City of Petaluma

General Plan 2025
Final Environmental Impact Report

Volumes 6B & 6C, Technical Appendix G-3
Public Comments



City of Petaluma
Department of General Plan
Administration

State Clearinghouse
#2004082065

February 2008

Index of Draft Environmental Impact Report and Revised DEIR Public Comments and Final EIR Responses

Comment Reference	Hearing Or Date Received	From	Comment Topic (Note: Please refer to the full set of Comments; summary contained herein is intended for general information only.)	Form of Corres-pondence	Comment FEIR Volume 6.B or 6.C Page #	Response FEIR Volume 6.A Page #
			MASTER RESPONSE **A**. ALTERNATIVES			33-36
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			MASTER RESPONSE **F**. TRANSPORTATION (TRIP REDUCTION, TRANSPORATION, IMPLEMENTATION AND FUNDING, AND SIGNIFICANT AND UNAVOIDABLE IMPACTS AT STUDY INTERSECTIONS)			50-52
1	P.C. 12/12/06	PC Sullivan	Population projection by age at 2025	Verbal	**A**	52
2	P.C. 12/12/06	PC Miller	"No Project" clarification	Verbal	**A**	53
3	P.C. 12/12/06	PC Arras	Alternative 2 and 3 information	Verbal	**A**	53
4	P.C. 12/12/06	Susan Kirks	Opinion on Commission education	Verbal	**A**	53
5	P.C. 10/10/06	Dianne Reilly-	Mannion Knoll Park; LOS and Trip Reduction	Verbal	**A**	53

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A, B, C, D, E		Torres	Ordinance; water optimization; Zero Net Fill and run-off			
6	P.C. 10/24/06	Joseph Grubaugh	Kelly Creek	Verbal	A	53-54
7 A, B	P.C. 11/14/06	Janice Cader-Thompson	Deer Creek surface water; Biological Reports	Verbal	A	54
8 A, B	P.C. 11/14/06	Mary Glardon	Traffic impacts; flooding and habitat impacts	Verbal	A	54
9	P.C. 11/14/06	Ann Kemmer	Traffic	Verbal	A	54
10	P.C. 11/14/06	Steve Girard	Traffic and Drainage	Verbal	A	54
11	P.C. 11/14/06	Laura Miller	Flooding	Verbal	B	54
12	P.C. 11/14/06	Christie Flum	Utilities, wetlands, traffic	Verbal	B	55
13	P.C. 11/14/06	Hank Flum	Surface Water, groundwater, traffic	Verbal	B	55
14	P.C. 12/12/06	PC Sullivan	Recycled water quality	Verbal	B	55
15	P.C. 12/12/06	PC Chair Dargie	Groundwater impacts	Verbal	B	55-56
16	P.C. 12/12/06	Bill Kortum	Conservation & Water Emergency Plan	Verbal	B	57
17	P.C. 12/12/06	David Bradley	Surface water, mapping (site specific)	Verbal	B	57
18 A, B	P.C. 12/12/06	Bill Bennett	Surface water (Marin Creek); illegal fill	Verbal	B	57
19	P.C. 2/27/07	PC Sullivan	Global climate change; emergency cell phone access	Verbal	B	57

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A, B						
20 A, B	P.C. 2/27/07	PC Sullivan	Recycled water quality; groundwater recharge	Verbal	B	57
21	P.C. 3/13/07	PC Chair Dargie	River Element; River Plan	Verbal	C	57-58
22 & 23	P.C. 3/13/07	CC Barrett	LOS and LOS assumptions	Verbal	C	58
24 & 25	P.C. 3/13/07	PC Chair Dargie	LOS assumptions	Verbal	C	58
26	P.C. 3/13/07	PC Mills	Project Timing	Verbal	C	58
27 & 28	P.C. 3/13/07	PC Chair Dargie	Timing/Reality of Long-Term Mobility Projects; groundwater recharge	Verbal	C	58-59
29	P.C. 3/13/07	CC Barrett	Base Data – 100-year event	Verbal	C	59-60
30	P.C. 3/13/07	CC Barrett	Project funding/timing	Verbal	C	60
31	P.C. 3/13/07	CC Barrett	Berms need to be higher and stronger	Verbal	C	60
32 A - D	P.C. 3/13/07	CC Barrett	New development drainage concerns; disposal of excavated soil; housing relocation in hazard area; seismic related ground shaking	Verbal	C	60-61
33	P.C. 3/13/07	PC Chair Dargie	Connection fees relate to purple pipe installation	Verbal	C	618
34	P.C. 3/13/07	CC Barrett	Raising tertiary water standards	Verbal	C	61
35	P.C. 3/13/07	PC Mills	Tertiary water and water conservation	Verbal	C	61
36	P.C. 3/13/07	CC Barrett	PUC standards on resale properties; dumpsite resource	Verbal	C & D	61-62

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A - C			recovery area; phase out Redwood Landfill dump59-60			
37 A - I	P.C. 3/27/07	CC Barrett	Casino impacts; County standards for overcross culverts; addressing SCWA's response to DEIR; traffic concerns - DSL financing mechanisms; Sonoma County PRMD's issues regarding traffic; Bike Plan County-wide coordination; Friends of Lafferty Park language; greywater legalities & rainwater collection	Verbal	D	62-63
38	P.C. 3/27/07	PC Arras	Citizens' comments on soil conditions	Verbal	D	63
39	P.C. 3/27/07	CC Barrett	Ban gas-powered landscaping tools	Verbal	D	63
40 A - D	P.C. /27/07	Dianne Reilly-Torres	Berms need to be higher and stronger	Verbal	D	63-64
41	P.C. 3/27/07	CC Barrett	Flood control & zero net run-off	Verbal	D	64
42 A – E	City Council 10/2/06	David Keller	Flood management; channelization of the River; Petaluma River Corridor; holding area for storm water; people & property at risk	Verbal	D & E	64-65
43 A, B	CC 10/16/06	Mary Glardon	Level of service; global warming	Verbal	E	65
44 A – C	CC 11/6/06	Sherry Taylor	Low-income and disabled population/housing needs; cost of future development; water supply - % of growth	Verbal	E	65-66
45	CC 11/20/06	Geoff Cartwright	Stop development in floodplain	Verbal	E	66

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46	CC 12/4/06	Patricia Tuttle Brown	River Plan (See Comment #73)	Verbal	E	66
47	CC 12/4/06	Geoff Cartwright	Floods & terracing relating to Denman Flats	Verbal	E	66
48 A, B	CC 12/4/06	David Keller	Process of hearings is confusing; surface water element	Verbal	E	66-67
49	CC 12/18/06	Tiffany Renee	Resources, landscape, conservation of watershed	Verbal	E	67
50	CC 12/18/06	Geoff Cartwright	Weir and the widening of the river	Verbal	E	67
51	CC 2/12/07	Geoff Cartwright	Hydrology and bridges (See Comment #71)	Verbal	E	67
52	CC 2/12/07	Walter Kieser	Market study in 2004 for property outside the UGB	Verbal	E	67
53	CC 2/26/07	Wayne Morganthaler	Building a healthy sustainable local economy is key	Verbal	F	67
54	CC 2/26/07	Patricia Tuttle Brown	Mobility section	Verbal	F	67-68
55	CC 2/26/07	CC Rabbitt	Casa Grande @ McDowell hard to navigate	Verbal	F	68
56	CC 3/5/07	Marianne Hurley	Cultural resources	Verbal	F	68
57	CC 3/5/07	Tiffany Renee	Empire Waste's expansion of the landfill	Verbal	F	68
58	CC 3/5/07	Richard Brawn	Unacceptable level of service	Verbal	F	68-69
59	CC 3/19/07	David Keller	Lawsuit filed in Sonoma County Superior Court	Verbal	F	69
60	CC 4/16/07	Geoff Cartwright	Army Corps of Engineers flood-control project	Verbal	F	69
61	CC 4/16/07	Tiffany Renee	Reducing greenhouse gas emission	Verbal	F & G	69

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62 A – D	3/5/07	No Wetlands Landfill Expansion	Risks of shipping solid waste to Redwood Landfill; contributory impacts; City waste in its watershed; consistency with an eco-system approach	Letter	5 – 8	69-73
63	3/4/07	Angela Garvin	DSL site	Email	9 – 10	73
64	3/4/07	Mary Glardon	DSL site	Email	11 – 12	73
65 A – C	3/4/07	David Keller	Greenhouse gases; GP policies & program suggestions; Marin Independent Journal article	Email	13 – 16	73
66	3/4/07	David Keller	River-dependent industrial lands & dredging	Email	17 – 22	73
67 A – G	3/1/07	O.W.L. Foundation	Groundwater transmissivity; delivery stats. From SCWA to NMWD; NMWD water purchases; revised Draft Water Policy Statement 2002; letter from John Nelson; SCWA UWMP 2000; evaluation of groundwater resources	Letter with Attachments	23 – 172	73-74
68 A – J	2/27/07	Petaluma Build It Green (PBIG) Program's Stakeholders' Advisory Team	Climate Change; reduction of greenhouse gas emissions; sea level must rise; projections of future energy use; recycled water unit costs; reduce the City's overall water usage; greater efficiency improvements; watershed's groundwater resources; impacts from reduced rainfall &/or snow pack; request to recirculate DEIR. Attachments: 1. Petaluma Resolution # 2005-118; 2. Letter/ from Kathryn W. Egolf, Deputy Attorney General for the State of California; 3. Report on GHG Emission Inventory for all sectors of Sonoma County, CA from the Climate Protection Campaign; 4. Climate Action Plan from Greg Nickels, Mayor of Seattle, WA; 5. Executive Order S-3-05 from Arnold Schwarzenegger, Governor of CA; 6. Press Release announcing signing legislation to Reduce GHG	Letter with 17 Attachments	173 – 402	74-78

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			Emissions from the Office of the Governor. 7. Marin County GHG Reduction Plan from the Marin County Community Development Agency. 8. Endorsement of the U.S. Mayors Climate Protection Agreement from the U.S. Conference of Mayors. 9. Building Sector Unites to Confront Global Climate Change from Kristina Kershner, Director Arch. 2030. 10. Stern Review: The Economics of Climate Change. 11. Summary for Policymakers from the Intergovernmental Panel on Climate Change. 12. Adopting the "2030 Challenge" for City Buildings from the Mayors of Albuquerque, Seattle, Chicago and Miami. 13. Global Warming's Impact on CA – A Fact Sheet of the Union of Concerned Scientists. 14. Our Changing Climate: Assessing the Risks to CA by the CA Climate Change Center. 15. News Story – Global warming: passing the 'tipping point' from The Independent. 16. Global warming: the final verdict from the Guardian Unlimited. 17. Battling Climate Change from Business Week (online)			
69 A – J	5/2/05	Bryant Moynihan	Land use classifications; comprehensive land use absorption study; Mixed Use land use; Very Low Density Residential land use; High Density Residential land use; feathering of density; bulk retail land use designation; Urban Separator designation; Business Park/Office land use designations; Industrial to Office land use designation	Letter	403 – 404	79-81
70 A – Z AA – ZZ	12/3/06	O.W.L. Foundation Includes List of Files/Folders Submitted with Letter on CD	Urban Water Management Plan; catastrophic water cut-off plan; restructured agreement for Water Supply; Water Supply; Santa Rosa Plain groundwater basin; Admin. Record *O.W.L. et al vs. Rohnert Park et al;* City's water consumption; monitoring wells; SCWA wells; "Modest growth"; SCWA deliveries; population growth/water usage; per capita water consumption per year; three	Letter w/CD	405 – 420.5	81-102

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			SCWA wells; Ranney collectors; water supply; seawater intrusion; groundwater subsidence (GWS); subsidence measurement results; GWS/groundwater pumping; water supply and demand comparisons; water supply contingency plan; request DEIR T.O.C. update/change; global warming/sea level rise saturation data; State-identified groundwater recharge areas; cumulative impact of City's urbanization; City's estimates of surface flows Impending change in rainfall patterns; 100-yr storm with 2025 buildout; development in flooded areas; changes in sea level in 100 years; cause of "New Year's Flood"; "nutrient levels"; increase in storm runoff; estimated amount of additional pollution; DEIR Fig. 3.6-2; DEIR Fig. 3.6-2; Wilson Grove Formation Highlands; DEIR Fig. 3.6-2; groundwater pumping expectations; future peak demand shortfalls; temporary impairment MOU; GP 2025 goals 8-G-3 & 8-G-4; recycled water; sewage treatment; emerging toxicants in treated wastewater; scientific testing of treated wastewater; emerging toxicants in treated wastewater; water supply, groundwater, global warming, wastewater contamination, casino impacts, litigation with Rohnert Park including Rohnert Park General Plan and EIR, etc.			
71	12/4/06	Geoffrey H. Cartwright	Widening & terracing of the channel; Corps of Engineers flood control project; development/fill in floodplain; zero	Letter	421 – 422	102-103

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A – I			net fill policy; storm frequency calculation; Cherry Magnolia conduit; detention/retention basin systems; typo in DEIR; concerns about the process			
72 A – H	12/3/06	Gregory L. Colvin	6 acres of trail on Davidon site; 14 acres of urban separator on Davidon site; Urban Separator; neighborhood park classification; Davidon passive park; scientific/engineering analysis – Davidon; Helen Putnam Park; public park on Davidon site	Letter	**423 – 424**	103-105
73 A – O	12/4/06 2006	Patricia Tuttle Brown	Petaluma River Access & Enhancement Plan; River Plan not referenced in DEIR; area around Factory Outlets; separate Rainier & Corona Reach in DEIR; road diet; Chapter 3's usage of CPSP term; CPSP traffic improvements; Fairgrounds; Cavanaugh Landing; parking reduction impacts; joint use agreements for Schools; Bay area 2005 ozone strategy; PBAC; SPARC; green building.	Letter	**425 – 434**	105-108
74 A – O	12/5/06	Chey Moore	Hillside ordinance and standards	Email	**435 – 436**	108
75 A – F	12/2, 10/2 & 8/30/06	P.L.A.N. (Paula Lane Action Network)	1436 Western Avenue; changes to Draft GP 2025 & DEIR; grassland/Oak savannah definition; Fig. 3.8-1 (habitat areas & special status); glossary; evolving Chapter on Historic Resources	3 Letters	**437 – 472**	108-117
76 A, B	10/16/06	Bryant Moynihan	Land Use Map designations; Hummel discussion	Letter	**473 – 474.3**	117

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77 A – K	10/27/06	Terry Roberts, Director, State Clearinghouse	GP vs. Comp. Airport Land Use Plan; noise problem; height of buildings; school site investigation; hazardous wildlife populations; incompatible land use encroachment; Dept of Toxic Substance Control; wildland fires; Table 3.2-5 on pg. 3.2-9; AM peak hour analysis of U.S. Hwy 101; freeway peak-hour V/C ratio & existing LOS	Letter	475 – 488	117-123
78	11/27/06	Joseph Grubaugh & Sigrun Seifert	Kelly Creek; privately owned, maintenance concerns.	Letter with map & photos	489 – 516	123
79	9/11/06	Ron Bendorff, CDD Dir., City of Rohnert Park	Regional mobility system; proportionate fair share of CIPs. Expand 5-P-12 to include share of regional improvements; excerpt from Rohnert Park General Plan.	Letter with attachment	517 – 520	123
80	9/25/06	Kate Brolan	Retail planning, does not support big box development.	Email	521 – 522	123
81	10/11/06	Emma Webber	Retail businesses, not in support of expansion	Letter	523 – 524	123
82	9/30/06	PSC³ (Petaluma Small Craft Center Coalition)	Recommended GP text amendments regarding small craft use of River and facilities to support that use.	Letter	525 – 528	123
83	11/14/06	Susan Kirks	Urban separator: request for 100' of width in Paula Lane area; also retention of Land Use designation of Rural Residential. Support for open space project.	Email	529 – 530	123
84	11/16/07	Susan Kirks	West Hills, see comment #83.	Email	531 – 532	123
85	12/18/06	Geoffrey Cartwright	Hydrology: questioned assumption of Corps of Engineers assessment and concept of terracing.	Letter	533 – 534	123-124

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86	2/11/07	Brock Dolman	Rainfall harvesting; support for inclusion of policies and program to allow use.	Email	535 – 538	124
87	2/23/07	Paul Palmer	Residential greywater, support for inclusion of policies and programs to allow or mandate use.	Email	539 – 540	124
88 A – E	3/8/07	Ellen Bicheler	Water; water conservation measures; retrofitting; rainwater harvesting; greywater systems. Attachments: 1. Additional Resources: Greywater, rooftop gardens; 2. Catching, conserving, and using water; 3. Constructed wetland & infiltration basin section; 4. Greywater policy center; 5. saving rain for a sunny day	Letter w/5 Attachments	541 – 594	124
89 A – L	3/14/07	David Keller	Local & regional traffic congestion; water supplies from SCWA; wastewater discharges; groundwater pumping; -Hwy 101; emergency room & health care needs; low-income housing demands; sales tax shifts; local air/water pollution; regional greenhouse gas emissions; wear & tear on local roads; revised focused draft EIR	Email	595 – 604	124-126
90 A – C	3/15/07	Larry Modell, Friends Lafferty Park	Lafferty Park, suggested changes to G-P-13; clarification of graphic in DEIR.	Letter	605 – 606	126
91 A, B	3/16/07	Larry Modell for Pet. Tomorrow	Sea level rise; global climate change/fossil fuel scarcity; need to replace energy source with renewables.	Letter w/Argus Courier article attached	607 – 614	127
92	3/18/07	Geoff Cartwright	Hydrology; water quality beyond the life of the	Email w/Letter	615 – 616	127

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			General Plan.			
93 A – G	3/19/07	Gary Helfrich, Planner I from SCPRMD	Traffic; Sonoma County's GP2020 DEIR traffic analysis; fair share funding of regional transportation improvements.; road diets; bicycle circulation; surface water management policies; groundwater protection	Letter	**617 – 622**	127-131
94 A – J	3/19/07	Marilee Montgomery, Press Liaison for STC101	Reservation shopping/casinos; Community facilities, Design, character and sustainable building; over-development of ag. Zoned land; mobility; recreation, music, park & the arts; community facilities, services & education; water resources; economic health & sustainability; health & safety; housing	Letter	**623 – 630**	131-132
95 A – C	3/19/07	Kristin Schenone of Morgan Miller Blair	Transportation impacts; recirculation of DEIR; analysis of changes in land use designations	Letter	**631 – 634**	132-133
End of Volume 6.B. Please see Volume 6.C for the full text of remaining comments						
96 A – N	3/19/07	Randy Poole for Sonoma County Water Agency	Water supply; SCWA water supply assumptions in DEIR; groundwater basin; water conservation programs; reduce peak summertime water demands; water conservation measures; clarification of policy 8-P-30 – river/creek setback; clarification of policy 8-P-30 – Study; coordination w/SCWA re: XP-SWMM; policies 8-P-31 & 8-P-32 – inundation areas – clarify; clarification of policy	Letter	**635 – 640**	133-138

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			8-P-31-A – Corps project; clarification of policy 8-P-33 – channel maintenance; buildout conditions – assumptions; level of stream maintenance			
97 A – F	3/19/07	Barry Albert Bussewitz	Reducing GHG emissions; green design principles; limit on retail store sq. ft.; future nearby casinos; maintain historical animal corridors; prohibit future loss of ridgetop/hilltop access	Email	**641 – 642**	138
98 A, B	3/19/07	Craig Lee Chrisco	Regency project-specific; sufficient water supply for big box retail	Email	**643 – 644**	139
99 A – D	3/19/07	Janice Cader-Thompson	Water supply; land use; impact of new retail uses on existing retail; traffic pattern changes	Email w/Attached Letter	**645 – 648**	139-140
100	3/19/07	Ken Burgess	Water conservation; BMP, greenhouse gases Attachments: 1. Home Economics by Ned Orrett, MS, PE; 2. Pay-As-You-Save Energy; 3. More Distributed Generation With Pay-As-You-Save; 4. A Preliminary Analysis of the Cost Effectiveness of Potential PAYS® Products in Missouri	2 Emails (1 w/4 Attachments)	**649 – 720**	140
101 A, B	3/28/07	David Keller	Denser infill housing; reduce greenhouse gas emissions	Email/ with 3-27-2007 Sacramento Bee article	**721 – 728**	140-141
102 A – J	3/27/07	Diane Reilly Torres	Level of Service; increase in trans. Energy consumption; Bay area 2005 ozone strategy; definition of timely; planned roadway improvements; North Petaluma Blvd	Email	**729-734**	141-143

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			grid; Rainier Ave and DSL site; intersection impacts at Rainier & DSL sites; preserve the pedestrian environment in Central Petaluma; increased motor traffic impacts			
103 A – E	3/28/07 (*date rec'd.*)	Tiffany Renee	Water demand; urban water mgmt plan; particulate matter; auto pollution from Hwy 101; renewable sources of energy	Letter	735 – 738	143-145
104	3/12/07	R.B.G. Naidu	Rezoning of parcels on Petaluma Blvd. N.	Faxed Letter	739 – 742	145
			Duplication – Removed		743 – 748	
105 A – E	10/26/06	Sonoma State University, Northwest Information Center	Native American cultural resources; historical resources; known archaeological resources; historic remains; GP text comments	Letter	749 – 752	145-146
			Duplication – Removed		753 – 766	
106	9/21/06	State Public Utilities Comm.	Rail safety factors	Letter	767 – 768	146
107 A – J	9/16/04 & 10/30/06	California Regional Water Quality Control Board	Development along the river corridor – floodplain capacity; existing agricultural lands; mitigation bank; pollutants; sediments loads; overall hydrology; habitat loss & water quality impacts; feasibility of preserving parcels; wetland, riparian & upland habitats; Petaluma River – impaired waterbody.	Letters	769 - 776	146-147
108 A – Z	10/31/06	Morrison & Foerster and Basin Street Properties	Analysis of alternatives in the EIR; water supply; southern crossing; ineffective, vague & uncertain GP policies; future plans & studies; realistic water analysis &	Letter with attachments	777 - 796	147-160

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AA - GG			capacity; Public Resources Code § 21083.3; Land Use & Mobility Alternatives Report; Central Petaluma Specific Plan (CPSP); segments the project; proposed water supply; development code & the zoning map; evaluating land use impacts; farmland; impacts at six study intersections; Transportation Demand Mgmt. (TDM); parking impacts; traffic impacts; future freeway operations; park standard; dedication of park land; river-dependent industrial; police officer staffing; public utilities and energy; hydrology & water quality; biological resource impacts; noise; hazardous material; impact overview; analysis of growth/growing impacts; alternatives analysis; DEIR recirculation			
109 A - E		Smith Engineering on behalf of Morrison and Foerster	General lack of good faith effort to disclose impact; analysis of alternatives; land use alternatives; population totals; transportation improvement projects & assoc. impacts	Letter	**797 - 810**	160-164
110 A – Y		Grassetti on behalf of Morrison & Foerster	Alternatives; vaguely worded policies; future plans and studies; environmentally superior alternative; cumulative impacts analyses; project impact on six intersections; TDM program; identify increased funding sources; policy to reduce parking impacts; addition of 15,600 citizens/reduce student by 15%; 21 new police officers; available water supplies; studying the 100-year flood	Letter	**811 - 847**	164-172

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			zone; widespread very-high liquefaction potential; mitigation for loss of habitat & special status species; impact assessments for special status species; aircraft noise; development on hills; intersection operation, etc.; growth inducing impacts – groundwater; cumulative impacts – flooding, water quality; cumulative biological impacts; project's significant environmental impacts; traffic assessment; environmentally superior alternative			
111	10/31/06	Ryder Companies	Brody Ranch – floodplain (site specific)	Letter	849 - 850	172
112	10/31/06	Philip Williams & Associates (PWA)	Surface water impacts and analysis	Letter	851 - 852	172
113 A, B	10/12 & 11210/30/06	Steefel, Levitt & Weiss (on behalf of DSL)	Previously requested revisions to land use designation; DSL site (site specific)	Letter	853 - 860	173
114 A – F	0/29/06	Regency Center	GP text comments: mixed-use designation/Washington core; sustainable building; air quality; community parks; neighborhood parks; water conservation policies and programs	Letter	861 - 864	173
115 A – P	11/13/06	Petaluma River Council	Channelize & terrace Willow Brook; overtopping weir & flood walls; downstream impacts; base flood elevations; floodplain storage; engineering prediction; modeling; Marin Creek; basin-wide city & county for zero-net increment; stream-side growth & habitat improvements; equilibrium conditions; zero-net fill requirements; XP-	Email	865 - 868	174-177

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			SWMM; Petaluma flood control project FEIR; comment noted; floodplain management			
116 A – D	11/15/06	Friends of the Eel River	Current hearing process; environmental review guidelines; agendas and public notices vague; new public review period & hearing formats required	Letter	**869 - 874**	177-178
117	8/11/04	Pamela Tuft, City of Petaluma, General Plan Administration	Notice of Preparation (NOP) of Draft Environmental Impact Report announcement	NOP of a Draft EIR	**875 – 882**	178
		List of Responses to NOP			**883 – 884**	
			Deleted duplicate, see comment #108		***885 – 888***	
118 A – G	9/10/04	City of Rohnert Park	GP and its associated growth; traffic analysis – Graton Rancheria casino; traffic analysis; increased traffic congestion; water & sewer capacity; regional air quality impacts; solid waste disposal.	Letter	**889 – 908**	178-179
119 A – C	8/24/04	Dept. of Fish and Game	Flora & fauna; take of species of plants; Streambed Alteration Agreement (SAA)	Letter	**909 – 910**	179-180
120 A, B	8/31/04 & 1/22/92	North Marin Water District	Petaluma Boulevard South industrial area; attached comments dated January 22, 1992	Letters	**911 – 938**	180
121 A, B	8/28/04	Petaluma City Schools	Junior High & High school locations; Elementary school, long range needs.	Letter	**939 – 940**	180-181
122	9/30/04,	Sonoma County	Water Supply and Transmission System Project;	Letters	**941 – 956**	181

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A, B	6/14/04, 2/26/03, 8/11 & 8/23/03	Water Agency	stormwater management			
123 A – E	9/10/04	SCPRMD	Planning area boundary rationale; land use; open space; traffic (incl. attached Guidelines); water	Letter w/5 Attachments	957 – 988	181-183
124	9/14/04	Department of Transportation	Level of service analysis, recommendations for consideration in preparing DEIR.	Letter	989 – 992	183
125	8/25/04	Management & Performance Consulting	Petaluma Municipal Airport, careful consideration of the Airport Master Plan should be included.	Email w/2 Attachments	993 – 1004	183-184
126 A, B	8/22/04	Richard E. K. Brawn	Environmental impact considerations; environmental impact considerations/specific values	Letter	1005 – 1008	184
127 A – I	9/1, 7/7 & 3/22/04	P.L.A.N. (Paula Lane Action Network)	Biological resources in Land Use Alternative Report; potential loss of open space; hydrology; noise; lighting and glare; traffic; historic preservation; visual/aesthetic; cumulative impacts	Letters	1009 – 1036	184-186
128 A – C	9/21/04	Abrams Associates	Washington-McDowell intersection; traffic conditions/improvements; note to property owner	Letter	1037 – 1038	186
129 A, B	9/30/04	Diane Reilly Torres	Thank you to staff; Petaluma River Flood Control Project	Email w/Attachment	1039 – 1044	186
130 A, B	3/22/07	National Trust for Historic	Central Petaluma Specific Plan is flawed; GP text recommendations	Letter	1045 – 1050	186

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		Preservation				
131 A – E	3/12/07	Marianne Hurley	Historic resources; cultural resources; archeological resources; eligible sites; character vs. historical integrity	Letter	1051 – 1052	187
132	4/16, 4/19 & 5/3/07	David Keller	Global warming, greenhouse gas emissions & watershed management	3 Emails (1 w/LA Times article)	1053 – 1062	187
133 A – E	5/5/07	Accountable Development Coalition, Conservation Action Fund For Education, Living Wage Coalition, New Economy Working Solutions, North Bay Labor Council, Petaluma Tomorrow, & Sonoma County Conservation Action	Internally consistent GP; global warming; Bakersfield case; sustainability; fiscal & Community Impact Report	Letter	1063 – 1084	187-188
134	5/7/07	Wayne Morganthaler –	Economic trends; General Plan; local cultural programs; Draft GP 2025 text; economic health	Letter	1085 –	188-189

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A – F		*Proprietor of Jungle Vibes*	element; community character		1098	
			Duplication – Removed		1099 – 1104	
135 A – C	2/21 & 3/22/07	David Keller	Tulsa, OK information; Corps Flood Control Project; construction in the floodplain	2 Emails	1105 – 1136	189
136	3/19/07	Paige J. Swartley, ESQ.	Site specific comment regarding Lands of Davidon – historic barns should be preserved.	Letter	1137 – 1138	189
137 A, B	2/20/07	Janice Cader-Thompson	Water supply; sufficient facts to evaluate the pros and cons of supplying the water development; land use – DSL	Letter	1139 – 1142	189-190
138	5/7/07	Perry, Johnson, Anderson, Miller & Moskowitz LLP	Lafferty Ranch, DEIR adequacy of identification for regional facility.	Letter	1143 – 1148	190
139	5/7/07	SCPRMD	Lafferty Ranch, request to modify General Plan text to emphasize Tolay Park as regional resource.	Letter	1149 – 1150	190
140	5/7/07	Heritage Homes	See #130 GP text amendments	Letter	1151 – 1152	190-191
141	5/7/07	Marianne Hurley	Benefits of historic preservation and specific suggestions for General Plan text amendments.	Letter	1153 – 1154	191
142 & 143	5/11/07	Diane Reilly-Torres	Urban Water Management Plan/wasting of water for lawn watering; need public input and suggested wording on possible conservation ideas and programs.	Email w/Attachment	1155 – 1158	191

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		Duplication – Removed			1159 – 1160	
144	No date	Friends of the Eel River	CEQA / water supply; court decision excerpt.	Blog	1161 – 1162	191
145	5/11/07	Ellen Bicheler	Global warming; encouraging use of proper language in General Plan.	Email w/Attachment	1163 – 1166	191-192
146	5/20/07	Janice Cader-Thompson	Photos of wetlands and habitat.	3 Emails w/Attached Photos	1167 – 1176	192
147	4/20/07	David Keller	Greenhouse gas emissions; excerpted information from AEP and background information.	Email w/Attachment	1177 – 1200	192
148 A – C	5/21/07	Diane Reilly Torres	Water conservation (smart irrigation controller); delineation of flood affected areas; Hazard Mitigation Plan (add flooding) including attachments	2 Emails w/Attachments	1201 – 1232	192
149 A, B	5/21/07	Greenbelt Alliance	Urban Growth Boundary; expansion of UGB	Letter	1233 – 1234	192
150 A – C	5/21/07	Diane Reilly Torres	No net increase in peak-day runoff; definition of "community needs"; Petaluma River Corridor and river terrace	Email	1235 – 1236	192-193
151	CC 4/23/07	Tiffany Renee	Greenhouse gas emissions / walkable community; consider infrastructure and traffic impacts; flood issues.	Verbal	G	193
152	CC 4/23/07	Ann Kemmer	DEIR model runs (project specific – DSL as Mixed Use).	Verbal	G	193

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153	CC 4/23/07	Geoff Cartwright	Project specific comments on DSL site; Base Flood Elevation is higher than historic numbers.	Verbal	G	193
154	CC 5/7/07	Geoff Cartwright	Floodplain channelization and development	Verbal	G	193-194
155	CC 5/7/07	Richard Squaglia	Water supply and infrastructure to handle development.	Verbal	G	194
156	CC 5/7/07	Marianne Hurley	Support for letter written by National Trust for Historic Preservation (see Comment #130).	Verbal	G	194
157	CC 5/7/07	Wayne Morganthaler	Civic economics – money spent at local businesses recirculates 3 times in community.	Verbal	G	194
158	CC 5/21/07	Duane Bellinger	Flooding and water levels over the next 50 years.	Verbal	G	194
159	CC 5/21/07	John Cheney	EIRs don't work – they are educated guesses. Stop building in the floodplain Flooding	Verbal	H	194
160	CC 5/21/07	Diane Reilly-Torres	Verbatim comments; floodplain development; zone 2A funding limitations; required GP content for floodplain information	Verbal	H	194
161	CC 5/21/07	Geoff Cartwright	Flooding hazards, funding, building in floodplain	Verbal	H	194
162 A, B	CC public comment 2/20/07	Joe Grubaugh	Flooding along Kelly Creek and sea level rise concerns, frequency of 100 year storm events.	Letter	1237-1238	194-195
163	8/3/07	Geoff Cartwright	BCDC report on sea level rise.	Letter	1239	195
164	8/3/07	Claire McCarthy	CIR's needed for development with outline of basic elements.	Letter	1240-1241	195

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165	8/3/07	citizen	Excerpts from West Petaluma Specific Plan and Sonoma County correspondence	Maps	1242-1249	195
COMMENTS ON REVISED DRAFT EIR – GREENHOUSE GAS EMISSIONS OR RECEIVED DURING REVIEW OF REVISED DRAFT EIR						
166	9/6/07	Department of Forestry	Fire safety element standard recommendations	Letter	1250-1259	195
167	11/30/07	Tiffany Renee	The Party's Over – greenhouse gas emissions, excerpt from Sydney Morning Herald and specific suggestions regarding Home Occupation Permits and encouraging aggressive approach to GHG reduction.	Email	1260-1262	195
168 A - V	1/3/08	State of California Attorney General's Office	Air Quality: Greenhouse Gas Emissions background information and specific CEQA requirements, proposed mitigation measures (smart growth, mandatory Mixed Use, identify additional Mixed Use sites, incentives for mixed-use development; increase single family dwelling densities; add policy to require high end of density ranges; adopt a Heat Island Mitigation Plan, strengthen policies to support increase of walking, biking and carpooling to schools, etc.; enforce TDM policies, funding infrastructure improvements in mixed use and high density areas; require Climate Action Plan; require leadership and guidance to specific GHG	Letter	1263-1272	195-197

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			reduction policies; provide time-frame for green building ordinance; recycling for all buildings; expand renewable energy policies and programs; strength and expand use of recycled water.			
169 A - J	1/4/08	Todd Tamura	Greenhouse Gas Emissions, specific comments on halocarbons; CEC inventories; geographical boundaries; clarification of page 3.10-23; estimate for retrofitting fixtures; measures (pg. 3.10-24) are targeting other emissions not necessarily GHG; bus replacement issue; reference to Clear Air and Climate Protection Software (reference to halocarbons); need to include more sources than just buildings, municipal services, solid waste, and transportation (i.e. industrial sources and agriculture). Airplanes and marine vessels were not included; energy usage in street lights not included; Table 3.10-7 is unclear; Table 3.10-8 renewable fuels do not necessarily reduce GHG emissions; questioned credits assumed.	Email	1273-1275	197-200
170 A - J	1/7/08	David Keller on behalf of Petaluma River Council	Air Quality, Greenhouse Gas Emissions; failure to meet Council commitment to GHG emissions reduction; vehicles miles traveled not addressed adequately; and list of potential mitigation measures (park locations and improved transit system, more aggressive programs, mandatory green building, require solar.	Email	1276-1278	200-201

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171 A - K	7/17/07 & 1/7/08	Tiffany Renee	Significant reductions through reduction of vehicle miles traveled, renewable energy; proposed policies and programs. Thresholds of significance and targets for reduction; analytical approach used (quantitative, qualitative, with or without significance determinations); findings of over-riding considerations; cumulative reductions without quantity of reductions for policies; specific evidence is lacking; GHG effects of City activities; environmental considerations of reaching targets through more thorough set of policies	Letters	1279-1282	201-203
172	1/11/08	State of CA. Dept. of Transportation	Commend GHG effort; sidewalk and ITS strategies	Letter	1283-1284	203
173	PC 12/11/07	PC Burton	How much attempt was made to reach the City goals? Ideas such as banning parking in certain areas? Transportation comparison, Contra Costa is lowest, highest is Petaluma; there should be a better way to meet traffic needs through improved traffic means. Did the City look at Rainier and what it does to reduce GHG. Issue with existing Council Resolution which mandates certain goals, finding it difficult to recommend a document does not meet that goal.	Verbal	H	203
174	PC 12/11/07	Richard Brawn	Two issues: error in GP, 2762 I Street incorrectly shown for land use; energy costs have gone up for a reason: 1) dollar devaluation; and 2) cost of petroleum, all aspects of	Verbal	H	203-204

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			developing petroleum (examples). Conservation is absolutely essential. Leave accommodations wide open so that the individual can take the necessary steps to conserve (don't constrain business and individuals).			
175	PC 12/11/07	PC Sullivan	In addressing the State's requirements for specificity of solutions, we have opted to be specific for the GP and EIR; concern is that 20 years from now we may have been so detailed that we create something obsolete – how do we respond in the GP. Option of putting policies and programs in a separate document. Should strengthen the language for preparation of a Climate Action Plan to "shall".	Verbal	H	204
176	PC 12/11/07	CC Barrett	CEQA only asks that we address existing conditions, therefore the DEIR does not have to meet the local goal. Ideas for mitigation include purchase (i.e. neighborhood) to buy solar panels through a "neighborhood buy" for group discount, excess power could multiply out to neighbors;; also question of "green-collar jobs", encouragement of design and installation of green improvements; classes at local schools (high school and SRJC) to train people for those jobs; GHG mitigation fee. City should start work on the Climate Action Plan (change may to shall).	Verbal	H	204
177	PC 12/11/07	PC Chair Mills	In favor of fee when mitigations aren't incorporated into design of projects; agree with 'shall' with regard to CAP;	Verbal	H	204

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			the CAP will be the key to implementation of the GP following GP adoption.			
178	CC 1/7/08	Mayor Torliatt	Wants less development potential, slowing development; increase transit ridership to a certain percentage and how we are going to get there; what about providing large, sweeping alternatives; we haven't been given all or some of the alternatives that we could have seen; wants to see GHG mitigation fee.	Verbal	H	204
179	CC 1/7/08	Connie Madden	The City needs to think about how to get there: encourage telecommuting, a Mayor's bus ride, conservation methods as offered by Ned Orrett, do not allow a million square feet of retail.	Verbal	I	204
180	CC 1/7/08	Ellen Bicheler	Quote from AG letter, Climate Protection Campaign, compromised to get to 25% reduction commitment, look at solutions proposed by Rohnert Park, community choice aggregation, Ned Orett's ideas on energy efficiency plan, look at Marin County.	Verbal	I	204-205
181	CC 1/7/08	Tiffany Renee	Read submittal (see written comment #171).	Verbal and letter	I	205
182	CC 1/7/08	David Keller	Requested Mayor's comments be submitted as comments on the DEIR (see above comment #178); submitted letter (see written comment #170); Greenhouse Gas calculations needs to be in document; mixed use must be required; GHG references contained in other elements should be included in this document; local retail, local	Verbal and letter	I	205

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			business, telecommuting.			
183	CC 1/7/08	Allen Tacy	Bike Plan is an excellent start, need to do more.	Verbal	I	205
184	CC 1/7/08	Patricia Tuttle-Brown	Referenced Attorney General's letter; her participation is the culmination of 14 years idealism, shared history of participation, General Plan needs mandates; three examples: 1) tighten up language, CPSP, page 8 of 27 regarding Land Use; 2) Boost effectiveness of PBAC, include a "shall" that final conditions be provided to the PBAC; 3) On the subject of schools, there are no teeth on school references.	Verbal	I	205
185 A - G	12/27/07	Richard Brawn	Economic annex and city revenue expectations are inaccurate and invalid; base year reflected stability of growth rather than recession; federal operating revenues are declining; liquid fuel energy sources are declining and rising in cost; growth is tied inseparably to energy, new technologies will not be available for many years; economic annex does not provide a bottom up analysis of costs, does not include capital expenditures or costs of deferred maintenance; no new taxes will be possible.	Letter	1285-1295	205-208
186	11/29/07	U.S. Dept. of Homeland Security – FEMA	Referenced Flood Insurance Rate Map (FIRMs), City's National Flood Insurance Program (NFIP) participant status; referenced Volume 44 Code of Federal Regulations (44 CFR), Sections 59 through 65 regarding NFIP floodplain management building requirements.	letter	1297-1298	208

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187	1/17/08	State of California Office of Planning and Research State Clearinghouse	Acknowledgement of compliance with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.	Letter with copy of Comment #172	1299	208

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GENERAL PLAN 2025 – VERBAL PUBLIC COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT REPORT and REVISED DRAFT EIR

Planning Commission and City Council Hearings

PLANNING COMMISSION HEARINGS

Petaluma Planning Commission Hearing - September 12, 2006

Planning Commissioner Sullivan: Asked for a breakdown of projected population at the end of the General Plan by age and stratification. She felt this would help to better understand the number of retirement-aged citizens as compared to students. **1**

Commissioner Miller: Wanted further explanation of "No Project" having more impact that the new General Plan and asked for specific examples. **2**

Commissioner Arras: Asked where the public or commissioners would look regarding Alternative 2 or 3. **3**

Susan Kirks: Wanted to provide input on Commission discussion after attending all General Plan workshops. She wanted the Commission to explore every element as it relates to legal issues such as CEQA. She wanted the Commission to look at the natural environment, wildlife corridors, and species protection. Her neighborhood group is a non-profit and would like to assist in the Commission's efforts if needed. **4**

Petaluma Planning Commission Hearing - September 26, 2006

General Plan text review, no Draft EIR comments

Petaluma Planning Commission Hearing - October 10, 2006

Dianne Reilly-Torres had concerns about Mannion Knoll Park at Magnolia being listed as an existing park since it hasn't been built; how the cross-town connector would affect her neighborhood; and the Level of Service being lower than it is currently; how could the Trip Reduction Ordinance be enforced since it is voluntary and how could this be a feasible mitigation; how would the City optimize usage of water from the Sonoma County Water Agency, and if this is a feasible mitigation. She supported the continuation of the Zero Net Fill and Zero Net Run-off requirements. She will submit her concerns in writing. **5** **A** **B** **C** **D** **E**

Petaluma Planning Commission Hearing - October 24, 2006

Joseph Grubaugh stated he lives downstream of the Davidon project. He brought slides showing the area near Kelly Creek with the culverts and the problem with the private properties that abut the area and the lack of creek maintenance. He also showed the flooding that occurred this last winter. He asked what the City owed its current residents before it adds development that will impact them. *(discussion relative to the Davidon project site, Scott Ranch, D Street at Windsor)* **6**

Petaluma Planning Commission Hearing – November 14, 2006

Janice Cader-Thompson said there would be surface water problems with the existing Deer Creek; traffic impacts; EIR needs to be done first; and the first biological report was substantially different than the new report and should be compared and reviewed. *(discussion relative to the DSL site, Rainier Avenue at McDowell Boulevard North)* **7** **A** **B**

Mary Glardon mentioned concerns about intense commercial and its affect on ambulance, pedestrian, bicycles and people using wheelchairs and walkers. She said flooding, run-off, large trucks, wildlife habitat, surface traffic transferring to local streets, air quality, and causing a decrease in their property values. *(discussion relative to the DSL site, Rainier Avenue at McDowell Boulevard North)* **8** **A** **B**

Ann Kemmer lives in neighborhood and was concerned with the traffic impact of 16,000 cars but without the EIR she didn't know how it would affect traffic on surface streets as people try to avoid the increase volume of traffic. She also mentioned that the nearest freeway access would be at the already gridlocked Washington Street/McDowell intersection. **9**

Steve Girand is concerned about Monica (proposed street) as the primary entrance/exit instead of using Corona Road and mentioned drainage issues in the area. *(discussion relative to Lands of Delco, 470 & 490 Corona Road)* **10**

11 **Laura Miller** was concerned about flooding because of the areas problem with seepage that has caused flooring issues in her home and respiratory problems because of the dampness. *(discussion relative to Lands of Delco, 470 & 490 Corona Road)*

12 **Christie Flum** talked about the developer's water and sewer needs; consideration for the neighbors; reduction of density; seasonal wetlands; traffic level of service; access to the site; improvement of Corona to Ely *(discussion relative to Lands of Delco, 470 & 490 Corona Road)*

13 **Hank Flum** said the area is part of the flood plain; water table is very high; bio-retention would increase the hydrostatic pressure on an already high water table. He said that in the future Corona Road would become an arterial and would need to be widened. *(discussion relative to Lands of Delco, 470 & 490 Corona Road)*

Petaluma Planning Commission Hearing – November 28, 2006

General Plan text and parcel-specific land use discussion, no DEIR comments.

Petaluma Planning Commission Hearing – December 12, 2006

Water Resources:

14 **Commissioner Sullivan** asked if with the new technology at Ellis Creek, would 100% of contaminants be removed from the wastewater? She was concerned about using recycled water where children play and the public health safety aspect of wastewater usage.

15 **Chair Dargie** asked Pamela to explain the effect on the aquifer in response to the concerns of Penngrove residents and the water table.

16 **Bill Kortum** commented that Petaluma was on track to capture water effectively through its conservation programs. He felt a drought emergency plan was needed and didn't want the present population burdened to meet new development needs.

17 **David Bradley, Ryder Homes** – representing 360 Corona Road development – Said his company was concerned about the flood map model that affects this property. He said the assumption was for a peak flow of 600 cfps (cubic feet per second) with some flooding. He said with the channelization of the creek, and the three 72-inch culverts, the creek could handle 468 to 580 cfps. He is working with staff and SCWA and collecting data to show the original assumptions were incorrect.

18 A B **Bill Bennett –** Commented on Westhaven and how that detention pond was funneling water to Marin Creek like a storm drain. He said development in the western hills is creating flooding problems on his property. He said regulations prevent terracing and removal of vegetation and would be even harder in the unincorporated areas of the County. He was concerned about illegal fill and had proposed an ordinance to address this problem.

Petaluma Planning Commission Hearing – January 9, 2007

General Plan text and map discussion, no DEIR comments.

Petaluma Planning Commission Hearing – January 23, 2007

General Plan text and map discussion, no DEIR comments.

Petaluma Planning Commission Hearing – February 13, 2007

General Plan text and map discussion, no DEIR comments.

Petaluma Planning Commission Hearing – February 27, 2007

Community Facilities, Services and Education Element:

19 A B **Commissioner Sullivan** mentioned she wanted to acknowledge global climate change and its affect on facilities such as the Marina, wastewater facility, clearance under bridges. She was also concerned about emergency cell phone access, especially as more people begin using cell phones exclusively; she felt a policy statement was needed.

20 A B **Commissioner Sullivan** asked about the safety of tertiary treated water on playing fields; and asked about potential groundwater recharge area protection and how this was achieved.

Petaluma Planning Commission Hearing – March 13, 2007

Chair Dargie asked about the statement that a separate River Element was not included. He asked if the Petaluma River Access and Enhancement Plan is incorporated. **21**

Council Member Barrett asked about the seven intersections identified with unmitigated Levels of Service "E", but number 7 was dropped because its LOS exists on a feeder street, Lindberg Lane. **22**

Council Member Barrett asked about the assumption that the GP's LOS is based on the construction of the cross town connector and other improvements, and she was skeptical where the funding would come from during the GP's period. **23**

Chair Dargie said a series of planned roadway improvements appeared to assume mitigations to improve traffic and he questioned how achievable this was and the need to qualify the mitigations to make it work. **24**

Chair Dargie said it was not because of a lack of will, but the cost, environmental concerns, and lack of community support for these projects. He wondered if these improvements weren't done, what the affect would be, and if the EIR would be complete without this knowledge. **25**

Commissioner Mills said this could be said about any of the policy/goals of the GP. He pointed to the money for the sewer plant as an example of funding a large project. He asked whether a project can be built that supersedes the GP and whether the EIR should address this. **26**

Chair Dargie said he would like to include a statement that the ability to complete all of the projects in the GP may not be attainable. **27**

Chair Dargie asked about groundwater recharge and how this is quantified and how reliable would these figures be to judge how much pumping could take place at a sustainable rate. **28**

Council Member Barrett asked about using the 100-year flood event as the basis for measurement and if a 300-year flood event would be better. **29**

Council Member Barrett mentioned projects that have funding and others that did not, and asked how development planned around all of these improvements being in place could move ahead. **30**

Council Member Barrett asked about the mitigation measure in the Denman Reach area to increase berm heights and if this might cause more serious problems because of more water increasing the pressure behind the berms. She wanted the GP to spell out that the berms needed to be higher and stronger. **31**

Council Member Barrett mentioned new development may result in overloading existing storm drains and require additional drains to meet the Zero Net Fill mitigation. She wanted to include a double permitting process to indicate where excavated soil would be disposed of to prevent it being dumped in possible detention areas. She felt this would protect the City from any liability resulting from disposal of soil. She asked about the statement to relocate housing and suggested it state to move, demolish or relocate structures. Regarding seismic related shaking, she wanted additional language stating development would be subject to any hillside ordinance that the City may adopt. **32** **A** **B** **C** **D**

Chair Dargie said he would like the financial connectivity explained further to clearly define how the connection fee relates to the installation of "purple" pipe to offset the use of potable water. Chair Dargie said this seemed a circular system requiring the builder to install the pipes to mitigate the cost for water and if there were no money to install the "purple" pipe, then the City couldn't reuse the water. Chair Dargie said he understood the Ellis Creek treatment of secondary and tertiary water was a way to mitigate the water supply issue regarding using potable water for irrigation, etc. He wondered if the cost of building the "purple" pipe would be the developer's responsibility. **33**

Council Member Barrett asked about raising the tertiary water standards to remove pharmaceutical and other by-products. **34**

Commissioner Mills asked about the Water Conservation statement that new development may require the expansion of the wastewater facility. He wondered if this meant what was released in the form of tertiary water rather than creating more tertiary water from additional wastewater. **35**

Council Member Barrett mentioned under the Public Utilities and Energy portion that a statement regarding when property is sold, certain energy saving devices must be installed to bring the property up to current City standards before the sale could be finalized. As far as Solid Waste, she wanted to include language stating the **36** **A** **B**

C waste contractor would be required provide a resource recovery area at the actual dumpsite to further recycling. She also mentioned a requirement to the phase out dumping at the Redwood Landfill or any other environmentally sensitive sites; she said this would help mitigate problems such as air quality as well.

Petaluma Planning Commission Hearing – March 27, 2007

37 **Council Member Barrett** asked how the casino impacts would be addressed.

A **Council Member Barrett** asked about County standards for overcross culverts that differ from the City's. She said it didn't raise red flags and the Zone 2A committee didn't indicate if the standards were less or more, or just different. She asked if the City was aware of this and if there would be standards.

B **Council Member Barrett a**sked if the comments from the Sonoma County Water Agency (SCWA) and response to the Draft Environmental Impact (DEIR) would be addressed.

C **Council Member Barrett** asked about the letter from the representatives of the Plaza North Shopping Center owners about their concerns about traffic when the DSL land use designation is changed.

D **Council Member Barrett** asked about financing mechanisms for the mitigations and if these would be addressed.

E **Council Member Barrett** asked about the Sonoma County Permit and Resource Management Department's (SCPRMD) issues regarding traffic and the regional affects and how the coordination of these issues would be handled. Council Member Barrett brought up the SCPRMD memo regarding bicycle circulation when the Bike Plan is updated and the need to have county-wide coordination and appointing county-wide liaisons.

F **Council Member Barrett** mentioned the Friends of Lafferty Park and suggested handling this language differently than Tolay to indicate it was a City-owned park located outside the limits.

G **Council Member Barrett** asked if the legalities of greywater were addressed and about capturing rainwater.

H **Commissioner Arras** asked if during the course of looking at land use, citizens' comments on soil conditions on certain parcels would be included and how these comments would be responded to.

I **Council Member Barrett** asked if there would be some measures to ban gas-powered landscaping tools and promotion of the use of electric-powered tools.

38 **Diane Riley Torres**, distributed Section 11.90 of the Petaluma Municipal Code that included the Trip Reduction Ordinance. She asked how, with voluntary participation, this was reflected in the EIR to reduce the impacts of increased motor vehicle traffic. She also mentioned Zero Net Run Off, the Rainier improvement grid, the SCWA policy statement, evaluating public funding of Zone 2A EIR improvements, benefit assessment districts, and energy as concerns that needed to be addressed. She asked if public opinion had been considered for these impacts and if mitigation measures were feasible.

39 **Council Member Barrett** asked about comments regarding the financial ability to mitigate impacts and efforts to resolve conflicts between the City and County regarding flood control and Zero-Net Run-Off.

40 **Public Hearing on DEIR was closed. Motion made to forward to Council the recommendation to direct staff to prepare the Final EIR and Final General Plan documents for consideration.**

CITY COUNCIL HEARINGS

Petaluma City Council Hearing - October 2, 2006

41 **David Keller, Petaluma River Council** – (using time donated by Connie Madden) He agreed with Mary Glardon. He talked about flood management and that the DEIR omitted the principle that new development shall pay for itself because flooding is a consequence of development. He mentioned past flood events and their costs; that every engineering prediction has been wrong and if this continues could result in a fatality. He stated the flood depths for Chelsea were 3' – 4' too low. He wanted the West modeling to show the results from the February 1998 storm event. He said the channelization of the River and Willow Brook needs a response because the Corps project was not designed to accommodate this extra flow. .He stated that the Petaluma River Corridor is a development scheme to allow construction without showing the impact of sheet flows. He said the use of the Pumpkin Patch to provide a holding area for storm water will be inadequate and that the DEIR won't

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provide for new development and will barely keep up with the current development. He cited a risk factor and asked the Council if they would take personal responsibility for their decision to put people and property at risk because of their decisions. **E**

Petaluma City Council Hearing - October 16, 2006

Mary Glardon had concerns about the Level of Service at 16 intersections in the Mobility Element. She was also concerned about Global Warming not being addressed. **43** **A B**

Petaluma City Council Hearing - November 6, 2006

Sherry Taylor, 519 Oak Street – said she was a long-term resident and was concerned about the low-income and disabled populations and the need for housing to be developed for them. She didn't want future development costs to fall back to long-term residents to pay for. She mentioned the finite water supply and asked who decides what percentage of growth is necessary. She said the City cannot continue to grow and if current residents are not provided for they won't be able to afford to stay. **44** **A B C**

Petaluma City Council Hearing - November 20, 2006

Geoff Cartwright, Petaluma, spoke about stopping all development in the floodplain and the water supply issue. **45**

Petaluma City Council Hearing - December 4, 2006

Patricia Tuttle Brown, Petaluma, a fifth-generation Petaluman, listed reasons why her comments should be included in the General Plan, and submitted comments in writing to Council on both the Draft General Plan and the EIR concerning Petaluma River Access and Enhancement Plan, the Central Petaluma Specific Plan, the 14 sub-areas into which the General Plan divides the City, parks, encouragement for non-motorized transportation, joint-use agreements with schools, the Pedestrian and Bicycle Advisory Committee, and SPARC's purview. **46**

Geoff Cartwright, Petaluma, spoke about floods and terracing and was worried how this would relate to Denman Flats. He also spoke about dirt fill and the zero net fill policy in the floodplain. **47**

David Keller, Petaluma, feels the process of these hearings has been confusing and has not followed the CEQA (California Environmental Quality Act) rules. He believes the CEQA hearings should be separate from discussion about the Plan itself. He asked for a timetable for future hearings that makes it clear what will be discussed and whether it will be regarding the Plan or the EIR. He thought the Surface Water Element was extremely flawed. **48** **A B**

Petaluma City Council Hearing - December 18, 2006

Tiffany Renee, Petaluma, spoke regarding the Draft EIR; we all have a moral responsibility to protect our resources and landscape and conservation of the watershed. **49**

Geoff Cartwright, Petaluma, spoke regarding the weir of the widening of the river. **50**

Petaluma City Council Hearing – January 22, 2007

Due to late hour, no testimony or discussion occurred, continued hearing.

Petaluma City Council Hearing - February 12, 2007

Geoff Cartwright, Petaluma, wrote a letter to General Plan Administration about hydrology and bridges in Petaluma. He would like this to be addressed in the hydrology portion of the EIR. **51**

Walter Kieser, Economic and Planning Systems, Berkeley, told Council his company prepared a market study in 2004 for property outside UGB on Lakeville Highway. The study concluded that shortage of industrial development sites throughout Sonoma County will mean that jobs won't be able to locate here. He added the site is ideal from a variety of perspectives, except it's outside the UGB. **52**

Petaluma City Council Hearing - February 20, 2007

General Plan text and map discussion, no DEIR comments.

Petaluma City Council Hearing – February 26, 2007

53 **Mr. Morganthaler** continued that building a healthy sustainable local economy is key to long-term success and quality of life. In the strongest local economies, most dollars are spent at locally-owned businesses, where they re-circulate several times in the community.

54 **Patricia Tuttle Brown, Petaluma,** made comments about the mobility section of the draft EIR regarding *"incomplete integration of the Central Petaluma Specific Plan"* in the mobility section; and the need to do a *"road diet"* on Petaluma Boulevard South at the same time the new Fire Headquarters is being built. She suggested eliminating the proposed *"southern crossing"* because of cost. She believes the Pedestrian and Bicycle Advisory Committee needs to receive final conditions of approval on all projects it reviews. She also spoke about one potential alignment of the Rainier Cross-Town Connector, to the left of Rancho, and said it would be sad to be put a road through *"One of the most beautiful spots in Petaluma."*

55 **Council Member Rabbitt –** Mentioned Casa Grande @ McDowell near the high school is very hard to navigate as a pedestrian. He felt capacity is a legitimate issue but flow and safety supersede this. He said he did not see this GP as pro-growth but looking at providing the appropriate development for a specific site.

Petaluma City Council Hearing - March 5, 2007

56 **Marianne Hurley, Petaluma** mentioned the letters sent by various individuals and groups regarding cultural resources and hoped they were taken seriously. She spoke regarding the impact analysis and mitigations. She believes the archeological information in the General Plan should extend beyond the historic downtown as there are historical properties elsewhere in the City.

57 **Tiffany Renee, Petaluma,** read from the letter from the *"No Wetlands Landfill Expansion"* group and as a representative of the Friends of the Petaluma River. Their main concern was Empire Waste's expansion of the landfill adjacent to the Petaluma River that is built on sensitive wetlands. She wanted the Council to draft a resolution like Novato's to prevent this expansion.

58 **Richard Brawn, Petaluma,** commented on the EIR and GP disconnect regarding funding for improvements and the need for funding to achieve lessening/preventing environmental impacts from development. He mentioned unacceptable Level of Service at the intersections that only the Council seems to accept. He also mentioned the finite supply of water and he didn't want the current citizens of Petaluma to suffer because of growth.

Petaluma City Council Hearing - March 19, 2007

59 **David Keller, Petaluma**, spoke about a lawsuit filed in Sonoma County Superior Court challenging the Sonoma County Water Agency's Urban Water Management Plan as being inadequate. It is being challenged by a consortium of 14 organizations, including the Sonoma County Water Coalition. He commented that the Council was on the cutting edge of what the City needs to be doing regarding water. He also spoke about the General Plan DEIR and asked Council to specify exactly when they will be revisiting the public comments on the DEIR, especially as it relates to the casino impacts, greenhouse gases and global warming.

Petaluma City Council Hearing - April 2, 2007

No evening meeting, hearing continued.

Petaluma City Council Hearing - April 16, 2007

60 **Geoff Cartwright, Petaluma**, spoke regarding the Army Corps of Engineers flood-control project, which was supposed to over 100-year flood level protection, but noted that the Corps had predicted that once Petaluma reached buildout, that protection could be degraded to 40-year.

61 **Tiffany Renee, Petaluma**, made the comment that the $160.00 home occupation permit is costly for a small home-based business and a reduction should be considered for economic development. The City should consider lowering the permit fee because small and home-based businesses are a very important resource to the City as their owners tend to spend what they make locally because they're not commuting. She added that increasing home-based businesses and small businesses will help reduce green-house gas emissions because

their owners don't drive or commute as far, especially in walk-able communities like West Petaluma. She said she and her husband have gone from two cars to one.

NOTE: Comment numbers 62 through 150 are written comments, see numbered pages following verbal comments.

Petaluma City Council Hearing - April 23, 2007

Note: Site specific comments on land use not included in DEIR.

Tiffany Renée, Petaluma, spoke regarding the draft EIR. She stated she would like the recommendation of the Planning Commission of mixed-use to be upheld. This project could be a collaborative effort of Petalumans. She asked the Council to consider the infrastructure and traffic impacts and their commitment to reduce greenhouse gas emissions. She has asthma attacks and is terrified thinking about driving across town to the hospital and she worries about kids who live with asthma having to travel to a hospital. She said would like to hear from the Council Members about the flooding issues, because if it is a flood plain, it needs to be addressed. Stated that creating walkable communities encourages public transportation. 151

Ann Kemmer, Petaluma, asked the Council to uphold the Planning Commission's recommendation that the DSL site be designated as mixed-use. She stated that the Draft EIR and the analysis for the Draft General Plan 2025 include a mixed-use land designation at that site. All traffic models, water demand studies, community design and sustainable building goals are based on mixed-use at that site. To rezone to community commercial would have significant impacts on North McDowell Boulevard and the entire community. If the developer wants to propose a commercial plan for that site, there is a General Plan Amendment process that would allow them to change. 152

Geoff Cartwright, Petaluma, spoke about community commercial being an upgrade in the zoning. Community Commercial is big store center. He stated that he believes this circumvents the process as a zoning change without completion of a General Plan. He is concerned about traffic. The traffic will have to be combined with the traffic for the Kenilworth site. He was also concerned about the flooding issue, the water issue and the wetlands issue. The base flood elevation is 3 feet higher than what is on the old FEMA flood insurance rate maps. He questioned the dirt fill that will raise this site above the flood level. The water will be sent downstream and will add to the flooding there. 153

Petaluma City Council Hearing – May 7, 2007

Geoff Cartwright, Petaluma, spoke regarding the Washington Street Interchange improvements and the need for a northbound ramp. He thought the City might be able to get some help from Caltrans *"if you push."* Regarding Rainier, he called it a *"placeholder for development."* He doesn't see it happening easily, and said it will induce development in the floodplain. *"We do not need development, fill, or channelization in the floodplain. It gets flooded!"* 154

Richard Squaglia, Petaluma, said that development requires more than space to put up a building, it takes support from the City. Just because there's space available, it doesn't mean it's buildable. If there is not water available or the infrastructure of the town can't handle the increased burdens, the land is essentially unbuildable. 155

Marianne Hurley, Petaluma, spoke about a letter written by the National Trust for Historic Preservation. Heritage Homes voted in April to support all the recommendations in the letter. She urged Council to support these recommendations and include them in General Plan. 156

Wayne Morgenthaler, Petaluma, thanked Council for extending public comment period to May 21 and spoke about civic economics - authors of the study that show that money spent at local businesses recirculates three times within the community, whereas money spent at chains is spent and then gone from community. 157

Petaluma City Council Hearing – May 21, 2007

Duane Bellinger, Petaluma, spoke about flooding and projected water levels over the next fifty years. 158

159 **John Cheney, Petaluma,** said he remembers many projects that were going to be *"above flood level"* which have flooded since they were built. He said that EIR's don't work - at best, they are educated guesses. He told Council, *"It's time to stop building in the floodplain."*

160 **Diane Reilly-Torres**, comments should be verbatim, emailed her comments – read quotes from General Plan and EIR (no development in floodplain, Zone 2A funding expired, utility tax needed, definition of floodway needs to be clearly spelled out – differentiate between floodplain and Petaluma River Corridor, new OADS site may be in floodplain, quoted Government Code regarding required General Plan content, submitted in writing.

161 **Geoff Cartwright, Petaluma,** seems we have gone back to the wild-wild west, allowing development in the floodplain, exceeding available water supply, $50 million in damage with every flood, FEMA Hazard Mitigation Plan – where will $ come from? Spoke about flooding in Petaluma and the dangers of building in the floodplain. He added that the hazard mitigation in the General Plan does not prevent building in the floodplain. *"It's time to stop building in the floodplain. Put it in the General Plan."*

NOTE: Comment numbers 162 through 172 are written comments, see numbered pages following verbal comments.

REVISED DRAFT EIR – GREENHOUSE GAS EMISSIONS

PLANNING COMMISSION HEARING

Planning Commissioner Hearing December 11, 2007

173 **Planning Commissioner Burton**, How much attempt was made to reach the City goals? Ideas such as banning parking in certain areas? Transportation comparison, Contra Costa is lowest, highest is Petaluma; there should be a better way to meet traffic needs through improved traffic means. Did the City look at Rainier and what it does to reduce GHG. Issue with existing Council Resolution which mandates certain goals, finding it difficult to recommend a document does not meet that goal.

174 **Richard Brawn**, Two issues: error in GP, 2762 I Street incorrectly shown for land use; energy costs have gone up for a reason: 1) dollar devaluation; and 2) cost of petroleum, all aspects of developing petroleum (examples). Conservation is absolutely essential. Leave accommodations wide open so that the individual can take the necessary steps to conserve (don't constrain business and individuals).

175 **Planning Commissioner Sullivan,** In addressing the State's requirements for specificity of solutions, we have opted to be specific for the GP and EIR; concern is that 20 years from now we may have been so detailed that we create something obsolete – how do we respond in the GP. Consider the option of putting policies and programs in a separate document? Should strengthen the language for preparation of a Climate Action Plan to "shall"?

176 **Councilmember Barrett,** CEQA only asks that we address existing conditions, therefore the DEIR does not have to meet the local goal. Ideas for mitigation include purchase (i.e. neighborhood) to buy solar panels through a "neighborhood buy" for group discount, excess power could multiply out to neighbors;; also question of "green-collar jobs", encouragement of design and installation of green improvements; classes at local schools (high school and SRJC) to train people for those jobs; GHG mitigation fee. City should start work on the Climate Action Plan (change may to shall).

177 **Planning Commission Chair Mills,** In favor of fee when mitigations aren't incorporated into design of projects; agree with 'shall' with regard to CAP; the CAP will be the key to implementation of the GP following GP adoption.

CITY COUNCIL HEARING

City Council Hearing January 7, 2008

178 **Mayor Torliatt (as submitted and reiterated by David Keller),** wants less development potential, wants to see GHG mitigation fee.

Connie Madden, The City needs to think about how to get there: encourage telecommuting, a Mayor's bus ride, conservation methods as offered by Ned Orrett, do not allow a million square feet of retail. 179

Ellen Bicheler, Climate Protection Campaign, compromised to get to 25% reduction commitment, look at solutions proposed by Rohnert Park, community choice aggregation, Ned Orett's ideas on energy efficiency plan, look at Marin County. 180

Tiffany Renee, read submittal (see written comment #171). 181

David Keller, Petaluma River Council, requested Mayor's comments be submitted as comments on the DEIR (see above); submitted letter (see written comment #170); Greenhouse Gas calculations needs to be in document; mixed use must be required; GHG references contained in other elements should be included in this document; local retail, local business, telecommuting. 182

Allen Tacy, PBAC, Bike Plan is an excellent start, need to do more. 183

Patricia Tuttle-Brown, referenced Attorney General's letter; her participation is the culmination of 14 years idealism, shared history of participation, General Plan needs mandates; three examples: 1) tighten up language, CPSP, page 8 of 27 regarding Land Use; 2) Boost effectiveness of PBAC, include a "shall" that final conditions be provided to the PBAC; 3) On the subject of schools, there are no teeth on school references. 184

Public Hearing on Revised Draft EIR closed January 7, 2008.



LANDFILL EXPANSION

March 5, 2007

City of Petaluma
Mike Bierman, City Manager
11 English Street
Petaluma, CA 94952

General Plan Administration
Pamela Tuft, Director
27 Howard Street
Petaluma, CA 94952

RE: Petaluma Draft General Plan and Draft Environmental Impact Report

Dear Mr. Bierman and Ms. Tuft:

We submit this letter to comment on the solid waste element of the Petaluma Draft General Plan (the "General Plan") and related sections of the Draft Environmental Impact Report ("DEIR").

No Wetlands Landfill Expansion ("NWLE") is a grassroots environmental group consisting of concerned citizens in Main and Sonoma Counties. NWLE is a member of the **Green Coalition for Responsible Waste/Resource Management.**[1] A number of our members are Petaluma residents. Our mission includes asking local governments to:

- Oppose expansion of the Redwood Landfill (the "dump") located at the edge of the Petaluma River Estuary and Marsh on the Marin and Sonoma County border;
- Protect citizens, wildlife, and the Petaluma River Estuary from the negative health and environmental effects from air and water pollution from operation of the dump; and
- Preserve the Petaluma River and Marsh as a public educational and environmental resource for residents to appreciate its natural beauty and critical role in our local and Bay ecosystems.

We applaud the overall sustainability goal of the General Plan. Unfortunately, the few pages dedicated to the Solid Waste element do not begin to do justice to the topic or the grave environmental risks posed by Petaluma's current and future waste management activities. As the *Citizen Guide to the Petaluma General Plan* states, the General Plan is intended to "set a direction for sustainable development for the City of Petaluma. A sustainable community can be defined as a community that meets the needs of its current generation without compromising the ability of future generations to meet their needs." Where Petaluma sends its solid waste matters greatly in terms of not compromising future generations. Neither the General Plan nor the FEIR adequately address the risks

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[1] The Green Coalition includes Friends of the Petaluma River, Madrone Audubon, Petaluma Tomorrow, Sierra Club Marin Group, Sustainable Marin, Sustainable Novato, Sustainable San Rafael, Novato Democratic Club, and Baykeeper.

posed by Petaluma continuing to contract for the shipping of its solid waste to the Redwood Landfill.

The Redwood Landfill is built on old marshland immediately adjacent to the largest tidal marsh in California, which leads to the Petaluma River and San Pablo Bay. The owner, Waste Management, Inc., the global waste giant, has applied to expand its operations significantly to enable it to build a garbage mountain 166 feet high to become a regional landfill. Petaluma's current garbage hauling contract is a significant aider and abettor to this ill-advised scheme.

Petaluma's sister city to the south, Novato, has expressed substantial alarm about the Redwood Landfill and the danger it poses to the environment:

> There are numerous potential environmental impacts from such an expansion that would directly and negatively impact the sensitive habitat. In addition, any catastrophic failure of the facility or mitigation measures (e.g. seismic event or leachate leakage) may not be mitigable because the sloughs and wetlands are so close to the site. Such a catastrophic event could have significant impacts on San Francisco Bay.[2]

Landfill experts agree that all dumps ultimately will fail to contain their pollutants. The closure of Sonoma's well-managed Central Landfill is testament to this truth. Future failure at the Redwood Landfill will have dire consequences to the Petaluma Marsh, whose tidal actions will wash the pollutants across the county border right back to Petaluma. Below sea-level, the Redwood Landfill sits in a floodplain between two major earthquake faults. It is no more than a few inches above groundwater in places, yet it does not have the bottom liner required of modern dumps. A leak of dump pollutants ("leachate") would poison surrounding wetlands and wildlife and ultimately the Bay. The Landfill has already had at least one leachate spill of over 8 million gallons, and its old levees regularly need repair.

The Petaluma General Plan states that "as of January 2006, the private hauler Green Waste Recovery" may take Petaluma's waste - 56,000 tons per year as of 2001 - "to landfills in Novato, Hollister, Suisun city, or Dixon." (General Plan at 4-15.) The relevant Policy and Program, 4-P-16, states only that Petaluma will "Continue to work toward reducing solid waste and increasing recycling, in compliance with the Countywide Integrated Waste Management Plan." (General Plan at 4-16.) Finally, the FEIR finds that the increased demand for solid waste disposal between now and 2025 due to build-out "may increase demand for solid waste disposal." But, without any analysis, it concludes that the impact is less than significant because "Petaluma will likely continue to contract with private waste haulers who transport solid waste" outside of Sonoma, including to the Redwood Landfill, so "solid waste demand will not likely exceed landfill capacity." (DEIR at 3.5-27.)

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[2] City Council of the City of Novato, Resolution No. 109-05, Commenting on the Proposed Redwood Landfill Solid Waste Facilities Permit Revision and Final EIR (Sept. 29, 2005).

These summary conclusions fail to consider the potential contributory impacts on the Petaluma Marsh and River Estuary of the City allowing its waste to be dumped at the Redwood Landfill on the edge of these environmentally sensitive wetlands. The General Plan itself emphasizes the "significance of the Petaluma River . . . as a natural habitat, a carrier of storm waters, a centerpiece of urban identity and local history, a recreation resource." (General Plan at 4-2.) Dumping city waste in its watershed is grossly inconsistent with this viewpoint. Nor is it consistent with what Petaluma has told its residents in the *Citizen Guide to the Petaluma General Plan*: B C

> Sustainable communities require an ecosystem approach to developing and managing human settlements that recognize the relationship of the community to the broader region . . . ; reduce consumption of resources . . . and managing waste through pollution prevention, recycling, and conservation.

Consistency with an eco-system approach to general planning for solid waste and with the City's professed vision requires the following: D

- A solid waste plan that only allows hauling to locations that include a resource recovery park to extract valuable materials for reuse before trucks are weighed and allowed to tip their loads in the landfill;
- A requirement that any landfill that is to receive Petaluma's waste must minimize the dumping of green waste and must divert green materials for composting. Today up to 40% of the volume disposed at Redwood is green waste, which is buried instead of composted, resulting in methane gas emissions that are 22 times more harmful than carbon dioxide when it comes to global warming. In fact, Redwood Landfill is the largest emitter of greenhouse gas in all of Southern Sonoma / Northern Marin.
- Rapidly phase-out waste hauling to Redwood Landfill or any other legacy landfill that is built on historic Baylands so that Petaluma can act responsibly and stop contributing to a future environmental disaster and toxic clean-up for which Petaluma's present or future generations will have to pay along with other California taxpayers. This is a virtual certainty to happen at some point as a result of a future earthquake, flood, or sea-level rise due to global warming.

We appreciate your consideration of these comments. You may contact me at 415.209.9616, or David Yearsley, a member of NWLE and the Executive Director of Friends of the Petaluma River at 707.763.7756, if you would like more information relating to our comments.

Very truly yours,

/s

Christopher Gilkerson
Chair, No Wetlands Landfill Expansion

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Tuft, Pamela

From: Angela Garvin [garvinma@pacbell.net]

Sent: Sunday, March 04, 2007 9:47 AM

To: ptorliatt@aol.com; petalumamike@aol.com; m4pet@aol.com; david@davidrabbit.com; freitaspr@comcast.net; kpetersonnau@aol.com; teresa4petaluma@comcast.net; Tuft, Pamela

Subject: DSL site needs to remain mixed use

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Dear Petaluma leadership,

I am writing to ask that the Land Use Zoning at the DSL site be a mixed use site, and that the normal environmental impact review be followed, as was requested at a previous meeting. The requirement of an environmental impact review on this project cannot be ignored - the DSL area is in a known flood plain area, and will have an impact on traffic flow and pollution to nearby creeks.

I am a home owner with a backyard that borders North McDowell, across from the proposed DSL site. I also have 2 young children, one of whom suffers from asthma. Additional traffic on North McDowell resulting from a commercial property will only worsen the air pollution in this area, and will negatively affect my child's health. Additionally, this traffic will add to the noise in our community, and make traveling along N. McDowell even more difficult than it already is. We already have commercial areas that contain nationally, outside owned chain stores, all along North McDowell, that detract from our town's unique personality. I am also very concerned about the possibility of flooding that could result from paving over the flood plain area - what are the drainage plans for the the water run-off - my backyard?

I would hope that the leadership in Petaluma would make a responsible choice, that puts the health and well-being of our citizens as a top priority. Potential tax revenue from a few new outside-owned, no-character businesses is no reason to create a large negative impact on our beloved Petaluma, in terms of traffic, air-pollution, flooding, and pollution into near by creeks. We DO NOT need a Lowes and Applebees - we need Rex hardware and our locally owned restaurants. Medical offices or business offices are a much better choice for the DSL location, if it must be developed at all.

Sincerely,

Angela & Mitchell Garvin
315 Olympic Ct.
Petaluma, CA 94954
707-778-8106

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Tuft, Pamela

From: Crump, Katie
Sent: Monday, March 05, 2007 8:13 AM
To: Tuft, Pamela
Subject: FW: Comment for Public Record on General Plan DEIR

FYI
katie

From: maryglardon@comcast.net [mailto:maryglardon@comcast.net]
Sent: Sunday, March 04, 2007 1:02 AM
To: CityCouncil
Subject: Comment for Public Record on General Plan DEIR

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Please enter this in "Comment for the Public Record on the General Plan DEIR"
Subject:
Community Outcry.Request reconsider of DSL Land Use to Mixed Use.
Date:
Monday, February 26, 2007 5:03:50 PM

Hello Madame Mayor and fellow Councilmembers,

The residents in ParkPlace Subdivision and Vintage Chateau, of which there are 1,000's of your citizens resideing here, would be most grateful, if you would **reconsider** your Land Use straw vote, of the DSL site **and give direction of Mixed Use** to that site. All things considered, it would be the wisest choice, being most beneficial to the City coffers, the existing commerce in the city, and enough of a **compromise** to the adjoining neighborhoods, and the developers.

The spokesperson for DSL stated, last Tues., that he spoke to a couple of members of the Planning Commission that eve., after they voted for Mixed Use. He stated he felt they were weak in their vote. Who knows what the results of his, after hours, after the public had left, lobbying of a couple of Planning Commissioners were? We do know that his next statement, that the project was always meant to be Community Commercial was perhaps, disingenuous, or a half truth, at best. We realize that this is a New Council and some members that voted may not be up to date with the actual facts regarding that site. Please see in my **attachment (in my next e- mail, due to length of scanner time)** of the January 10, 2003 submittal by the DSL Company to the Petaluma Community Development Dept.. It is the **DSL Project Report** and **their request of a General Plan Amendment, to Rezone for Mixed Use** from the existing Special Industrial/Office Park. Please note they were **requesting a Zoning to fit Offices**, and a **Deer Creek Neighborhood consisting of live-work townhouses and mixed use apartments, as well as a park and retail center.** The project speaks of the **displacement of wetlands and tributaries** and how they would **aggregate** them into an open space area in order **to mitigate the wetlands issues** of the property. Please read the attachment which will arrive in my next e-mail.

When they requested the Mixed Use, DSL had a meeting or 2 with the neighborhoods. Since then, they have relobbied the city to go into an even higher intensity project/Land Use for that site, up to Commercial , scrapping their earlier intents, and they have **not responded to requests to meet with the neighborhoods**. The spokesperson stated they are on hold, so no meetings, however, they continue to push for this higher intensity, and solicit for tenants, one of which, Chili's has obtained a liquor license. This Developer got what they first wanted, and now they want it all, with **"0" regard for the residents of a 30 year, established, neighborhood community**. Further, they state their project is not reliant on Rainier, (ie. traffic infrastucture to support this project.) Moving to Commercial Land Use requires a

new General Plan EIR be done. The General Plan did an EIR on Mixed Use.
Let's face it, **none of us can have everything we want.** The nieghborhood would like it to remain Special Industrial/Office Park, which was the zoning when most of us bought our homes. We struggle with ground water issues of our trees drowning, our fences, and stucco walls sinking, and our ongoing placement of french drains in our yards, to direct the excess water from undermining our homes. We cannot imagine the addtional water runoff of a strictly Commercial strip mall, cutting off the tributaries, directing more water in our direction. Allowing residences at DSL site would help absorb water in their unpaved yard soil . We are strongly owner occupied residences. A portion of the neighbors stated if DSL site is zoned Commercial, yet another ugly strip mall here, they will move far North, where it is less costly to migrate, meanwhile keeping their homes here, in an effort to retain their lower property tax base, and rent out their homes. This will r esult in abs entee landlords, the downgrading of the nieghborhood and all that that entails. That will result in more police needed etc. We all wish to prevent this type of owner migration. We are willing to compromise to the increased intensity of Mixed Use.
We consider that the Cities' needs are that of tax base revenue, more parks, more residences, and content citizens. As in all economic management and portpholios, whether it be an individual, a business, or a City, it is best not to overleverage in any, one, economic sector. Let's allow that site to be the most economically flexible, and allow for the economic sectors of residences, offices, as well as commercial, to balance that site. When one sector slips, the others buffer. It is a wise balance.
The Developers wanted to replace the existing Land Use to fit Mixed Use. They got that. Now they have gone to the well again, and want higher intensity of Commercial, like Santa Rosa Blvd. They say it is to fit the Retail Leakage Study of 2004. Since that study, we, the citizens believe that has been asked and answered. This project delayed so long, since that study, the new downtown Theatre District Retail is here, likewise the Kennilworth Development, the Kohl's center, the new Lakeville Retail including Home Depo, and the Driving Range has been purchased by a Retail Developer. At this point Retail has been recaptured well enough and local merchants will be competing for their marketshare of the same wallet base. Baby boomers, your largest population are beginning retirement and there is a movement amongst them nationwide, as well as local, to "recycle, reuse, and reduce." Reduced consu merism based on lower retirement incomes, and simplifying their lives. The g reening of A merica movement. We already see it in our builders. Simplification and sustaining lifestyles.
We ask for your help to allow us all to co-exist and thrive in this beautiful city. There is a black cloud sitting over our homes and people are heartsick over this vote. We ask you for a speedy relief of this situation. We do not want to become part and parcel of the collateral damage of this cities development which does not fit the governing founding guidelines, and definitive goals, as set before you, in the General Plan 2025 which are, (without bringing them forth point by point, page by page), briefly stated, to have Family Friendly Communities,and to continue the development and sense of community.
Please do not disenfranchise our families by losing sight of the many goals stated in the General Plan.
Please meet us half way. Please give us a reason to continue to be loyal to this city, to continue to live here, to enjoy our neighborhood and city, to choose to shop locally, and thereby support our city tax base.

Let's all compromise on Mixed Use. Fair enough?

Thank you for your kind consideration,
Mary Glardon and Residents of Park Place Subdivision

Tuft, Pamela

65

From: David Keller [dkeller1@sonic.net]
Sent: Friday, March 02, 2007 10:54 AM
To: CityCouncil; Tuft, Pamela
Subject: Comment on General Plan DEIR: Marin IJ: 81% of North Bay residents approve climate protection action

Please enter the following article as comment for the public record for the Petaluma General Plan and DEIR.

The draft Petaluma General Plan and DEIR provide no clear and requisite guidance for the City on how it will achieve the City's adopted policy of reducing Green House Gases by 25% from 1990 levels, by the year 2015. A

There needs to be a specific series of Programs and Policies designed to achieve this stated and very important policy, with measurable ways to ascertain our progress.

Important components should include, at the least, a Mandatory Green Building standards, requirements that all new projects achieve a zero increase in Vehicle Miles Traveled (VMT) systemwide, and a requirement that the highest efficiency appliances and machinery be installed in all new projects to conserve and reduce demands for water and energy beyond the already proposed Water Supply program. B

There is tremendous public support for these changes, as evidenced in the Marin IJ story attached here, as well as demonstrated by the unanimous adoption of the City's resolution and comittment on reducing GHG by 2015.

Thank you,

David Keller
1327 I St.
Petaluma, CA 94952

North Bay sees warming as a serious threat

Mark Prado, Marin Independent Journal, 03/02/2007 C

An overwhelming majority of North Bay residents say global warming is a critical issue and approve of state plans to reduce greenhouse gas emissions, according to a new poll.

In all, 78 percent of North Bay residents - Marin , Sonoma, Napa and Solano - say global warming is a very or somewhat serious threat to the region's economy and quality of life, according the 2007 poll by the Bay Area Council, a San Francisco-based public policy

organization.

Told that California, if a separate country, would be the world's 12th largest producer of greenhouse gases, 81 percent of North Bay residents said they approved the passage of the California Global Warming Solutions Act, while 12 percent opposed it. Six percent didn't have an opinion.

In September 2006, Gov. Arnold Schwarzenegger signed the act into law, requiring California to reduce its greenhouse gas emissions by 25 percent by 2020. Scientists say the emissions are being trapped in the atmosphere, causing world climate change.

Marin County's Board of Supervisors and the Marin Municipal Water District have adopted policies to reduce greenhouse gas emissions by 15 percent from 1990 levels.

"I think people are beginning to understand the impact, so it's not surprising it polled so high," said Jana Haehl, a Marin Conservation League board member. "It will affect everyone from people who live near water to people who live in the hills."

Fewer than a fifth of residents do not see the issue as a serious threat, the poll found.

Bay Area residents support the creation of a flexible, statewide emissions "trading" system, rather than an across-the-board cut of emissions for companies. Thirty-four percent favor a uniform cut, but 50 percent want a trading system created.

"On this issue, Bay Area residents and the Bay Area business community are in perfect agreement," said Jim Wunderman, the president of the business-oriented Bay Area Council. "The problem with across-the-board regulations is that it is relatively easy for some companies to comply, but for others it's the death knell, possibly wreaking economic havoc that could throw many thousand Californians out of their jobs."

The poll, conducted by the Field Research Corp. from Jan. 8 to 14, queried 600 residents of the nine-county Bay Area. Findings are subject to a sampling error of 4 percentage points.

—

RESULTS

How serious a threat is global warming is to the Bay Area's future economy and quality of life?

42% Very serious

36% Somewhat serious

12% Not too serious

4% Not at all serious

5% Don't know

(results rounded)

Contact Mark Prado via e-mail at mprado@marinij.com

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Tuft, Pamela

From: David Keller [dkeller1@sonic.net]
Sent: Sunday, March 04, 2007 11:38 PM
To: CityCouncil; CDD; Tuft, Pamela; Mayor Pam Torliatt
Cc: Moore, Mike
Subject: Comments on General Plan DEIR: No ReZoning for Riverfront Property
Importance: High

66

From: David Keller
Petaluma River Council
1327 I St.
Petaluma, CA 94952
March 5, 2007

To: City Council, City of Petaluma
Members, Planning Commission
Pamela Tuft, General Plan Administrator

RE: Consideration of certain changes in Land Use Map Designations and Zoning on Specific Parcels, in particular, River-Dependent Industrial lands.

The following are comments for the public record on the Petaluma draft General Plan and DEIR, pertaining to any proposed changes of "River-dependent Industrial" zoning to any other zoning category, including Mixed Use, PUD, Commercial or other. (Excepting APN 007-700-005, not river frontage or access)

As former co-chair of the Central Petaluma Specific Plan Citizens Advisory Committee, I am well aware of the huge pressure to change the Pomeroy site, (and also Shamrock and Jerico Dredging and any others) designated in the CPSP or elsewhere in the current General Plan as "river-dependent industrial" zoning to the catch-all "mixed use", "commercial", "retail" or other zoning and land use designations. Doing this would spell the end of very important industrial and associated activities in Petaluma. This is true especially for parcels which have the potential for current or future proposals for 'vista' river front, high demand, housing, commercial and retail sites. Once you zone the land 'mixed use' and "allow" industrial use of it, market pressures will evict the industrial uses, and go for the higher dollar developments that come with mixed use. "Mixed Use" = death of industrial uses. Period.

We had vigorous discussions on these issues within the CPSP CAC, and ultimately agreed by consensus (as did the adopting City Council) that keeping these lands designated as "river-dependent industrial" zoning, versus a proposed 'mixed use' designation, was important for several reasons:

1- Petaluma needs to retain the ability to attract and keep heavy industrial businesses within the city. As part of a mixed economy, industrial employment (generally high wage, blue collar) is an important piece of the long term economic health of Petaluma. Industrial jobs tend to run in different economic cycles than retail or high tech employment, and helps to stabilize the Petaluma employment base, skills levels, and cumulative local income and wealth.

2- River or water front land for industrial uses around the entire San Francisco and San Pablo Bays is

increasingly difficult to find and develop, as much of it has been ruled off limits or converted to higher value lands. Having lands reserved for this use in Petaluma makes us a target location for the industrial businesses looking to locate (or relocate) with access to the water, railroad, and highway.

3- River front Industrial lands may go vacant for a year or two or more, but if we give them up now for "the convenience of the landowner" or, "to help out with our future housing needs" by upzoning the land, we lose those important business and economic functions from the city's inventory and wealth creation ability.

4- Upzoning the land now merely gives the current owner(s) a windfall profit: they knowingly bought the land under its current zoning, and have contributed nothing to the local economy to merit this free gift that comes with upzoning. Then they'll likely sell out to some developer at the newer inflated market price, pocket the huge profits, and disappear. Their bankers and investors will benefit from the council's vote, but the city will see no benefits of this decision.

5- The US Army Corps of Engineers requires a minimum commercial tonnage annually (recreational boating tonnage does not qualify) for Petaluma to qualify for continued dredging of our Petaluma River. We currently qualify for this federal involvement. The Petaluma River is actually a tidal slough, and is guaranteed to silt up and impede deeper draft shipping and boating without regular dredging. The siltation will also impede recreational boating, as sand and silt bars are deposited in the river and turning basin, and the river bed elevations increase with sediment deposits. In fact, Petaluma Creek became Petaluma River by an act of Congress specifically to enable federal involvement in dredging, since apparently waterways named 'creeks' don't qualify. Loss of the river-dependent industrial businesses' shipping via our river will cut that tonnage to virtually nil, disqualifying Petaluma from that future federal assistance.

6- The USACE dredging is also an important part of our flood management system, since a shoaled up waterway will also interfere with flood flows going downstream to the Bay, especially during high water and storm events. If the dredging cycles are to be interfered with, we will need to recalculate our flood mapping for low elevation City lands, and find a viable funding source forever.

7- If the city council wants to form a Special Benefit Assessment District to replace the Federal funding likely to be lost when commercial tonnage is lost due to the zoning changes, then *it must have this funding mechanism in place ahead of any zoning changes*, with a legally binding vote and assessment rate and money collection process completely approved. That means having the binding vote by property owners whose lands would be deemed beneficiaries of any dredging benefits.

8- This nexus may well be a legally tenuous connection, since those properties (the *former* sites for river-dependent industrial activities) would receive little to no future benefit from dredging. It would be very difficult to demonstrate that dredging provides benefits for housing or retail or commercial, at least in the value and rates necessary to collect enough money for a real dredging program in perpetuity. In fact, the Special Benefits Assessment laws requires proof that the actual assessments to be collected from each and every parcel has to come with a legally demonstrated engineering calculation that the property assessed does in fact receive the benefits proportional to the assessment paid. Absent that engineering report, which has to be voted on and approved by property owners (with votes proportional to acreage to be included), some current or future property owner might try to break or refuse the agreement with a legal challenge. This would undo the City's proposed agreement for the assessment, and force us to either seek funding from all the city's property owners as a whole, or instead to give up the River as a navigable waterway, as has happened elsewhere around the Bay and nation.

9- Further complicating matters, there are industrial lands outside the city's limits (Western Dock

Enterprises and others south of the city) who benefit by dredging a navigable waterway, but who are not under the jurisdiction of the City. How these county lands would be brought into any legal agreement becomes even more complex.

10- Our current inventory of industrial lands, whether currently occupied or not, are NOT blighted lands, and do not qualify for Redevelopment participation. They are now, or recently have been, functioning industrial lands, providing economic returns to their owners, and economic and social benefits to our City and region.

Finding enough land to satisfy our future housing needs, and providing the correct mix of housing types to supply our future anticipated needs and desires for growth should NOT come at the expense of river-dependent industrial lands and our town's economic livelihood and future. It is imperative that we do not take a short term view of these valuable lands in the city's inventory.

If the city is anticipating changing zoning for these lands during the period of the General Plan, then the General Plan and DEIR must address the impacts of those losses and changes, at least as noted above, and provide a complete assessment of the environmental impacts and also economic impacts to the extent that economic impacts will have physical and environmental effects elsewhere in the city and region, at least in conformity with at the requirements of CEQA and Bakersfiled Citizens for Local Control v City of Bakersfield et al. (California Appeals Court, 12/13/04).

Thank you very much.

David Keller
Petaluma River Council

attached below: Press Democrat, "No rezoning for riverfront property", March 2, 2007.

Friday, March 2, 2007

No rezoning for riverfront property

Former Pomeroy site must remain industrial for federal government to
pay for river dredging

By JOSE L. SANCHEZ Jr.
THE PRESS DEMOCRAT

For the time being, a vacant 39-acre parcel along the east bank of the
Petaluma River near downtown will continue to be designated for industrial use. But that could change in the future.

The City Council recently turned down a proposed land-use change that
could have led to the construction of shops and hundreds of new

homes
on the former site of Pomeroy Corp., a cast concrete manufacturer.

The reason: River-dependent uses are what justify the federal government spending millions of dollars to dredge the river every few
years, several council members said.

But with the amount of land available for homes in Petaluma becoming
scarce and its value already twice that of industrial land, the debate

over what is to become of about 90 acres of riverfront - including the
Pomeroy parcel - is sure to continue.

Petaluma land available for housing already is nearly 80 percent built
out, said Scott Duiven, a city planner.

Boise, Idaho-based Washington Group International closed Pomeroy Corp.
in June and requested the change in land-use designation in July.

While some council members vow to keep the land for industrial use
indefinitely, others are thinking about possible changes and alternative ways to pay for dredging the river.

Whether the land is kept for industrial use will ultimately be a matter
of "political will," Mayor Pam Torliatt said.

Keeping the parcel for industrial use "is important because of the dredging issue but also because of the jobs it would provide in the community," Torliatt said.

"As the city has undergone redevelopment, it hasn't paid as much attention as it should to the retention of blue-collar jobs," she said.

Councilman David Rabbitt, who joined his colleagues in voting to retain
the river-dependent industrial designation for the parcel, said that may have to change some day.

"We need to give every benefit to the businesses that are there," he said.

But sometime in the next 20 years, "it may go to housing," he said. "It's inevitable."

Torliatt said the city's ability to promote the kind of development it

wishes should not be underestimated.

"When we were talking about redeveloping downtown, a lot of people said
it would not work, and look at what's there now," she said.

Meanwhile, some elected officials, Councilman Mike Harris among them,
already are weighing the possibility of creating a benefit assessment
district to pay for dredging if the amount of industrial activity on the river declines below a level the federal government considers necessary to justify dredging.

Benefit assessment districts normally include all property owners who
stand to benefit from a project and must be approved by the owners.

The inland portion of the river needs to be dredged every four years,
and the river channel across the San Pablo Bay flats needs dredging
every three years, said Maria Or, spokeswoman for the San Francisco
district of the U.S. Army Corps of Engineers.

The estimated cost to dredge both portions of the river in fiscal year
2007-08 is $6.5 million. At this point, the president's budget request
for Corps of Engineers projects in California includes no money for the
project.

A Washington Group spokesman was too busy with other matters to

comment, according to a secretary at the company's headquarters.

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Open Space Water Resource Protection Land Use
OWLFOUNDATION.NET

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3/1/07
Pamela Tuft
General Plan Manager
City of Petaluma
27 Howard Street
Petaluma, CA 94952

RE: Comment Addendum to the General Plan update and DEIR

Dear Ms. Tuft;

Please accept these additional documents into the administrative record pursuant to the General Plan Update and the DEIR for it. Included in this contribution are these single page submissions: 67 A

1. Schematic diagrams of groundwater transmissivity
2. DWR Well Completion Report Request form
3. Map based on Sonoma County Planning Department of groundwater recharge land
4. Map of Sonoma County groundwater storage units.
5. Chart of Total Ground Water In Storage for both groundwater basins and groundwater storage units
6. Page 2-18 from Sonoma County General Plan
7. Charts of current and projected water supplies for Santa Rosa and description of North Marin
8. SCWA General Location Map
9. SCWA pumpage from Santa Rosa Plain Occidental, Todd and Sebastopol "emergency" wells
10. Delivery stats. from SCWA to NMWD from 1973 to 2006
11. MMWD water purchases from SCWA 1973 to 2006
12. Revised Draft Water Policy Statement 2002 page 6
13. Letter from John Nelson to Joseph May 20, 1992

B C D E

Two reports:
1. Executive Summary SCWA UWMP 2000 (complete)
2. DWR report Evaluation of Groundwater Resources Sonoma County Volume 3: Petaluma, Bulletin 118-4 June, 1982; 92 pages

F G

Thank you,



RECEIVED
MAR 0 2 2007
GP Administration

H.R. Downs

1390 N. McDowell Blvd., Ste G 360, Petaluma, CA 94954 * Tel. (707) 769-2008
owl@owlfoundation.net
California Non-Profit, 501(c)(3) organization

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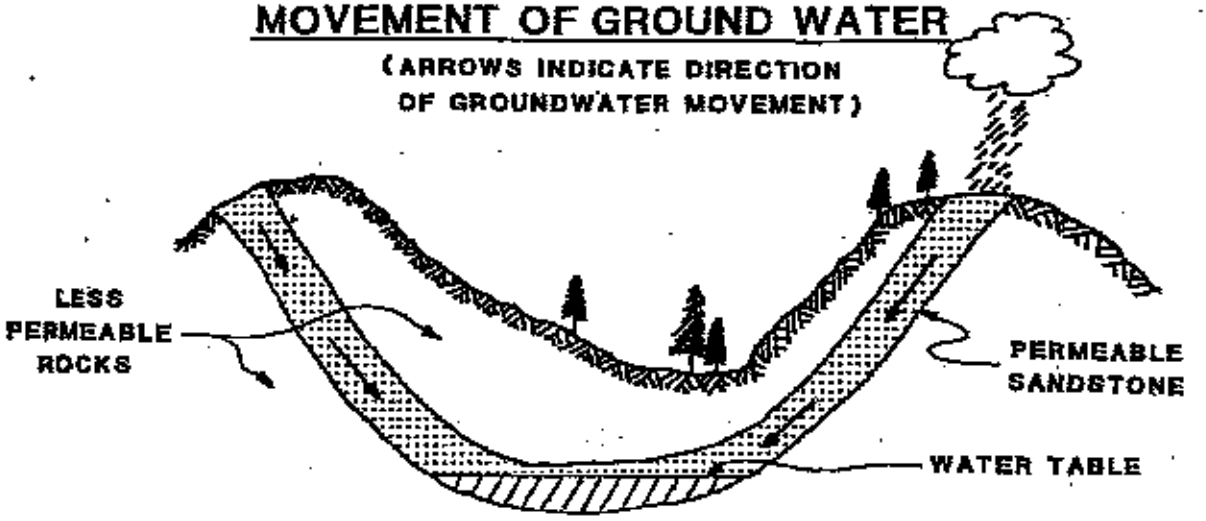
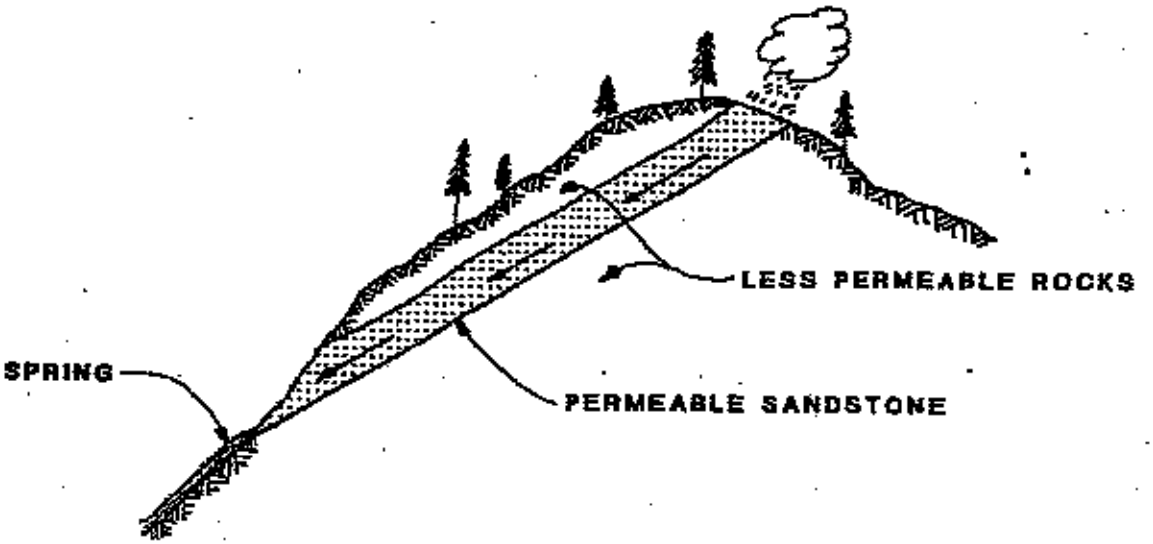
MOVEMENT OF GROUND WATER

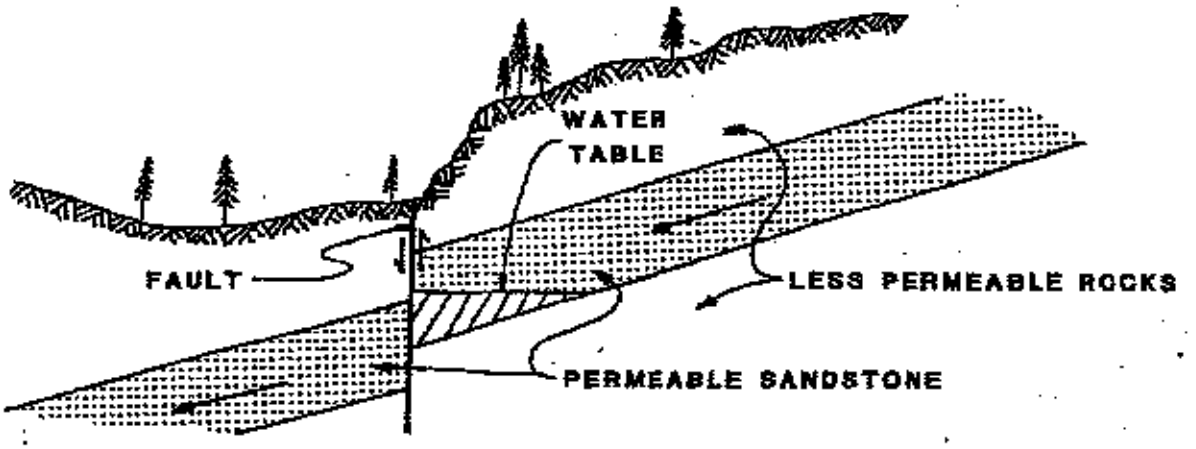
(ARROWS INDICATE DIRECTION OF GROUNDWATER MOVEMENT)



GROUND WATER MOVES DOWNDIP
UNTIL IT REACHES THE LOWEST POINT IN ELEVATION



GROUND WATER MOVES DOWNDIP UNTIL
THE PERMEABLE ROCKS ARE AGAIN AT THE SURFACE
GROUND WATER IS RELEASED AS A SPRING



TRANSMISSIVITY IS REDUCED ACROSS FAULT
GROUND WATER "STACKS UP" ON UPHILL SIDE OF FAULT

STATE OF CALIFORNIA - THE RESOURCES AGENCY — GRAY DAVIS, Governor

DEPARTMENT OF WATER RESOURCES

CENTRAL DISTRICT
3251 S Street
Sacramento, CA 95816
(916) 227-7632
(916) 227-7600 (Fax)

NORTHERN DISTRICT
2440 Main Street
Red Bluff, CA 96080
(530) 529-7300
(530) 529-7322 (Fax)

SAN JOAQUIN DISTRICT
3374 East Shields Avenue
Fresno, CA 93725
(559) 230-3300
(559) 230-3301 (Fax)

SOUTHERN DISTRICT
770 Fairmont Avenue
Glendale, CA 91203
(818) 543-4600
(818) 543-4604 (Fax)

WELL COMPLETION REPORT REQUEST–OWNER

Use this form to request a copy of the Well Completion Report on file with the California Department of Water Resources for a well you own. Describe the well below. California Water Code Section 13752 permits release of Well Completion Reports from DWR files on written request by the well owner. DWR requires the township, range, and section where the well is located to start a search. Attach a map or a sketch with north indicated, and as much identifying information listed below as possible. Use additional paper if necessary.

Location of well (city or county)_____ Year drilled_____

Street address_____

Distances and directions from cross streets or other landmarks_____

_____

Township_____, Range_____, Section_____, Quadrant_____ Use_____

Owner at time of drilling_____ Driller_____

Depth of well_____ Diameter and type of casing_____

Other identifying information, such as assessor's parcel number (on tax statement), subdivision or tract, lot number, well number, well completion report number, driller, date completed, (other)_____

_____

I certify that I am the present owner of the well described above.

_____
Name (please print)

_____
Address

_____
City, State, and Zip Code

Telephone ( ) _____

Fax ( ) _____

Date_____

E-mail_____

_____
Signature

Complete this part only if you wish a copy sent to someone other than yourself. Please send a copy of this Well Completion Report to:

_____
Name/Company

_____
Address

_____
City, State, and Zip Code

Telephone ( ) _____

Fax ( ) _____

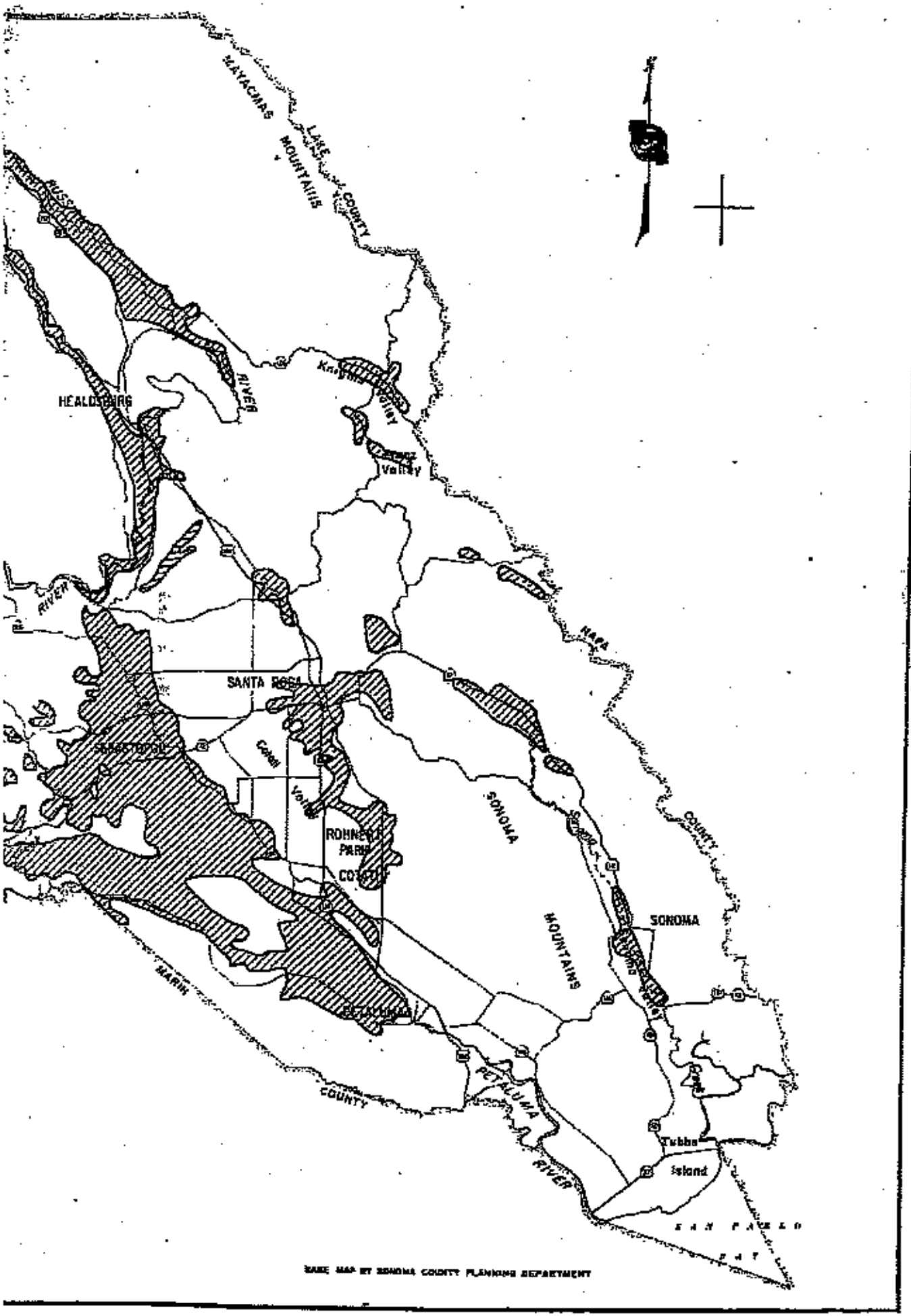
Date_____

E-mail_____

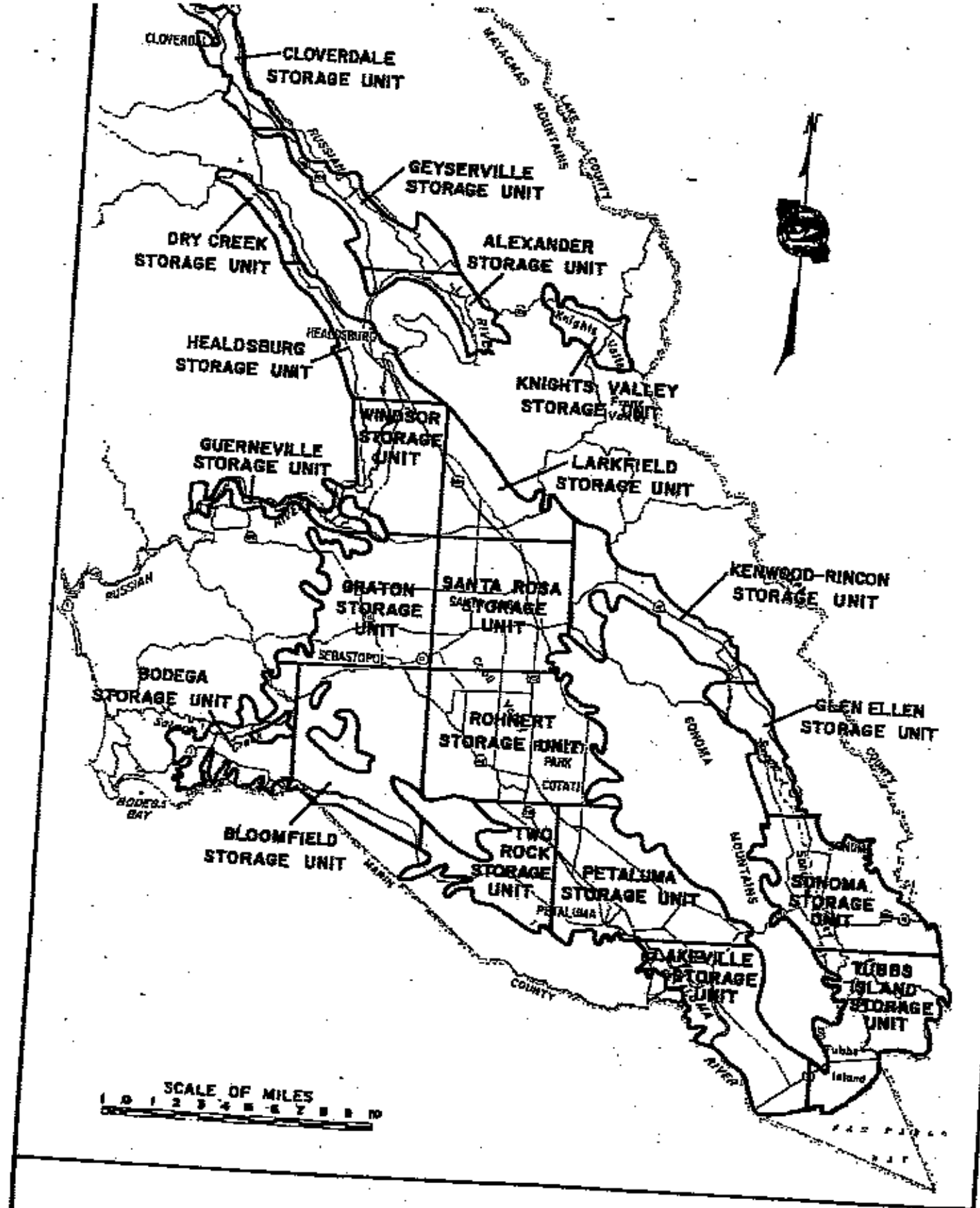
_____
Owner's Signature Authorizing Release

Ann Roth
DWR

6 June 2001



BASE MAP BY SONOMA COUNTY PLANNING DEPARTMENT



GROUND WATER STORAGE UNITS

Table 10

TOTAL GROUND WATER IN STORAGE

(By Ground Water Storage Unit[1/])

Ground Water Storage Unit	Surface Area (acres)	Surface Area (hectares)	Average Ground Elevation (feet)	Average Ground Elevation (meters)	Bottom Elevation (feet)	Bottom Elevation (meters)	Number of Control Wells	Average Specific Yield (percent)	Gross Ground Water Storage Capacity (thousand acre-feet)	Gross Ground Water Storage Capacity (cubic hectometers)
Cloverdale	5,430	2,198	300	90	+ 230	+ 64	19	17.98	50	60
Geyserville	10,176	4,118	170	50	- 500	-152	19	9.89	325	400
Alexander	4,736	1,917	150	45	- 320	- 98	18	10.95	120	150
Dry Creek	2,830	1,145	180	55	+ 40	+ 12	20	14.76	20	25
Healdsburg	9,180	3,715	100	30	- 110	- 34	25	7.78	40	50
Windsor	14,610	5,913	110	35	- 930	-283	51	9.49	1,100	1,360
Larkfield	17,800	7,203	130	40	- 510	-156	40	6.56	600	740
Graton	21,280	8,612	100	30	- 530	-162	95	13.54	2,400	3,000
Santa Rosa	23,500	9,510	80	25	- 960	-293	124	6.69	1,700	2,100
Bodega	10,400	4,209	150	45	- 160	- 49	8	12.78	500	620
Wheatfield	24,300	9,834	200	60	- 900	-274	97	15.05	2,650	3,275
Rainert	30,350	12,281	100	30	- 930	-283	79	9.22	3,100	3,825
Two Rock	14,765	5,976	60	20	- 400	-122	40	14.25	885	1,100
Petaluma	21,750	8,803	40	15	- 800	-244	65	8.22	770	950
Lakeville	20,140	8,151	20	6	- 690	-210	11	5.51	875	1,080
Kenwood-Rincon	12,660	5,124	420	130	- 740	-226	52	6.83	1,650	1,300
Glen Ellen	7,936	3,212	270	80	- 150	- 46	30	4.87	198	245
Sonoma	20,600	8,337	90	28	- 930	-283	87	8.01	1,760	2,170
Tubbs Island	21,092	8,536	20	6	- 530	-162	8	5.51	535	660
Knights Valley	3,370	1,364	400	120	+ 260	+ 83	6	7.54	15	20
Guerneville	1,840	745	40	10	- 250	- 76	41	18.82	50	60
								Total	18,735	23,080

(By Ground Water Basin[2/])

Ground Water Basin and Subbasin	Average Specific Yield (percent)	Gross Ground Water Storage Capacity (thousand acre-feet)	Gross Ground Water Storage Capacity (cubic hectometers)
Alexander Valley	14.20	495	610
Alexander Area	10.42	445	550
Cloverdale Area	17.98	50	60
Santa Rosa Basin	8.61	8,335	10,280
Santa Rosa Plain	8.03	7,135	8,795
Healdsburg Area	10.67	930	1,145
Rincon Valley	5.83	290	355
Knights Valley	7.54	15	20
Kenwood Valley	5.83	460	570
Lower Russian River	18.82	160	200
Petaluma Valley	8.86	2,100	2,590
Sonoma Valley	8.76	2,660	3,280
	Total	14,225	17,560

1/ Ground water storage units delineated on Figure 19.
2/ Ground water basins delineated on Figure 11.

Potentially Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	No Impact

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)? ☐ ☐ ■ ☐

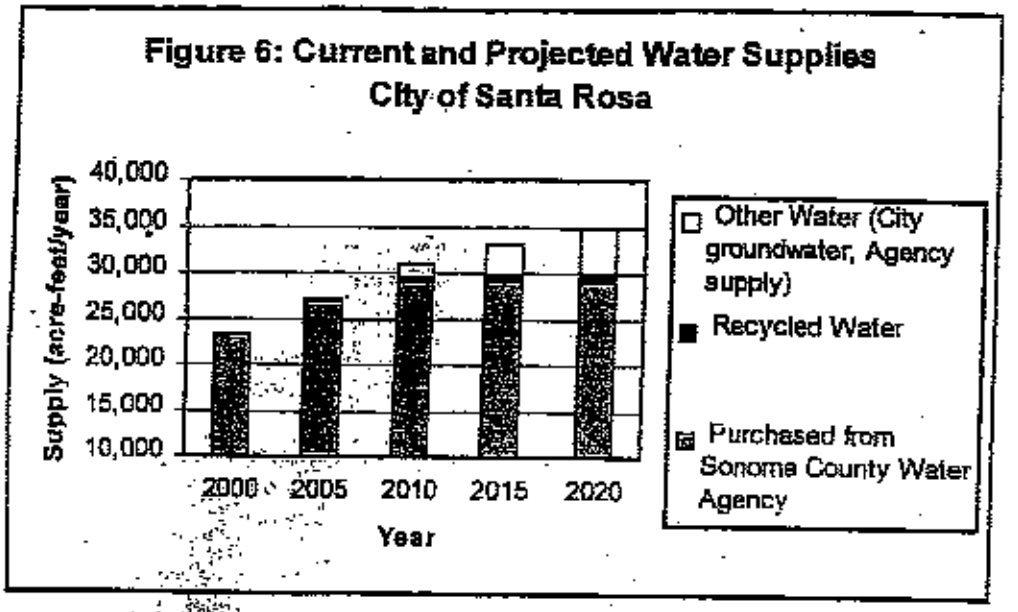
This analysis summarizes the findings of the Groundwater Study prepared by Stetson Engineers (See Appendix C). The project area is located within a Groundwater Recharge Area and within an area identified as a major groundwater basin.[10](1) Use of groundwater in the area since the 1950's has affected water levels and the direction of flow of groundwater. Water levels have declined from published depths of about 20 to 40 feet in 1951 (Cardwell, 1958) to about 100 feet under current conditions. Water level data from nearby wells completed at different depths suggests the possibility of semi-confined conditions that cause some variation in estimates of depth to the water table. (10)

Copeland Creek and a small tributary to Lichau Creek along Roberts Road flow near but not through Canon Manor West. They enter the ground water basin east of Canon Manor and flow west and southwest away from the project area. These streams, and particularly their headwaters to the east, probably represent the primary source of recharge to this portion of the groundwater basin. When groundwater levels are high, these streams help to recharge ground water levels in the basin. Currently, the primary discharge areas for groundwater are both municipal and domestic wells.

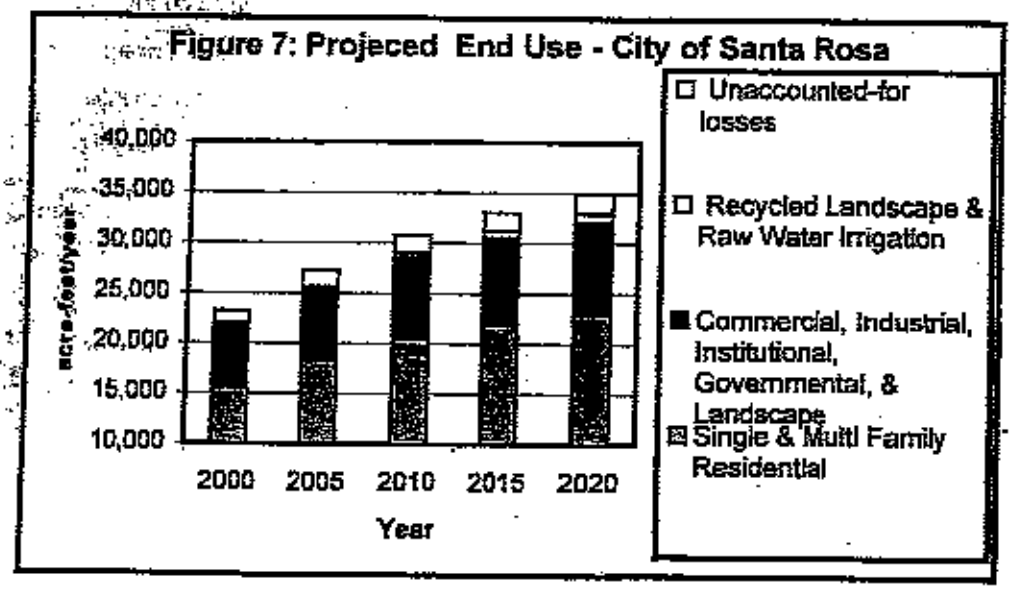
Natural recharge from streams and precipitation for the entire basin has been estimated by CDWR (1982) at about 30,000 acre-feet per year (afy). Natural recharge to the southern one third of the Santa Rosa basin, in which the project is located, has been estimated to range from about 700 afy (0.6 million gallons per day (Mgd)) to 3700 afy (3.3 Mgd) with an average of approximately 1,900 afy over the period of 1970-1999 (Revised Rohnert Park General Plan, 2000). The total amount of natural recharge in the southern portion of the basin is significantly less than one third of the Santa Rosa basin total because much of the basin recharge occurs due to percolation from the Russian River and other large creeks north of Rohnert Park.

The impact of the project on local ground water supplies is not expected to be significant under current and project-proposed levels of development. Existing pumping from domestic wells

[10] Sonoma County General Plan, Figure RC-2g.



West Yost and Associates. Year 2005 data is based on the low range demand projections; projections for the years 2010 – 2020 are based on the mid-point of the low projections and high projections of this study.



Supply and Demand Comparison: No deficits are projected for the City of Santa Rosa through 2020.

NORTH MARIN WATER DISTRICT:

Water Supply and Sources: Figure 8 shows the current and projected water supplies available to North Marin Water District (NMWD). NMWDs entitlement to Agency transmission system water under the Eleventh Amended Agreement is a maximum average monthly delivery rate of 19.9 mgd with an annual limit of 14,100 AF. NMWD also has a local surface water source from Lake Stafford. Lake Stafford source has a safe yield of approximately 2,000 AF.

Figure 2 - 1
GENERAL LOCATION MAP
Agency's Transmission System and Service Area

Page 2

Monthly pumpage Sonoma County Water Agency, Santa Rosa Plain Wells, Occidental, Todd and Sebastopol

	Occ. Well Gallons	Seb. Well Gallons	Todd Well Gallons			Occ. Well Gallons	Seb. Well Gallons	Todd Well Gallons
Jan-99	5744640	12432508	9702308		Jan-03	0	76833812	33281316
Feb-99	0	0	0		Feb-03	0	55970596	31537924
Mar-99	0	0	50864		Mar-03	0	72867168	32364464
Apr-99	0	36584680	28328256		Apr-03	0	76662520	45149280
May-99	0	53977824	46313168		May-03	0	71479628	43511160
Jun-99	0	61737676	55257752		Jun-03	0	74155224	46575716
Jul-99	0	49109940	45393876		Jul-03	37128476	62773656	47466584
Aug-99	0	56227160	52013676		Aug-03	51577824	52732504	43627648
Sep-99	0	39341808	45832204		Sep-03	62891840	53234412	42028824
Oct-99	0	0	24334684		Oct-03	51078676	48660101	47585516
Nov-99	0	0	45432024		Nov-03	38522748	42439276	42456480
Dec-99	11379324	0	52419840		Dec-03	50650072	44697488	51543184
Jan-00	40645572	0	55551716		Jan-04	42582892	44800712	48714996
Feb-00	36258552	0	38251972		Feb-04	43086296	50473544	45443244
Mar-00	9634988	0	16144832		Mar-04	43275540	46916804	52799076
Apr-00	18247460	0	15999720		Apr-04	38736676	29906536	33750508
May-00	25518768	0	59401672		May-04	38187644	47172620	37794944
Jun-00	20069588	0	50101788		Jun-04	41232004	58722488	50828096
Jul-00	33432608	0	55161260		Jul-04	43588204	52421336	32862632
Aug-00	33185768	0	54111816		Aug-04	55517308	54837388	45774608
Sep-00	13992088	0	35147772		Sep-04	35209108	61284388	41897724
Oct-00	0	0	57524940		Oct-04	49810816	8067928	35816768
Nov-00	0	0	52092964		Nov-04	12637460	21698732	17109004
Dec-00	0	0	49752472		Dec-04	14960	84307080	36975884
Jan-01	0	0	59972396		Jan-05	8985724	66483736	37316217
Feb-01	0	0	49696372		Feb-05	59884132	11018033	31494540
Mar-01	0	0	52419092		Mar-05	79057616	104334780	42177476
Apr-01	0	0	56683440		Apr-05	82321888	41550652	37921356
May-01	0	0	51238748		May-05	106868540	42899580	43036928
Jun-01	0	0	41635924		Jun-05	68126344	49673184	38543692
Jul-01	0	0	51065960		Jul-05	97873556	41341212	35865104
Aug-01	0	69757994	44977240		Aug-05	126101580	52716048	39302912
Sep-01	0	63140999	39954420		Sep-05	73797680	36435080	35518780
Oct-01	0	81444073	38457672		Oct-05	48111949	39204824	32351748
Nov-01	0	63907624	35098404	X	Nov-05	109934308	48007388	18967036
Dec-01	0	76195768	3284468		Dec-05	80855060	27976200	30834056
Jan-02	0	90763068	47999998		Jan-06	95343072	40529632	35307096
Feb-02	0	74943616	47399997		Feb-06	106444888	22209616	53856
Mar-02	0	73954012	46750000		Mar-06	111965876	38011864	58344
Apr-02	0	83039968	51211620		Apr-06	90561108	3663704	12295624
May-02	0	72086256	42486400		May-06	100081652	24684	34298792
Jun-02	0	64692276	41339716		Jun-06	90205053	2560404	32716024
Jul-02	0	47749328	46266440		Jul-06	91600828	40052408	31506508
Aug-02	0	78540	37038716		Aug-06	748	38619988	34075140
Sep-02	0	44221012	38560148		Sep-06	0	34358632	30591704
Oct-02	0	73515677	8328980		Oct-06	0	8859312	33162580
Nov-02	0	31647132	24618924		Nov-06	0	0	31463124
Dec-02	0	52304648	27410460		Dec-06	0	0	18352928

These data prepared by George Lincoln, P.E., Sonoma County Water Agency, January 25, 2007

The deliveries from SCWA to NMWD are pursuant to the Agreement for Water Supply and Construction of the Russian River – Cotati Intertie Project and authorized amendments thereto.

FYE	MG
1973	1,483
1974	1,722
1975	1,574
1976	1,937
1977	1,729
1978	1,083
1979	1,591
1980	1,999
1981	2,575
1982	2,005
1983	1,808
1984	2,190
1985	2,810
1986	2,712
1987	2,575
1988	2,806
1989	2,725
1990	2,733
1991	2,895
1992	2,609
1993	2,336
1994	2,579
1995	2,839
1996	2,701
1997	2,771
1998	2,244
1999	2,505
2000	2,853
2001	2,954
2002	3,016
2003	2,564
2004	3,095
2005	3,041
2006	3,518

BILLION GALLONS

NORTH MARIN WATER DISTRICT RELIES ON THE SCWA FOR APPROXIMATELY 80% OF ITS DAILY WATER NEEDS.

J.C.K.
2-14-07

MMWD

Water Purchases
in Gallons

Year	SCWA Deliveries
1973	0
1974	0
1975	0
1976	347,007,672
1977	592,682,587
1978	498,518,084
1979	759,181,104
1980	761,787,734
1981	723,665,765
1982	631,130,386
1983	593,008,416
1984	915,253,099
1985	753,318,186
1986	725,620,738
1987	1,052,101,195
1988	1,450,569,818
1989	2,125,381,262
1990	1,681,276,608
1991	2,387,673,446
1992	1,816,169,731
1993	1,475,678,635
1994	2,150,795,909
1995	1,517,710,550
1996	1,960,387,446
1997	2,373,336,979
1998	2,418,953,011
1999	2,581,867,411
2000	2,568,058,158
2001	2,569,811,746
2002	2,712,198,931
2003	2,649,985,630
2004	2,605,978,742
2005	2,368,351,799
2006	2,329,350,091

Policy and Direction Regarding Russian River Water Rights

Policy: The Agency should take all steps reasonably necessary to defend its existing water rights and to acquire additional rights as needed to meet its contractual obligations.

Direction:

a. The Agency will continue to file objections with the State Water Board to the issuance of any new Russian River, Dry Creek, or other water rights, including those applications that could affect the Agency's water rights, unless the new rights are conditioned to recognize the priority of the Agency's rights.

b. Agency staff will increase efforts to quantify and monitor existing uses of Russian River and Russian River tributary water so that the Agency's priority water rights may be enforced in times of shortage.

c. The Agency will apply for and pursue new and modified water rights as needed to provide water under current, amended, and future water supply agreements.

d. The Agency will continue to develop and negotiate agreements with potentially competing water users as necessary to resolve water rights disputes and protect the Agency's water rights. When developing agreements, the Agency will include, where feasible, the provision of using recycled water to offset existing potable water use.

2. *Water Supply*

Background:

a. Surface Water

The Agency's enabling act authorizes it to provide water and construct facilities needed to serve water for all purposes, including domestic, municipal, commercial, industrial, recreational, and agricultural purposes.[7] The Agency's enabling act does not, however, require that the Agency provide a water supply to any particular party in any particular amount or from any particular source.

The Agency has constructed and operates a water transmission system that delivers potable water to distribution systems in Sonoma and Marin Counties. The water transmission system has been financed and constructed, and is operated and maintained, pursuant to the Agreement for Water Supply between the Agency and the cities and water districts it

[7] The Agency's enabling act (Statutes of 1949, Chapter 994 as amended) contains no limitations on the uses to which water served by the Agency may be put to use. The Agency, under contract with the federal government, has rights to store water in Lake Sonoma for water supply use. Although the Agency's enabling act does not limit uses to which the Agency may put water, both the federal contract and the water rights for Lake Sonoma preclude the use of water for irrigation and agricultural use.

NORTH MARIN WATER DISTRICT
[illegible] - POST OFFICE BOX 146 - NOVATO, CALIFORNIA [illegible] - [illegible] - FAX [illegible]

May 20, 1992

Mr. Joseph Netter, City Manager
City of Rohnert Park
6750 Commerce Boulevard
Rohnert Park, CA 94928

Subj: Use of Surplus Entitlement

Dear Mr. Netter:

As you know, North Marin's existing entitlement is set by the Agreement for Water Supply and Construction of the Russian River - Cotati Intertie Project dated October 25, 1974 and last amended on December 17, 1990 at 11.2 mgd (Section 3.1(b)). Furthermore, Section 3.3(b) provides that North Marin may obtain excess deliveries in an amount not greater than 3.6 mgd provided said deliveries do not impair or delay the delivery to any other regular customer of said customer's entitlement and provided further that North Marin is then proceeding with plans and funding for expansion of the transmission system. Like Rohnert Park, North Marin is supporting and proceeding with expansion of the Agency's transmission system. Lastly, North Marin enjoys access and use of Petaluma's surplus entitlement pursuant to the Agreement for Use of Surplus Capacity dated November 15, 1990 between the City of Petaluma and North Marin (copy attached for your reference, refer Section 8).

North Marin acknowledges that Rohnert Park, Petaluma and this District are all cooperatively working towards consummation of a new Master Water Supply Agreement which would provide for expansion of the existing Sonoma County Water Agency's aqueduct facilities to meet the future planned requirements of all concerned. North Marin is also aware that Rohnert Park is temporarily in need of use of excess entitlements of others during the interim period until the new Master Agreement is approved.

Pursuant to your request of April 10, 1992, and requests made by Bob Beach, Manager of Sonoma County Water Agency, North Marin agrees that surplus entitlement available to North Marin due to the above noted agreements which is not being used by North Marin may be made available for use by the City of Rohnert Park until such time as the new Master Water Supply Agreement is approved.

Sincerely yours,

John Olaf Nelson
General Manager

Enclosure:
- Agreement for Use of Surplus Capacity

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EXECUTIVE SUMMARY

SONOMA COUNTY WATER AGENCY
URBAN WATER MANAGEMENT PLAN 2000

Prepared: February 20, 2001

The plan was prepared by Sonoma County Water Agency with participation of staff members from:

City of Santa Rosa
North Marin Water District
City of Petaluma
City of Rohnert Park
City of Cotati
Valley of the Moon Water District
City of Sonoma
Forestville Water District

Note: This document is a summary of the content of the Sonoma County Water Agency Urban Water Management Plan 2000. Copies of the original report are available for public inspection or can be obtained from the Sonoma County Water Agency, 2150 West College Avenue, Santa Rosa, CA 95401.

SONOMA COUNTY WATER AGENCY

The Sonoma County Water Agency (Agency) was created by California state legislation (Statutes of 1949, Chapter 994 as amended) and is empowered to produce and deliver potable water for municipal and industrial purposes; prevent the waste or diminution of water supplies; control and conserve flood and storm waters to reduce potential damage to life and property; provide sanitary sewage services; and provide recreational services in connection with flood control and water conservation activities. The Agency operates under the direction of a Board of Directors that, for governance of the water supply system, consists of members of the Sonoma County Board of Supervisors.[1]

The Agency delivers water, on a wholesale basis, to customers through the Agency's water transmission system. The primary water customers, collectively known as the water contractors, consist of the cities of Santa Rosa, Rohnert Park, Petaluma, Cotati, and Sonoma; and the North Marin, Valley of the Moon, and the Forestville Water Districts. The responsibility for supplying water to the water contractors is entrusted to the Agency through an agreement entitled, "Eleventh Amended Agreement for Water Supply" which was originally executed in 1974 and most recently amended in 2001 (Eleventh Amended Agreement). The Agency also provides water, on a wholesale basis, to additional water purveyors, including, but not limited to: Marin Municipal Water District, the Town of Windsor, and the Lawndale Mutual, Penngrove, and Kenwood Water Companies.

Collectively, the water contractors' service areas reach from the middle of Marin County northward to Santa Rosa, bounded by the City of Sonoma to the east and Forestville to the west. Figure 1 is a General Location Map of the Agency's water transmission system and service area.

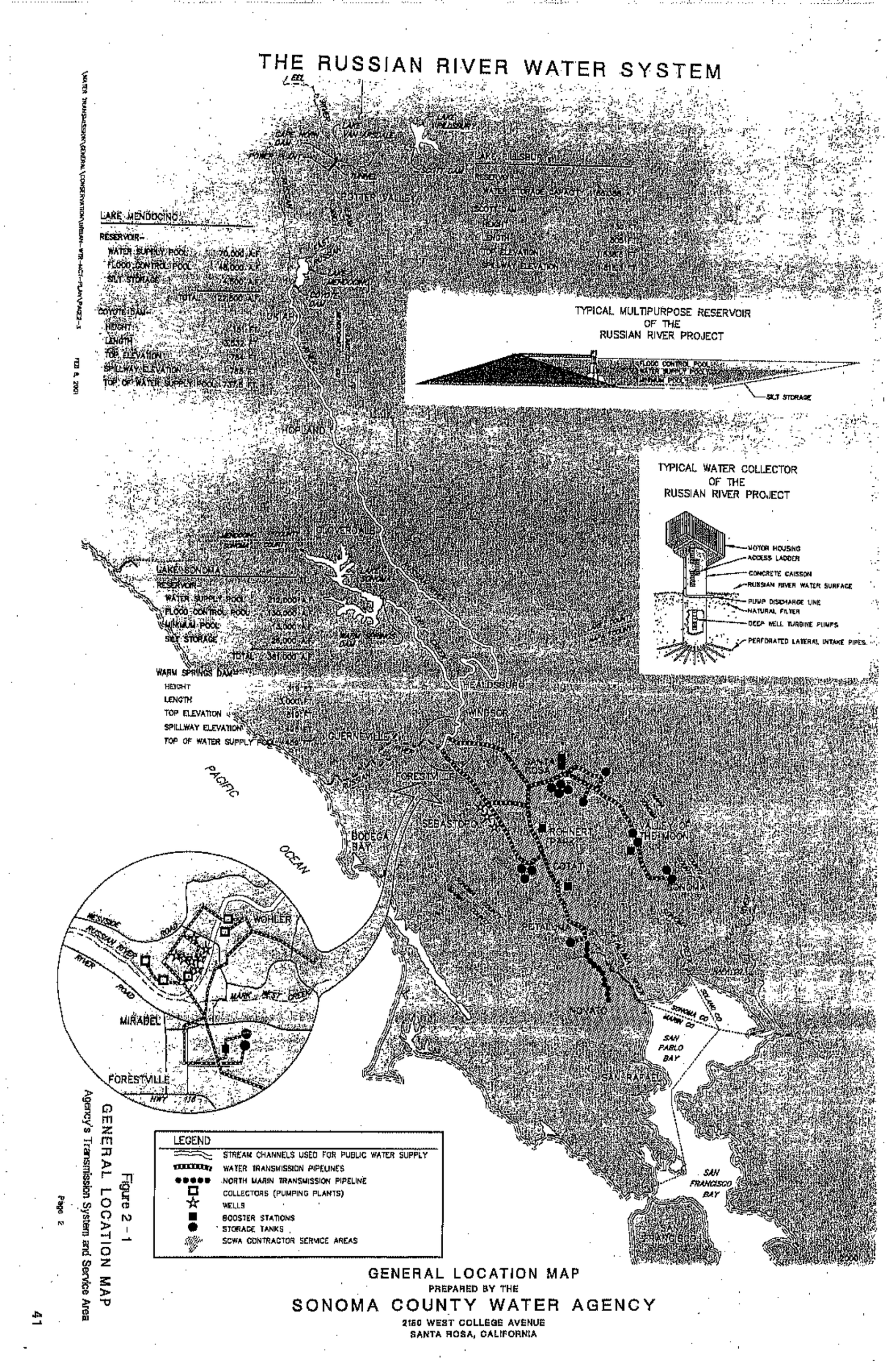
REGIONAL URBAN WATER MANAGEMENT PLAN 2000

The regional Urban Water Management Plan (UWMP 2000) has been prepared by the Agency as required by California Water Code, Sections 10610 et seq. The UWMP 2000 is intended to serve as the Urban Water Management Plan for the Agency and its eight primary water contractors.[2]

Covering the Agency and its eight water contractors, the UWMP 2000 describes the availability of water and discusses water use, reclamation, and water conservation activities. The UWMP 2000 concludes that the water supplies available to the Agency's water transmission system, and to the eight water contractors that this plan covers, are adequate over the next 20-year planning period.

The evaluation and conclusions in the UWMP are based in part upon assumptions about the most likely outcome of decisions of regulatory agencies over the 20-year planning period. The Agency recognizes that regulatory agencies may make different decisions or take different actions than those assumed by the Agency, which may affect the

[1] The Board of Directors for governance of the sanitation districts differs from the Board of Directors for the water supply system.
[2] It is assumed that customers that are supplied with water via the Agency's transmission system and are not water contractors will submit individual UWMPs, as required.



\WATER TRANSMISSION\GENERAL\CONSERVATION\URBAN-WTR-ACT-PLAN\PAGE2-1 FEB 8, 2001

Figure 2-1
GENERAL LOCATION MAP
Agency's Transmission System and Service Area

Page 2

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availability of water and the adequacy of the Agency's transmission system. The Agency concludes, given the facts currently available, that the assumptions in the UWMP 2000 are reasonable.

Local planning agencies choosing to consider the UWMP 2000 as a reference for analysis of water availability are encouraged to check with the Agency or their appropriate water contractor for updated information regarding the assumptions on which the UWMP 2000 is based.

In its analysis of the availability of water for diversion from the Russian River by its transmission system, the Agency assumes that the current interim flow schedule for the Potter Valley Project[3] that has been voluntarily implemented by Pacific Gas and Electric Company (PG&E) will continue, either voluntarily, or as a requirement of PG&E's Federal Energy Regulatory Commission (FERC) license. The Agency also assumes that the water right permit terms that the State Water Resources Control Board (SWRCB) now includes in new water rights permits will be enforced. The permit terms establish the seniority of the Agency's water rights in relation to new water rights. Finally, the Agency assumes that the listing of three salmonid species as threatened under the federal Endangered Species Act (ESA) will not reduce the amount of water it can supply using its Russian River diversion facilities.

With respect to the Agency's ability to deliver water, the Agency assumes that it will construct and operate the Water Supply and Transmission System Project (WSTSP) approved by its Board of Directors in December 1998 without significant changes to the project. Project changes could, however, be required by state and federal agencies, including National Marine Fisheries Service (under the ESA) and the SWRCB (which implements California water rights laws).

If construction and operation of the WSTSP or an alternative project to meet the demands of the water contractors is delayed, deliveries by the Agency to its water contractors will be limited to the capacity of the transmission system. The State Department of Health Services (DHS) recently evaluated the adequacy of the Agency's existing system to meet the demands of the water contractors.[4]

Coordination With Cities, Districts, and Other Agencies

The Agency coordinated development of the UWMP 2000 with all of the water contractors and staff from the Santa Rosa Subregional Wastewater System, the Petaluma Wastewater Treatment Facility, and the Novato Sanitary District. The divisions within the Agency that assisted in preparation of UWMP 2000 include: the divisions of Water Supply Planning and Resources, Operations and Maintenance, and Environmental Resources and Public Affairs. In addition, Agency staff, in the capacity of managing the Sonoma Valley and Forestville County Sanitation Districts, assisted in UWMP 2000 preparation.

[3] PG&E diverts water from the Eel River into the Russian River through the Potter Valley Project Powerhouse in Mendocino County.

[4] The DHS Report is available for review at the Sonoma County Water Agency.

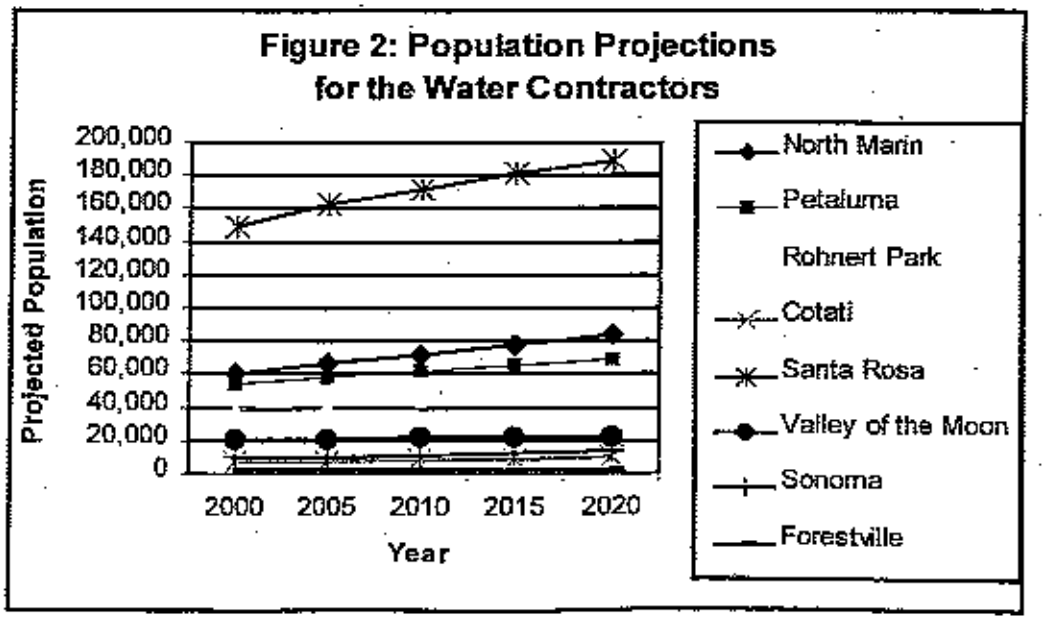
DESCRIPTION OF THE SERVICE AREA

Climate: The climate of the Russian River watershed is tempered by its proximity to the Pacific Ocean. In common with much of the California coastal area, the year is divided into a wet season and a dry season. Approximately 93 percent of the annual precipitation normally falls during the wet season, October to May, with a large percentage of the rainfall typically occurring during three or four major winter storms. Winters are cool, but below-freezing temperatures are seldom experienced. Summers are warm and the frost-free season is fairly long, varying from 224 days in Santa Rosa to 265 days in Cloverdale. Average annual precipitation over the Russian River Basin is 41 inches, ranging from about 22 inches over the southern portion of the Santa Rosa Plain to over 80 inches near Cazadero. The quantity of rainfall increases with elevation, with the center of greatest precipitation occurring over the highest ridges. The climate in northern Marin County follows similar patterns.

Employment: Within the water contractors' service area, employment is primarily within the public and private service and manufacturing industries. Within the region, there is also employment in the agricultural industry with the greatest emphasis on vineyards, livestock, orchards, silage crops, and timber. In recent years there has been a growing trend toward telecommunications, light industry, and commercial development in the region.

Land Use: Land use within the water contractors' service area is characterized as suburban. Residential development is more densely concentrated in the cities of Santa Rosa, Rohnert Park, Petaluma, and Cotati than in Forestville, Sonoma, or Valley of the Moon. In the North Marin County area, residential development is more concentrated in the city-centered corridor, which runs north to south along Highway 101 and adjacent to San Pablo Bay.

Population Projections: Figure 2 shows the projected population growth and the overall rate of increase for each water contractors. Collectively, the population within the water contractors' service area is expected to increase by approximately 28% over the next twenty years to a total population of approximately 439,961.



AGENCY WATER SUPPLY AND DEMAND

Supply Functions of The Agency: The Agency has two principal water supply functions: delivery and flow regulation. The Agency constructs and operates a water transmission system that delivers water to public and investor-owned water distribution systems in Sonoma and Marin Counties. The transmission system is financed, constructed, and maintained pursuant to the Eleventh Amended Agreement. It is the delivery function that is the subject of the Urban Water Management Plan 2000.

Water Supply Sources: The principal source of water for the Agency's water transmission system is the natural flow of Dry Creek and the Russian River, augmented by diversions from the Eel River made by PG&E's Potter Valley Project. A secondary source of water for the Agency is its three production wells located west of the City of Santa Rosa, near the Laguna de Santa Rosa.

Agency's Surface Water Supply: Digital computer hydrologic models are used to analyze the adequacy of surface water supplies available to the Agency. To determine the water available at the Agency's water transmission system intakes, model runs were made to simulate different historic hydrologic periods as specified in California Water Code Section 10631(c). These periods were selected from the historical hydrologic record to best represent an average water year, a single dry water year, and multiple dry water years. For each simulation, the model includes the years immediately prior to the water year(s) of interest. Inclusion of these prior years is necessary to establish the beginning reservoir conditions and essential to avoid having to assume beginning reservoir storage levels that would control the results of the modeling.

Continuing sedimentation of Lake Pillsbury, Lake Mendocino and Lake Sonoma, and small increases in diversions along the Russian River that could occur will result in a gradual small reduction in the water supply available to the Agency's water transmission system. Based on historic rates of sedimentation of Lake Pillsbury and Lake Mendocino and estimated sedimentation rates for Lake Sonoma, it is estimated that a reduction in surface water supply available to the Agency's water transmission system will occur at a rate of approximately 1,000 acre-feet each five years between now and the year 2020.

To represent an average water year, 1962 was selected. Water year 1962 was slightly drier than average and was preceded by two similar years. The current total average year surface water supply available to the Agency's water transmission system is 212,920 acre-feet.

To represent a single dry water year, water year 1977 was selected. Water year 1977 is the single driest year of record. The current total single dry year surface water supply available to the Agency's water transmission system is 87,970 acre-feet.

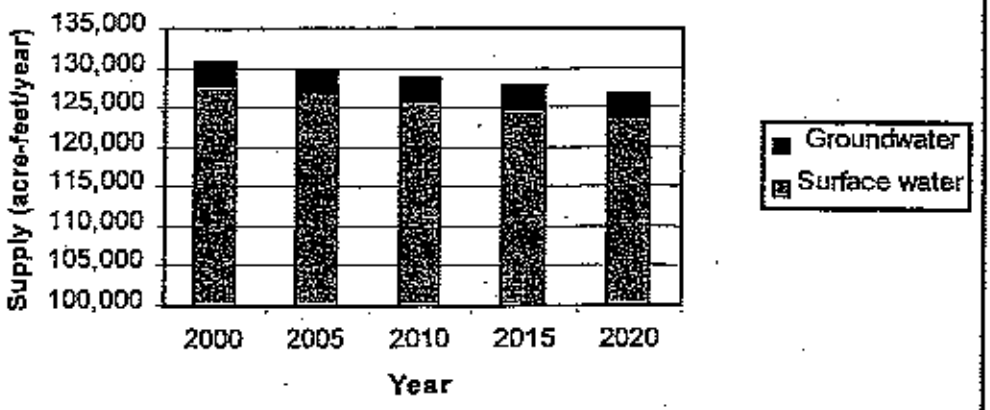
To represent multiple dry years, water years 1990 through 1992 were selected. While this is not the driest three-year period of record (1929-1932 and 1931-1933 were slightly drier), it is the driest three-year period of record for which Potter Valley Project diversions for the three-year period, and critical prior period, can be modeled. The

current total multiple dry year surface water supply available to the Agency's water transmission system is 127,830 acre-feet in the first year, 127,660 acre-feet in the second year, and 127,460 acre-feet in the third year.

Agency's Ground Water Supply: In addition to the surface water supply from the Russian River described above, the Agency has three existing groundwater wells in the Santa Rosa Plain with a maximum production capacity of 7.6 million gallons per day (mgd). These wells are located on Sebastopol Road, Occidental Road and Todd Road and have capacities of 3.6 mgd, 2.3 mgd and 1.7 mgd, respectively. The reliable capacity of the Agency's existing wells (2/3 of the capacity with the largest well out of service) is 2.7 mgd, or 3,025 acre-feet per year (AFY).

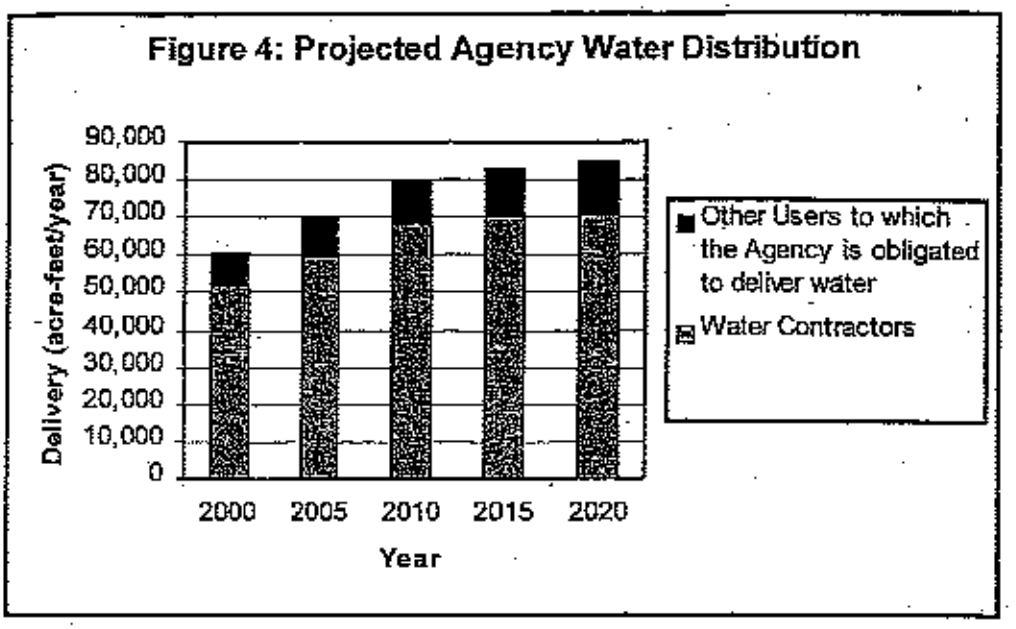
Total Water Supply Available to the Agency: The current and projected water supplies available to the Agency's water transmission system are shown in Figure 3.[5] The water supply deemed available in Figure 3 is based upon the multiple dry years 1990 through 1992 (and the four preceding years). The apparent decline in water availability is due to the estimated rate of sedimentation of Lake Pillsbury, Lake Mendocino and Lake Sonoma. It is estimated that a reduction in surface water supply available to the Agency's water transmission system will occur at a rate of approximately 1,000 acre-feet each five years between now and the year 2020.

Figure 3: Current and Projected Water Supplies
Multiple Dry Year Hydrologic Modeling Results

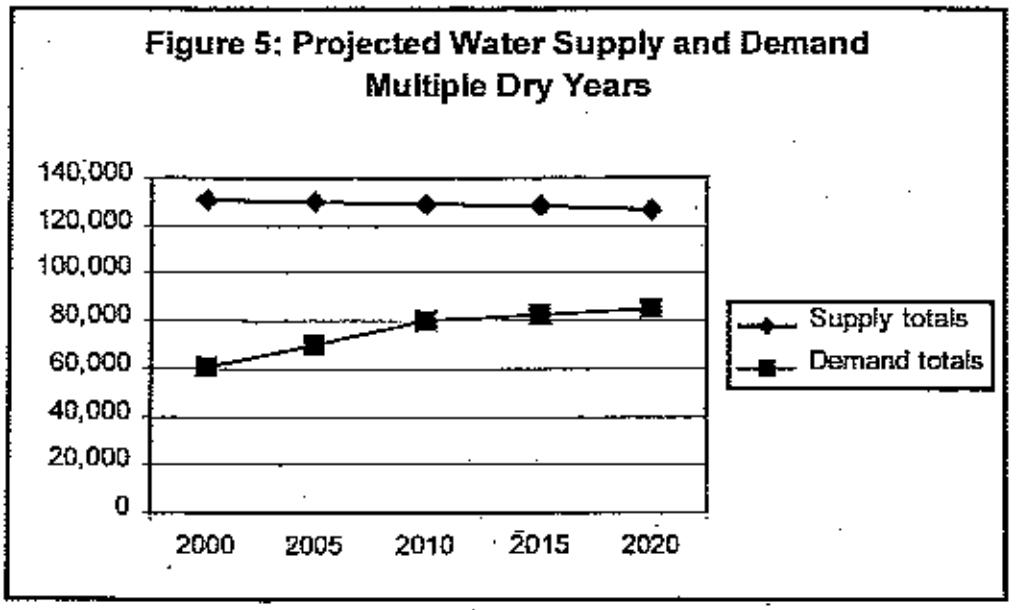


Past, Current, and Projected Water Use: The current and projected wholesale water distribution by the Agency is shown in Figure 4. The historical water distributed in water years 1990 and 1995 was 51,439 and 53,644 acre-feet, respectively. The annual rate of increase from water years 1990 through 2000 was approximately 1.7 percent.

[5] The Agency's existing water rights permits include terms that limit the amount of water the Agency can store in Lake Mendocino and Lake Sonoma, as well as directly divert and re-divert at Wohler-Mirabel and other authorized points of diversion. For purposes of analyzing water available to the Agency's transmission system in the UWMP 2000, it is assumed that any applications and petitions necessary to change the limits in the Agency's existing permits will be approved by the State Water Resources Control Board.



Supply and Demand Comparisons: Figure 5 compares the total water supply available to the Agency's water transmission system in multiple dry water years with projected total water use over the next 20 years, in five-year increments.



Supply and Demand Comparison: No deficits are projected for the Sonoma County Water Agency through 2020.

CONTRACTORS' WATER SUPPLY AND DEMAND

As mentioned previously, the Agency delivers water, via its transmission system, to the eight water contractors covered by the UWMP 2000 pursuant to the Eleventh Amended Agreement. The Agency's Board of Directors certified an Environmental Impact Report for a Water Supply and Transmission Project (WSTSP) that proposes to expand use of the water supply provided by Lake Sonoma and the Agency's current water transmission system. The WSTSP will provide additional supplies to the water contractors and was approved by the Agency's Board of Directors in 1998. The Eleventh Amended Agreement is the institutional structure under which the WSTSP will be constructed, operated, and maintained.

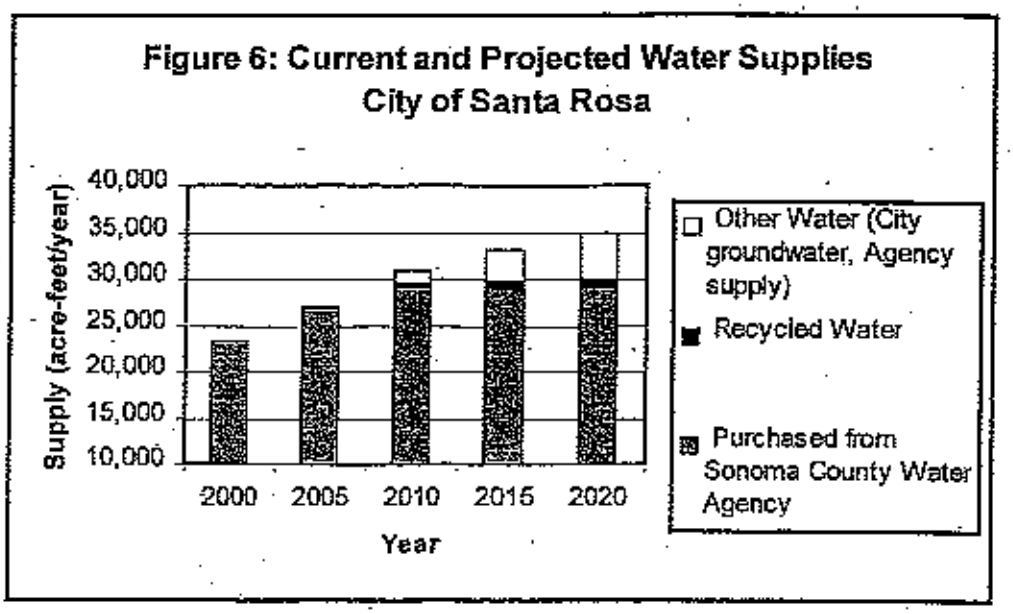
A description of current and projected water supplies available to the water contractors follows. Projections reflect the assumption that the quantities of water proposed by the WSTSP will be available to the water contractors. The Agency assumes that it will construct and operate the Water Supply and Transmission System Project (WSTSP) approved by its Board of Directors without significant changes. Project changes could, however, be required by state and federal agencies, including National Marine Fisheries Service (under the ESA) and the SWRCB (which implements California water rights laws).

The water supply defined to be available to the Agency, based on hydrologic modeling, may be available to the water contractors to meet the demands that have been identified in the UWMP 2000 over the 20-year planning period. Any increases in water delivery beyond that which is authorized in the WSTSP will require completion of additional environmental documentation addressing growth issues and the impacts of such additional delivery to other Russian River beneficial uses and will require application(s) to the State Water Resources Control Board for additional water diversion or re-diversion rights. In addition, the Agency and the water contractors that require additional water supply will need to execute additional appropriate contracts increasing their annual delivery entitlements.

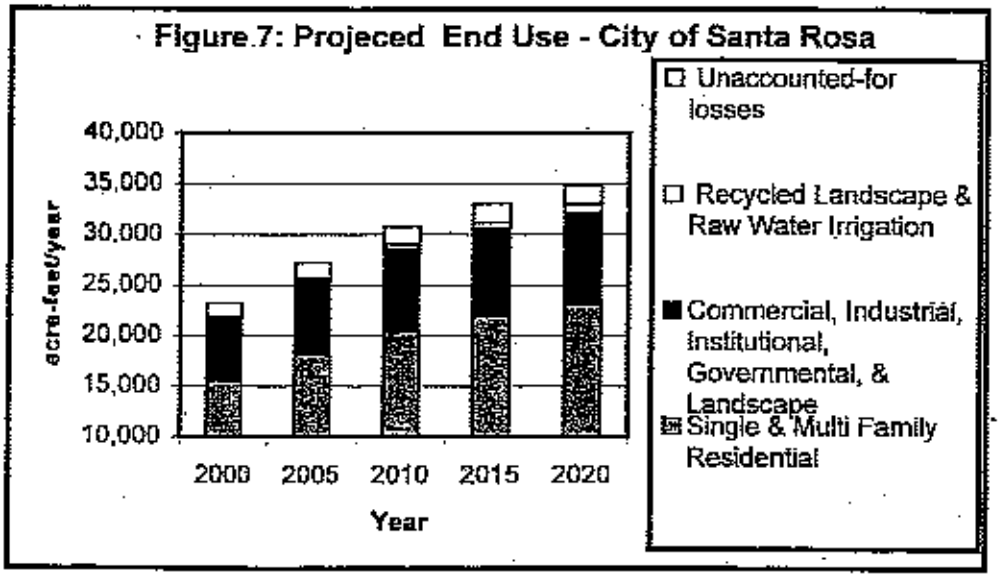
CITY OF SANTA ROSA

Water Supply and Sources: Figure 6 shows the current and projected water supplies available to the City of Santa Rosa (Santa Rosa). Santa Rosa's entitlement to Agency transmission system water under the Eleventh Amended Agreement is a maximum average monthly delivery rate of 56.6 million gallons per day (mgd) with an annual limit of 29,100 acre-feet (AF). Santa Rosa currently has 7 operational standby groundwater wells with a rated production capacity of 6.5 mgd. Currently, Santa Rosa's wells provide no long-term reliable capacity because they are only approved by the State Department of Health Services for standby use (less than 15 days per year). However, if these wells were improved in the future such that they could be used on a continuing basis, the reliable capacity (2/3 of the capacity with the largest well out of service) would be 4.3 mgd, or 4,817 acre-feet per year (AFY).

Current and Projected Use: Figure 7 shows the available water end-use data provided by the City of Santa Rosa (Santa Rosa). The projections are based on the "Santa Rosa Water Supply Analysis – Draft January 2001" by



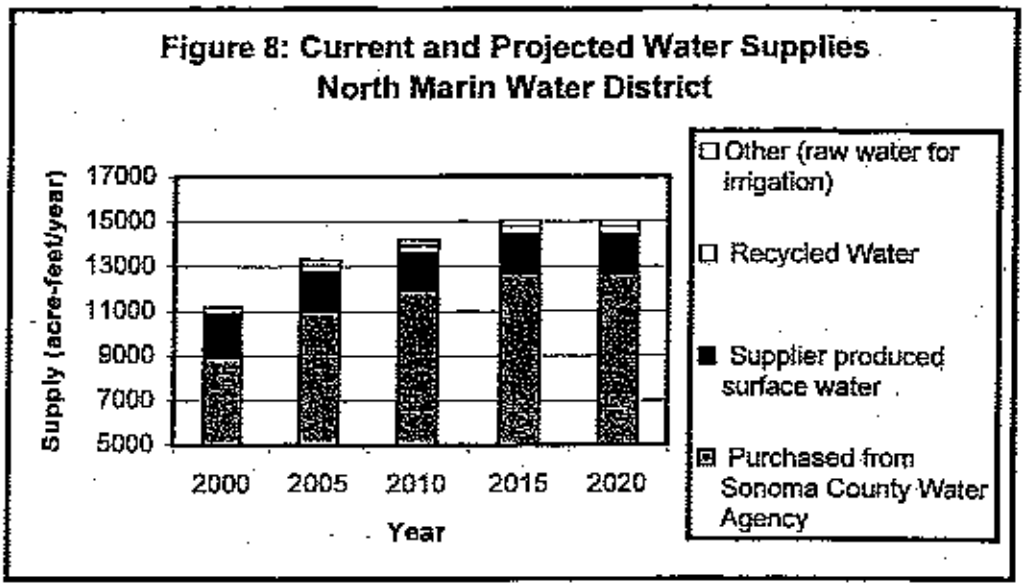
West Yost and Associates. Year 2005 data is based on the low range demand projections; projections for the years 2010 – 2020 are based on the mid-point of the low projections and high projections of this study.



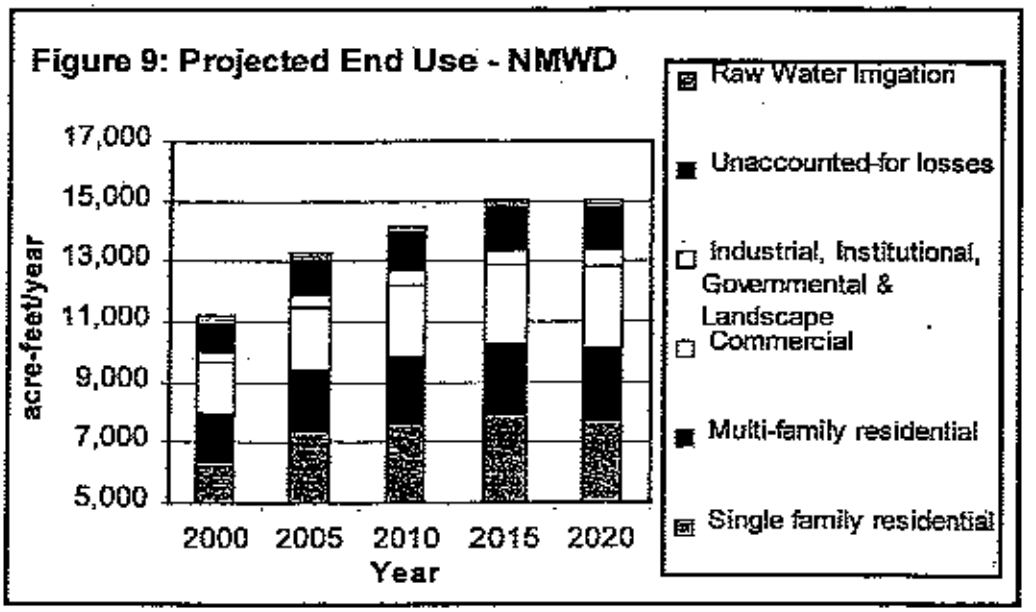
Supply and Demand Comparison: No deficits are projected for the City of Santa Rosa through 2020.

NORTH MARIN WATER DISTRICT:

Water Supply and Sources: Figure 8 shows the current and projected water supplies available to North Marin Water District (NMWD). NMWDs entitlement to Agency transmission system water under the Eleventh Amended Agreement is a maximum average monthly delivery rate of 19.9 mgd with an annual limit of 14,100 AF. NMWD also has a local surface water source from Lake Stafford. Lake Stafford source has a safe yield of approximately 2,000 AF.



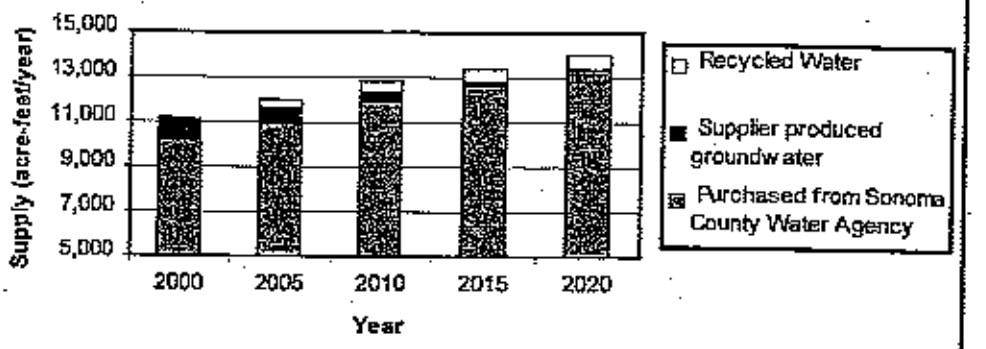
Current and Projected Use: Figure 9 shows the available water end-use data provided by NMWD. Data was provided for single-family residential, multi-family residential, commercial, and institutional and governmental uses. Multi-family residential includes townhouses/condominiums, apartments and mobile homes. NMWD has no industrial account classifications and landscape is included with institutional and governmental use. Raw water irrigation includes service to Indian Valley Golf Course and the County of Marin's Stafford Lake Park.



Supply and Demand Comparison: No deficits are projected for the North Marin Water District through 2020.

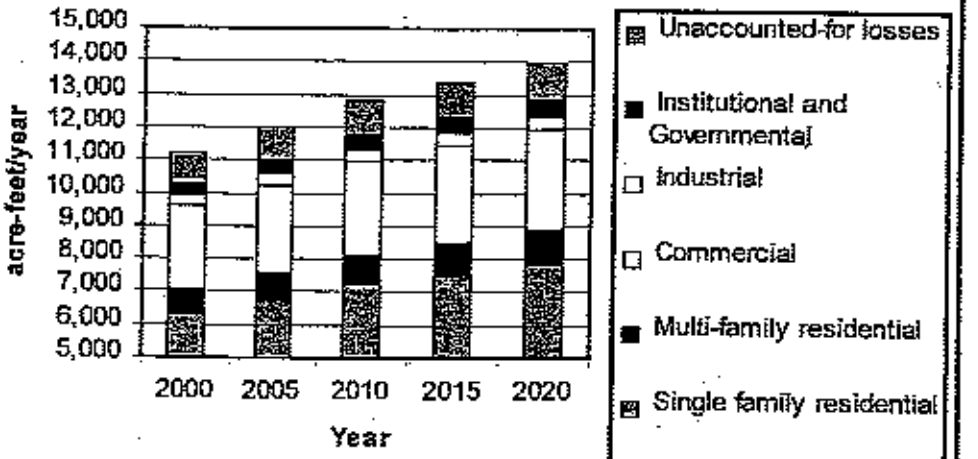
Water Supply and Sources: Figure 10 shows the current and projected water supplies available to the City of Petaluma. Petaluma's entitlement to Agency transmission system water under the Eleventh Amended Agreement is a maximum average monthly delivery rate of 21.8 mgd with an annual limit of 13,400 AF. Petaluma currently has 1 operational groundwater wells with a long-term reliable capacity of approximately 3,585 AFY.

Figure 10: Current and Projected Water Supplies City of Petaluma



Current and Projected Use: Figure 11 shows the available water end-use data provided by the City of Petaluma. The State Department of Health Services projected an approximate 2% annual rate of growth for Petaluma and a corresponding demand of 16,945 acre-feet for the year 2020.

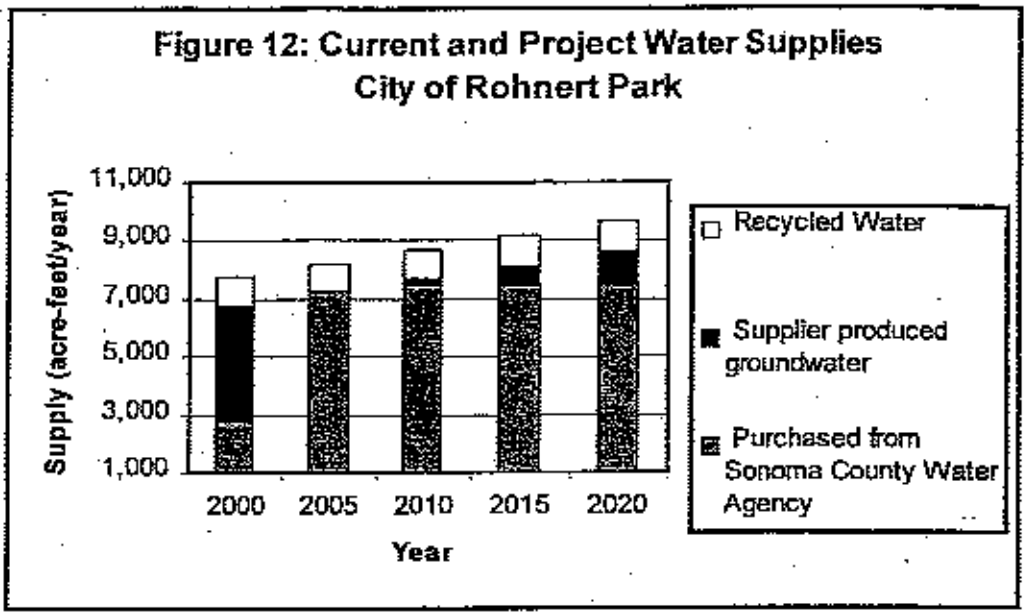
Figure 11: Projected End Use - City of Petaluma



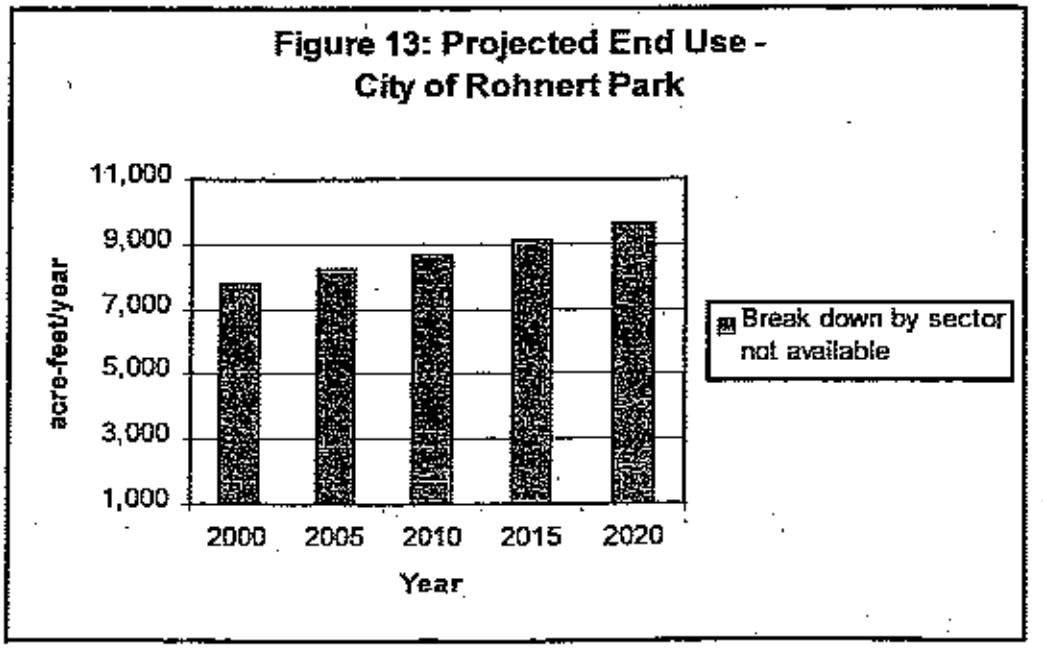
Supply and Demand Comparison: No deficits are projected for the City of Petaluma through 2020.

CITY OF ROHNERT PARK

Water Supply and Sources: Figure 12 shows the current and projected water supplies available to the City of Rohnert Park. Rohnert Park's entitlement to Agency transmission system water under the Eleventh Amended Agreement is a maximum average monthly delivery rate of 15.0 mgd with an annual limit of 7,500 AF. Rohnert Park currently has 39 operational groundwater wells with a reliable capacity of approximately 4,481 AFY.

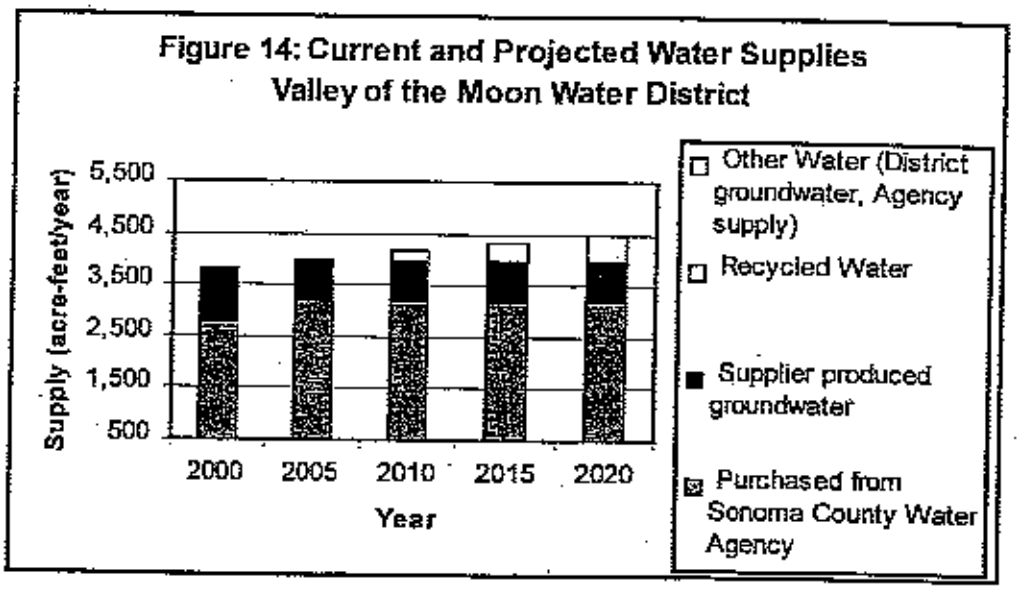


Current and Projected Water Use: Figure 13 shows the available water end-use data for the City of Rohnert Park. Specific information on water use sectors was not provided by Rohnert Park; therefore, no breakdown is shown. The projections for years 2000 to 2020 are based upon an average annual rate of growth in new connections of 1.08%, which occurred from 1993 through 1999.

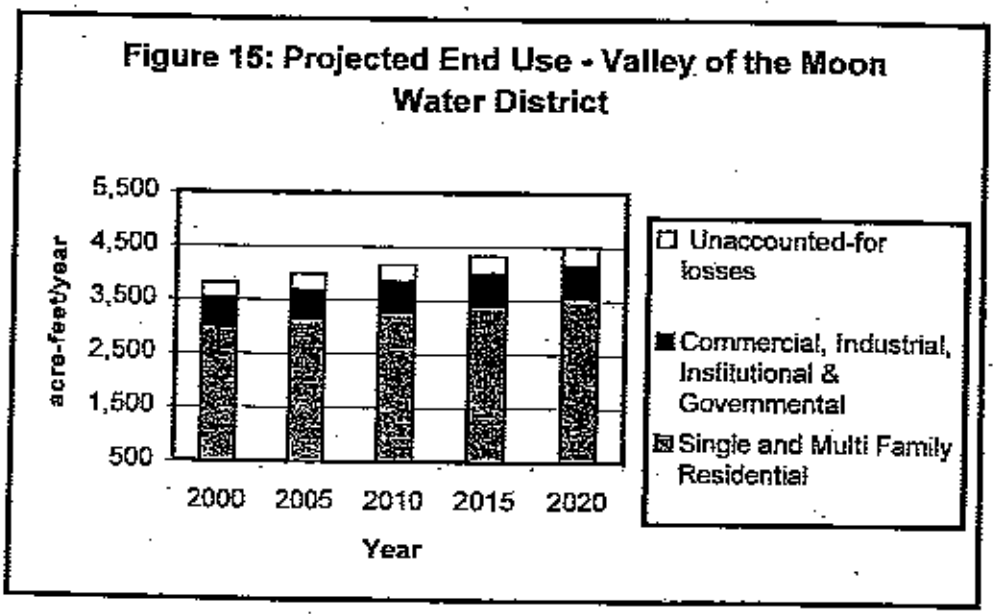


Supply and Demand Comparison: No deficits are projected for the City of Rohnert Park through 2020.

Water Supply and Sources: Figure 14 shows the current and projected water supplies available to the Valley of the Moon Water District (VOMWD). VOMWD's entitlement to Agency transmission system water under the Eleventh Amended Agreement is a maximum average monthly delivery rate of 8.5 mgd with an annual limit of ,200 AF. VOMWD currently has 5 operational groundwater wells with a total long-term reliable capacity of approximately 1,008 AFY. VOMWD is proceeding with plans, based upon a Groundwater Master Plan developed by Luhdorff & Scalmanini (1998), to develop three additional wells over the next four years that will provide an additional long-term reliable capacity of approximately 1,456 AFY.



Current and Projected Use: Figure 15 shows the available water end-use data provided by Valley of the Moon Water District (VOMWD). VOMWD use projections are based upon an assumed approximate 0.9% rate of growth. The DHS has projected VOMWD's water use at 3,790 AF for the year 2010 based upon a slightly lower annual rate of growth.

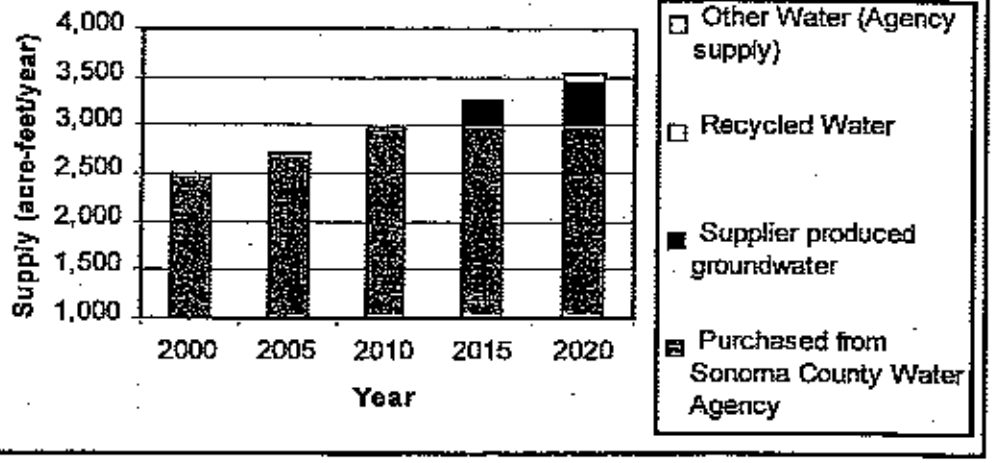


Supply and Demand Comparison: No deficits are projected for the Valley of the Moon Water District through 2020.

CITY OF SONOMA

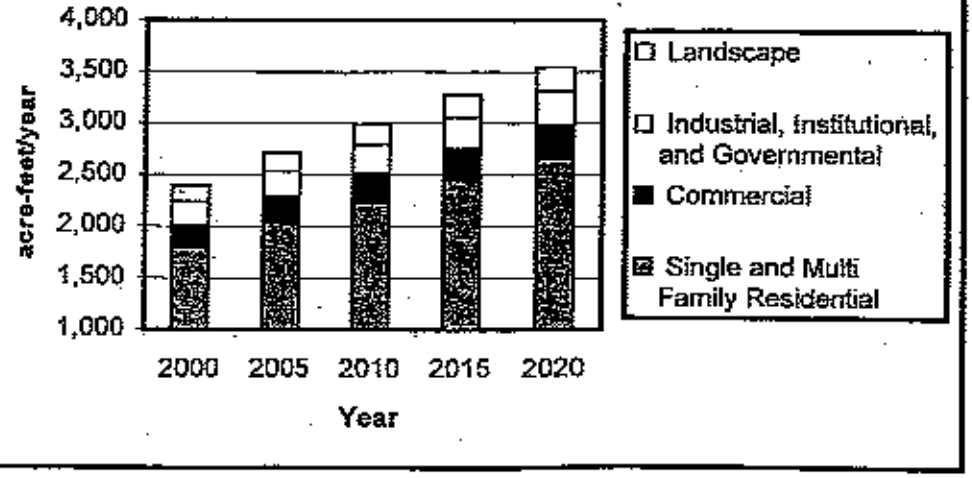
Water Supply and Sources: Figure 16 shows the current and projected water supplies available to the City of Sonoma (Sonoma). Sonoma's entitlement to Agency transmission system water under the Eleventh Amended Agreement is a maximum average monthly delivery rate of 6.3 mgd with an annual limit of 3,000 AF. Sonoma currently has 3 operational groundwater wells with a long-term reliable capacity of approximately 448 AFY.

Figure 16: Current and Projected Water Supplies City of Sonoma



Current and Projected Use: Figure 17 shows the available water end-use data provided by the City of Sonoma. The water use information is based upon information from Sonoma's Finance Department and Planning Departments. Projections are based upon an assumed approximate 2% annual rate of growth. The DHS projected Sonoma's water use at 2,820 acre-feet for the year 2010 based upon an approximate 1.4% annual rate of growth.

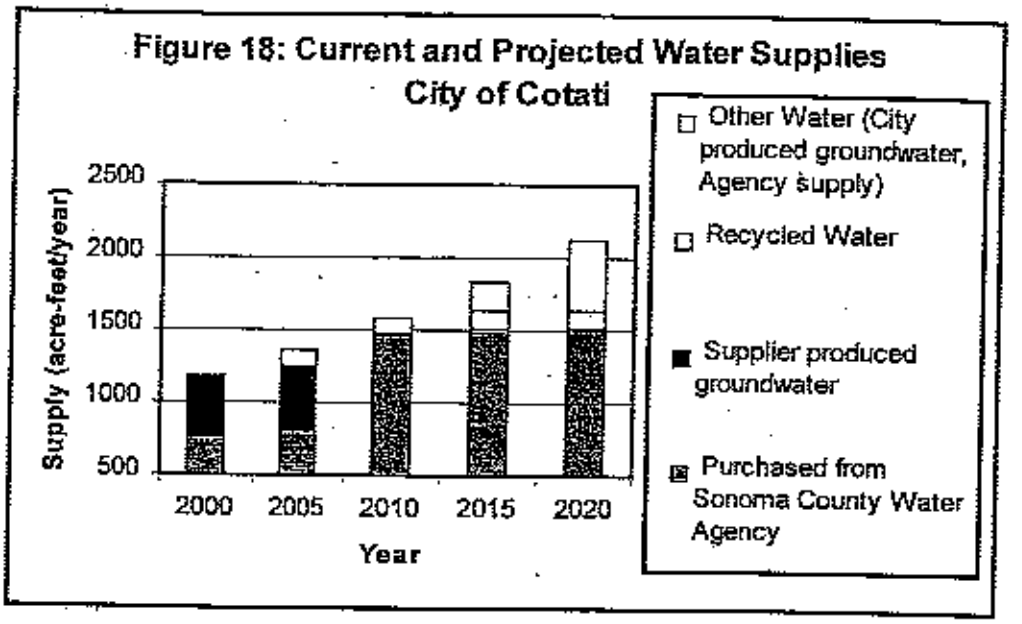
Figure 17: Projected End Use - City of Sonoma



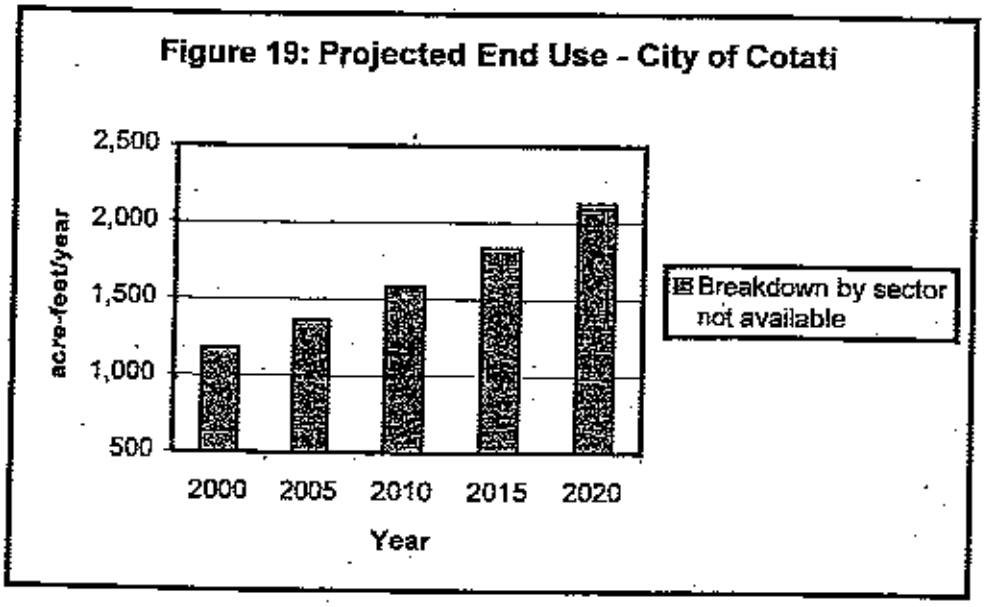
Supply and Demand Comparison: No deficits are projected for the City of Sonoma through 2020.

CITY OF COTATI

Water Supply and Sources: Figure 18 shows the current and projected water supplies available to the City of Cotati (Cotati). Cotati's entitlement to Agency transmission system water under the Eleventh Amended Agreement is a maximum average monthly delivery rate of 3.8 mgd with an annual limit of 1,520 AF. Cotati currently has 3 operational groundwater wells with a long-term reliable capacity of approximately 896 AFY.

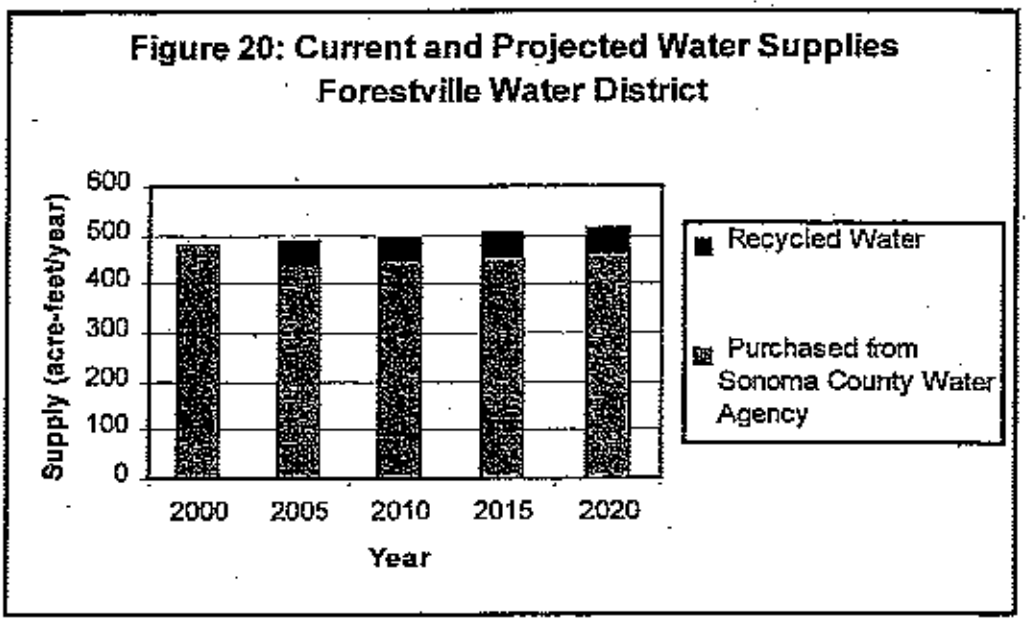


Current and Projected Use: Figure 19 shows the available water end-use data provided by the City of Cotati. Cotati only provided total water use data; therefore, no breakdown is shown. Cotati's water use projections are based upon an approximate 3% annual rate of growth. The DHS has projected Cotati's water use at 1,300 acre-feet for the year 2010 based upon an approximate 2% annual rate of growth.

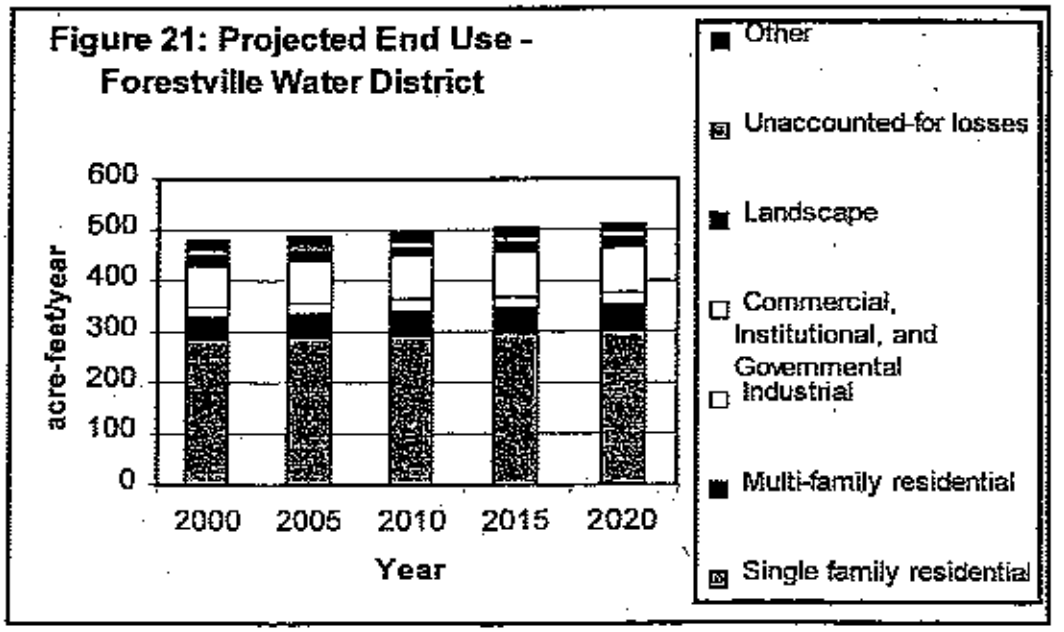


Supply and Demand Comparison: No deficits are projected for the City of Cotati through 2020.

Water Supply and Sources: Figure 20 shows the current and projected water supplies available to the Forestville Water District (FWD). FWD's entitlement to Agency transmission system water under the Eleventh Amended Agreement is a maximum average monthly delivery rate of 1.5 mgd with no annual limit.



Current and Projected Use: Figure 21 shows the available water end-use data provided by the Forestville Water District (FWD). FWD use projections are based upon an assumed approximate 0.4% rate of annual growth. This rate is just slightly lower than the 0.5% annual rate of growth in new connections that the State Department of Health Services reported actually occurred in the FWD service area from 1993 to 1999.



Supply and Demand Comparison: No deficits are projected for the Forestville Water District through 2020.

INCONSISTENT WATER SOURCES

Based upon the water availability results described above, the Agency has not identified any inconsistent sources of water to supply the Agency's transmission system. However, from the vantage point of the water contractors, for which the UWMP 2000 has also been written, the Agency's transmission system may be considered an inconsistent source of water during some peak months of water demand.

On December 7, 1999, the Agency's Board of Directors declared a temporary impairment of the reliable water production capacity of the Agency's water transmission system for the defined period of June, July, August, and September though the year 2005 (temporary impairment). During the temporary impairment, the Agency may not be able to reliably deliver some of the water supply entitlements to the Agency's water contractors when water demands are at their highest. The adequacy of the Agency's existing transmission system to meet demands was recently evaluated by the State Department of Health Services (DHS). This report is available for review at the Sonoma County Water Agency.

Provisions to allocate water in the event of a temporary impairment are included in Section 3.5 of the Eleventh Amended Agreement. In addition, in response to the current temporary impairment, the water contractors were requested by the Agency to update and implement their water shortage contingency plans and provide additional facilities to reduce demands on the Agency's transmission system.

A REGIONAL RESPONSE TO WATER SHORTAGE

In an effort to create a regional response to water shortage in the Agency's service area, the water contractors cooperated with one another to draft a Model Water Shortage Emergency Ordinance (Model Ordinance). The Model Ordinance contains contingency provisions to address water shortages and a Water Waste Prohibition (WWP) section. An independent water waste prohibition provision may be in effect at all times by operation of a separate ordinance to be adopted by each water contractor.

The key elements of the Model Water Shortage Emergency Ordinance contain flexibility to address the varying needs of the individual water contractors so that it may be acceptable to all parties. While the Model Ordinance is in draft form at this time, it is expected that each water contractor will adopt an ordinance of similar, if not identical, content.

Water Waste Prohibitions (WWP) and three stages of rationing are included in the Model Ordinance with reduction goals that range from 15 to 65 percent. Stage 1 calls for a voluntary reduction of 15 percent while stages 2 and 3 are mandatory and range from 25 to 65 percent. Table 1 summarizes the three-stage approach, the conditions of shortage, and the rationing requirements for each stage.

Table 1: Rationing Stages, Conditions, and Reduction Goals		
Stage 1 - Voluntary	**Stage 2 - Mandatory**	**Stage 3 - Mandatory**
Supply condition depends upon total water requirement, supply available from Agency, and sustainable local supply. For additional detail, refer to the description of the Model Water Shortage Emergency Ordinance.		
15%	**25% to 65%**	**25% to 65%**

WASTEWATER COLLECTION, TREATMENT, DISPOSAL, AND RECYCLING

Five main wastewater (sanitary) treatment plants serve the Agency's water contractors[6]; two are operated and maintained under contract by the Agency and are located in the Forestville area and in the southern Sonoma Valley.[7] The three plants not operated and maintained by the Agency are located in Santa Rosa, Petaluma and Novato. The City of Santa Rosa, the City of Petaluma, and the Novato Sanitary District, or a designated private contractor, retains the responsibility of operation and maintenance of their respective plants.

The North Coast Regional Water Quality Control Board (NCRWQCB) and the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), depending on location, regulate treatment plant discharge in the Agency's service area and develop discharge requirements. Table 2 provides a summary of each wastewater district or zone, its service area, treatment process, and disposal methods. Table 3 provides information relating to the quantity of wastewater treated at each plant and the amount of effluent currently reused.

[6] Two of the treatment plants (Santa Rosa Subregional and Novato Sanitary District) are subdivided into multiple treatment facilities, but for the purpose of this UWMP 2000 the facilities are grouped into one "main" plant.

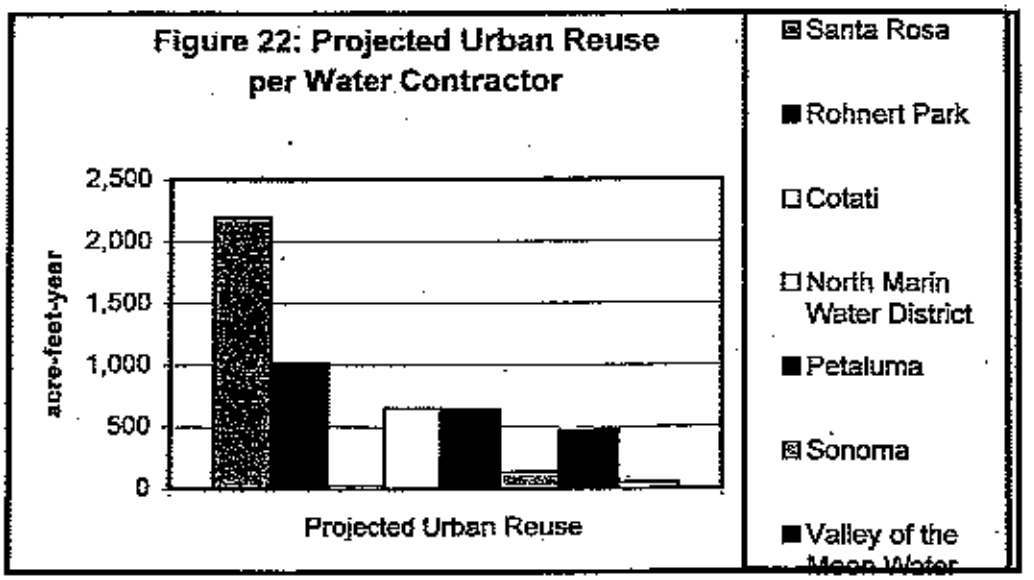
[7] The Agency operates additional treatment facilities in the region; however, these are not included in the UWMP 2000 because they do not provide service to the eight water contractors covered under this plan.

Table 2: Wastewater Syste & Disposal Methods					
Wastewater District/ Zone	Service Area	Treatment	Level of Treatment	Summer Disposal & Reuse	Winter Disposal
Forestville County Sanitation District	Forestville	aerated ponds, chlorination, storage	Secondary	Reuse: Agricultural irrigation	Jones Creek, a tributary to the Russian River
Sonoma Valley County Sanitation District	Sonoma and Valley of the Moon Water District	activated sludge, clarification, equalization ponds, chlorine chambers, reservoir storage	Secondary	Reuse: Pasture & Vinyard irrigation, wetlands enhancement	Schell Slough, a tributary to San Pablo Bay
Santa Rosa Subregional Wastewater Reclamation System	Santa Rosa, Rohnert Park, Cotati, Sebastopol, and South Park Sanitation Dist.	sedimentation, aeration, clarification, filtration, disinfection	Tertiary	Reuse: Agricultural Irrigation, Golf Courses (Geysers Recharge - planned)	Russian River tributaries
City of Petaluma Wastewater Treatment Plant	Petaluma and Penngrove	biofiltration, activated sludge, oxidation ponds	Secondary	Reuse: Agricultural Irrigation, Golf Courses	Petaluma River
Novato Sanitary District	Novato and surrounding area	clarification, biofiltration, secondary clarification, nitrification, gravity filtration	Secondary/ Tertiary	Reuse: Wildlife Habitat, Agricultural Irrigation	San Francisco Bay

Table 3: Wastewater Treatment and Reuse				
Wastewater District or Zone	Average Dry-Weather Daily Flow (mgd)	Maximum Dry-Weather Daily Flow (mgd)	Maximum ADWF Capacity (mgd)	Current Annual Reuse
Forestville County Sanitation District	0.06	0.1	0.1	11 mg/year
Sonoma Valley County Sanitation District	2.8	3.7	3	391 mg/year
Santa Rosa Subregional Wastewater System	17.5	18.5	19.2	3.3 billion gallons per year
City of Petaluma Wastewater Treatment Plant	4.6	5.8	5.2	780 mg/year
Novato Sanitary District	1.6	4	2	600 mg/year

RECYCLED WATER: POTENTIAL USES AND PROJECTED VOLUMES

Summertime demands on the Agency's water supply and transmission system have been increasing at a rate of approximately 2.0 million gallons per day (mgd) each year for the past several years. As a result, during peak water use periods, the Agency is operating near capacity. The use of recycled water for irrigation in urban areas has the potential to reduce peak summer demands and delay the need for construction of additional potable water storage facilities. "A Preliminary Assessment of Urban Water Reuse Sonoma County Water Agency Service Area Sonoma County and Marin County, California" (Reuse Optimization Plan) was prepared by the Agency in November 1999 to analyze the potential and optimal use of recycled water in the service area. This assessment is available for review at the Sonoma County Water Agency. Figure 22 shows the total projected amount of recycled water that could be used in urban areas. The feasibility of using recycled water in urban areas is contingent upon additional analysis of the cost-effectiveness of utilizing recycled water in each of the water contractors' service areas.



WATER CONSERVATION BEST MANAGEMENT PRACTICES

In 1998, with funding in place to implement water conservation, the Agency became signatory to the California Urban Water Conservation Council's (CUWCC) Memorandum of Understanding (MOU) regarding urban water conservation.[8] By signing the MOU, the Agency agreed to develop and implement applicable best management practices (BMPs) using sound economic criteria. The BMPs and the criteria for their implementation are contained in the MOU, a copy of which is available through the CUWCC's website, www.cuwcc.org.[9] As a signatory, the Agency pledges a "good faith effort" to implement applicable cost-effective water conservation efficiency

[8] The CUWCC is made up of three groups. Group 1 consists of water suppliers. A "water supplier" is defined as any entity, including a city, which delivers or supplies water for urban use at the wholesale or retail level. Group 2 consists of public advocacy organizations and Group 3 consists of other interested groups.

[9] There are currently 14 BMPs addressing residential, commercial, industrial, landscape, system loss and leak detection, education, public information, and pricing conservation practices.

improvements.[10] In addition, the Agency undertakes additional water conservation measures in its service area that benefit the water contractors. A list of the BMPs and water conservation measures that the Agency implements follows:

Best Management Practices

- BMP #03: System Water Audits, Leak Detection and Repair (required)
- BMP #06: High-Efficiency Washing Machine Rebate Programs
- BMP #07: Public Information Programs (required)
- BMP #08: School Education Programs (required)
- BMP #10: Wholesale Agency Assistance Programs (required)
- BMP #11: Conservation Pricing (required)
- BMP #12: Conservation Coordinator (required)

Additional water conservation programs

- Sonoma Valley County Sanitation District Toilet Replacement Program

WATER CONTRACTOR IMPLEMENTATION OF THE BMPS

Table 4 provides a detailed summary of which best management practices are being employed by each water contractor.

[10] The Agency, as a wholesale water supplier, is not expected to implement all BMPs; according to the MOU, wholesale water suppliers are not expected to implement BMPs that require direct end-user interventions.

Table 4 Activity Profile of Water Conservation Measures Undertaken by Water Contractors

(This table shows measures undertaken through June 2000. Asterisk indicates a funded and designed program to be fully implemented by the end of calendar yr 2000.)

No.	Water Conservation Measure	Notes	Cotati	FWD	Pet.	RP	SR	Son.	NMWD	VOM
Share of SCWA Deliveries in water yr 1998-99 >		a	1%	1%	16%	5%	39%	4%	13%	5%
Best Management Practices:										
1	Residential Surveys - Both Inside and Outside								W	
	SF									
	MF									
	Residential Surveys - Inside only (SF & MF)	b					X			
2	Residential Plumbing Retrofit	c	X	X	X	X	X	X	X	X
3	Leak Detection/Repair									
	Unaccounted for Water < 10%	d	X	X	X		X	X	X	X
	Systemwide Audit performed			X	X		X		X	X
4	Meter Water Sales		X	X	X	X	X	X	X	X
5	Large Landscapes									
	Assign ETo Budgets to Irr Meters						*		*	
	Tracking Feedback (with each water bill)						*		*	
	Large Landscape Surveys				parks, *		X	*	X	
	Training for Landscape Professionals			X	X		X	*	X	
6	Washing Machine Rebates									
	Energy Utility Rebate available	e	X	X	X	X	X	X	X	X
	Water Agency Rebate available	f	X	X	X	X	X	X	X	X
7	Public Information									
	Comparative Water Use on each bill				X		X	X	X	X
	Bill Stuffers and Offers	g	X	X	X	X	X	X	X	X
	Handout Information available	g	X	X	X	X	X	X	X	X
	Speakers and Display(s) available	h	X	X	X	X	X	X	X	X
	ET hot-line				X		X	*	X	*
	Internet Water Conservation Info				X	X	X	*	*	
	Public Service Announcements	i			X	X	X		X	
	Paid or Co-op advertising	i			X	X	X	*	X	
	Media Events	i			X		X		X	
	Contests		X		X	X	X		X	
	Recognition and Award Programs						X			
8	School Education Program									
	K - 1, 2 - 3, and 4 - 6	j	X	X	X	X	X	X	X	X
	7 - 8 and High School	j								

Continued

No.	Water Conservation Measure	Notes	Cotati	FWD	Pet.	RP	SR	Son.	NMWD	VOM
9	CII Programs									
	CULFT Replacement on Resale of property								X	
	CULFT Rebates		X		X	X	X			
	CULFT Direct Installation Program				X	X				
	CII Survey and Incentive Program(s)				*		X			
	Sanitation Fixture Surveys	b					X			
	Coin Operated Rate/Incentives available	k					X			
10	Wholesale Agency (SCWA) Assistance	k	X	X	X	X	X	X	X	X
11	Conservation Pricing									
	Uniform Commodity rate	l	X	X	X		X		X	X
	Tiered (escalating) Conservation rate	m						X		
12	Conservation Co-ordinator	n	O	C	C	C	O	O/C	C	O/C
13	Water Waste Prohibition	o	X	X	X	X	X	X	X	X
14	Residential ULFT Replacement Program									
	Replacement at Time of Sale of Property								X	
	Rebates	p	X		X	X	X	X	X	X
	Give-a-way Events				X	X	X	X		X
	ULFT Direct-Install					X				
Other Activities/Measures Above and Beyond BMPS:										
15	Large Meter Testing Prog. (at least 1 test/yr)			X	X		X		X	
16	Preemptive PB service line replacement	q	X				X	X	X	X
17	Xeriscape Demo Garden(s)				X		X		X	
18	Incentives for Irrigation Efficiency or Equipment				*		X		residential	*
19	Xeriscape Plant Promotions								X	
20	Standing Displays	r					X		X	
21	Committed Booth Outreach	s					X			
22	Workshops for Homeowners				*		X			
23	Water Watch Patrol	t					X		*	
24	Incentive for Limiting Turf								X	
25	Prohibit Narrow Strips of Turf (new development)	u			*		X		X	
26	Grants for Youth Conservation Programs							X		X
27	Post Program Survey and Analysis Reports	v			X	X	X	*	X	
28	HAWs required in new connections								X	
Water Recycling:										
	Actual deliveries (acre-ft) - yr 2000		0	0	0	138	200	0	0	0
	Planned deliveries (acre-ft) - yr 2010		112	50	460	153	600	**	250	**

Definitions for Table:	
	C = water contractor contracts with the SCWA for water conservation co-ordinator service.
	CII = Commercial, institutional and industrial
	CULFT = commercial ultra low flush toilet (1.6 gpf)
	HAW = Horizontal axis (high efficiency) clothes washers
	Irr Meters = meters which provide water used primarily for irrigation purposes
	MF = multi-family accounts
	O = water contractor has own conservation co-ordinator.
	O/C = collaborative effort of local utility staff and contract SCWA staff.
	PB = Polybutylene service lines
	SF = Single family detached home accounts
	* Program funded, designed and in process of being implemented by the end of calendar yr 2000.
	** feasibility study planned or underway
Notes for Table:	
a	Does not include Other Agency customers which accounted for 1.4% or Surplus (agriculture) customers which accounted for 0.7 %.
b	Survey done by customer or plumbing contractor in order to qualify for ULFT/CULFT rebates.
c	At various times in the past 25 years, all Water Contractors have distributed water saving kits. An "x" here verifies that the contractor has an active current distribution program.
d	If UW is > 10%, a system wide audit is required. Some contractors have performed these even if not required by BMP 2.
e	PG& E offers a $75 rebate for high efficiency washing machines.
f	SCWA supplements PG&E's rebate with an additional $75. Application forms are available at point of sale in area stores/outlets and are processed by a single payout office.
g	Available from American Water Works Association and other sources. SCWA purchases popular items in bulk to obtain quantity discounts for water contractors.
h	Also provided by SCWA.
i	Generally coordinated or undertaken by SCWA.
j	Provided and coordinated by SCWA. Materials matriculated for grades K - 6 including a Field Studies Program. Currently working on program for Grades 7 through High School. Lending library has been compiled for all grades and teaches provided notice and access.
k	Coin operated washing machines in laundries, multifamily wash rooms and elsewhere
l	Prior to the 1980's many Contractors had declining rate structures which were based on the assumption that water supply was not limited and reflected the economy of scale of delivering larger amounts of water.
m	Tiered rates are generally implemented specifically to encourage efficient use of water.
n	Code denotes who is primarily responsible for water conservation coordinator duties. See definitions.
o	A Model Water Waste Ordinance was developed by the WAC in spring of 2000.
p	Example: High School fund raisers with truckload distribution of ULFTs.
q	PB service lines prematurely fail and leak: A number of utilities have implemented preemptive replacement strategies. If service lines are predominantly of a different material, this issue does not apply.
r	Permanently installed and maintained displays in local nurseries, garden centers, hardware stores, etc.
s	Manned booth outreach that is frequent and committed (such as booth at each local farmer's market event or in an outlet mall, etc.
t	High profile, intentional and committed Water Watch Patrol (not just an incidental function of employees in the field). Example: Santa Rosa's Oops Program.

u	Applies to new connections only.
v	Has performed a post conservation measure follow-up survey and analysis of participants in at least one conservation program.
w	NMWD has piloted a program involving 200 full SF audits.

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State of California
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Evaluation of Ground Water Resources Sonoma County Volume 3: Petaluma Valley

Department of Water Resources
in cooperation with the Sonoma County Water Agency

Bulletin 118-4
June 1982

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Department of Water Resources
in cooperation with the
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Bulletin 118-4

Evaluation of Ground Water Resources: Sonoma County

Volume 3: Petaluma Valley

June 1982

Huey D. Johnson
Secretary for Resources

The Resources Agency

Edmund G. Brown Jr.
Governor

State of California

Ronald B. Robie
Director

Department of Water Resources

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FOREWORD

Ground water plays an important role in Sonoma County. As the population of this North Bay county has increased over the last 30 years, the use of ground water has likewise increased. Currently, over 15,000 wells have been identified in the county. These wells are used for domestic and agricultural purposes in rural areas and for municipal and industrial purposes in urban areas.

The Sonoma County Water Agency (SCWA) requested the California Department of Water Resources (DWR) to join a cooperative study to estimate the volume of ground water in storage and the recharge potential in the Santa Rosa Plain, Petaluma Valley, Sonoma Valley, and Alexander Valley and Healdsburg area. The study examined alternative ways the ground water resources of the county may be used conjunctively with the Russian River and other surface water sources.

The results of the study are presented in four volumes. This report is Volume 3, and describes ground water conditions in the Petaluma Valley. Volume 2 deals with the Santa Rosa Plain, Volume 4 with the Sonoma Valley, and Volume 5 with the Alexander Valley and Healdsburg area. The present study was designed to augment the earlier countywide investigation of geology and hydrology conducted jointly by the Sonoma County Planning Department and DWR. Results of the earlier investigation were published as DWR Bulletin 118-4, Volume 1 (Ford, 1975).

This report on the Petaluma Valley includes an evaluation of geologic and hydrologic characteristics of the ground water basin, an evaluation of the volume of usable ground water in the basin and the volume that can reasonably be extracted, possible changes in water quality resulting from pumping of ground water, an evaluation of the interconnection of ground and surface waters, and the potential for artificial recharge of the ground water basin.

Ronald B. Robie, Director
Department of Water Resources
The Resources Agency
State of California

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PLATE
(in separate pocket)

1. Geology of Petaluma Valley

Copies of this bulletin at $4.00 each may be ordered from:

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The California Water Commission serves as a policy advisory body to the Director of Water Resources on all California water resources matters. The nine-member citizen commission provides a water resources forum for the people of the State, acts as a liaison between the legislative and executive branches of State Government, and coordinates Federal, State, and local water resources efforts.

CONVERSION FACTORS

Quantity	To Convert from Metric Unit	To Customary Unit	Multiply Metric Unit By	To Convert to Metric Unit Multiply Customary Unit By
Length	millimetres (mm)	inches (in)	0.03937	25.4
	centimetres (cm) for snow depth	inches (in)	0.3937	2.54
	metres (m)	feet (ft)	3.2808	0.3048
	kilometres (km)	miles (mi)	0.62139	1.6093
Area	square millimetres (mm^2)	square inches (in^2)	0.00155	645.16
	square metres (m^2)	square feet (ft^2)	10.764	0.092903
	hectares (ha)	acres (ac)	2.4710	0.40469
	square kilometres (km^2)	square miles (mi^2)	0.3861	2.590
Volume	litres (L)	gallons (gal)	0.26417	3.7854
	megalitres	million gallons (10^6 gal)	0.26417	3.7854
	cubic metres (m^3)	cubic feet (ft^3)	35.315	0.028317
	cubic metres (m^3)	cubic yards (yd^3)	1.308	0.76455
	cubic dekametres (dam^3)	acre-feet (ac-ft)	0.8107	1.2335
Flow	cubic metres per second (m^3/s)	cubic feet per second (ft^3/s)	35.315	0.028317
	litres per minute (L/min)	gallons per minute (gal/min)	0.26417	3.7854
	litres per day (L/day)	gallons per day (gal/day)	0.26417	3.7854
	megalitres per day (ML/day)	million gallons per day (mgd)	0.26417	3.7854
	cubic dekametres per day (dam^3/day)	acre-feet per day (ac-ft/day)	0.8107	1.2335
Mass	kilograms (kg)	pounds (lb)	2.2046	0.45359
	megagrams (Mg)	tons (short, 2,000 lb)	1.1023	0.90718
Velocity	metres per second (m/s)	feet per second (ft/s)	3.2808	0.3048
Power	kilowatts (kW)	horsepower (hp)	1.3405	0.746
Pressure	kilopascals (kPa)	pounds per square inch (psi)	0.14505	6.8948
	kilopascals (kPa)	feet head of water	0.33456	2.989
Specific Capacity	litres per minute per metre drawdown	gallons per minute per foot drawdown	0.08052	12.419
Concentration	milligrams per litre (mg/L)	parts per million (ppm)	1.0	1.0
Electrical Conductivity	microsiemens per centimetre (uS/cm)	micromhos per centimetre	1.0	1.0
Temperature	degrees Celsius (°C)	degrees Fahrenheit (°F)	(1.8 × °C)+32	(°F−32)/1.8

CHAPTER 1. INTRODUCTION

The Petaluma Valley (Figures 1 and 2) is one of the most rapidly urbanizing regions in the North Bay area and, as the population has increased, so has the demand for water. Ground water, i.e., water stored underground in the spaces between grains of sand and gravel and in cracks in consolidated rocks, plays an important role in meeting this demand.

Today, the valley's largest city, Petaluma, meets 15 percent of its water demand with ground water. During 1980, 1 100 cubic dekametres (dam^3) (900 acre-feet (ac-ft)) of ground water was pumped from the Petaluma municipal wells.

The increase in population in the rural areas of the valley affects local ground water supplies even more significantly. The population of the unincorporated upland area north and west of Petaluma has increased 28 percent over the last 10 years — from 5,840 to 7,460; the number of housing units has increased 44 percent — from 1,810 to 2,610 (Criss, 1981). This has resulted in an additional 800 wells and 800 septic tanks in this 5 830-hectare (14,400-acre) area.

To present some ideas on the conjunctive use of ground and surface water, this study evaluates the hydrologic characteristics of this rapidly growing area and the effects of increased use on the ground water resource.

The Petaluma Valley was numbered 2-1 in California Department of Water Resources (DWR) Bulletin 118 (California Department of Water Resources, 1975). The valley is now included with other contiguous ground water reservoirs in the county in the Sonoma County Basin (Peters, 1980).*

Location of Study Area

The study area comprises 24 400 hectares (60,000 acres)** extending from Penngrove south to the Marin County line and San Pablo Bay (Figure 2). It includes the Two Rock area to the west, and extends east to the crest of the Sonoma Mountains, which separate the Petaluma and Sonoma Valleys. This area includes most of the watershed of the Petaluma River.

Method of Investigation

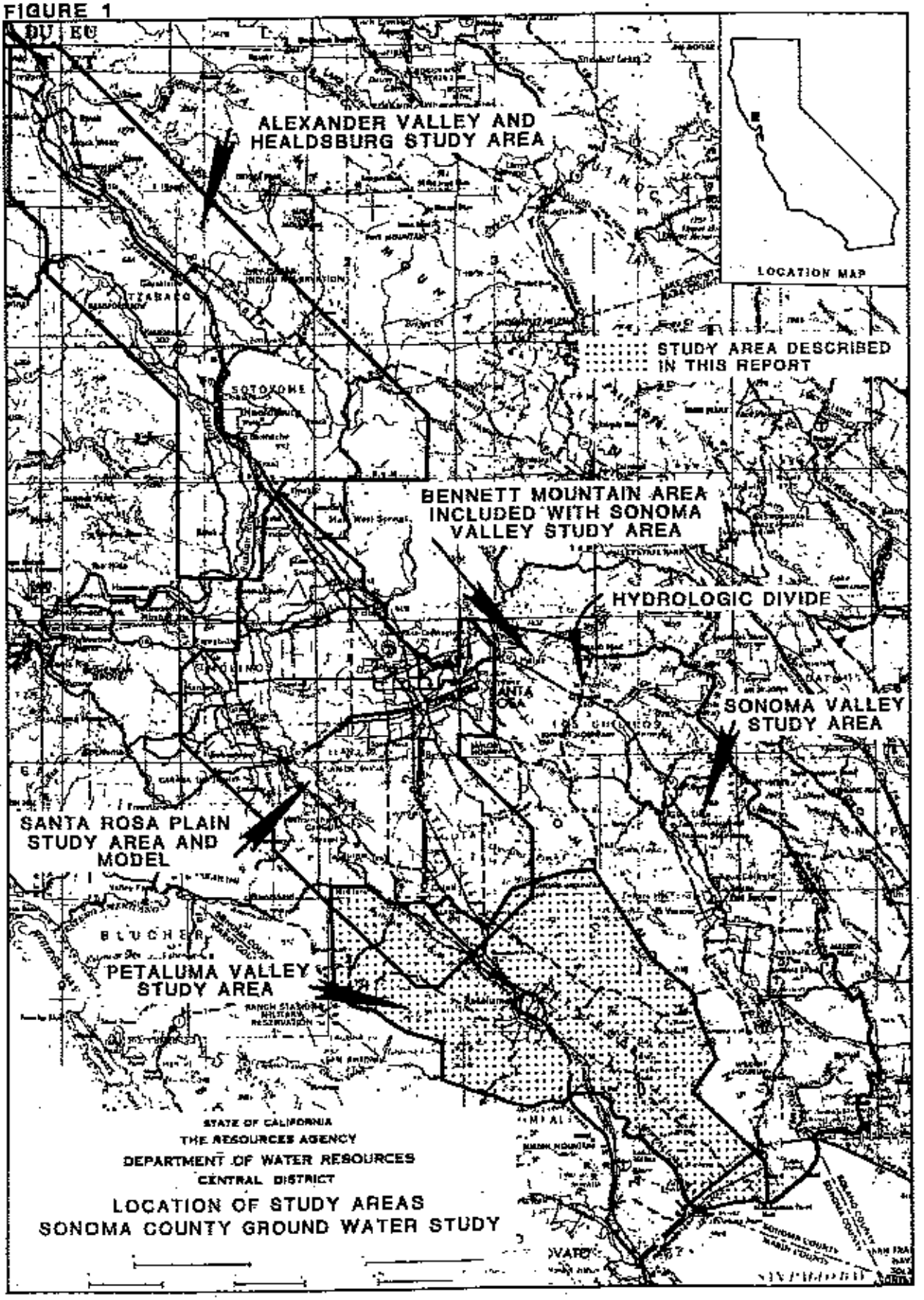
To simplify compilation and evaluation of hydrologic data for computer analysis, the study area has been divided along township, range, and section lines to form 132 cells of 130 or 260 hectares (320 or 640 acres) each. All hydrologic data have been evaluated using these cell divisions. The volume of ground water in storage and the total storage capacity were not determined for the Stony Point area and the northern part of Meacham Hill, because these areas are included in the Santa Rosa Plain study area. For continuity, cells in the area northwest of the city of Petaluma have been included in both the Santa Rosa Plain model and the Petaluma Valley.

Basic data available for the Petaluma Valley were compiled and evaluated in several different ways. Water well logs were used to develop geologic cross sections showing the subsurface geology.

* A list of references is presented following Chapter 8.

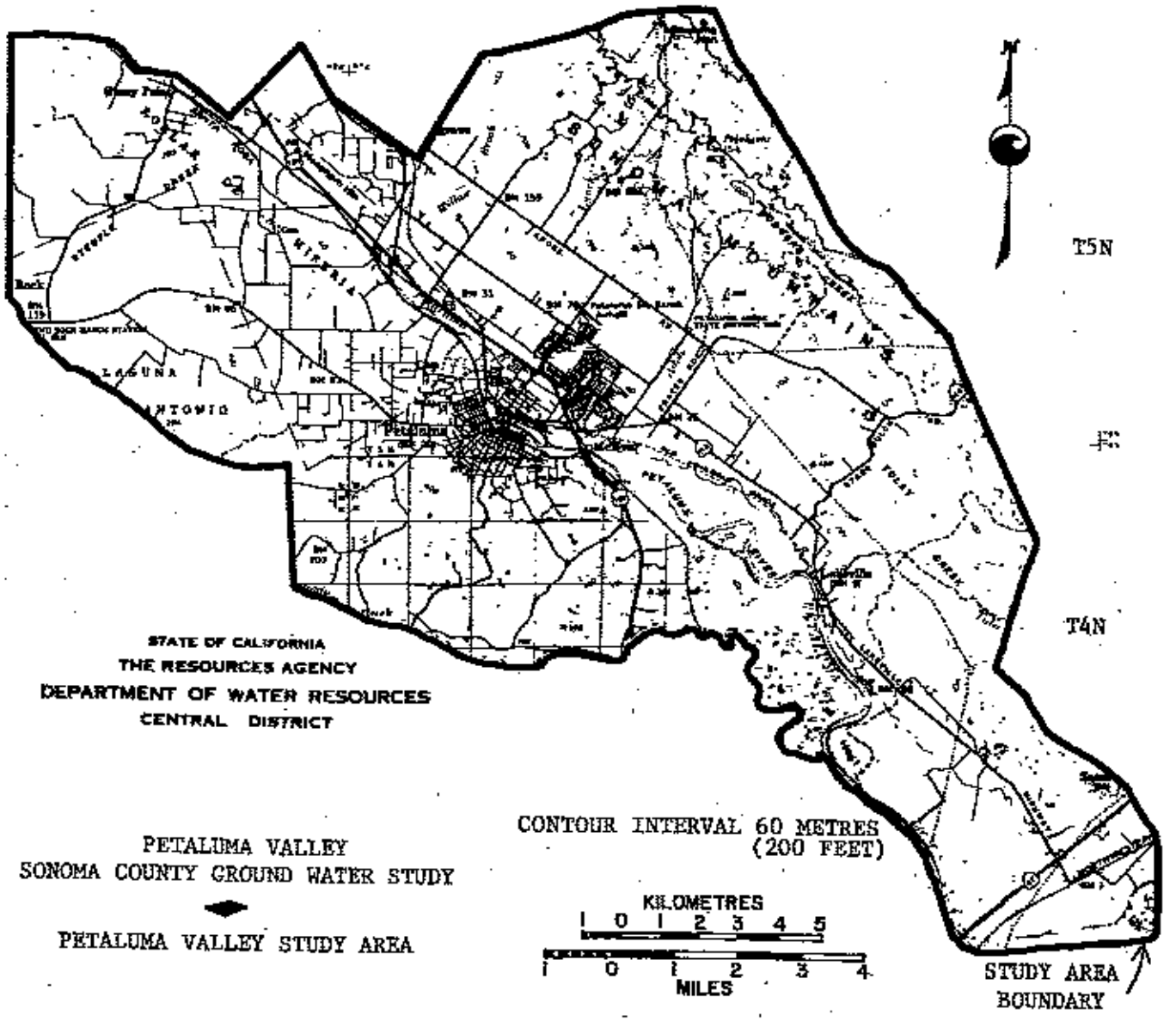
**Conversion factors for changing from metric to customary units are listed on the inside back cover.

FIGURE 1


ALEXANDER VALLEY AND HEALDSBURG STUDY AREA
LOCATION MAP
STUDY AREA DESCRIBED IN THIS REPORT
BENNETT MOUNTAIN AREA INCLUDED WITH SONOMA VALLEY STUDY AREA
HYDROLOGIC DIVIDE
SONOMA VALLEY STUDY AREA
SANTA ROSA PLAIN STUDY AREA AND MODEL
PETALUMA VALLEY STUDY AREA
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT
LOCATION OF STUDY AREAS
SONOMA COUNTY GROUND WATER STUDY

R8W R7W

FIGURE 2



The well log information on types of materials encountered in each well was coded as input to the TRANSCAP computer program. The log information is compiled by cells to estimate the total ground water storage capacity for each cell. When combined with fall 1980 water level information, the total volume of ground water in storage and the total storage space available to receive recharge were determined.

It was assumed that all ground water in the study area is unconfined. The TRANSCAP program is discussed in more detail in Chapter 4.

All available water quality data were tabulated and plotted on topographic maps. This information was evaluated to determine regional water quality types as an indicator of aquifer continuity. Special water quality problems, such as high nitrate, sodium, and salinity, were evaluated to determine areal extent, source, and potential for migration of the affected water.

Soil maps developed by the U. S. Department of Agriculture Soil Conservation Service (Miller, 1972) were used to classify lands according to slope and soil infiltration rate. Those soils on

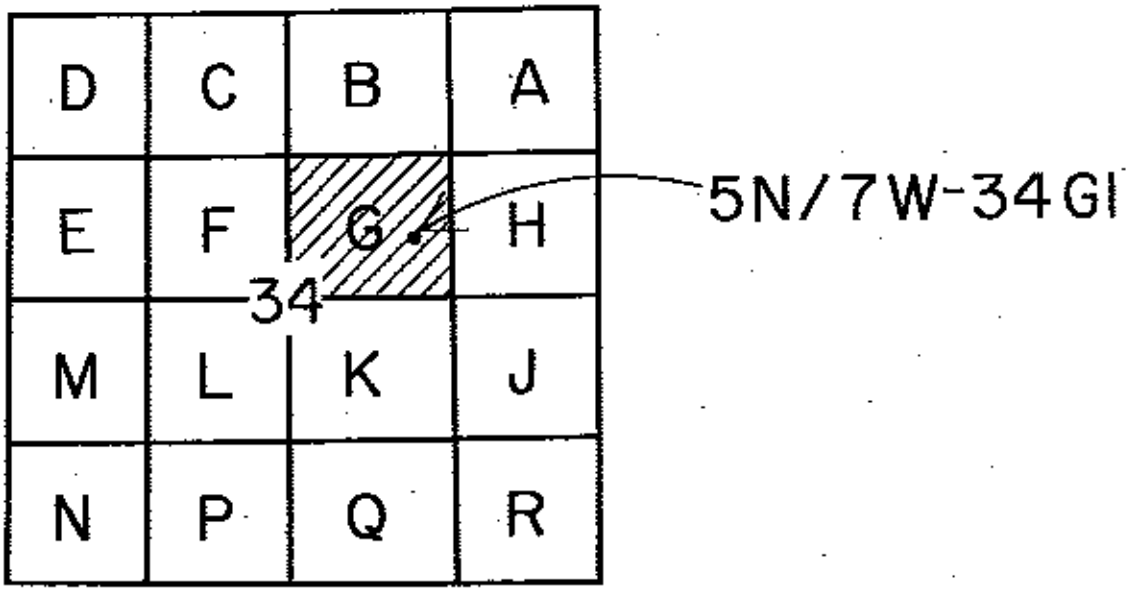
slopes of less than 15 percent and with an infiltration rate greater than 1.5 centimetres (0.6 inch) per hour have been tentatively classified as ground water recharge areas (after Muir and Johnson, 1979). Additional study may indicate that different infiltration rates may be more appropriate for this area.

Data from the investigation were insufficient to provide accurate estimates of the annual quantity of ground water recharge in the Petaluma Valley. Some suggestions for a data collection program to determine this rate are included in this report (see Chapter 8).

The water well numbering system used in this bulletin is based on the rectangular system of subdivision of public land. When Sonoma County was first settled, most valley lands became parts of 25 land-grant ranchos. Lands outside of the land grants became public lands and were surveyed into townships of 93 square kilometres (36 square miles) that were referenced to the Mount Diablo base and meridian. Each township was divided into 36 sections of roughly 2-1/2-square-kilometres (one-square-mile) each. Because land-grant areas do not have surveyed township, range, and section lines, these have been projected for the purpose of numbering water wells.

A State well number has two basic parts: its township location and its section location. For example, Well 5N/7W-34G1 is located in Township 5 North, Range 7 West, and Section 34; this places the well east of Petaluma. Each section is subdivided into 16 quarter-quarter sections of 16 hectares (40 acres) each; each 16-hectare tract is identified by a letter. Letters A through R are used, with letters I and O omitted to avoid confusion with similar appearing numbers. This particular well is in Tract "G", which also can be described as the southwest quarter of the northeast quarter of Section 34 (Figure 3). The final part of the well number is the sequential number of the well within that particular tract.

FIGURE 3



WELL NUMBERING SYSTEM

CHAPTER 2. CONCLUSIONS AND RECOMMENDATIONS

Major conclusions and recommendations of this study are summarized below.

Conclusions

- Ground water in Petaluma Valley is compartmentalized due to the discontinuous nature of most of the water-yielding deposits and to extensive faulting, which reduces the thickness of water-yielding deposits and may impede ground water flow. However, the western uplands underlain by the sandy Merced Formation have a high degree of vertical and horizontal aquifer continuity.

- The total storage capacity of the Petaluma Valley ground water basin is estimated to be 2 092 300 cubic dekametres (dam^3) (1,697,000 acre-feet (ac-ft)). The thickness of the water-yielding material ranges from 0 to 200 metres (m) (0 to 660 feet (ft)), with an average thickness of 87 m (185 ft). In the sandy western uplands, the water-yielding Merced Formation averages 150 m (450 ft) in thickness. The total volume of ground water in storage as of fall 1980 was 1 751 300 dam^3 (1,420,000 ac-ft). This figure includes water of all quality types, including brackish water caused by sea water intrusion.

- Nitrate contamination in the area northwest of Petaluma has made about 21 000 dam^3 (17,000 ac-ft) of ground water unsuitable for drinking. Sea water intrusion in the southern portion of the valley has made an additional 88 000 dam^3 (71,000 ac-ft) of ground water unsuitable. This reduces the total ground water in storage that is suitable for use to 1 642 300 dam^3 (1,332,000 ac-ft).

- Based on TRANSCAP, the volume of storage available to accept recharged surface water as of fall 1980 was 341 000 dam^3 (277,000 ac-ft). This represents 16 percent of the total storage capacity. Because of topographic constraints, ground water in the study area rarely fills more than 84 percent of storage capacity. Since the ground water reservoirs are therefore essentially "full", an artificial recharge program to increase the volume of ground water in storage is not needed at this time.

- Using available water level data and available data concerning the hydraulic properties of the sediments in the ground water reservoir, the average annual recharge is estimated to be 50 000 dam^3 (40,000 ac-ft) under present operational conditions. This recharge generally takes place in the Merced Formation and in some areas of alluvial fan deposits. Recharge also takes place in the Sonoma Volcanics; direction and rate of movement of this recharged water are unknown.

- Hydrographs of wells monitored during the 1976-1977 drought indicate that more surface water could be stored underground if more storage space were made available. This suggests that if ground water pumping were increased, more surface water runoff could be retained as ground water recharge. At present, much water runs off the land surface as rejected recharge.

- The area northwest of Petaluma contains a large proportion of the total ground water in storage in the Petaluma Valley. It also contains much of the total storage space available in the Petaluma Valley to accept recharge

water. Proportionately more land surface (30 percent) in this northwest area has been classified as recharge areas than in the Petaluma Valley as a whole (20 percent).

° Ground water quality is generally poor in the Petaluma Valley. Much shallow ground water in the area northwest of Petaluma is contaminated by nitrates; ground water from near the base of the Merced Formation frequently has a high electrical conductivity. Poor quality water fills the few aquifers near San Pablo Bay; there is a potential for renewed sea water intrusion near Petaluma.

° Nitrate contamination is a serious problem in the area northwest of Petaluma. Based on recent water quality analyses, generally the top 15 m (50 ft) extending down from the land surface are affected. A lack of vertical and horizontal barriers in the sediments of the upland area will allow the contaminated ground water to spread.

° Both sea water intrusion and connate water affect the few water-yielding zones in the bay mud deposits in the southern portion of the valley. Sea water intrusion has affected aquifers in alluvial fan deposits near Petaluma. Existing water quality data, although limited, suggest little change in the extent of intrusion over the past 20 years.

Recommendations

° A program to determine streamflow infiltration rates and evapotranspiration should be implemented to more accurately determine the recharge rate of the Petaluma Valley.

° Ground water level monitoring of the 29-well network should be continued in order to improve estimates of change in storage and flow patterns.

° When artificial recharge becomes necessary, alternative methods and sites should be studied so that recharge optimized.

° The area northwest of Petaluma contains potential recharge sites, but care should be taken to avoid moving nitrate-contaminated ground water into presently uncontaminated or unpolluted areas.

° A program of ground water quality sampling should be implemented south of Petaluma to monitor possible inland movement of sea water. If sea water is found to be moving inland, mitigation measures should be explored, including (1) reduction in ground water pumpage near the intruded area; and (2) artificial recharge of ground water via injection wells near the intruded area, because geologic conditions make percolation ponds impractical.

° Nitrates in the ground water northwest of Petaluma are currently being studied by DWR, Central District (Perkins, progress). Sonoma County Ordinance 2607 requires that new wells in this area be built "... with an annular seal of at least 50 feet, but in no case less than into the first impervious structure." A deeper seal (Ritchie, 1981, Water Well Standards), from ground surface to 30 m (100 ft), would reduce the likelihood of well contamination by shallow, nitrate-contaminated wells.

° Ground water pumpage in the area northwest of Petaluma can be maintained at present levels, and possibly increased, if deep wells with 15- to 30-m (50- to 100-ft) sanitary seals are used. Ground water elevations in the study area should be measured biannually and examined periodically for large declines in the ground water table. Ground water pumpage from alluvial fan deposits near Petaluma can be maintained at present levels, but increases in pumpage to historical high volu will renew sea water intrusion into this area.

CHAPTER 3. OVERVIEW OF GROUND WATER GEOLOGY, HYDROLOGY, AND SOILS

This chapter presents a brief overview of the ground water geology, hydrology, and soils of the Petaluma Valley. A detailed description of these subjects has been previously published in DWR Bulletin 118-4, Volume 1 (Ford, 1975).

Geology and Hydrology

Geologic formations in the Petaluma Valley can be divided into water-yielding formations, nonwater-yielding formations, and formations with highly variable water-yielding properties (Figure 4). Water-yielding formations are: alluvium, alluvial fan deposits, and the Merced Formation. Water-yielding formations that generally produce only low yields of ground water are bay mud deposits and the Petaluma Formation. Yields from the Petaluma Formation are higher when a well intercepts a lens of gravel. The Franciscan complex is nonwater-yielding (Plate 1). The Sonoma Volcanics and Tolay Volcanics have highly variable water-yielding properties; because of this variability, yields and the volume of ground water in storage in these units cannot be estimated as accurately as with other units.

Geologic characteristics of these units and their specific yields are summarized on Table 1. The areal distribution of these units is shown on Plate 1. The subsurface distribution of these units has been determined along the cross-section lines indicated on Plate 1 and Figure 5A as A-A', B-B', C-C', and D-D'. Profiles of the four cross sections are shown on Figures 5B-E. The following paragraphs briefly describe the geologic units, beginning with the oldest rocks.

In the following geologic descriptions, well yields have been described as limited or low, moderate, and high. "Limited" or "low" yield means yields generally range from 5 to 380 litres per minute (L/min) (1 to 100 gallons per minute (gal/min)). With such yields, dry holes are common. "Moderate" yields generally range from 380 to 1 100 L/min (100 to 300 gal/min). "High" yields generally exceed 1 100 L/min (300 gal/min). The yield of a well is directly related to the hydraulic conductivity of the formation it penetrates. For more information on well yields, see Ford (1975).

Franciscan Complex

The Franciscan complex is the oldest geologic unit in the study area (Jurassic and Cretaceous age — see Figure 6). It is exposed along the western and southwestern edges of the study area, and east of Lakeville Highway along Tolay Creek (see Plate 1). The complex includes highly variable amounts of shale, sandstone, chert, greenstone, and serpentinite. The Franciscan complex generally contains only limited quantities of water in fractures. Normally, consolidated rocks containing water only in fractures are not considered to have a specific yield. However, for this report, the Franciscan complex has been assigned a very low apparent specific yield of less than 3 percent. Because of the very low specific yield, areas composed of the Franciscan complex were not included in calculations of storage capacity in Chapter 4.

Tolay Volcanics

The Tolay Volcanics is of Miocene to early Pliocene age. It is present east of the Tolay fault at a depth of several hundred metres (Morse and Bailey, 1935). It is exposed in the vicinity of Petaluma

(Continued on page 18)

FIGURE 4

GROUND WATER TERMINOLOGY

The science of ground water hydrology deals with the distribution and behavior of ground water -- how much water is contained in any geologic material and how easily it can be extracted. The science of ground water geology deals with the effect of geology on the distribution and movement of ground water -- how different geologic materials and geologic structures determine the rate and paths of movement of ground water. By knowing the geology of an area, the subsurface hydraulic properties of that area can be estimated, because ground water hydrology and ground water geology are closely related.

Geologic formations can be divided into two groups: water-yielding and nonwater-yielding. Water-yielding formations, which usually consist of unconsolidated deposits of sand and gravel, readily absorb, transmit, and yield large quantities of ground water to wells. Nonwater-yielding formations, which usually consist of clay and consolidated rocks, yield only limited quantities of water to wells. Each geologic formation has specific hydraulic properties: porosity, permeability, specific yield, and transmissivity.

POROSITY AND PERMEABILITY

Porosity is the ratio of the volume of the voids between the particles in a sample to the total volume of the sample.

$$\text{Porosity} = \frac{\text{volume of voids}}{\text{total volume of sample}} (100) = \%$$

Porosity is not necessarily indicative of permeability, which indicates the ease with which ground water moves through a material. If the openings between the particles are small or are not connected, the permeability of the material is low. For example, clay contains a large number of small voids, so its porosity may be as high as 50 percent. Because of the physical and chemical nature of clay, it transmits very little water and it has a very low permeability, about 1.07×10^{-4} metres (3.5×10^{-4} feet) per day.* The porosity of sand and gravel is about 20 percent, much lower than the porosity of clay, but the voids in the sand and gravel are larger and are interconnected. Thus, most sands and gravels transmit water readily, having a permeability of about 1.07×10^{2} metres (3.5×10^{2} feet) per day.

A permeable geologic unit is called an aquifer. A relatively impermeable geologic unit is called an aquiclude or an aquitard because it retards the flow of water; both are called confining beds because they block the movement of ground water. Confining beds usually consist of clay or other fine-grained sediments. They contain ground water but have low permeability and cannot transmit extractable quantities. Granite is an example of an aquifuge because ground water cannot flow through it; granite is neither porous nor permeable. Ground water does flow through joints in the granite, but that geologic complication is a result of structural complexities not related to porosity or permeability. The porosity and permeability of formations composed of clay, sands, and gravels generally decrease through time as the formation becomes more consolidated.

SPECIFIC YIELD

Specific yield is the ratio of the volume of water that will drain due to gravity from a saturated sample of material to the total volume of the sample.

$$\text{Specific Yield} = \frac{\text{volume of water drained}}{\text{total volume of sample}} (100) = \%$$

The higher the specific yield of a geologic unit, the more water it will yield. Listed below are representative specific yield values for common geologic materials. Geologic materials having a more uniform grain size distribution will have a greater specific yield because of the greater total amount of space between particles. Consolidated rock and rocks such as basalt and granite are given specific yield values close to zero because water is contained only in fractures and not within the rock. The volume of water stored in fractured rock is highly variable, depending on the size and extent of the fractures, and cannot be easily quantified.

% Specific Yield	3	5	10	20	25
Geologic Material	Adobe Clay Shale	Cemented Gravel Cemented Sand Clay and Gravel Silt	Clay, Sand, & Gravel Fine Sand Quicksand Sand and Clay	Coarse Sand Loose Sand Medium Sand	Gravel Sand and Gravel

TRANSMISSIVITY

Transmissivity is the rate at which ground water will flow through a unit width of an aquifer, and is equal to the permeability of an aquifer multiplied by its thickness. The transmissivity of an aquifer or formation can generally be determined only from water level data collected during extended pumping of a water well. During a constant-rate pump test, abrupt changes in the slope of the curve from which transmissivity is determined indicate either the presence of a barrier, which impedes ground water movement, or the presence of a source of ground water recharge.

*"Metres per day" and "feet per day" are standard velocity units that indicate the amount of ground water that moves through a given cross-sectional area in one day:
a. 1 cubic metre of ground water moves through 1 square metre in 1 day. The units are: $1\ m^3 / m^2 / day = 1\ m/day$
b. 1 cubic foot of ground water moves through 1 square foot in 1 day. The units are: $1\ ft^3 / ft^2 / day = 1\ ft/day$

Table 1

GEOLOGIC UNITS IN THE PETALUMA VALLEY[1/]

Geologic Unit	Lithology[2/]	Specific Yield	Comments
Bay Mud Deposits Qbm	Mud, rich in organic matter, silty mud, silt, and fine sand.	Very Low (<3%)	Low yields. Generally contain brackish water, either connate or as the result of intrusion.
Alluvium Qal	Unconsolidated sand, silt, clay and gravel.	Variable (3-15%)	Moderate to high yields. Water quality is excellent. Minor amounts of methane gas. Lenses of very fine sand.
Alluvial Fan Deposits Qf	Unconsolidated fine sand, silt, and silty clay, coarse sand and gravel, with gravel more abundant near fan heads.	Moderate to high (8-17%)	
Sonoma Volcanics Tsv	Volcanic flows (labeled Tsv on Plate 1) and tuff, agglomerate, and volcanic sediments (Tst).	Highly variable (0-15%)	Variable yields, yields from Tst generally higher. Boron in some water may affect plants. Some waters thermal.
Merced Formation Tm	Coarse- to fine-grained sandstone with minor amounts of clay.	High (10-20%)	Generally high yields. Minor amounts of hydrogen sulfide (H_2S). Lenses of very fine sand. Zones of high concentration of methane gas.
Petaluma Formation Tp	Consolidated clay and shale with minor amounts of sandstone.	Low (3-7%)	Generally low yields. Yields may be higher for wells penetrating lenses of coarse material. Zones of hydrogen sulfide (H_2S).
Tolay Volcanics Ttv	Volcanic flows, tuffs, breccias, and agglomerates.	Highly variable (0-10%)	Variable yields. Fair to good water producer west of City of Petaluma.
Franciscan Complex KJf	Melange, including chert, sandstone, shale, greenstone, and serpentinite.	Very low (<3%)	Low yields. Poor quality water in thermal areas, serpentinite. Good water quality south of City of Petaluma.

1/ After Ford (1975, Table 1).
2/ Data from Blake, et al (1971); Fox, et al (1973); Blake, et al (1974).

4—75762

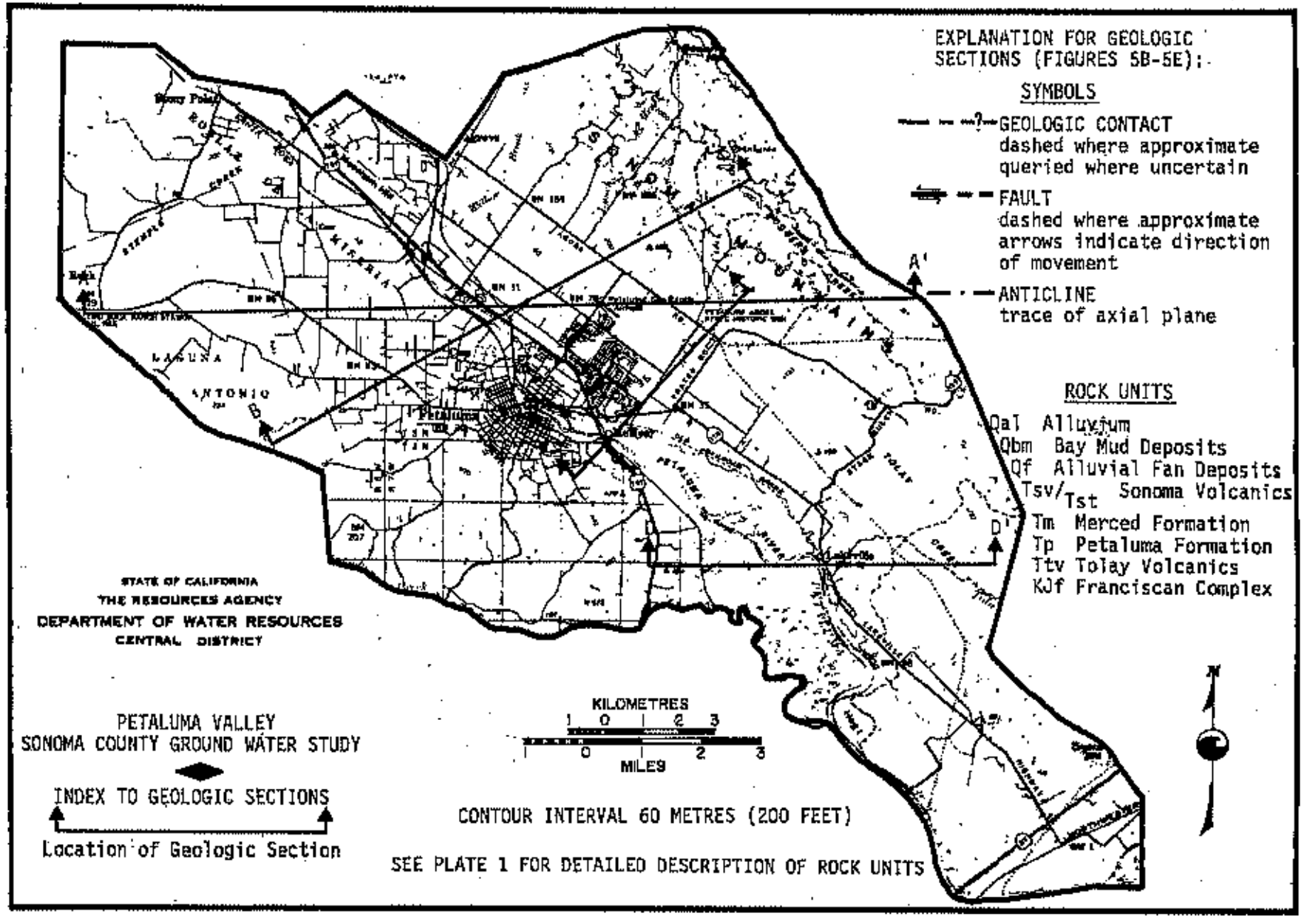

EXPLANATION FOR GEOLOGIC SECTIONS (FIGURES 5B-5E):
SYMBOLS
GEOLOGIC CONTACT
dashed where approximate
queried where uncertain
FAULT
dashed where approximate
arrows indicate direction of movement
ANTICLINE
trace of axial plane
ROCK UNITS
Qal Alluvium
Qbm Bay Mud Deposits
Qf Alluvial Fan Deposits
Tsv/Tst Sonoma Volcanics
Tm Merced Formation
Tp Petaluma Formation
Ttv Tolay Volcanics
KJf Franciscan Complex
A
A'
B
B'
C
C'
D
D'
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT
PETALUMA VALLEY
SONOMA COUNTY GROUND WATER STUDY
INDEX TO GEOLOGIC SECTIONS
Location of Geologic Section
KILOMETRES
1 0 1 2 3
0 1 2 3
MILES
CONTOUR INTERVAL 60 METRES (200 FEET)
SEE PLATE 1 FOR DETAILED DESCRIPTION OF ROCK UNITS

FIGURE 5A

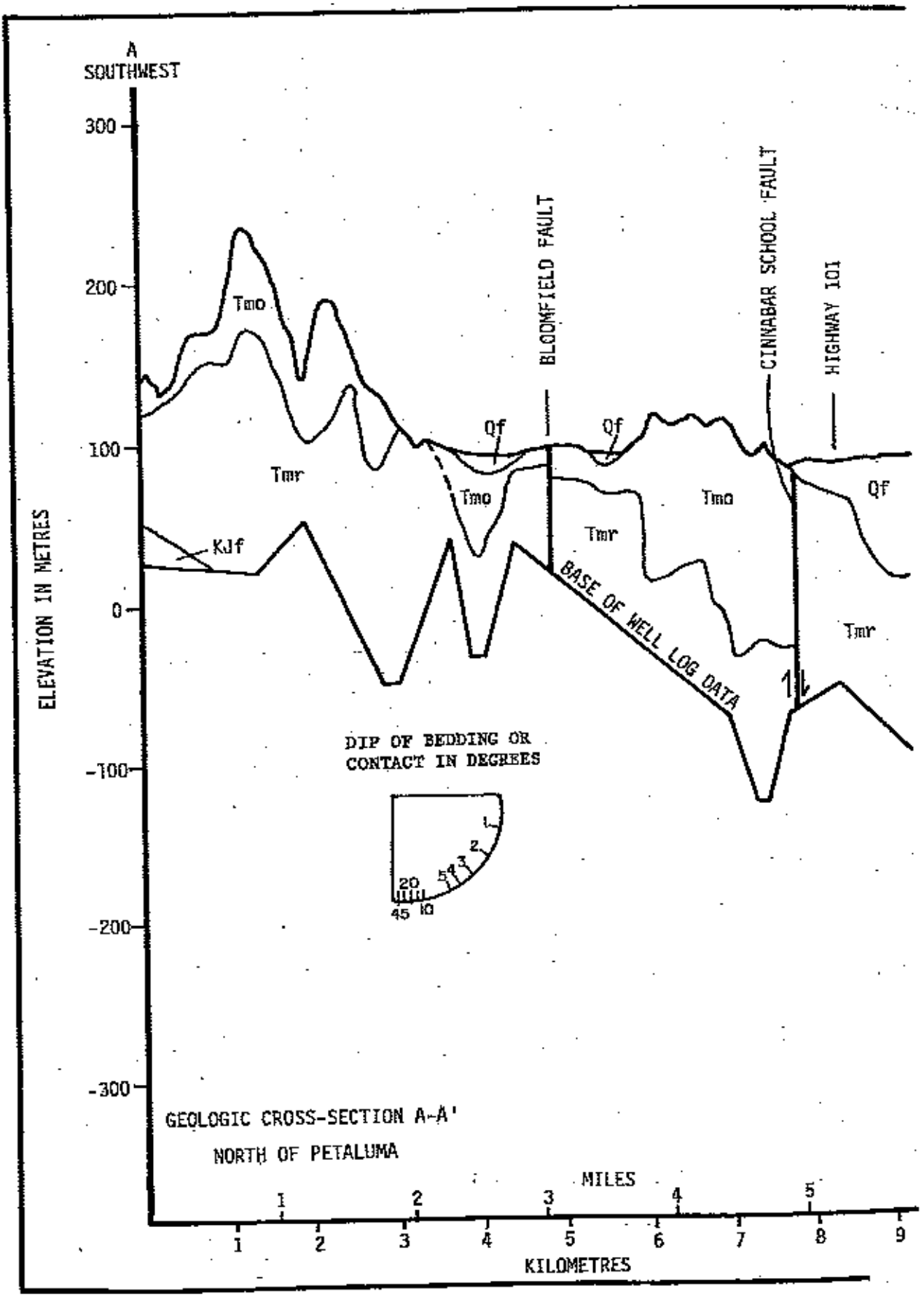
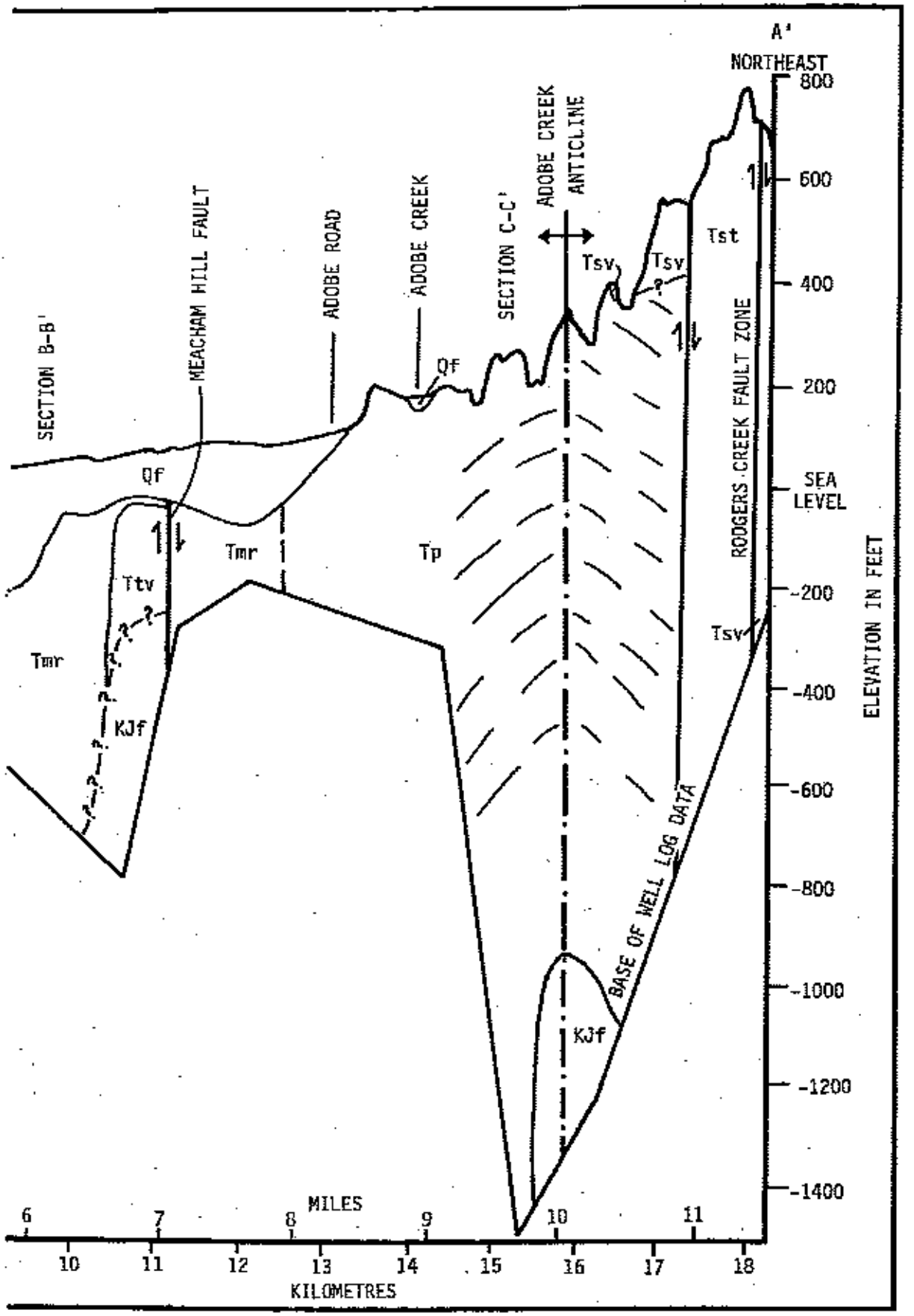

A
SOUTHWEST
300
200
100
0
-100
-200
-300
ELEVATION IN METRES
Tmo
Tmr
KJf
Qf
BLOOMFIELD FAULT
CINNABAR SCHOOL FAULT
HIGHWAY 101
BASE OF WELL LOG DATA
DIP OF BEDDING OR
CONTACT IN DEGREES
1
2
3
5
20
45
10
GEOLOGIC CROSS-SECTION A-A'
NORTH OF PETALUMA
MILES
1
2
3
4
5
KILOMETRES
1
2
3
4
5
6
7
8
9

FIGURE 58


A'
NORTHEAST
SECTION B-B'
MEACHAM HILL FAULT
ADOBE ROAD
ADOBE CREEK
SECTION C-C'
ADOBE CREEK ANTICLINE
RODGERS CREEK FAULT ZONE
Qf
Tmr
Ttv
Tp
Tsv
Tst
KJf
BASE OF WELL LOG DATA
800
600
400
200
SEA LEVEL
-200
-400
-600
-800
-1000
-1200
-1400
ELEVATION IN FEET
MILES
6
7
8
9
10
11
KILOMETRES
10
11
12
13
14
15
16
17
18

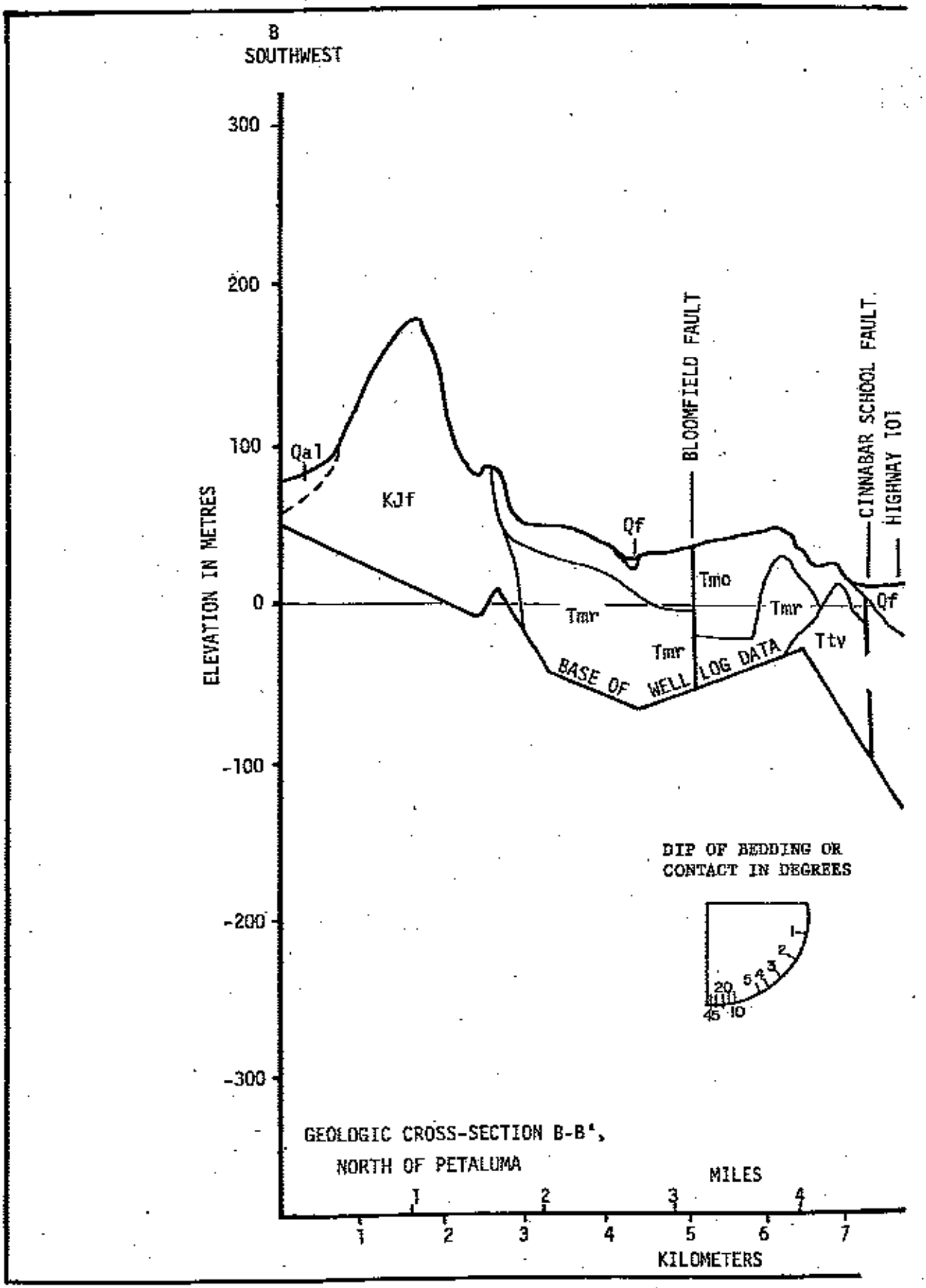

B
SOUTHWEST
300
200
100
0
-100
-200
-300
ELEVATION IN METRES
Qal
KJf
Qf
Tmo
Tmr
Tmr
Tmr
Ttv
Qf
BLOOMFIELD FAULT
CINNABAR SCHOOL FAULT
HIGHWAY 101
BASE OF WELL LOG DATA
DIP OF BEDDING OR
CONTACT IN DEGREES
1
2
3
4
5
10
20
45
GEOLOGIC CROSS-SECTION B-B',
NORTH OF PETALUMA
MILES
1
2
3
4
1
2
3
4
5
6
7
KILOMETERS

FIGURE 8C

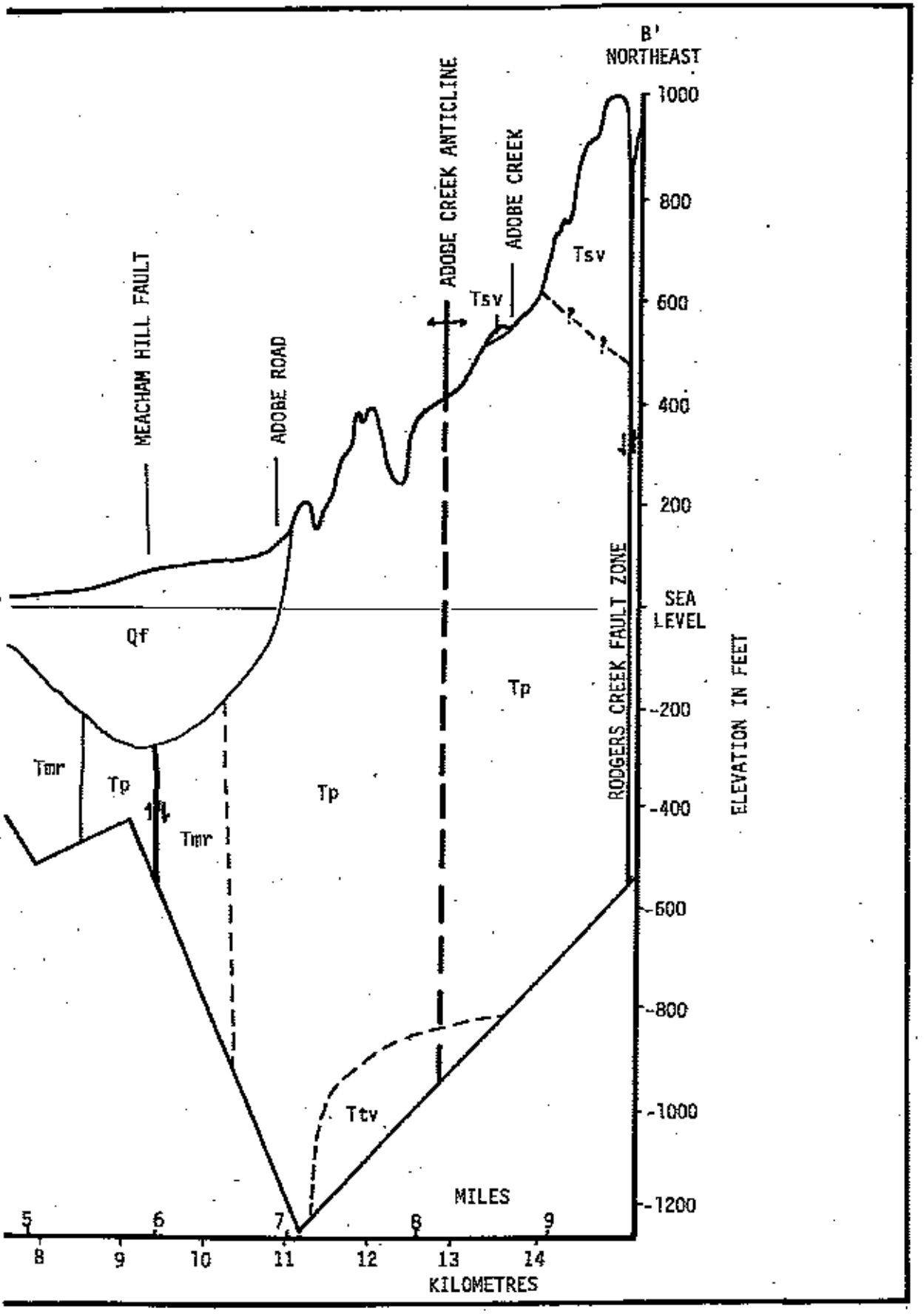

B'
NORTHEAST
MEACHAM HILL FAULT
ADOBE ROAD
ADOBE CREEK ANTICLINE
ADOBE CREEK
Tsv
Tsv
Qf
Tp
Tmr
Tp
Tmr
Tp
Ttv
RODGERS CREEK FAULT ZONE
SEA LEVEL
1000
800
600
400
200
-200
-400
-600
-800
-1000
-1200
ELEVATION IN FEET
MILES
5
6
7
8
9
8
9
10
11
12
13
14
KILOMETRES

FIGURE 8D

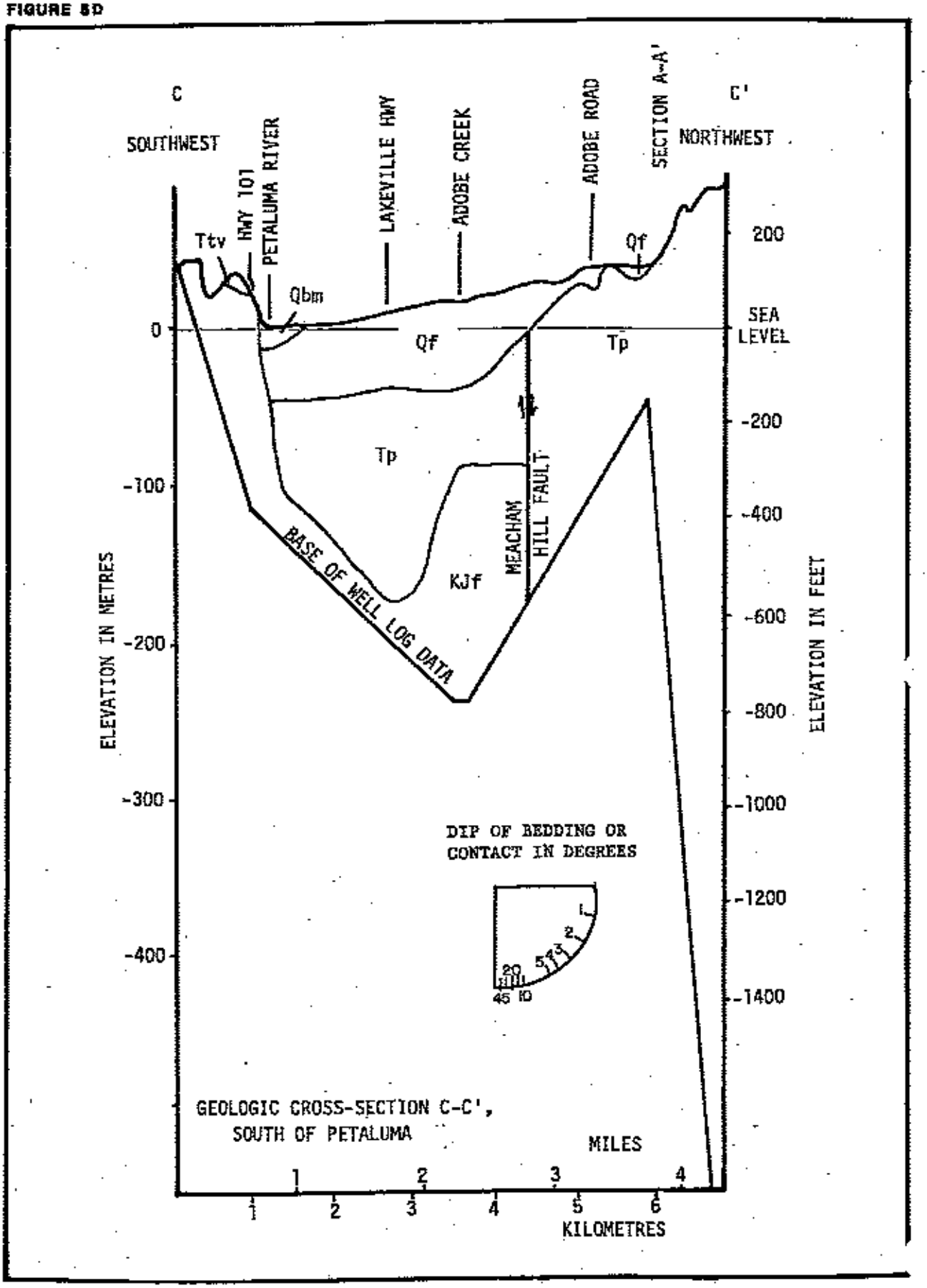
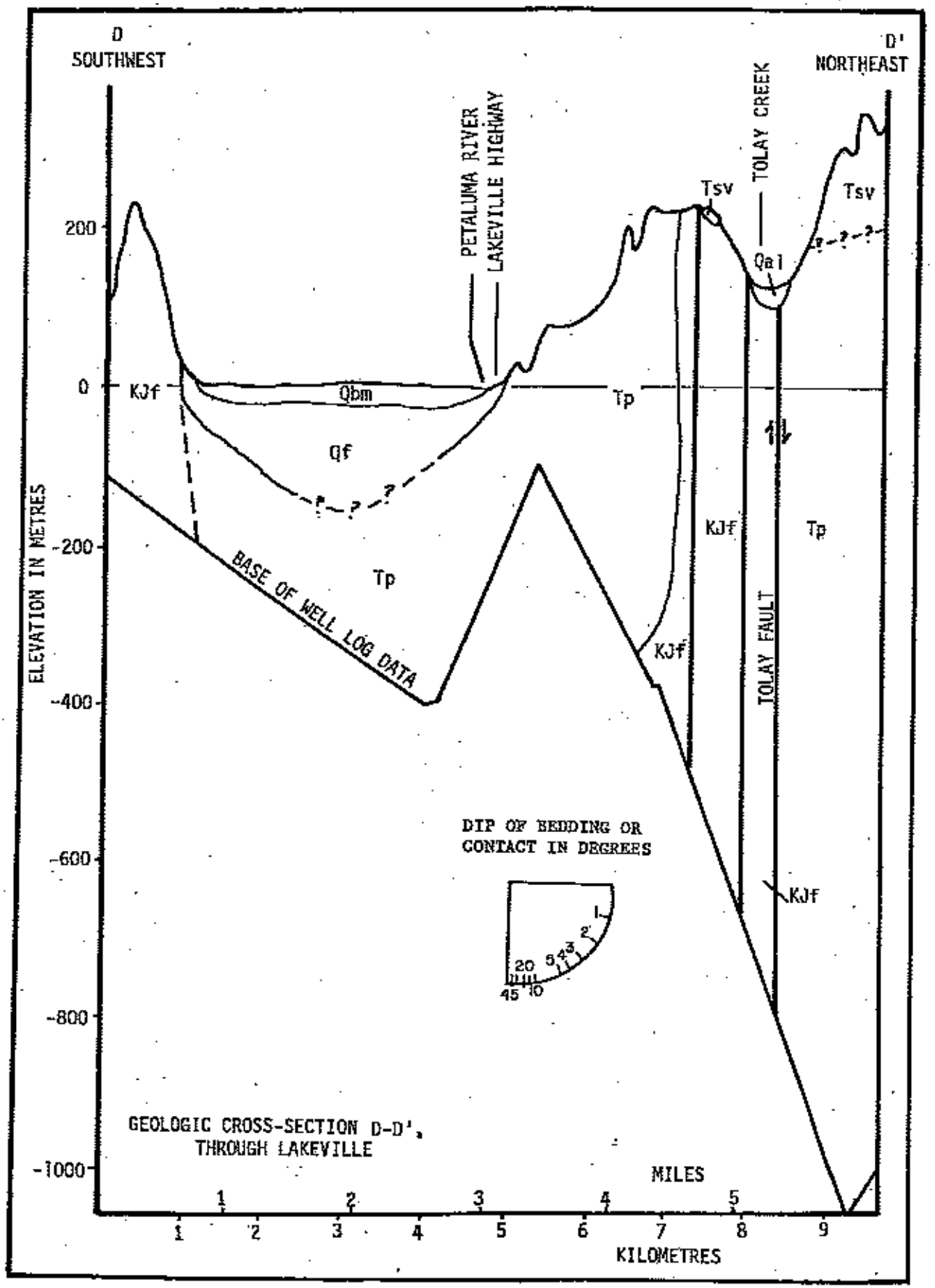
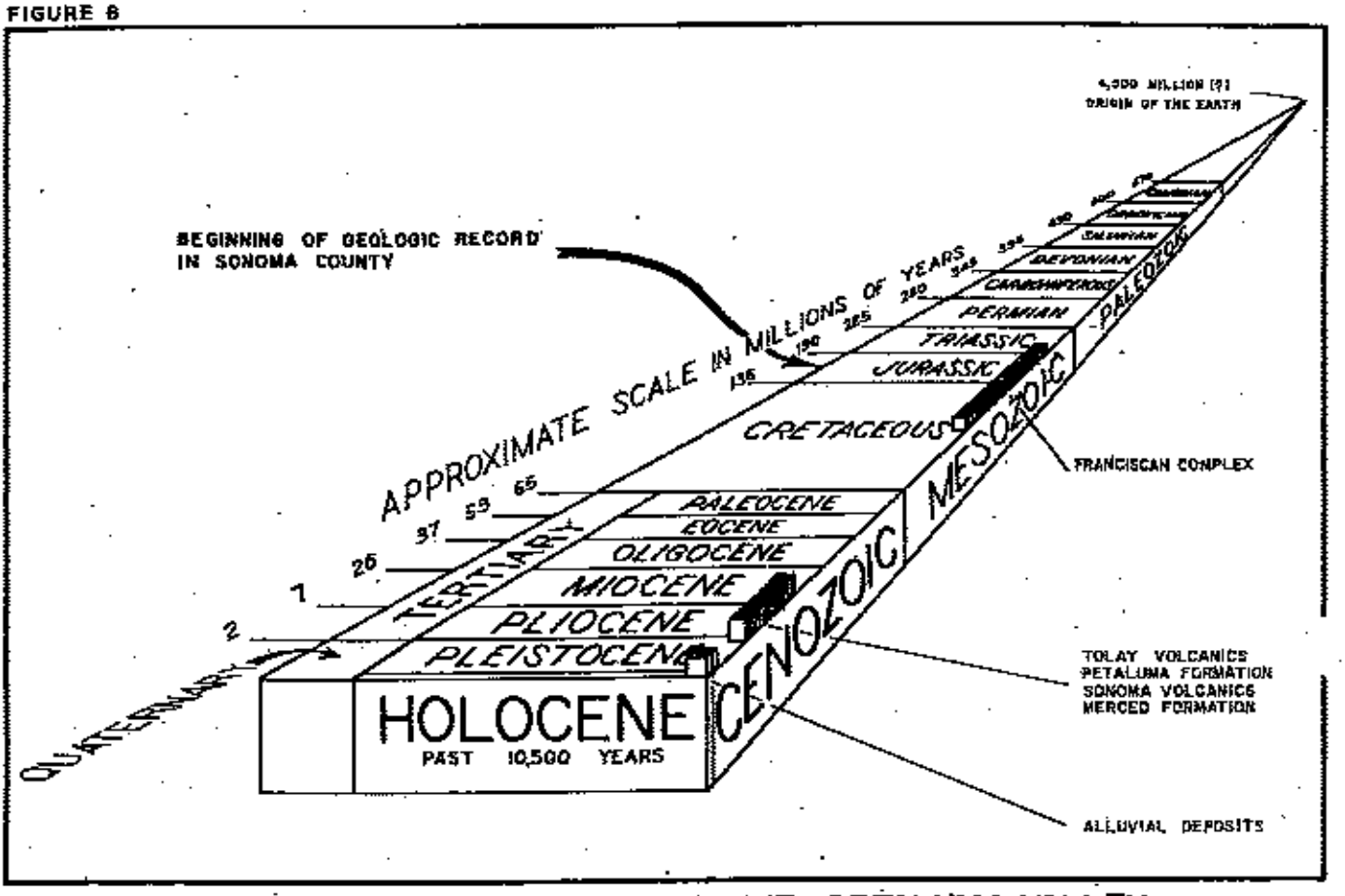

C
SOUTHWEST
C'
NORTHWEST
SECTION A-A'
ADOBE ROAD
ADOBE CREEK
LAKEVILLE HWY
PETALUMA RIVER
HWY 101
Ttv
Qbm
Qf
Tp
KJf
MEACHAM HILL FAULT
BASE OF WELL LOG DATA
SEA LEVEL
ELEVATION IN METRES
ELEVATION IN FEET
200
0
-100
-200
-300
-400
-200
-400
-600
-800
-1000
-1200
-1400
DIP OF BEDDING OR CONTACT IN DEGREES
20
45
10
GEOLOGIC CROSS-SECTION C-C',
SOUTH OF PETALUMA
MILES
1
2
3
4
KILOMETRES
1
2
3
4
5
6

FIGURE 6E



5—75782

FIGURE 8



LOOKING BACK IN GEOLOGIC TIME—PETALUMA VALLEY

and is present at shallow depths of 45 m (150 ft) immediately to the west of Petaluma. Although originally mapped as Sonoma Volcanics, these rocks have been identified as Tolay in this report based on new age data. These dates are from:

- Burdell Mountain, Marin County (11.8 ± 0.8 million years (MY) (Mankinen, 1972)).
- Basalt Rock Company quarry immediately east of Petaluma (12.0 ± 0.5 MY (Garniss H. Curtis to Basalt Rock Company, written communication, 1969))
- Volcanic rocks along Spring Hill Road (11.76 MY) and from Meacham Hill (13.62 MY (Kenneth F. Fox, Jr., written communication, 1981)).

The unit, defined by Morse and Bailey (1935) from oil well core samples, includes a great thickness of lava flows, breccias, tuffs, and agglomerates. In some areas west of Petaluma, stream channel deposits are interbedded with the volcanic flow rocks.

The Tolay Volcanics has a highly variable specific yield. It is considered to b fair-to-good water producer in some ar

west of Petaluma (Ford, in progress). In other parts of the Petaluma Valley, the lava flows are essentially nonwater-yielding except where the rocks have been highly fractured by faults. Normally, consolidated rocks containing water only in fractures are not considered to have a specific yield. However, for this report, the Tolay Volcanics has been collectively assigned a variable apparent specific yield of from 0 to 10 percent. Because of the variable water-yielding characteristics, areas composed of Tolay Volcanics were not included in calculations of storage capacity in Chapter 4.

Petaluma Formation

The Petaluma Formation, mid-to-late Pliocene in age, is exposed in the mountains east of the Petaluma River. The Petaluma Formation consists of folded continental and shallow marine to brackish-water deposits of clay, shale, and sandstone, with lesser amounts of conglomerate and nodular limestone. Occasional thick beds of diatomite are present. Abundant clay characterizes this unit; Weaver (1949) measured a 323-m (1,059-ft) thick stratigraphic section near Lakeville in the Petaluma Valley containing 70 percent clay, shale, and clayey or shaley beds. Hydrogen sulfide has been found in wells penetrating the Petaluma Formation in the Santa Rosa Plain. The Petaluma Formation can yield moderate amounts of water when a well penetrates an appreciable thickness of sand and gravel. However, because of the large amounts of clay that characterize the unit, it has been assigned a low overall specific yield of from 3 to 7 percent.

Merced Formation

The Merced Formation, generally Miocene to Pliocene in age, is one of the principal water-yielding formations in Sonoma County. It is exposed in the uplands on the northern and western sides of the Petaluma Valley. In these uplands, the Merced consists of an upper oxidized continental unit of brown sandstone, clay, and gravel, and a lower reduced shallow-marine unit of blue sandstone and blue sandstone with shells. The two units are separated by an erosional surface, and sometimes by lava flows of the Sonoma Volcanics. Both units are excellent aquifers, and when the volcanic rock is not present, there appears to be good hydraulic continuity between the upper and lower units. Where the volcanic rock is present, water in the lower unit is confined; some wells in the vicinity of Paulsen Lane that pump water from the lower unit, below the volcanics, have heads of approximately 15 m (50 ft). Some ground water in the upper unit is also confined (based on information from water well logs). Since no confining beds can be located from existing subsurface data, confinement may be due to local cementation of overlying sandstone.

The reduced Merced unit underlies the Petaluma Valley at a depth of 76 m (250 ft). Cardwell (1958) noted that the permeability of the Merced is lower in the southeastern part of the Petaluma Valley than in the northwestern part.

Marine fossils are abundant within the reduced Merced unit and are generally recorded as oysters or clamshells on water well drillers' logs. Also common within the formation are zones of poorly consolidated, very fine sand, frequently reported by drillers as "quicksand". High concentrations of methane gas have been noted in the Merced in the central portion of the Santa Rosa Plain. Hydrogen sulfide has been reported in a Petaluma municipal well that bottomed in the Merced. Since the Merced is predominantly sandstone, it has a high specific yield of from 10 to 20 percent.

Sonoma Volcanics

The Sonoma Volcanics, of Pliocene age, is exposed along the crest of the Sonoma Mountains on the eastern edge of the study area. In this area, the Sonoma

Volcanics consists of a thick sequence of lava flows (labeled Tsv on Plate 1) with minor intrusive igneous rocks consisting of rhyolite, perlite, and rhyolite breccia. In some areas, such as near Rodgers Creek, lava flows are interlayered with tuff, welded tuff, and volcanic sedimentary deposits, such as tuffaceous sand and volcanic gravel (labeled Tst on Plate 1). Large landslides have been mapped by Fox, et al. (1973) in areas underlain by Sonoma Volcanics.

The Sonoma Volcanics has a highly variable specific yield. It is considered to be a good water producer where unwelded tuff, scoria, and volcanic sediments are present. In the Petaluma Valley, the lava flows and intrusive rocks are essentially nonwater-yielding except where the rocks have been highly fractured. Normally, consolidated rocks containing water only in fractures are not considered to have a specific yield. However, for this report, the Sonoma Volcanics has been collectively assigned a variable apparent specific yield of from 0 to 15 percent. Because of the variable water-yielding characteristics, areas composed of Sonoma Volcanics were not included in calculations of storage capacity in Chapter 4.

Alluvial Fan Deposits and Alluvium

Alluvial fan deposits of Pleistocene and Holocene age form a nearly continuous blanket over the northern Petaluma Valley and along the eastern edge of the southern Petaluma Valley. They consist of poorly sorted coarse sand and gravel and moderately sorted fine sand, silt, and silty clay; gravel content increases near the heads of fans. Fan deposits in the southern Petaluma Valley are generally finer grained.

Lenses of very fine sand within the alluvial fan deposits frequently cause sanding problems in water wells. This sand is similar to the very fine-grained sand present in the Merced Formation; the Merced may be, in part, a source of this alluvial fan sand.

Minor amounts of methane gas have been noted in fan deposits in the southern Santa Rosa Plain. The gas may have risen from an underlying formation, such as the Merced, and been trapped within the fan deposits by overlying impermeable clay.

Because of the unconsolidated, coarse-grained nature of much of the alluvial fan deposits, they have been given a moderate to high specific yield of 8 to 17 percent.

Alluvium of Pleistocene to Holocene age forms a thin surficial deposit along Tolay Creek, Stemple Creek, and other creeks in the Petaluma Valley. It is composed of interbedded sand, silt, clay, and gravel. The specific yield of these deposits is variable, depending on the amount of clay present and the thickness of the deposit. Most are less than 30 m (100 ft) thick with specific yield ranging from 3 to 15 percent.

Bay Mud Deposits

Bay mud deposits of Holocene age cover the southern Petaluma Valley. They are bay and marsh deposits, generally composed of mud, silty mud, silt, and small amounts of sand, and are rich in organic material. They have been covered in many areas by artificial fill. The bay mud was deposited during a higher stand of sea level, and much sea water was trapped in the sediments as they were deposited; bay mud is still being deposited on the floor of San Pablo Bay. Since little fresh water has moved through the bay muds since they were deposited, water pumped from them is generally brackish to highly saline. The bay muds have a low permeability and a very low specific yield of less than 3 percent.

Folds and Faults

Ground water reservoirs can be modified by folds and faults. Layered geologic formations can be bowed upward and downward by regional geologic forces to form anticlines and synclines, respectively. Because the hydraulic conductivity in these formations prior to folding is usually highest in the horizontal direction and lowest in the vertical, ground water usually flows away from the axis, or core, of an anticline and toward the axis of a syncline. In both cases, this is the direction of highest permeability.

Many folds are present in the Petaluma Formation in the Petaluma Valley; one of the largest is the Adobe Creek Anticline. It may be the feature that separates the Petaluma Valley and Santa Rosa Plain ground water basins. No large folds have been mapped in the Merced Formation, but the Merced as a whole dips slightly to the east. Younger geologic formations have not been folded.

Faults are fractures in the rock along which the rocks on either side have been moved. The fracture might or might not intersect the earth's surface. Faults are widespread in the Petaluma Valley and surrounding mountains. Faults sometimes create zones of crushed and broken rock along the fault plane. This crushed material, known as gouge, consists of clay-sized particles and can impede the movement of ground water across the fault, thus acting as a ground water barrier. In contrast, faults in brittle rocks can shatter the rocks, forming zones of high permeability. Faults can also affect ground water movement by thinning water-yielding sands and gravels on the upthrown side of the fault; higher topographic relief increases the rate of erosion. Water-yielding materials may be thicker on the downthrown side if sediments are being deposited during a period of continued downward movement of one side of the fault.

Major faults in the Petaluma Valley are the Rodgers Creek, Tolay, Bloomfield, and two faults that have not previously been recognized; they are here named the Meacham Hill fault and the Cinnabar School fault (Plate 1).

The Rodgers Creek fault, known to be active, is actually a zone of faulting just west of the crest of the Sonoma Mountains. The 1969 earthquake that extensively damaged Santa Rosa was centered on this fault. Because of the fault's location, it probably has very little effect on aquifers beneath the valley floor. Because the fault may impede the flow of recharging ground water moving downslope toward the valley, and because many of the rocks in the mountainous areas are essentially nonwater-yielding, areas east of the Rodgers Creek fault trace were not included in calculations of storage capacity in Chapter 4.

The trace of the Tolay fault parallels Tolay Creek and the Lakeville Highway. The fault has influenced valley aquifers by bringing the nonwater-yielding Franciscan complex to the surface along the western side of its fault trace. There are no indications of a direct connection between the Tolay fault and a northwestern extension of the Tolay fault published by Fox (1973); water levels do not change across the projected trace and there are no recognizable displacements of geologic units, based on subsurface data from water well drillers' logs. The southern trace of the Tolay fault has been designated as potentially active under the Alquist-Priolo Special Studies Zones Act of 1972. "Potentially active" means that evidence has been found which indicates that movement along the fault occurred within the last 2 million years, or during Quaternary time.

The trace of the Bloomfield fault extends north and west of the City of Petaluma. First mapped by Travis (1952), it was later extended from data compiled by

Koenig (1963). Ford (in press) has extended the fault farther to the southeast and connected it with an unnamed fault mapped by Blake (1974), based on subsurface data from water well logs. The sense of vertical displacement on the fault changes from northwest to southeast. Presently available data are not sufficient to determine the effect of the fault on ground water.

The trace of the Meacham Hill fault crosses the southwestern flank of Meacham Hill, where it is delineated by a line of springs. On Meacham Hill, the fault emplaces Sonoma Volcanics against the Merced Formation (G. D. Woodard, personal communication, 1980). In 1943, Johnson mapped an unnamed fault at this location; he estimated the maximum throw to be 90 m (300 ft). Farther south along the trace, the Meacham Hill fault has brought Tolay and Franciscan rocks near the surface along the western side of its fault trace. This displacement is similar in sense and magnitude to that along the southern trace of the Tolay fault. Geologic sections constructed from well drillers' logs indicate that the southern trace of the Tolay fault and the Meacham Hill fault are connected.

Ground water level contours steepen in the vicinity of the fault trace (see Figure 10), indicating that transmissivity may be reduced across the Meacham Hill fault trace.

The Cinnabar School fault offsets the Merced Formation at the base of the hills northwest of Petaluma. This fault extends northwestward to connect with the Tolay fault of Fox (1973) and extends southeastward along the base of the hills as far as Lynch Creek, based on subsurface data from water well logs (Ford, in press). Geophysical anomalies identified by Harding-Lawson Associates (1976) as caused by the Tolay fault appear instead to be related to the Cinnabar School fault. The fault brings the upper oxidized Merced Formation into contact with the lower reduced Merced. The upper oxidized Merced Formation does not appear east of the fault trace. The effect of this fault on ground water in the area cannot be determined from presently available data.

Soils

Soil is a product of many factors:

- The geologic formation that underlies it and from which it formed.
- The slope of the land.
- Age of the soil.
- Climate, especially the amount of rainfall.
- Organisms, especially native vegetation.

Of these factors, geology is the most important. For example, the sandy soils in the vicinity of Petaluma formed from the Merced Formation, which is composed predominantly of sandstone. The heavy soils in the southern Petaluma Valley were formed from bay mud deposits, which are largely clay. Slope generally affects the thickness of the soil profile, with thicker, older soils forming on flatter slopes. Age of the soil and the amount of rainfall control the degree to which the soil profile develops into distinct layers or "horizons". Young soils, especially in arid climates, have relatively little profile development. Organisms modify soil characteristics such as the amount of nitrogen and organic matter in the soil.

In turn, soil characteristics control the types of crops that can be grown in an area, the amount of surface water that infiltrates to the ground water body, and the effectiveness of septic-tank leachfield sewage disposal systems. Agricultural crops usually grow best on deep, permeable soils. Some nearly impermeable

adobe soils are suitable only for pasture. Permeable soils are necessary for recharge of surface water to the ground water body unless an artificial recharge program is initiated. Soils that have neither a very high infiltration rate (infiltration rate faster than 2 minutes per centimetre or 5 minutes per inch) nor a low infiltration rate (infiltration rate slower than 25 minutes per centimetre or 60 minutes per inch) are necessary for leach-field siting.

In general in the Petaluma Valley, permeable soils have formed on some alluvial deposits (labeled Qf and Qal on Plate 1), on some sedimentary units in the Sonoma Volcanics (Tst), on the Merced Formation (Tm), and on some portions of the Petaluma Formation (Tp). Poorly permeable soils have generally formed on bay mud deposits (Qbm), on some units in the Sonoma Volcanics (Tsv), and on the Franciscan complex (KJf).

In this report, only soils with an infiltration rate greater than 1.5 centimetres (0.6 inch) per hour and a land slope less than 15 percent are considered to be permeable enough to allow recharge to ground water. These criteria were developed by the U. S. Geological Survey during recharge studies in the Santa Cruz area (Muir and Johnson, 1979). Approximately 20 percent of the study area has been tentatively classified as recharge areas. Locations of the recharge areas are discussed in Chapter 5.

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CHAPTER 4. GROUND WATER SUPPLY IN THE PETALUMA VALLEY

Ground water supplies can be estimated once the geologic and hydrologic characteristics of a basin are understood. In Petaluma Valley, the volume of potable water is reduced by nitrate contamination in the area northwest of Petaluma and by sea water intrusion near San Pablo Bay and along lower Petaluma River. The potential for increased sea water intrusion governs the volume of fresh ground water that should be extracted in Petaluma Valley.

The study area contains 1 751 300 dam^3 (1,420,000 ac-ft) of ground water in water-yielding materials that average 87 m (285 ft) in thickness. Long-term annual extractions from the study area should not exceed the average annual recharge to the study area if permanent depletion of the ground water in storage is to be avoided. Using the results of the computer program TRANSCAP and ground water well data from 1950 through 1980, the average annual recharge to the study area was estimated to be 50 000 dam^3 (40,000 ac-ft). The estimated volume of ground water pumpage in the Petaluma Valley in 1980 was 9 600 dam^3 (7,800 ac-ft) (derived from Finlayson, 1980, Table 13). If natural recharge rates could be determined more accurately, a sustained yield figure could be calculated; sustained yield would more accurately reflect the ground water potential of the basin than does the estimated average annual recharge given in this report.

Method of Investigation Using TRANSCAP

In the Petaluma Valley, the TRANSCAP (transmissivity and storage capacity) computer program was used to determine:

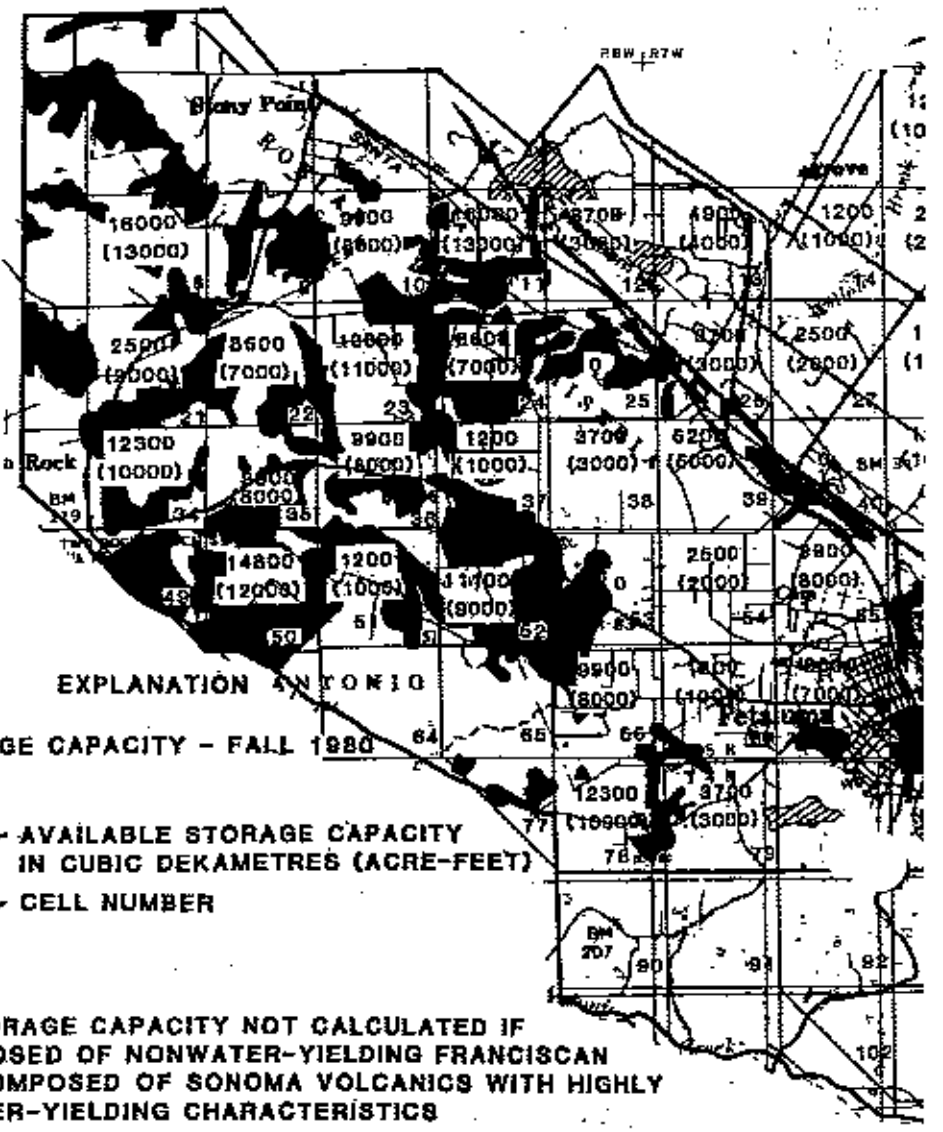
- Total storage capacity.
- Volume of ground water in storage.
- Volume of storage available to store recharge.
- Estimated annual natural recharge.

A detailed description of the TRANSCAP computer program is given in Miyazaki (1980).

The initial step in using TRANSCAP to study an area is to divide the area into "cells". In the Petaluma Valley, each cell is equivalent to a 260-hectare (640-acre) section, or to that portion of a section underlain by water-yielding materials. The study area and cell boundaries are shown on Figure 7.

Where the surficial geology is composed mainly of the Franciscan complex, cells were not evaluated because this complex is nonwater-yielding. Where the surficial geology is composed mainly of Sonoma or Tolay Volcanics, cells were not evaluated because volcanic rocks are highly variable in their hydrologic properties. Cells east of the trace of the Rodgers Creek fault were not evaluated because the fault may impede the flow of ground water toward the valley.

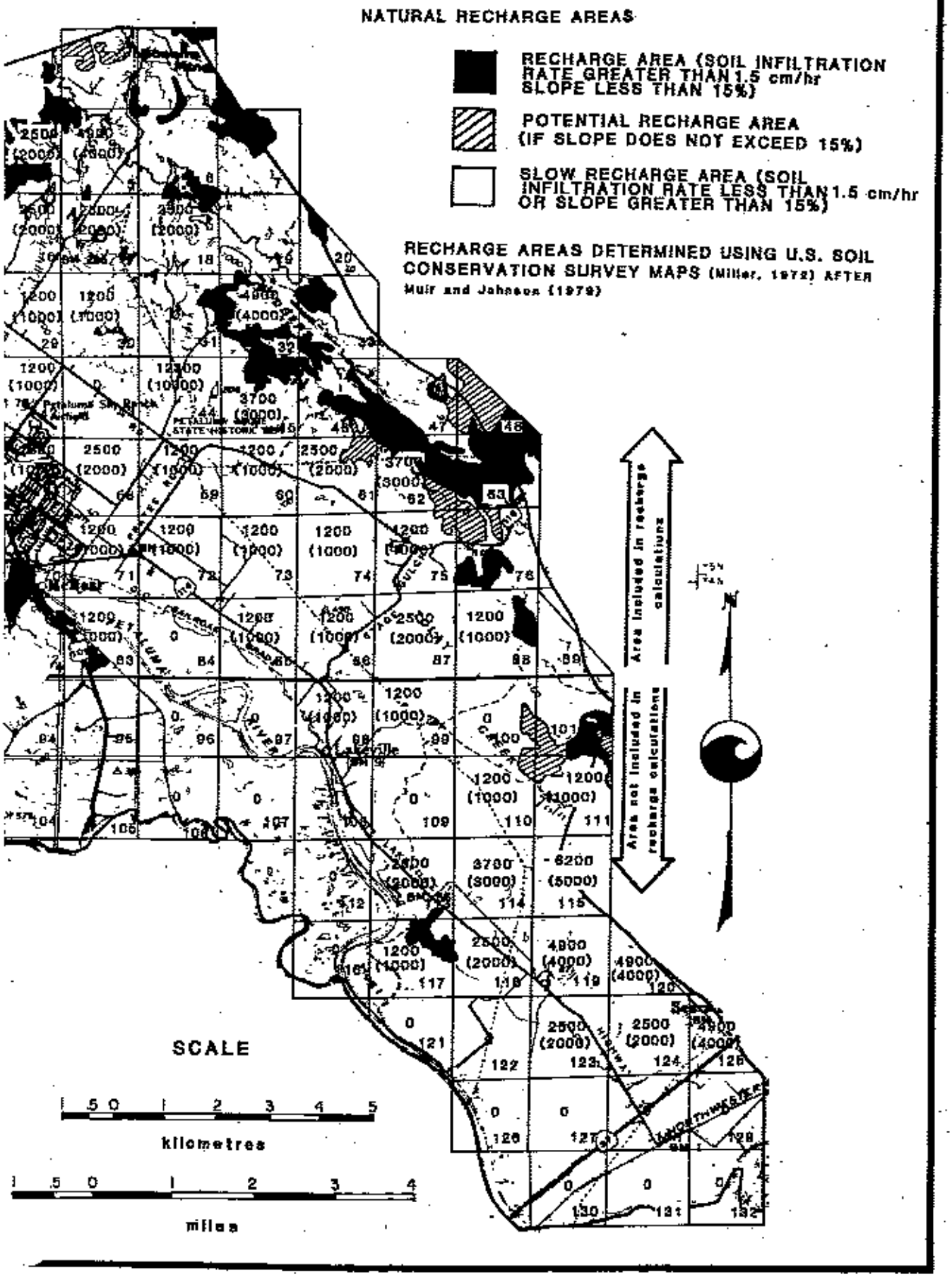
Water well drillers' reports are collected for each cell to be evaluated. A sample well driller's report is shown in Figure 8. The right-hand column of the report lists the geologic materials encountered during drilling of the well. The materials in each well are then coded into the computer according to their specific yield. This specific yield information is the basic data used by the TRANSCAP program.



STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT

PETALUMA VALLEY
SONOMA COUNTY GROUND WATER STUDY

AVAILABLE STORAGE CAPACITY PER CELL AND AREAS OF NATURAL RECHARGE


NATURAL RECHARGE AREAS
RECHARGE AREA (SOIL INFILTRATION RATE GREATER THAN 1.5 cm/hr SLOPE LESS THAN 15%)
POTENTIAL RECHARGE AREA (IF SLOPE DOES NOT EXCEED 15%)
SLOW RECHARGE AREA (SOIL INFILTRATION RATE LESS THAN 1.5 cm/hr OR SLOPE GREATER THAN 15%)
RECHARGE AREAS DETERMINED USING U.S. SOIL CONSERVATION SURVEY MAPS (Miller, 1972) AFTER Muir and Johnson (1979)
Area included in recharge calculations
Area not included in recharge calculations
SCALE
kilometres
miles

The TRANSCAP program adjusts all wells within a cell to the average elevation of the land surface in that cell. The program then averages all specific yield data from all wells in a cell for specified depth intervals, generally 3 m (10 ft). The averaged specific yield data are converted to transmissivities using equations of a curve developed by the DWR investigation of the Livermore and Sunol Valleys (Ford and Hills, 1974). For specific yield values from 0 to 9, the curve is described by the equation:

$$\Delta T = \Delta D \cdot 10^{\left[3.5319 - \frac{7.16288}{|SY| - 0.84}\right]}$$

and for specific yield values greater than 9, the curve is described by the equation:

$$\Delta T = \Delta D \cdot (100\ |SY| - 500)$$

where ΔT = incremental transmissivity,
ΔD = incremental depth, and
$|SY|$ = absolute value for average specific yield for a given interval

When no drillers' logs were available for a cell, transmissivity and storage capacity values from another cell with similar geology were used.

A sample TRANSCAP printout in customary units is shown in Figure 9. The variables listed in the upper left-hand corner of the table describe the values used to set up TRANSCAP for this cell. Increment of Depth = 10 indicates that specific yields were averaged over 10-ft (3-m) intervals. Node Elevation Control is the average elevation of the land surface within the cell. Node Surface Area is the surface area, in acres, of the cell. Note that the center point in a cell is called the "node".

The figure describes hydrologic properties by intervals: either as "Depth" below land surface, or "Elevation" relative to sea level. For example, for the interval from 10 to 20 ft (3 to 6 m) above sea level or 80 to 90 ft (24 to 27 m) below land surface, the "average specific yield" is 10.30 percent, the "unit width transmissivity" is 5,300 gallons/day (20 000 litres/day), and the "storage capacity" is 673 ac-ft (830 dam^3). These computer-generated numbers are rounded to one or two significant figures before use, to avoid giving an erroneous impression of precision.

To determine the storage capacity of any cell, the bottom of the water-yielding zone must first be determined. The graph in Figure 9 entitled "unit width summation of transmissivity plot" shows a profile of the transmissivity in the sample cell. Points on the graph represent unit width transmissivity values that have been summed starting at the lowest elevation evaluated for the cell. Summed unit width transmissivity values are listed in the right-hand column labeled "TR VALUE" opposite the corresponding elevation. The numbers across the top of the graph are summed unit width transmissivities in thousands of gallons per day.

The point at the lowest elevation on the graph represents 0. As elevation increases, the points on the graph move from left to right, and the heading is read from left to right, lowest line first (0 to 500).

When the summed transmissivities exceed 500 thousand gallons per day, the graph doubles back, and the headings are read from right to left (500 to 1,000). When the summed transmissivities exceed 1,000 thousand gallons per day, the graph again doubles back and the headings are read from left to right (1,000 to 1,500).

The more horizontal the line on the graph, the more permeable the water-yielding zone. The more vertical the line, the more that zone functions as a confining bed. The bottom of the water-yielding zone is determined from the TRANSCAP graph and is verified by comparison with geologic maps and cross sections. The top of the water-yielding zone is generally assumed to be the land surface. The net storage capacity of the water-yielding zone is calcula

FIGURE 8

ORIGINAL

File with: DWR

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
WATER WELL DRILLERS REPORT

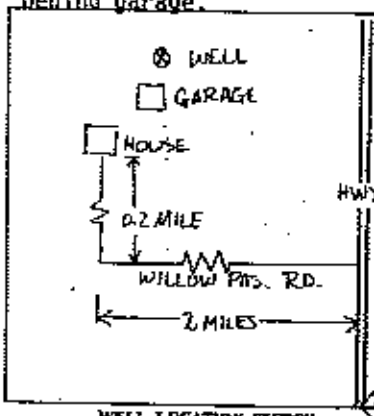
Do not fill in
No. SAMPLE

Notice of Intent No. _____ Permit No.
Local Permit No. or Date _____

State Well No. _____
Other Well No. _____

(1) OWNER: Name Alice Mar
Address 212 South Willow Pass Road
City Woodlake, California Zip 93563

(2) LOCATION OF WELL (See instructions):
County Sonoma Owner's Well Number 74-2
Well address if different from above _____
Township 7N Range 6W Section 19
Distance from cities, roads, railroads, fences, etc. 4 miles west of Woodlake, 2 miles east of Highway 101, 0.2 mi. north of Willow Pass Road. NE of house behind garage.



WELL LOCATION SKETCH

(3) TYPE OF WORK:
New Well ☒ Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:
Domestic ☐
Irrigation ☐
Industrial ☐
Test Well ☐
Stock ☐
Municipal ☐
Other ☐

(5) EQUIPMENT:
Rotary ☒ Reverse ☐
Cable ☐ Air ☐
Other ☐ Bucket ☐

(6) GRAVEL PACK:
Yes ☒ No ☐ Size 1/8 - 1/4"
Diameter of bore 12"
Packed from _____ ft. to _____ ft.

(7) CASING INSTALLED:
Steel ☒ Plastic ☐ Concrete ☐

From ft.	To ft.	Dia. in.	Gage of Wall
0	152	8"	1/4"

(8) PERFORATIONS:
Type of perforation or size of screen _____

From ft.	To ft.	Slot size
40	51	100
129	143	100

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☒ No ☐ If yes, to depth 50 ft.
Were strata sealed against pollution? Yes ☐ No ☒ Interval _____ ft.
Method of sealing Cement Grout

(10) WATER LEVELS:
Depth of first water, if known 23 ft.
Standing level after well completion 28 ft.

(11) WELL TESTS:
Was well test made? Yes ☒ No ☐ If yes, by whom? A-OK Drilling
Type of test Pump ☐ Bailer ☐ Air lift ☐
Depth to water at start of test 23 ft. At end of test 37 ft.
Discharge 100 gal/min after 24 hours Water temperature 67 °F
Chemical analysis made? Yes ☒ No ☐ If yes, by whom? Dow Lab
Was electric log made? Yes ☒ No ☐ If yes, attach copy to this report

(12) WELL LOG: Total depth _____ ft. Depth of completed well _____ ft.
from ft. to ft. Formation (Describe by color, character, size of material)

from ft.	to ft.	Formation
0	4	top soil
4	23	brown sandy loam
23	40	brown clay and gravel
40	41	coarse sand and pebble gravel
51	68	brown sandy with minor clay
68	92	blue sand
92	97	coarse sand with shell fragments
97	103	sand and pebble gravel with minor clay
103	125	red volcanic rock
125	129	black crystal vitric tuff
129	143	andesite
143	147	dark grey volcanic ash
147	152	scoria and volcanic ash
152	165	fractured andesite

Work started 16 June 19 59 Completed 21 June 19 59

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Signed Seymour Rocks (Well Driller)
NAME A-OK Drilling Co. (Person, firm, or corporation) (Typed or printed)
Address 2664 So. Bascomb
City Woodlake, CA Zip 93563
License No. 000001 Date of this report 20 July 1959

DWR 188 (REV. 7-74)

SAMPLE NOT FOR PUBLIC USE
WATER CODE SEC. 13752

SAMPLE WATER WELL DRILLERS REPORT

by subtracting the "storage capacity to bottom" figure at the bottom of the water-yielding zone from the corresponding figure at the top of the water-yielding zone.

The program TRANSCAP calculates storage capacities to the bottom of the deepest well in each cell. No storage capacity information is available for that portion of an aquifer below the bottom of the deepest well. For cells where the aquifer extends below the well data, the storage capacity from TRANSCAP is a minimum value; the true storage capacity would be higher.

In the Petaluma Valley, the thickness of the water-yielding materials ranges from 0 to 200 m (0 to 660 ft), with an average thickness of 87 m (285 ft). The thickest sections are northwest of the City of Petaluma.

To determine the volume of water in storage, the average ground water level for the cell is determined from a ground water level map. The volume of water in storage is determined by subtracting the "storage capacity to bottom" figure at the bottom of the water-yielding zone from the corresponding figure at the ground water table elevation. This method assumes that all ground water in the cell is unconfined. If, however, ground water is confined, the volume of stored ground water estimated by this method will be too large. The more confined the ground water, the larger the error will be.

Water level information for fall 1980 (Figure 10) was combined with the product of TRANSCAP to determine the storage capacity, the total volume of water in storage, the available ground water storage capacity, and the amount of fresh water displaced by sea water in the Petaluma Valley. Available storage capacity indicates the capability of the cell to store additional ground water from natural or artificial recharge.

Available storage capacity (estimated for cells where no drillers' logs were available) is given in Figure 7. The volume of ground water in storage per cell is presented in Figure 11.

Total Water in Storage and Available Storage Capacity

The total volume of water in storage and the available ground water storage capacity are given in Table 2. There were not enough ground water level data available before fall 1980 to construct ground water level maps, but hydrographs of wells that have been monitored in the past were examined for trends.

Ground water levels near the City of Petaluma dropped from the mid-1950s until the early 1960s. Ground water levels began to recover after introduction of imported water in 1962. In some cases, ground water levels returned to historic normal levels. Ground water levels have remained relatively steady since that time except during the drought of 1976-1977.

Ground water levels in monitored wells in the Petaluma Valley normally drop 3 m (10 ft) between the spring water level (highest of the year) and the fall water level (lowest of the year). During the 1976-1977 drought, ground water levels dropped an average of 3 m (10 ft) below the normal yearly low by the fall of 1977, but in most areas, levels had returned to normal by spring 1978. In general, therefore, the hydrographs indicate that the volume of ground water stored in the Petaluma Valley has not changed much over time.

Volume of Ground Water Affected by Nitrate Contamination

During the winter of 1978-79, a case of methemoglobinemia in an infant whose family lived in the upland area northwest of Petaluma sparked concern about nitrate concentrations in the ground water in that area. Testing of domestic wells during summer 1979 indicated nitrate

FIGURE 9

SONOMA COUNTY
GROUND WATER INVESTIGATION
DEPTH INCREMENT CALCULATIONS FROM SPECIFIC YIELD

NODE 7

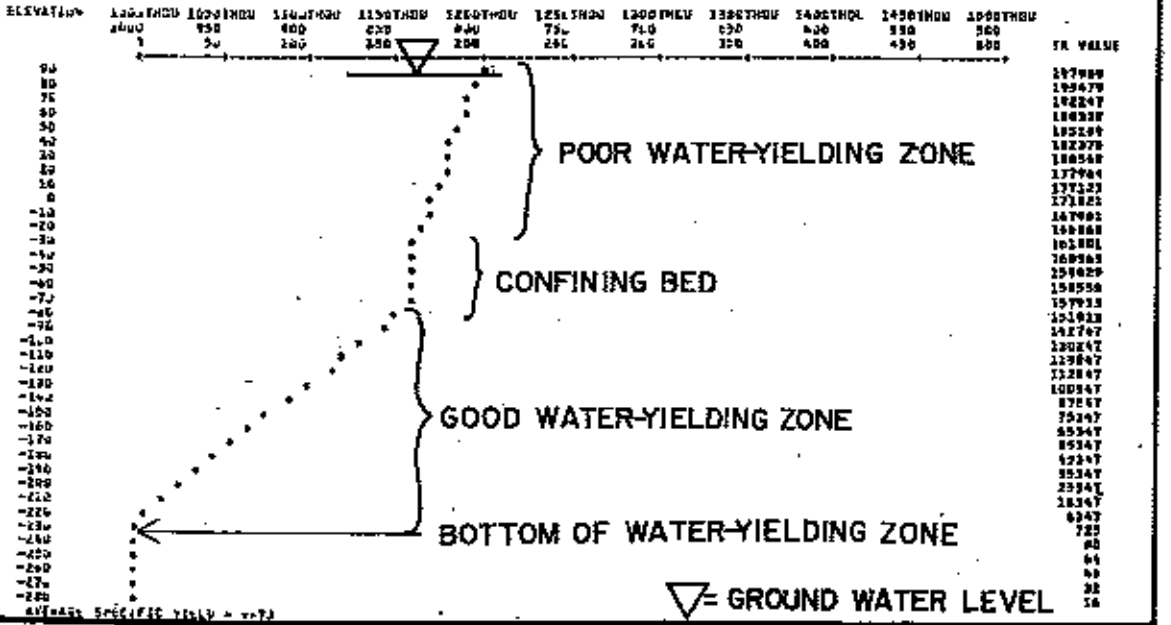
PAGE 1
DATE 10/27/81

INCREMENT OF DEPTH = 20
NODE ELEVATION CONTROL = 100
NODE SURFACE AREA (ACRES) = 654

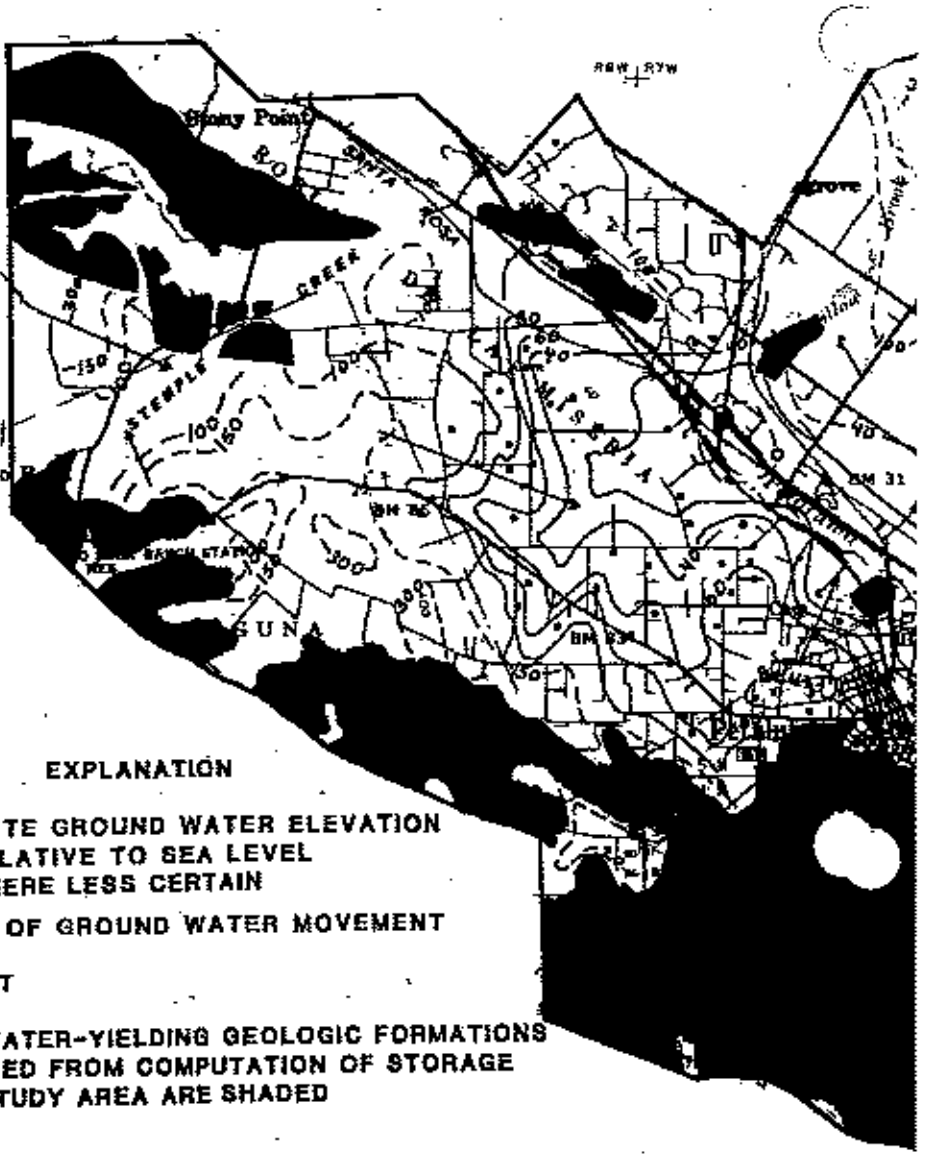
SY VALUE FOR CLAY = 3

DEPTH	ELEVATION	AVERAGE SPECIFIC YIELD (IN PERCENT)	UNIT WIDTH TRANSMISSIVITY (GAL/DAY)	UNIT WIDTH TR FOR USE IN MODEL AC-FT/YR	STORAGE CAPACITY (ACRE-FEET)	STORAGE CAPACITY TO BOTTOM (ACRE-FEET)	NO. OF SAMPLES
10	90	7.17	2540	221	488	24178	12
20	80	7.83	3232	219	512	23710	13
30	70	6.44	3908	215	591	23197	13
40	60	7.77	2149	211	508	22644	13
50	50	7.46	2619	207	487	22136	18
60	40	6.48	1016	204	422	21649	15
70	30	7.25	1596	202	474	21227	12
80	20	5.30	843	198	346	20753	10
90	10	10.30	5300	198	675	20407	10
100	0	4.40	3640	192	549	19756	10
110	-10	6.25	1613	188	408	19155	8
120	-20	9.50	5067	186	621	18777	8
130	-30	5.24	728	180	336	18156	7
140	-40	5.24	736	179	336	17828	7
150	-50	5.86	1271	179	303	17484	7
160	-60	5.00	645	177	327	17101	6
170	-70	11.00	6100	177	719	16774	6
180	-80	14.17	9266	170	926	16055	6
190	-90	17.00	12500	160	1144	15129	6
200	-100	15.40	10450	146	1007	13985	5
210	-110	12.00	7000	134	786	12978	4
220	-120	17.50	12500	126	1144	12194	2
230	-130	17.50	12500	112	1144	11056	2
240	-140	17.50	12500	96	1144	9908	2
250	-150	15.00	10000	44	981	8762	1
260	-160	15.00	10000	73	981	7741	1
270	-170	15.00	10000	63	981	6800	1
280	-180	15.00	10000	50	981	5819	1
290	-190	15.00	10000	35	981	4988	1
300	-200	15.00	10000	24	981	3837	1
310	-210	14.00	9000	17	918	2876	1
320	-220	10.00	6622	7	654	1961	1
330	-230	5.00	665	0	327	1307	1
340	-240	3.00	16	0	196	980	1
350	-250	3.00	16	0	196	784	1
360	-260	3.00	16	0	196	588	1
370	-270	3.00	16	0	196	392	1
380	-280	3.00	16	0	196	196	1

UNIT WIDTH SUMMATION OF TRANSMISSIVITY PLOT



SAMPLE TRANSCAP PRINTOUT



EXPLANATION

—110— APPROXIMATE GROUND WATER ELEVATION IN FEET RELATIVE TO SEA LEVEL DASHED WHERE LESS CERTAIN

——→ DIRECTION OF GROUND WATER MOVEMENT

• DATA POINT

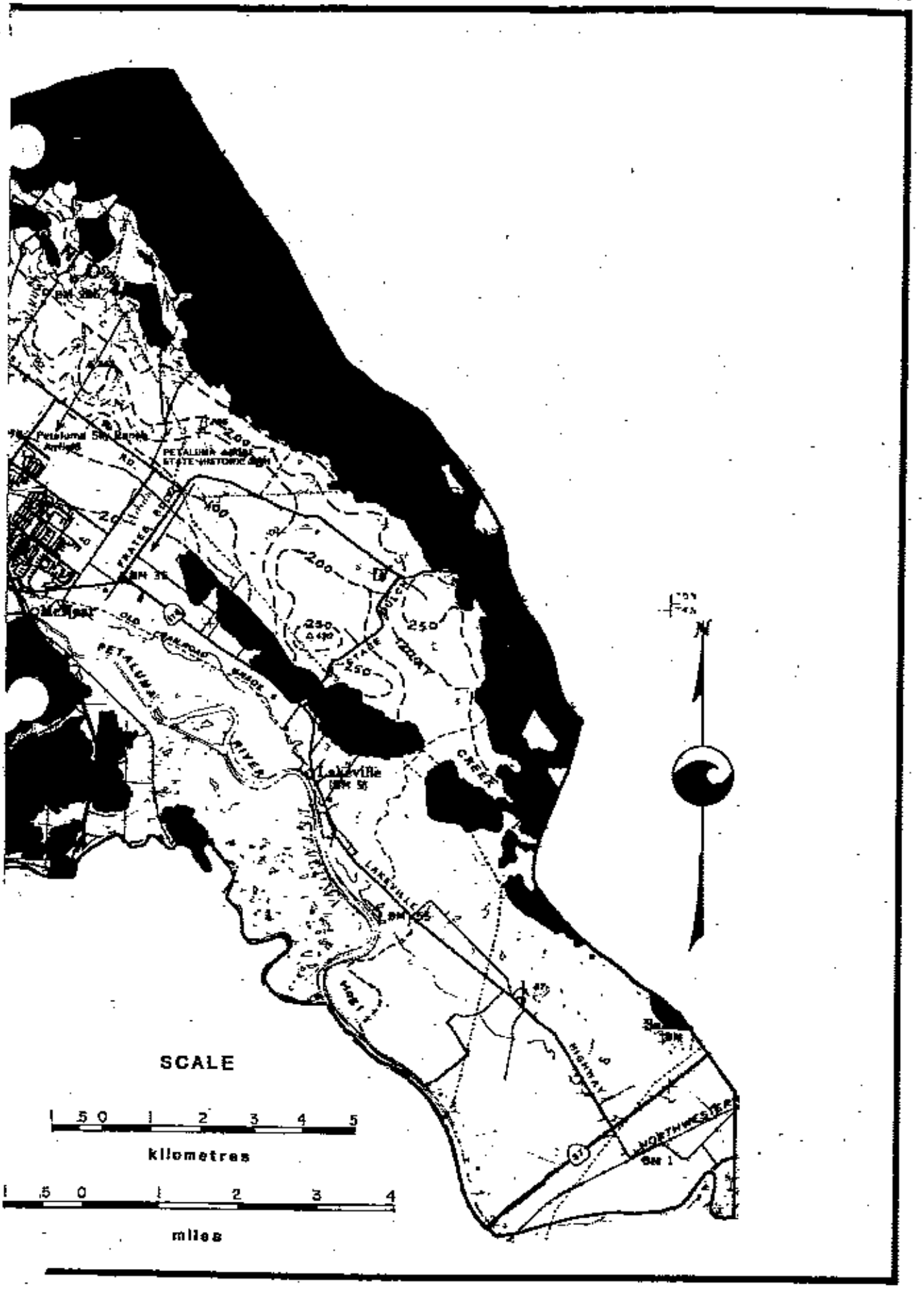
ESSENTIALLY NONWATER-YIELDING GEOLOGIC FORMATIONS THAT WERE EXCLUDED FROM COMPUTATION OF STORAGE CAPACITY IN THE STUDY AREA ARE SHADED

GROUND WATER ELEVATIONS CALCULATED FOR FALL 1980.

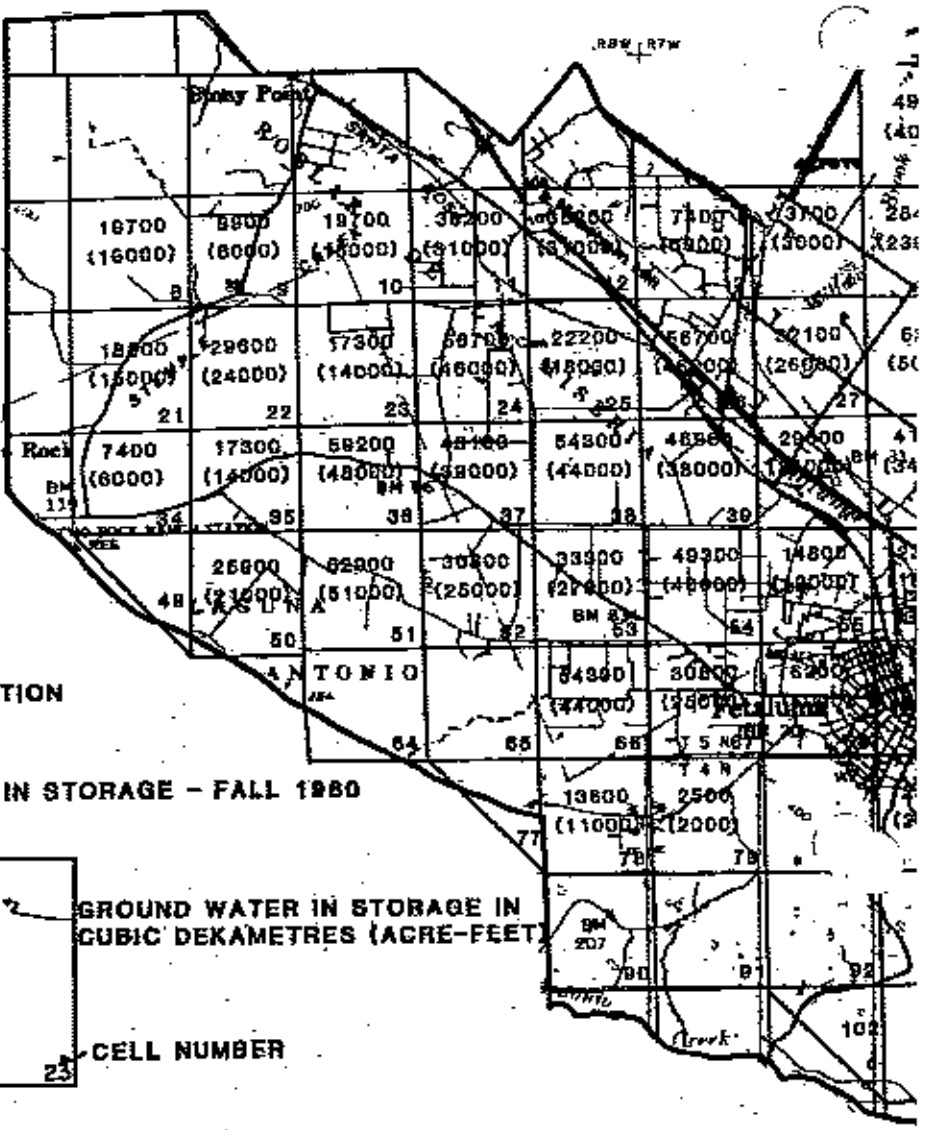
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT

PETALUMA VALLEY
SONOMA COUNTY GROUND WATER STUDY

GROUND WATER ELEVATIONS


Petaluma
PETALUMA RIVER
Lakeville
LAKEVILLE CREEK
HIGHWAY
NORTHWESTERN
SCALE
1 5 0 1 2 3 4 5
kilometres
1 .5 0 1 2 3 4
miles

7—73762



EXPLANATION

GROUND WATER IN STORAGE – FALL 1980

23456
(56789) — GROUND WATER IN STORAGE IN CUBIC DEKAMETRES (ACRE-FEET)

23 — CELL NUMBER

GROUND WATER IN STORAGE NOT CALCULATED IF AREA
1) COMPOSED OF NONWATER-YIELDING FRANCISCAN COMPLEX
2) COMPOSED OF SONOMA VOLCANICS WITH HIGHLY VARIABLE WATER-YIELDING CHARACTERISTICS AREAS

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT

PETALUMA VALLEY
SONOMA COUNTY GROUND WATER STUDY

GROUND WATER IN STORAGE PER CELL

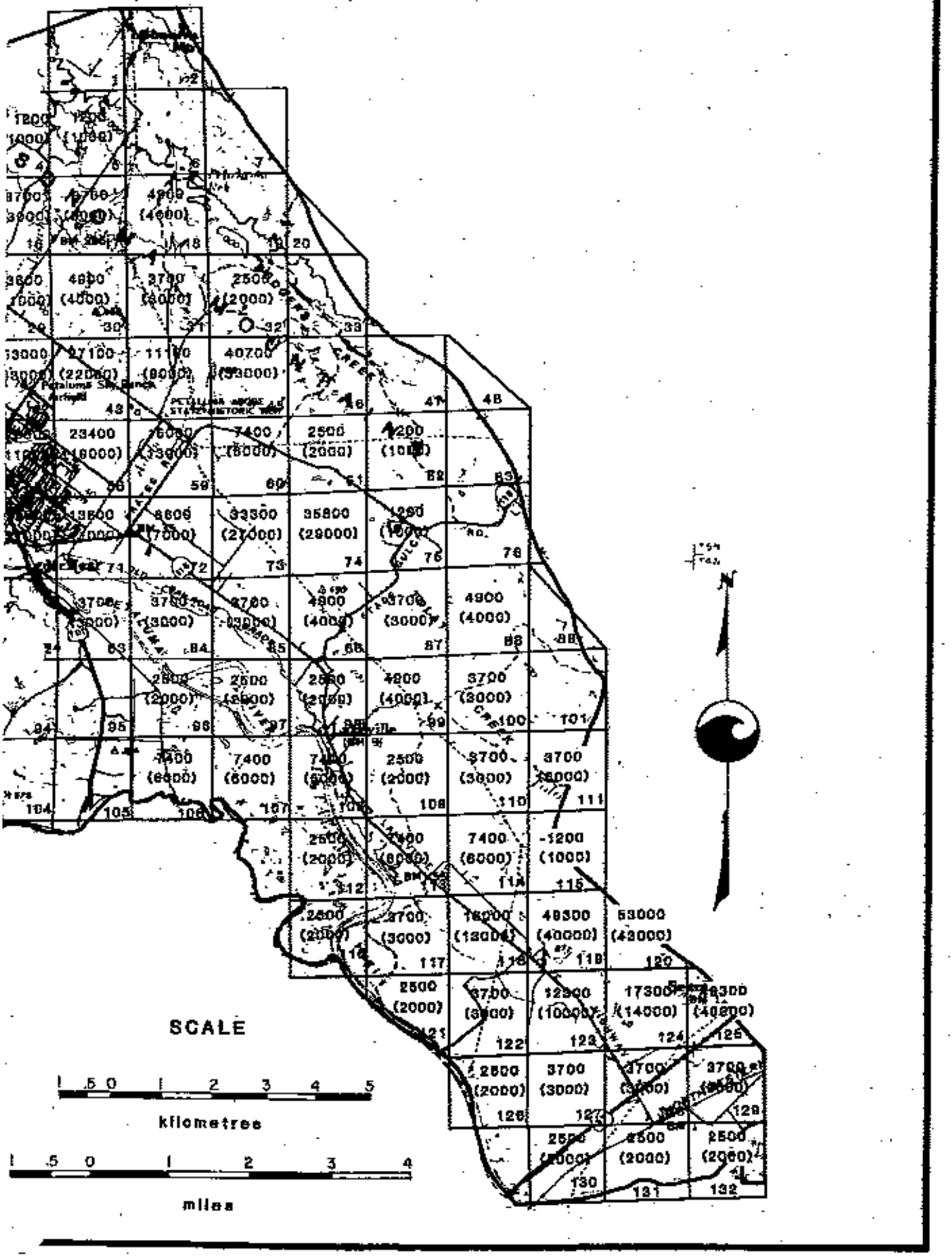
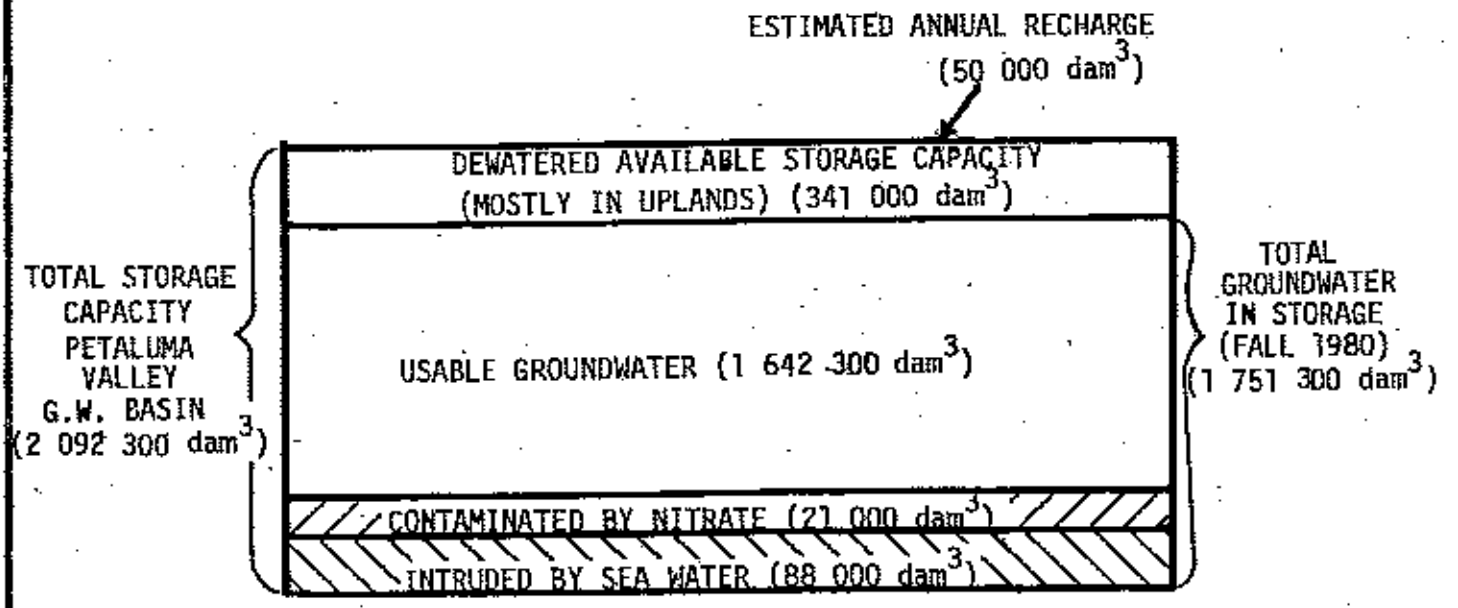

SCALE
1 5 0 1 2 3 4 5
kilometres
1 5 0 1 2 3 4
miles
N

Table 2

GROUND WATER SUPPLY IN THE PETALUMA VALLEY

Total Storage Capacity	2 092 300 dam^3	(1,697,000 ac-ft)
Available Storage Capacity	341 000 dam^3	(277,000 ac-ft)
Total Water in Storage (Based on fall 1980 ground water levels)	1 751 300 dam^3	(1,420,000 ac-ft)
Volume of Ground Water Seriously Affected by Nitrate Contamination (Area Northwest of Petaluma)	21 000 dam^3	(17,000 ac-ft)
Sea Water Intrusion	88 000 dam^3	(71,000 ac-ft)
Volume of Usable Water in Storage	1 642 300 dam^3	(1,332,000 ac-ft)
Estimated Annual Natural Recharge	50 000 dam^3	(40,000 ac-ft)
Percentage of Total Storage Capacity Dewatered	16%	

*Because both metric and customary figures have been rounded, multiplying metric figures by 0.81070 will not give the customary figures.



concentrations in excess of recommended public health limits in 33 percent of the 200 wells tested.

There is evidence of serious nitrate contamination in wells located in 16 cells northwest of Petaluma (Figure 12). Sampling indicates that all contamination probably occurs within 15 m (50 ft) of the land surface. Assuming that the 16 cells (numbers 11, 23, 24, 37, 38, 52, 53, 54, 55, 56, 65, 66, 67, 68, 79, and the southwestern half of 40) are contaminated to 15 m (50 ft) below land surface, the total amount of water in storage that is unusable is 21 000 dam^3 (17,000 ac-ft) (Table 3). This is a rural residential area, and houses are served water by individual wells averaging 55 m (180 ft) deep. Therefore, this volume of contaminated water represents 8 percent of the total water in storage in these cells that is currently being tapped by wells.

Because the Merced Formation, which underlies this area, has few barriers to vertical movement of ground water, contamination is likely to spread. If the sources of the nitrate contamination are not eliminated and the existing contamination is not removed, it is probable that the contaminated zone will eventually extend to 30 m (100 ft) below land surface in the presently contaminated cells. If so, the volume of contaminated water would be 60 000 dam^3 (49,000 ac-ft), which represents 22 percent of the total water in storage in these cells that is being tapped by wells.

Because there are also few horizontal barriers to ground water movement on the Merced Formation, contamination could also spread to neighboring cells. The nearby cells most likely to be affected are cells 9, 10, 21, 22, 25, 34, 35, 36, 39, 50, 51, and the southwestern half of cells 12 and 26 (Figure 12). If the presently affected cells and these nearby cells were all contaminated to a depth of 15 m (50 ft) below land surface, 32 000 dam^3 (26,000 ac-ft) of ground water would be affected. This represents 7 percent of the total ground water supply currently used in these cells. Further contamination to 30 m (100 ft) would affect 21 percent of the currently used supply or 99 000 dam^3 (81,000 ac-ft). The sampling program currently under way by DWR (Perkins, in progress) may indicate that some of these nearby cells are already affected.

Volume of Ground Water Affected by Sea Water Intrusion

Sea water intrusion generally affects the southern Petaluma Valley and areas adjacent to the tidal portion of the Petaluma River. The bay mud deposits in the southern part of the valley (Plate 1) generally contain brackish water that was trapped between the clay particles when the material was deposited. Farther north, along the Petaluma River, some of the alluvial fan deposits near the river produce brackish water as a result of inland movement of sea water in response to ground water pumping.

The bay mud and alluvial fan deposits are generally only affected to shallow depths of 30 m (100 ft). At present, the total volume of water lost in this interval because of intrusion is 88 000 dam^3 (71,000 ac-ft). No attempt was made to calculate the volume of unpotable connate water in the Petaluma Formation.

In general, available data do not indicate any appreciable change over the last 20 years in the volume of ground water affected by sea water intrusion. Lack of change is probably a result of reduced ground water pumpage by Petaluma after imported Russian River water became available in 1962. As long as ground water pumpage near the tidal portion of the Petaluma River does not substantially increase, the volume of affected ground water should not increase.

FIGURE 12

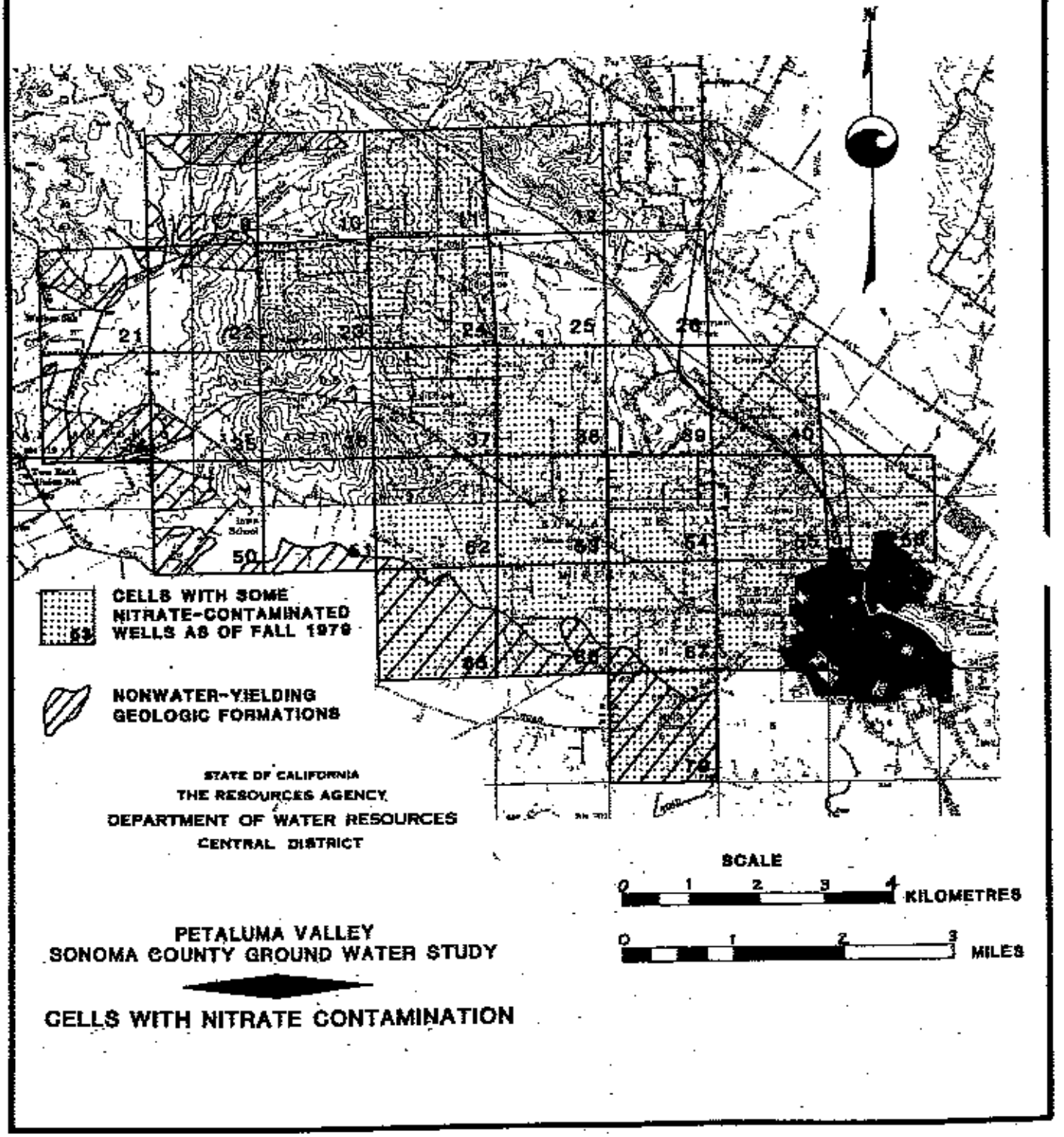

N
CELLS WITH SOME NITRATE-CONTAMINATED WELLS AS OF FALL 1979
NONWATER-YIELDING GEOLOGIC FORMATIONS
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT
SCALE
0 1 2 3 4 KILOMETRES
0 1 2 3 MILES
PETALUMA VALLEY
SONOMA COUNTY GROUND WATER STUDY
CELLS WITH NITRATE CONTAMINATION

Table 3

PRESENT AND POSSIBLE FUTURE EXTENT OF NITRATE CONTAMINATION OF GROUND WATER NORTHWEST OF PETALUMA

Time	Cells involved	Depth of contamination		Volume of water extractible at present time1/		Volume of water contaminated		Percent of water extractible at present affected
		metres	(feet)	cubic dekametres	(acre-feet)	cubic dekametres	(acre-feet)	
Present	2/	15	(50)	271 000	(220,000)	21 000	(17,000)	8
	2/	30	(100)	271 000	(220,000)	60 000	(49,000)	22
Future	3/	15	(50)	482 000	(391,000)	32 000	(26,000)	7
	3/	30	(100)	482 000	(391,000)	99 000	(81,000)	21

1/ Average well at present is 55 metres (180 feet) deep. These numbers represent the volume of water stored to this depth below land surface.

2/ Currently affected cells: 11, 23, 24, 37, 38, 52-56, 65-68, 79, southwestern half of 40.

3/ All currently affected cells plus nearby cells: 9, 10, 21, 22, 25, 34-36, 39, 50, 51, southwestern half of 12 and 26.

If ground water pumpage in this area does increase to historical levels without mitigating measures, saline water will probably migrate farther into ground water bodies that presently have acceptable water quality. This increased risk of intrusion is offset to some degree by increased indirect ground water recharge stemming from use of the imported water, which currently meets 85 percent of the water demand of Petaluma.

Further Limits on Volume of Usable Ground Water

After subtracting the volume of water contaminated by nitrates and sea water from the total volume of ground water in storage in the Petaluma Valley, there remains 1 642 300 dam^3 (1,332,000 ac-ft) of usable ground water in storage as of fall 1980.

Experience has shown that not all this water can be extracted. Sustained yield is the volume of this total water in storage that can be extracted annually without causing adverse effects on the ground water basin. Sustained yield generally equals annual recharge to the basin, but can be increased over a short period of time to temporarily remove an additional volume of water beyond seasonal fluctuations. This dewatering creates storage space for additional capture and recharge of surface water during wet years.

The hydrologic balance of a ground water basin can be described by the hydrologic equation:

Inflow - Outflow = Change in Storage

The "inflow" term in this equation is the volume of water returned to the basin and the "outflow" term is the volume of ground water removed from the basin. The "change in storage" term represents the change in the volume of ground water in storage which, if greater than zero, is the accretion to ground water storage for that period.

To determine the natural recharge rate, and therefore the sustained yield of the basin, data are required that have not been collected in the Petaluma Valley:

1. The volume of water entering the ground water basin, which includes:
   - Volume of irrigation water that percolates to the ground water body (deep percolation).
   - Volume of streamflow and precipitation that percolates to the ground water body.
   - Volume of waste water that percolates to the ground water body.
2. The volume of water removed from the ground water basin, which includes:
   - Volume of ground water pumpage.
   - Volume of surface and subsurface water flowing out of the basin.
   - Volume of water used by vegetation (evapotranspiration).

This type of detailed balance was not attempted during this study because of the lack of data.

A rough estimate of the volume of annual recharge to the Petaluma Valley basin has been made using the computer program TRANSCAP. The Petaluma Valley was divided in two, with cells 1-89 included in the northern portion and cells 90-132 included in the southern portion (Figure 7). The recharge estimate was made for the northern half of the valley because sea water intrusion limits the use of ground water contained in shallow aquifers in the southern portion. These shallow aquifers would normally provide storage for recharged water.

Hydrographs of wells in the northern half of the Petaluma Valley generally show an annual fluctuation of 3 m (10 ft) between spring and fall ground water level measurements. Based on TRANSCAP, this fluctuation represents a total volume of 50 000 dam^3 (40,000 ac-ft) of ground water that is withdrawn and naturally recharged every year. Note that this value of recharge was calculated assuming that the ground water levels fluctuated a uniform 3 m (10 ft) in all cells in the northern Petaluma Valley; some wells east of Petaluma have annual fluctuations that average 1.5 m (5 ft).

This calculation also assumes that all ground water in the Petaluma Valley is unconfined, even though some areas in the Petaluma Valley are thought to have semiconfined to confined ground water (Cardwell, 1958). The portion of all ground water in the study area that is semiconfined to confined is not known. Confinement would reduce the volume of recharge determined from the 3-m (10-ft) fluctuation; the amount of reduction is not known. In determining the area to be included in the recharge calculation, some cells known to contain small amounts of fresh ground water were not included in the northern portion, and a few containing brackish water were included.

Hydrographs indicate that during the 1976-77 drought, ground water levels were lowered an average of 3 m (10 ft) below the normal low fall level. By spring 1978, most ground water levels returned to normal high spring levels. This 6-m (20-ft) change in ground water levels at the end of the 1976-77 drought represe

a total volume of 100 000 dam^3 (80,000 ac-ft) of recharge if all ground water is unconfined. Therefore, the 50 000 dam^3 (40,000 ac-ft) represents an approximate average volume of annual recharge in the northern Petaluma Valley. The 100 000 dam^3 (80,000 ac-ft) of recharge after a time of unusually low ground water levels indicates that this area is capable of higher annual recharge if there were space in the aquifers to store it. Under present conditions, it appears that natural recharge exceeds the storage capacity; the surplus runs off as "rejected recharge".

The northern Petaluma Valley appears to be capable of recharge that under normal conditions would fill the available storage capacity. There may, therefore, be a topographic limit to the volume of natural recharge that can be stored before "leakage" begins. If more than a certain volume of water is recharged, that stored water begins to leak out in creeks, roadcuts, and as springs.

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CHAPTER 5. GROUND WATER MOVEMENT IN PETALUMA VALLEY

The effect of increased ground water extraction on the Petaluma Valley is a function of the degree to which aquifers are connected, including the presence or absence of barriers to ground water movement. Aquifer continuity controls the migration of poor quality ground water from one area to another and the extent to which sea water can move into freshwater aquifers. Aquifer continuity controls the degree of interaction between ground water and fresh surface water, and it influences the movement of naturally and artificially recharged water from a recharge site to an area of ground water extraction.

Aquifer Continuity

The degree of aquifer continuity is controlled by two factors: the areal extent of each single aquifer or group of interconnected aquifers, and the influence of faults on ground water. The areal extent of an aquifer or aquifers can be evaluated by examining the surficial and subsurface geology, reviewing ground water quality data to locate similar quality types, and comparing hydrographs for wells of different depths or in different locations. Faults can influence ground water by reducing or increasing transmissivity across the fault plane; the influence of faults on ground water movement can be determined from constant-rate pump tests of water wells and from ground water level maps.

The geology of the Petaluma Valley indicates that the water-yielding sands and gravels of the Merced Formation generally form continuous aquifers. Most of the other geologic units in the Petaluma Valley contain discontinuous lenses of water-yielding sands and gravels, while other units consist of nonwater-yielding material. These characteristics result in a number of isolated ground water bodies, each having a unique water quality. These same characteristics also reduce the potential for vertical and horizontal movement of ground water. Ground water movement can be analyzed for local areas in the Petaluma Valley, but because of the number of isolated water bodies, some of which may be semiconfined, basinwide predictions of ground water behavior made with existing data are of questionable value.

To determine the areal extent of aquifers in the Petaluma Valley, standard mineral analyses of ground water were evaluated. Standard mineral analyses include the concentrations of the cations calcium (Ca^{++}), magnesium (Mg^{++}), sodium (Na^{+}), and potassium (K^{+}), and the anions bicarbonate (HCO_3^{-}), carbonate ($CO_3^{=}$), sulfate ($SO_4^{=}$), and chloride (Cl^{-}).

In this report, water types are described by listing cations first, in order of abundance in milliequivalents per litre, followed by anions, in order of abundance. A single cation or anion is used to describe a water type if that ion constitutes over 50 percent of the total cations or anions in solution. Closely spaced wells with similar water quality types were assumed to tap the same aquifer. Conversely, it was assumed that aquifer separation exists to the degree that water quality types vary when taken from wells with perforations at the same elevation at different locations, or different elevations at the same location.

Ideally, ground water quality data collected entirely within a single year should be used to evaluate regional water quality because the chemical composition of ground water can change slowly over time. Water quality data for the Petaluma Valley are sparse and were

collected sporadically over 30 years. In some cases, several analyses have been collected for the same well. In determining regional ground water quality patterns, the most recent data have been given the most weight.

Wells pumping from the same aquifer, even wells of different depths or in different locations, usually will have similar water level fluctuations shown on well hydrographs. The few long-term hydrographs available for wells in the Petaluma Valley were examined for similarities and differences.

Aquifer continuity will be described by geologic units because each unit has distinct properties controlling the occurrence of ground water (see Plate 1 and Figures 5A-E).

Bay Mud Deposits

The few water-yielding zones present in the bay mud deposits generally lack vertical and horizontal continuity. Water in the bay mud deposits is generally brackish and of poor quality, and varies from magnesium chloride to sodium chloride.

The variation in water quality types indicates a lack of any significant aquifer continuity within the bay muds. No hydrographs are available for the few shallow wells that pump from bay mud deposits, so no evaluation of the aquifer continuity between bay muds and alluvial fan deposits can be made. Although the amount of aquifer continuity is assumed to be small, under heavy pumping in fan deposits, some brackish water may be drawn from bay mud deposits into the alluvial fans.

Alluvial Fan Deposits and Alluvium

Most aquifers within the alluvial fan deposits and alluvium are vertically continuous; these aquifers may be continuous with aquifers in underlying formations, depending on the lithology of the underlying formations. The extent of horizontal continuity within these alluvial deposits is much more variable.

Northeast of Petaluma (cell 56) and south of Meacham Hill (cells 26 and 39), fan deposits are vertically continuous with the underlying Merced Formation. In cells 41 and 42 and in cell 58 east of Petaluma, there appears to be good vertical continuity between fan deposits and the underlying Petaluma Formation.

Lack of ground water quality data prevents a detailed analysis of horizontal and vertical continuity in the alluvial deposits in other areas. Because water quality data indicate sea water intrusion in some alluvial fan deposits near the Petaluma River, there must be some horizontal aquifer continuity in that area. In cell 71, there is a 15-m (50-ft) thick zone of unusually high chlorides 27 m (90 ft) below the land surface; the chlorides may be related to sea water intrusion. At some times in the past, under the stress of heavy ground water pumpage sea water moved through the fans into underlying formations in those areas where aquifers were vertically continuous.

A ground water elevation map of the study area was drawn based on fall 1980 water levels in shallow wells pumping from alluvial fan deposits and the Merced Formation (Figure 10). Water levels in wells pumping from both the alluvial fan deposits and underlying materials were not used, because these levels are generally lower and more variable than levels in wells drawing only from fan deposits. Ground water levels in these deeper wells may actually represent the piezometric surface of a confined or semiconfined aquifer.

Merced Formation

The Merced Formation in the hills west of Petaluma produces water of a distinctly

different quality type than the Merced beneath the valley floor to the east. Water in the hills is generally a calcium bicarbonate chloride type regardless of well depth. Two shallow wells in cell 40, which draw from alluvial fan deposits and the Merced Formation, produce a poor quality calcium chloride water (5N/7W-20L2 and -20L3); this unusual quality may be a result of surface contamination. In general, there appears to be good horizontal and vertical aquifer continuity within the western hills. Impermeable flows from the Sonoma Volcanics locally separate the lower reduced Merced Formation from the upper oxidized Merced.

Beneath the valley floor east of Petaluma, the Merced Formation generally contains sodium bicarbonate water. Some isolated water bodies contain chloride ion (cell 26). Some wells in cell 40 (such as 5N/7W-20B1) produce water midway in quality between the Merced of the hills and the Merced beneath the valley floor near Petaluma -- higher calcium and chloride concentrations than the Merced near Petaluma and higher sodium and bicarbonate concentrations than the Merced in the hills. This indicates some degree of aquifer continuity between the two areas, allowing mixing of ground water. Aquifer separation across the Meacham Hill fault trace is suggested by differences in water quality type between 200-m (600-ft) wells 0.8 kilometre (0.5 mile) apart on either side of the fault trace; well 5N/7W-20B1 (cell 40) produces a sodium calcium chloride bicarbonate water, and well 5N/7W-16N1 (cell 28) produces a sodium bicarbonate water.

Petaluma Formation

The Petaluma Formation has variable water quality and degrees of aquifer continuity. Since the Petaluma is a marine formation, it frequently contains brackish connate water that is highly mineralized.

At the southern end of the Petaluma Valley there is a zone of poor quality connate water at least 50 m (150 ft) below the land surface that extends vertically to a depth of at least 210 m (700 ft). The zone extends horizontally from cell 128 north at least to cell 113, based on existing water quality data. Since the geology indicates few if any aquifers in this area, the poor water quality is probably a result of sea water trapped in the fine-grained sediments as they were deposited.

In the Sonoma Mountains on the eastern boundary of the study area, the quality of ground water varies greatly depending on the volume of connate water remaining in the Petaluma Formation. In 1958, Cardwell described well 5N/7W-24F1 (576 m or 1,896 ft deep) as contaminated by connate water, and nearby well 5N/7W-25C1 (72 m or 235 ft deep) as flushed of connate water (Plate 4); well 5N/7W-25C1 has much lower levels of boron, salinity, and total dissolved solids. Wells 5N/6W-30D1 (47 m or 155 ft deep) and 5N/7W-25C1 are of similar depth but different water quality; well 5N/7W-25C1 has much lower levels of salinity and total dissolved solids and has sulfate instead of chloride as its second most abundant anion. These data suggest that there is little aquifer continuity vertically or horizontally within the Petaluma Formation in this area.

The Petaluma Formation near Petaluma generally contains bicarbonate ground water with varying percentages of calcium, magnesium, and sodium. It appears that the Petaluma Formation is connected with near-surface deposits in cell 58 because a 120-m (400-ft) well in that cell fluctuates with tidal loading (Cardwell, 1958). Data are insufficient to further evaluate vertical or horizontal aquifer connection in this area.

Other Geologic Units

Because of the variable geology of the Tolay and Sonoma Volcanics, it was not possible to determine the extent of aquifer continuity within their permeable units. The Franciscan complex in the Petaluma Valley contains water only in fractures; the amount of continuity depends on the extent those fractures are connected. The extent of fracture interconnection was not determined.

Faults

There are several ways to determine the effect of faults on ground water movement. During a 24-hour constant-rate water well pump test, the apparent transmissivity of the aquifer will drop abruptly when the well's pumping cone intercepts a fault acting as a barrier. Unfortunately, few long constant-rate pump tests are available in the Petaluma Valley. Ground water level maps are drawn from measurements taken in wells of known depth and construction. Water level contours in general reflect topography but can be influenced by barriers such as faults that reduce ground water flow.

Reduced transmissivity across faults causes water to "stack up" on the side of the fault nearest the source of recharge. A ground water level map for fall 1980 (Figure 10) indicates that ground water levels steepen in the vicinity of the Meacham Hill fault trace. This may reflect the fault's influence on near-surface water-yielding deposits. The Cinnabar School fault does not appear to influence ground water levels. The southern portion of the Tolay fault influences ground water levels by bringing nonwater-yielding material to the surface along the western side of the fault trace.

Sea Water Intrusion

In the past, sea water intrusion has degraded the few aquifers present in bay mud deposits and aquifers in the alluvial fan deposits in the Petaluma Valley. In 1958, Cardwell described inland movement of sea water from the tidal reach of the Petaluma River into alluvial fan deposits near the City of Petaluma. The limited water quality data collected since 1958 indicate that ground water quality in this area has not deteriorated further since delivery of surface water to the City of Petaluma began in 1962 because the volume of municipal ground water pumpage has been reduced. Increasing ground water pumpage to 1961 levels or beyond might again create an inland gradient and renew sea water intrusion.

The extent of sea water intrusion in the bay mud deposits in the southern Petaluma Valley is more difficult to determine. The bay muds were originally deposited in a marine environment, and much sea water was trapped in the fine-grained sediments at that time. In general, little fresh water has moved through the deposits since deposition, so the deposits contain highly mineralized, brackish water. In addition, some wells (such as 4N/6W-7H2) near the tidal reach of the Petaluma River produce magnesium and sodium chloride water even closer to the composition of sea water, as a result of post depositional inland sea water movement. Because these deposits are fine-grained, water moves through them slowly, and the movement of sea water into the deposits should remain a localized phenomenon. Because of the generally poor quality of water in the bay mud deposits, water contained in these deposits was not included in estimates of the volume of usable ground water in the Petaluma Valley (Chapter 4).

Natural and Artificial Recharge

Recharge is the movement of water from land surfaces and streambeds into underlying aquifers. Because aquifers in the Petaluma Valley are generally full at present, recharge occurs in response to natural subsurface outflow or pumpage of ground water from those aquifers. Several physical factors control natural recharge in an area:

- Slope of the land surface.
- Permeability of the soils.
- Subsurface geology.
- Amount of available storage space in the aquifer.

A rough estimate of the annual volume of natural recharge is presented in Chapter 4.

For recharge to take place in an area, the slope of the land surface should be less than 15 percent and the infiltration rate of the soil profile should exceed 1.5 centimetres (0.6 inch) per hour (Muir and Johnson, 1979). If the slope is greater than 15 percent, rapid runoff greatly reduces the recharge potential. For an appreciable amount of water to penetrate the soil, the infiltration rate must be rapid.

Subsurface geology is an important factor in evaluating a recharge area and is the most difficult factor to evaluate. Good aquifer continuity between the area of recharge and the area of extraction is necessary. The extent of aquifer continuity in the Petaluma Valley has already been discussed at the beginning of this chapter. The extent to which the Cinnabar School and Meacham Hill faults affect ground water movement has not been determined. The ground water level measurement network now being implemented by the Department of Water Resources and the Sonoma County Water Agency will provide more information on the continuity of aquifers. Other data that would aid in determining water movement would be:

- 24-hour constant-rate pump tests to determine aquifer transmissivity.
- Drilling at potential artificial recharge sites to determine detailed local subsurface geology.

The availability or the lack of storage space in the aquifer determines whether or not recharge can take place.

Without available storage space in the underlying aquifer, surface water will run off even the most favorable recharge site as "rejected recharge". Figure 7 shows areas of favorable slope and soils within the study area and estimates of available storage as of fall 1980 in aquifers within each cell.

Soils with slopes and permeabilities suitable for natural and artificial recharge cover 4 500 hectares (11,000 acres) in the Petaluma Valley study area — 18 percent of the total land surface (Figure 7). An additional 400 hectares (900 acres) are covered by soils of suitable permeability; they can be classified as recharge areas if the land slope is less than 15 percent.

The largest concentration of suitable soils is northwest of the City of Petaluma. These soils have formed on the sandy Merced Formation and cover 28 percent of the land surface in this area. Many soils in this area not classified as recharge areas were excluded because land slope exceeded 15 percent. If runoff were controlled by modifications of slopes, construction of ponds, or other methods, recharge to the ground water body could be increased. The Merced Formation in this area is essentially one continuous aquifer averaging 150 m (450 ft) in thickness.

Because few creeks cross the recharge areas, the major source of natural recharge to the Merced Formation appears to be from rain falling on suitable soils. The rate of recharge from

rainfall is generally slow, depending on the annual precipitation. This suggests that if long-term draft on the ground water in this area were heavy, ground water recharge could not keep pace. Water levels did recover rapidly from the 2-year 1976-1977 drought; a 50-m (180-ft) deep well in cell 39 (5N/7W-19N1) had recovered 6 m (20 ft) to predrought levels by spring 1978.

Other recharge areas dot the western uplands. Soils suitable for recharge underlie portions of the City of Petaluma, having formed on top of a thin deposit of alluvium and, to a lesser extent, alluvial fan deposits and the Tolay Volcanics.

The Petaluma River flows across some of these recharge areas; because there is little storage available in aquifers beneath these recharge areas, the loss of surface water to the ground water body is probably small. In fact, Cardwell reported in 1958 that water levels in streams in the Petaluma Valley, including the Petaluma River, generally stood lower than the water levels in nearby wells, indicating that the flow of ground water was maintaining streamflows. There are not sufficient recent shallow ground water level data available to compare stream and ground water levels at the present time. If the draft on the ground water body in these areas were to increase, thereby creating additional storage, the loss of surface water could increase proportionately. Because the Petaluma River is tidal and brackish at the City of Petaluma, an increase in river recharge in this area would not be desirable.

The degree to which increased pumping in areas away from the Petaluma River will increase available storage in the aquifers beneath the river and therefore increase river recharge is variable. It depends on the degree of aquifer connection between the two areas and on the presence or absence of barriers, such as faults. Because there are no stream gaging stations operating on the Petaluma River, there is no way to determine the amount of surface water lost from the river due to percolation to the ground water body. Stations would have to be installed on the Petaluma River to determine losses in the future.

Recharge areas are scattered on the western flank of the Sonoma Mountains, generally forming on the Sonoma Volcanics. As in the western uplands, most recharge is from rainfall because few streams flow across recharge areas. The fate of the recharged water is difficult to determine because of the discontinuous nature of aquifers in the Sonoma Volcanics.

Aquifers beneath the valley floor are recharged less directly than those aquifers overlain by recharge areas. While infiltration from rainfall and streamflow still occurs, the rate is much slower.

In mountainous areas, recharge from rain or streams occurs when an aquifer is exposed at the surface. Recharged ground water then moves down dip in the aquifer (Figure 13) until:

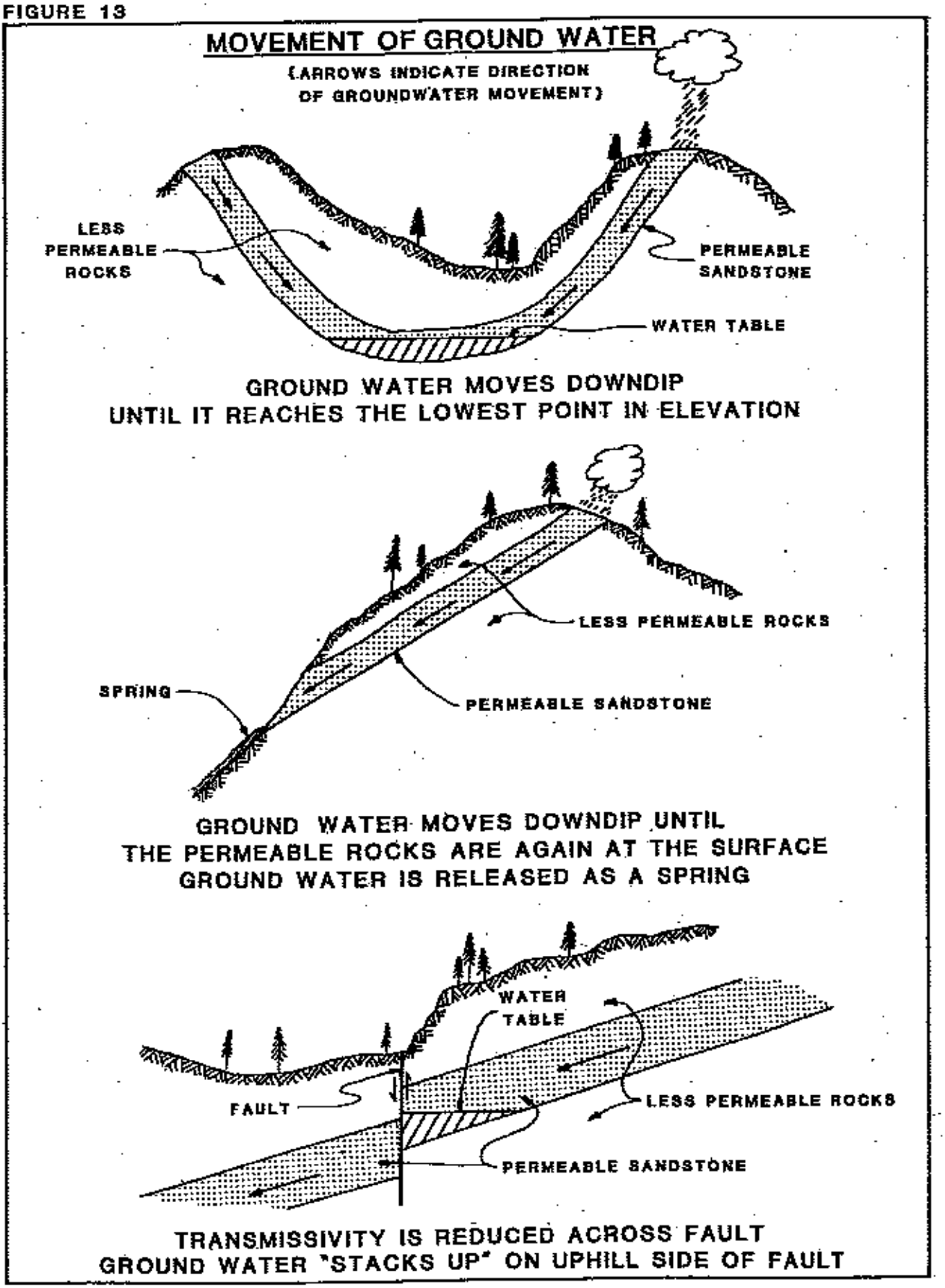
- The water reaches the lowest point in elevation, where it remains because the gradient is zero.
- The aquifer again is at the land surface, where ground water is released as a spring.
- Ground water encounters a barrier, which can reduce the flow rate or create a spring.

When aquifers are as discontinuous as those in the mountainous portions of the study area, ground water frequently does not reach the area of ground water extraction because of these geologic complexities.

At present, artificial recharge is not necessary in the Petaluma Valley because the ground water reservoir is essentially full and because surface water is available to meet most domestic needs. When

the reservoir has been dewatered sufficiently to make an artificial recharge program feasible, the recharge site(s) selected should be in an area of favorable slope and soil permeability. A detailed subsurface geologic investigation should be conducted for the proposed site, including on-site drilling and evaluation of the degree of connection between the recharge area and the area of extraction. Although the area northwest of Petaluma contains many potential recharge sites, care should be taken to avoid moving nitrate-contaminated ground water into presently unaffected areas. In the valley area near Petaluma, an artificial recharge program to halt or reverse sea water intrusion should be considered if further water quality sampling indicates renewed inland movement of sea water.

FIGURE 13


MOVEMENT OF GROUND WATER
(ARROWS INDICATE DIRECTION OF GROUNDWATER MOVEMENT)
LESS PERMEABLE ROCKS
PERMEABLE SANDSTONE
WATER TABLE
GROUND WATER MOVES DOWNDIP UNTIL IT REACHES THE LOWEST POINT IN ELEVATION
LESS PERMEABLE ROCKS
SPRING
PERMEABLE SANDSTONE
GROUND WATER MOVES DOWNDIP UNTIL THE PERMEABLE ROCKS ARE AGAIN AT THE SURFACE GROUND WATER IS RELEASED AS A SPRING
WATER TABLE
FAULT
LESS PERMEABLE ROCKS
PERMEABLE SANDSTONE
TRANSMISSIVITY IS REDUCED ACROSS FAULT
GROUND WATER "STACKS UP" ON UPHILL SIDE OF FAULT

CHAPTER 6. SOURCE AND POTENTIAL MIGRATION OF SELECTED MINERAL CONSTITUENTS

Many ions and substances, when present above certain concentrations in ground water, can be harmful to humans, animals, or plants. Increased ground water pumpage near areas with ground water quality problems may cause the ground water containing these constituents to migrate.

Summary

Sodium, salinity, total dissolved solids (TDS), boron, nitrate, hardness, and iron and manganese concentrations in ground water were examined during this study. High sodium, salinity, TDS, and boron frequently occur together, most commonly in wells affected by sea water intrusion or in connate water of marine origin.

High nitrate levels are widespread in ground water in the area northwest of Petaluma as the result of contamination from surface sources. Elevated electrical conductivity (EC) levels in this area may be a result of surface contamination, connate water stored near the base of the Merced Formation, or a combination of these factors.

Hard to moderately hard water is common throughout the Petaluma Valley; hard water is found in wells affected by sea water or wells that tap connate waters of marine origin.

Few accurate analyses are available for iron and manganese; available data indicate that water containing iron and manganese above recommended limits is produced from wells:

- Tapping alluvial fan deposits.
- Tapping the Petaluma Formation.
- Tapping the Sonoma Volcanics.

The potential for movement of ground water with these quality problems varies. There is a high potential for migration of nitrate-contaminated water in the area northwest of the City of Petaluma. There is a low potential for migration of poor quality ground water in the lower Petaluma Valley because the sediments containing the ground water are fine-grained.

Aquifers in the central and northern part of the Petaluma Valley are connected in some areas; in the past, sea water has moved inland under the stress of increased pumpage. Water quality degradation caused by intrusion may include increased sodium, salinity, TDS, boron, hardness, and iron and manganese. Periodic monitoring should be conducted near wells with water quality problems in areas conducive to ground water migration.

Some quality problems could not be evaluated because data were insufficient. Hydrogen sulfide has been noted in a Petaluma municipal well in cell 42 (Condiotti well, 5N/7W-22Q). High temperature is sometimes associated with hydrogen sulfide. No further analyses of these problems have been made.

The pumping of large amounts of sand by water wells can be a serious problem; sand damages the pump and fills in the well casing. Many of the Petaluma municipal wells pump sand; one 120-m (400-ft) well in cell 58 was abandoned due to excessive sanding (well 5N/7W-26R1). The sand causing the problem is probably related to a very fine sand present in the Merced Formation that may be eroded and redeposited as part of the alluvial fan deposits. Only careful well design using a small slot size and a

fine-grained gravel pack will prevent this sand from entering the well during pumping. No further information on the extent of the sanding problem in the Petaluma Valley is available.

Sodium

High concentrations of sodium ion may be hazardous to persons with heart problems, such as high blood pressure. While generally not hazardous to livestock, high concentrations of sodium ion can adversely affect agriculture by causing soils to deflocculate or "puddle"; a hard crust forms after irrigating, adversely affecting tilth, permeability, and infiltration.

Based on the University of California Committee of Consultants report, "Guidelines for Interpretation of Water Quality for Agriculture" (Ayers and Branson, 1975), the adjusted sodium adsorption ratio (ASAR) is used to evaluate the effect of sodium on agriculture. The ratio is computed by the following formula:

$$ASAR = \frac{Na}{\sqrt{\frac{Ca + Mg}{2}}} \left[1 + (8.4 - pH_c)\right]$$

where pH_c is a calculated value based on the water analysis for total salinity (Na+Ca+Mg), on the calcium and magnesium (Ca+Mg), and on the carbonates and bicarbonates (CO_3+HCO_3), all expressed in milliequivalents per litre (see Ford, 1975, Table 20).

For ion toxicity from root absorption, problems increase as the ASAR exceeds 3; severe problems occur when the ASAR is greater than 9 (Ayers and Branson, 1975). For ion toxicity from foliar absorption, problems increase as the ASAR exceeds 3. Foliar absorption limits are important when sprinklers are used for irrigation or frost control. Previous guidelines for sodium used the SAR rather than the ASAR. The new guidelines (ASAR) recommend a lower concentration of sodium than the previous guidelines.

Of 61 wells analyzed for sodium in the Petaluma Valley, 42 were found to have ASAR values exceeding 3; 18 have ASAR values exceeding 9 (Table 4 and Figure 14A). Of the 42 wells, 8 had been similarly identified in DWR Bulletin 118-4, Volume 1 (Ford, 1975), using Hem. Water from the affected wells does not represent a single quality type, although sodium is generally the dominant cation.

The highest sodium is in the southern portion of the Petaluma Valley in water from aquifers that have been intruded by sea water and in connate waters trapped in the Petaluma Formation. High sodium is already widespread in this area; because the sediments are fine-grained, the potential for migration is low except within coarser grained alluvial fan deposits that have been intruded. The possibility of movement is high in the intruded fan deposits if the sea water intrusion is allowed to spread.

Water from wells in the uplands on the eastern side of the Petaluma Valley have severe sodium problems. The poor quali connate water is contained in isolated aquifers, and the potential for migration is low.

Water from a number of wells producing from the Petaluma Formation beneath the valley floor poses a severe sodium problem. The poor quality may be the result of connate water or of base exchange within clays, which increases the sodium concentration and decreases the calcium and magnesium concentrations. There is a potential for migration into overlying alluvial deposits because there is some vertical aquifer connection in this area. Likewise, the Merced Formation beneath the valley floor contains water with a moderate sodium concentration that may migrate vertically.

Salinity

Excessive salinity in water can kill sensitive plants and impart a salty taste to drinking water. The degree of

Table 4
SODIUM IN GROUND WATER
IN EXCESS OF RECOMMENDED STANDARDS

Well Number	Depth		Date of Sampling	Adjusted SAR Value[1]	Degree of Hazard	
	metres	(feet)	mo/yr		Increasing	Severe
3N/5W-06C01	15	(50)	8/58	7.3	x	
3N/6W-01Q01	69	(225)	4/62	50.6[3]		x
-03C01	--	(--)	4/63	13.8[2]		x
-11B01	76	(250)	3/65	22.3[2]		x
-11L01	159	(520)	6/75	16.0		x
4N/6W-07H01	11	(35)	8/58	5.6	x	
-07H02	--	(--)	3/59	42.3[2]		x
-08E01	23	(74)	8/59	4.6	x	
-21A01	79	(259)	8/72	3.3	x	
-21Q01	141	(464)	4/63	21.4[2]		x
-27N01	68	(222)	3/59	11.2		x
-27R01	224	(736)	3/65	12.4		x
-33R01	53	(175)	3/65	30.7[2,4]		x
4N/7W-02D01	19	(62)	3/65	38.4[2]		x
5N/6W-30D01	47	(155)	8/78	11.4		x
5N/7W-08D01	--	(--)	5/47	7.2	x	
-08D03	42	(138)	4/63	4.2	x	
-16N01	184	(605)	12/58	7.6	x	
-18P	182	(597)	7/77	4.5	x	
-19A01	99	(325)	3/59	4.7	x	
-19A	182	(596)	9/77	4.1	x	
-20B01	183	(600)	5/47	8.3	x	
-20C01	210	(688)	3/59	3.2	x	
-20L02	19	(62)	3/59	3.2	x	
-20L03	15	(50)	3/65	5.1	x	
-24B01	198	(650)	9/49	52.0		x
-24F01	578	(1,896)	10/50	16.5		x
-25C01	72	(235)	5/47	9.5[5]		x
-26E01	184	(605)	8/78	6.5	x	
-26R01	130	(428)	2/49	6.2	x	
-27A01	130	(425)	3/59	3.3	x	
-28A01	153	(502)	7/49	7.5	x	
-28A03	85	(280)	9/59	7.7	x	
-28H05	143	(468)	5/49	7.6	x	
-28N01	19	(62)	3/58	6.6	x	
-33N01	91	(300)	8/58	6.0	x	
-33Q01	63	(205)	8/58	3.6	x	
-34A01	125	(410)	6/49	9.6		x
-34A02	159	(520)	8/50	11.6		x
-34E02	85	(280)	3/65	23.6[2]		x
-34G01	70	(230)	3/54	9.5		x
-34G02	85	(280)	9/60	24.1[2]		x
-35H01	165	(542)	7/49	5.1	x	
-35L	70	(229)	5/77	4.5	x	

1/ All exceed recommended limit of ASAR = 3. Sodium hazard rates "severe" if ASAR >9.
2/ Well described in DWR Bulletin 118-4, Volume 1 (Ford, 1975).
3/ ASAR was 16.5 in 6/76.
4/ ASAR was 14.3 in 7/68.
5/ ASAR was 5.3 in 9/59.

salinity hazard is different for agricultural and domestic water supplies. Salinity of both agricultural and domestic water supplies is measured by electrical conductivity and chloride ion concentration.

In agriculture, salinity problems from root absorption are related to electrical conductivity (EC). Problems increase as the EC exceeds 750 microsiemens per centimetre (uS/cm). Problems are severe when the EC exceeds 3 000 uS/cm.

A related problem in agriculture is ion toxicity caused by high levels of chloride ion. Problems from foliar absorption increase as the chloride ion concentration exceeds 106 milligrams per litre (mg/L). Problems from root absorption increase as the chloride ion concentration exceeds 142 mg/L; problems are severe when the concentration exceeds 355 mg/L (Ayers and Branson, 1975).

The salinity of domestic water supplies is measured by the content of chloride ion and electrical conductivity. Title 22 of the California Administrative Code (California Department of Health, 1977) recommends a maximum concentration of chloride ion in drinking water of 250 mg/L; the maximum allowable concentration is 500 mg/L. Water containing more than 250 mg/L of chloride ion usually has a noticeably salty taste. The maximum recommended electrical conductivity for drinking water is 900 uS/cm. The upper limit for EC is 1 600 uS, although for short periods of time, water with EC values up to 2 200 uS/cm can be used.

Of the 269 wells evaluated in the Petaluma Valley, 130 produce water with an EC greater than 750 uS/cm; 6 exceed 3 000 uS/cm. Of the 69 wells tested for chloride ion, 31 produce water with chloride ion concentrations greater than 106 mg/L and 21 exceed 142 mg/L; 12 exceed 250 mg/L and 7 exceed 500 mg/L (Table 5 and Figure 14B).

In the Petaluma Valley, ground water with a high EC is generally found in areas affected by sea water intrusion into shallow aquifers or by connate water trapped within fine-grained sediments of the Petaluma Formation. In the hills west of Petaluma, the normal EC may have been locally increased by contamination from surface leachate. In the hills west of Petaluma, EC values also increase as the base of the Merced Formation is approached. The base of the formation is near contacts with the Franciscan complex or Tolay Volcanics, and is generally west of the City of Petaluma. The basal portion of the Merced Formation was not as completely flushed with fresh water after its marine deposition as were the middle and upper portions of the formation; the remaining connate water has a high EC, usually greater than 900 uS/cm, and occasionally as high as 3 000 uS/cm (Ford, in progress).

Chloride ion concentrations exceeding recommended limits generally result from sea water intrusion, although chloride ion is common in water from the Merced Formation northwest of Petaluma, where chloride concentration decreases with depth, and in the Petaluma Formation on the east side of the study area. Within the alluvial fan deposits in cell 71, there is a 15-m (50-ft) thick zone of unusually high chlorides 27 m (90 ft) below land surface; the chlorides may be related to sea water intrusion.

Chloride ion concentration is generally very low in water from alluvial fan deposits or alluvium when these deposits are not intruded by sea water. Two shallow wells in cell 40 (wells 5N/7W-20L2 and -20L3) produce water with both high electrical conductivity and high chloride ion concentration; the source may be surface contamination.

The potential for migration of water known to have high salinity is greatest in the Merced Formation and alluvial fan deposits. Although the extent of sea water intrusion has remained the same decreased over the past 20 years, thi

Table 5

SALINITY OF GROUND WATER IN EXCESS OF RECOMMENDED STANDARDS

Well Number	Depth		Date of sampling	Chloride ion concentration	Electrical conductivity 1/
	metres	(feet)	mo/yr	mg/L	µS/cm
3N/5W-06C01	15	(50)	4/52	147	1 270
3N/6W-01Q01	69	(225)	4/62	150	1 370
-03C01	--	(--)	3/65	4 241	11 000
-11B01	76	(250)	3/58	304	2 120
-11L01	159	(520)	8/79	471	2 060
4N/6W-07H02	11	(35)	9/66	55	1 230
-07H02	--	(--)	3/59	1 360	5 260
-08E01	23	(74)	8/77	123	1 280
-21A01	80	(259)	8/78	244	1 290
-21Q01	141	(464)	8/58	264	1 490
-27N01	68	(222)	8/60	152	1 119
-27R01	224	(735)	8/58	166	1 210
-33R01	48	(175)	6/74	4 150	11 700
4N/7W-02D01	19	(62)	11/65	10 200	26 900
-04F01	56	(184)	8/58	143	1 280
-06B01	--	(--)	10/79	---	903
-06C01	--	(--)	10/79	---	1 803
-06E01	--	(--)	10/79	---	3 170
5N/6W-30B01	47	(155)	9/64	176	1 510
5N/7W-08D01	--	(--)	5/47	112	910
-08D03	42	(138)	4/62	177	1 300
-10Q01	141	(462)	8/51	55	2 700
-20B01	183	(600)	7/58	176	891
-20C01	210	(688)	8/58	202	988
-20L02	19	(62)	4/60	590	2 370
-20L03	15	(50)	7/60	656	2 191
-20N01	--	(--)	10/79	---	1 070
-20N02	--	(--)	10/79	---	825
-20N03	--	(--)	10/79	---	920
-20N04	--	(--)	10/79	---	960
-20N05	--	(--)	10/79	---	1 350
-20P03	--	(--)	10/79	---	926
-20P04	--	(--)	10/79	---	814
-24B01	198	(650)	9/49	1 050	7 500
-24F01	578	(1,896)	10/60	140	1 100
-25A01	81	(265)	4/61	135	1 250
-26E01	184	(605)	8/74	86	842
-28N01	19	(62)	8/58	247	1 620
-29C01	--	(--)	9/79	---	891
-29D01	--	(--)	9/79	---	912
-29D02	--	(--)	9/79	---	1 420
-29D03	--	(--)	9/79	---	857
-29D04	--	(--)	10/79	---	1 370
-29D05	--	(--)	10/79	---	949
-29D06	--	(--)	10/79	---	1 380
-29D07	--	(--)	10/79	---	1 280
-29L01	20	(65)	2/50	100	960
-29M02	73	(238)	10/79	---	1 030
-29R01	74	(244)	3/59	138	1 000
-29N02	--	(--)	9/79	---	1 150
-29N03	44	(144)	9/79	---	819
-29N05	--	(--)	9/79	---	936
-30A01	36	(118)	10/79	---	933
-30A03	--	(--)	10/79	---	1 280
-30D02	--	(--)	10/79	---	988
-30D03	--	(--)	10/79	---	844
-30E02	57	(188)	10/79	---	968
-30E03	--	(--)	10/79	---	1 120
-30E04	--	(--)	10/79	---	1 040
-30E05	--	(--)	10/79	---	837
-30E06	--	(--)	10/79	---	810
-30G02	--	(--)	10/79	---	791
-30H02	--	(--)	9/79	---	826
-30H03	--	(--)	9/79	---	1 180
-30H04	--	(--)	10/79	---	1 020
-30J01	42	(138)	9/79	---	1 210

Well Number	Depth		Date of sampling	Chloride ion concentration	Electrical conductivity 1/
	metres	(feet)	mo/yr	mg/L	µS/cm
5N/7W-30K08	--	(--)	10/79	---	870
-30K09	--	(--)	10/79	---	1 190
-30K10	--	(--)	10/79	---	942
-30K12	--	(--)	10/79	---	1 070
-30K13	--	(--)	10/79	---	1 140
-30L03	37	(122)	10/79	---	957
-30M01	--	(--)	9/79	---	1 210
-30M02	--	(--)	9/79	---	1 080
-30N03	--	(--)	9/79	---	780
-30N05	--	(--)	9/79	---	800
-30N10	--	(--)	9/79	---	975
-30N11	--	(--)	10/79	---	829
-30Q02	40	(130)	9/79	---	1 090
-30Q03	--	(--)	9/79	---	830
-30Q04	--	(--)	9/79	---	917
-30Q05	--	(--)	10/79	---	1 790
-30Q06	--	(--)	10/79	---	851
-30Q07	--	(--)	10/79	---	947
-30R05	--	(--)	9/79	---	846
-31A05	--	(--)	10/79	---	805
-31A06	--	(--)	10/79	---	957
-31B01	--	(--)	9/79	---	1 970
-31B02	--	(--)	9/79	---	813
-31B04	--	(--)	9/79	---	927
-31B05	35	(115)	9/79	---	980
-31B06	--	(--)	9/79	---	1 120
-31D01	--	(--)	10/79	---	1 330
-31E01	--	(--)	9/79	---	812
-31E03	--	(--)	10/79	---	855
-31J01	--	(--)	10/79	---	882
-31M01	--	(--)	10/79	---	1 440
-31M02	--	(--)	10/79	---	979
-31N03	--	(--)	10/79	---	1 600
-31P01	--	(--)	10/79	---	2 140
-31P02	--	(--)	10/79	---	1 020
-31Q01	--	(--)	10/79	---	938
-31R01	--	(--)	10/79	---	1 510
-32D01	--	(--)	9/79	---	1 260
-32M01	--	(--)	10/79	---	914
-33Q01	63	(205)	3/59	92	961
-34A01	125	(410)	6/49	128	909
-34A02	159	(520)	8/61	255	1 130
-34E02	86	(280)	7/68	68	908
-34G01	70	(230)	8/64	425	1 770
-34G02	85	(280)	9/60	76	854
-35L	70	(229)	6/77	300	800
5N/8W-01Q01	55	(180)	2/50	133	981
-11N01	83	(271)	2/50	130	974
-11R01	91	(300)	10/79	---	983
-13N03	59	(192)	10/79	---	823
-14L01	61	(200)	10/79	---	768
-23B01	--	(--)	10/79	---	894
-23R01	--	(--)	10/79	---	1 350
-25K01	--	(--)	10/79	---	821
-25Q01	--	(--)	10/79	---	1 230
-26A01	69	(195)	10/79	---	1 690
-26J01	--	(--)	10/79	---	1 360
-26J02	--	(--)	10/79	---	916
-35A01	--	(--)	10/79	---	840
-36C03	--	(--)	10/79	---	899
-36C03	--	(--)	10/79	---	1 560
-36C04	82	(269)	10/79	---	1 750
-36D01	61	(200)	10/79	---	1 000
-36E01	--	(--)	10/79	---	1 010
-36E02	--	(--)	10/79	---	1 340

1/ Electrical conductivity exceeds 750 µS (increasing problems, agriculture-root absorbtion).

Limits for cloride ion concentrations:
- exceeds 250 mg/L (recommended limit, human drinking water)
- exceeds 106 mg/L (increasing problems, agriculture-foliar absorbtion)
- between 142-355 mg/L (increasing problems, agriculture-root absorbtion)
- exceeds 355 mg/L (severe problems, agriculture-root absorbtion)

could change with increased ground water pumpage, which could create a landward gradient and draw sea water inland. If ground water pumpage were to increase near aquifers intruded by sea water, salinity would then increase as sea water moves inland. If the City of Petaluma were to increase ground water pumpage to its 1961 levels (it presently pumps half that volume), sea water intrusion would probably resume.

Total Dissolved Solids

The amount of total dissolved solids (TDS) in water indicates the total mineral content in the water. The recommended limit for TDS in domestic water is 500 mg/L. The maximum limit for TDS is 1 000 mg/L, although for short periods of time 1 500 mg/L is allowed (California Department of Health, 1977). Water with a TDS higher than 500 mg/L may also be expected to contain other hazardous ions, usually high sodium and salinity.

Of the 62 wells evaluated for TDS in the Petaluma Valley, 32 produce water with TDS greater than 500 mg/L; 10 of these exceed 1 000 mg/L (Table 6 and Figure 14C). Each of these wells also produces water that exceeds recommended limits for salinity, and most produce water that exceeds recommended limits for sodium and boron. The source of the poor quality water is similar to the source of salinity and is usually related to sea water intrusion or connate water. Potential for movement is the same as that for highly saline water.

Table 6

TOTAL DISSOLVED SOLIDS (TDS) IN GROUND WATER IN EXCESS OF RECOMMENDED STANDARDS

Well Number	Depth		Date	TDS
	metres	(feet)	mo/yr	mg/L*
3N/5W-06C01	15	(50)	8/58	678
3N/6W-01Q01	69	(225)	4/62	811
-03C01	--	(--)	9/60	2 288
-11B01	76	(250)	10/60	1 553
-11L01	159	(520)	8/79	829
4N/6W-07H01	11	(35)	4/63	671
-07H02	--	(--)	3/59	3 060
-08E01	23	(74)	8/79	666
-21A01	79	(259)	8/72	699
-21Q01	141	(464)	8/51	826
-27N01	68	(222)	3/59	665
-27R01	224	(736)	3/59	665
-33R01	53	(175)	3/65	6 460
4N/7W-02D01	--	(--)	3/59	20 560
-04F01	56	(184)	8/58	789
5N/6W-30D01	47	(155)	3/59	855
5N/7W-08D03	42	(138)	3/59	599
-10Q01	141	(462)	8/51	1 473
-20B01	183	(600)	7/58	584
-20C01	210	(688)	4/61	572
-20L02	19	(62)	9/59	1 320
-20L03	15	(50)	4/61	1 160
-24B01	198	(650)	9/49	4 301
-24F01	578	(1,896)	10/50	635
-28N01	19	(62)	8/58	1 000
-29N01	74	(244)	3/59	612
-33Q01	63	(205)	3/59	571
-34A01	125	(410)	6/49	525
-34A02	159	(520)	8/51	625
-34E02	85	(280)	4/63	534
-34G01	70	(230)	8/54	943
-34G02	85	(280)	9/60	529

*All exceed recommended limit of Total Dissolved Solids = 500 mg/L.

Boron

Boron in drinking water is not generally considered a health hazard, because concentrations up to 30 mg/L are not considered harmful to humans. Although a minor constituent of most water, boron is extremely important in agriculture. An amount greater than 2 mg/L is toxic to most plants, but small amounts are essential to plant growth. Boron is toxic to many plants, such as citrus, grapes, apples, and walnuts, in concentrations of less than 1 mg/L. Boron concentrations below 0.5 mg/L are satisfactory for all crops (Ayers and Branson, 1975).

Of the 50 wells tested in the Petaluma Valley, 17 produce water with boron concentrations in excess of 0.5 mg/L, and 5 of these 17 wells produce water with boron in excess of 2 mg/L (Table 7 and Figure 14D).

High boron in the Petaluma Valley is generally the result of sea water intrusion (as in wells 3N/6W-3C1 and 4N/7W-2D1) or connate water trapped within fine-grained marine sediments of the Petaluma Formation (as in wells 4N/6W-27N1 and -27R1, 5N/7W-24F1 and -24B1).

In the Petaluma Valley, high concentrations of boron in ground water are always found in association with water having a moderate-to-severe sodium hazard and are frequently found in association with high salinity and TDS. The potential for movement of boron-rich ground water is the same as that for water containing high sodium, salinity, or TDS.

Nitrate

High concentrations of nitrate can cause methemoglobinemia, an oxygen deficiency in infants. For this reason, a recommended drinking water limit of 45 mg/L of nitrate (10 mg/L expressed as nitrogen) has been established by the California Administrative Code, Title 22 (California Department of Health, 1977).

Nitrates are produced by aerobic stabilization of organic nitrogen. The presence of nitrate in ground water is usually indicative of pollution from surface sources such as septic-tank leach-fields, fertilizers, or livestock and poultry farms.

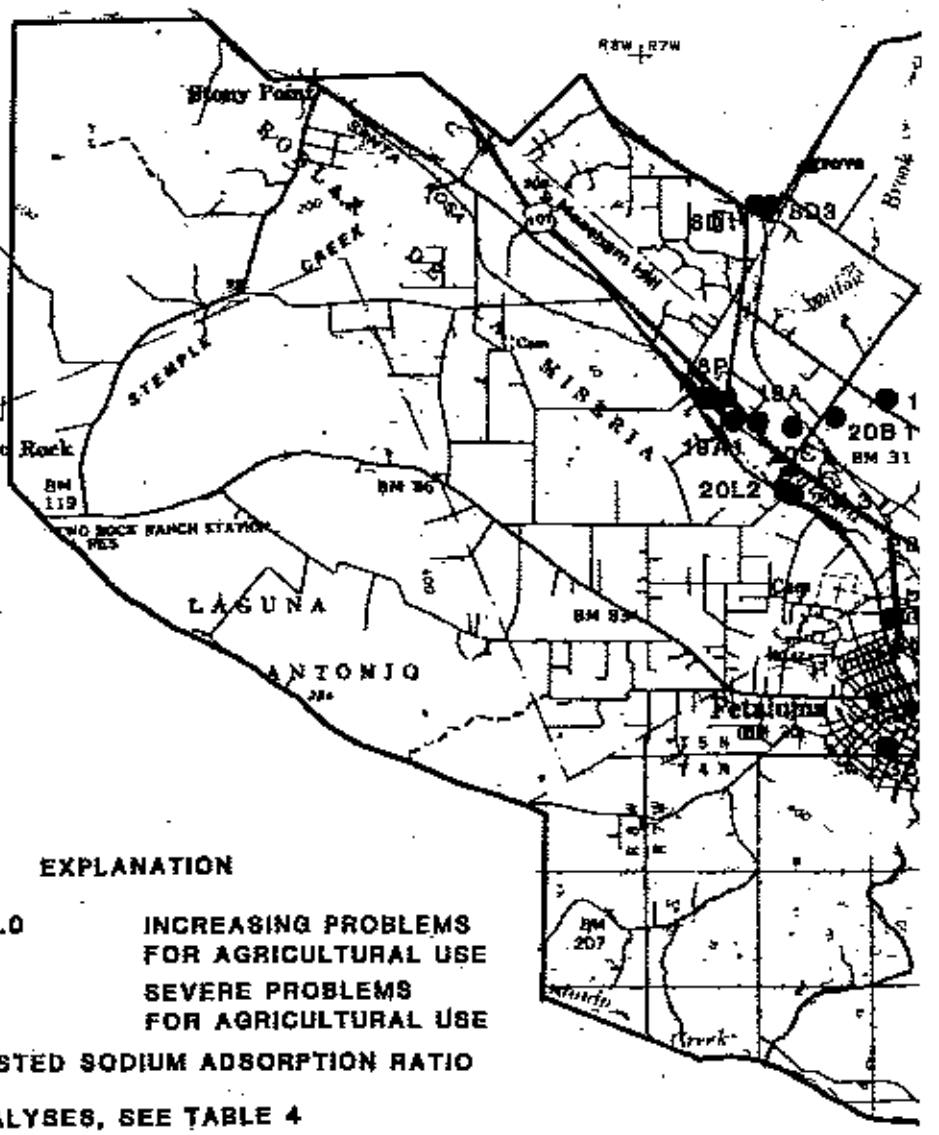
In the area northwest of Petaluma, the major source of nitrate contamination

Table 7

BORON IN GROUND WATER
IN EXCESS OF RECOMMENDED STANDARDS

Well Number	Depth		Date	Boron
	metres	(feet)	mo/yr	mg/L *
3N/5W-06C01	15	(50)	3/59	0.59
3N/6W-03C01	--	(--)	4/62	0.92
-11B01	76	(250)	3/58	0.56
4N/6W-07H01	11	(35)	4/60	2.3
-07H02	--	(--)	11/65	3.1
-08E01	23	(74)	8/79	2.4
-21Q01	141	(464)	11/65	1.2
-27N01	68	(222)	9/60	0.62
-27R01	224	(736)	8/58	0.96
4N/7W-02D01	19	(62)	9/60	1.01
5N/6W-30D01	47	(155)	8/58	0.81
5N/7W-19A01	99	(325)	9/60	0.73
-24B01	198	(650)	9/49	6.96
-24F01	578	(1,896)	10/50	3.40
-34A02	--	(--)	8/51	1.08
-34G01	70	(230)	8/54	0.66
-35H01	165	(542)	7/49	0.6

*All exceed recommended limit of Boron = 0.5 mg/L.



EXPLANATION

● ASAR = 3.0–9.0 — INCREASING PROBLEMS FOR AGRICULTURAL USE

○ ASAR > 9.0 — SEVERE PROBLEMS FOR AGRICULTURAL USE

ASAR = ADJUSTED SODIUM ADSORPTION RATIO

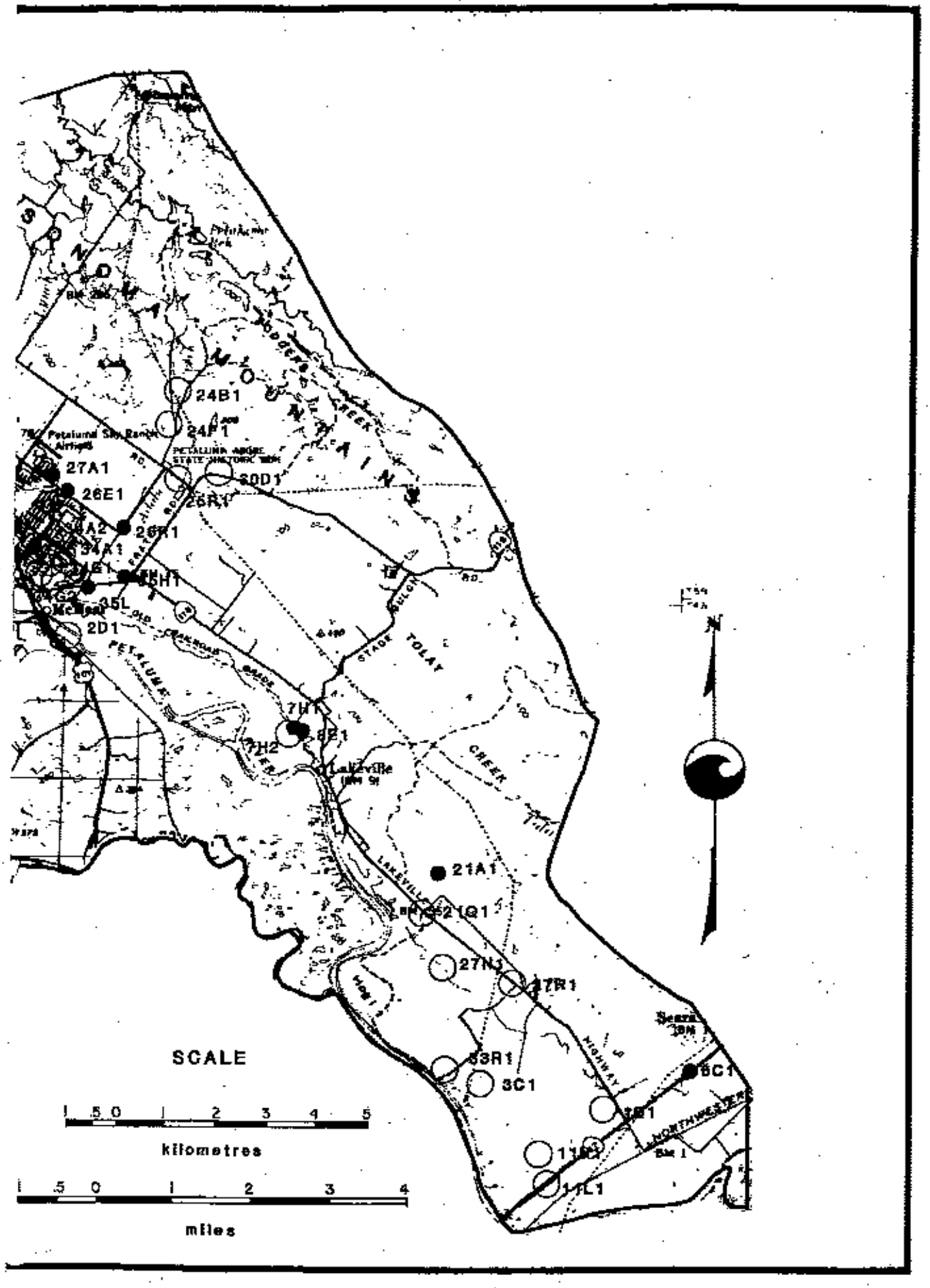
FOR DATES OF ANALYSES, SEE TABLE 4

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT

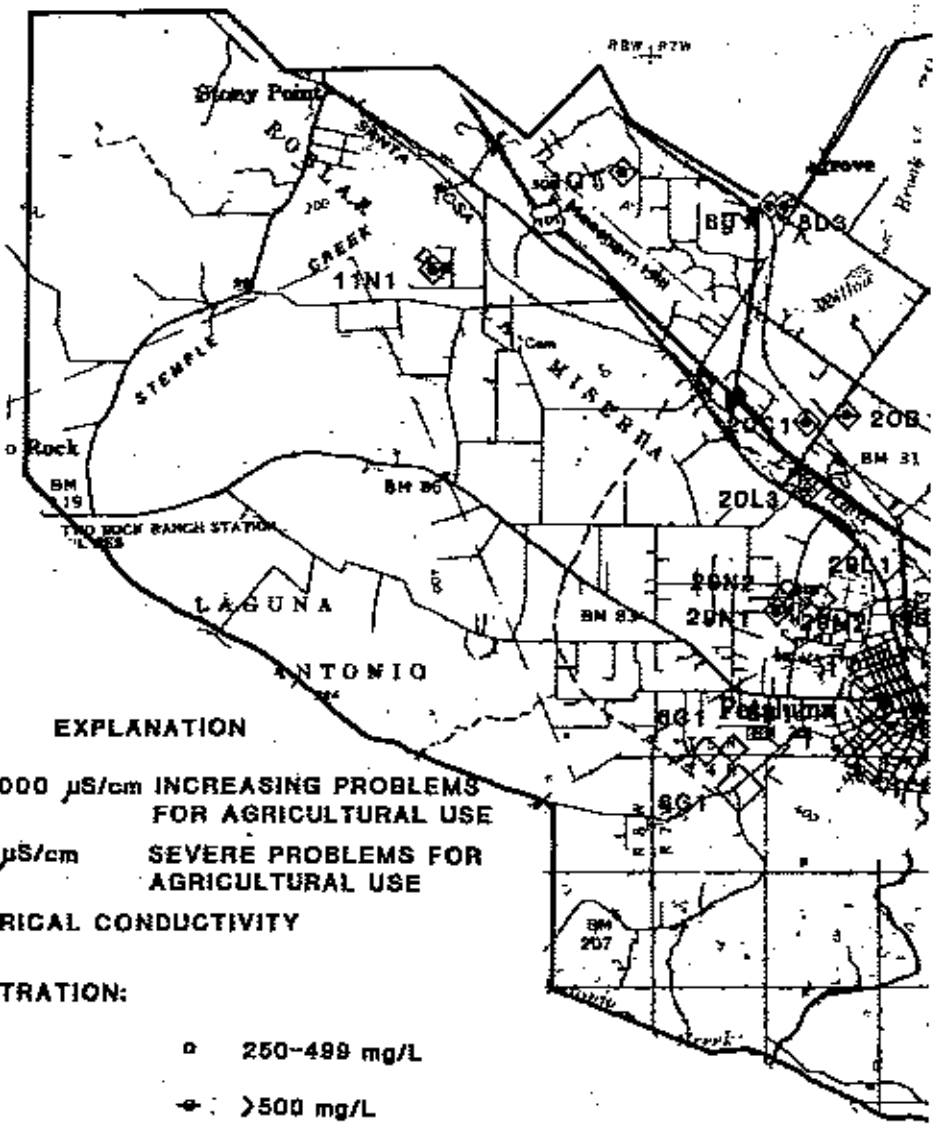
PETALUMA VALLEY
SONOMA COUNTY GROUND WATER STUDY

SODIUM IN GROUND WATER IN EXCESS OF RECOMMENDED STANDARDS

FIGURE 14A



24B1
24F1
27A1
26E1
30D1
26R1
35L
2D1
7H1
7H2
Lakeville
21A1
21Q1
27N1
27R1
33R1
3C1
6C1
11L1
TOLAY
CREEK
PETALUMA
STAGE
HIGHWAY
NORTHWESTERN
SCALE
kilometres
miles



EXPLANATION

◇ E.C. = 150–3000 µS/cm INCREASING PROBLEMS FOR AGRICULTURAL USE

◇ E.C. > 3000 µS/cm SEVERE PROBLEMS FOR AGRICULTURAL USE

E.C. = ELECTRICAL CONDUCTIVITY

CHLORIDE CONCENTRATION:

- • 106–141 mg/L
- ◦ 250–499 mg/L
- ◆ 142–248 mg/L
- ◈ >500 mg/L

E.C. IN AREA ENCLOSED IN DASHED LINE IS APPROXIMATELY 1000 µS/cm

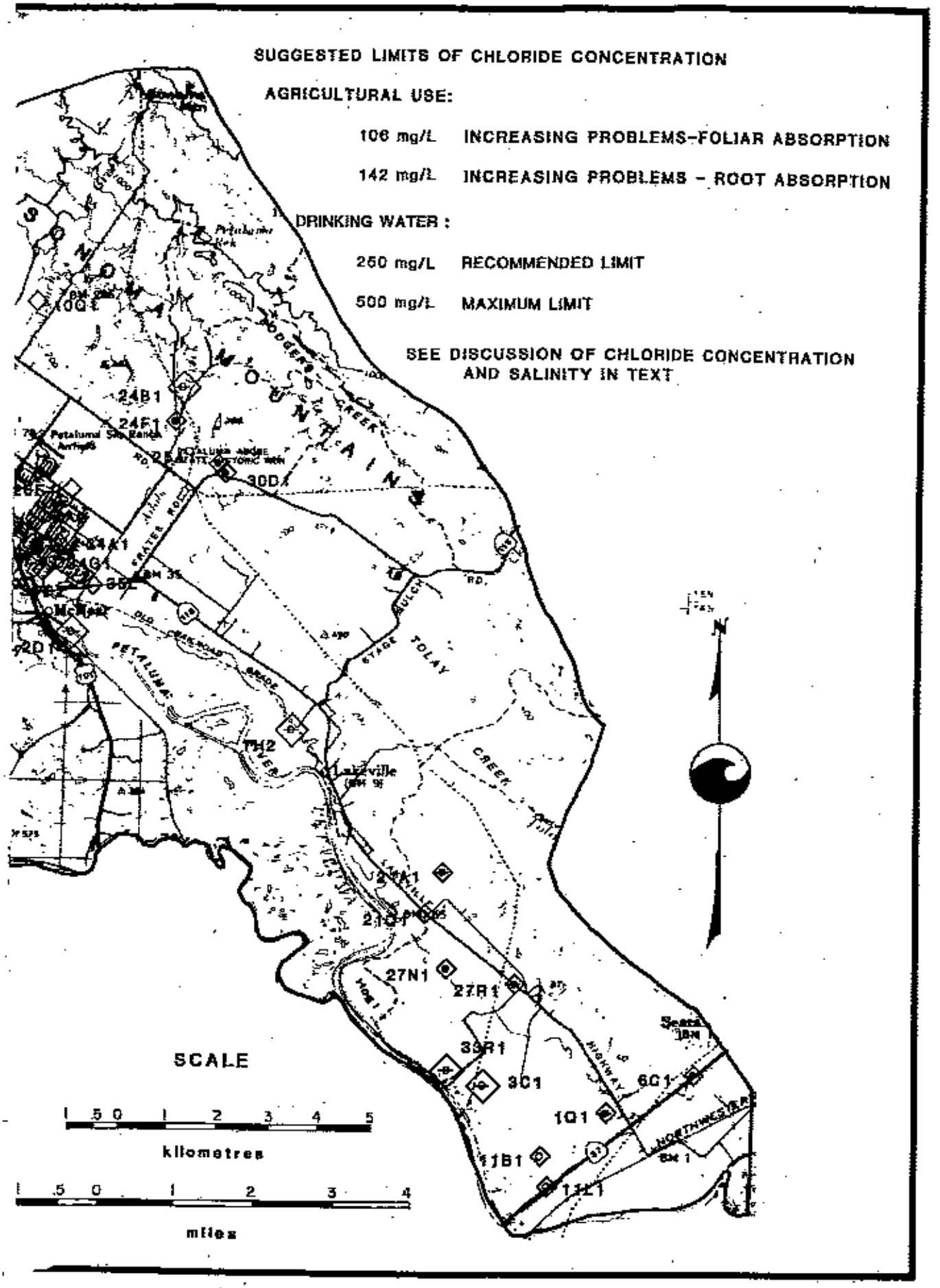
FOR DATES OF ANALYSES, SEE TABLE 6

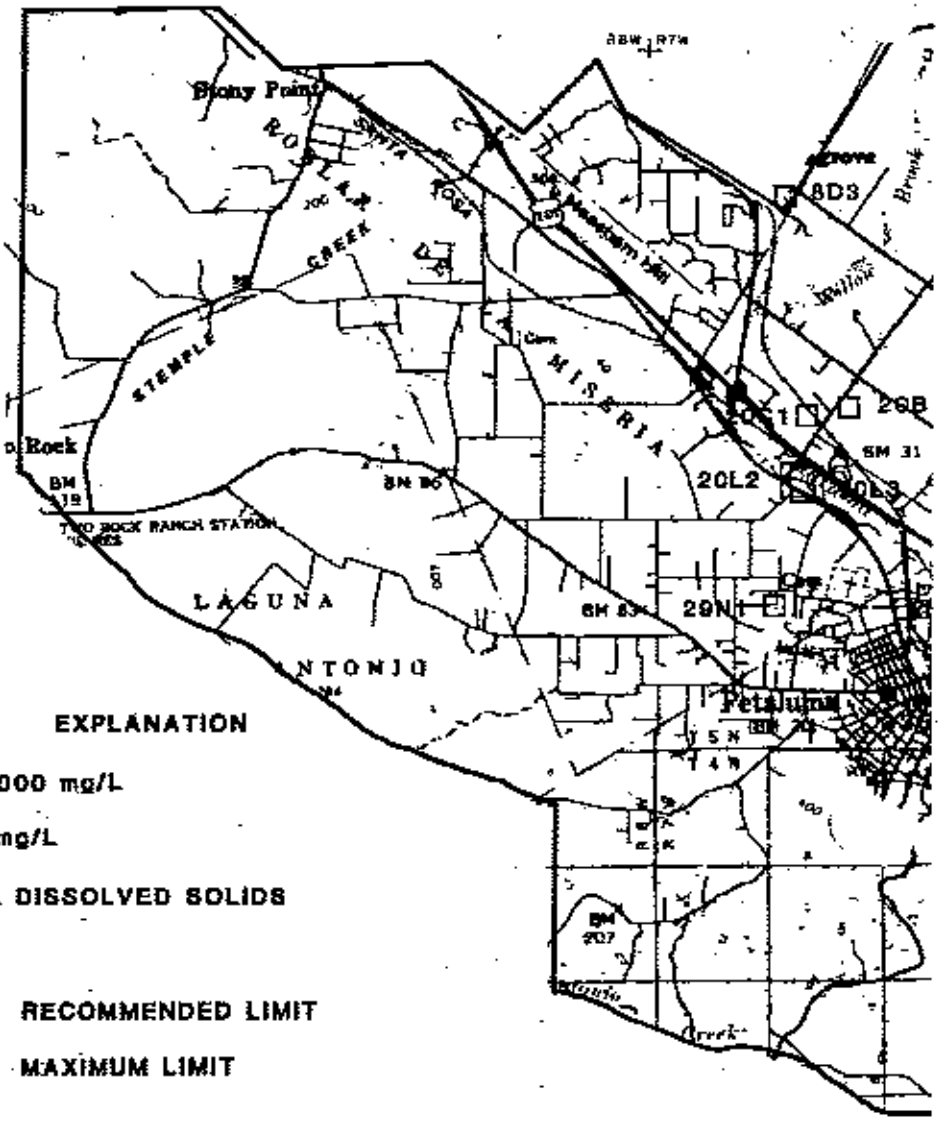
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT

PETALUMA VALLEY
SONOMA COUNTY GROUND WATER STUDY

SALINITY IN GROUND WATER IN EXCESS OF RECOMENDED STANDARDS

FIGURE 14B


SUGGESTED LIMITS OF CHLORIDE CONCENTRATION
AGRICULTURAL USE:
106 mg/L INCREASING PROBLEMS-FOLIAR ABSORPTION
142 mg/L INCREASING PROBLEMS - ROOT ABSORPTION
DRINKING WATER :
250 mg/L RECOMMENDED LIMIT
500 mg/L MAXIMUM LIMIT
SEE DISCUSSION OF CHLORIDE CONCENTRATION AND SALINITY IN TEXT
SONOMA MOUNTAINS
24B1
24F1
30D1
TH2
Lakeville
27N1
27R1
33R1
3C1
1Q1
11B1
11L1
6C1
Sears
TOLAY CREEK
PETALUMA RIVER
SCALE
kilometres
miles
N



EXPLANATION

□ TDS = 600–1000 mg/L

□ TDS > 1000 mg/L

TDS = TOTAL DISSOLVED SOLIDS

DRINKING WATER:

600 mg/L RECOMMENDED LIMIT

1000 mg/L MAXIMUM LIMIT

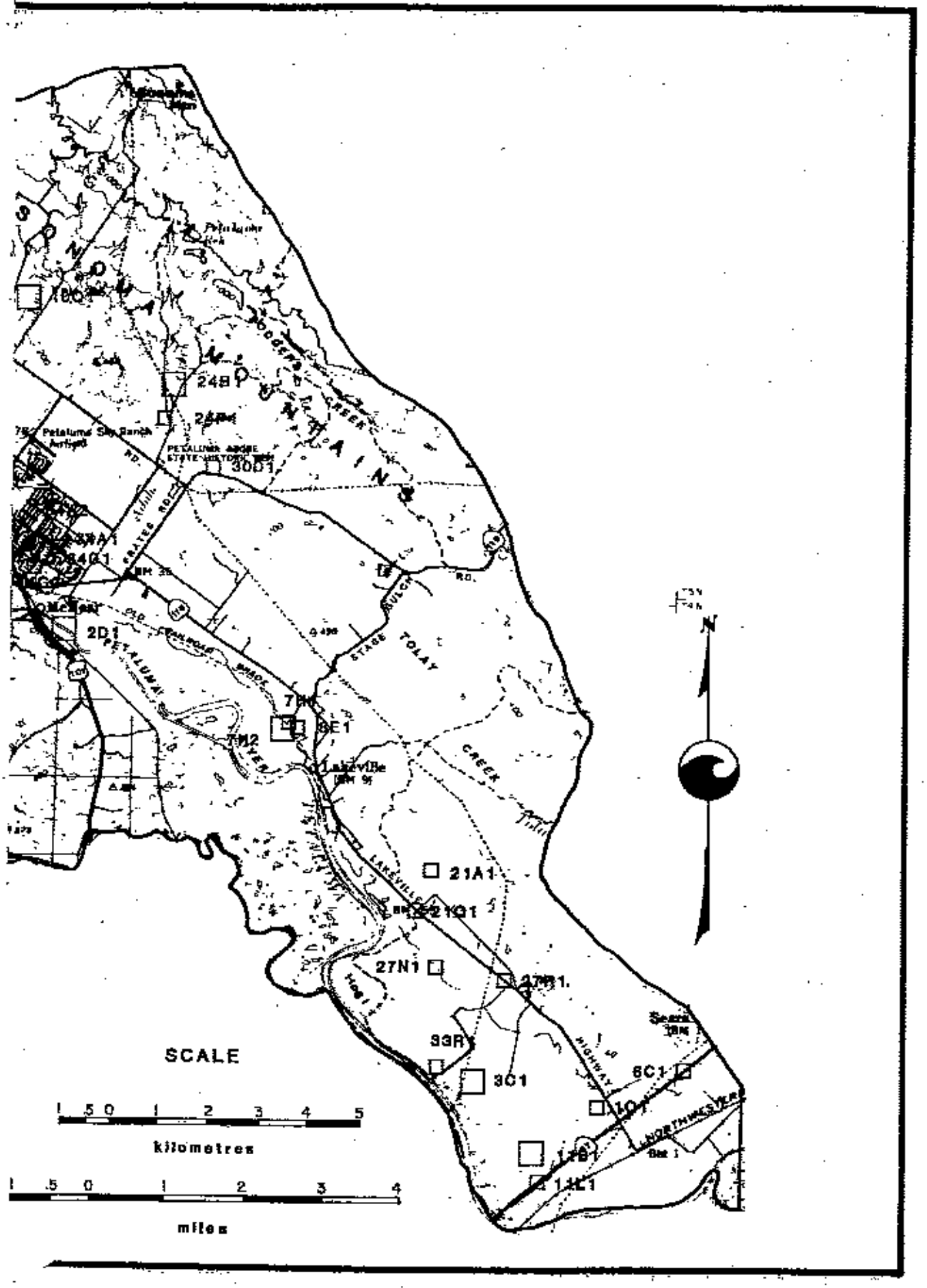
FOR DATES OF ANALYSES, SEE TABLE 8

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT

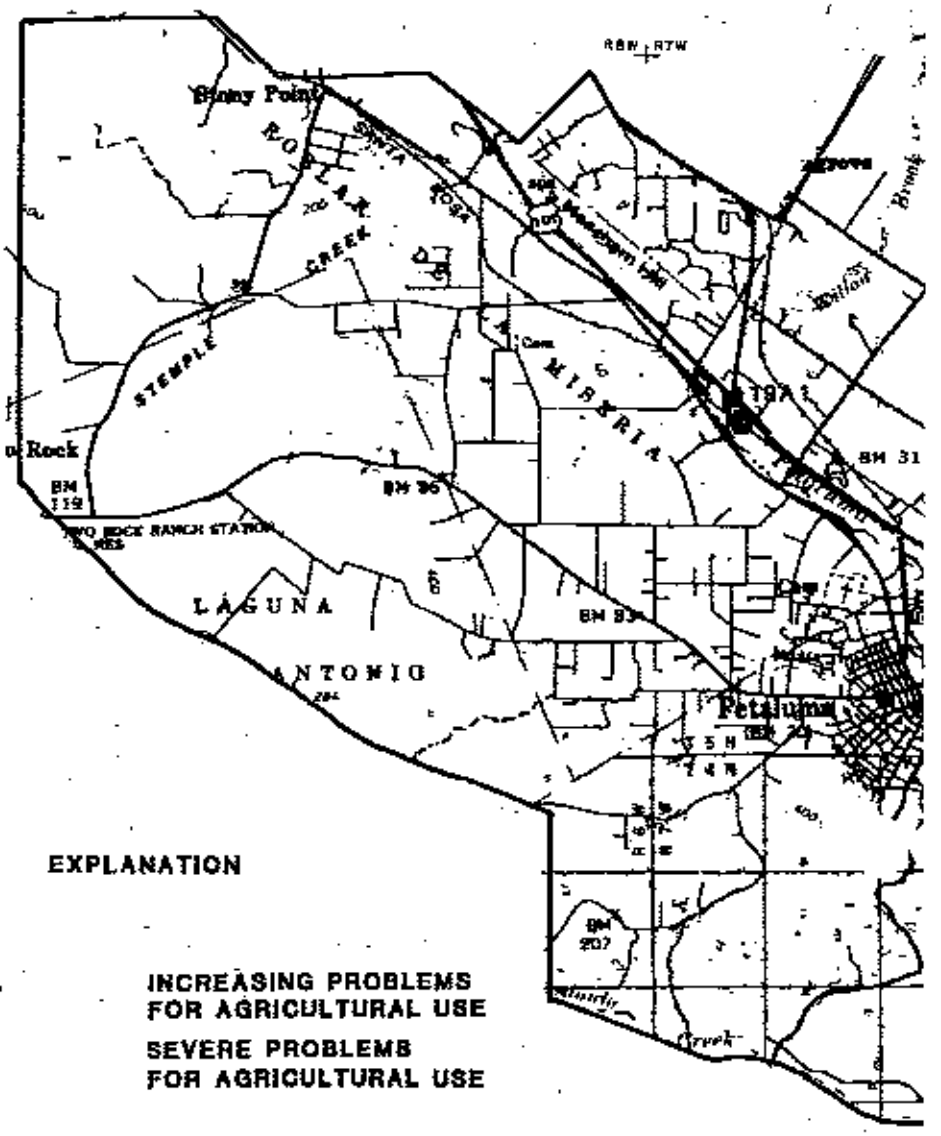
PETALUMA VALLEY
SONOMA COUNTY GROUND WATER STUDY

TOTAL DISSOLVED SOLIDS IN GROUND WATER IN EXCESS OF RECOMMENDED STANDARDS

FIGURE 14C



24B1
24P1
30D1
2D1
7H1
8E1
7H2
Lakeville
21A1
21Q1
27N1
27R1
33R1
3C1
6C1
1Q1
11B1
11L1
TOLAY
CREEK
STAGE
GULCH
RD.
PETALUMA
HIGHWAY
NORTHWESTERN
Petaluma Sky Ranch Airfield
PETALUMA ADOBE STATE HISTORIC PARK
SCALE
1 .5 0 1 2 3 4 5
kilometres
1 .5 0 1 2 3 4
miles
N



EXPLANATION

BORON

- ● 0.5–2.0 mg/L — INCREASING PROBLEMS FOR AGRICULTURAL USE
- ⬡ >2.0 mg/L — SEVERE PROBLEMS FOR AGRICULTURAL USE

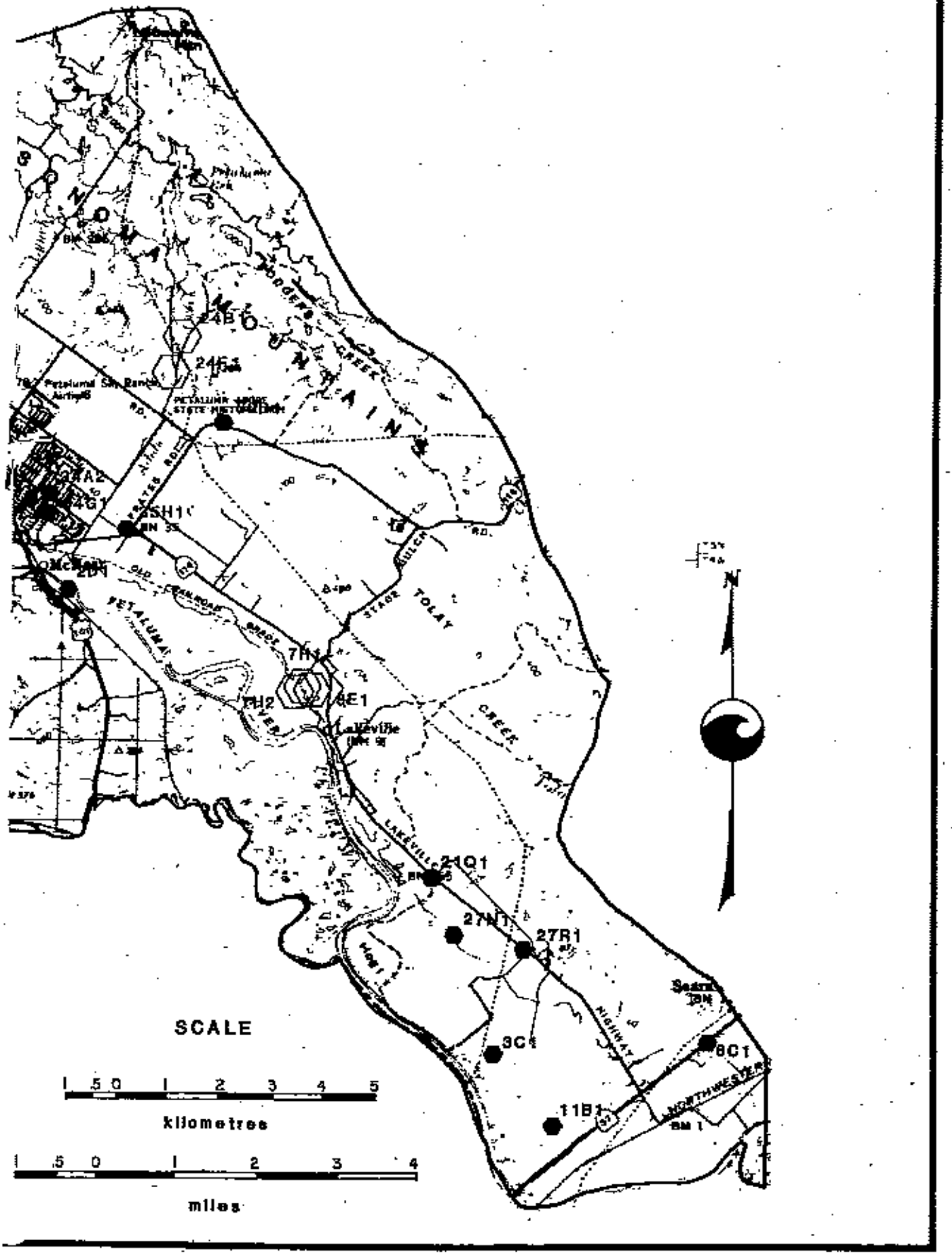
FOR DATES OF ANALYSES, SEE TABLE 7

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT

PETALUMA VALLEY
SONOMA COUNTY GROUND WATER STUDY

BORON IN GROUND WATER IN EXCESS OF RECOMMENDED STANDARDS

FIGURE 14D



24B1
24E1
PETALUMA SAN RANCH
PETALUMA ADOBE STATE HISTORIC PARK
PRATES RD.
OLD CRAN ROAD GRADE
PETALUMA
STAGE GULCH RD.
TOLAY CREEK
7H1
7H2
8E1
Lakeville
LAKEVILLE
21Q1
27N1
27R1
3C1
11B1
8C1
NORTHWESTERN
N
SCALE
1 .5 0 1 2 3 4 5
kilometres
1 .5 0 1 2 3 4
miles

appears to be livestock and poultry manure that was disposed of in unlined pits or on the land surface. Nitrates were leached from the manure piles by rainfall and infiltrated downward to the ground water body. A secondary source of nitrate contamination in some areas is septic-tank leach-field systems; fecal coliform bacteria in ground water samples indicates contamination from this source.

Once nitrate is present in the ground water, the contamination can spread vertically and horizontally, unless confining layers of clay or other poorly permeable materials are present. Gravel-packed wells provide a conduit for contaminated water to move vertically from a shallow zone to a deeper zone; the contaminated water moves through the perforations and gravel pack. For this reason abandoned wells should be properly filled and sealed, and deep sanitary seals that extend below the contaminated zone (about 15 m, or 50 ft, in the area northwest of Petaluma) should be installed in new wells. As a minimum requirement, seals should extend at least to the first impermeable stratum. A temporary ordinance now in effect for the area northwest of Petaluma requires seals 15 m (50 ft) deep or to the first impermeable stratum (County of Sonoma Ordinance 2607). A seal of 30 m (100 ft) would reduce the likelihood of well contamination by shallow, nitrate-rich ground water. (See Ritchie, 1981, Water Well Standards.)

Before 1979, water quality data collected in the Petaluma Valley at random locations indicated that 5 of the 54 wells sampled produced water containing nitrates in excess of recommended limits. During the winter of 1978-79, a case of methemoglobinemia was diagnosed in an infant whose family lived in the area northwest of Petaluma. Because of this incident, an extensive sampling program was conducted cooperatively in this area in 1979 by DWR, the California Department of Health Services, and the Sonoma County Health Department.

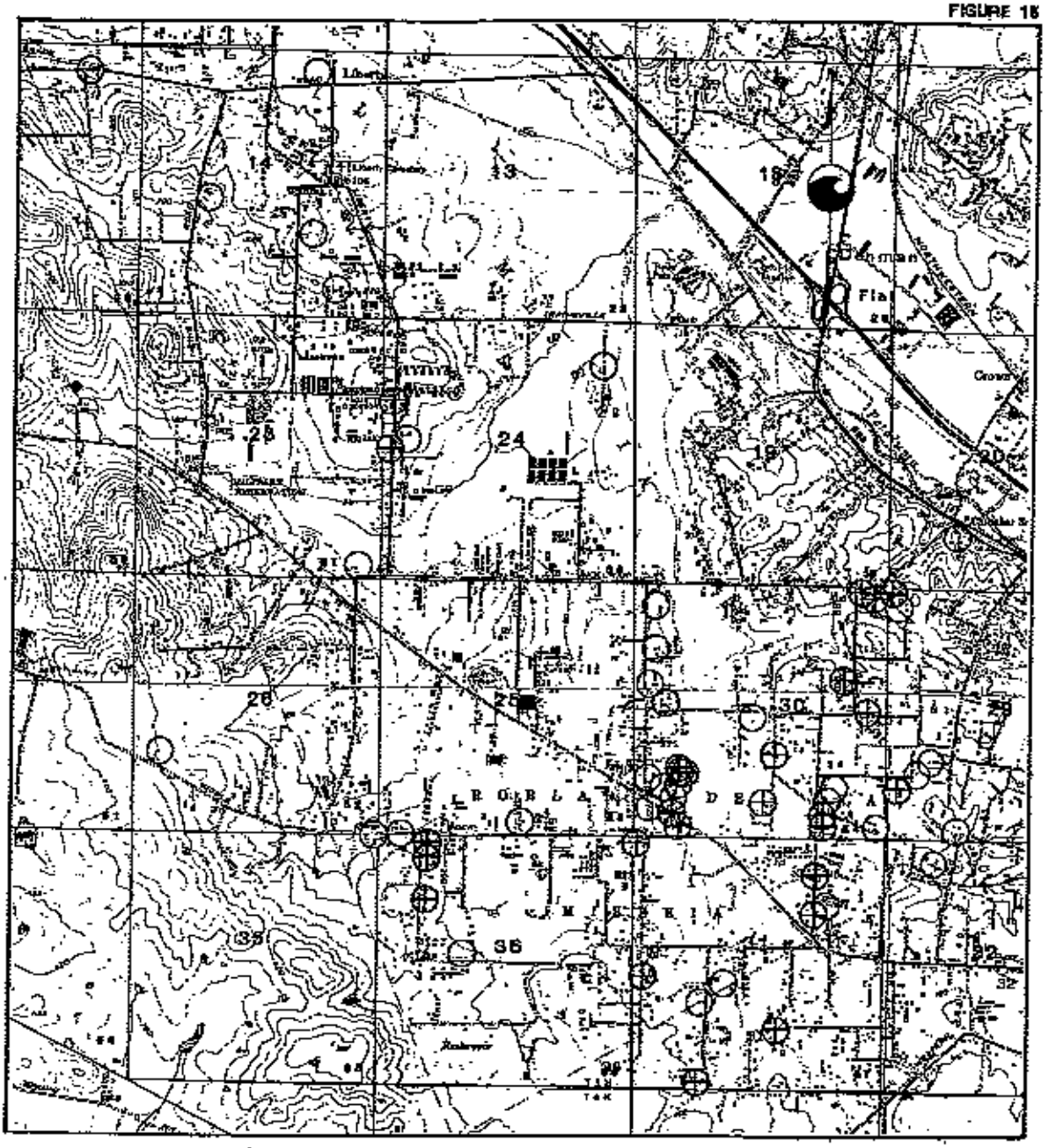
Of the 200 wells sampled in 1979, 33 percent produced water containing nitrate in excess of the recommended limits (Figure 15 and Table 8). Because of this widespread contamination, DWR, Central District, is conducting a cooperative study with the previously listed agencies and the San Francisco Regional Water Quality Control Board to better define the vertical and horizontal extent of the contaminated water and determine the source of contamination. Information from this study will be published as a District Report in April 1982 (Perkins, in progress).

Preliminary data indicate that the zone of nitrate contamination extends from the land surface to perhaps 15 m (50 ft) deep. There are no vertical barriers within the Merced Formation in the western uplands except for isolated lava flows of the Sonoma Volcanics (Plate 1 and Figures 5A-E). The nonwater-yielding Tolay Volcanics and Franciscan complex rocks form horizontal barriers beneath the Merced Formation and vertical barriers where they are exposed at the surface adjacent to the Merced Formation. The concentration of nitrate in ground water may actually increase near these margins because the Tolay and Franciscan rocks restrict ground water migration.

Electrical conductivities appear to be higher than average in nitrate-contaminated water because leachate from animal wastes or septic tanks is generally high in salts. In the area west of Petaluma, two wells of similar construction 0.40 kilometre (0.25 mile) apart had nitrate concentrations above recommended limits and EC values of 500 uS/cm and 2 000 uS/cm (wells 5N/8W-36C41 and 5N/8W-36C4). The well with the higher nitrate and EC values is near holding ponds used for dairy wastes (DWR, unpublished data).

The extent and sources of nitrate contamination in other areas of the Petaluma Valley cannot be evaluated as to extent or source because of the limited data available. Further sampling should be conducted near wells known to be affec to define the size of the nitrate contamination problem in these areas.

FIGURE 18



NITRATE AS NITROGEN (mg/l)

⊕ 40 mg/L

○ 10 - 39 mg/L

24 — SECTION NUMBER

18 — WELL NUMBER

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT

PETALUMA VALLEY
SONOMA COUNTY GROUND WATER STUDY

NITRATE IN EXCESS OF RECOMMENDED STANDARDS IN THE AREA NORTHWEST OF THE CITY OF PETALUMA

Table 8

NITRATE IN GROUND WATER
IN EXCESS OF RECOMMENDED STANDARDS

Well Number	Depth		Date	Nitrate NO_3 1/	Nitrate NO_3 as N 2/
	metres	(feet)	mo/yr	mg/L	mg/L
3N/6W-03C01	--	(--)	9/61	45	
4N/7W-04F01	56	(184)	8/58	216	
5N/7W-20L02	19	(62)	3/59	191	
-20L03	15	(50)	4/64	118	
-20N05	--	(--)	10/79		11
-28N01	19	(62)	8/58	106	
-29D04	--	(--)	10/79		70
-29D07	--	(--)	10/79		16
-29M02	73	(238)	10/79		20
-29N02	--	(--)	9/79		36
-29N03	44	(144)	9/79		11
-29N05	--	(--)	9/79		18
-30A01	36	(118)	10/79		43
-30A03	--	(--)	10/79		31
-30D02	--	(--)	10/79		59
-30E02	57	(188)	10/79		27
-30E03	--	(--)	10/79		31
-30E04	--	(--)	10/79		29
-30H03	--	(--)	9/79		67
-30H04	--	(--)	10/79		40
-30K09	--	(--)	10/79		66
-30L04	--	(--)	10/79		12
-30M01	--	(--)	9/79		53
-30M02	--	(--)	9/79		52
-30N03	--	(--)	9/79		33
-30N04	--	(--)	9/79		22
-30N05	--	(--)	9/79		27
-30N06	--	(--)	9/79		14
-30N07	--	(--)	9/79		27
-30N08	--	(--)	9/79		24
-30N09	--	(--)	9/79		17
-30N10	--	(--)	9/79		22
-30N11	--	(--)	10/79		38
-30Q03	--	(--)	9/79		34
5N/7W-30Q04	--	(--)	9/79		21
-30Q06	--	(--)	10/79		32
-30R02	--	(--)	9/79		20
-30R04	--	(--)	9/79		25
-30R07	--	(--)	10/79		20
-31B06	--	(--)	9/79		31
-31D01	--	(--)	10/79		39
-31G01	--	(--)	9/79		25
-31G02	--	(--)	9/79		11
-31G03	--	(--)	10/79		15
-31L01	59	(192)	10/79		24
-31M01	--	(--)	10/79		31
-31M03	--	(--)	10/79		10
-31P01	--	(--)	10/79		33
-31Q01	--	(--)	10/79		56
-32D01	--	(--)	9/79		28
5N/8W-11R01	91	(300)	10/79		17
-14K01	--	(--)	10/79		11
-14L01	61	(200)	10/79		15
-14R01	34	(110)	10/79		24
-15A01	--	(--)	10/79		17
-23R01	--	(--)	10/79		22
-24A01	--	(--)	10/79		16
-24E01	--	(--)	10/79		21
-24E02	61	(200)	10/79		38
-24M04	--	(--)	10/79		38
-25Q01	--	(--)	10/79		19
-26M03	--	(--)	10/79		11
-35A01	--	(--)	10/79		12
-36C03	--	(--)	10/79		83
-36C04	82	(269)	10/79		17
-36D01	61	(200)	10/79		35
-36E02	--	(--)	10/79		69
-36F01	13	(42)	10/79		15

1/ All exceed recommended limit of nitrate of 45 mg/L for infants.
2/ All exceed recommended limit of nitrate as nitrogen of 10 mg/L for infants.

Hardness

Ground water containing calcium and magnesium salts is divided into two general classifications: carbonate hardness and noncarbonate hardness. Carbonate hardness becomes apparent after water has been heated, causing the soluble calcium and magnesium bicarbonates to precipitate as insoluble carbonates. The precipitates adhere to heated surfaces, such as the inside of water heaters and hot water pipes, and ultimately reduce the capacity of the fixture. Noncarbonate hardness is not affected by heat because it is principally caused by the presence of calcium sulfate; since few analyses of noncarbonate hardness in the study area are available, it will not be discussed here. Both forms of hardness reduce the cleansing ability of many soaps and detergents.

The hardness of ground water is variable. Soft waters are those with a hardness of less than 60 mg/L of calcium carbonate; moderately hard waters are those with a hardness range of from 61 to 200 mg/L. Hard waters are those that have a hard in excess of 200 mg/L.

Available data indicate that most ground water in the Petaluma Valley varies from moderately hard to hard. The hardest water is generally found in areas affected by sea water intrusion or underlain by poor quality connate water bodies.

The greatest potential for a change in hardness is near areas affected by sea water intrusion. If ground water pumping produces a landward gradient, encouraging inland movement of sea water, hardness will increase as sea water moves into alluvial fan deposits.

Iron and Manganese

The presence of excessive iron and manganese in ground water is a common problem. Both of these constituents can impart a metallic taste to water or to food prepared with such water. The metallic impurities may also stain fixtures, fabrics, and utensils. The iron and manganese deposits build up in pressure tanks, water heaters, and pipes and reduce the available quantity and pressure of the water supply. The recommended limit is 0.3 mg/L for iron and 0.05 mg/L for manganese.

To obtain an accurate analysis of the amount of iron and manganese in a water sample, the sample must be acidified with nitric acid immediately after collection to stabilize the metallic constituents. If this is not done, some iron and manganese will precipitate out of solution. If plastic jugs are used for sampling, some iron and manganese will adhere to the plastic. Acidification of water samples has rarely been performed in the Petaluma Valley; therefore, a general statement on the occurrence and movement of iron- and manganese-rich water cannot be made.

Water containing excessive iron and manganese has been produced from wells:

- Tapping alluvial fan deposits.
- Tapping the Petaluma Formation.
- Tapping the Sonoma Volcanics.

Table 9 lists wells in the Petaluma Valley known to produce water with iron or manganese in excess of recommended limits.

Table 9

IRON AND MANGANESE IN GROUND WATER IN EXCESS OF RECOMMENDED STANDARDS

Well Number	Depth		Date	Iron		Manganese
				Total*	Dissolved	
	metres	(feet)	mo/yr	mg/L	mg/L	mg/L
3N/6W-01Q01	69	(223)	4/60	0.93**		---
-03C01	--	(--)	3/59	4.60**		---
-11B01	76	(250)	3/58	0.57**		---
4N/6W-07H01	11	(35)	4/60	0.33**		---
-07H02	--	(--)	4/60	0.37**		---
-21A01	80	(259)	8/74	0.31**		0.02
-21Q01	141	(464)	4/60	1.20**		---
-27N01	68	(222)	4/60	5.60**		---
-33R01	53	(175)	4/60	6.00**		---
4N/7W-02D01	19	(62)	4/60	6.50**		---
5N/7W-08B01	--	(--)	5/47	0.03		0.07**
-08D03	42	(138)	3/59	1.2**		---
-19A01	99	(325)	4/60		1.1**	---
-19A	182	(596)	9/77	0.22		0.07**
-19N01	55	(180)	3/59	0.59**		---
-20B01	183	(600)	5/47	0.03		0.09**
5N/7W-22Q01	28	(92)	7/49	0.19		0.30**
-22Q02	30	(97)	8/49	0.13		0.10**
-22Q	110	(360)	5/77	0.18		0.19**
-25C01	72	(235)	5/47	0.26		0.15**
-26E01	184	(605)	3/59	1.20**		---
-26R01	131	(428)	2/49	0.03		0.07**
-27A01	130	(425)	3/59	0.59**		---
-28A02	30	(99)	5/49	0.14		0.11**
-28A03	85	(280)	5/49	0.01		0.14**
-28H03	28	(92)	4/60		0.61**	0.14**
-28H04	25	(83)	5/49	0.01		0.06**
-28H05	143	(468)	5/49	0.03		0.06**
-28N01	19	(62)	4/61		0.01	0.08**
-34E02	85	(280)	4/60	0.52**		---
-35J	85	(280)	7/77	0.30**		<0.05
-35K01	24	(78)	4/60	0.44**		---
-35L	70	(229)	5/77	0.06		0.10**

* Value for iron given as "Total" or no distinction made as to type of analysis.
**Concentration is above recommended limits of 0.3 mg/L iron or 0.05 mg/L manganese.

Sources of iron and manganese are varied. Iron is frequently present in the cementing material of sandstones and within shales. Iron is also found in the soils produced by weathering of these rocks. Iron may be added to ground water from contact with well casing, pump parts, piping, storage tanks, and other iron objects. It can be derived from iron bacteria that grow in some well casings.

Manganese found in ground water is most frequently the result of solution of manganese from soils and sediments aided by anaerobic bacteria under reducing conditions.

In some parts of California, water rich in iron and manganese occurs near the bottom of various individual aquifers. Because iron and manganese ions are relatively heavy, they tend to settle in an aquifer until they are concentrated just above a clay bed. Water drawn from a well perforated near the bottom of an aquifer would therefore tend to have a greater concentration of iron and manganese. In the Petaluma Valley, however, data are insufficient to evaluate this phenomenon.

Well Owner Questionnaire Results

To determine well owners' opinions of their ground water quality, the Sonoma County Water Agency mailed questionnaires in 1977 to all rural property owners in Sonoma County who do not receive water from municipal water systems. The questionnaires requested information on ground water taste, odor, and color. The responses were grouped according to assessor's parcel books (Figure 16). Within each parcel book area, responses were separated according to well depth

- Shallow wells, 0-46 m (0-150 ft) deep.
- Intermediate wells, 46-107 m (151-350-ft) deep.
- Deep wells, greater than 107 m (350 ft) deep.

Within each depth range, the number of wells with each of the following problems was tabulated:

- Taste
- Odor
- Color
- Other (problem)
- None (no problem)

Since a single well could have more than one problem, two other tabulations were added: (1) taste, odor, or color; and (2) taste, odor, color, or other. The responses to the questionnaires are tabulated in Table 10.

The most common complaints about water from shallow wells were taste and color. No complaint was more common than others about water from intermediate-depth wells. Few complaints were reported about water from deep wells.

Some common causes of unpleasant taste are excessive hardness, salinity, sodium, iron and manganese, and sulfides. Some causes of colored water are excessive iron and manganese and the pumping of sand. Unpleasant odor can be caused by excessive iron and manganese or hydrogen sulfide.

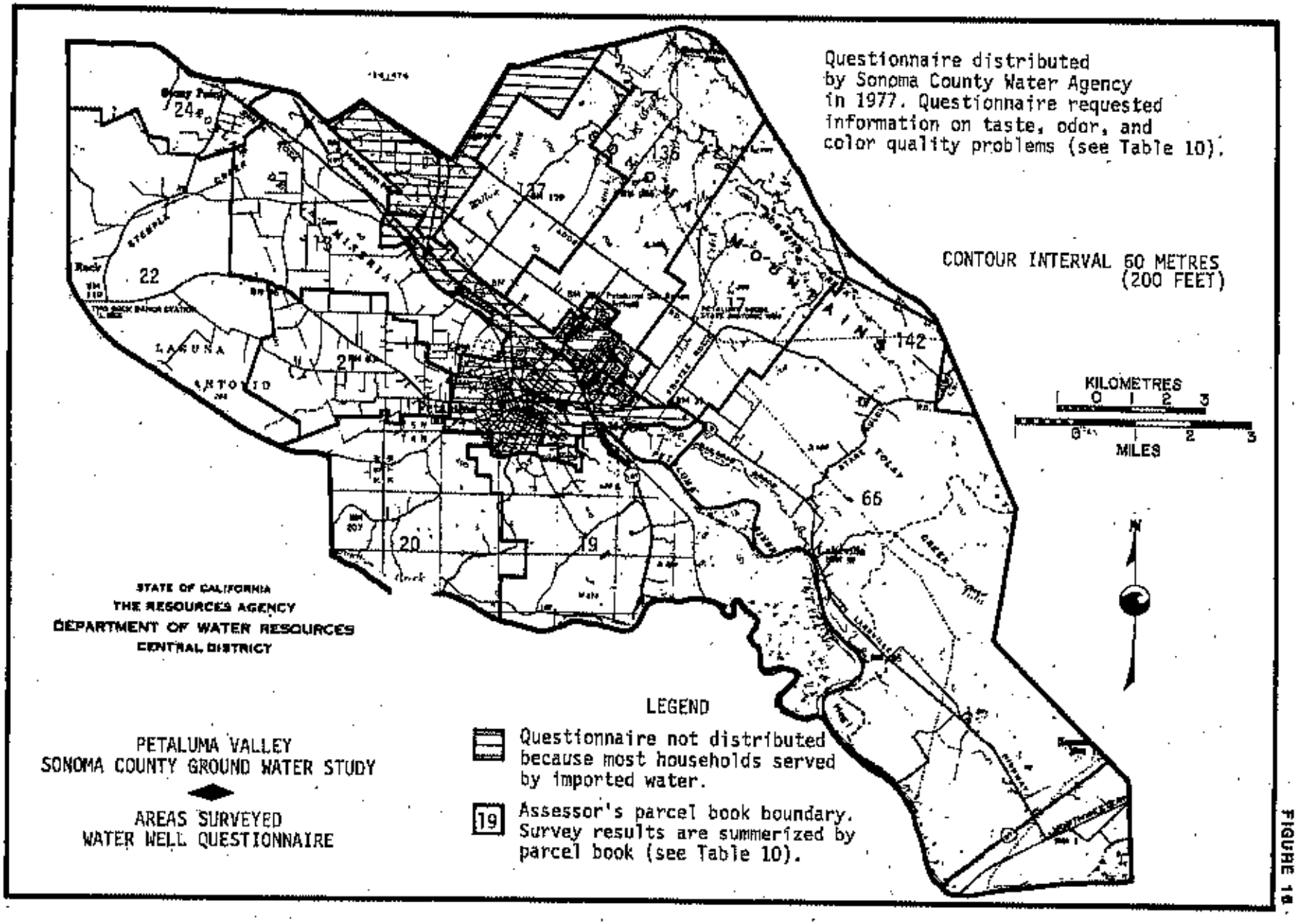

Questionnaire distributed by Sonoma County Water Agency in 1977. Questionnaire requested information on taste, odor, and color quality problems (see Table 10).
CONTOUR INTERVAL 60 METRES (200 FEET)
KILOMETRES
0 1 2 3
0 2 3
MILES
N
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT
PETALUMA VALLEY
SONOMA COUNTY GROUND WATER STUDY
AREAS SURVEYED
WATER WELL QUESTIONNAIRE
LEGEND
Questionnaire not distributed because most households served by imported water.
19 Assessor's parcel book boundary. Survey results are summerized by parcel book (see Table 10).

FIGURE 18

TABLE 10

WATER WELL QUESTIONNAIRE RESPONSES

1977 DATA

1/

ASSESSORS PARCEL BOOK NO. 17

QUALITY PROBLEM	NUMBER OF RESPONSES WITH INDICATED QUALITY PROBLEM: SHALLOW WELLS 0-150 FT	INTERMEDIATE WELLS 151-350 FT	DEEP WELLS > 350 FT	WELLS WITH DEPTH UNKNOWN	SUMMARY ALL WELLS
TASTE	0	0	0	0	0
ODOR	3	0	0	0	3
COLOR	3	0	0	2	5
OTHER	0	0	0	0	0
NONE	8	0	0	2	7
TASTE, ODOR OR COLOR	3	0	0	2	5
TASTE, ODOR, COLOR OR OTHER	3	0	0	2	5
NUMBER OF WELLS IN SURVEY	8	0	0	4	12
% WELLS WITH T,O,C QUALITY PROBLEM	37.5%	N/A	N/A	50.0%	41.7%
% WELLS WITH T,O,C,X QUALITY PROBLEM	37.5%	N/A	N/A	50.0%	41.7%

ASSESSORS PARCEL BOOK NO. 19

QUALITY PROBLEM	NUMBER OF RESPONSES WITH INDICATED QUALITY PROBLEM: SHALLOW WELLS 0-150 FT	INTERMEDIATE WELLS 151-350 FT	DEEP WELLS > 350 FT	WELLS WITH DEPTH UNKNOWN	SUMMARY ALL WELLS
TASTE	5	0	0	3	8
ODOR	2	0	0	0	2
COLOR	0	0	1	3	4
OTHER	3	0	0	2	5
NONE	19	0	0	4	23
TASTE, ODOR OR COLOR	6	0	1	3	10
TASTE, ODOR, COLOR OR OTHER	7	0	1	5	13
NUMBER OF WELLS IN SURVEY	26	0	1	9	36
% WELLS WITH T,O,C QUALITY PROBLEM	23.1%	N/A	100.0%	33.3%	27.8%
% WELLS WITH T,O,C,X QUALITY PROBLEM	23.1%	N/A	100.0%	55.6%	36.1%

ASSESSORS PARCEL BOOK NO. 20

QUALITY PROBLEM	NUMBER OF RESPONSES WITH INDICATED QUALITY PROBLEM: SHALLOW WELLS 0-150 FT	INTERMEDIATE WELLS 151-350 FT	DEEP WELLS > 350 FT	WELLS WITH DEPTH UNKNOWN	SUMMARY ALL WELLS
TASTE	0	2	0	1	3
ODOR	0	2	0	1	3
COLOR	3	2	0	1	6
OTHER	2	3	0	1	6
NONE	30	0	0	3	41
TASTE, ODOR OR COLOR	3	2	0	1	
TASTE, ODOR, COLOR OR OTHER	5	4	0	1	
NUMBER OF WELLS IN SURVEY	35	12	0	4	
% WELLS WITH T,O,C QUALITY PROBLEM	8.6%	16.7%	N/A	25.0%	1.
% WELLS WITH T,O,C,X QUALITY PROBLEM	14.3%	33.3%	N/A	25.0%	19.6%

ASSESSORS PARCEL BOOK NO. 21

QUALITY PROBLEM	NUMBER OF RESPONSES WITH INDICATED QUALITY PROBLEM: SHALLOW WELLS 0-150 FT	INTERMEDIATE WELLS 151-350 FT	DEEP WELLS > 350 FT	WELLS WITH DEPTH UNKNOWN	SUMMARY ALL WELLS
TASTE	10	6	0	5	21
ODOR	5	6	0	3	14
COLOR	12	10	0	9	31
OTHER	16	13	0	1	30
NONE	64	38	0	30	155
TASTE, ODOR OR COLOR	20	15	0	11	46
TASTE, ODOR, COLOR OR OTHER	32	25	0	12	69
NUMBER OF WELLS IN SURVEY	115	63	3	42	224
% WELLS WITH T,O,C QUALITY PROBLEM	17.4%	23.8%	.0%	26.2%	20.5%
% WELLS WITH T,O,C,X QUALITY PROBLEM	27.8%	36.7%	.0%	28.6%	30.8%

ASSESSORS PARCEL BOOK NO. 22

QUALITY PROBLEM	NUMBER OF RESPONSES WITH INDICATED QUALITY PROBLEM: SHALLOW WELLS 0-150 FT	INTERMEDIATE WELLS 151-350 FT	DEEP WELLS > 350 FT	WELLS WITH DEPTH UNKNOWN	SUMMARY ALL WELLS
TASTE	12	1	0	0	13
ODOR	0	1	0	0	1
COLOR	8	0	0	0	8
OTHER	1	1	0	0	2
NONE	29	10	0	9	48
TASTE, ODOR OR COLOR	14	2	0	0	16
TASTE, ODOR, COLOR OR OTHER	15	3	0	0	18
NUMBER OF WELLS IN SURVEY	44	13	0	9	66
% WELLS WITH T,O,C QUALITY PROBLEM	31.8%	15.4%	N/A	.0%	24.2%
% WELLS WITH T,O,C,X QUALITY PROBLEM	34.1%	23.1%	N/A	.0%	27.3%

ASSESSORS PARCEL BOOK NO. 24

QUALITY PROBLEM	NUMBER OF RESPONSES WITH INDICATED QUALITY PROBLEM: SHALLOW WELLS 0-150 FT	INTERMEDIATE WELLS 151-350 FT	DEEP WELLS > 350 FT	WELLS WITH DEPTH UNKNOWN	SUMMARY ALL WELLS
TASTE	3	3	1	4	11
ODOR	2	3	0	6	11
COLOR	1	4	0	6	11
OTHER	0	4	0	1	5
NONE	12	7	0	4	23
TASTE, ODOR OR COLOR	3	6	1	6	16
TASTE, ODOR, COLOR OR OTHER	3	10	1	7	
NUMBER OF WELLS IN SURVEY	15	17	1	11	
% WELLS WITH T,O,C QUALITY PROBLEM	20.0%	35.3%	100.0%	54.5%	
% WELLS WITH T,O,C,X QUALITY PROBLEM	20.0%	58.8%	100.0%	63.6%	47.

1/ FOR LOCATION OF ASSESSOR'S PARCEL BOOKS SEE FIGURE 16.

TABLE 10 (continued)

ASSESSORS PARCEL BOOK NO. 84	NUMBER OF RESPONSES WITH INDICATED QUALITY PROBLEM				
QUALITY PROBLEM	SHALLOW WELLS 0-150 FT	INTERMEDIATE WELLS 151-350 FT	DEEP WELLS > 350 FT	WELLS WITH DEPTH UNKNOWN	SUMMARY ALL WELLS
TASTE	21	4	2	9	34
ODOR	15	2	0	7	24
COLOR	24	2	[illegible]	[illegible]	[illegible]
OTHER	15	[illegible]	[illegible]	6	27
NONE	82	7	1	26	116
TASTE, ODOR OR COLOR	32	3	2	10	47
TASTE, ODOR, COLOR OR OTHER	42	6	2	15	65
NUMBER OF WELLS IN SURVEY	124	13	3	35	175
% WELLS WITH T,O,C QUALITY PROBLEM	25.8%	23.1%	66.7%	28.6%	26.9%
% WELLS WITH T,O,C,X QUALITY PROBLEM	33.9%	46.2%	66.7%	42.9%	37.1%

ASSESSORS PARCEL BOOK NO. 113	NUMBER OF RESPONSES WITH INDICATED QUALITY PROBLEM				
QUALITY PROBLEM	SHALLOW WELLS 0-150 FT	INTERMEDIATE WELLS 151-350 FT	DEEP WELLS > 350 FT	WELLS WITH DEPTH UNKNOWN	SUMMARY ALL WELLS
TASTE	7	11	0	3	21
ODOR	7	10	1	3	20
COLOR	12	26	1	8	47
OTHER	8	15	0	4	27
NONE	35	46	2	13	96
TASTE, ODOR OR COLOR	14	31	1	9	55
TASTE, ODOR, COLOR OR OTHER	22	42	1	12	77
NUMBER OF WELLS IN SURVEY	57	66	3	27	175
% WELLS WITH T,O,C QUALITY PROBLEM	24.6%	35.2%	33.3%	33.3%	31.4%
% WELLS WITH T,O,C,X QUALITY PROBLEM	38.6%	47.7%	33.3%	44.4%	44.0%

ASSESSORS PARCEL BOOK NO. 135	NUMBER OF RESPONSES WITH INDICATED QUALITY PROBLEM				
QUALITY PROBLEM	SHALLOW WELLS 0-150 FT	INTERMEDIATE WELLS 151-350 FT	DEEP WELLS > 350 FT	WELLS WITH DEPTH UNKNOWN	SUMMARY ALL WELLS
TASTE	7	2	0	0	9
ODOR	3	1	0	0	4
COLOR	3	1	0	0	4
OTHER	4	3	0	0	7
NONE	10	7	2	2	21
TASTE, ODOR OR COLOR	3	2	0	0	5
TASTE, ODOR, COLOR OR OTHER	6	4	0	0	10
NUMBER OF WELLS IN SURVEY	16	11	2	3	32
% WELLS WITH T,O,C QUALITY PROBLEM	18.8%	18.2%	[illegible]	[illegible]	15.6%
% WELLS WITH T,O,C,X QUALITY PROBLEM	37.5%	36.4%	[illegible]	[illegible]	34.3%

ASSESSORS PARCEL BOOK NO. 137	NUMBER OF RESPONSES WITH INDICATED QUALITY PROBLEM				
QUALITY PROBLEM	SHALLOW WELLS 0-150 FT	INTERMEDIATE WELLS 151-350 FT	DEEP WELLS > 350 FT	WELLS WITH DEPTH UNKNOWN	SUMMARY ALL WELLS
TASTE	1	2	2	2	7
ODOR	3	1	2	1	7
COLOR	5	5	2	2	15
OTHER	2	[illegible]	2	1	7
NONE	11	9	2	4	26
TASTE, ODOR OR COLOR	4	7	3	5	19
TASTE, ODOR, COLOR OR OTHER	8	8	4	3	23
NUMBER OF WELLS IN SURVEY	19	17	6	7	49
% WELLS WITH T,O,C QUALITY PROBLEM	31.6%	41.2%	50.0%	42.9%	38.8%
% WELLS WITH T,O,C,X QUALITY PROBLEM	42.1%	47.1%	66.7%	42.9%	46.9%

ASSESSORS PARCEL BOOK NO. 142	NUMBER OF RESPONSES WITH INDICATED QUALITY PROBLEM				
QUALITY PROBLEM	SHALLOW WELLS 0-150 FT	INTERMEDIATE WELLS 151-350 FT	DEEP WELLS > 350 FT	WELLS WITH DEPTH UNKNOWN	SUMMARY ALL WELLS
TASTE	5	2	0	0	7
ODOR	2	[illegible]	[illegible]	0	4
COLOR	4	2	[illegible]	0	6
OTHER	3	2	[illegible]	2	7
NONE	34	11	[illegible]	10	55
TASTE, ODOR OR COLOR	6	3	[illegible]	0	9
TASTE, ODOR, COLOR OR OTHER	9	5	0	2	16
NUMBER OF WELLS IN SURVEY	43	16	0	12	71
% WELLS WITH T,O,C QUALITY PROBLEM	14.0%	[illegible]	n/a	0%	12.7%
% WELLS WITH T,O,C,X QUALITY PROBLEM	20.9%	31.3%	n/a	16.7%	21.5%

CHAPTER 7. PLANNING FOR GROUND WATER MANAGEMENT

This chapter discusses alternative plans for ground water management in the Petaluma Valley. The concept of ground water basin management includes planned use of the ground water basin yield, storage space, transmission capability, and water in storage. It includes (1) protection of natural recharge and use of artificial recharge; (2) planned variation in amount and location of pumping over time; (3) use of ground water storage conjunctively with surface water from local and imported sources; and (4) protection and planned maintenance of ground water quality (Peters, 1980).

Use of ground water storage conjunctively with surface water is practiced in some areas in California where extensive use of ground water has partially dewatered a basin, creating additional space to store water underground. The Santa Clara Basin in Northern California, for example, is operated much like a bank account. During wet periods, excess surface water is "deposited" -- artificially recharged to fill the additional underground storage space. During dry periods, when there is less surface water, ground water is "withdrawn" -- pumped to supplement available surface water supplies.

Natural topographic constraints prevent the Petaluma Valley ground water basin from filling more than the present 84 percent indicated by the computer program TRANSCAP (Chapter 4). If the basins are more than the 84 percent full indicated by TRANSCAP, the additional ground water begins to "leak out" along roadcuts and into streams. This spillage of excess water that cannot be stored underground is a form of rejected recharge. The Petaluma Valley basin is therefore, in effect, completely filled at the present time. For a program similar to that in the Santa Clara Basin to be practical, the volume of ground water in storage would have to be reduced below the present 84 percent to create storage space for water presently being rejected by the basin.

A ground water management program must be carefully examined from an economic viewpoint to determine costs versus the benefits of increased recharge. Lowered ground water tables require increased pumping lifts and, consequently, increased energy costs. Lowered water tables may also necessitate deepening of shallow wells and may result in costly litigation by owners of existing shallow wells against owners of new and high-use wells.

More ground water could be stored in some areas in the Petaluma Valley if ground water levels were drawn down further, making more storage space available. During the 1976-1977 drought, ground water levels dropped an average of 3 m (10 ft) below the normal fall lows, yet they returned to normal spring high after one winter of slightly higher than normal precipitation. The maximum that the basin could be drawn down and still recover in one winter is not known.

Certain special conditions control operation of the Petaluma Valley ground water basin. These special characteristics are:

- Generally poor quality ground water in the Petaluma Valley south of Petaluma.
- Potential for renewed sea water intrusion along the Petaluma River.
- Nitrate contamination in the upland areas northwest of the City of Petaluma.

Data collected by the U. S. Geological Survey (Cardwell, 1958) and DWR indicate that shallow ground water in the Petaluma Valley south of the City of Petaluma is contained in bay mud deposits and is generally brackish. Beneath these muds, ground water is generally connate water contained in the Petaluma Formation and is also of poor quality. The potential for increased use of ground water in this area is low. Good quality water is produced from alluvial fan deposits at the base of the hills that border the valley, but the quantity of water is limited.

In the valley area near Petaluma, wells are presently extracting water from alluvial fan deposits for municipal and agricultural uses. Increased use of ground water in this area is limited by the potential of sea water intrusion from the Petaluma River into aquifers in the fan deposits. In the late 1950s and early 1960s, the Petaluma municipal wells, which then provided all water for the city, had increasing problems from sea water intrusion as a result of the volume of municipal pumpage, which had created a landward gradient and drawn sea water into the freshwater aquifers. When ground water pumpage decreased as a result of surface water deliveries from the Russian River (beginning in 1962), the intrusion front stabilized and locally even moved back toward the Petaluma River. This action was a result of fresh water entering the alluvial fan aquifers from the east and moving toward the river, carrying with it some of the brackish sea water.

At present, the Petaluma municipal wells are collectively pumping about half the volume pumped in 1961, the year of heaviest pumping. The risk of renewed sea water intrusion increases as pumpage increases, and a return to historical high levels of pumpage (1 192 dam^3 or 967 ac-ft in 1961) would probably renew intrusion.

Increased pumpage beyond historical high levels might create a contamination problem that would require a much lon period of reduced pumpage to eliminate. In some coastal aquifers where this type of contamination has occurred, it has resulted in the construction of expensive injection wells to pump fresh or nearly fresh water into the affected aquifer in an attempt to force the sea water front away from the ground water pumping areas.

In the upland area northwest of Petaluma large amounts of ground water are stored in the sandy Merced Formation. Many small domestic wells pump water for the use of individual households. Because of the large amounts of animal wastes dumped on the permeable soils in this area, the shallow ground water in this area is seriously contaminated with nitrate. Presently, the upper 15 m (50 ft) of the aquifer is generally affected. In some areas that have many septic-tank leachfield systems, the ground water is also polluted with fecal coliform derived from human wastes. Given the hydrologic co -tions of the area, the polluted water continue to spread.

Further use of the ground water resource in this upland area is possible as long as wells are deep and sufficiently sealed to prevent the near-surface contamination from entering the wells. Several households could draw water from a single very deep well, because the deeper ground water has not been contaminated. Deeper ground water does have certain aesthetic problems, such as taste, that are unrelated to the nitrate problem. To slow the rate of increase of nitrate contamination, manure holding ponds should be lined to prevent the infiltration of rain-leached nitrates into the ground water.

CHAPTER 8. PROPOSED GROUND WATER DATA COLLECTION PROGRAMS

Additional data on ground water are needed to both refine estimates of the total water in storage and to define more precisely the hydrology of the Petaluma Valley ground water basin so that the ground water resources can be managed prudently.

Determination of Ground Water Levels

To accurately evaluate the ground water potential of an area, a wide areal distribution of ground water level data gathered over a long period of time is necessary. This information can be used to determine the overall condition of the basin and to define areas of intense, increasing, or decreasing ground water pumpage. Ground water level data can also be used to evaluate the effects of geologic structures, such as faults and geologic formations, on the movement and occurrence of ground water. Ground water level maps constructed from these data permit a more accurate estimate of total ground water in storage.

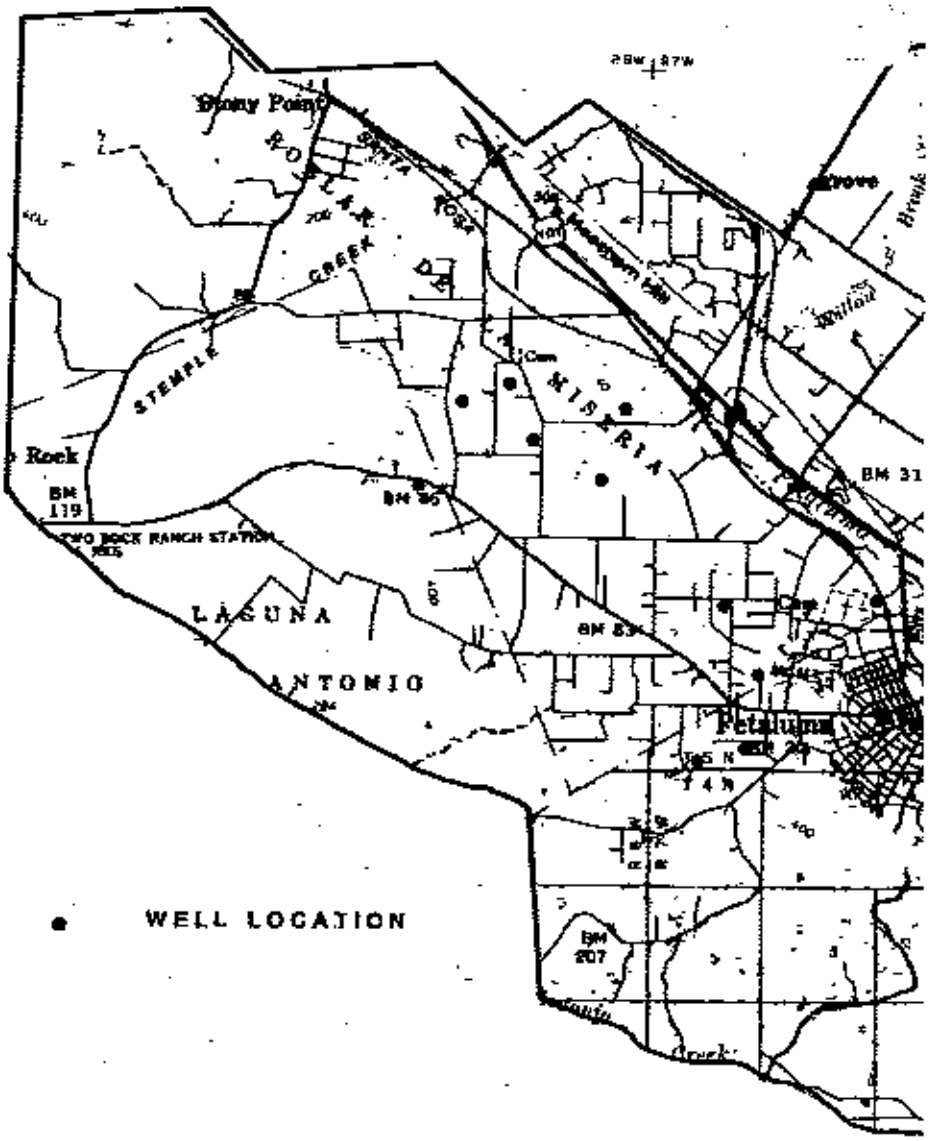
At present, 12 wells in the Petaluma Valley study area are being monitored by DWR. A new network is being implemented consisting of 4 of the presently monitored wells and existing wells at 25 additional locations (Figure 17). The 25 additional locations were selected on the basis of geology, hydrology, existence of a well at that location, and information on the construction of the well. Construction data are available for the additional wells; these data are vital in determining the zone from which ground water is being extracted. Presently monitored wells lacking these data have been dropped from the proposed network.

Wells added at the additional locations tap a single aquifer or zone, and therefore represent the water level of this ground water body alone. A few "deep composite" wells have been selected for areas where no other wells are available; construction data is available for these wells, which tap ground water from several aquifers or zones. Water levels in deep composite wells can be correlated with water levels in other wells of similar depth and construction (gravel packed or multiple perforations) to determine the effects of faults and other barriers on the movement of ground water.

After several years of measurement, data from the new network should be analyzed to better define basin hydrology, including the role of faults in ground water movement and the extent of aquifer continuity. After sufficient ground water level data have been collected to verify estimates of total ground water in storage, the monitoring network should be reevaluated. Those wells whose data are no longer necessary should be dropped.

Determination of Annual Amount of Ground Water Recharge

The amount of water that can be extracted annually from a ground water basin without causing adverse effects is the sustained yield of that basin; it generally equals the average volume of water recharged annually. Recharge in the Petaluma Valley is the result of rain falling on recharge areas because, with the exception of the Petaluma River, streams do not flow across recharge areas (Figure 7). Recharge from rainfall equals the total rainfall minus runoff and evapotranspiration, and varies from year to year. Recharge is greatest on flat, permeable soils, which allow greater infiltration. At present, data are insufficient to allow accurate estimates of average annual recharge in the

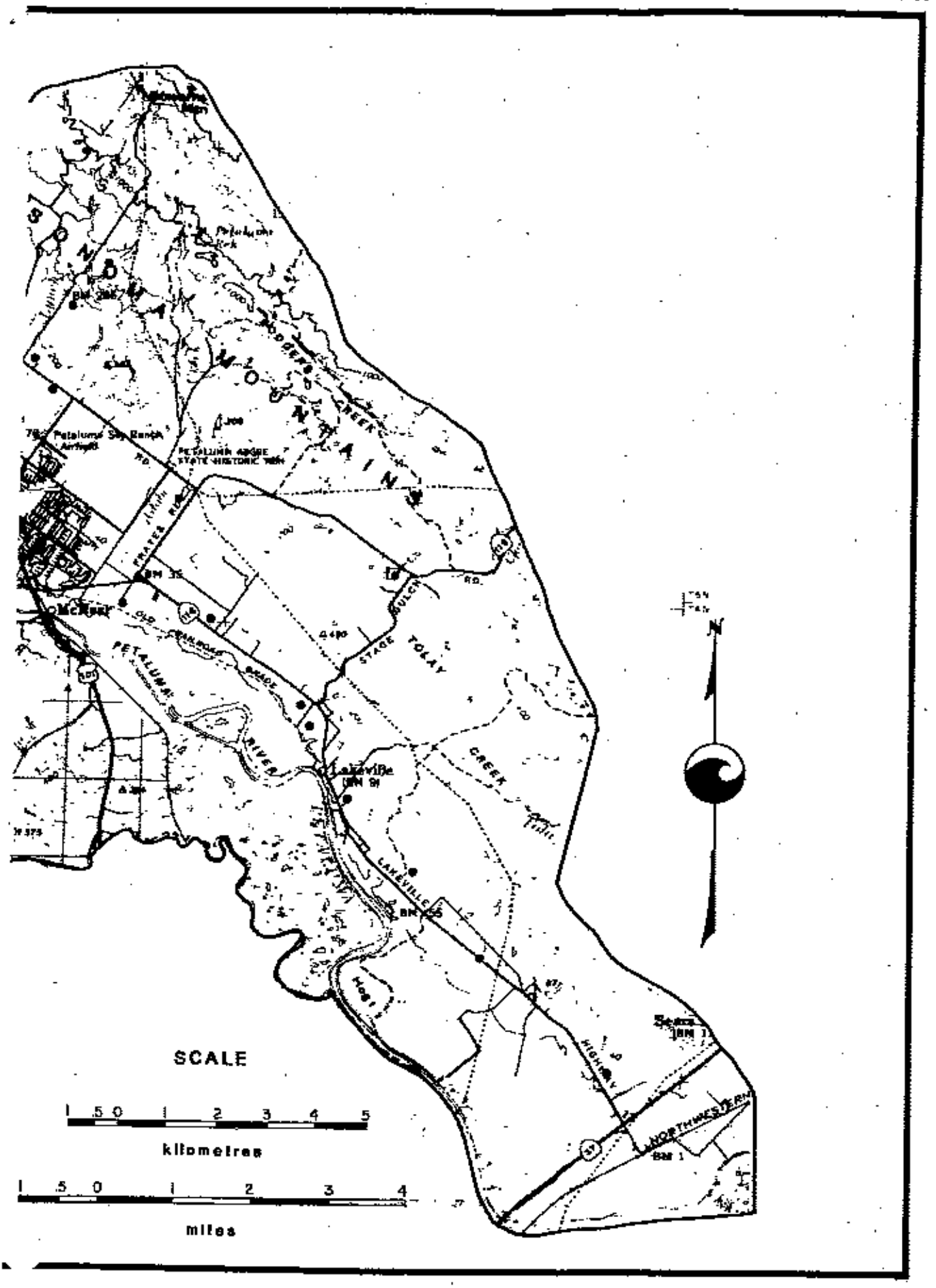


STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT

PETALUMA VALLEY
SONOMA COUNTY GROUND WATER STUDY

GROUND WATER LEVEL MONITORING NETWORK

FIGURE 17



SONOMA MOUNTAINS
Petaluma Sky Ranch Airfield
PETALUMA ADOBE STATE HISTORIC PARK
PRATES RD.
McNear
OLD CRAILROAD GRADE
PETALUMA RIVER
STAGE GULCH RD.
TOLAY CREEK
Lakeville
LAKEVILLE HIGHWAY
NORTHWESTERN
Sears
N
SCALE
1 .5 0 1 2 3 4 5
kilometres
1 .5 0 1 2 3 4
miles

Petaluma Valley to be made. A program to determine the annual amount of recharge would include measurements of rainfall, streamflow, and soil permeability, and estimates of plant evapotranspiration.

Rainfall is measured by the National Weather Service in the City of Petaluma. Neither runoff nor streamflow is presently measured in the Petaluma Valley, although the U. S. Geological Survey maintained gaging stations on the Petaluma River near Petaluma from 1948 to 1965.

Temporary gaging stations on larger streams in the valley would help determine runoff. Reactivating the gaging station on the Petaluma River at Petaluma and adding a temporary gaging station upstream of the recharge areas would measure the reduction in streamflow due to percolation to the ground water body.

Evapotranspiration, while not usually measured directly, can be estimated by measuring evaporation by an accepted method. The volume of water removed by evapotranspiration can then be estimated by comparing the measured rate of evaporation with the rate of evaporation in an area where evapotranspiration is known.

Very general estimates of soil permeability were made by the U. S. Soil Conservation Service for the "Soil Survey of Sonoma County" (Miller, 1972). These estimates can be refined by conducting permeameter tests on each major soil type.

Determination of Changes in Ground Water Quality

Additional ground water quality data are necessary to monitor the extent of sea water intrusion. Data should be collected from shallow wells (less than 60 m, or 200 ft, deep) of known construction. The wells should be within 3 kilometres (2 miles) of the presently known extent of intrusion. Monitoring wells should extract water only from alluvial fan deposits (Plate 1). Water samples from these wells should be analyzed in spring and fall for electrical conductivity. Standard mineral analyses should be taken periodically, such as at 5-year intervals. Changes in ground water quality can be monitored an appropriate corrective measures taken if necessary.

Nitrates are a serious problem in the area northwest of the City of Petaluma, and the nitrate-contaminated water will continue to spread. The study currently being conducted by DWR, Central Dist (Perkins, in progress) will contain recommendations for continued observation of the nitrate problem. These recommendations should be implemented as soon as possible so that residents will be kept informed about changes in ground water quality and so that any possible mitigating measures can be taken.

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GLOSSARY

Agglomerate. A pyroclastic volcanic rock containing a predominance of rounded to subangular fragments greater than 32 mm in diameter.

Alluvial Fan Deposit. A cone-shaped deposit of alluvium made by a stream where it runs out onto a level plain or meets a slower stream. The fans generally form where streams issue from mountains upon the lowlands.

Alluvium. A geologic term describing beds of sand, gravel, silt, and clay deposited by flowing water during comparatively recent geologic time.

Anion. A negatively charged ion, for example, OH^- or Cl^-.

Anticline. A fold, generally convex upward, whose core contains the older rocks.

Aquifer. A geologic formation that stores, transmits, and yields significant quantities of water to wells and springs.

Aquifer Continuity. Hydraulic interconnection between aquifers so that ground water stored in one aquifer or portion of an aquifer is able to move into another aquifer or portion of an aquifer.

Artesian. An adjective referring to ground water confined under hydrostatic pressure.

Brackish. Water that is intermediate in salt content between streams and sea water; neither fresh nor salty.

Breccia. A rock made up of highly angular, coarse, broken fragments.

Cation. A positively charged ion, for example, H^+ or Ca^{++}.

Chert. A hard, dense siliceous rock of sedimentary origin.

Clay. A term which denotes either (1) particles, regardless of mineral composition, with diameter less than 1/256 mm or (2) a sediment composed primarily of these particles.

Confined. Refers to ground water under sufficient pressure to rise above the aquifer containing it when the aquifer is penetrated by a well. The difference between the water level in a well and the top of the aquifer is the Hydrostatic Pressure. Confined ground water is also known as Artesian.

Conglomerate. A cemented rock containing rounded fragments corresponding in size to gravel. The consolidated equivalent of gravel.

Connate Water. Water entrapped in the openings between particles of a sedimentary rock at the time the rock was deposited. The water may be derived from either ocean water or land water.

Consolidated. Firm and coherent.

Constant-Rate Pump Test. Test pumping of a water well at a constant rate of discharge while the drop in the ground water level (drawdown) is recorded in the well or a nearby observation well. The drawdown is plotted versus time since pumping began to determine Transmissivity, the rate at which ground water will flow through a unit width of the aquifer.

Contamination. Contamination means an impairment of the quality of the waters of the State by waste to a degree which creates a hazard to the public health through poisoning or through the spread of disease. Contamination includes any equivalent effect resulting from the disposal of waste, whether or not waters of the State are affected.

Continental Deposits. Sedimentary deposits laid down within a general land area and deposited in lakes or streams or by the wind; nonmarine deposits.

Diatomite. An earthy deposit composed of nearly pure silica and consisting of the shells of microscopic plants called diatoms.

Dip. The angle at which a planar feature such as a fault or formation is inclined from the horizontal.

Evapotranspiration (ET). Loss of water from a land area through transpiration of plants and evaporation from the soil.

Fault. A fracture, or fracture zone, along which there has been displacement of the two sides relative to one another. This displacement may be a few centimetres or many kilometres. An Active Fault is one which has had surface displacement within Holocene time (about the last 11,000 years). The inverse of this, that other faults are inactive, is not necessarily true. A Potentially Active Fault is one which shows evidence of displacement during Quaternary time (last 2 to 3 million years).

Fault Plane. The more or less planar surface of a fault along which dislocation has taken place.

Fault Trace. The surface expression of a fault.

Fault Zone. An area along the trace of a large fault consisting of numerous interlacing small faults and/or a confused zone of gouge.

Fold. A bend in rock strata. An Anticline is an upward fold; it influences ground water by inducing flow away from the fold axis. A Syncline is a downward fold; it influences ground water by inducing flow toward the fold axis.

Formation. A geologic term that designates a specific group of underground beds or strata which have been deposited in sequence one above the other and during a specific period of geologic time.

Fresh Water. Water that is not so affected by sea water intrusion, nitrate pollution, or other water quality problem, as to be detrimental for human use or consumption.

Gouge. Finely abraded material occurring between the walls of a fault, the result of grinding movement.

Gravel. A term which denotes either (1) particles, regardless of mineral composition, with diameter greater than 2 mm or (2) unconsolidated sediment composed primarily of these particles. Gravel frequently is found as lens-shaped units within sandy deposits.

Greenstone. An altered basic igneous rock of greenish color due to the presence of such minerals as chlorite, hornblende, and epidote.

Ground Water Barrier. A body of material which is impermeable or has only low permeability and which occurs below the land surface in such a position that it impedes the horizontal movement of ground water and consequently causes a pronounced difference in the level of the water table on opposite sides of it.

Ground Water Basin. An area underlain by one or more permeable formations capable of furnishing a substantial supply of acceptable quality water. Usually, there is little movement of ground water from one basin to another.

Hydraulic Conductivity. The rate of flow of water in gallons per day through a cross section of one square foot under a unit hydraulic gradient, at the prevailing temperature or adjusted for a temperature of 60°F.

Hydraulics. The aspect of engineering that deals with the flow of water or other liquids.

Hydrograph. A graph showing the changes in the water level in a well with respect to time.

Hydrology. The science that relates to the distribution and circulation of naturally occurring water on and under the earth's surface.

Igneous. Rock formed from the solidification of molten material, either at depth or on the ground surface.

Infiltration. The flow or movement of surface water downward through the soil to become ground water.

Interbedded. Occurring between beds, or lying in a bed parallel to other beds of a different material.

Intrusive. Igneous rock which cools and solidifies below the earth's surface.

Limestone. A sedimentary rock consisting chiefly of calcium carbonate.

Marine Deposits. Sedimentary deposits laid down on the floor of the ocean.

Mathematical Model. A computer technique which simulates responses of a ground water basin to changes in recharge and pumping patterns. Used as a tool to predict future water levels.

Metamorphic. Rock which has been re-formed in the solid state in response to pronounced changes of temperature, pressure, and/or chemical environment and which takes place below the ground surface. A metamorphic rock originally was of a different form; i.e., it originally was igneous, sedimentary, or a different type of metamorphic rock.

Methemoglobinemia. A bluish or purplish discoloration (as of skin) due to deficient oxygenation of the blood which can be caused by excessive nitrates in drinking water.

Milliequivalent. A contraction of "milliequivalents per million", which is based on molecular weights; the units are "milligram equivalents per kilogram" if derived from data expressed in parts-per-million or "milligram equivalents per litre" if derived from data expressed in milligrams per litre. In analyses expressed in milliequivalents, unit concentrations of all ions are chemically equivalent.

Oxidation. The process of combining with oxygen; rust is a product of oxidation.

Percolation Rate. The rate at which water passes through the fine interstices in earth materials.

Permeability. The ability of a geologic material to transmit fluids such as water. The degree of permeability depends on the size and shape of the pore space and the extent, size, and shape of their interconnections.

Pollution. Pollution means an alteration of the quality of the waters of the State by waste to a degree which unreasonably affects (1) such waters for beneficial uses, or (2) facilities which serve such beneficial uses. Pollution may include contamination.

Potable. Suitable for drinking; said of water and beverages.

Recharge. The processes involved in the absorption and addition of water to the zone of saturation. In this report, natural recharge is recharge that occurs without assistance or enhancement by people; artificial recharge is recharge that occurs when people modify the physical system to increase recharge.

Reduction. The process of removing oxygen; the opposite of oxidation.

Saline. Consisting of or containing salts (minerals), the most common of which are potassium, sodium, or magnesium in combination with chloride, nitrate, or carbonate.

Sand. A term which denotes either (1) particles with diameter ranging from 1/16 to 2 mm or (2) a sediment composed primarily of these particles.

Scoria. Material ejected from a volcanic vent. Such material is usually vesicular, dark in color, heavy, and has a partly glassy-partly crystalline texture.

Sedimentary. Said of rocks formed from sediments. Includes such rock types as sandstone, conglomerate, shale, etc.

Serpentinite. A rock consisting almost entirely of the mineral serpentine, which is the alteration product of several types of ultrabasic rocks.

Silt. A term which denotes either (1) particles with diameter ranging from 1/256 to 1/16 mm or (2) a sediment composed primarily of these particles.

Soil. A natural body consisting of layers or horizons of mineral and/or organic constituents of variable thicknesses, which differ from the parent material in their morphological, physical, chemical, and mineralogical properties and their biological characteristics.

Sorting. The degree of similarity, in respect to some particular characteristic (frequently size), of the component particles in a mass of material.

Specific Yield. The ratio of the volume of water that a given mass of saturated rock or soil will yield by gravity, to the volume of that mass. This ratio is expressed as a percentage.

Storage Capacity. The volume of space below the land surface that can be used to store ground water. Total Storage Capacity is the total volume of space that could be used to store ground water. Available Storage Capacity is that volume of the total storage capacity that does not presently contain ground water and is therefore available to store recharged water.

Stream Gaging. The process by which the streamflow can be determined by measurement of the water level and velocity in the stream.

Sustained Yield. The volume of ground water that can be extracted annually from a ground water basin without causing adverse effects.

Syncline. A fold in which the core contains the younger rocks; it is generally concave upward.

Thermal Water. Hot or warm water.

Total Dissolved Solids (TDS). The total quantity of minerals (salts) in solution in water, expressed in milligrams per litre.

TRANSCAP. A computer program which determines transmissivity and storage capacity using specific yield data from individual wells. Averaged specific yield data are converted to transmissivities using equations of a curve developed by the DWR investigation of the Livermore and Sunol Valleys (Ford and Hills, 1974). For specific yield values from 3 to 9, the curve is described by the equation:

$$\Delta T = \Delta D \cdot 10^{\left[3.5319 - \frac{7.16288}{|SY| - 0.84}\right]}$$

and for specific yield values greater than 9, by the equation:

$$\Delta T = \Delta D \cdot (100\ |SY| - 500)$$

where ΔT = incremental transmissivity
ΔD = incremental depth
$|SY|$ = absolute value for average specific yield for a given interval.

Transmissivity. The rate of flow of water through each vertical strip of aquifer of unit width having a height equal to the saturated thickness of the aquifer and under a unit hydraulic gradient.

Tuff. A rock composed of compacted volcanic fragments smaller than 4 mm in diameter.

Unconformity. A surface of erosion that separates younger strata from older rocks; represents a substantial break or gap in the geologic record.

Water Table. (1) The upper surface of a zone of saturation except where that surface is formed by an impermeable body; (2) The surface of a body of unconfined ground water at which the pressure is equal to that of the atmosphere; (3) colloquially, the surface where ground water is encountered in a well in an unconfined aquifer.

Well Log. A record made by the driller of a water well which lists geologic materials encountered during drilling and information on the construction of the well such as casing perforations and sanitary seal.

Zone of Saturation. A subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere.

Definitions Modified from the Following Sources:

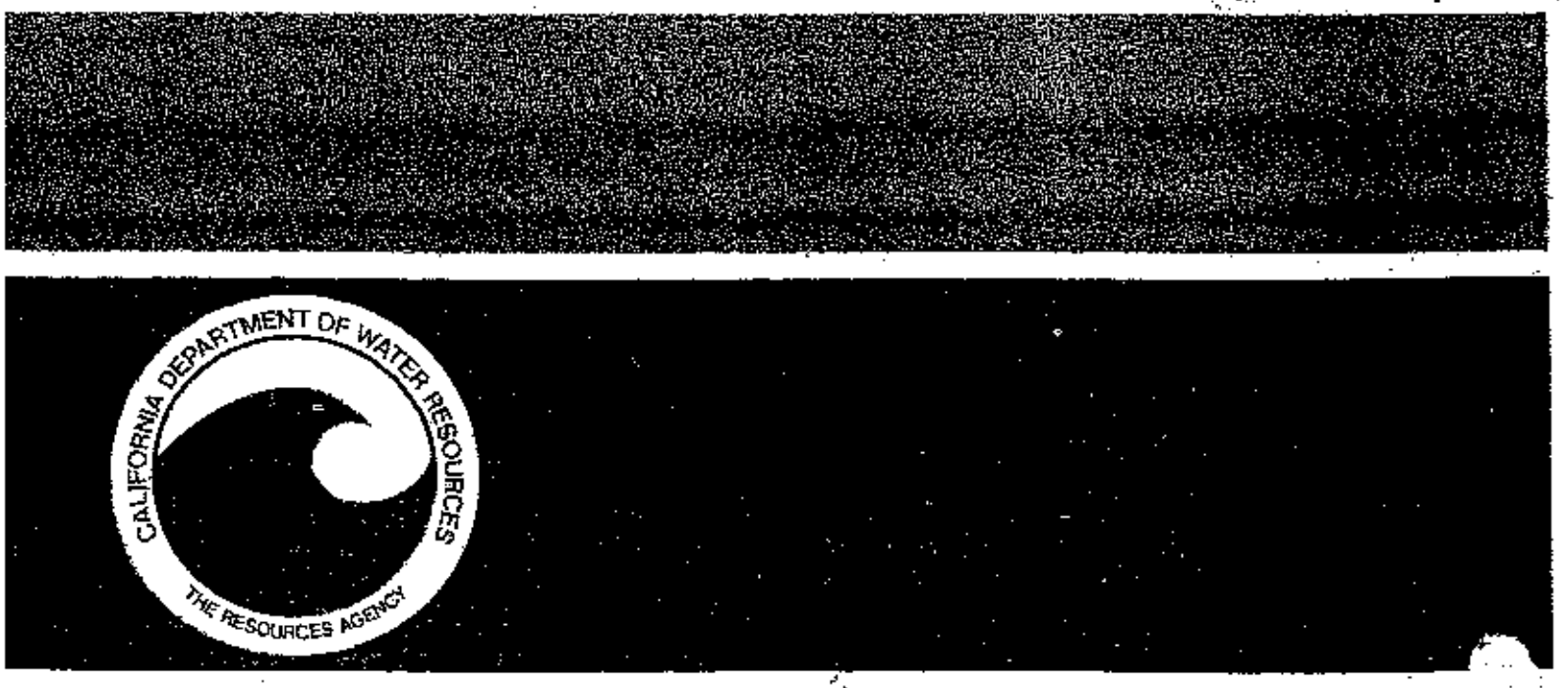
American Geological Institute, 1976, "Dictionary of Geological Terms". Revised Edition.

California Department of Water Resources, 1975, "California's Ground Water". Bulletin 118.

Ford, R. S., 1975, "Evaluation of Ground Water Resources: Sonoma County", California Department of Water Resources. Bulletin 118-4, Volume 1: "Geologic and Hydrologic Data".

Peters, H. J., 1980, "Ground Water Basins in California". California Department of Water Resources. Bulletin 118-80.

State of California—Resources Agency
Department of Water Resources
P.O. Box 388
Sacramento
95802



RECEIVED
FEB 28 2007
GP Administration

To: General Plan Administration, Planning Commission & City Council
City of Petaluma
11 English Street
Petaluma, CA 94952

From: Petaluma's Build It Green (PBIG) Program's Stakeholders' Advisory Team

Re: Comments on September 2006 Draft Environmental Impact Report, Appendix G to General Plan 2025

Date: February 27, 2007

The purpose of this memo is to comment on the September 2006 **Draft Environmental Impact Report**, Appendix G to the (Draft) General Plan 2025. Areas addressed include Climate Change, Energy and Water. 68

1. Climate Change and Energy

Among the 14 Guiding Principles enumerated for the DEIR (p. E-3) is #11:

> 11. Foster a sustainable community in which today's needs do not compromise the ability of the community to meet its future needs. Promote green development.

Perhaps no issue facing us has greater potential long-term impact on our lives and those of future generations than Climate Change resulting from Greenhouse Gas (GHG) emissions. And yet, strikingly, we find no mention of either global climate change or GHG emissions in either the Key Issues or "unavoidable environmental impacts" sections of the DEIR.

Five or six years ago when the General Plan update process was begun, outside of the scientific community, climate change was perceived by some as speculation. However, significant developments over the last two years have brought the subject of global climate change to centerstage worldwide. A document that is intended to guide a community's development for the next twenty years **must make explicit reference to climate change and, even more, must address specific ways that the community's policies and practices will address the issue.** A

John Holdren, Harvard's Director of Program on Science, Technology, and Public Health at the Kennedy School of Government, states that **global climate change is "the most dangerous and intractable of all the environmental problems caused by human activity."**

Global climate change is real. It is the **consensus of world's leading climate scientists** that the earth's overall energy balance has been upset, largely due to the burning of fossil fuels and deforestation. The temperature of the Earth's atmosphere is increasing in proportion to the atmospheric concentration of CO_2 which is now significantly higher than it has been at any time in the last 650 thousand years.

This increase in the earth's average temperature is already having **far-reaching and devastating global environmental impacts** including: melting icecaps, disappearing glaciers, rising sea levels, new diseases, increasing acidity of the world's oceans, increasing incidence of catastrophic weather events, slowing of the oceans' thermohaline currents, etc.

In signing the **Kyoto Protocols**, 156 of the world's nations, including all of the developed nations except the United States and Australia, have demonstrated their understanding that concentrations of atmospheric CO2 must be stabilized below 1990 levels as quickly as possible. The Kyoto Protocols formally entered into force on February 16, 2005.

"According to CEQA Guidelines, an EIR must discuss **any significant environmental impacts** that cannot be avoided under full implementation of the proposed project." [Draft EIR, p. 4-1].

In his March 30, 2006 comments to Orange County Transportation Authority's 2006 Long-Range Transportation Plan Draft Program Environmental Impact Report, California Attorney General Bill Lockyer forcefully asserts that **climate change is a significant environmental impact that should be addressed in an Environmental Impact Report.** [See attached].

The City of Petaluma signaled its understanding of the urgent need for immediate action on climate change in July of 2005 when it unanimously passed **Resolution #2005-118.** Together with all nine cities in Sonoma County, and the County itself, **Petaluma committed itself to ambitious the goal of "...reducing greenhouse gas emissions produced community wide 25% below 1990 levels by 2015..."**

According to the Climate Protection Campaign, a non-profit with which the City contracts, countywide greenhouse gas emissions are currently **28% above 1990 levels. In order to get to 25% below 1990 levels within 8 years will require a sincere and coordinated effort.**

B In order for us to be successful in this critically important effort, **the reduction of greenhouse gas emissions must be addressed as a Key Issue in our General Plan together with methods of measuring and tracking our progress in doing so.**

The **General Plan** and the **Draft EIR** must be written with full recognition of the following developments, all of which have taken place within the last two years:

- **On June 1, 2005 Governor Schwarzenegger** signed **Executive Order S-3-05** calling for statewide reduction in greenhouse gas emissions, saying "We know the science; we know the time for action is now. Global warming, pollution and the burning of fossil fuels that caused it are threats we see here in California and everywhere around the world."

- **On September 27, 2006, Governor Schwarzenegger** signed AB 32, the landmark **California Global Warming Solutions Act of 2006** that establishes a comprehensive program of regulatory and market mechanisms to achieve quantifiable, cost-effective reductions of greenhouse gases. At the time, he stated, "We simply must do everything in our power to slow down global warming before it's too late."

- The January 2007 **Draft Environmental Impact Report** for the **Marin Countywide Plan** (or CWP, its County-wide General Plan update) addresses climate change in sections on Air Quality and Sea Level Rise

- To date, 398 Mayors of American cities, representing more than 58 million citizens, have signed the **U.S. Mayors Climate Protection Agreement** calling for participating cities to meet or surpass the Kyoto Protocol targets in their own communities. The City of Petaluma has signed this Agreement.

- In 2006, the **U. S. Conference of Mayors** unanimously adopted the **2030 Challenge**, which calls for all new buildings and major renovations to immediately reduce their fossil-fuel GHG-emitting energy consumption by 50%, with increasing phased reductions in order to be completely carbon-neutral by the year 2030.

- The **2030 Challenge** has been adopted by the **American Institute of Architects, (AIA)**, the **American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)**, the **US Green Building Council, (USGBC)**, and integrated into the EPA's Target Finder.

- As of June 20, 2006, seven Northeastern US states (ME, NH, VT, CT, NY, NJ, and DE) are involved in the **Regional Greenhouse Gas Initiative**, or RGGI, which is a state level emissions capping and trading program.

- With a clear sense of purpose, the City **of Seattle has already reduced its greenhouse gas emissions 60% percent below 1990 levels.** Its September 2006 **Climate Action Plan** is a model of clarity and simplicity.

- On November 10, 2006, the **Bay Area Air Quality Management District** (BAAQMD) held a Summit of five hundred Bay Area business, community, and government leaders to seek and implement local solutions to climate change. The featured keynote speaker was former Vice President Al Gore, creator of the documentary film "An Inconvenient Truth."

- The **Joint Policy Committee** (JPC), which coordinates regional planning efforts of the **Association of Bay Area Governments** (ABAG), the **Bay Area Air Quality Management District** (BAAQMD), and the **Metropolitan Transportation Commission** (MTC), is actively working on crafting a region-wide climate change strategy.

- The Introduction to **The Stern Review, The Economics of Climate Change**, prepared for Britain's Prime Minister and Chancellor of the Exchequer and released in late 2006, begins, "The scientific evidence that climate change is a serious and urgent issue is now compelling. It warrants strong action to reduce greenhouse-gas emissions around the world to reduce the risk of very damaging and potentially irreversible impacts on ecosystems, societies, and economies."

- The first volume of the **United Nations' Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report**, released on February 2, 2007, representing the work of 600 authors from 40 countries, reviewed by over 620 experts and governments, and reviewed (in summary) by representatives from 113 governments, gives new momentum to the immediacy and the urgency of global climate change.

- The urgency of global climate change has been addressed in cover articles of **national magazines including Time, Fortune, Business Week**, and others. The cover of a Time magazine Special Report on Global Warming read in large letters, "Be Worried. Be Very Worried."

In light of the above-cited recent developments and numerous others, it is **imperative** that climate change be fully acknowledged, addressed, and incorporated within every section of the **General Plan** and its accompanying **Draft Environmental Impact Report–*as required by CEQA*.** It must be given the status of a criterion that is included in every planning and purchasing decision, in the setting of every priority, in the consideration of every regulatory alternative.

The General Plan must clearly state the City's **existing policy** of reducing **GHG's to 25% below 1990 levels by 2015** [see Resolution #2005-118]. There needs to a full inventory of sources, a clear and comprehensive set of metrics, and a timeline showing how the City will meet its goals, with annual reporting. Funding, responsibilities for the implementation of these efforts, and enforcement provisions, if needed, should likewise be included.

The effects of climate change on sea level rise must also be addressed. The Bay Conservation and Development Commission (BCDC) has revised information on its website showing an anticipated rise in sea level as a result of global climate change of one to three feet by the year 2100. (These figures do not include rise in sea level due to melting of the great ice sheets, which already appear to be rapidly melting.)

C

The General Plan and DEIR must address changes in planning, zoning and/or building codes that are suggested as a result of this information. Changes may well include:

Redefining Base Flood Elevation City-wide
No new development within the existing 100 year floodplain
Zero net runoff based on pre-development conditions
Zero-net fill in floodplains

D

Energy

As already suggested, the information in the DEIR dealing with energy should provide an analysis about greenhouse gas emissions generated by activity within the city. The current draft of the DEIR does provide helpful baseline energy data, but there are no projections for future use, except that it will increase. Suggestions are made for ways by which the rate of energy growth might be slackened, but there is no plan for doing so, nor are any metrics suggested, with targets, by which performance may be monitored.

In light of this, we offer the following points/questions:

- Baseline Data:
  - Total baseline energy for Petaluma is reported on page 3.5-9 as 62.866 Therms. ***Should this instead be 62.866 million Therms?***
  - Table 3.5-6; ***Should Energy Use units in the rightmost column be 10^{10} Btu?***
  - Table 3.5-6: ***Should electrical energy use be 1,000 times larger?***
- Future Trend:

  DEIR, p. 5-12: "Water, wastewater treatment, solid waste disposal, and energy forecasts are based upon anticipated population and job growth. Typically, larger quantities of water and energy are consumed by larger populations and greater number of jobs than by smaller populations with fewer jobs."

  - There is no alternative advanced that would be "atypical" –in other words an alternative that would, by design, reduce energy use and its impacts citywide from Baseline conditions (e.g., achieve the City Council's greenhouse gas emissions targets.) Given the potential cost of later retrofitting infrastructure and buildings citywide to mitigate the problems that will ensue from following conventional practices, the benefit to the community of applying forethought and examining innovative alternatives could be enormous.

2. Water

E

In the DEIR, the future incremental water demand is to be supplied principally from internal resources via recycling treated wastewater and improving end-use efficiency. Recycled water is presented as the main incremental supply. It is also projected to have a higher unit cost than water saved via the conservation program.

- Given that recycled water unit costs are based upon an 80-year model:
  - *To what degree might concern over currently unregulated chemicals in recycled water affect both health and safety and project costs? Such potential impacts should be evaluated to ensure community health and well-being.*
  - *To what degree might sea level rise from global climate change affect this project and costs? What are the potential risks and strategies that might mitigate these risks?*
  - *How does recycled water compare to SCWA water and efficiency improvements in terms of greenhouse gas emissions?*

- Given that conserved water as projected herein costs less than either SCWA or recycled water, and that average per capita usage citywide will be reduced by only 5% at buildout (in an absolute sense there are almost no savings because the conserved water does little more than offset the expected increase in per capita consumption), it seems that more should be done. **Absent evidence that our current water supply can be guaranteed indefinitely with no adverse environmental impacts, responsible city policy and planning should aim to reduce, in significant and absolute terms, the City's overall water usage over General Plan period.** A comprehensive DEIR process should therefore address the question of whether a net 5% decrease in per capita usage is environmentally sound for Petaluma today and in the future, and examine the specific possible impacts of this nominal decrease, against the potential benefits of larger usage decreases (which have been targeted and achieved and by other cities. Seattle provides one example of how a forward-looking municipal utility has been lowering its overall water usage even in the face of significant population increases (see chart, next page). F
- The DEIR should also include an examination of alternative and innovative approaches that may achieve greater efficiency improvements than standard "best management practices" so as to further reduce risks associated with traditional sources, possibly reduce total costs, and also achieve the City Council's objective regarding greenhouse gas emissions. G

Derived from data in the DEIR:

Year	Proposed Conservation (MG/Y)	Annual Water Demand		Total Population	Average per Capita Demand		
		Without Conservation (MG/Y)	With Conservation (MG/Y)		Without Conservation gpd	With Conservation gpd	Savings
2005	0	3,845	3,845	57,085	185	185	n.a.
Buildout	266	5,139	4,873	72,707	194	184	5%

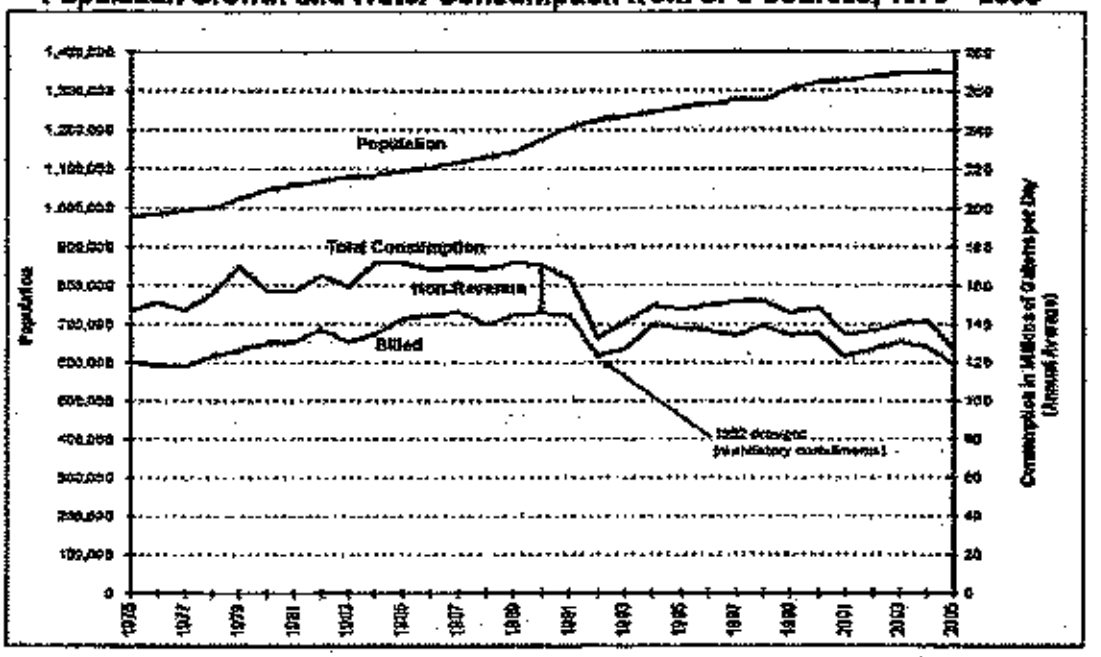
Forward looking water utilities are broadening the range of factors that guide their strategic planning. San Francisco PUC's recently released Sustainability Plan, for example (prepared by ARUP), includes a list of innovative practices culled from utilities worldwide. Both Seattle and Melbourne, Australia represent examples of utilities that are leading the way in terms of utility-wide water efficiency trends.

Related questions to be addressed in the DEIR include:

- What is the current status of our watershed's groundwater resources, and how might Petaluma's projected water demand impact and/or be impacted by these resources? H
- What might be impacts on our groundwater resources of reduced rainfall and/or snowpack associated with climate change projections? I

Example - Seattle Public Utilities

Population Growth and Water Consumption from SPU Sources, 1975 – 2005*



We request that a Revised Draft EIR be recirculated for public comment once the Climate Change, Energy and Water issues referenced above have been addressed.

J

Respectfully submitted,

Petaluma Build It Green's
Stakeholder Advisory Team

Cliff Kendall, Chief Building Official, City of Petaluma
Phil Boyle, Associate Planner, City of Petaluma
Bill Hammerman, PetalumaNet
Bill Wolpert, Architect Principal, Green Building Architects, Historic SPARC Commissioner
Clark Rosen, Broker Associate, Coldwell Banker
Grayson James, Principal, Resource Performance Partners, Inc.
Kathleen Garber, Public Outreach Manager, GreenWaste Recovery, Inc.
Larry Reed, Landscape Architect, SWA Group, SPARC Commissioner
Loretta Catarozoli, Vice President/Client Relations Manager, First Community Bank
Pete Gang, Architect Principal, Common Sense Design, Co-Chair, USGBC-Redwood Empire Chapter
Robert J. Dreher, Directory of Housing, Petaluma Ecumenical Properties (PEP)
Scott Hess, Photographer, Sustainable Petaluma

Attachments:

#1 City of Petaluma Resolution #2005-118, passed in July of 2005
#2 California Attorney General Bill Lockyer's comments to Orange County Transportation Authority's 2006 Long-Range Transportation Plan Draft Program Environmental Impact Report
#3 Greenhouse Gas Emission Inventory for all sectors of Sonoma County, Climate Protection Campaign, January 2005
#4 City of Seattle, Climate Action Plan, September 2006
#5 California Executive Order S-3-05, signed June 1, 2005
#6 California Global Warming Solutions Act of 2006, AB 32, signed September 27, 2006
#7 Marin Countywide Plan (CWP) Draft Environmental Impact Report, January 2007
#8 U.S. Mayors Climate Protection Agreement
#9 Architecture 2030 Press Release, December 2006
#10 The Economics of Climate Change, The Stern Review, Executive Summary
#11 Summary of the United Nations' Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report, released February 2, 2007
#12 Global Warming's Impact on California, California's Climate Choices, A Fact Sheet of the Union of Concerned Scientists, 2006
#13 Our Changing Climate, Assessing the Risks to California, July 2006
#14 Global Warming: Passing the 'Tipping Point' Independent, February 11, 2006
#15 Global Warming: The Final Verdict, The Guardian, January 21, 2007
#16 Battling Climate Change, Business Week online, December 5, 2005
#17 Architects and Climate Change, AIA Fact Sheet

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Resolution No. 2005-118 N.C.S.
of the City of Petaluma, California
RESOLUTION TO ESTABLISH GHG EMISSION REDUCTION TARGET(S) FOR CITY OF PETALUMA

WHEREAS, actions taken by local government to reduce greenhouse gas emissions and increase energy efficiency provide multiple local benefits by improving air quality and public health, reducing energy expenditures, and saving money for the local government, its businesses, and its residents; and,

WHEREAS, local governments greatly influence the community's energy usage through their actions concerning land use, transportation, construction, waste management, energy supply, and energy management; and,

WHEREAS, the City of Portland recently proved the effectiveness of a concerted community climate protection program by reducing greenhouse gas emissions citywide below 1990 levels while simultaneously increasing the community's vibrancy and economic prosperity; and,

WHEREAS, increased temperatures due to higher greenhouse gas levels in the atmosphere threaten to adversely impact water quality and supply, to exacerbate air quality problems, and to adversely impact human health by increasing heat stress and related deaths, the incidence of infectious disease, and the risk of asthma, respiratory and other health problems; and,

WHEREAS, California has taken a leadership role in climate protection by implementing the motor vehicle greenhouse gas emission reduction regulations, implementing the Renewable Portfolio Standard, implementing the most effective building and appliance efficiency standards in the world, and on June 1, 2005, establishing greenhouse gas reduction targets for the State: by 2010 to reduce greenhouse gas emissions to 2000 levels, by 2020 reduce greenhouse gas emissions to 1990 levels, and by 2050 to reduce greenhouse gas emissions to 80 percent below 1990 levels; and,

WHEREAS, Sonoma County has taken a leadership role in climate protection by being the first county in the nation where 100 percent of its cities and the County pledged by resolution to reduce both greenhouse gas and air pollution emissions throughout the community, and by being the first county in the nation where 100 percent of its cities and the County determined their baseline greenhouse gas emissions for municipal operations; and,

WHEREAS, the City of Petaluma resolved to be part of Cities for Climate Protection and follow its five milestone program, and,

WHEREAS, on May 21, 2005, thirty-two representatives from Sonoma's nine cities and the County considered targets for the community and consequently recommended that the cities and the County adopt a target to reduce greenhouse gas emissions 25 percent below 1990 levels by 2015.

NOW, THEREFORE, BE IT RESOLVED by the City of Petaluma to establish the following climate protection target(s): To reduce greenhouse gas emissions produced community wide 25 percent below 1990 levels by 2015 and to reduce greenhouse gas emissions produced by internal municipal operations by 20 percent from 2000 levels by 2010.

Under the power and authority conferred upon this Council by the Charter of said City.

REFERENCE:

I hereby certify the foregoing Resolution was introduced and adopted by the Council of the City of Petaluma at a (Regular) (Adjourned) (Special) meeting on the 18th day of July, 2005., by the following vote:

Approved as to form

City Attorney

AYES: Canevaro, Mayor Glass, Vice Mayor Harris, Healy, O'Brien, Torliatt

NOES: None

ABSENT: Nau

ATTEST: Claire Cooper
City Clerk

David A. Glass
Mayor

Council File
Res. No. 2005-118 N.C.S.

BILL LOCKYER
Attorney General

State of California
DEPARTMENT OF JUSTICE

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March 30, 2006

VIA OVERNIGHT MAIL AND U.S. MAIL

Glenn Campbell, Principal Transportation Analyst
Orange County Transportation Authority
550 South Main Street
P.O. Box 14184
Orange, CA 92863-1584

RE: Orange County Transportation Authority 2006 Long-Range Transportation Plan Draft Program Environmental Impact Report

Dear Mr. Campbell:

The Attorney General of the State of California submits the following comments regarding the Orange County Transportation Authority ("OCTA") 2006 Long-Range Transportation Plan ("Plan") Draft Program Environmental Impact Report ("DPEIR"). The Attorney General provides these comments pursuant to his independent power and duty to protect the natural resources of the State from pollution, impairment, or destruction in furtherance of the public interest. (*See* Cal. Const., art. V, § 13; Cal. Gov. Code, §§ 12511, 12600-12; *D'Amico v. Board of Medical Examiners*, 11 Cal.3d 1, 14-15 (1974).) These comments are made on behalf of the Attorney General and not on behalf of any other California agency or office. While these comments focus on some of the primary issues raised by the Draft PEIR, they are not an exhaustive discussion of all issues.

I. Introduction

The Plan is described as being OCTA's "blueprint" for maintaining and improving Orange County's transportation network, including freeways, roadways and bus and rail systems through 2030. The Plan focuses much of its attention and planned spending on freeways and roadways, with a much smaller emphasis on public transit. Consequently, the Plan forecasts huge increases (approximately 45%) in vehicle miles traveled ("VMT") per day in the coming years. The environmental analysis in the DPEIR fails to adequately analyze air quality impacts and contains no analysis at all of the impact of the Plan on climate change, both in violation of the California Environmental Quality Act ("CEQA"), Pub. Resources Code §§ 21000, et seq. Orange County is one of the most populous counties in the State, in one of the worst air quality

regions in the country. The environmental and public health concerns raised by the projected increases in vehicular travel under the proposed plan deserve, and CEQA requires, serious and thorough environmental analysis.

II. The DPEIR Should Discuss The Plan's Impact On Climate Change.

Despite the Plan's heavy reliance on vehicular travel and improvements to freeways, roads and streets, and the acknowledged increase in vehicle travel that the Plan will encourage, the DPEIR never analyzes one of the most important environmental impacts of vehicle emissions--greenhouse gases and resulting climate change

Climate change results from the accumulation in the atmosphere of "greenhouse gases" produced by the burning of fossil fuels for energy. Because greenhouse gases (primarily, carbon dioxide("CO_2"), methane and nitrous oxide) persist and mix in the atmosphere, emissions anywhere in the world impact the climate everywhere. The impacts on climate change from greenhouse gas emissions have been extensively studied and documented. (*See* Oreskes, Naomi, *The Scientific Consensus on Climate Change*, 306 Science 1686 (Dec. 3, 2004) [review of 928 peer reviewed scientific papers concerning climate change published between 1993 and 2003, noting the scientific consensus on the reality of anthropogenic climate change]; J. Hansen, *et al.*, *Earth's Energy Imbalance: Confirmation and Implications*, Sciencexpress (April 28, 2004) (available at http://pubs.giss.nasa.gov/abstracts/2005/HansenNazarenkoR.html) [NASA and Department of Energy scientists state that emission of CO_2 and other heat-trapping gases have warmed the oceans and are leading to energy imbalance that is causing, and will continue to cause, significant warming, increasing the urgency of reducing CO_2 emissions].)

In California, the state government has acknowledged the true environmental impacts of greenhouse gas emissions on climate change. Governor Schwarzenegger, in his Executive Order S-3-05 issued on June 1, 2005, recognized the significance of the impacts of climate change on the State of California, noting that "California is particularly vulnerable to the impacts of climate change." The Order goes on to itemize a litany of the direct impacts that climate change and the increased temperatures resulting from the increased presence of greenhouse gases in the atmosphere, will have on the state:

- "[I]ncreased temperatures threaten to greatly reduce the Sierra snowpack, one of the State's primary sources of water;"
- "[I]ncreased temperatures also threaten to further exacerbate California's air quality problems and adversely impact human health by increasing heat stress and related deaths;"

- "[R]ising sea levels threaten California's 1,100 miles of valuable coastal real estate and natural habitats;" and

- "[T]he combined effects of an increase in temperatures and diminished water supply and quality threaten to alter micro-climates within the state, affect the abundance and distribution of pests and pathogens, and result in variations in crop quality and yield."
Executive Order S-3-05, June 1, 2005.

The California legislature, also recognized all of these severe impacts resulting from climate change, as well as a "projected doubling of catastrophic wildfires due to faster and more intense burning associated with drying vegetation." (Stats. 2002, ch, 200, Section 1, subd. (c)(4), enacting Health & Saf. Code § 43018.5) In the particular realm of vehicular travel and emissions from cars and truck, the California legislature went on to recognize that "passenger vehicles and light-duty trucks are responsible for *40 percent of the total greenhouse gas pollution in the state.*" (*Ibid.*, subd. (e)(emphasis added).)

Despite the increasing attention that governments, climate scientists, environmentalists, and other members of the public are rightfully directing to the issue of climate change, OCTA does not even mention the issue in its long term transportation plan, which is meant to cover the next quarter century. The DPEIR never once mentions carbon dioxide, climate change or global warming, and mentions greenhouse gases only by passing reference, when discussing other emissions, without explaining either the importance, or the projected impacts, of greenhouse gases.

Under CEQA, an environmental impact report must identify and focus on the "significant environmental effects" of a proposed project. (Pub. Res. Code § 21100(b)(1); Cal. Code Regs., Title 14, §§ 15126(a), 15126.2(a), 15143.) "'Significant effect on the environment' means a substantial, or potentially substantial, adverse change in the environment." (Pub. Res. Code § 21068). CEQA also provides that the CEQA guidelines "shall" specify certain criteria that *require* a finding that a project may have a significant effect on the environment:

> "(1) A proposed project has the potential to degrade the quality of the environment, curtail the range of the environment, or to achieve short-term, to the disadvantage of long-term, environmental goals.
>
> (2) The possible effects of a project are individually limited but cumulatively considerable. As used in this paragraph, "cumulatively considerable" means that

> the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.
>
> (3) The environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly."
> (Pub. Res. Code § 21083(b).)

In other words, if these criteria are present with regard to a project's impacts on the environment, they must be considered in an EIR. The Plan under consideration in this DPEIR, with its projected 45% increase in vehicular miles traveled by the year 2030, when considered in light of the severe impacts cars and trucks have on the level of greenhouse gas emissions in this state, clearly "has the potential to degrade the environment." (*See ibid.*, subd. (b)(1).) Moreover, the cumulative effects of this project on greenhouse gas emissions, when taken in consideration with the impacts statewide of increased population and vehicular travel over the next quarter century, are undeniable. (*See ibid.*, subd. (b)(2).) When considering the impacts of climate change on California, it is impossible to ignore that the impacts of this project will have either direct or indirect effects on human beings. (*See ibid.*, subd. (b)(3).) Given the scope of the Plan (both in years, and geographically), the projected increase in vehicle travel it calls for, and the fact that it covers one of the most heavily populated regions in the State, there is no question that the impacts of this Plan on greenhouse gas emissions and climate change may, and likely will, have significant cumulative environmental impacts for California. These impacts should have been considered and analyzed in the DPEIR.

There *could* be such analysis in the DPEIR; the data is obtainable. Carbon dioxide emissions from cars can be quantified. The California Air Resources Board has information that could be applied to the projected increase in VMT. The impacts could be assessed as to their cumulative impact on climate change, assuming (as is highly probable in this Plan) that there would be a considerable impact from the increase in CO_2 resulting from the increased VMT. (*See* Cal. Code Regs., title 14, § 15130(a) ["an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable.] *See also* Cal. Code Regs., title 14, § 15065(a)(3) [""Cumulatively considerable' means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probably future projects."].)

Moreover, the Plan could include mitigation for these impacts. The Governor has recognized, "mitigation efforts will be necessary to reduce greenhouse gas emissions and adaptation efforts will be necessary to prepare Californians for the consequences of global warming." (Executive Order S-3-05, June 1, 2005.) Increased public transportation, increased

support of alternative fuels and technologies, the purchase of carbon offsets (or mitigation "credits"), installation of electric vehicle charging stations, and other affirmative steps to reduce the transportation impacts of CO_2 could be considered as potential mitigation projects. These are real, achievable and available mitigation measures that could be considered when OCTA recognizes its obligations to analyze greenhouse gas emissions and their impact on climate change as part of its long term transportation planning.

III. The DPEIR Does Not Adequately Discuss The Plan's Impact On Air Quality.

The DPEIR's discussion of air quality fails to address potentially serious impacts on Orange County and the South Coast air basin. In the DPEIR chapter on air quality the drafters concluded that there would be no significant unavoidable adverse long-term air quality impacts from the Plan (see DPEIR, 4.1-17 through 4.1-20), that the plan would have a neutral effect on air quality (see id.), and that the only potentially significant impacts relate solely to regional and local short term impacts from the construction of individual projects (e.g., construction of individual road widening, or lane building projects anticipated under the Plan). (*See id.* at 4.1-21 through 4.1-23)[1]. The DPEIR bases these optimistic conclusions on a comparison of the future, year 2030, emissions under the Plan to the emissions budgets of the federally mandated, local Air Quality Management Plan (AQMP), prepared by the South Coast Air Quality Management District (SCAQMD) and projected for 2030. The DPEIR finds that the Plan's emissions are within the projected emissions for the AQMP in 2030, and thus there are no significant impacts. The fundamental basis on which all of the DPEIR's assumptions rests, however, is that by the year 2030, "better fuels" and "improved emission controls" will result in overall emission reductions from vehicles. (See DPEIR at 4.1-18.) There are a number of things wrong with this analysis.

First, the comparison fails to analyze all phases of this 24-year project. The CEQA Guidelines require that an EIR consider "all phases of a project when evaluating its impact on the environment." (Cal. Code Regs., title 14, §15126.) The huge emission reductions anticipated in the Plan by the year 2030 as an anticipated result of "better fuels" and "improved emission controls" will surely take some time. The DPEIR must look at the all phases of the 24-year project time frame, not just 2030, to discern if the project will have significant impacts on health and air quality. The DPEIR contains no analysis of whether the impacts on air quality in the "in between" years, before all of the "better fuels" and "improved emission controls" have been implemented, will be significant; there is no way to discern, from the information available in the DPEIR what the emissions during those years will be.

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1. These impacts, according to the DPEIR, would be addressed through mitigation measures, but the mitigation measures include no monitoring requirements.

Second, there is no detailed comparison of the project with the emissions budgets of the AQMP. The DPEIR states that "[c]umulative impacts were assessed by comparing projected vehicle emissions in 2030 to the emission budgets established in the local AQMP." (DPEIR at 4.1-16.) Nowhere in the document, however, is a detailed comparison shown to the public, nor is there any indication of how the project emission budgets compare year by year with the AQMP emission budgets. This failing is linked to the failure to consider "all phases" of the project, but displays as well the fundamental lack of detailed information in this DPEIR. The conclusory statement that "the impacts were assessed," without any backup, is not sufficient disclosure for the public to make its own evaluation, and, in fact, this lack of information precludes the informed decision making and public participation required by CEQA. (*See* Pub. Res. Code § 21061; Cal Code Regs, title 14, § 15121(a) [an EIR is an informational document which will inform public agency decision-makers and the public generally].) The purpose of an EIR, inter alia, is to provide public agencies and the public in general with detailed information about the effect of the proposed project on the environment. (Pub. Resources Code § 21061; *Laurel Heights Improvement Association v. Regents of the University of California* (1988) 47 Cal.3d 376, 391.) An EIR should, when viewed as a whole, provide a reasonable, good faith analysis of known environmental impacts. (*Al Larson Boat Shop, Inc. v. Board of Harbor Commissioners* (1993) 18 Cal.App.4th 729, 749.)

Third, the air quality appendix does not contain any actual useful emissions data or modeling to allow the public to evaluate the accuracy or appropriateness of the model. Appendix B, Air Quality, contains only summary tables of the results of some computer modeling performed by OCTA for criteria pollutant emissions. The tables may represent various alternative scenarios (perhaps for the proposed Plan and for some plan alternatives; it is not clear), but there are no explanations of the assumptions and data (or "inputs") that went into the modeling program that produced these results. There is no explanation of what the various summaries (or "outputs") represent. Without an explanation of the data inputs for the modeling done to support the DPEIR, or an explanation of what the summaries show, it is impossible for the public or the public agency decision makers to make informed decisions. (*See* Pub. Res. Code § 21061.)

Fourth, the toxics analysis is inadequate. In its discussion of impacts on hydrology and water quality, the DPEIR acknowledges that there will be "new roadways in undeveloped areas" under the Plan. (DPEIR at 4.7-11.) In its discussion of toxic air contaminants, however, there is no discussion of the impacts of those "new roadways in undeveloped areas" which will expose new populations to both criteria and toxic pollutants. There should be a risk assessment in order to draw valid conclusions about public health, and such an assessment should be done for each phase of the project (just as with the overall air quality assessment). The DPEIR recognizes that diesel emissions are a known carcinogen, but limits its analysis of cancer risk from the project to

construction emissions and to the expected situation in 2030. The DPEIR does not consider the cancer risks resulting from the operation of current and new roadways, expanded freeways, etc. In Health & Safety Code Section 39606(b), the Legislature recognized the special susceptibility of children and infants to air pollution, and the DPEIR itself recognizes that there are particularly sensitive receptors (DPEIR at 4.1-16), yet the DPEIR makes no effort to evaluate the project's effects on them.[2]

Fifth, where the DPEIR does provide some mitigation for the few significant air quality impacts it does recognize (related to construction), the document makes no assignments, not even tentatively, of responsibility for enforcing them through mitigation monitoring. The DPEIR recognizes only two categories of potentially significant impacts on air quality: Short-term (construction) regional impacts (from a number of construction-related activities and materials) and short-term localized impacts (from construction vehicles which are sources of carcinogenic pollutants and diesel exhaust). (*See* DPEIR at 4.1-21 through 4.1-23.) With regard to the construction impacts, the DPEIR acknowledges that "a large number of the projects in the [Plan] would involve extensive construction or reconstruction" and that it is "very likely" that some of the projects would be under construction at the same time. (DPEIR at 4.1-21.) Notwithstanding the acknowledged significant air quality impacts the construction activities are expected to produce, there are no monitoring requirements for the list of mitigation measures that the DPEIR says "should be considered" when EIR's are prepared for the individual projects. Likewise, there are no monitoring requirements incorporated in the mitigation measures to address the emissions from construction equipment. Moreover, Chapter 7, Mitigation Monitoring and Reporting Program, does not indicate any monitoring actions, or responsible implementation agencies for the proposed mitigation measures. (DPEIR at 7-1 through 7-34.)

OCTA is required to "provide that measures to mitigate or avoid significant effects on the environment are fully enforceable through permit conditions, agreements or other measures." (Pub. Res. Code § 21081.6(b).) The DPEIR should disclose and discuss such mitigation monitoring measures, or at least make tentative assignments of responsibility for enforcing them, so that the public can take these proposed measures into account.[3]

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2. In addition to these failures to address toxic air contaminants, in the chapter on Hazardous Materials, the DPEIR does not examine the indirect effects of the 45 % increase in VMT, such as increased cancer risk from benzene and other petrochemical toxic emissions released from gas stations, increased refinery emission, and the like.

3. In addition, the Plan should contemplate, discuss and disclose whether funding for the mitigation measures it will require is or will be available.

Finally, given the inadequacies and lack of detail in the air quality impacts analysis it is not appropriate for all future projects contemplated under this Plan to be able to "tier" off of a document as deficient as this DPEIR.[4] The DPEIR states "[t]he lead agencies for individual projects may use this PEIR as the basis of their regional and cumulative analysis." (DPEIR at 2-13.) The deficient analysis of the air quality impacts would make any meaningful project-level analysis of regional and cumulative of air quality impacts for an individual project nearly impossible. For example, it is possible that a project-level EIR could be prepared next year for a project such as a lane-addition to a freeway. Based on "tiering" from this DPEIR, the planners of such a project would have only the conclusory statements regarding air quality impacts in the year 2030 from this DPEIR upon which to base cumulative and regional impacts analyses in their EIR, whereas the new hypothetical freeway lane might be operational in 2009. There would be no analysis of the cumulative and regional impacts of that project for years 2009 through 2029. While this example pertains only to the air quality analysis, the other failings of the DPEIR discussed below also contribute to the inappropriateness of allowing future project level EIR's to "tier" off of this deficient CEQA document.

IV. The DPEIR Contains Many Other Inadequacies.

In addition to the failure of the DPEIR to adequately address air quality, and to address greenhouse gas emissions impacts at all, the DPEIR is inadequate in a number of other areas.

A. The DPEIR Does Not Contain An Adequate Description of the Project

Chapter 2 of the DPEIR, is titled "Project Description" and it does contain a list of the projects that the Plan envisions. The description, however, is lacking. The list of projects contemplated under the plan includes one-line, bullet-point descriptions of various freeway and interchange improvements, lane additions and ramp construction projects that will make up the improvements to freeways under the Plan. (There are also one-line, bullet-point descriptions of the other planned projects.) Despite the fact that the primary focus of projects and spending under the Plan is on freeway construction projects, however, the Project Description does not contain any maps or visual drawings of the Plan's contemplated improvements. It is very difficult to ascertain what the impacts on the ground will be from the brief descriptions of the planned projects. Guidelines indicating areas of disturbance, or footprints, for planned projects

---

4. "'Tiering' or 'tier' means the coverage of general matters and environmental effects in an [EIR] prepared for a policy, plan, program or ordinance followed by narrower or site-specific [EIRs] which incorporate by reference the discussion in any prior EIR . . ." (Pub. Res. Code §§ 21068.5.)

should be included. From the descriptions in the DPEIR, an understanding of the true impact of the Plan is not possible.

The public should be able to understand from the DPEIR what implementation of the Plan will mean to their communities and their surroundings in physical terms. "Only through an accurate view of the project may affected outsiders and public decision-makers balance the proposal's benefit against its environmental cost, consider mitigation measures, assess the advantage of terminating the proposal (i.e., the "no project" alternative) and weigh other alternatives in the balance. An accurate, stable and finite project description is the *sine qua non* of an informative and legally sufficient EIR." *County of Inyo v. City of Los Angeles*, (1977) 71 Cal.App.3d 185, 192-193.

B. The DPEIR Does Not Contain An Adequate Analysis of Alternatives.

The alternatives considered in the DPEIR consist entirely of plans that envision varying degrees of funding, as opposed to plans that envision alternative mixes of various transportation improvements or projects. The four alternatives to the Proposed Plan are:

(i) the No Project (Baseline) Alternative, which "includes projects and programs that have secured funding, have been assessed for their environmental impacts, and have been approved to be implemented" (a small sub-set of the projects in the Proposed Plan) (DPEIR at 5-4,);

(ii) the Constrained Alternative, which is "a set of projects and services that can be completed within the County's traditional revenue sources for transportation improvements" (a sub-set, larger than the No Project Alternative sub-set, of the same projects that are included in the Proposed Plan) (DPEIR at 5-11, 5-17);

(iii) the Balanced II Alternative, which "includes all of the projects from the Proposed Plan with the exception of the High Occupancy Toll (HOT) projects proposed along [SR 91, including the direct connectors between SR-241 and the SR-91 toll lanes" (DPEIR at 5-29); and

(iv) the "Unconstrained" Alternative, which "includes projects and services that could be implemented . . . if funding was not an issue." (DPEIR at 5-43.)

It is clear from the alternatives considered that the planners looked only at alternative levels of funding that would allow variable numbers of projects off a master-list of desired projects, and not at alternatives designed to provide alternative levels of environmental impact,

or a different master-list of projects. For example, nowhere does the DPEIR consider a potential alternative that changes the balance of spending to focus more on improvements to mass transit services rather than on improvements to freeways and roadways. The decision to focus so much attention on freeway upgrades was pre-determined by the planners' view that the only solution to increased congestion is to build more freeways. The planners exhibit this view when they explain that "the projections for 2030 indicate that vehicle miles will increase faster than population and employment, mostly due to longer trips or commutes. In short, freeway capacity must grow to meet future freeway travel demand." (DPEIR at 2-5) This conclusion ignores the obvious alternative viewpoint: some of the increased travel demand might be more properly diverted to mass transit solutions, as opposed to simply concluding that increased freeway capacity is the only solution. Based on a review of the Plan "objectives" to increase mobility, protect transportation resources and enhance the quality of life (see DPEIR at 2-3), other types of alternatives – alternatives that examine variable mixes of modes of transportation as opposed to just variable mixes of dollars – that still met the objectives of planners could have been considered.

Given that the impacts on the environment from the proposed Plan are projected to be significant, such alternatives should have been considered. One of the purposes of the discussion of alternatives in an EIR is to diminish or avoid adverse environmental effects. (*See Laurel Heights Improvement Ass'n v. Regents of Univ. of Cal.* (1988) 47 Cal.3d 376, 403 [discussion of only three alternatives, where planners claimed they had already ruled out other alternatives as infeasible, was inadequate]; Pub. Res. Code § 21002 [EIR should consider alternatives which would substantially lessen the significant environmental effects].)

C. The DPEIR Does Not Contain Adequate Discussion of Biological Resource Impacts.

The DPEIR does not quantify the biological resource impacts that it recognizes will be more significant under the proposed Plan than under the No Project alternative. (See DPEIR at 5-6 through 5-7.) Additional detail on the magnitude of direct impacts of the project must be provided for the Proposed Project and all project alternatives. All of the proposed alternatives and the proposed Plan contain lists of the projects they include. The Program EIR should make an attempt to quantify the impacts. Instead, the DPEIR puts off the analysis of the biological resource impacts of all the projects until the EIR for the individual project is prepared. (*See* DPEIR at 4.2-22.) It is impossible to analyze the difference between alternatives on this subject, when the impacts have not been described.

D. The Plan And DPEIR Should Include Plans For Improving Air Quality And Reducing Greenhouse Gas Emissions In Its Discussion Of "Environmental Programs."

The only "environmental program" contemplated under the Plan is a program for augmenting urban runoff treatment and mitigation to create a "coordinated high-quality urban runoff program." (DPEIR at 2-11.) As discussed in detail above, the impacts of the Plan on greenhouse gas emissions and the cumulative impacts of those emissions on climate change, warrant close examination in this DPEIR. Likewise, a plan like this one which places so much of its emphasis for transportation planning and spending on automobile and truck travel versus mass transit will likely result in greater emissions of criteria pollutants and toxic air contaminants than would an alternative that focuses on improving mass transit and *reducing* vehicular miles traveled. Given these considerations, the state of air quality in the South Coast air basin and the severe impacts climate change can inflict on the citizens of Orange County, it would be a responsible and reasonable planning measure to include some "environmental program" aimed at reducing the air quality and climate impacts of the proposed Plan. As mentioned in above, there are some easily implemented steps that might be considered, such as the purchase of mitigation credits. There are also programs that might encourage greater use of alternative technologies and fuels (e.g., electric and hybrid vehicles) or that might add incentives for increased use of public transit (enhanced employer managed discount programs that reward use of transit when compared with parking costs) that could be explored. This long term plan is an opportunity for OCTA to take a truly "visionary" role in shaping the transportation *and* environmental landscape of Orange County for the next quarter century. We hope that the opportunity will not be missed.

V. Conclusion

If you or your staff have questions regarding these comments, please contact me at 213-897-0628.

Sincerely,

Kathryn W. Egolf

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Deputy Attorney General

For BILL LOCKYER
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Greenhouse Gas Emission Inventory

for all sectors of

Sonoma County, California

January 2005

Prepared for the

Bay Area Air Quality Management District

and the

Sonoma County Waste Management Agency

by the

Climate Protection Campaign

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Greenhouse Gas Emission Inventory for all sectors of Sonoma County, California

January 2005

Abstract

This report,[1] funded by the Bay Area Air Quality Management District, describes the results of the greenhouse gas emissions inventory for all sectors of Sonoma County. This represents Sonoma's first community-wide climate protection effort, and the first climate protection initiative undertaken by a California regional air district. This report is intended to help Sonoma County governments, businesses, and residents reduce their greenhouse gas emissions. Also it aims to inspire other communities to conduct similar inventories, and guide them as they do so.

The following tasks and findings correspond to the study's scope of work.

A. Inventory Sonoma County's greenhouse gases (GHG)
For the inventory we reviewed the science of global climate change, and the relationship between greenhouse gas emissions and criterion air pollutants. We followed emission accounting protocol from Cities for Climate Protection®, and categorized emissions into four sectors:

- Electricity and natural gas
- Vehicular transportation
- Agriculture
- Solid waste

We found that from 1990 to 2000, Sonoma County's GHG emissions increased overall by 28 percent. Key factors for this rise are an increase in vehicle miles traveled of 42.5 percent, and an increase in population of 18 percent.

B. Recommend emission reduction targets
Scientists say that we need to reduce emissions of carbon dioxide, the major GHG, by 50 to 70 percent to stabilize its concentration in the atmosphere, and can succeed in making such reductions using solutions that exist today. After surveying options for GHG reduction targets, we recommend that Sonoma County adopt a 20 percent reduction from 1990 levels by 2010, a bold beginning to align this area's GHG emissions with the scientific imperative.

C. Recommend next steps
We recommend that Sonoma County launch an initiative through which representatives from diverse sectors of the community come together to consider and adopt GHG emissions reduction targets; and create, adopt, and commit to implementing a plan for reaching the target.

[1] This report is posted at www.climateprotectioncampaign.org

Greenhouse Gas Emission Inventory for all sectors of Sonoma County, California

January 2005

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A. Greenhouse gas emission inventory for all sectors of Sonoma County, California

Project background and overview

In August 2002, Sonoma became the first county in the nation where 100 percent of its municipalities—the County and all nine cities—pledged by resolution to measure and reduce their greenhouse gas (GHG) emissions. They joined *Cities for Climate Protection®*, a campaign led by *ICLEI - Local Governments for Sustainability*. Over 600 communities participate in this campaign worldwide, with over 150 of them in the U.S.

The Cities for Climate Protection (CCP) program consists of five milestones:

Milestone One:	Inventory greenhouse gas emission production
Milestone Two:	Set a target for emission reduction
Milestone Three:	Create a plan for meeting the target
Milestone Four:	Implement the plan
Milestone Five:	Monitor progress and adjust as appropriate

Municipalities can focus on GHG emissions produced by their internal operations, on emissions produced by all sectors in the jurisdiction, or first one and then the other. Sonoma municipalities chose to "lead by example," focusing on internal operations first. This study represents Sonoma's first assessment of the greenhouse gas emitted by the whole community.

The County of Sonoma and the City of Santa Rosa completed their GHG emissions inventories—Milestone One—for their internal operations in 2002. The County also set a target—Milestone Two—to reduce the emissions produced by its internal operations by 20% from 2000 to 2010. The remaining eight Sonoma cities completed inventories of the emissions produced by their internal operations in September 2003.[2] In doing so, Sonoma set a second national precedent when 100 percent of its municipalities completed their baseline emission inventories. In 2004, Rohnert Park, Sebastopol, and Cotati set their emission reduction targets – Milestone Two - for their internal operations. All three cities' targets are the same as the County's except Sebastopol's which is 30% from 2000 by 2008.

In 2002 the Sonoma County Mayors' and Council members' Association sent a letter to the Chair of the Board of the Bay Area Air Quality Management District encouraging the district to support climate protection. In June 2003, the Air District Board approved a request for financial support of a two-part study comprised of a GHG inventory for all sectors of Sonoma County, and research regarding actions underway regionally and nationwide in which air quality and climate protection efforts are being integrated. The Sonoma County Waste Management Agency served as administrator for the study.

[2] References for inventory reports are listed under Resources, page 47.

This report of Sonoma County's emissions inventory is intended for use by other communities as an example of how to inventory their GHG emissions. The report on the second part of the study, Phase 2, will be issued separately.

Project work statement

Phase 1. Inventory of the greenhouse gases emitted in Sonoma County

	Task	Description	Corresponding CCP Milestone
A.	Analysis: Inventory of GHG emissions	Greenhouse gas emission inventory for Sonoma County broken down into at least three sources – residential, business, and governmental.	Milestone One – Inventory
B.	Recommendations: Targets	Recommendations for GHG emission reduction targets for Sonoma County.	Milestone Two – Target
C.	Recommendations: Next Steps	Recommendations for next steps for reducing GHG emissions in Sonoma County, and how these next steps relate to the BAAQMD's Air Quality Plans.	Milestone Three - Plan
D.	Research: Input from stakeholders	A list of the stakeholders involved in producing the inventory report with copies of minutes of meetings with stakeholders	Not applicable
E.	Public outreach	Copies of newspaper articles and other print media coverage, if any, for these efforts listed above.	Not applicable

Phase 2. Integration of air quality and climate protection efforts and the BAAQMD's role

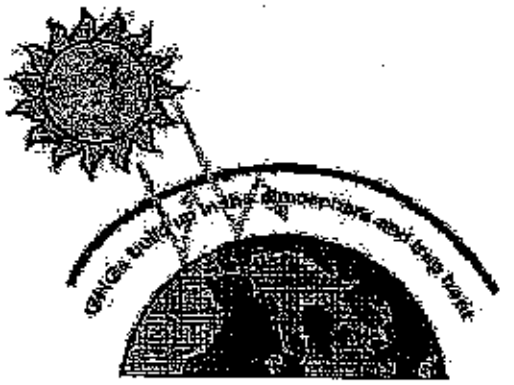
	Task	Description
A.	Research: District-wide inventory	Inventory of climate protection efforts throughout the Bay Area Air Quality Management District, and identification of the best models for climate protection found in the District. Description of the coordination, if any, between climate protection and air quality in these efforts.
B.	Research: Nationwide review	Description of the results of a nationwide review of how climate protection and air quality management are being connected and coordinated at the regional level. Identification of the most effective models for making this connection.
C.	Analysis: Relation between plans	Analysis of the relation between the BAAQMD's Air Quality Plans and climate protection plans, including identification of the overlaps, gaps, and areas of synergy.
D.	Recommendations: Model ordinance(s)	Model ordinance(s) for local government that addresses and integrate climate protection and air quality management.
E.	Recommendations: Model framework	Description of a model framework for programs – local, regional, and multi-county – that both protect the climate and improve air quality.
F.	Recommendations: Next steps	Description of recommended next steps for the BAAQMD.
G.	Resources: Possible funding sources	A list of possible funding sources for climate protection and clean air efforts.
H.	Resources: Other	A list of resources for more information about the above.
I.	Research: Source of information	A list of the stakeholders involved in producing the report with copies of minutes of meetings with stakeholders.
J.	Final Report	A presentation to the BAAQMD Board with the results of the project.

Global climate change: Description and significance

Heat from the sun is trapped near the Earth's surface by naturally occurring gases. This greenhouse effect stabilizes earth's temperature at an average of approximately 60°F, making Earth habitable for humankind.

The major greenhouse gas from human activity, carbon dioxide (CO_2), is produced when gasoline, diesel, natural gas, coal and other fossil fuels combust. Methane (CH_4), the second most important greenhouse gas from human activity, is a byproduct of organic decomposition.

As human population and consumption has increased, so has the amount of greenhouse gas emitted into Earth's atmosphere. In the mid 1850s there was about 280 parts per million of carbon dioxide in the atmosphere; now there is about 379. Human activity has increased the blanket of heat-trapping gas surrounding the Earth, magnified the greenhouse effect, and increased Earth's average temperature by an average of more than 1°F over the last 100 years.



Climate change is caused by a manmade blanket of carbon dioxide that surrounds the earth and traps in heat.

Scientists prefer the term climate change to global warming because climatic changes vary across the planet, from place to place and season to season. With climate change comes extreme weather – both record-breaking hotter and colder temperatures, both droughts and floods. For example, between 1995 and 1998 there were a record 33 hurricanes in the U.S. In August 2004, Hurricane Charley with winds of 145 miles per hour in Florida, caused $7.4 billion in damages and killed 27 people. For many areas in the U.S., droughts in 1998 were among the worst ever. Currently, the western part of North America is in the midst of one of the worst droughts in 500 years. While no single weather event can be attributed to global climate change, the pattern of increasing extreme weather can, say climatologists.

The world's foremost authority on climate change, the International Panel on Climate Change (IPCC), involves thousands of scientists worldwide who study atmospheric changes, their potential impacts, and appropriate policy responses. Having verified the increase in greenhouse gas, the rise in temperatures, and the impacts on Earth's living systems, these scientists concluded that global climate change imperils life on Earth. In 1995, the IPCC specified that stabilizing the concentration of carbon dioxide required an immediate reduction in CO_2 emissions of 50 to 70 percent, and required further reductions thereafter until the year 2100.[3]

[3] IPCC second assessment synthesis of scientific-technical information relevant to interpreting article 2 of the UN Framework Convention on Climate Change, 1995, the summary for policymakers, page 9, http://www.ipcc.ch/pub/sa(E).pdf See also "Climate Change Research - Facts, uncertainties and responses," Astrid Zwick, Antonio Soria http://www.jrc.es/pages/iptsreport/vol05/english/art-en1.doc

Types and strengths of greenhouse gases[4]

Processes that generate, absorb, and destroy greenhouse gases determine its concentration in the atmosphere, currently less than 1 percent. Major greenhouse gases besides carbon dioxide and methane are nitrous oxide (N_2O), chlorofluorocarbons (CFCs), and ozone (O_3).[5] Water vapor (H_2O) also contributes to the greenhouse effect, but human activity has little impact on it, according to scientists.

The IPCC identified the strength of each type of GHG based on its ability to trap heat, defined as cumulative radiative forcing.[6] Global warming potential also takes into account the atmospheric lifetimes of GHGs.

Global Warming Potential of major greenhouse gases[7]

	Greenhouse gas	Estimated Lifetime (years)	Global Warming Potential		
			20 years	100 years	500 years
	Carbon Dioxide (CO_2)	50-200[8]	1	1	1
	Methane (CH_4)	12.0	62	23	7
	Nitrous Oxide (N_2O)	114	275	296	156
Chlorofluorocarbons (CFCs)	$CFCl_3$ (CFC-11)	45	6300	4600	1600
	CF_2Cl_2 (CFC-12)	100	10200	10600	5200
	$CClF_3$ (CFC-13)	640	10000	14000	16300
	$C_2F_3Cl_3$ (CFC-113)	85	6100	6000	2700
	$C_2F_4Cl_2$ (CFC-114)	300	7500	9800	8700
	C_2F_5Cl (CFC-115)	1700	4900	7200	9900

[4] Reference: Hong Kong Observatory: http://www.hko.gov.hk/wxinfo/climat/greenhs/e_grnhse.htm Please note that these figures are from the IPCC's Third Assessment Report. The protocol followed for this report follows the U.S. inventory as well as the recommendation of the IPCC, i.e., to continue to use the GWPs from the IPCC's Second Assessment report through the end of the first reporting period when inventories will shift over to the Third Assessment Report.

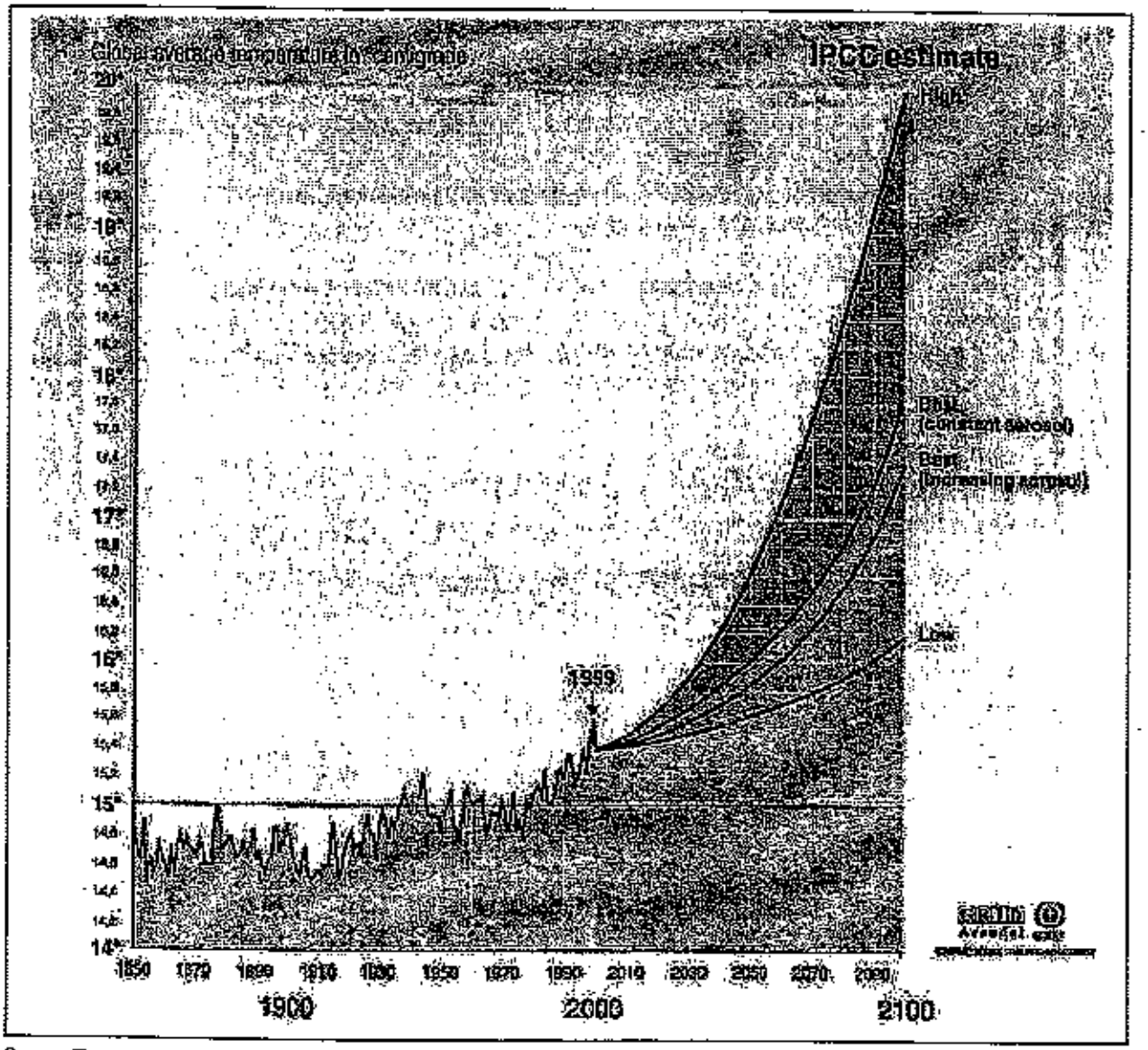
[5] Tropospheric ozone concentrations in the Northern Hemisphere may have increased since preindustrial times because of human activity, resulting in positive radiative forcing. Although not yet well characterized, this forcing is estimated to be about 0.4 Wm2 (15% of that from the long-lived greenhouse gases). However, the observations of the most recent decade show that the upward trend has slowed significantly or stopped. IPCC Summary for Policy Makers http://www.ipcc.ch/pub/sarsum1.htm

[6] Radiative forcing considers the difference between the present and some future time caused by a unit mass of greenhouse gas emitted now, expressed relative to CO_2. Radiative forcing is defined as a change in average net radiation at the top of the troposphere (tropopause) due to a change in either solar or infrared radiation. A radiative forcing perturbs the balance between incoming and outgoing radiation. A positive radiative forcing tends on average to warm the Earth's surface; a negative radiative forcing tends on average to cool the Earth's surface.

[7] Global warming potential following the instantaneous injection of 1 Kg of each GHG, relative to 1 Kg of CO_2. Table is based on information found in the IPCC Third Assessment Report, 2001. Derivations of global warming potentials require knowledge of the fate of the emitted gas (typically not well understood) and the radiative forcing due to the amount remaining in the atmosphere (reasonably well understood). GWPs typically encompass ± 35% uncertainty relative to CO_2 reference.

[8] Different removal processes result in a varying CO_2 lifetime, U.S. Environmental Protection Agency, April 2002, http://yosemite.epa.gov/oar/globalwarming.nsf/UniqueKeyLookup/SHSU5BUM9T/$File/ghg_gwp.pdf

Projected changes in global temperature: Global average 1856-1999 and projection estimates to 2100



Source: Temperatures 1856-1999: Climatic Research Unit, University at East Anglia, Norwich UK. Projection: IPCC report 95.

World Scientists' Warning to Humanity

Human beings and the natural world are on a collision course. Human activities inflict harsh and often irreversible damage on the environment and on critical resources. If not checked, many of our current practices put at serious risk the future that we wish for human society and the plant and animal kingdoms, and may so alter the living world that it will be unable to sustain life in the manner that we know. Fundamental changes are urgent if we are to avoid the collision our present course will bring about."

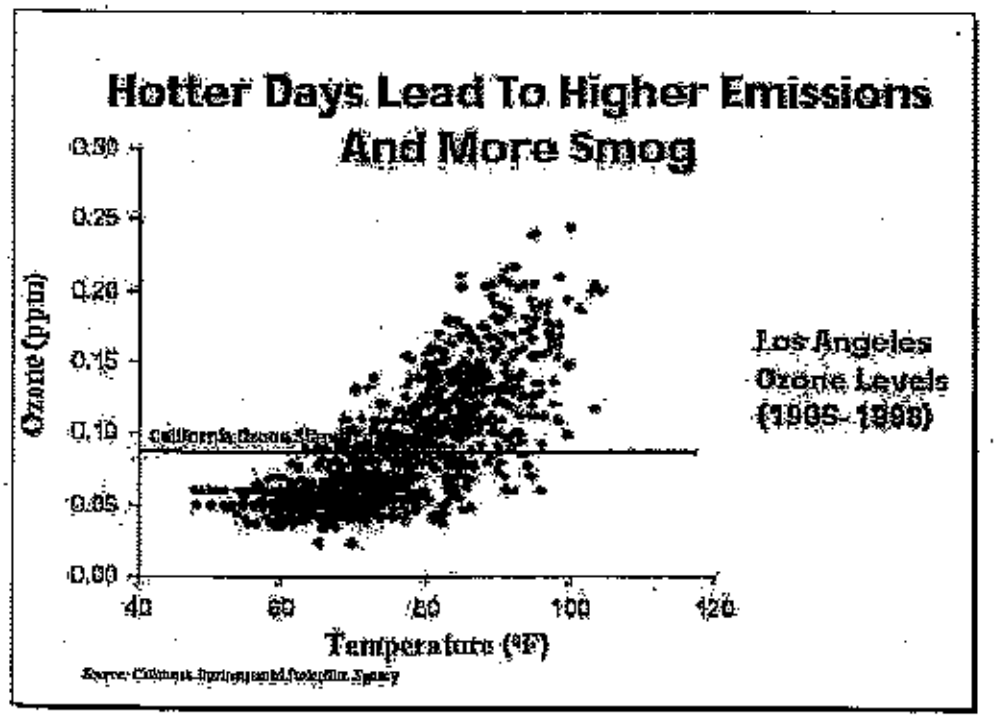
--Signed in 1992 by more than 1,600 scientists, including 102 Nobel laureates, from 70 countries

http://www.ucsusa.org/ucs/about/page.cfm;pageID=1009

Relationship between global climate change and air quality

The higher temperatures forecast by scientists will worsen air quality in several ways. Ozone formation tends to increase with higher temperatures, strong sunlight, and a stable air mass, as shown in the following graph. Higher temperatures also increase air pollution by causing vegetation to emit more natural hydrocarbon, harder working engines, increases in fuel evaporation, and greater demands on power plants.[9]

Recent research confirms that global climate change will likely trigger increases in smog and health problems even if the level of man-made smog-causing pollutants remains the same. The research predicts that by 2050 the number of smog-alert days in selected U.S. cities will increase by about 60%, accompanied by more lung diseases including asthma, more hospital admissions, and more premature deaths.[10]



Just as climate change exacerbates air pollution, air pollution also exacerbates climate change. Incomplete combustion of fossil fuels, biofuels, and biomass produces black carbon, also called soot or particulate matter. The impact of these air pollutants on global temperature is very complex.[11] Some climate scientists assert that their overall impact is to heat the atmosphere.[12]

[9] "Global Warming and Greenhouse Gas Emissions from Motor Vehicles," AB 1493 (Pavley) Briefing Package, prepared by the California Environmental Protection Agency, http://www.energy.ca.gov/global_climate_change/documents/AB1493_PRESENTATION.PDF

[10] "Heat Advisory: How Global Warming causes More Bad Air Days, July 2004, http://www.nrdc.org/globalWarming/heatadvisory/heatadvisory.pdf

[11] "Climate Change Overview: Technical support document for staff proposal regarding reduction of greenhouse gas emissions from motor vehicles," California Environmental Protection Agency, Air Resources Board, August 6, 2004, http://www.arb.ca.gov/cc/factsheets/august_tsd/overview_august.pdf

Air pollution and climate change share causes and solutions. Reduction in fossil fuel consumption reduces both criteria pollutants and GHG emissions. Many criteria pollutants, specifically the various oxides of nitrogen (NOx) produced during combustion originate from fossil fuel combustion, as does carbon dioxide (CO_2), the primary greenhouse gas. Volatile organic compounds (VOCs) are ozone precursors, and will under certain circumstances, produce methane. Reducing VOCs improves air quality and helps protect the climate.

Electricity, transportation, and industrial sectors account for most of the U.S. anthropogenic emissions of criteria pollutants and GHG emissions. Electric and transportation sectors are the largest aggregate producers of GHG emissions, with each accounting for about 35 percent to 40 percent of total emissions.[13] For all sectors, the two essential steps to both clean the air and protect the climate are improving energy efficiency and switching to lower-carbon or zero-net-carbon fuels, i.e., renewables.

Enormous opportunities exist worldwide for taking these essential steps, usually with significant positive economic benefits as well. For example, estimates from the Centre for Integrated Assessment Modelling indicate that Kyoto-level cuts in CO_2 emissions would reduce the cost of reaching European countries' 2010 air pollution objectives by at least €5 billion.[14]

> In continuing to address criteria pollutant nonattainment challenges, state and local officials have the opportunity to capture significant GHG emission reductions. The most effective path for achieving this goal is to ensure that, in obtaining emission reductions needed for criteria pollutant attainment, the applied strategies are ones that also provide GHG reduction benefits, rather than measures that are ineffective or counterproductive from a GHG perspective.
>
> "Reducing Greenhouse Gases and Air Pollution: A Menu of Harmonized Options," STAPPA /ALAPCO

Clean air solutions do not necessarily translate to climate protection. Smog-creating air pollution decreased substantially in the U.S. following the Clean Air Act of 1970. By contrast, CO_2 emissions rose during the same period because air quality tactics such as "tailpipe" controls and smokestack scrubbers have little or no impact on carbon dioxide. In fact, some clean air technologies actually increase CO_2 by lowering plant efficiency, thus requiring more energy to be used. Some alternative fuels that are good for air quality either have no effect or increase GHG emissions. Congestion management measures like signal synchronization often reduce emissions only temporarily. Emissions may actually increase in the long run because short-term traffic relief encourages people to drive more. Although strategies that cut standard air pollution often miss GHG emissions, strategies that reduce GHG emissions almost always improve air quality as well.[15]

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[12] See, for example, "Defusing the Global Warming Time Bomb," James Hansen, Scientific American, March 2004.
[13] "Reducing Greenhouse Gases and Air Pollution: A Menu of Harmonized Options," October 1999, STAPPA/ALAPCO, http://www.4cleanair.org/comments/execsum.PDF
[14] UNECE Convention's IIASA, http://www.unece.org/env/emep/pr03_env02e_h.pdf
[15] "Converging solutions: Clean air and climate protection," ICLEI fact sheet by Chris Giovinazzo, undated.

Many initiatives that aim to both clean the air and protect the climate are emerging. One recent development with potentially far-reaching impacts is the suit filed in July 2004 against five major utilities by attorneys general from eight states including California, and officials from New York City. The suit charges that greenhouses gas emissions from the utility companies are creating a public nuisance. The suit seeks a court order to require the utilities to reduce these emissions. Attorneys general contend that they must act because normal regulatory approaches such as action from the E.P.A., Congress, and the administration, have failed to adequately address the threat posed by utilities' GHG emissions.[16]

Passage of AB1493 in 2002, California's law to regulate greenhouse gas emissions, represents the first-ever mandatory reduction of greenhouse gas pollutants from vehicles in the U.S. The legislation directed the Air Resources Board to develop regulations for automobile manufacturers to achieve maximum feasible reductions in GHG emissions. In September 2004, the California Air Resources Board voted unanimously to adopt standards that cut carbon dioxide emissions by 25 percent starting with the 2009 model year.[17]

The two major national associations of air pollution control agencies, State and Territorial Air Pollution Program Administrators (STAPPA) and the Association of Local Air Pollution Control Officials (ALAPCO) in 1999 issued a substantial education resource guide to help state and local officials identify and assess harmonized strategies and policies to reduce air pollution and address climate change simultaneously.[18] Also, STAPPA/ALAPCO together with ICLEI in 2003 released software called CACPS – Clean Air and Climate Protection Software – to help state and local governments track criterion air pollution and GHG emissions.[19] CACPS was used for this Sonoma County GHG emissions inventory.

In Europe, the European Environmental Agency has issued a report that analyzes the linkages between climate protection and air quality.[20]

The integration of air quality management and climate protection is the subject of Phase Two of this project where the relationship between global climate change and air quality from an implementation and policy perspective will be taken up in more depth.

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[16] "New environmental cops: state attorneys general," Christian Science Monitor, July 22, 2004, http://www.csmonitor.com/2004/0722/p03s01-usju.html

[17] "California Goes Ahead With Disputed Smog Plan," UPI, September 24, 2004, http://www.spacedaily.com/news/pollution-04c.html

[18] "Reducing Greenhouse Gases and Air Pollution: A Menu of Harmonized Options," October 1999, STAPPA/ALAPCO, http://www.4cleanair.org/comments/execsum.PDF

[19] http://www.cacpsoftware.org

[20] http://reports.eea.eu.int/technical_report_2004_5/en/tab_content_RLR

Summary of findings

This study found that from 1990 to 2000, overall GHG emissions produced in Sonoma County increased by 28 percent. Two critical factors in this rise are increases in emissions from vehicle transportation of about 43 percent, and in population of 18 percent during this same period. For comparison, GHG emissions nationwide increased by 14.2 percent between 1990 and 2000, according to the U.S. Environmental Protection Agency.[21]

Greenhouse gas emissions[22] (GHG), Sonoma County

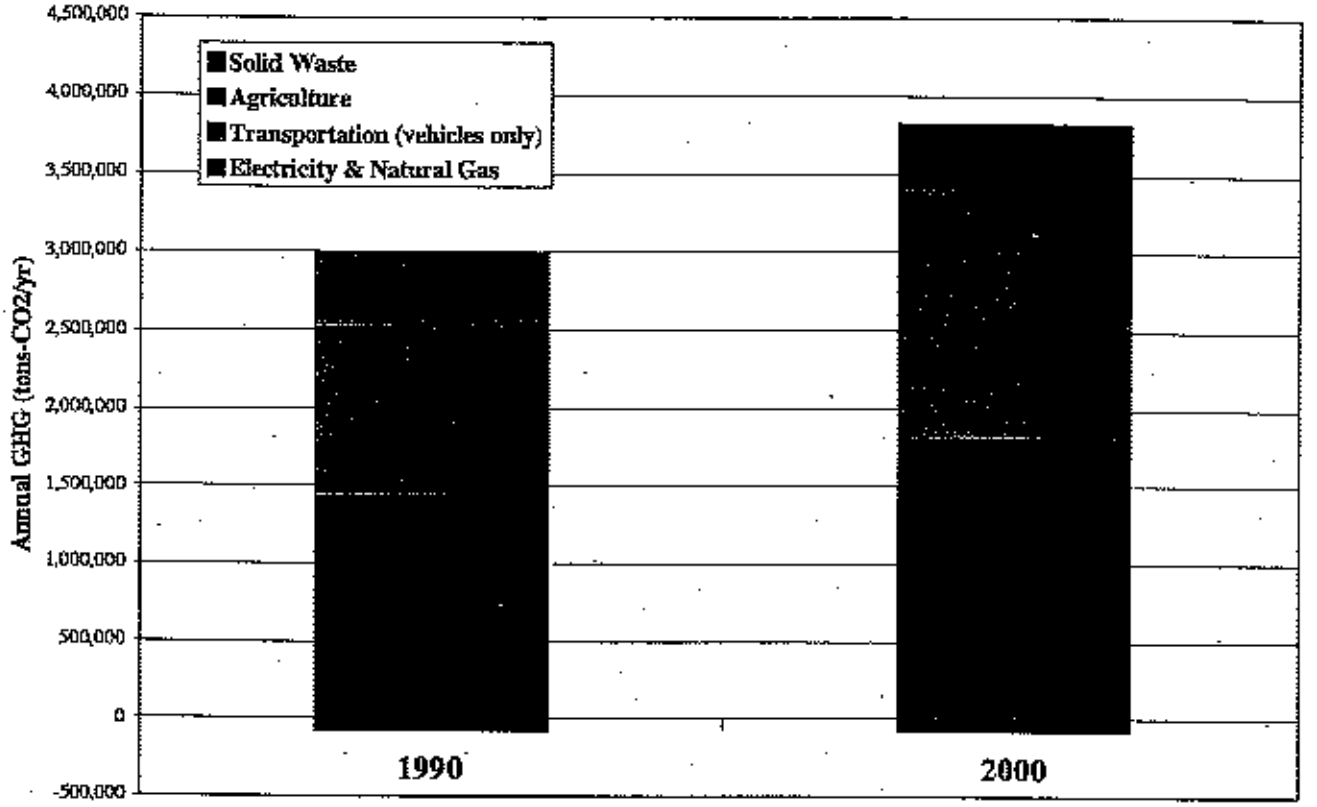
	1990		2000		% change
	GHG (tons)	% of total	GHG (tons)	% of total	
Electricity & natural gas	1,430,996	48	1,804,158	47	+26
Transportation (vehicles only)	1,115,000	37	1,589,000	42	+43
Agriculture	444,690[23]	15	425,040	11	-4
Sub-total	2,990,686	100	3,818,198	100	
Solid Waste[24]	-80,332		-78,818		+2
Total Net GHG	**2,910,354**		**3,739,380**		**+28**
Population	388,222		458,614		+18
GHG per person in Sonoma	7.5		8.2		+9

[21] "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 –2000" U.S. Environmental Protection Agency, 2002, http://yosemite.epa.gov/oar/globalwarming.nsf/UniqueKeyLookup/SHSU5BUKBK/$File/executive_summary.pdf

[22] Greenhouse gas (GHG) is expressed throughout this report, except where otherwise noted, in tons equivalent carbon dioxide (tons eCO2)

[23] Data is for 1992; data for 1990 not available.

[24] Solid waste is negative because solid waste's overall impact is to take GHG out of the atmosphere, following the protocol used for this inventory. Please see page 27 for an explanation.


Solid Waste
Agriculture
Transportation (vehicles only)
Electricity & Natural Gas
Annual GHG (tons-CO2/yr)
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
-500,000
1990
2000

Greenhouse gas emission accounting

Accounting for greenhouse gas emissions, although a relatively new field, has evolved rapidly over the last ten years as pioneer practitioners worldwide standardize methods and protocols for calculating GHG emissions. ICLEI – Local Governments for Sustainability, through its Cities for Climate Protection campaign, is a leader in developing accounting methodology and setting standards for local communities' GHG emission inventories. ICLEI coordinates its work with the California Climate Action Registry,[25] the U.S. Department of Energy, the U.S. Environmental Protection Agency, Canada-based software developers Torrie Smith Associates, and, more recently, State and Territorial Air Pollution Program Administrators-Association of Local Air Pollution Control Officials (STAPPA/ALAPCO). As noted previously, over 600 local governments worldwide participate in ICLEI's Cities for Climate Protection campaign, suggesting the importance of having a standard GHG emission protocol, as well as the role ICLEI plays in promulgating standards.

All accounting methodologies, even in highly advanced fields such as finances, face new challenges and change over time. GHG accounting is especially challenging, first because of the relative newness of its methodology, and second because GHG data source development is also relatively new.

Accounting never exactly represents reality. What is included and excluded is determined by accounting protocol and by the amount of resources devoted to data collection and analysis. For example, this GHG inventory doesn't include emissions from meat consumed locally but produced elsewhere, nor emissions from residents' air travel; it does include emissions from electricity consumed locally even when the electricity is produced elsewhere.

Communities can obtain a good idea of their GHG emissions relatively easily using ICLEI's GHG emissions accounting method, as we intend to demonstrate in this report. In general, the years to be studied are specified, and data - much of it from government sources – is collected and then converted to greenhouse gas emissions using standard coefficients.

Many communities use software to help organize and convert data into emissions and create reports. ICLEI and STAPPA/ALAPCO developed and released new software, called Clean Air Climate Protection Software (CACPS) in 2003 to enable communities to inventory criterion air pollutants and GHG emissions. CACPS was used for most of the calculations in this study.

Base years chosen for this study, 1990 and 2000, correspond with years for other significant data benchmarking, i.e., the U.S. Census. The year 2000 also corresponds to the base year used by the County of Sonoma and Sonoma's nine cities to inventory GHG emissions of their municipal operations.

[25] The California Climate Action Registry, a non-profit public/private partnership, develops protocols for calculating GHG emissions, and provides GHG emissions software called CARROT to participating organizations. The Registry anticipates a carbon trading market in the future, and is now helping businesses establish "credit for early action." The Registry focuses on emission tracking and certifying, primarily for business, while ICLEI focuses on a comprehensive climate protection program for local governments, from pledging to tracking to implementing GHG reduction measures.

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Electricity and natural gas[26]

Electricity originates with some other form of energy - falling water, wind, geothermal steam, nuclear, natural gas, oil, or coal. Electricity from fossil fuels emits relatively more greenhouse gas than electricity from renewable resources, e.g., hydropower, wind, and biomass, as shown in the following table.[27]

GHG emissions	Power plant energy source	
Least	Hydro, wind, solar thermal, biomass	Biomass fuels (such as wood) emit carbon dioxide when burned, but extract carbon dioxide from the atmosphere when they are growing.
?	Geothermal, solar photovoltaic (PV), nuclear	Geothermal steam contains carbon dioxide which is usually vented. The production of PV panels is energy intensive; however, if renewable energy sources were used in their manufacture, then GHG emissions would be minimal. Electricity is needed to produce enriched uranium nuclear fuel, often from coal-powered plants. Waste from nuclear energy generation makes this a controversial energy source.
	Natural gas	Carbon/Hydrogen Ratio[28] (C/H) = 1:4
Most	Oil	C/H = ~1:2
	Coal	C/H = ~1:1

Each power plant has its own emissions coefficient that is based on the type of fuel burned and the plant's thermal efficiency. Thermal efficiency is a function of the power plant's design, and indicates how much of the heat created during combustion becomes electricity. The range for this is about 30 to 60 percent, resulting in wide variation in power plants' emissions coefficients.

California's electricity grid receives power from many locations and energy sources. The mix can vary from one hour to the next. It is impractical to determine the exact amount of greenhouse gas emitted by electricity consumption because this would require identifying the exact sources, coefficients, and mix for the electricity. The U.S. Department of Energy annually determines each state's emissions coefficient based on the average amount of power supplied from various sources. The coefficient used for this report is 0.73 lbs of equivalent carbon dioxide emitted for every kilowatt hour consumed.[29]

The impact of "green" power generation is demonstrated by the following two examples. If California's electricity came exclusively from coal, the state's GHG emissions for electricity would be about three times higher. If California's electricity were as green as that used in the City of Healdsburg - supplied by the Northern California Power Authority rather than PG&E - the state would cut its GHG emissions for electricity by more than half.

[26] Although Sonoma County relies almost solely on natural gas, other jurisdictions following Sonoma County's inventory model should count in this section any oil and coal combusted for stationary consumption.
[27] Harnessing power from hydro, wind, solar thermal, and biomass sources currently relies on some use of fossil fuel, for example, in the manufacture of photovoltaic panels, and the fuel used in transporting firewood.
[28] Differences among fossil fuels are caused primarily by the fuel's ratio of carbon and hydrogen: the more carbon, the more carbon dioxide.
[29] Coefficient used in CACP software; it is derived from the Department of Energy, and based on the grid region.

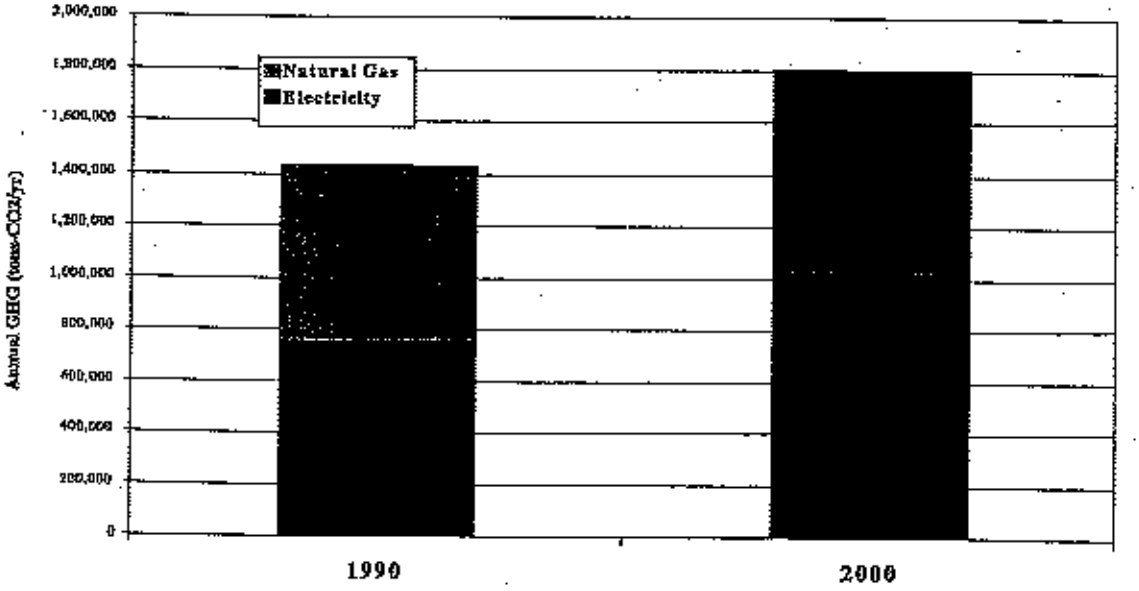
Converting natural gas usage to GHG emissions requires no coefficient specific to time or place. Natural gas is almost entirely methane. Each molecule of methane becomes one molecule of carbon dioxide upon combustion, equal to about 12 pounds of carbon dioxide released for each therm of natural gas consumed.[30]

Steps for calculating GHG emissions from electricity and natural gas:

1. Obtain electricity (kilowatt-hours) and natural gas (therms) data from the California Energy Commission. This data is organized by the following SIC sectors: residential, commercial, industrial, agricultural and water pumping, and other. The SIC sector definitions for these categories are based on SIC code classifications of economic activity within the county.
2. Enter this data into the CACP software to compute GHG emissions.
3. Obtain the following data from the U.S. Census using SIC codes:
    a. Total population
    b. Number of commercial establishments
    c. Number of employees
    d. Number of industrial establishments, including agriculture and water pumping, non-agricultural and other (includes airports, postal service, sewer, street lighting, communication, and military)
4. Enter these census figures into the software to compute per capita, per employee, and per establishment emissions.

Results for Sonoma County

From 1990 to 2000, total electricity use in Sonoma County increased by 29 percent, and natural gas use increased by 14 percent. GHG emissions from electricity and natural gas use combined increased 26 percent. Electricity and natural gas account for 47 percent of Sonoma County's total GHG emissions in 2000. These emissions are associated primarily with energy use in buildings, and are from all sectors - residential, commercial, and industrial.



[30] Please note that regional variations exist for fossil fuels other than natural gas.

Electricity, natural gas, and GHG emissions, Sonoma County[31]

	1990			2000			
	kWh (millions)	therms (millions)	Total GHGs (tons)	kWh (millions)	therms (millions)	Total GHGs (tons)	% change GHG
Residential - total	**988**	**76**	**810,123**	**1,213**	**83.6**	**958,627**	**+18**
Per capita[32]			*2.1*			*2.1*	*0*
Per household[33]			*5.4*			*5.6*	*+4*
Commercial - total	**743**	**22**	**392,423**	**997**	**27.8**	**535,368**	**+36**
Per capita			*1.0*			*1.1*	*+10*
Per commercial employee[34]			*4.2*			*4.7*	*+12*
Per commercial establishment[35]			*43.1*			*54.7*	*+27*
Industrial - total	**455**	**11.5**	**228,450**	**606**	**14**	**310,163**	**+36**
Agriculture & water pumping	86	2	42,134	94	2.3	48,388	+14
Per employee[36]			*324.1*			*806.5*	*+149*
Per establishment[37]			*2340.8*			*3,225.9*	*+38*
Non-agriculture industrial	298	9	158,786	383	10	203,970	+12
Per employee[38]			*5.4*			*4.8*	-11
Per establishment[39]			*63.4*			*72.4*	+14
Other[40]	71	0.5	27,531	129	1.7	57,804	+101
Per employee[41]			*4.8*			*8.1*	*+69*
Per establishment[42]			*64.0*			*137.6*	*+115*
Total energy use - all sectors	**2,186**	**109.5**		**2,816**	**125**		
Total tons GHGs - all sectors	756,896	674,100	1,430,996	1,026,493	777,665	1,804,158	+26

[31] Energy use data supplied by Andrea Gough, California Energy Commission, 1516 9th Street, MS-22, Sacramento, CA 95814, (916) 654-4928, fax (916) 654-4901, agough@energy.state.ca.us. Figures do not include fuel such as heating oil, propane, and diesel for powering individual generators. Please note that Cities for Climate Protection protocol specifies that emissions from water and waste pumping, and from street and traffic lighting be counted as part of government operations.

[32] Population – 1990:388,222; 2000:458,614. 18% increase in population.

[33] Households – 1990:149,011; 2000:172,403. 16% increase in households.

[34] 1990: 92,936 employees; 2000: 114,922 employees. 24% increase in commercial employees.

[35] 1990: 9,096 establishments; 2000: 9,792 establishments. 8% increase in commercial establishments.

[36] 1990: 130 employees; 2000: 60 employees. 54% decrease in Ag & Water Pumping employees

[37] 1990: 18 establishments; 2000: 15 establishments. 17% decrease in Ag & Water Pumping employees.

[38] 1990: 29,324 employees; 2000: 42,505 employees. 45% increase in Non-Ag Industrial employees.

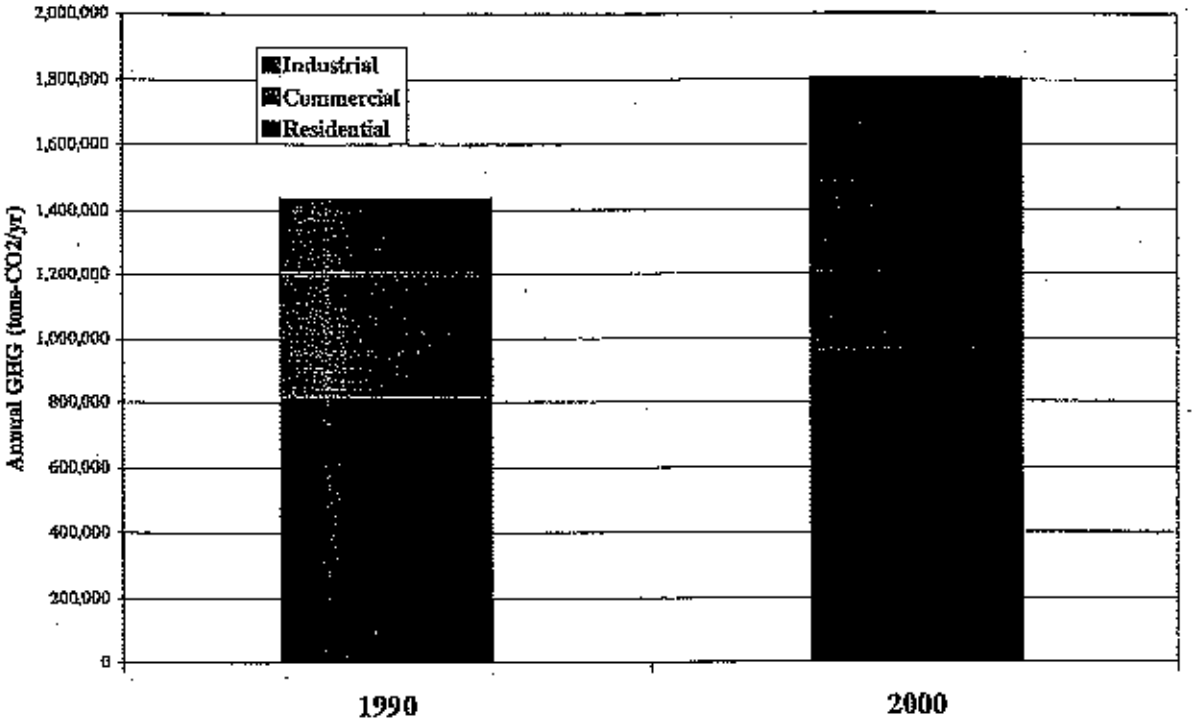
[39] 1990: 2,503 establishments; 2000: 2,819 establishments. 13% increase in Non-Ag Industrial establishments.

[40] Airports, postal service, sewer, street lighting, communication, and military

[41] 1990: 5,777 employees; 2000: 7,109 employees. 23% increase in Other Industrial employees.

[42] 1990: 430 establishments; 2000: 420 establishments. 2% decrease in Other Industrial establishments.

Sonoma County Greenhouse gas emissions, electricity and natural gas: Industrial, commercial, residential



Energy efficient aeration blowers at the Laguna Wastewater Treatment Plant

The City of Santa Rosa installed new efficient aeration blowers at their wastewater treatment plant. The new blowers are estimated to use 50 percent less energy than the previous blowers, reduce over 1,200 tons of greenhouse gas emissions per year, and save more than $400,000 per year. This GHG reduction is equivalent to the electricity use of 600 single family homes, or 13 trips to the moon in a 25 mpg car. Through this project, the city saves $125 for every ton of GHG reduced.

From "Standing Together for the Future." Find reference in Resources page 47.

Transportation

Vehicles on Sonoma County roads were the only source of GHG emissions considered for this study's transportation sector. Air travel was beyond the study's scope, and is not generally part of the Cities for Climate Protection or other GHG emissions inventory protocol.

Most vehicles on Sonoma County roads are powered by fossil fuel, primarily gasoline and diesel, which are major GHG contributors. Therefore, as the amount of driving increases, so does the amount of greenhouse gas emitted. According to the Sonoma County Transportation Authority, population growth in the county combined with greatly increased number of vehicles per person is leading to more vehicle miles traveled, more congestion, longer trips and poorer air quality.[43] Reflecting this finding, vehicle miles traveled in Sonoma County increased a dramatic 42.5 percent between 1990 and 2000, more than twice the rate of the county's 18 percent population increase.[44] The future will bring even more vehicle miles and congestion in Sonoma County, according to a study from the Association of Bay Area Governments that projects increases in the number of jobs, residents, and commuters.[45]

One major factor in Sonoma County's vehicle miles traveled is the number of commuters who drive alone. In the Bay Area, Sonoma is second only to Napa for the number of residents who drive alone to work. The reasons for driving alone given most frequently by Sonoma commuters are difficulty finding carpool partners, a lack of direct transit service, and irregular work hours. Compared with the rest of the Bay Area, Sonoma's carpool and bicycle rates are slightly above average, while use of transit modes is lower.[46]

Sonoma County Primary Commute Mode

Drive Alone	72%
Carpool	19%
Bus	3%
Walk	3%
Bicycle	2%
Motorcycle	1%
Telecommute	1%
Vanpool	<1%

The importance of the relationship between city-centered living and climate protection is shown in the map on page 21. On average, those who live in urban parts of Sonoma County travel fewer miles and produce fewer greenhouse gas emissions.

[43] "Keeping Sonoma County Moving," Comprehensive Transportation Plan, Sonoma County Transportation Authority, June 2004, http://www.sonoma-county.org/scta/CTP2004.htm

[44] Metropolitan Transportation Commission data is available on the following sites:
http://www.mtc.ca.gov/datamart/stats/vmt.htm for average daily VMT
http://www.mtc.ca.gov/datamart/stats/vmt9095.htm for select annual VMT totals

[45] Smart Growth Strategy/Regional Livability Footprint Project, Policy-based projections 2003, Association of Bay Area Governments, http://www.abag.ca.gov/planning/smartgrowth/projections.html

[46] "Commute Profile, October 2003," Rideshare.511, http://rideshare.511.org/research/pdfs/cp_sonoma_cp03.pdf

Steps for calculating GHG emissions from transportation:

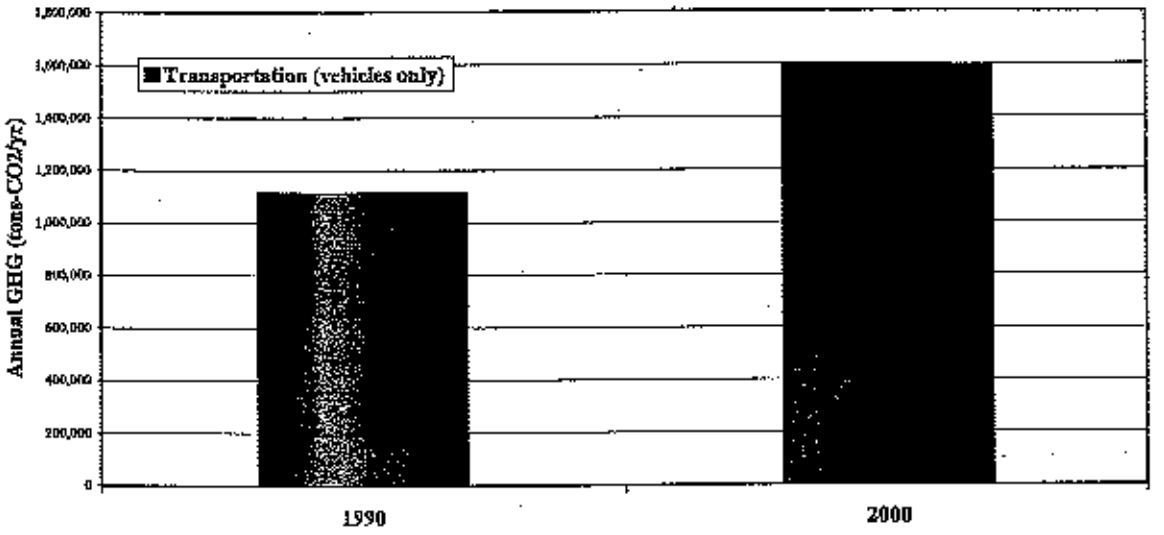
1. Obtain the number of total daily vehicle miles traveled (VMT) from the Metropolitan Transportation Commission (MTC), and multiply by 365 to calculate annual VMT.[47]
2. Using state averages available from the MTC, break down VMT figures using a complex breakdown based on vehicle type and size class. CACP software performs this step.
3. Calculate the number of gallons of fuel used given average fuel efficiency of each type of vehicle.[48] CACP software performs this step.
4. Convert estimated gallons of gasoline and diesel combusted in Sonoma County vehicles into GHG emissions. CACP software also performs this step.

Results for Sonoma County

Transportation from vehicles was responsible for 42 percent of total greenhouse gas emissions in Sonoma County in 2000. From 1990 to 2000, GHG emissions from vehicle transportation increased by 42.5%.

Transportation and GHG emissions, Sonoma County

	1990	2000	% change
Daily Average vehicle miles traveled (VMT)[49]	5,873,500	8,368,000	
Annual VMT	2,144,000,000	3,054,000,000	
GHG from transportation	1,115,000	1,589,000	+42.5%

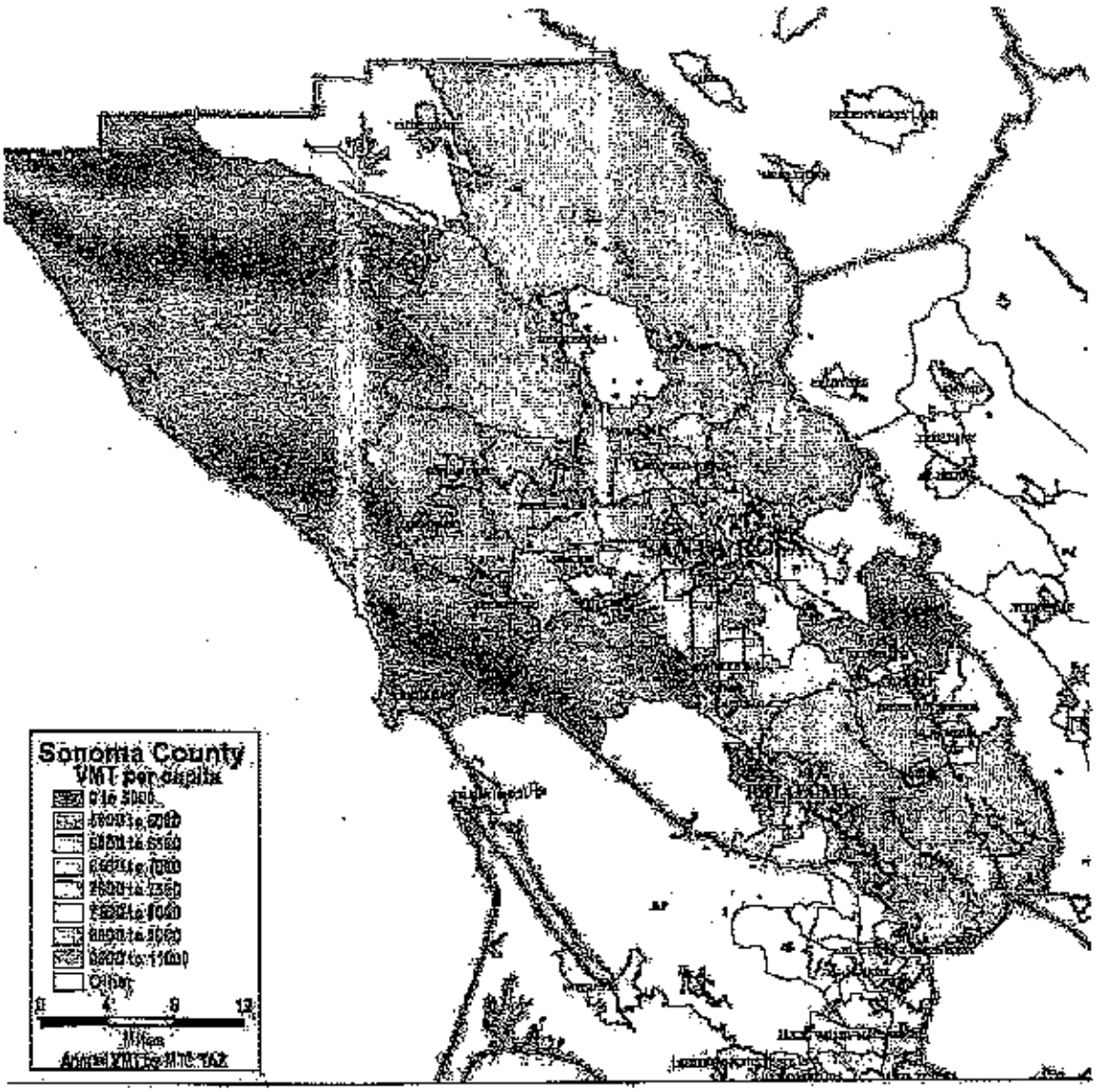


[47] To account for decreases in driving on the weekend, many analysts recommend using 320 instead of 365 as the multiplier for converting daily to annual VMT. In the Bay Area, driving increases on the weekend; for this reason we used 365 for this report.

[48] State averages include gasoline and diesel but not alternatives such as biodiesel. It is assumed that such alternatives represent an insignificant amount of overall transportation fuel. Note: State averages for fuel efficiency may not accurately reflect average fuel efficiency for Sonoma vehicles.

[49] Metropolitan Transportation Commission data is available on the following sites:
http://www.mtc.ca.gov/datamart/stats/vmt.htm for average daily VMT
http://www.mtc.ca.gov/datamart/stats/vmt9095.htm for select annual VMT totals

Location of residence is correlated to miles traveled



This map shows the relationship between residence location and vehicle miles traveled. In general, the farther from the urban core, the more miles traveled and the more greenhouse gas produced through transportation.[50]

[50] Joel Woodhull created the map using data from an analysis conducted by John Holtzclaw who used smog check records from the mid 1990's to obtain vehicle miles traveled per registered vehicle. The areas defined by various colors are traffic analysis zones used by the Metropolitan Transportation Commission. For more information: www.sonomatic.org

Agriculture

Agricultural activities such as livestock management, use of agricultural equipment, fertilizer application, and conversion of land for agricultural purposes produce greenhouse gas. Calculating the GHG emissions from these agricultural activities is more demanding than for other sectors in this study. In fact, after considerable research, it was determined that data unavailability and the complexity of calculations would prevent inclusion of agricultural activities other than livestock in this study.[51] It is worth noting that CACP software does not include an agriculture section, likely because of the difficulties cited above, and because most communities that conduct GHG inventories are urban.[52]

Regarding the potential for climate protection through increased sequestration of carbon dioxide, some estimates calculate that terrestrial ecosystems now absorb approximately 10 percent of the annual GHG emissions from fossil fuel combustion.[53] While terrestrial ecosystems are expected to continue absorbing carbon from the atmosphere, their capacity to do so is unknown.[54]

Emissions from livestock include methane from flatulence and manure, followed by nitrous oxide from nitrogen compounds that are released as manure decomposes. GHG from livestock is considered human-caused for two reasons. People control the animal population to provide human food and other services, and the practice of keeping animals in high concentrations causes their manure to produce more gas as it decays than it would under unmanaged conditions. Manure concentrated in waste lagoon undergoes anaerobic digestion, resulting in significant methane production. When manure is allowed to decompose naturally in the field, aerobic digestion of the manure produces little or no methane.

Methane and other biogas are untapped sources of renewable energy. Innovative ventures have demonstrated how this waste can become fuel, as shown in the inset box shown on page 24.

[51] Examples of resources that address GHG emissions from agricultural activities include: US EPA, Greenhouse Gas Mitigation Assessment: A Guidebook, Chapter 7: Agricultural Sector, and "Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories," Chap. 4, IPCC, 2000.

[52] A USEPA spreadsheet tool supplied by Ryan Bell, ICLEI, was used for this report.

[53] Watson, R. T., M. C. Zinyowera, et al., eds. 1996. *Climate Change 1995—Impacts, Adaptations and Mitigation of Climate Change: Scientific-Technical Analyses*. New York: Cambridge University Press.

[54] "The Institutional Dimensions of Carbon Management," from Institutional Dimensions of Global Environmental Change (IDGEC), 2000. http://dlc.dlib.indiana.edu/archive/00000342/00/canadcllp041300.pdf

Steps for calculating GHG emissions from livestock.

1. Determine the number of livestock.[55]
2. Calculate the methane and nitrous oxide emitted by livestock and their manure.[56]
3. Convert the methane and nitrous oxide to equivalent tons of carbon dioxide using standard conversion factors.[57]

The simplicity of these three steps belies the intricacies of performing such calculations, as detailed in the footnotes below.

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[55] Livestock population data for this study were taken from the Census of Agriculture produced by the National Agriculture Statistics Service (NASS) and the U.S. Department of Agriculture, and from the Sonoma County Agricultural Crop Report. Supplemental data was obtained from Stephanie Larson, Livestock Range Advisor, Sonoma County Agriculture Extension Office, University of California, Davis. This data was especially important for cattle populations. For example, the census provides the population counts for mature cows and the total cattle population, but not for the subpopulations of bulls and calves. Thus, a method for estimating these subpopulations was required. Because census data populations did not perfectly match the populations for which counts were needed, assumptions, e.g., 1 bull for every 100 cows, had to be made which may have introduced a small source of error. To estimate bull populations, it was assumed that for every 100 cows, beef farms kept 4 bulls and cattle farms kept 1 bull. To estimate calf populations, every adult cow was assumed to have one calf. Of these, 20% become "replacement calves." For every 100 cattle, there are thus 20 replacement calves 0-12 months of age and 20 replacements 12-24 months of age (the 12-24 month replacements should actually be 20% of last year's population, but the census does not occur annually). The other 80% of the calves are typically sold when they're six months old. Thus, in addition to the 20 calves (per 100 adults) that are replacement calves 0-12 months old, there are 80 calves kept for one-half of the year, or approximately 40 additional calves 0-12 months old (per 100 adults). Thus, the population of replacement calves 0-12 months old was 60% of the adult cow population, while the population of replacement calves 12-24 months old was 20% of the adult cow population. The appropriateness of this population estimation method was confirmed by observing that it yielded total cattle populations very close to the actual county total as counted by the census. For the three years considered, percentage error ranged from was 1.3%, 0.4%, and 8.9%. (Because calves are born in different seasons, it is reasonable to assume that at any given time, half of that year's calves will be present for counting.) When calculating emissions, however, this estimation method may slightly overestimate emissions because a calf kept until 6 months of age will produce less than half of the emissions of a calf kept from birth to age 1, because emissions increase with size. However, a more appropriate scalar for calf emissions could not be found.

[56] Calculations follow the process prescribed by the U. S. Environmental Protection Agency, Emission Inventory Improvement Program (EIIP) handbook, volume 8, October 1999, Chapters 6 and 7. Equations, conversion factors, and national averages used for typical animal mass and other similar values were found in this report. To calculate the amount of methane released directly by livestock, the population of that animal was multiplied by the pounds of methane typically released annually by that animal. To calculate the amount of methane released from manure decomposition, the number of livestock was multiplied by the typical animal mass, the typical weight of solids produced per animal mass and the amount of methane produced per unit of solids. The latter value was calculated using a weighted average of the different manure management methods used in the county and these methods' methane conversion rates. To calculate the amount of N_2O released from manure decomposition, the number of each type of livestock was multiplied by the typical animal mass for that type, the Kjeldahl N/year/animal mass, the percentage of manure managed (as opposed to being deposited on the range or paddock), and a conversion factor of 80% which represents the amount of elemental nitrogen that is not volatized to NH_3 or NOx and thus remains to potentially become N_2O. This calculation determines the amount of elemental nitrogen annually present in Sonoma County's managed manure. To calculate the amount of elemental nitrogen becomes N_2O, the kg/year of unvolatized N was multiplied by a conversion factor for each type of manure management system weighted by the percentage of manure managed in that system. Because fewer manure management conversion factors were provided, these calculations were less precise than those for methane, reducing the calculation's accuracy slightly. In calculating the releases of nitrogen and methane as manure decomposes, for dairy cattle, the EPA calculation method only offers nitrogen and methane conversion values for "heifers," (female cattle that have not calved over 500 pounds). It gives no value for calves under 500 pounds. Nor did the subpopulation categories already calculated (determined by age) line up with these new categories (determined by weight). Therefore, it was assumed that all calves 12-24 months represented a heifer, while all calves 0-12 months of age (a figure that includes those 80 calves kept for one-half the year) represented one-half of a heifer. To calculate the amount of nitrogen and methane released from manure decomposition, assumptions had to be made about the proportion of farms using particular manure management techniques. Percentages of farms employing particular manure management practices, such as deep pit, pasture, and anaerobic lagoon, were estimated by Stephanie Larson, UC Davis, for cattle and sheep, by Michael Murphy, UC Davis, for horses, and by individual animal raisers for turkeys. Where not specified, values (e.g. typical animal mass, methane conversion rates) are national or state averages supplied by the U.S. EPA EIIP handbook. For beef farms, it was assumed that 100% of the manure was deposited on the range. For dairy farms, it was assumed that 70% of the manure was managed in anaerobic lagoons, 15% was managed in drylots, and 15% was deposited on the range. We assumed that manure management methods have been relatively constant over time.

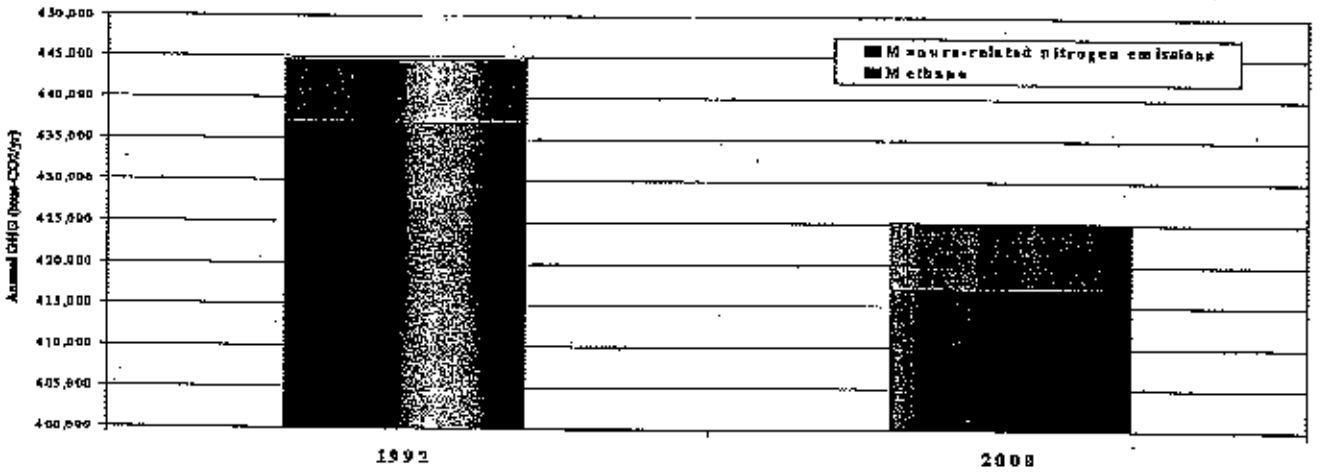
[57] Restating what was previously noted: Various types of GHG, e.g., CH_4 and N_2O, are converted to measures of equivalent carbon dioxide (eCO_2) to enable calculations with and comparisons among the various types of GHG.

Results for Sonoma County

Livestock account for 11 percent of Sonoma County's GHG emissions in 2000. Decreases in GHG emissions for the study period correspond to decreases in the number of livestock.

GHG emissions from livestock

	1992[58]		2000		% change
Methane (CH_4) - tons	20,813		19,863		-5
Methane converted to equivalent CO_2- tons		437,066		417,115	-5
Manure-related nitrogen emissions (nitrous oxide) converted to equivalent CO_2 - tons		7,624		7,925	+4
Total GHG (equivalent CO_2 - tons)		444,690		425,040	-4



Cows generate electricity - Methane digester also breaks down waste

Marin County rancher Albert Straus runs his family's dairy farm, organic creamery, and electric car from manure generated by his 270 cows. On Thursday, Straus switched on a 75- kilowatt generator. His electricity meter began running backward, indicating that power originating from a nearby poop-filled lagoon was feeding PG&E's power grid. The farm's new $280,000 system signaled a breakthrough for the state's dairy industry.

The Straus Farms' methane generator is expected to save between $5,000 and $6,000 per month in energy costs. Straus estimates he will pay back his investment in two to three years. Straus' new methane digester will also eliminate tons of greenhouse gases and strip 80 to 99 percent of organic pollutants from wastewater. Heat from the generator warms thousands of gallons of water that may be used to clean farm facilities and to heat the manure lagoon. Wastewater left over after the methane is extracted is used for fertilizing the farm's fields.

Taken from an article by Maria Alicia Gaura, **San Francisco Chronicle**, Friday, May 14, 2004. Full text of the article posted at: http://sfgate.com/cgi-bin/article.cgi?file=/c/a/2004/05/14/BAGJG6LG3R15.DTL

[58] Data for 1990 unavailable.

Fetzer Vineyards: GHG Emission Case Study for Agriculture

Fetzer Vineyards, headquartered in Hopland, California, is the sixth largest vineyard by total sales in the United States. The California Climate Action Registry selected Fetzer as a case study to demonstrate how an agricultural producer can calculate its impact on the climate. The prominence of wine renders this study relevant to Sonoma County as well as to California.

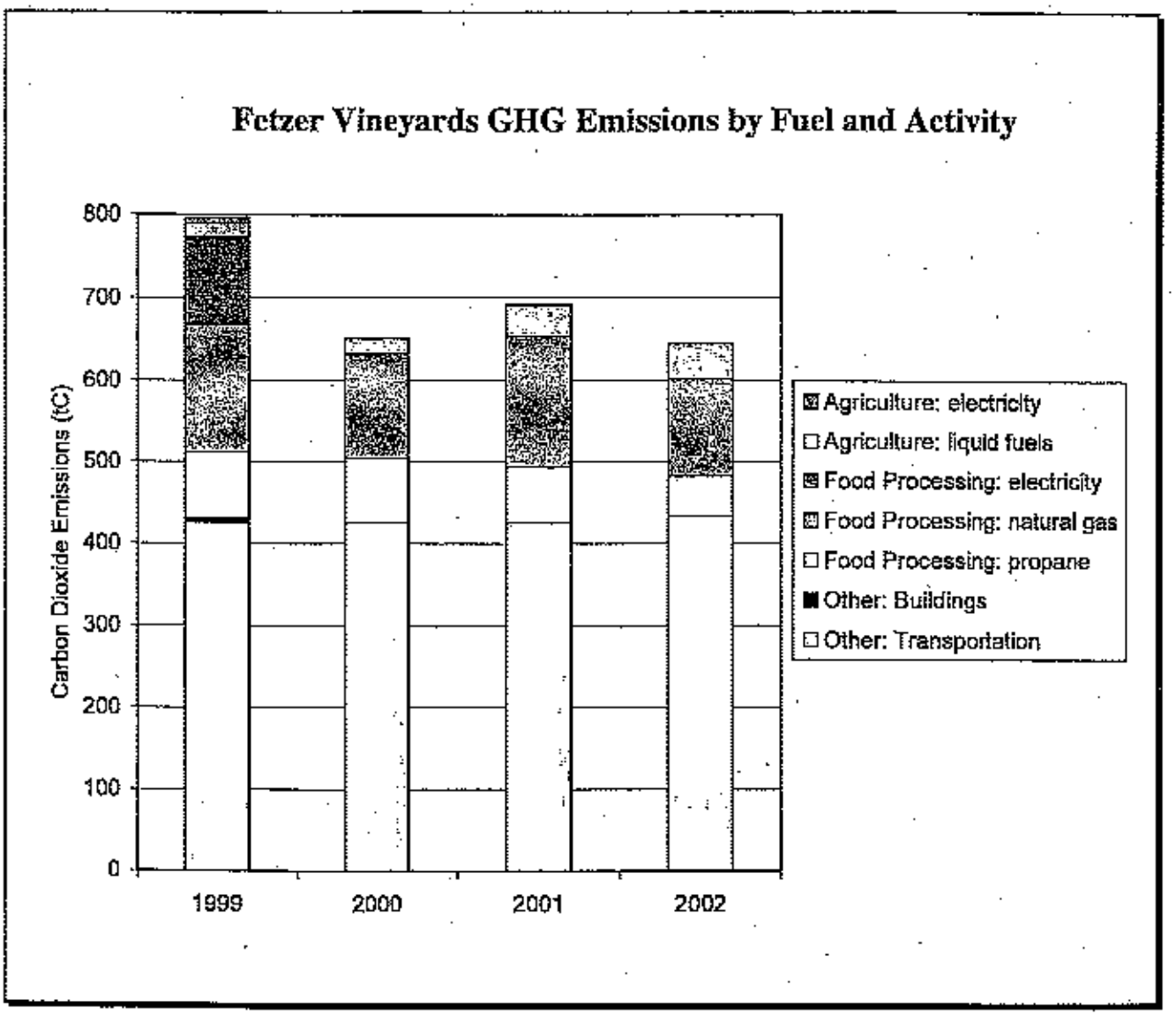
Fetzer, a recognized industry leader in the area of energy and environment, has taken several actions to reduce its GHG emissions. With the advent of competition for retail electricity in 1998, Fetzer became the first winery to purchase 100% renewable power. In addition to numerous projects to reduce electricity consumption, roughly 50,000 kWh are produced on site by solar photovoltaic panels. In 2002, Fetzer also substituted approximately 9,000 gallons of diesel with 100% biodiesel from soybean oil. Recently, Fetzer has also undertaken energy efficiency measures that have significantly reduced its consumption of natural gas.

To inventory Fetzer's GHG emissions, Fetzer's electricity consumption for 1999 were converted to eCO_2 emissions using an emissions coefficient factor specific to Pacific Gas and Electric Company, the utility serving Fetzer Vineyards. Emissions for 2000 through 2002 were assumed to be zero because Fetzer purchased renewable electricity beginning in May 1999.

The following figure shows Fetzer's GHG emissions by economic activity and fuel. As can be seen, GHG emissions at Fetzer, which are dominated by the transportation-related consumption of liquid fuels, dropped significantly after 1999 due to the change to renewable electricity in 2000. Overall, GHG emissions dropped an average of 2.2% per year between 1999 and 2002. Of the fuel-consuming activities, emissions dropped 8.7% per year on average from natural gas used for food processing, and propane emissions dropped 15.5% per year. Liquid fuel consumption for agricultural crop production grew an average of 39.2% per year during this period.

Note: This study took into account only GHG emissions resulting from company activity, e.g., building energy use and transportation fuel. Another significant source of GHG emissions may be the CO2 emitted by fermentation of grapes. Wineries may be able to capture this CO2, preventing it from being released into the atmosphere; there may also be commercial applications for such CO2. In general, GHG inventories look at anthropogenic sources, i.e., combustion of fossil fuels, and are not concerned with CO2 that is part of the "natural" carbon cycle, for example vines that take in CO2 as they grow, and release CO2 when they and grapes are composted/fermented.

From "Evaluation of Metrics and Baselines for Tracking Greenhouse Gas Emission Trends: Recommendations for the California Climate Action Registry," By Lynn Price, Scott Murtishaw, and Ernest Worrell of the Lawrence Berkeley Laboratory, June 2003, http://eetd.lbl.gov/ea/jes/iespubs/53027.pdf


Fetzer Vineyards GHG Emissions by Fuel and Activity
Carbon Dioxide Emissions (tC)
800
700
600
500
400
300
200
100
0
1999
2000
2001
2002
Agriculture: electricity
Agriculture: liquid fuels
Food Processing: electricity
Food Processing: natural gas
Food Processing: propane
Other: Buildings
Other: Transportation

Solid Waste

This study counts only GHG emissions from landfilled solid waste, not the emissions released when the materials were manufactured. An explanation for this is offered below.

Landfilling can result in a positive or negative contribution to a city's GHG emissions, depending on the type of waste and on the management of the waste in the landfill. When carbonaceous material such as paper is buried in a landfill, part of its carbon is sequestered. This means it can no longer enter the atmosphere as greenhouse gas. The remainder of the carbon decomposes to methane, a potent greenhouse gas, and carbon dioxide.

When methane is allowed to escape to the atmosphere, net GHG emissions from solid waste is positive and substantial. However, an estimated 70 percent of the Sonoma County landfill's methane is captured and used to generate electricity that is sold to PG&E. More information about the County's landfill energy generation is offered in the inset box on the following page.

The net effect of landfilling solid waste when employing this accounting method is to offset, or reduce, a community's overall GHG emissions. However, the amount of GHG sequestered when solids are landfilled offsets only a fraction of the amount of GHG produced when those same materials were manufactured. For instance, manufacturing a ton of office paper generates 3 tons of GHG. Landfilling that ton of office paper will only offset about 0.5 tons of the emissions from manufacture, depending on the landfill operation.

To prevent double counting, manufacturing emissions are not part of a community's GHG inventory; instead they accrue to the manufacturer. The complete picture of solid waste's GHG impact emerges through an economy-wide inventory. Communities are given credit in ICLEI's accounting protocol later when they reduce and recycle solid waste, measures that result in carbon sequestration in forests and avoided emissions from manufacturing.

The methodology for calculating solid waste GHG emissions differs from that used in other sectors where emissions actually released during a given year are calculated. For solid waste the calculation is based on the total amount of emissions produced over time by the solid waste generated in a given year. This approach is preferable because it more accurately reflects the atmospheric pollution occurring due to a community's actions in a given year, and because interventions such as recycling will more readily appear when tracking reduction measures.

Because of the many types of solid waste and the various ways to process them, including methane recapture, calculating their corresponding GHG emissions is complex. CACP software includes custom emissions coefficients to facilitate making these calculations.

Steps for calculating GHG emissions from solid waste:

1. Determine the tons of solid waste produced in the subject year(s) by residential and commercial sectors[59].
2. Estimate, by percentages, the composition of both residential and commercial waste using the Solid Waste Characterization Database produced by the California Integrated Waste Management Board (CIWMB).[60]
3. Convert CIWMB solid waste characterization categories and percentages to CACP software categories and percentages for both residential and commercial sectors.[61]
4. Enter the landfill type in the software by choosing from the available menu, and enter the methane recovery factor.[62]
5. Convert solid waste tonnage into GHG emissions using the CACP software.

Sonoma County turns trash into power and cash

By capturing methane and converting it to electricity, the County of Sonoma reduced 103,046 tons of greenhouse gas and generated 51,045 MWh of power at its landfill in 2001, according to a study done by Edwin Orrett for the County of Sonoma. Among various GHG reduction measures, such as photovoltaics, hybrid cars, and natural gas buses, methane capture and use for electricity at the landfill produced the greatest amount of greenhouse gas savings per dollar spent, according to Orrett's study.

By July 2004, Sonoma's landfill power plant is expected to have ten generators producing 7.5 megawatts of electricity, enough to power 7,500 homes, or a town about the size of Windsor. Revenue from the sale of the electricity will be about $600,000 per year. With the new generators, Sonoma County's landfill power plant will be the tenth largest in California. Only 57 of the State's 172 active landfills operate power plants.

Orrett's study is listed under Resources, page 47. The Sonoma County Waste Management Agency provided the 2004 data cited above. Please note that the GHG accounting methodology used in this report represents a refinement of the methodology used by Orrett for Sonoma County's GHG emissions inventory. Therefore, solid waste GHG figures found in these two studies are not comparable.

[59] Solid waste data is available from local waste management agencies and from the California Integrated Waste Management Board (CIWMB).

[60] The CIWMB database estimates the composition of waste typically disposed by single family and multifamily residences and by businesses in California.

[61] CACP software categories are Paper Products, Food, Plant Debris, Wood/Textiles, and All Other Waste. The CIWMB characterization has significantly more categories; these are combined to determine the percentages used in the CACP software.

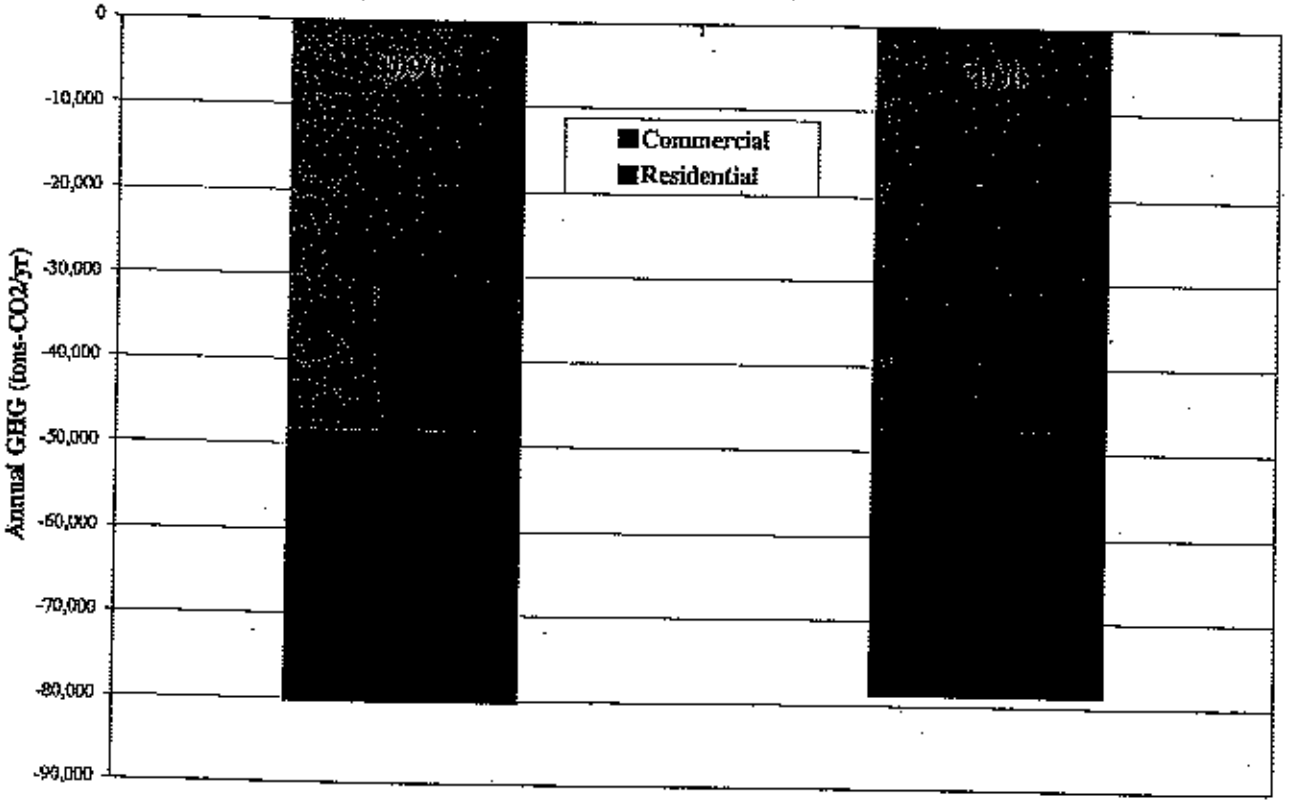
[62] The 70% methane recovery factor for Sonoma County was provided by Ken Wells, Director of the Sonoma County Waste Management Agency.

Results for Sonoma County

Solid waste landfilled in Sonoma County resulted in an overall reduction in GHG emissions. GHG sequestered by landfilling and methane conversion offset about 2 percent of Sonoma County's total GHG emissions in 2000.

Solid waste and GHG emissions [63]

	1990		2000		% change
	Solid waste - tons	GHG - tons	Solid waste - tons	GHG - tons	GHG - tons
Residential	297,828	-48,446	292,285	-47,545	2%
Commercial	243,677	-31,886	239,142	-31,273	2%
Total	541,505	-80,332	531,427	-78,818	2%



[63] Data supplied by Donna Caldwell, Sonoma County Waste Management Agency, (707) 565-3587.

Solid Waste Characterization, Sonoma County[64]

Solid waste CAWRS categories	Residential	Commercial
Paper	27.5%	32.4%
Food	17.0%	18.1%
Plant	16.1%	6.0%
Wood, textiles	4.3%	7.6%
All other	35.1%	35.9%
Total	100%	100%

Paper vs. electronic news: Small choices add up to big differences

Researchers studied the environmental impacts of the industrial processes needed to supply the ***New York Times*** to a Berkeley resident for one year. They found that the newsprint version produces about 54 times more carbon dioxide than does receiving the same information electronically. Other air pollutants were also significantly higher for newsprint, as reflected in the table that follows.

Annual emissions - kilograms	CO_2	NOx	SOx
Newsprint - per reader, assuming 2.6 readers per issue	270	0.9	1.4
Newsprint - 1.2 million readers	324 million	1.08 million	1.68 million
Electronic - per reader	5	.004	.004
Electronic - 1.2 million readers	6 million	4,800	4,800
Newsprint: Electronic	**54:1**	**225:1**	**350:1**

Environmental Science and Technology, June 1, 2004, as reported in **Science News**, June 12, 2004.

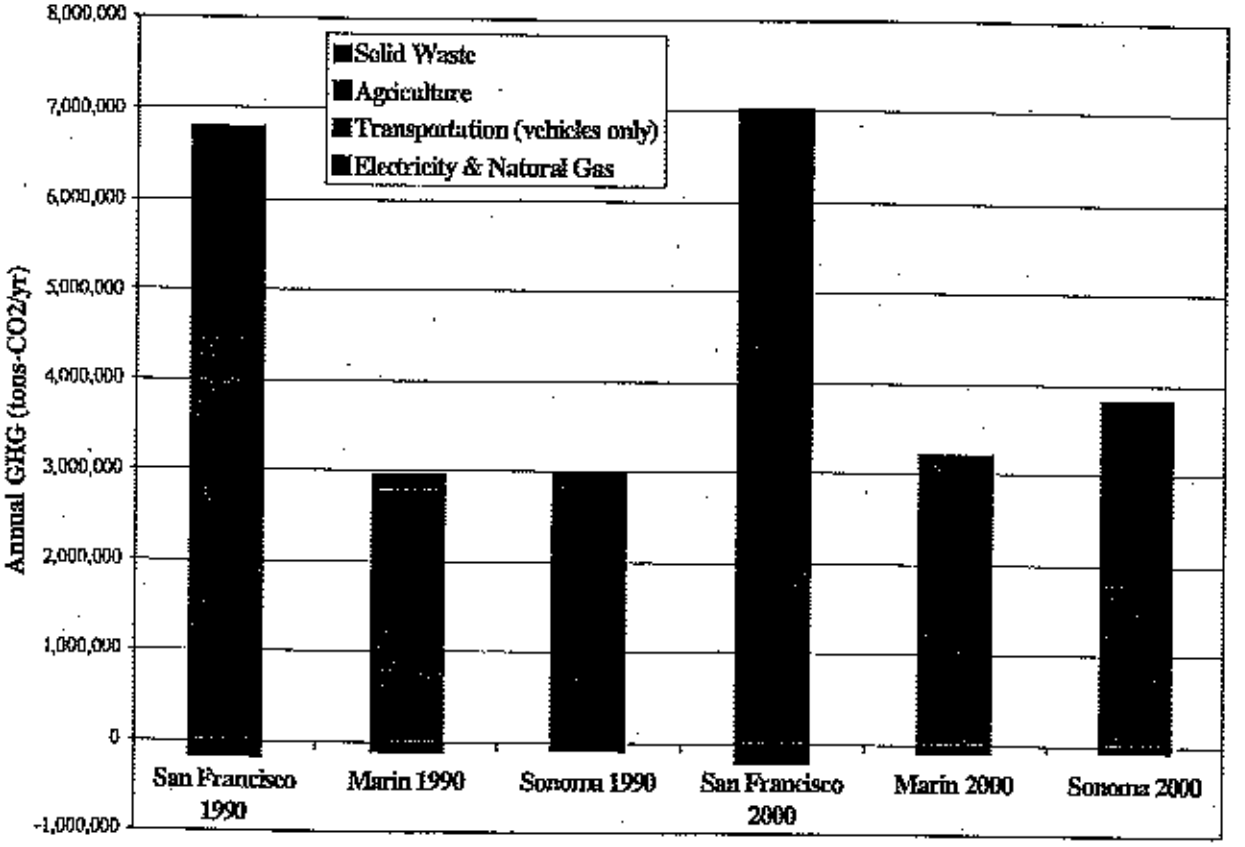
[64] Data from the California Integrated Waste Management Board. Total tonnage for each jurisdiction is computed using regional per capita disposal rates obtained in the 1999 Statewide Waste Characterization Study. http://www.ciwmb.ca.gov/wastechar/rescomp.asp?J=639&SortBy=Disposal

Marin, San Francisco, Sonoma comparison

	1990			2000			% change		
	Marin [65]	San Francisco[66]	Sonoma	Marin	San Francisco	Sonoma	Marin	San Francisco	Sonoma
Electricity & natural gas									
Residential	*724,835*	*1,717,488*	*810,123*	*797,499*	NA	*958,627*	*+10*	NA	*+18*
Commercial	*469,933*	*1,878,814*[67]	*392,423*	*562,434*	NA	*535,368*	*+20*	NA	*+36*
Industrial	*36,609*	*893,764*	*228,450*	*15,145*	NA	*310,163*	*-59*	NA	*+36*
Total	1,231,377	4,490,066	1,430,996	1,375,078	4,612,505	1,804,158	+25	+3	+26
Transportation[68]	1,542,175	2,320,000	1,115,000	1,649,116	2,420,000	1,589,000	+7	+4	+43
Ag. & water pumping	197,376	NA	444,690[69]	183,462	NA	425,040	-7	NA	-4
Solid Waste	-116,204	-185,490	-80,332	-94,091	-217,087	-78,818	+13	+2	+2
Total GHG	2,854,724	6,624,576	2,910,354	3,113,565	6,815,418	3,739,380	+9	+3	+28
Population[70]	230,096	723,959	388,222	247,289	776,733	458,614	+7	+7	+18
Tons GHG per person	12.4	9.2	7.5	12.6	8.8	8.2	+2	-4	+9

[65] Marin figures from County of Marin Greenhouse Gas Emissions Analysis Report, June 2003.
[66] San Francisco figures from San Francisco Community Action Plan, http://temp.sfgov.org/sfenvironment/aboutus/energy/cap.pdf or www.sfenergy.org. Additional information from Danielle Dowers, Utility Specialist, San Francisco Public Utilities Commission, Nov. 2004.
[67] Includes municipal operations.
[68] In San Francisco's Community Action Plan report, transportation figures include intraregional trips. However, Marin and Sonoma's transportation figures do not include intraregional trips; therefore, we subtracted San Francisco's intraregional trips from their transportation figures above for comparison purposes.
[69] Data is for 1992; data for 1990 not available.
[70] Population data from U.S. Census, http://census.abag.ca.gov/counties/counties.htm

Marin, San Francisco, Sonoma greenhouse gas emissions, 1990, 2000



California Context[71]

California uses less fossil energy to generate electricity than the rest of the United States. California's lower reliance on fossil fuel is due to the availability of hydroelectric and nuclear power, and to the State's continuing and growing use of renewable energy.

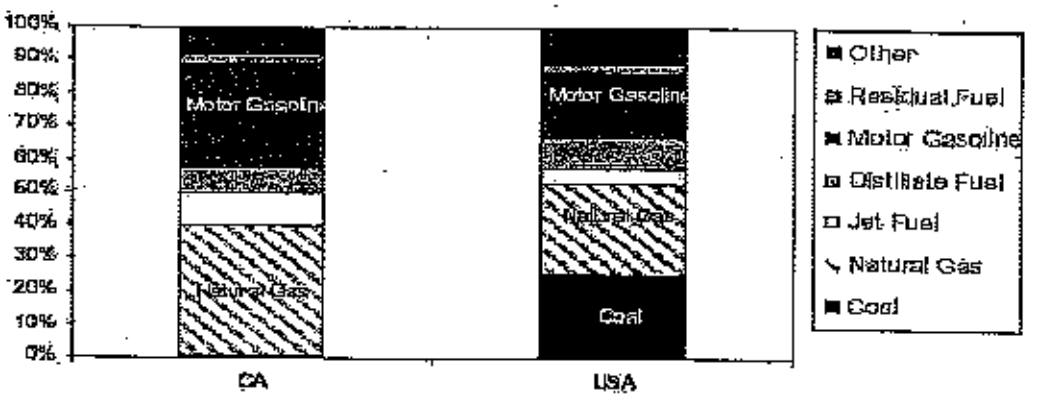
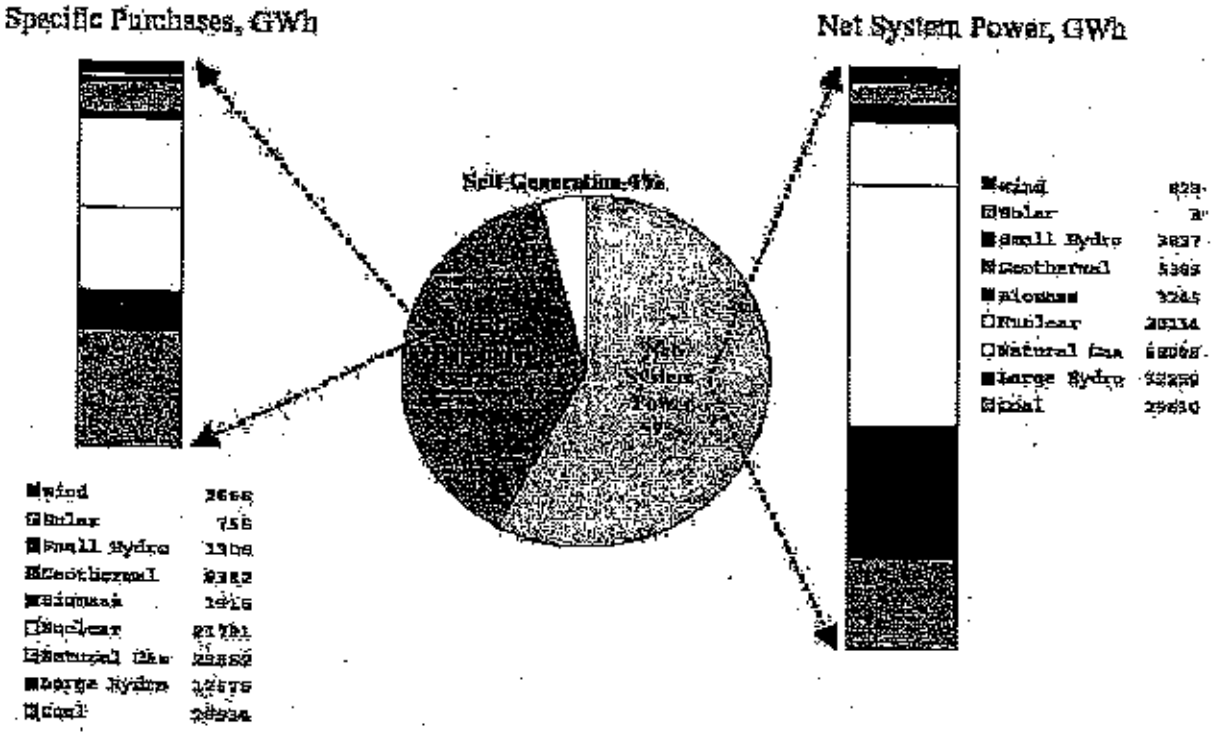


Figure ES-1: Distribution of Fossil Fuel Consumption in California and United States in 1999

California's power mix, 2003[72]



[71] Excerpts for California Context, including graphs except as noted, taken from "Inventory of California Greenhouse Gas Emissions and Sinks: 1990-1999," pages 2-13, California Energy Commission, November 2002, Publication #600-02-001F, http://www.energy.ca.gov/reports/600-02-001F/

[72] "2003 Net System Power Calculation," California Energy Commission, http://www.energy.ca.gov/reports/2004-05-05_300-04-001R.PDF; GWh is an abbreviation for gigawatt hours.

From 1990 to 1999, California's gross state product increased 28 percent, its population grew by 10 percent, and its total greenhouse gas emissions increased 3.5 percent. California has been able to reduce its per capita carbon dioxide emission rate by 8.6 percent, from 13.2 tons of carbon dioxide equivalent per person in 1990 down to 12.4 tons of carbon dioxide equivalent per person in 1999. In terms of per dollar of gross state product, the state lowered its "greenhouse gas intensity" by 19 percent, from 0.96 lbs. of carbon dioxide equivalent per dollar of gross state product in 1990 down to 0.77 lbs. of carbon dioxide equivalent per dollar of gross state product in 1999. [73]

Carbon dioxide emissions from the combustion of fossil fuels have remained more or less constant for combined electricity generation and industrial use, primarily due to fuel switching and abundant non-fossil fuel choices (renewable, hydro, and nuclear) for electricity generation. These modest increases throughout the 1990s are also due to aggressive state control of criteria air pollutants, which can lead to a reduction of carbon dioxide emissions.

Trends in California GHG emissions

	1990	1999	% change
Carbon Dioxide	363.8	362.8	
Fossil Fuel Combustion	358.2	356.3	
Other	5.6	6.5	
Methane	34.6	31.6	
Nitrous Oxide	24.6	23.5	
HFCs, PFCs, SF6	2.1	9.7	
Gross Emissions	425.1	427.7	0.6%
Soils and Forest (Sink)	-25.6	-18.8	
Net Emissions	**399.5**	**408.9**	**2.4%**
Marine Bunker Fuels[74]	22.0	10.7	
Gross Emissions Minus Marine Bunkers	403.1	417.0	3.5%
Net Emissions Minus Marine Bunkers	377.5	398.2	5.5%

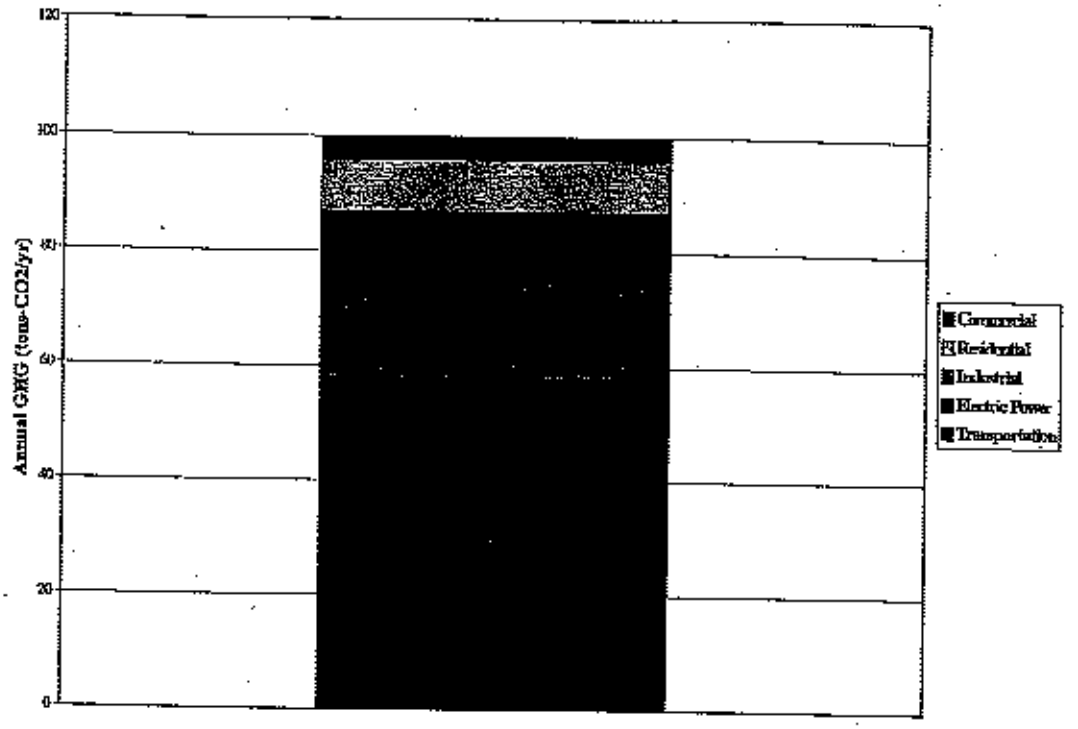
Figures expressed in MMT eCO2

Carbon dioxide emissions have grown substantially in the transportation sector, which more closely mirrors national growth trends. This growth is especially true for gasoline-based emissions in the transportation sector, which have increased by 9.4 percent over the decade.

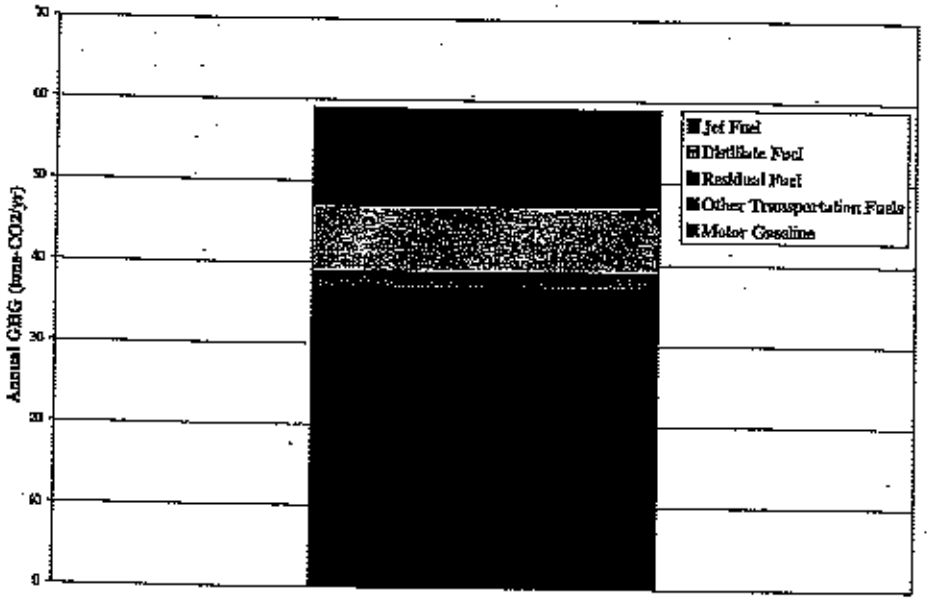
[73] Many factors contribute to improving the State's energy intensity, including changes in the composition of the industrial sector, increases in the price of energy, new technologies, and California's building energy code. "The Public Benefit of California's Investments in Energy Efficiency, RAND, 2000, http://www.rand.org/publications/MR/MR1212.0/MR1212.0.pdf

[74] Marine bunker fuels, defined as fuel sold to ships moving in international trade, are excluded from national emissions. When the IPCC began developing its guidelines for national emissions inventories in the early 1990s, the practice of excluding marine bunker fuels was extended to international aviation fuels, defined as fuel consumed by aircraft moving between international destinations. International bunker emissions account for about 2 percent of U.S. carbon dioxide emissions. National Energy Information Center, Emissions of Greenhouse Gas Emissions in the United States, 1998, http://www.eia.doe.gov/oiaf/1605/gg99rpt/carbon.html

Greenhouse gas emissions from all fuels, California 1999[1]



Breakdown of transportation sector by fuel type, California 1999



[1] Total equals 345.7 million metric tons; excludes marine bunker fuels.

B. Recommendations for a GHG emission reduction target for Sonoma County

With completion of this community-wide GHG emissions inventory, Sonoma County fulfills Milestone One of the Cities for Climate Protection five milestone program.

Milestone Two involves setting a GHG emissions reduction target. Three reference points help determine the target:

- the base year and its corresponding amount of GHG emissions
- the target year by which those reductions will be achieved
- the percent by which the emissions of the base year are to be reduced

In deciding how bold a target to set, some points to consider are:

- As previously noted, scientists in 1995 said that stabilizing the concentration of carbon dioxide required an immediate reduction in CO_2 emissions of 50 to 70 percent, and required further reductions thereafter until the year 2100.
- Cities for Climate Protection encourages municipalities to consider a 20 percent reduction target.[75]
- The Kyoto Protocol set a 7 percent U.S. emission reduction target from 1990 levels by 2012.
- The County of Santa Clara, led by the Silicon Valley Manufacturers Group, in March 2004 set an emissions reduction target of 20 percent below 1990 levels by 2010. This is about three times the level of the Kyoto Protocol. (Please see article about Silicon Valley on page 39.) Other communities have also set bold targets, as shown below.

Examples of community targets municipalities have adopted[76]

Municipality	Base year	Target year	Community GHG reduction target	Year target adopted
Berkeley	1990	2010	15%	1998
Chula Vista	1990	2010	20%	2000
County of Marin	1990	2015	15-20%	2002
Oakland	1990	2010	15%	1999
San Diego	1990	2010	15%	2000
San Francisco	1990	2012	20%	2002

Those responsible for implementing an emissions reduction target often ask, "How will we achieve reductions when our community is still growing?" This is the dilemma humankind must successfully address to meet the global climate crisis. Fortunately, solutions exist.

[75] In 1989 Toronto became the first city worldwide to adopt a GHG reduction target. It pledged to achieve a reduction of 20 percent below 1989 levels by 2005. The city's action is known as the "Toronto target," and has helped set the standard for local action for emission reductions. www.epa.gov/globalwarming/greenhouse/greenhouse2/cities.html

[76] From a survey conducted by the Climate Protection Campaign in Fall 2004.

Another question that may arise regarding GHG emission targets is, why are the goals set by Cities for Climate Protection and the Kyoto Protocol so small when the scientific imperative is much greater. ICLEI's literature states, "Adopting the 20 percent reduction target is a substantial beginning." Faced with political, economic, and cultural realities, ICLEI representatives and Kyoto signatories accept a more modest target than science dictates.

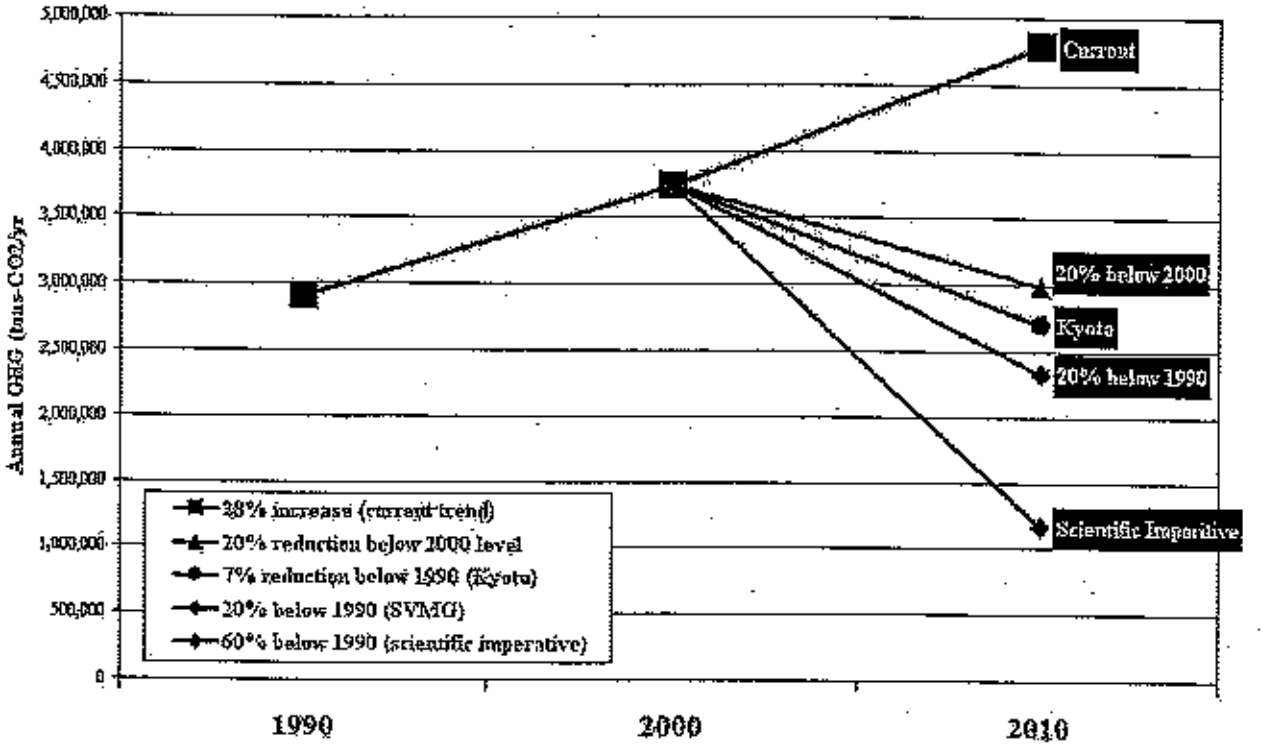
Sonoma County must also recognize political, economic, and cultural realities. Moreover, Sonoma's challenge is greater than most other areas because our GHG emission growth rate was about double that of the rest of the nation. Nonetheless, timidity and inaction cannot be justified given the dire forecasts for humanity if we ignore scientists' warnings. Silicon Valley business and community leaders adopted a "stretch goal" when faced with the same choice, according to Margaret Bruce of the Silicon Valley Manufacturers Group. Although achievement of their ambitious target was uncertain, they still felt compelled to be bold.

People in Sonoma County take pride in their love of nature and their responsibility toward others. This is a community with a knowledge-based economy that thrives on innovation and maximizing opportunities. It is therefore recommended that Sonoma County rise to the test, make a choice for the future, and take on a climate protection challenge that may at first seem impossible.

> *"Yes it is impossible, therefore it will take a little longer."*
>
> *Paolo Lugari, Founder of Gaviotas*

Recommendation: Sonoma County residents, businesses, and governments adopt a community-wide GHG emission reduction target of 20% below 1990 levels by 2010.

Choices for the future



Choices		2010 Target (tons GHG)
Current trend	28% continued growth rate in GHG emissions in Sonoma County	**4,786,406**
20% reduction	20% reduction in GHG emissions from 2000 by 2010	**2,991,504**
Kyoto	7% reduction in GHG emissions from 1990 by 2010, the target set for the U.S. through the Kyoto Protocol	**2,706,629**
SVMG	20% reduction in GHG emissions from 1990 by 2010, the target set by the Silicon Valley Manufacturers Group in March, 2004	**2,328,283**
Scientific imperative	50 - 70% reduction in carbon dioxide emissions from 1995 to stabilize levels in the atmosphere, amounts specified by the International Panel on Climate Change[77]	**1,164,142**

[77] IPCC second assessment synthesis of scientific-technical information relevant to interpreting article 2 of the UN Framework Convention on Climate Change, 1995, the summary for policymakers, page 9, http://www.ipcc.ch/pub/sa(E).pdf See also "Climate Change Research - Facts, uncertainties and responses," Astrid Zwick, Antonio Soria http://www.jrc.es/pages/iptsreport/vol05/english/art-en1.doc

Valley firms to fight global warming

Coalition hopes innovation will entice other regions

In one of the first programs of its kind in the United States, a coalition of major Silicon Valley companies is set to announce today a plan to reduce greenhouse gas emissions to collectively combat global warming.

The companies -- Hewlett-Packard, Oracle, Calpine, Lockheed, ALZA, Life Scan and PG&E -- along with the city of San Jose, NASA Ames Research Center and the Santa Clara Valley Water District, will set a goal of cutting Santa Clara County's carbon dioxide emissions to 20 percent below 1990 levels by 2010.

If successful, such a reduction would be more than triple the goal set by the still-stalled Kyoto agreement on global warming. It would be as effective as removing 1.1 million cars from Silicon Valley roads...

Organizers of the Silicon Valley plan estimate that Santa Clara County emitted 15.7 million tons of carbon dioxide in 2000, up from 13.4 million tons in 1990. The estimates are based on consumption of gasoline, diesel fuel, electricity and natural gas.

Article by Paul Rogers, **San Jose Mercury News**, March 29, 2004. Full text of the article is available at: http://www.mercurynews.com/mld/mercurynews/news/local/8302706.htm

C. Recommendations for next steps for reducing GHG emissions in Sonoma County

For Milestone Three, developing a plan for achieving the emissions reduction target, many communities worldwide have produced comprehensive, practical plans to reduce their GHG emissions. Examples include Brookline, Massachusetts; Portland/Multnomah County, Oregon; Missoula, Montana, Marin County, and San Francisco.[78]

Broad community involvement and commitment from residents, business, and government is the key for success in setting targets, developing plans, and implementing programs for community-wide greenhouse gas reduction efforts. This level of undertaking is similar to the development and adoption of communities' general plans for which communities usually make significant investments. Logically, general plans and greenhouse gas emission reduction plans should align and integrate.

Two recommendations from "Standing Together for the Future," the GHG emission inventory report for eight cities in Sonoma County, September 2003, bear on this point:

"All Sonoma County jurisdictions direct staff to evaluate actions necessary to ensure their general plan reflect their commitment to climate protection, and target September 30, 2004, to report to the government bodies the results of these evaluations."

"All Sonoma County jurisdictions cooperate to identify a process and actions necessary to establish community-wide targets, plans, and programs, and target September 30, 2004, as the date by which the approach for doing so is identified."

No Sonoma County jurisdictions have implemented these recommendations. We reaffirm the importance of doing so. They support this report's second recommendation:

Recommendation: Sonoma County residents, businesses, and governments develop a plan that will enable the achievement of its GHG reduction target.

These recommendations should be implemented as soon as possible. The earlier we begin, the easier it will be in the future.

Examples of GHG emission reduction measures are provided on page 42. Many of the energy-saving examples have already been implemented by Sonoma residents, businesses, and municipalities, e.g., changing incandescent bulbs to efficient compact fluorescents, installing solar panels for a renewable energy supply, buying gas-saving hybrid vehicles, curbing sprawl through development that follows new urban design principles. Such measures help eliminate our dependency on fossil fuel as well as protect the climate. They provide a springboard for accelerated efforts in the future.

[78] Websites where these plans are posted are given in the resources and references section of this report.

We encourage those who disseminate information to the community to familiarize themselves with the recommendations found in "Talking Global Warming" about how to frame and deliver compelling messages regarding the climate crisis and solutions. The research upon which "Talking Global Warming" is based shows that information alone, no matter how accurate, is not sufficient to inspire people to take action.[79]

Tamminen on Air Quality and Climate Protection in California

"With air quality, for years we had been making good, steady progress. Now, in the last four or five years, we're going backwards: to stage-one smog alerts, to non-attainment of federal ozone standards and particulate matter. So there are very troubling signs on the horizon, especially as we try to accommodate the state's growth...[We have] 36 million people and our population is growing by almost 600,000 every year. We have 30 million motorized vehicles in the state, almost one per person. And the vehicles in showrooms today have worse fuel economy than in 1987. So if you have more vehicles that are less fuel-efficient, that results in more consumption and more air pollution."

Grist: The greenhouse-gas law would establish a 30 percent reduction in CO2 emissions. Will the governor stand behind that number?

"Absolutely. Of course we're waiting for the final report to come out and there will be opportunity for public comment. But whatever gets adopted by the [California Air Resources] Board as technologically feasible, the governor has stated he will defend." [Grist editor's note: The CARB staff's final report, released after this interview was conducted, proposed giving the auto industry eight rather than six years, starting in the 2009 model year, to meet the 30 percent target. The CARB will decide in September whether to endorse the staff's recommendation.]

"In terms of California's role as a trendsetter, the governor has mentioned AB 1493. That is our greenhouse-gas bill with respect to cars, which he intends to defend in court if need be, because there've been some rumblings about challenges [from auto companies]. We're doing our best to work with the stakeholders to avoid that, so we get implementation and actual CO2 reductions rather than just go to battle. His friend [New York Gov. George Pataki] has literally told him they are waiting to see how it plays out so they can adopt it in New York. Other states are looking to do the same. I just got back from Australia and England, where they're also looking to copy what we're doing."

Excerpted from "Terry Firma," an interview with Terry Tamminen, secretary of California's Environmental Protection Agency, by Mark Hertsgaard, **Grist Magazine**, Aug. 19, 2004, http://www.gristmagazine.com/maindish/tamminen081904.asp

[79] Reference to "Talking Global Warming" is given in the Resource section, page 47.

Examples of emission reduction measures

Although it is beyond the scope of this project to supply a comprehensive, ranked list of actions for reducing GHG emissions, the following measures exemplify the plethora of possibilities. Community measures are identified by voluntary, incentive-based, and regulatory to reflect the various strategies available to municipalities for implementing these measures. Most measures can be approached using more than one strategy. See Resources, page 47, for references.

Measures for the whole community that local government can take

Homes, buildings and facilities

Increase energy efficiency and conservation, and increase the use of renewable energy

	Voluntary	Incentive-based	Regulatory
Distribute compact fluorescent bulbs, lighting occupancy sensors, and other energy saving devices	X	X	
Offer small business energy audits and technical assistance	X	X	
Distribute water saving devices such as low flow showerheads and faucet aerators	X	X	
Promote "cool communities" through landscaping, for example, planting trees to shade buildings	X	X	X
Develop and adopt building codes that set energy efficiency standards for construction, and promote energy efficient retrofits in existing buildings at time of sale	X	X	X
Promote building insulation and weatherization	X	X	X
Reward businesses that develop and implement energy conservation programs including energy efficiency improvements and fuel switching (including use of solar energy), heat recovery/co-generation systems	X	X	
Require light colored, high albedo rooftops and pavement	X	X	X
Offer financial incentives, for example, fee and tax reductions, rebates, and loans, to builders who construct energy-efficient homes and buildings		X	
Encourage the use of energy efficient appliances and HVAC systems	X	X	
Encourage passive solar design and solar orientation incentives, guidelines, and ordinances	X	X	
Encourage the use of photovoltaics and other renewable energy applications	X	X	
Facilitate cooperative or aggregate purchase or buyer program for lighting, and energy efficient equipment	X	X	X
Establish financing program for efficiency improvements in the community, for example, revolving loan funds through bonds, energy taxes, etc.	X	X	

Transportation

Decrease the use of single occupancy vehicle travel by increasing the use of public transit, vans, carpooling, cycling, and walking

	Voluntary	Incentive-based	Regulatory
Adopt land use and zoning policies that discourage sprawl and that promote infill high-density development, including density bonuses and incentives for high-density, infill, and transit-oriented Impact, facility, mitigation, and permit fee	X	X	X
Implement policies that shift funds from roads and highways to alternative transit		X	X
Use parking fees to fund transit use, bicycle and pedestrian improvements		X	X
Reward drivers of fuel efficient vehicles, for example, through priority parking		X	
Engage community stakeholders to build their support for alternative transit	X	X	
Fund infrastructure improvements, for example, install bike racks and showers	X	X	
Encourage employers to provide carpool incentives, for example, free or priority parking for carpoolers	X	X	
Implement a free bike share program	X	X	
Reduce fares on public transit	X	X	
Offer shuttle service that connects neighborhoods to commuter lines	X	X	
Guarantee emergency rides home for pedestrians and bicyclists	X	X	
Establish a service center for transit passes, route information, schedules, maps, car and van pool information and coordination	X	X	
Create an alternative working schedule program for non-motorized commuters, for example, flextime, compressed work week, and work from home	X	X	
Implement programs to remove public parking		X	X
Adopt zoning ordinances that reduce minimum parking space requirements and allowances		X	X
Ensure that children's routes to school are safe	X	X	X

Solid Waste

Source reduction: Reduce the amount of waste being generated and going to landfills; use the methane coming from landfills to generate electricity

Two basic strategies exist to reduce GHG emissions associated with solid waste: 1) use less, and 2) recycle more. The first strategy, also called "source reduction" avoids the GHG emissions of manufacture, and it also saves the purchase cost of supplies. One example of source reduction is promoting double sided photocopying, and saving paper costs as well as solid waste. Electronic documents can replace paper documents. The recycling strategy reduces the overall GHG emissions over landfilling since manufacturing products from recycled materials generally requires substantially less processing and energy.

The effect of reducing the GHG emissions of manufacture is accounted for later with ICLEI's protocol, when measures are taken to reduce their landfilled solid waste by either using less, or diverting more to recycling. Either action will yield GHG credit for reducing the emissions of manufacture, and reduce their overall GHG emissions accordingly.

PRIUS VS. EXPEDITION

	TOYOTA PRIUS	FORD EXPEDITION	HUMMER
Fuel costs per year*	$565	$2,070	
Smog-forming pollutants per 15,000 miles	2.8 - 4.1 lbs.	27.4 - 36.3 lbs.	39 – 40 lbs.
If every vehicle in Sonoma County were a Prius (Expedition), the amount of GHG emitted per year would be **	1,133,755 tons	4,146,304 tons	
If every vehicle in Sonoma County were a Prius (Expedition), the amount of smogforming pollution emitted per year would be	1,328,113 lbs.	11,758,659 lbs.	
The total difference would be 3,012,549 tons CO2 and 10,430,546 lbs. of smog forming pollutants.			

* Assuming gas prices of $2.07 for regular and $2.25 for premium, and assuming 15,000 miles driven per
** Assuming each of Sonoma'323,930 vehicles isdriven 15,000 miles per year

Benefits: Prius vs. Expedition

- **1/4 cost for gas**
- **1/4 GHG production**
- **1/9 smog-forming pollutants**

Refcrences:US EPA's Green Vehicle Guidewww.fueleconomy.goy http://www.fueleconomy.gov/feg/sbs.ht, http://www.mtc.ca.gov/datamart/stats/regveh.ht

	Voluntary	Incentive-based	Regulatory
Conduct home composting education programs	X	X	
Establish a center for reusing salvageable goods	X	X	
Distribute compost bins	X	X	
Collect curbside yard debris	X	X	
Implement or expand residential and commercial recycling collection	X	X	
Establish community recycling drop-off sites	X	X	
Offer incentives to reduce waste such as pay-as-you-throw or unit pricing, special taxes and tipping fees		X	
Implement a landfill methane collection and conversion program			X

Using prices to curb greenhouse gas emissions

A powerful, underutilized strategy available to governments is market-based measures. Intelligently applied, price signals can help reverse the incentives that now encourage people to use fossil fuels. Many governments are not fully aware of the powerful set of tools at their disposal. These can be extremely effective and are often less expensive to implement than traditional regulatory approaches. Economic instruments can also generate substantial revenues for government. By rewarding desired practices using funds levied on undesired practices, price signals can help shift our energy use towards efficiency and renewables, and away from fossil fuels.

Many compelling examples are offered in ICLEI's booklet "Changing the Price Signal: How local governments can use economic instruments to cut traffic and pollution."

Natural gas powered County buses

Sonoma County's 62-bus fleet includes 34 Compressed Natural Gas buses. These 34 buses reduce the GHG emissions from the County bus fleet by approximately 15% from a standard diesel fleet. According to the County's GHG inventory, one CNG bus driving 34,200 miles per year will save 22 tons eCO2/year, and $6,660/ year.

"Greenhouse Gas Emission Analysis for the County of Sonoma," Edwin Orrett, P.E., August 2002.
http://www.recyclenow.org/FINAL_RE.PDF

Measures for municipal operations[80]

- Adopt procurement policies that specify energy efficiency standards
- Replace existing lights with energy-efficient and low-wattage lamps and ballast, e.g., use light emitting diodes (LEDs) for traffic signals
- Improve energy efficiency when replacing equipment, renovating or constructing
- Lighten colors of rooftops and street paving to reduce the "heat island" effect
- Use plants to reduce energy use, e.g., with rooftop gardens and shade trees
- Capture "waste" heat through co-generation
- Convert to solar power, e.g. install solar water heating at recreational facilities, and use solar powered street and emergency lights
- Reduce lighting in areas that are overlit
- Switch from a five to a four day work week to reduce energy use in buildings as well as in commuting
- Replace job-related driving with telecommunications, transit, bicycling, and walking
- Provide incentives to reduce municipal employee travel, e.g. trip reduction policies like subsidized transit passes, elimination of free parking, preferred parking for carpools
- Purchase fuel efficient fleet vehicles
- Reduce the fleet size, i.e., the total number of vehicles
- Improve fleet scheduling and route efficiency
- Improve fleet maintenance for increased efficiency, e.g., check tire pressure
- Reduce the amount of energy used to supply and treat water and waste water, e.g., promote water conservation, replace old equipment with energy-efficient models
- Require that energy efficiency be a key criterion for new infrastructure
- Increase office recycling, e.g. paper, cardboard, cans, toner cartridges
- Prevent waste in day-to-day operations, e.g., reduce paper use
- Recover food waste in cafeterias and kitchens of local government buildings for composting or other use
- Adopt procurement policies that give preference to recycled materials
- Compost landscaping debris

Carbon Sequestration Measures

- Implement urban forestry projects
- Encourage the maintenance and restoration of a thick cover of plants and trees to absorb and sequester carbon dioxide
- Encourage the maintenance and restoration of soil tilth, rich with carbonaceous matter, to absorb and sequester carbon dioxide, and to retain water to replenish ground water

[80] Adapted by Climate Change Connection from Cities for Climate Protection

Resources

Sonoma County resources

Climate Protection Campaign: Advances practical, science-based solutions for significant greenhouse gas reductions to create a positive future for our children. www.climateprotectioncampaign.org

"Greenhouse Gas Emission Analysis for the County of Sonoma," Edwin Orrett, P.E., August 2002. http://www.recyclenow.org/FINAL_RE.PDF

"Santa Rosa Milestone One," Greenhouse gas emissions inventory, 2002, http://ci.santa-rosa.ca.us/City_Hall/City_Manager/CCPFinalReport.pdf

"Standing together for the Future: Greenhouse gas emission inventories for eight cities in Sonoma County, California," September 2003, http://www.skymetrics.us/standing-together/standing-together.php#summaryreports

"Report on the Sonoma County Ecological Footprint Project," May 2002. Report shows that much of human impact on earth is related to fossil fuel usage. http://www.sustainablesonoma.org/projects/footprintreport/scfpweb.pdf

Sonoma County Waste Management Agency: Administrator for municipalities' climate protection collaboration. Site also offers green building resources. www.recyclenow.org

Sonoma County Business Environmental Alliance: Promotes economic benefits of responsible environmental practices. www.sonoma-county.org/bea

Community Clean Water Institute: Protects water resources and public health, identifies pollution sources, and prevents water pollution throughout Northern California. www.ccwi.org

Resources from other local governments

"County of Marin Greenhouse Gas Emissions Analysis Report," June 2003 http://www.co.marin.ca.us/depts/CD/Main/pdf/CCP_FinalReport.pdf

"Climate Action Plan for San Francisco: Local Actions to Reduce Greenhouse Gas Emissions, September 2004, http://sfwater.org/detail.cfm/C_ID/2137

Other noteworthy examples of local climate action plans:

- Town of Brookline, Massachusetts: http://www.townofbrooklinemass.com/conservation/climatechange.html
- City of Missoula, Montana: ftp://www.ci.missoula.mt.us/Packets/Council/2003-11-17/Referrals/Missoula%20GHG-Energy%20Efficiency%20Plan%2011-17.htm
- City of Portland & Multnomah County: http://www.sustainableportland.org/Portland%20Global%20Warming%20Plan.pdf

Regional Resources

Bay Area Air Quality Management District: Aims for clean air to protect the public's health and the environment in the San Francisco Bay region. http://www.baaqmd.gov/

Association of Bay Area Governments: A regional planning agency that helps solve problems in areas such as land use, housing, environmental quality, and economic development. http://www.abag.ca.gov/ Includes the Bay Area Green Business Program http://www.abag.ca.gov/bayarea/enviro/gbus/

Metropolitan Transportation Commission: The Bay Area's transportation, planning, financing, and coordinating agency. http://www.mtc.ca.gov/

California Resources

California Air Resources Board: Works to protect the public's health, the economy, and the state's ecological resources through the most cost-effective reduction of air pollution. http://www.arb.ca.gov/homepage.htm

California Climate Registry: State institution for businesses to register their GHG reductions.. www.climateregistry.org

California Energy Commission: Climate Change and California. http://www.energy.ca.gov/global_climate_change/index.html

"Climate Change Overview: Technical support document for staff proposal regarding reduction of greenhouse gas emissions from motor vehicles," California Environmental Protection Agency, Air Resources Board, August 6, 2004, http://www.arb.ca.gov/cc/factsheets/august_tsd/overview_august.pdf

"Inventory of California Greenhouse Gas Emissions and Sinks: 1990-1999," California Energy Commission, November 2002, Publication #600-02-001F. http://www.energy.ca.gov/reports/600-02-001F/

"Evaluation of Metrics and Baselines for Tracking Greenhouse Gas Emission Trends: Recommendations for the California Climate Action Registry," By Lynn Price, Scott Murtishaw, and Ernest Worrell of the Lawrence Berkeley Laboratory, June 2003. http://eetd.lbl.gov/ea/ies/iespubs/53027.pdf

U.S., international, and other resources

Cities for Climate Protection, a program of ICLEI – Local Governments for Sustainability: Premier resource for local governments involved in climate protection www.iclei.org/us

Clean Air and Climate Protection Software Tool to help state and local governments harmonize greenhouse gas and air pollution emission reductions. www.cacpsoftware.org

U.S. Environmental Protection Agency Global warming resources
http://yosemite.epa.gov/oar/globalwarming.nsf/content/index.html

Pew Center on Global Climate Change: www.pewclimate.org

Alliance to Save Energy: Organization that promotes energy efficiency worldwide. www.ase.org

Watergy: Resource for the water –energy efficiency connection www.watergy.org

Clean Air-Cool Planet: Resources for colleges and universities www.cleanair-coolplanet.org

Interfaith Power and Light: Resources for faith-based institutions www.interfaithpower.org

United Nations Environmental Programme, Grid-Arendal: Environmental information, communications, and capacity building services for information management and assessment. Excellent source for information and graphics, including a "CO_2 meter" showing the current estimated annual rate of global anthropogenic emissions of carbon dioxide, based on projections made by the International Energy Agency: www.grida.no/

Intergovernmental Panel on Climate Change: www.ipcc.ch

Summary for Policymakers, Climate Change 2001-Impacts, Adaptation and Vulnerability Intergovernmental Panel on Climate Change (IPCC), Third Assessment Report (TAR), "Climate Change 2001" http://ipcc-ddc.cru.uea.ac.uk/

Calculator to determine individual greenhouse gas emissions www.americanforests.org

"Talking Global Warming" Research and recommendations about effective climate communications www.skymetrics.us/talking-global-warming/talkingglobalwarming.php

D. Highlights of stakeholder meetings

Date: January 5, 2004, 2004
Interview conducted by: Mike Sandler and Ann Hancock
Name: Fred Euphrat, PH.D., Owner
Organization: Soil, Trees, and Water, an environmental consulting firm
Contact information:
Phone: (707) 433-5544
Email: woodrat@monitor.net
Mailing address: P. O. Box 1802, Healdsburg CA 95448

Connection to this project: Fred is an advisor to the Climate Protection Campaign. For this project, he is willing to guide us on the agriculture and biomass section of the GHG Inventory.

Summary of key points: Fred is willing to advise us. Get in touch with Pacific Forest Trust people. We're on the right track.

Discussion Summary: Soils are decomposers. Fertilization – NKP - acts like combustion – it speeds up global temperatures by accelerating decomposers in soil. Soil release of carbon is a huge factor for climate protection. Plants are our blanket of protection against global climate change. Biomass = sequestration. The deeper the biomass, the more life.

Carbon sequestration:

- Growing forests and locking up carbon, e.g., in wood in house, hay in bale construction, cotton in clothing, is good for the climate. If it takes longer to use the wood than to grow the tree, then we're on the plus side of the equation.
- Growing eucalyptus forests and burning the wood is bad for the climate.
- Increasing nitrogen fixation is good for the climate.
- Increasing tilth is good for the climate because it increases the soil's ability to hold water and carbon. Standard soil holds 6-7" of water. Carbon molecules act like little accordions.
- First year of opening soil produces a flush of nutrients allowing vigorous plant growth.
- Methyl bromide impacts many issues: soil, GHG, and ozone depletion.
- Paving takes away sequestration possibilities, even though the soil under the pavement isn't decomposing.
- Food coming into the County that's gathered from around the world is another factor.
- Recommend using SR wastewater to grow forests.

Resources, references, referrals:

- Pacific Forest Trust – Lori Wayburn and Connie Best
- Steve Smit, Vina Farms
- Paul Bernier - no till and dry farming
- Don Frazer of de Lormier winery, Alexander Valley

Date: January 7, 2004
Interview conducted by: Mike Sandler and Ann Hancock
Name: Barbara Lee, Executive Director
(later joined by Ken Wells, Director, Sonoma County Waste Management Agency)
Organization: Northern Sonoma County Air Quality Management District
Contact information
Phone: (707) 433-5911
Email: nsc@sonic.net
Mailing address: 150 Mathieson, Healdsburg 95448

Connection to this project: The GHG Inventory being done for this project includes Northern Sonoma County, an area over which the agency Barbara directs has jurisdiction.

Summary of key points: Barbara remains willing to partially fund this project. She is also has funding for related projects. She is willing to advise us, is well-connected and knowledgeable.

Discussion Summary:
Barbara is interested in this project, and is willing to advise us and partially fund us. She has worked for the BAAQMD, has served on CARB advisory committees, has been a researcher.

N. Sonoma hasn't violated ambient air standards for three years, but they can't meet attainment because they are tied to a larger district. Wood smoke is the biggest air quality challenge.

There are several pots of money her district works with. One is penalty money that can be spent on community projects. Barbara seeks projects to fund. She is willing to help (? design and) fund a community study whereby, for example, students take home a survey for their household to complete.

Recommendations:
- Make GHG Inventory relevant to the community by anticipating reduction strategies. Find community-specific measures, impacts, stories. Population-weighted averages don't motivate people because they don't show impacts of people's efforts (personal efficacy, locus of control). Motivate communities to take on recommendations, set goals, challenge other communities. Offer a menu of ordinance options for municipalities to enact.
- Have model ordinances be "bite-sized chunks" that communities can take on. Spell out next steps clearly for communities. Keep in mind "spectrum of efficiencies"

Resources, references, referrals:
- MTC – CalTrans trip data
- DMV – data on clunkers - "vehicle scrappage"
- SB700, Flores - recent state legislation that makes ag take center stage
- CARB just released an ag emissions inventory - methane
- Bob Fletcher, Chief of Emissions Assessment Branch, CARB (916) 322-5350
- CAPCOA – Technical assistance document re wine production emissions – San Joaquin Valley Planning

Date: January 22, 2004
Interview conducted by: Mike Sandler and Ann Hancock
Name: Michelle Passero, Director of Policy Initiatives. Also present: Wendy from PFT.
Organization: Pacific Forest Trust
Contact information

Phone: (707) 578-9950
Email: mpassero@pacificforest.org
Mailing address: 416 Aviation Blvd. Suite A, Santa Rosa, CA 95403
Website: www.pacificforest.org

Connection to this project: Pacific Forest Trust actively seeks to protect forests nationwide for the express purpose of sequestering carbon to protect the climate.

Summary of key points: PFT is actively involved with California Registry.

Discussion Summary:

- PFT helps create conservation easements for forests.
- They work with World Resources Institute.
- SB812 – amended Climate Registry bill - sets framework for forests
- Representatives from PFT are on the stakeholder working group creating guidelines for forest GHG accounting.
- Proposed guidelines require forests to be like native forests.
- Calculation about conversion of forestland to vineyards.
- Biomass to carbon ration usually about 50%. 3.67 (?)
- They are willing to help us, for example, review and edit written materials for the project.

Recommendations: Watch out for perverse incentives.

Resources, references, referrals:

- Mark Harmon – wrote articles
- Steve Hamburg, Brown University
- Andrea Mackenzie, Amy Chestnut – Sonoma County Agriculture and Open Space District – They know about accounting when land is put into open space.
- They supplied some written literature about their work.

E. Press coverage for the project

From Sonoma West Times and News, January 23, 2004

Air quality district funds Sonoma Co. climate study

by Dawn Pillsbury, Sonoma West Staff Writer

SONOMA COUNTY - How much of Earth's global warming is Sonoma County responsible for and what can be done about it? That's the question a $25,000 study hopes to answer.

"This is the first time an air district in California has taken a look at this," said Ann Hancock of the Sonoma County Climate Protection Campaign. "We got somebody to say yes to a commitment to the future."

The Bay Area Air Quality Management District, formed to help keep the air clean in the Bay Area including the southern half of Sonoma County, approved a one-year $25,000 contract with the local climate protection campaign on Jan. 6. The campaign will calculate the amount of greenhouse gasses emitted by the entire county, including residents and businesses. The study, due to be done by the end of the year, will also take a look at the relationship between Bay Area air quality and climate protection.

In the last two years, the campaign persuaded the county and city governments to inventory their emissions and reduce them, but this study will involve everything that happens in the county.

The Earth's atmosphere is a blend of gasses that keeps the planet's surface at about 60 degrees Fahrenheit. But because human activity has released large amounts of some gasses such as carbon dioxide and methane, according to the climate protection campaign, the planet's atmosphere is changing enough to disturb planetary weather patterns.

Sonoma County Supervisor Tim Smith, a member of the air quality board, said Sonoma County is at the front of California environmental responsibility.

"We're trying to do what we can to improve air quality, flying in the face of our current president," said Smith.

He admitted that he and fellow Sonoma County member Pam Torliatt of Sonoma had to do some pushing to get the board to approve the contract.

"Some members of the board were wondering if this is something an air board should get involved in," he said.

But, Smith said, it is clear to him that greenhouse gas emissions are important.

The study will inventory all greenhouse gas emissions produced in the county, study climate protection efforts throughout the Bay Area, conduct a survey of air districts across America to

find effective models that link climate protection and air quality and make recommendations to the air district for integrating climate protection into its air quality efforts.

Smith said he hopes the report will include incremental changes that will be easy to implement.

"We can show that these changes are economical," he said. Smith cited the $770,000 solar panel system installed in 2002 on the county Information Services building that is projected to reduce the building's electricity costs by $25,300 every year, and said making environmentally responsible decisions is also good for the budget in the long run.

"It's important for us to provide leadership and show it can be done, for people today and for future generations," he said.

Hancock said that while the contract is small, the campaign hopes to do a lot with it.

The campaign is looking for volunteers to help. To get involved, contact Hancock at 829-1224.

http://www.sonomawest.com/articles/2004/01/23/sonomawest/news/nws-5.txt

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Editorial from **Sonoma West Times and News**, January 23, 2004

Global responsibility

The Sonoma County Climate Protection Program has convinced the Bay Area Air Quality Management District to fund a $25,000 study to determine the county's production of greenhouse gases.

The study will take the climate protection program a step further than last year's greenhouse gas studies by the county and its cities and calculate the entire county's greenhouse gas emissions, which are linked to global warming and changes in the Earth's climate. The study will then be used to help air quality officials link climate protection with air quality protection. The BAAQMD is the first district in the state to fund such a study. "We got somebody to say yes to a commitment to the future," said Ann Hancock, leader of the county climate protection group. It is another small step in the right direction: Local leaders taking responsibility for our actions that affect the entire Earth.

- B.W.D.

http://www.sonomawest.com/articles/2004/01/23/sonomawest/letters_opinions/edit-2.txt

Acknowledgments

- The Board of the Bay Area Air Quality Management District for support and funding of this project, with special thanks to Petaluma City Council member Pam Torliatt and County of Sonoma Supervisor Tim Smith, climate protection champions, who brought the proposal for this project forward to the Board of the Bay Area Air Quality Management District
- Sonoma County Mayor and Council members Association for their for their original letter to the Bay Area Air Quality Management District Board expressing their support for climate protection
- The Sonoma County Waste Management Agency Board who oversaw implementation of this project
- Ken Wells, Director, and staff of the Sonoma County Waste Management Agency, for their guidance, partnership and big green light that shone on this project from beginning to end
- Jean Roggenkamp, Planning Director, and Joseph Steinberger, Senior Planner and project liaison, Bay Area Air Quality Management District
- Harold Brazil, Metropolitan Transportation Commission, for data assistance
- Project advisors: Fred Euphrat; Joel Woodhull; Michelle Passero, Director of Policy Initiatives, Pacific Forest Trust; Barbara Lee, Director of the Northern Sonoma County Air Quality Management District
- Ryan Bell, Program Officer, ICLEI – Local Governments for Sustainability, Cities for Climate Protection, for technical assistance
- County of Marin Community Development Agency whose Greenhouse Gas Inventory report we used for reference and inspiration

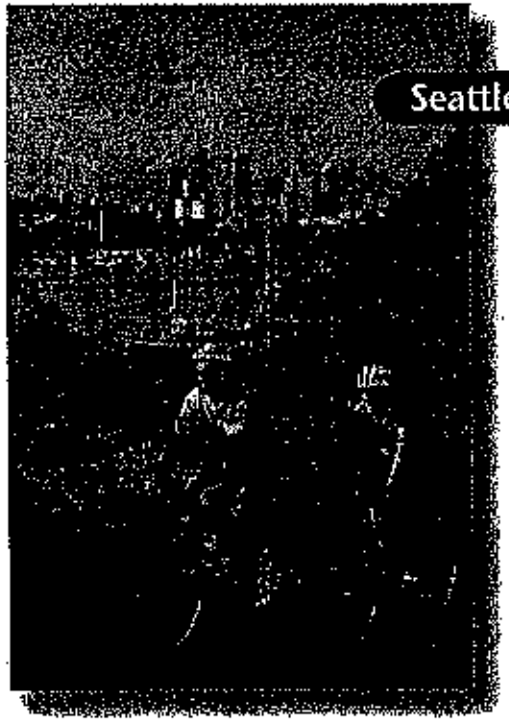
Project Team

- Ann Hancock, Coordinator, Climate Protection Campaign
- Mike Sandler, Coordinator, Community Clean Water Institute, and Executive Associate, Climate Protection Campaign
- Sonoma State University Interns:
  - Dave Erickson — Electricity and Natural Gas, and overall technical assistance
  - Gary Albright — Transportation
  - Monika Villanueva — Solid Waste
  - David Williard — Agriculture
- Edwin Orrett, engineer and ecologist with Resource Performance Partners: Consultant for conceptual project design

CLIMATE PROTECTION CAMPAIGN

P.O. Box 558, Graton, CA 95444 (707) 237-2696

www.climateprotectioncampaign.org



Seattle, a Climate of Change: Meeting the Kyoto Challenge

Climate Action Plan

September 2006

A Letter from the Mayor

September 2006

Dear friends:

I am pleased to present the first-ever Seattle Climate Action Plan, a strategy for reducing global warming pollution throughout our community.

This action plan implements the 18 recommendations that my Green Ribbon Commission delivered in March, 2006. Its purpose is to provide common-sense steps that people, businesses and the City can take to make a real difference in the battle against climate change.

I launched the Seattle Climate Protection Initiative in February 2005 for three reasons. First, I'm increasingly concerned about the impacts that climate disruption will have on the sources of water we rely on for drinking and powering our city. Second, I believe reducing emissions offers big opportunities. We will improve air quality, public health and quality of life while saving money and creating good new jobs—making Seattle even more of a climate-protection leader. Third, I'm disappointed by the lack of meaningful federal action on an issue so critical to the health of our city, our country and our planet. As the world's largest climate polluter, our country has a responsibility to act; we should not simply rejoin the community of nations in this critical task, we should lead it.

Seattle has much to be proud of. City government has reduced its global warming pollution by some 60 percent compared to 1990 levels. In addition, a growing number of Seattle residents, businesses and other institutions are doing their part, which gives us a great foundation on which to build.

I'm also proud of my fellow mayors across the country, 313 of whom have stepped up to provide the leadership that this growing crisis demands by signing the U.S. Mayors Climate Protection Agreement. Those mayors represent more than 50 million people, and together we're reducing climate pollution in our cities, raising awareness and inspiring action across the country, and setting the stage for stronger national climate policy.

But it's only a beginning. The science is increasingly clear that we must go well beyond the Kyoto target to stabilize our climate.

Global warming is an extraordinary challenge that requires an extraordinary response. But Seattle is up to the task. Historically, we chose energy conservation and renewable energy over nuclear power. We chose waste reduction and recycling over incineration. We chose water conservation over financially — and environmentally — costly new supplies. Now it's time to choose development patterns, transportation options and urban lifestyles that reduce our dependence on fossil fuels, making our community healthier, more prosperous and less vulnerable to volatile world oil markets.

I urge you not only to read this document, but to hold us accountable for its implementation. And, I urge you to do your part to reduce Seattle's contribution to climate disruption. Together, we can make Seattle America's most climate-friendly city.

Sincerely,



GREG NICKELS

tents

Page	Actions	2012 Target GHG Reduction
2	**Introduction: Crisis and Opportunity**	
	Reduce Seattle Dependence on Cars	**170,000 tons**
5	Significantly Increase the Supply of Frequent, Reliable and Convenient Public Transportation	
6	Significantly Expand Bicycling and Pedestrian Infrastructure	
7	Lead a Regional Partnership to Develop and Implement a Road Pricing System	
8	Implement a New Commercial Parking Tax	
9	Expand Efforts to Create Compact, Green, Urban Neighborhoods	
	Increase Fuel Efficiency and Use of Biofuels	**200,600 tons**
10	Improve the Average Fuel Efficiency of Seattle's Cars and Trucks	
12	Substantially Increase the Use of Biofuels	
14	Significantly Reduce Emissions from Diesel Trucks, Trains and Ships	
	Achieve More Efficient and Cleaner Energy for Our Homes and Businesses	**316,000 tons**
16	Maintain City Light at Zero Net Greenhouse Gas Emissions and Meet Load Growth Through Conservation and Renewable Energy Resources	
17	Substantially Increase Natural Gas Energy Conservation	
18	Strengthen the State Residential Energy Code	
19	Reduce Seattle Steam's Use of Natural Gas	
	Build on Seattle's Leadership	**Policy Action**
20	Continue City of Seattle's Strong Leadership Example	
21	Mobilize the Entire Community	
23	Create the Seattle Climate Partnership	
24	Leverage Regional, State and National Climate Solutions	
	Sustain Our Commitment	**Policy Action**
28	Direct More Resources to the Challenge	
29	Monitor and Report on Progress	
	TOTAL	**686,600 tons**
30	**The Importance of Recycling and Urban Forestry**	
32	**Adapting to Climate Change**	
35	**Acknowledgements**	
36	**What You Can Do to Reduce Global Warming**	

Introduction
Crisis – and Opportunity

Global climate disruption – and the inescapable conclusion that pollution from human activities is a major cause – is the defining challenge of our time. The signs are all around us. We just experienced one of the hottest, driest August on record. Wildfires and severe storms are increasing in frequency and intensity. The mountain snowpack from which we've drawn drinking water and electricity for 100 years is in decline.

Concerned about these and other local impacts, Mayor Nickels launched the Seattle Climate Protection Initiative. On February 16, 2005, the day the International Kyoto Protocol became law in 141 countries, Mayor Nickels challenged the Seattle community to meet or beat its climate pollution-cutting goal. He appointed a Green Ribbon Commission on Climate Protection to develop recommendations for reducing Seattle's emissions. In addition, Mayor Nickels and nine other mayors launched the U.S. Mayors Climate Protection Agreement.

In March 2006, the Mayor's Green Ribbon Commission delivered its report, featuring 18 recommendations for meeting or beating the Kyoto target: a 7 percent reduction by 2012, compared to 1990 levels. For Seattle, this means reducing our emissions of carbon dioxide and other climate-disrupting greenhouse gases by about 680,000 tons. That's about the amount of climate pollution generated by 147,000 cars in a year.

This Seattle Climate Action Plan is the City's strategy for implementing the Commission's recommendations and meeting the Kyoto target in ways that also improve public health, enhance quality of life and bolster economic vitality.

Mayors Leading the Way

What began as a simple call to action has emerged as a powerful — and growing — coalition of American mayors who are working locally to fight global warming and change national policy. Mayor Nickels challenged his colleagues across the country to join with Seattle in reducing greenhouse gas emissions. By September 2006, more than 300 mayors representing 50 million people in 46 states had signed his US Mayors Climate Protection Agreement.

Now the US Conference of Mayors, which unanimously endorsed the Agreement in June 2005, has created a new US Mayors Council on Climate Protection. The Council, co-chaired by Mayor Nickels, is partnering with ICLEI – Local Governments for Sustainability to recruit more mayors, help participating cities implement climate protection actions, track progress, and increase mayors' participation in, and influence on, national policy-making.

For more information on the US Mayors Climate Protection Agreement, please visit www.seattle.gov/mayor/climate.



About this Action Plan

This action plan describes high-priority climate protection actions and investments for the next two years, with a strong focus on the two major sources of global warming pollution in Seattle: motor vehicle emissions and natural gas consumption by homes and businesses.

The primary focus is on actions the City will take, both to achieve further reductions in its own greenhouse gas emissions and to promote reductions by Seattle's households, businesses and public institutions. In addition, the plan provides climate protection action tips, describes what the City will do to effectively integrate climate impacts into planning and resource management, and lays out what the Mayor and City will do to promote the strong regional, state and federal policies and programs that are necessary to curb climate pollution.

The action plan builds on the City's already substantial investments in climate protection. It calls for City departments to do even more within existing resources, for example by integrating climate protection goals into the City's purchasing and investment practices. In addition, it calls for significant new investment, through the Mayor's proposed 2007-2008 budget, submitted to the City Council in September 2006, and the *Bridging the Gap* transportation funding proposal to be decided by Seattle voters in November 2006.

The steps described in this action plan will take us a long way toward our target. We will closely monitor our progress every step of the way. The publication of this action plan is only a beginning. The Office of Sustainability and Environment will lead an intensive interdepartmental and community-wide effort to implement this plan. And we will produce a progress report and action plan update every two years, with the Mayor's biennial budget proposal.

The Highlights

This action plan calls for continuing and expanding three efforts that are critical to meeting our climate pollution-cutting goals:

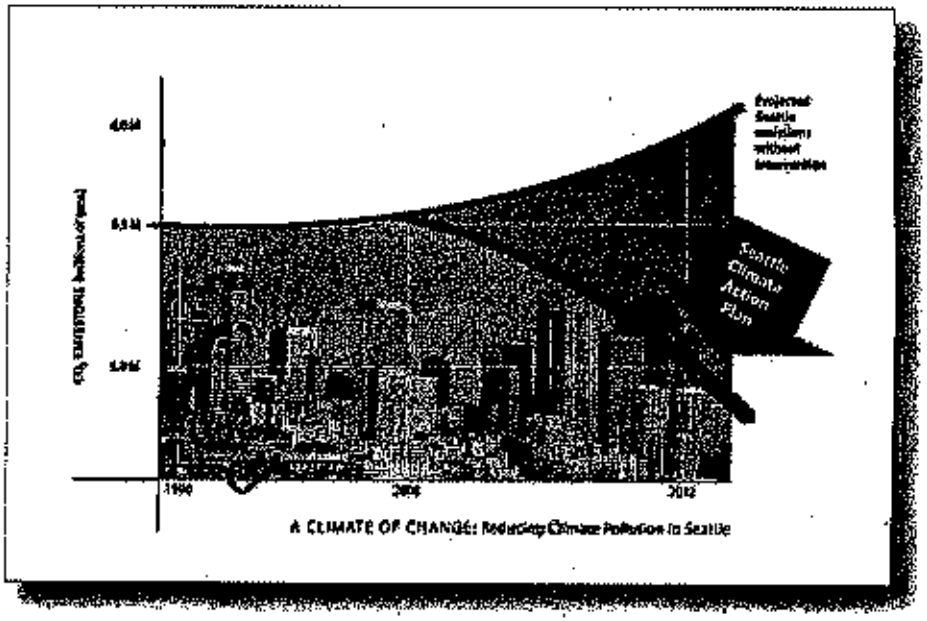
- Since motor vehicle emissions are the single largest source of climate pollution in Seattle, the City must do even more to provide climate-friendly transportation choices such as public transit, biking and walking — and to encourage greater use of those alternatives. This action plan calls for significant improvements in infrastructure and incentives, including additional investments to make transit, biking and walking easier, safer and more convenient; a commercial parking tax; and a stronger push toward regional road-pricing strategies that have proven successful in other cities.

- "Smart growth" efforts — policies and regulations that steer the majority of new households and businesses into existing urban centers and villages — are key to reining in not just sprawl, but also global warming pollution in the Seattle region. This action plan calls for continued, vigilant focus on creating compact, climate-friendly urban neighborhoods in places such as Northgate, the University District, South Lake Union, and South Downtown.

- Seattle City Light's program to deliver electricity to 370,000 commercial and residential customers with zero net greenhouse gas emissions will continue to be the cornerstone of the City's climate protection strategy. This action plan calls for the utility to continue to meet all new demand through conservation and renewable energy sources, and to balance out all remaining greenhouse gas emissions by purchasing carbon offsets.

In addition to continued and expanded work in these three critical areas, the action plan features several new initiatives, including:

- A major push to reduce climate pollution from natural gas use, including a stronger partnership between Seattle City Light and Puget Sound Energy to promote conservation programs; a new hot water conservation initiative by Seattle Public Utilities and Seattle City Light; an increased effort by the City's Green Building Program to promote natural gas efficiency in new and remodeled commercial and residential buildings; and ramped-up efforts to identify and implement natural gas efficiencies in City buildings and facilities;



- A major effort to reduce climate pollution from motor vehicles, including a "Drive Smart" campaign to promote climate-friendly driving habits; a "Smart Fleets" program to encourage Seattle-area commercial fleet operators to increase their fuel efficiency and use of biofuels; and increased use of biofuels in the City's fleet;

- A multi-faceted effort to rally the entire Seattle community to take actions that reduce climate pollution and improve quality of life. This includes an intensive climate protection action-awareness campaign aimed at everyone who lives, works and visits in Seattle; a campaign to turn the City's 10,000 employees into ambassadors for climate protection; a new Seattle Climate Partnership to engage the business community; and a new component of the Neighborhood Matching Fund to promote and fund community-based climate solutions; and,

- A new program to purchase carbon offsets to balance out the emissions from business-related air travel by City employees.

Action #1
Significantly Increase the Supply of Frequent, Reliable and Convenient Public Transportation

The problem, the solution, the benefits

Gasoline fueled cars and light duty trucks travel approximately two billion miles every year in Seattle — which is why they are the single largest source of climate pollution in our city. Getting more people to use public transportation more often is an essential component of this plan. Success depends on fast, frequent, convenient and reliable service.

The City is not directly responsible for providing public transportation — that's the job of King County Metro, Sound Transit, Pierce Transit and Community Transit. But its Department of Transportation is responsible for creating, maintaining and improving roadway infrastructure to provide faster and more reliable transit, including working to reduce congestion and setting traffic signals to give transit priority.

A number of transit improvements are on the horizon:

- King County Metro's *Transit Now* proposal for a one-tenth of 1 percent increase in the County sales tax goes to voters in November 2006. It will provide $10 million annually to fund transit service throughout the region, including RapidRide bus lines from West Seattle to Downtown, Ballard to Downtown and Shoreline to Downtown. A RapidRide line sends buses along the corridor at least every 15 minutes most times of the day, providing riders with more frequent and reliable transit. County officials estimate *Transit Now* will provide enough service system-wide to get as many as 60,000 drivers out of their cars and onto buses each weekday within 10 years.

- In fall 2007, the South Lake Union Streetcar will begin service, connecting South Lake Union, the new waterfront park, the Denny Triangle and the downtown retail core. Ridership is projected to be 350,000 passenger trips the first year.

- Sound Transit's Link light rail will begin operation between downtown Seattle and SeaTac International Airport in 2009 and is expected to carry 42,500 daily riders initially and 150,000 ultimately.

- Improvements to Sound Transit's Express Bus system are planned. Those already in place resulted in 8.8 million boardings in 2005, a number that is projected to grow to 10.6 million by 2011.

The climate benefits of increased transit ridership are plain: a typical car driven 20 miles, five days a week, 50 weeks a year pumps more than 4,600 pounds of greenhouse gas into the air. Shifting the drivers and riders of those cars onto public transportation would substantially cut greenhouse gas emissions and also improve air quality, reduce congestion for buses and trucks and save money now spent for car maintenance and gas.

New City investments and actions to improve public transportation

Bridging the Gap, the November transportation levy proposal, would make a major investment in public transportation. It provides:

- $1.5 million per year to increase Seattle transit service, which *Transit Now* will match 2:1, for an estimated 45,000 additional hours of service citywide.

- Approximately $3 million for transit corridor and reliability improvements, which *Transit Now* will match with an additional 5,000 service hours per affected route, allowing faster more reliable bus service in some of the city's most congested routes to Downtown including Ballard, West Seattle and Aurora.

- Funding to make King Street Station a transit hub in South Downtown.

- Funds for synchronizing traffic signal timing to improve transit flow and reliability.

How we will measure our progress

- Trends in the contribution of gasoline to Seattle's climate pollution levels via updates to the greenhouse gas inventory.
- Percentage of trips made using modes of transportation other than single occupancy vehicles, including transit ridership statistics.
- Vehicle miles traveled in Seattle.

Action #2
Significantly Expand Bicycling and Pedestrian Infrastructure

The problem, the solution, the benefits

More than three-fourths of the single-occupant auto trips in Seattle are not commute related, and most are within five miles of home. With nearly a quarter of Seattle's greenhouse gas emissions coming from cars, small trucks and motorcycles, traveling by bike and foot can be a real part of the solution to reduce emissions, saving money and improving public health in the process.

Some 8,000 people bicycle to work in Seattle every day. Our area boasts the largest bicycle club in the nation, the Cascade Bicycle Club. The Burke-Gilman Trail, used by walkers and riders alike, is one of the most heavily used city trails in the country. With improved facilities and better education and enforcement of traffic laws as they relate to bicycle and pedestrian safety, we can take advantage of these attributes to further reduce greenhouse gas emissions.

New City investments and actions to make it easier to bike or walk in Seattle

- To increase bicycle use and improve bicycle safety, the Seattle Department of Transportation (SDOT) will complete the City's first Bicycle Master Plan in 2007. The Plan will address opportunities to improve on-road bicycling conditions, develop a wayfinding system, establish facility design guidelines, and create a maintenance plan. Funding for implementation is included in the *Bridging the Gap* transportation package.

- In 2007-2008, SDOT will double the number of bike lanes by painting between 20 and 30 miles of new bicycle lanes with funding included in the *Bridging the Gap* transportation package. In addition, SDOT will identify four-lane corridors that can accommodate bicycle lanes in each direction.

- Legislation to increase bicycle parking requirements for development in neighborhood business districts is awaiting City Council action.

- SDOT helps fund and promote the new BikeStation bicycle transportation center on 3rd Avenue South in Pioneer Square.

- During 2007-2008, SDOT will nearly complete work on the Urban Trails System (Chief Sealth Trail, Burke Gilman Trail extension, Interurban Trail, Duwamish Bikeway, Lake Union Ship Canal Trail, Mountains to Sound Greenway and the Potlatch Trail).



- SDOT will create the City's first Pedestrian Master Plan by the end of 2008.
- To improve pedestrian safety, SDOT is installing 200 sidewalk curb ramps each year and will improve nearly 50 marked crosswalks to national safety standards by the end of 2008.

How we will measure our progress

- Percentage of trips made using modes of transportation other than single occupancy vehicles and, specifically, numbers of commuters traveling by bicycle or on foot.
- Numbers of trail users on the Burke-Gilman Trail (survey completed every five years by Bike Alliance and Cascade Bicycle Club).

In London, road pricing has reduced CO2 emissions by 16 percent and has made it easier and faster to travel through downtown.

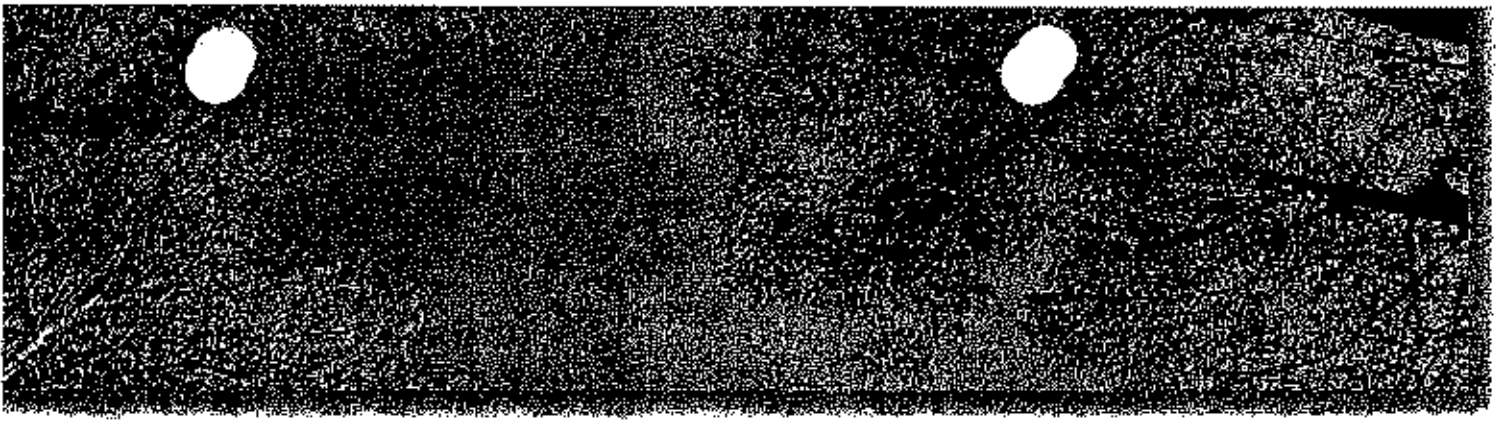
Action #3
Lead a Regional Partnership to Develop and Implement a Road Pricing System

The problem, the solution, the benefits

Several U.S. communities have succeeded in reducing rush-hour congestion, shifting travel to non-peak times and reducing overall vehicle miles traveled by implementing road pricing systems. We are convinced that a regional road pricing system in the Puget Sound region is a priority.

A system that charges for road use has significant potential to reduce greenhouse gas emissions: drivers respond to the "price signal" and adjust their driving habits accordingly. Road pricing can take many forms, including tolling of particular roads based on congestion levels, time of day, or miles driven; or "high occupancy toll" (HOT) lanes based on levels of congestion. Road pricing lowers vehicle miles traveled while managing traffic flows more efficiently. Revenue can further reduce congestion by funding alternatives like transit, cycling, and walking.

Establishing a pricing system on the region's most congested roads is ultimately the responsibility of the Washington Department of Transportation (WSDOT) which is already studying various road pricing scenarios. Seattle can help ensure that any proposed road pricing system meets the City's traffic management and emission reduction goals by add-



ing its investment to the state's road pricing analysis, and working closely with regional partners like the Puget Sound Regional Council. The benefits of reduced congestion — improved freight and transit times, reduced air pollution and fewer traffic accidents — will accrue to the entire region.

New City investments and actions to lead to regional road pricing

- The Mayor's 2007-2008 budget includes $100,000 for the Seattle Department of Transportation (SDOT) to work with regional partners to analyze and develop road pricing scenarios and address any legal and implementation issues. By the end of 2008, SDOT will report its findings and recommendations on pricing options as well as mechanisms for applying part or all of the road-pricing revenues to fund transit and other alternatives to single occupancy vehicles.

- Key City staff from SDOT, the Mayor's Office and the Office of Intergovernmental Relations will work closely with King County, the Port of Seattle, WSDOT, the Puget Sound Regional Council and the Puget Sound Clean Air Agency to raise support for regional road pricing and to address any legislative barriers to tolling on state and federal highways.

How we will measure our progress

Early progress will be measured by the state's progress in moving beyond pilot programs and studies. A key barometer will be whether road pricing systems are included in the planning for SR-520 and the Alaskan Way Viaduct.

Action #4
Implement a New Commercial Parking Tax

The problem, the solution, the benefits

Incentives are a powerful tool to shape the way we use — or conserve — energy. More expensive parking motivates people to choose alternative transportation, or to limit the number of trips that require paid parking.

While an increased parking tax provides the incentive to drive less, the other side of the equation is just as important — having viable transportation options available. A parking tax serves as a funding source to help make transit a viable alternative to traveling in single-occupancy vehicles.

New actions and investments: the City is phasing in a 10 percent commercial parking tax

- In August 2006, Mayor Nickels and the Seattle City Council approved a citywide commercial parking tax, which will be implemented in stages over three years. A 5 percent tax begins in July 2007, rising to 7.5 percent in July 2008 and 10 percent in July 2009.

How we will measure our progress

- Percentage of trips made using modes of transportation other than single occupancy vehicles.
- Vehicle miles traveled in Seattle.

Action #5
Expand Efforts to Create Compact, Green Urban Neighborhoods

The problem, the solution, the benefits

Increased urban density is one of the most effective strategies to increase energy efficiency; multi-family and high rise office buildings use far less energy per occupant than their stand-alone counterparts. Public transportation becomes far more frequent and cost effective in high density areas. An example is New York City, which is often rated as the greenest city in the United States. On a per capita basis, New York is the most energy efficient city with the lowest rate of car ownership.

Already the benefits of Seattle's move to more compact, urban living are apparent. According to the Puget Sound Regional Council, residents of the region's most compact neighborhoods drive 28 percent less than their counterparts in suburban areas. In a study conducted for King County, the Center for Clean Air Policy found that communities can cut carbon dioxide emissions 33 percent by increasing the number of dwellings per acre from four to 20. And there are many studies demonstrating that increased density — the combination of housing, retail, entertainment and employment — results in more walking, which translates into reduced obesity rates and improved health.

Given that Seattle is expected to grow significantly in the coming decades, there is a real need — and opportunity — to build walkable, transit-friendly neighborhoods across the city. Land-use changes to encourage such development are already under way, with height limits raised in some neighborhoods, allowing more residential and business development.

New City investments and actions to develop compact, livable neighborhoods

- The City's new downtown zoning rules allow increased height limits and greater development flexibility in exchange for incorporating energy-efficient green building practices and for providing funding for affordable housing and other public amenities.
- The mayor's Neighborhood Business District Strategy (NBDS) — scheduled to be considered by Council in December 2006 — includes zoning changes for the South Lake Union, Capitol Hill, University District and First Hill urban centers to encourage more compact development. It also includes changes to streamline regulations in all urban villages.
- The mayor's Center City Strategy is being implemented to accommodate 50,000 new jobs and 22,000 new homes Downtown and in nine close-in neighborhoods by 2024.
- As part of the NBDS, the City is revising policies and regulations to ensure "transit oriented development" — compact, mixed-use developments in which walking, biking and transit access are safe and easy — occurs at and around light rail stations.
- The multi-family code is being revised to encourage housing close to transit and commercial areas.
- Within the year, the Department of Planning and Development will be proposing new regulations to ensure new development includes open space, trees and other amenities. Options include:

Washington's per capita consumption of highway fuels (on-road use of gasoline and diesel) is 45 percent higher than British Columbia's.

— Sightline Institute, Seattle

- An open-space impact fee on new development in Seattle's urban centers to help fund public open space;
- Adopting the "Seattle Green Factor" in neighborhood commercial and multi-family zones — a menu-based system of development incentives and regulations that requires more trees and vegetation per parcel; and
- Strengthening the City's tree protection ordinance and providing incentives for private property owners to plant more trees and greenery.

How we will measure our progress

- Progress in increasing density will be measured by the percentage of people who live in pedestrian and transit oriented neighborhoods.
- Per capita residential energy use.
- Percentage of trips made using modes of transportation other than single occupancy vehicles.
- Tree canopy coverage.

Action #6
Improve the Average Fuel Efficiency of Seattle's Cars and Trucks

The problem, the solution, the benefits

Getting more miles per gallon out of our cars and trucks and reducing unnecessary trips is essential to reducing greenhouse gas emissions. Since 1987, the average fuel efficiency of cars nationally has steadily declined due to a number of factors: heavier vehicles, more horsepower, federal fuel efficiency standards that have remained essentially unchanged for two decades and higher speed limits. At the same time, the quality of vehicles has improved — thus the bigger, heavier, less fuel-efficient vehicles purchased in the last decade last longer and are likely to be in use for many years to come.

Fortunately, there are positive signs of change. In 2009, new cars sold in Washington will be required to meet new standards that restrict CO2 emissions. And rising oil prices are increasing the demand for more fuel efficient vehicles and prompting more people to consider how — and whether — they drive. Our challenge is to accelerate these changes in Seattle by encouraging "smart driving" — less idling, more moderate speeds, proper tire pressure, and bundling errands together. We'll also encourage actions such as fleet owners buying the most fuel-efficient vehicles for the job and taxi regulations being changed to reduce taxi "dead-heading" in Seattle-King County. These actions will reduce Seattle's projected GHG emissions by at least 35,600 metric tons by 2012.

Increased fuel efficiency not only reduces greenhouse gas emissions, it also reduces air pollution and saves consumers money at the gas pump. Ultimately, reducing our use of gas and diesel at a regional and national level contributes to a stronger, more sustainable economy that is less vulnerable to political upheaval in other parts of the world.

New City actions and investments to improve fuel efficiency in Seattle

- The Office of Sustainability and Environment (OSE), with other City departments and agencies such as the American Automobile Association (AAA) and the Puget Sound Clean Air Agency, will develop a comprehensive climate protection action-awareness campaign (see Action 14). It will include a "Drive Smart" component focused on fuel efficiency: what to look for when purchasing a car, maintenance and driving tips to increase mileage, and tips for driving less. The campaign will include a variety of media, messages, workshops and events tailored to reach specific audiences.

- OSE, partnering with Puget Sound Clean Cities Coalition and the Puget Sound Clean Air Agency, will develop and launch "Smart Fleets," a technical assistance program to reach commercial fleets. This program will feature both biofuels (see Action 7) and fuel efficiency, including benefit-cost case studies of fleets that have converted to more fuel efficient vehicles, reports on fuel saving opportunities for commercial drivers, fuel efficient technologies and any funding assistance that may be available.

- The Fleets and Facilities Department will improve and enhance its Clean, Green Fleet program. Already, the City fleet has reduced fossil fuel consumption by 12 percent since 1999 through such actions as purchasing the most fuel-efficient vehicle for the job. For example, hybrid electric cars are the standard sub-compact in the City fleet and Segways (battery operated personal mobility vehicles) are used for water meter reading, security at Seattle Center and for Seattle Police to patrol large events.

- The City will examine the use of smaller, more fuel-efficient taxicabs and offering incentives to taxicab owners to use gas-electric hybrid vehicles.

- The City will continue to work with King County, the Port of Seattle and taxi companies to explore ways of reducing the amount of taxi "deadheading" in the region.

- The Police Department will replace 20 non-pursuit vehicles with fuel efficient hybrid electric cars; the remaining 40 non-pursuit cars will be replaced with hybrids in the following four years.

- Seattle Center and the Parks Department will reduce the use of gasoline by replacing gas-powered mowers and other equipment with electric or hybrid electric models. Parks Department will also replace

About the Green Ribbon Commission

Mayor Nickels appointed the Green Ribbon Commission on Climate Protection in February 2006 and gave them a challenging task: develop recommendations for meeting or beating the Kyoto Protocol target for reducing global warming pollution right here in Seattle. The Commission, a diverse group of civic and business leaders, worked for a year poring over data and sorting through ideas. This Seattle Climate Action Plan is based in large part on the report and recommendations they delivered to the Mayor in March 2006.

"Our recommendations are based on careful review of both the major sources of global warming pollution in the Seattle area, and the most promising solutions from around the world," the Commission wrote in its report to the Mayor. "In our judgment, this is a necessary and achievable set of actions that will significantly reduce greenhouse gas emissions in Seattle, and at the same time create cleaner air, jobs and business opportunities, and a healthier environment for all of us."

For more information on the Commission and its report, please visit www.seattle.gov/climate.



three gasoline trucks with more climate-friendly models, and reduce vehicle idling by equipping five trucks with power inverters — devices that enable equipment to run off batteries without using the truck engine.

- The Parks Department will urge visitors at 14 of its most heavily used parks to reduce unnecessary idling by installing signs in parking lots.

- Seattle Public Utilities will offer an additional $25 incentive under its electric mulching lawn mower rebate program to ensure old mowers are turned in for disposal and not used elsewhere.

How we will measure our progress

- Trends in the contribution of gasoline to Seattle's climate pollution levels via updates to the greenhouse gas inventory.
- Regular survey tracking questions of drivers to measure behavior changes and levels of awareness.
- Seattle gasoline and diesel sales data, if available. (Currently, fuel sales data are available only at the statewide level.)
- Vehicle miles traveled in Seattle.

Action #7
Substantially Increase the Use of Biofuels

The problem, the solution, the benefits

Heavy duty diesel trucks on the road today average less than 8 miles per gallon, and they typically travel as many as a million miles before they are retired. Every gallon of diesel fuel burned adds more than 22 pounds of CO_2 to the atmosphere. Substituting at least part of the diesel use with biodiesel presents an enormous opportunity for cutting climate pollution. Similarly, gasoline fueled cars and light duty trucks using ethanol blends produce fewer greenhouse gas emissions per mile driven. Accelerating the use of biofuels in Seattle is projected to cut an estimated 165,000 metric tons of CO_2 by 2012.

- Biodiesel is a renewable non-petroleum fuel produced from crops such as soy and canola, or used cooking oils and unwanted animal fats. On a life cycle basis, biodiesel produces 78 percent less climate polluting carbon dioxide than petroleum diesel. Biodiesel can be blended at any level with petroleum diesel but is most commonly found at a ratio of 20 percent biodiesel to 80 percent petroleum diesel (B20).

- Ethanol is a renewable fuel currently distilled primarily from corn. The ethanol content in gasoline can be as high as 10 percent without needing to modify standard engines. Many automobile manufacturers make "flex-fuel" versions of their standard gasoline-powered vehicles which can use E85 (85 percent ethanol, 15 percent gasoline) and which cuts GHG emissions per gallon by as much as 64 percent compared to gasoline (if it is cellulosic ethanol).

Already, the use of biodiesel is expanding rapidly in Seattle. It costs about the same as petroleum diesel and is becoming more widely available at retail and bulk fueling stations. In 2008, state law will require that biodiesel will represent at least two percent by volume of diesel sales.

For E85, the main barrier is fuel availability; flex-fuel cars cost no more than standard cars and there are more than 110,000 in use in Washington today.

But nearly all use regular gas. Cellulosic ethanol development is underway and experts predict it may be available on a limited basis by 2008. Substantial state tax incentives exist to encourage in-state production facilities, distribution services and retail sales facilities for biodiesel and ethanol fuels. Developing more in-state production facilities will reduce the need to transport biofuels from other states thereby increasing climate benefits.

The switch to biofuels, particularly biodiesel, will also make big improvements in air quality. Petroleum diesel is currently the major source of the high rate of air toxics and particulate matter in Puget Sound. Reducing them will make our air cleaner and healthier.

New City investments and actions to accelerate the use of biofuels

- The Department of Fleets and Facilities will, following testing, increase the percentage of biodiesel blend used in City vehicles and equipment from B20 to as much as B40. Already, nearly all of the City's diesel vehicles are using B20.
- The climate protection action-awareness campaign (Action 14) will emphasize and promote biofuels as a climate solution.
- Seattle Center will install a 500-gallon biodiesel tank, allowing more equipment such as pressure washers and generators to be converted to biodiesel.
- OSE will work with other departments to identify and analyze potential additional City uses of biodiesel such as using biodiesel in emergency generators or requiring contractors to use B20 on City construction jobs.
- OSE will work with King County, the Puget Sound Clean Air Agency and the Puget Sound Clean Cities Coalition to develop and implement a mechanism to track biofuels sales in the Puget Sound region.
- E85 advocates such as the Puget Sound Clean Air Agency are looking to the state legislature for new incentives to create the supply and demand for E85. The City will actively support state legislation that is consistent with its legislative agenda and furthers the use and production of biofuels in Washington.
- The City is the major funder of the Puget Sound Clean Cities Coalition, a public/private partnership that is promoting policies and practices that increase the use of biofuels in transportation.

Actions by others in Seattle that will make a difference

- King County is the largest user of biodiesel in the region, with half of Metro's bus fleet using B20. As supplies become available, the County plans for all its on-road vehicles to be converted to B20.
- A coalition of air quality, labor and environmental interests is introducing state legislation in the 2007 session to further increase the use and production of biofuels in Washington.
- Puget Sound Clean Air Agency is producing a biodiesel users guide in early 2007.
- Washington State Ferries and Puget Sound Clean Air Agency will complete a study of specifications for marine use of biodiesel that will allow some ferry runs to return to using B20.
- The Port of Seattle uses B99 for its own uses.

How we will measure our progress

- Number of biofuel stations in Seattle.
- Gallons of biodiesel sold (if there are data available).



Action #8
Significantly Reduce Emissions from Diesel Trucks, Trains and Ships

The problem, the solution, the benefits

The Port of Seattle is the fastest growing container port in North America. The Port has also substantially increased its capacity to host the growing number of Alaska-bound cruise ships. This growth means Seattle is seeing an increase in diesel-emitting freight traffic from trucks, trains, and ships that carry goods, services, and people to and from Seattle. Ships are a particularly significant source of diesel pollution.

Consequently, diesel emissions are a growing source of Seattle's climate pollution. In addition, scientists are concluding that black soot caused in part by diesel emissions is adding to the impacts of global warming by increasing the melting rates of glaciers and snowfields.

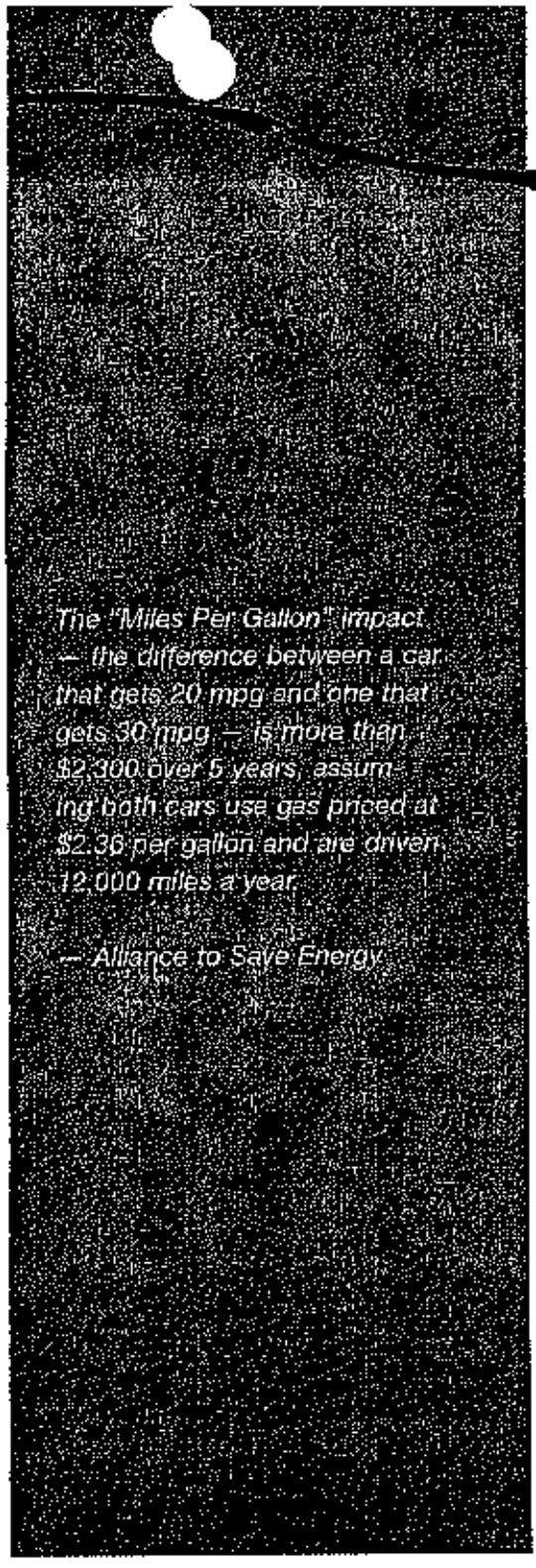
Reducing diesel emissions from freight transportation requires several strategies:

- Decreasing congestion along freight corridors to improve freight travel times;
- Running freight on cleaner fuels, where feasible;
- Reducing unnecessary idling by ships, trains and trucks; and
- Improving truck fuel efficiency.

Each of these strategies will contribute to substantial reductions in greenhouse gas emissions. Reduced emissions also help mitigate one of Seattle's more pressing public health issues: due primarily to diesel emissions, we have one of the highest rates of air toxics in the country, leading to increased cancer risks in our community.

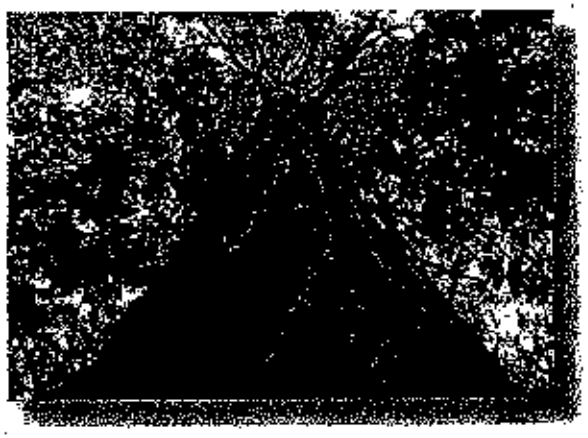
A number of recent initiatives are beginning to slow the rate of increased freight-related emissions:

- Thanks, in part, to funding assistance from Seattle City Light's greenhouse gas mitigation program, Seattle is just one of two North American Ports with shore power capability for cruise ships. This allows them to reduce emissions by about 30 percent by shutting off diesel engines.
- Port cargo cranes have all been converted from diesel to electric.
- The Port of Seattle (along with the Ports of Everett and Tacoma) is conducting a comprehensive inventory of maritime emissions that will be released in early 2007.
- The Port is taking steps to reduce truck idling. It has switched to using B99 (99 percent biodiesel, 1 percent petroleum diesel) in its diesel equipment. And it has successfully converted a number of its tenants to biofuels.
- The recently formed Puget Sound Maritime Air Forum, a public private partnership of the region's Ports, Air Agencies and others, is collaborating on adopting technologies and practices that reduce diesel emissions.



The "Miles Per Gallon" impact — the difference between a car that gets 20 mpg and one that gets 30 mpg — is more than $2,300 over 5 years, assuming both cars use gas priced at $2.36 per gallon and are driven 12,000 miles a year.

— Alliance to Save Energy



New City actions and investments to reduce diesel emissions

- OSE, partnering with the Puget Sound Clean Air Agency and the Puget Sound Clean Cities Coalition, will implement "Smart Fleets" to reduce emissions from commercial fleets. (See Action 6.)
- Seattle City Light will work with the Port of Seattle to expand the Port's capacity to provide onshore power to cruise and container ships.
- *Bridging the Gap*, the levy proposal to invest in Seattle's transportation infrastructure, would make numerous investments in freight mobility, including approximately $1 million in 2007 and $4 million in 2008 to provide critical freight infrastructure improvements near the Port. Projects include the Spokane Street Viaduct and Lander Street Bridge.
- The Seattle Department of Transportation, also through *Bridging the Gap*, will adjust traffic signals to improve the flow of freight traffic.

How we will measure our progress

- Tracking diesel emissions via regular updates to the community wide inventory of greenhouse gas emissions.

Action #9
Maintain Seattle City Light at Zero Net Greenhouse Gas Emissions and Meet Load Growth Through Conservation and Renewable Energy Resources

The problem, the solution, the benefits

In most communities in our country, the electric utility is a major source of greenhouse gas emissions because it burns coal or gas to produce electricity. In Seattle, by contrast, the City-owned electric utility is a point of climate protection pride. That's because Seattle City Light is the only electric utility in the country to have achieved zero net greenhouse gas emissions. Continuing this policy yields the single largest greenhouse gas reduction in the plan—about 200,000 metric tons.

The utility starts with a low baseline of greenhouse gas emissions because clean hydroelectricity produces approximately 90 percent of City Light's power. To reach its goal of zero net greenhouse gas emissions, the utility's first priority is to acquire cost-effective energy conservation and renewable energy and then, using stringent criteria and third-party verification, to purchase offsets for the remaining emissions. (An "offset" is a project that compensates for some or all of an organization's global warming pollution by avoiding or storing an equal amount of emissions outside of its own operations.) City Light offsets approximately 200,000 metric tons of greenhouse gas emissions each year and spends about $2 per customer per year to meet this commitment.

Although City Light electricity is climate neutral, conservation remains a top priority because it contributes to the utility's ongoing ability to meet the zero net GHG emissions target. The more the utility relies on cost-effective conservation to meet demand, the fewer greenhouse gas emissions it has to offset — a win for climate protection and a win for City Light rate payers.

Actions to meet the City's commitment to conservation, renewables and climate neutral electricity

- Seattle City Light's mitigation program has already purchased enough offsets for all of 2006 and part of 2007. It will purchase additional offsets as necessary to achieve zero net greenhouse gas emissions.
- City Light will acquire 7.25 average megawatts of energy conservation in 2007 and at least that for 2008.
- City Light will continue to buy about 3 percent of its power needs with renewable wind energy through its contract with Stateline Wind.
- As part of the climate protection action-awareness campaign (see Action 14) City Light, Puget Sound Energy and the Office of Sustainability and Environment (OSE) will collaborate on a campaign that promotes energy conservation for both natural gas and electricity for all users: homes, businesses and public institutions. Links to new federal tax incentives for home and business conservation measures will be included in the promotional materials.

How we will measure our progress

- The key performance indicator is whether or not City Light meets the zero net greenhouse gas emissions target each year.
- The supporting performance indicator is per capita residential electric energy use in Seattle.

Action #10
Substantially Increase Natural Gas Conservation

The problem, the solution, the benefits

Natural gas is one of the cleanest burning fuels for heating and cooking but, like all fossil fuels, it produces greenhouse gas emissions. The solution is to use it more efficiently.

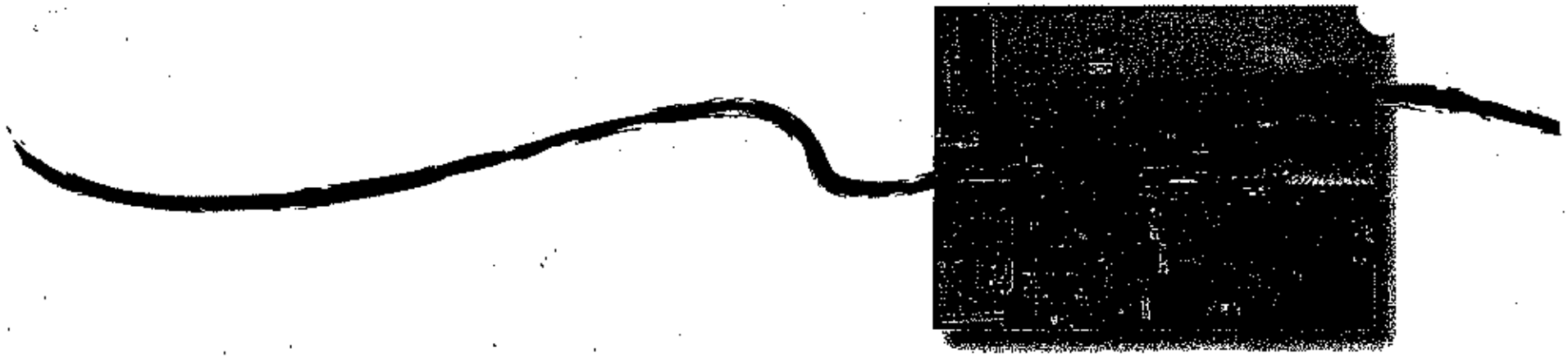
Opportunities and incentives abound for increasing natural gas efficiency. Puget Sound Energy (PSE), the gas utility serving Seattle, offers homes and businesses grants and rebates to help pay for gas conservation measures such as high efficiency appliances, furnaces, industrial processes and home weatherization. Seattle Public Utilities' water conservation program provides incentives for appliances and equipment that use hot water more efficiently. Substantial federal tax incentives are available for energy conservation investments. And, many conservation measures don't require any spending – shorter showers, fully loaded dish washers and keeping the door closed during the heating season.

The benefits of increased energy efficiency go well beyond climate protection. Energy efficiency helps pay for itself by lowering utility bills. It extends energy supplies. As the most cost-effective energy resource for a utility, investing in energy conservation helps keep rates down for everyone, which is good for our local economy.

We project that by accelerating natural gas conservation in businesses, public institutions and homes, greenhouse gas emissions in Seattle can be reduced by about 66,000 tons by 2012. The primary barrier is that, while the region has nearly three decades of experience with electric energy conservation, there just isn't as much awareness and experience with gas conservation. For example, there has never been a region-wide weatherization program for gas heated homes and since about half of Seattle homes heat with gas, there are likely many cost effective conservation opportunities in these homes.

New City actions and investments to accelerate natural gas conservation in Seattle

- In 2007, Seattle Public Utilities and City Light will implement a comprehensive showerhead and faucet aerator program for all residential customers. Program materials will feature greenhouse gas reductions as one of many benefits.
- Seattle Parks and Recreation will install covers on the Helene Madison and Ballard swimming pools, which are heated by natural gas, in 2007. In addition, in partnership with PSE, Parks is establishing a Resource Conservation program to identify and implement cost-effective energy conservation measures.
- The Fleets and Facilities Department will increase its focus on energy efficiency in City facilities, hiring a dedicated energy specialist and adding resources for implementing cost-effective conservation measures.
- City Light's energy conservation program promotional materials and messages will feature greenhouse gas reductions as one of many benefits of energy efficiency. In addition, the materials will urge customers who use gas for heating or cooking to contact PSE's conservation program.
- The Department of Planning and Development will increase the Green Building Program's focus on energy efficiency — particularly natural gas — and associated greenhouse gas reduction benefits by offering targeted technical assistance, incentives, promotion of utility conservation programs, and making case studies available.



- As part of the communications program, (see Action 14) PSE, City Light, and the Office of Sustainability and Environment will collaborate on a campaign that promotes energy conservation for both natural gas and electricity.

- Heat pump hot water heaters (HPHWH) are substantially more energy efficient than even the most efficient conventional water heaters. They are, however, more expensive and complicated to install. In 2008, OSE will work with City Light and PSE to report on HPHWHs and their potential for GHG reduction in Seattle.

How we will measure our progress

- Per capita residential energy use.
- Regular updates to the greenhouse gas inventory.

Action #11
Strengthen the State Residential Energy Code

The problem, the solutions, the benefits

The City has long been a leader in energy code development for commercial buildings, ensuring that the code stays current with changes in building technology and captures additional opportunities to increase energy efficiency. But the residential energy code—which governs single family housing, apartments, condominiums and hotel and motel guestrooms—is set at the state level by the State Building Code Council. To make improvements to the residential energy code, the City must work with the Council and other interested parties in a process that occurs once every three years. The 2006 revision cycle is under way now and will be complete in November 2006.

The climate benefits of energy code improvements are substantial and, because the energy code is statewide, Seattle's efforts in this arena will reverberate beyond the Puget Sound region.

Energy codes "lock-in" energy efficiency at the time of construction and homeowners and tenants save money on their utility bills — adding to long-term housing affordability.

When cost effective energy code changes are not adopted, utilities and their ratepayers ultimately pay more either for energy conservation retrofits or for a new source of energy; making housing energy efficient when it's constructed is far more cost effective than remodeling later.

City actions to achieve a strengthened energy code

As part of the State Building Council's 2006 energy code revision cycle, the Department of Planning and Development (DPD) and Seattle City Light submitted several proposed amendments to the residential energy code that will improve energy efficiency cost effectively. The amendments were adopted into the rule making process and will be considered during the

public comment period. The proposals are:

- Increasing insulation levels in vaulted ceilings;
- Requiring more energy efficient windows ("Class 35") that are standard practice in about 85 percent of construction already;
- Restricting developers' ability to take credit for less than 15 percent window area as a means to avoid more insulation in floors and/or walls;
- Requiring energy efficient lighting (compact fluorescents) for exterior lighting or regular lights with daylight and motion sensors; and
- Requiring linear fluorescent lights to be high efficiency fluorescent fixtures (T-8's).

The public comment period for the energy code revision process is in October 2006. Several city departments—DPD, the Office of Sustainability and Environment, the Office of Intergovernmental Relations and Seattle City Light—will be working with the State Building Code Council members and staff and others to urge adoption of the proposed amendments.

Progress on this action will be measured by

- Tracking per capita residential energy use (both gas and electric).
- Updates to the greenhouse gas emissions inventory.

Action #12
Reduce Seattle Steam's Use of Natural Gas

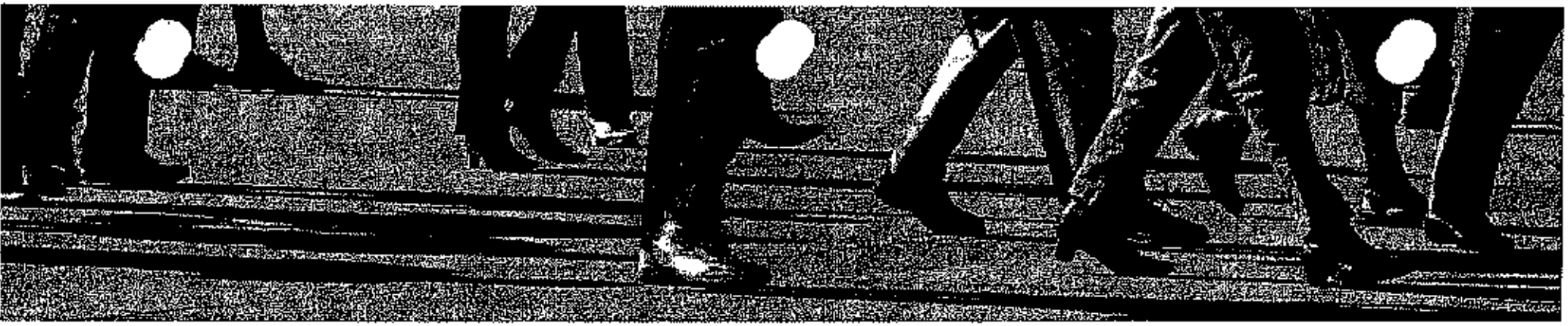
Seattle Steam Co. supplies steam for heat and hot water to 175 downtown Seattle customers by burning natural gas in addition to some petroleum diesel in its two boilers. Converting one of its boilers from fossil fuel to biofuel in the form of urban wood waste would avoid approximately 50,000 tons per year of GHG emissions.

Converting from natural gas to burning wood is a climate protection measure because the natural cycle of vegetation is to absorb CO2 when growing and emit CO2 when decaying; while burning vegetation accelerates the process, it is not a new source of CO2.

The City's role in this project is limited to permit review and compliance. Both the City and the Puget Sound Clean Air Agency have issued the necessary permits, and as of this writing the project is undergoing value engineering. If bids are within budget, the project schedule calls for completion by June 2007.

How we will measure our progress

- Monitor project status.
- Updates to the greenhouse gas emissions inventory.



Action #13
Continue the City of Seattle's Strong Leadership Example

The problem, the solution, the benefits

Having already cut its own greenhouse gas emissions by more than 60 percent and committing the resources and leadership to meet the Kyoto goal of 7 percent reduction by 2012, the City is widely recognized as a model in climate protection. Many effective programs already are in place to reduce the City's emissions, including City Light's energy conservation program, Seattle Public Utilities' waste reduction and recycling programs, the Department of Planning and Development's Green Building Program and the Clean, Green Fleet program at the Department of Fleets and Facilities.

Stabilizing the global climate, of course, requires far more than meeting the Kyoto targets. Consequently, the City must continue to lead the way — continually looking to further reduce emissions and generate the experience and best practices to promote action by others.

That "walk-the-talk" approach is evident in the success of the Seattle-led U.S. Mayors Climate Protection Agreement. Seattle's demonstrated success in climate protection — proving that emissions can be cut while a city prospers — has spurred hundreds of other cities to commit to strive to meet the Kyoto target in their own communities. The City will continue to build on its commitment by testing and implementing cost effective ways to reduce its own climate pollution while also increasing its efforts to promote community-wide emission reductions.

This commitment is made recognizing that, as always, City resources are limited. By focusing our investments on actions that deliver multiple benefits such as cost savings, cleaner air and the ability for the City to attract and retain new residents and businesses, we don't have to choose between prosperity and climate protection. By virtue of our leadership role, City actions have multiplier effects through our many partnerships, including the Puget Sound Clear Air Agency, the U.S. Conference of Mayors, and ICLEI — Local Governments for Sustainability.

New leadership investments and actions the City will take

- All City employees will be encouraged and inspired to take action — on the job and at home — to reduce greenhouse gas emissions through an employee outreach campaign led by the Office of Sustainability and Environment (OSE). (See Action 14.)
- The City will fully mitigate all business-related air travel by City employees beginning in 2007, by purchasing carbon-offset projects annually.
- As of January 1, 2007, the use of climate-friendly cement using blast-furnace slag will be included in the City's contract specifications, and the City will look for opportunities to further increase its use.
- A newly-created Department of Executive Administration Green Team will assess and, where appropriate, promote the purchase and use of other climate-friendly products such as super-efficient "80-plus" computers and servers.
- OSE and the Department of Finance will work with the Seattle City Employees Retirement System to explore options for climate-friendly

"America has the technology and resources to meet all its energy needs while safeguarding the earth's climate. The urgent question now is, 'Do we have the will?' At least one city does; and I'm proud to live in it."

— Denis Hayes, International Chair of Earth Day and Seattle Green Ribbon Commission Co-chair

investing that are consistent with State law governing the System's investments. This may include actions such as assessing both the risks to City investments posed by climate disruption and the opportunities to invest in climate solutions; asking companies in the City's existing investment portfolio to disclose climate risk information through reporting mechanisms such as the Carbon Disclosure Project or Global Reporting Initiative; and joining the Investor Network on Climate Risk.

- Seattle Public Utilities, the City's second-largest department, will complete a greenhouse gas emissions inventory and develop an action plan specific to its four lines-of-business: water supply; drainage; wastewater; and solid waste management.

- OSE and the Department of Neighborhoods will lead an interdepartmental effort to, by the end of 2007, develop recommendations on how the City can support local sustainable agriculture as a climate protection action.

How we will measure our progress

- Avoided greenhouse gas emissions from Seattle's recycling program.
- Updates to the inventory of the City's corporate greenhouse gas emissions, i.e., those emissions the City is directly responsible for in its operations and facilities.

Action #14
Mobilize the Entire Community

The problem, the solution, the benefits

A big piece of the climate protection puzzle lies at the feet—or more precisely, the gas pedals, light switches and thermostats—of individuals. While it's true that the Seattle area alone cannot solve the global climate crisis, we have shown that we can serve as a model for others to follow. And we have a responsibility to do so. The problem is that most individuals do not yet know what actions they can and should take to be a part of the solution.

The time is ripe to change that. A series of recent nationwide polls demonstrates enormous awareness of global warming as a problem. Fifty eight percent of respondents to a recent Gallup survey believe climate change has already begun and 88 percent in a 2006 ABC News/Time Magazine poll believe it will threaten future genera-

tions. A national poll completed in August 2006 shows sizeable majorities link climate change to recent severe weather events, from declining snow pack to hurricanes to wildfires. And an Environmental Defense poll done in April 2006 shows 59 percent think their individual actions can help.

The Office of Sustainability and Environment (OSE) will lead City departments and partners including King County Metro, Climate Solutions, Sound Transit, Puget Sound Energy, Port of Seattle, AAA Washington, Puget Sound Clean Air Agency and others, in developing and launching an action-awareness campaign for the Seattle area to connect a motivated public to the climate protections actions they can take, from smarter driving habits and turning down the thermostat to recycling and using less hot water.

The City has had demonstrated success in promoting conservation in the past. Seattle Public Utilities' successful water conservation campaigns, combined with water saving technologies, have resulted in water consumption that today is below levels of the mid 1970s, despite a 25 percent increase in population. Seattle City Light's conservation program, begun in 1977, has saved more than enough electricity to power three cities the size of Seattle for a year.

The benefits to a downward shift in our use of fossil fuels will be substantial reductions in greenhouse gas emissions, cleaner air, healthier residents and significant cost savings for residents and businesses through reduced energy consumption. Beyond these direct benefits, we all will benefit greatly from a public fully-engaged and eager to press for strong climate protection policies from government and climate-friendly products and practices from business. Such engagement is the lynchpin that will make the broader Seattle Climate Action Plan successful.

New City actions and investments to mobilize the community

- The City will launch a series of radio ads in early October offering tips for reducing emissions to residents and businesses.
- In early 2007, the City and its partners will launch a sustained, large-scale, climate protection action-awareness campaign to make Seattle-area residents, public institutions and businesses aware of the link between their everyday energy use and the climate crisis. The campaign, which will employ a variety of media, will use that awareness to stimulate positive actions by individuals and organizations that reduce the region's emissions of greenhouse gases. It will tie together existing utility conservation, public transportation and trip-reduction, car- and van-pooling, private car sharing, and energy-efficient building programs to boost awareness and usage through a variety of means: a web-site, other media and direct communication through utility bills, Neighborhood Service Centers and other City programs.
- The Department of Neighborhoods will launch a $75,000 Neighborhood Climate Protection Fund to promote and help finance neighborhood-based climate protection projects such as local biodiesel cooperatives, tool- and car-sharing programs, anti-idling campaigns and community energy conservation actions.
- OSE will partner with the Port of Seattle in 2007 to develop a program at SeaTac Airport to encourage air travelers to offset the climate-pollution emissions of their flights.
- OSE will partner with the Puget Sound Clean Air Agency to bring a new educational program, "Kids for Climate Protection," to Seattle schools.

How we will measure our progress

- Monitoring data on growth of programs promoted by the campaign; also monitoring of issue-branded web site traffic.
- Periodic polling to test awareness and behavior, compared to baseline surveys to be performed prior to campaign launch.
- Regular updates to the inventory of greenhouse gas emissions.

Action #15
Create the Seattle Climate Partnership

The problem, the solution, the benefits

No single sector of the community — government, residents or business — will get us to and beyond the goal of reducing emissions by 7 percent by 2012; it will require participation by everyone. Fortunately, Seattle's businesses and other organizations have a history of visionary leadership and have already shown their eagerness to step up to the climate challenge.

Large organizations — business, industry and public institutions — are uniquely positioned to tackle climate change by directly reducing greenhouse gas emissions in their own operations and by promoting reductions by their employees, vendors and customers.

To mobilize the area's public and private sectors to individually and collectively address climate change, the City has launched the Seattle Climate Partnership. The Partnership is a voluntary pact among employers to reduce their own emissions and work together to help meet community-wide reduction goals. Already, 20 institutions have joined the Partnership — a dynamic and growing network of climate-friendly institutions supported by a strong program of technical assistance, information sharing and recognition.

With the City of Seattle's leadership and participation, 11 other founding partners are developing the Partnership:

- REI
- Starbucks Coffee Company
- Group Health Cooperative
- Lafarge North America
- Port of Seattle
- University of Washington
- King County
- Urban Visions
- Mithun
- Garvey Schubert Barer Law Firm
- Shoreline Community College

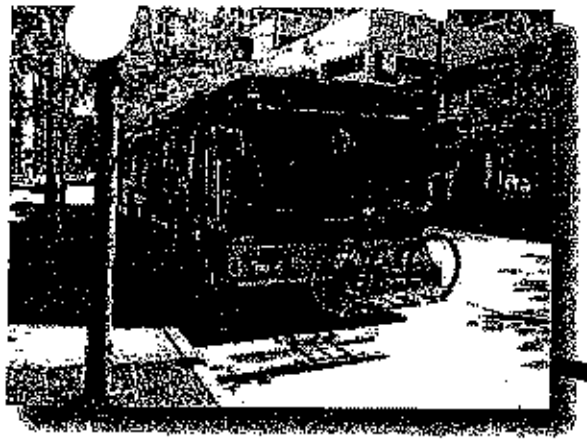
In May, 2005 the state Legislature passed energy efficiency standards for 12 appliances, including commercial clothes washers and natural gas unit heaters that will reduce greenhouse gas emissions in Seattle by 9,500 tons by 2012.

Investments and actions to implement the Seattle Climate Partnership

Engaging a large percentage of employers will take a deliberate, strategic and sustained effort. With staff support from the City's Office of Sustainability and Environment (OSE), the founding partners have developed a Partnership Agreement and initiated a recruitment effort that has already gained the participation of several other Seattle organizations including Fred Hutchinson Cancer Research Center, HomeStreet Bank, Imperium Renewables (formerly Seattle Biodiesel), Woodland Park Zoo, Seattle University, the Seattle Housing Authority, Waterstone Brands and Evergreen Construction.

During 2007, the Partnership members will, with staff support from OSE:

- Develop and implement a recruitment strategy to meet the Partnership's participation goals of 100 employers by the end of 2007 and 200 by the end of 2008, targeting the largest employers;



- Develop and implement a technical assistance program for partners, including: a resource guide; a web site for sharing ideas, experiences, best practices and success stories; training workshops; and direct technical support from a team of experts in climate solutions, such as energy conservation and commute trip reduction;

- Host an annual event with the Mayor and other civic leaders to recognize and promote the Partnership's climate protection accomplishments, thereby increasing networking and recruitment of new Partners;

- Members have concluded that the Partnership's credibility and effectiveness will be enhanced if it is ultimately housed in a non-governmental organization. By late 2006, the Partnership, with staff support from OSE, will develop a five-year business and funding plan with a target date of December 2007 for selecting a non-profit home for the Partnership.

How we will measure the progress of the Partnership in reducing emissions

- The founding partners will agree on a set of performance indicators as part of the five-year business plan for the Partnership. These indicators might include the number of Seattle-area employers participating in the Partnership and the tons of greenhouse gas emissions avoided or reduced by members of the Partnership.

Action #16
Leverage Regional, State and National Climate Solutions

The problem, the solution, the benefits

Climate disruption is a global challenge that requires strong action in all sectors of our society and by all levels of government. Seattle cannot solve the problem by itself, of course. But as Washington's largest city and economic engine, we are in a good position to help shape policy and promote action by neighboring jurisdictions, in Washington State and at the federal level, too. Strong climate protection policies and programs are urgently needed at all levels of government, both to demonstrate leadership and to bring about the significant emissions reductions that are needed to stabilize the climate.

We are fortunate to be part of a regional community that shares a commitment to climate protection:

- Both the Puget Sound Clean Air Agency and King County have strong climate protection programs.

- ICLEI — Local Governments for Sustainability, whose Cities for Climate Protection Campaign has mobilized local action on global warming for years, now has a new regional capacity center in Seattle.

- Seattle participates in a number of regional and statewide government forums that have a direct interest in strong climate protection policy, including the Association of Washington Cities, Puget Sound Regional Council, and the regular meetings of the King County Mayors, statewide Big City Mayors and King County City Managers.

- There are a number of well-respected and effective environmental, good government and labor groups — including Climate Solutions, the Sierra Club/Cascade Chapter, the U.S. Green Building Council/Cascade Chapter and the King County Labor Council — that have adopted climate protection as priority, and have a strong presence in the state Legislature.

- Governor Gregoire and the state legislature have passed several very important pieces of climate protection legislation in recent years, including the clean car rules, appliance efficiency standards, and biofuels standards, and will continue to look for ways to address this issue in future sessions.

In addition, more than 300 mayors across the country — including 19 from Washington — have signed onto the Seattle-initiated U.S. Mayors Climate Protection Agreement, pledging to take action to reduce global warming pollution in their own communities and support a national cap-and-trade system for greenhouse gas emissions. These mayors represent more than 50 million people in 46 different states plus the District of Columbia, and constitute an influential — and growing — coalition of municipal leaders who are taking local action on global warming and calling for stronger national action.

By building on these and other relationships and accomplishments, the City is well positioned to promote broader solutions, at the local and state level.

City investments and actions to leverage regional, state and national action

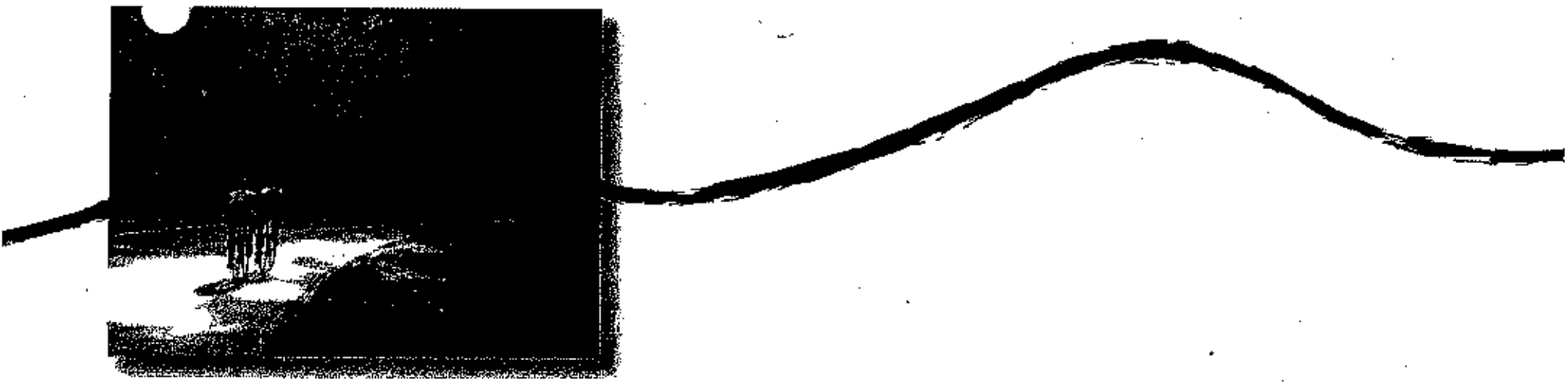
- The Office of Sustainability and Environment and the Office of Intergovernmental Relations will continue to work closely with the Clean Air Agency, ICLEI, King County, and the King County Mayors/City Managers group to promote strong climate protection action by local jurisdictions throughout the Puget Sound region.

- Along with King County and the Puget Sound Clean Air Agency, we will continue to work with the Puget Sound Regional Council to increase funding, through programs such as the Congestion Mitigation and Air Quality (CMAQ) Improvement Program, for climate-friendly transportation, including expanded public transit and freight mobility improvements that reduce diesel emissions.

- Strongly advocate for a Sound Transit/Regional Transportation Investment District (RTID) proposal for the November 2007 ballot that emphasizes increased funding for public transit and transit-related mitigation for roads projects.

- We will work toward a state-wide cap-and-trade system for Washington state, and ask the State to consider joining the cap-and-trade system now under development by the State of California.

- We will strongly advocate for state and national policies that: increase investment in public transit and other infrastructure that makes alternatives to motor vehicles more convenient and affordable; increase the fuel efficiency of motor vehicles as well as development and use of alternative fuels; encourage energy utilities to fully support and implement cost-effective conservation and meet new demand with renewable



energy sources; and other measures to reduce our state and national impact on the global climate.

- As co-chair of the newly created U.S. Mayors Council on Climate Protection, Mayor Nickels will: continue to lead efforts to increase participation in the U.S. Mayors Climate Protection Agreement (MCPA); lend his guidance and assistance to the U.S. Conference of Mayors and ICLEI — Local Governments for Sustainability as they help cities implement the Agreement; seek additional partnerships with other organizations working to implement solutions, and work with the U.S. Conference of Mayors to increase U.S. mayors' participation in, and influence on, national climate policy.
- The City will partner with the newly created Clinton Climate Initiative to accelerate the greenhouse gas emission reduction efforts of cities around the U.S. and abroad, and to ensure participation by MCPA signatories in purchasing collaboratives that will increase the market for (and lower the costs of) climate-friendly products and technologies such as plug-in hybrid vehicles and heat pump water heaters.

How we will measure our progress

- Number of mayors signed onto the U.S. Mayors Climate Protection Agreement.
- Number of local governments adopting Green Fleet Plans and other climate-friendly policies and programs.
- Adoption of a strong climate policy framework (as outlined above) by both the State of Washington and the federal Government.

Action #17
Direct More Resources to the Challenge

Upping our investment

The City has been investing in climate solutions for many years. For example, beginning in April 2000, Seattle City Light increased its investments in conservation, renewable energy sources, and carbon offset projects to achieve its goal of zero net emissions of greenhouse gases. Under this action plan, the utility will continue to make the investments necessary to sustain that goal. Similarly, through its Green Building Program (initiated in February 2000) and the Clean, Green Fleet Program (launched in April 2002), the City has already invested heavily in energy-efficient, climate-friendly buildings and vehicles.

This action plan builds on these accomplishments. It calls for more progress within existing resources, for example by better integrating climate impacts and solutions into City purchasing and investment decisions. In addition, the 2007-2008 Proposed Budget that Mayor Nickels submitted to the City



Council in September 2006 proposes additional climate protection investments of about $1.8 million in 2007 and about $1.2 million in 2008. In 2007, these new investments include the following:

- About $375,000 to buy more climate-friendly vehicles and landscaping equipment, and to install a biodiesel tank at Seattle Center;
- $530,000 to identify and implement cost-effective energy-efficiency measures in City facilities, with a strong focus on natural gas conservation;
- $200,000 to initiate an extensive community awareness and action campaign, including $75,000 to fund community-based climate solutions through the Neighborhood Matching Fund;
- $100,000 to promote alternatives to single-occupant vehicle travel in partnership with the Urban Mobility Group, Flexcar and others;
- $100,000 for technical and policy analysis in support the City's efforts to develop and implement and regional road-pricing systems;
- $50,000 to initiate a "Smart Fleets" program to increase fuel efficiency and use of biofuels by commercial fleet operators;
- $50,000 to provide technical support to the Seattle Climate Partnership, an effort to accelerate greenhouse gas emissions reduction efforts by Seattle-area employers; and
- $10,000 to fully mitigate global warming pollution from business-related air travel by City employees by investing in "carbon offset" projects.

In addition, if passed, *Bridging the Gap*, the transportation funding proposal that will be on the November 2006 ballot, will contribute significantly to implementing this action plan. Specifically, it includes approximately:

- $4.4 million in both 2007 and 2008 to expand bus service in Seattle, increase bus rapid transit, and improve transit efficiency in key bus corridors;
- $500,000 in 2008 to begin development of King Street Station as a multimodal transit hub;
- $7.5 million in both 2007 and 2008 to increase bike trails and lanes, improve sidewalks and walkways and pedestrian street crossings in high-use areas, and develop and begin implementing the city's first Pedestrian Master Plan — a comprehensive strategy for making walking in Seattle easier and safer;
- $2 million in 2007 and $3 million in 2008 to repair Seattle's existing pedestrian infrastructure, its sidewalks, trails, walkways, and stairways;
- $1 million in 2007 and $3.7 million in 2008 for freight infrastructure improvements, many of which will decrease emissions by improving truck travel times as they move through the city;
- $750,000 to maintain street trees and plant new trees.

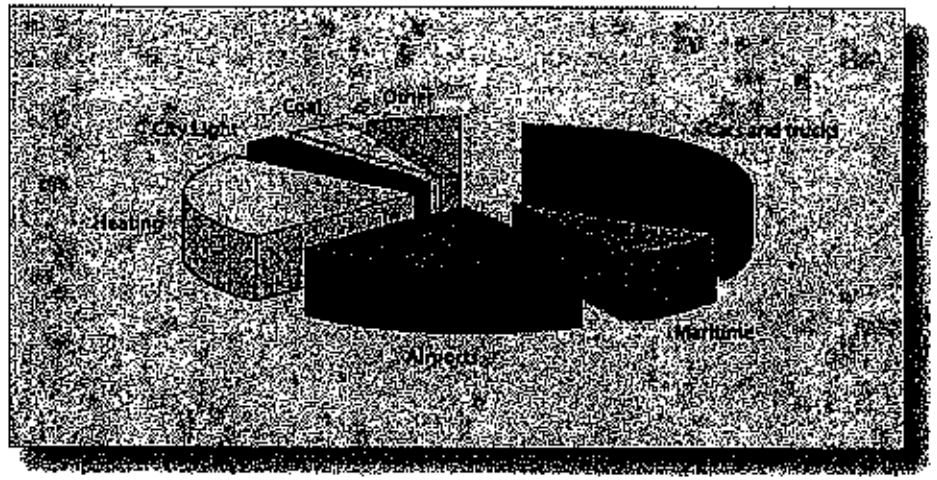
Reaping diverse dividends

Investments in climate protection will produce benefits that go well beyond reducing global warming pollution. For example, reducing motor vehicle emissions by increasing transit, biking and walking opportunities significantly improves air quality and public health. And increasing the use of biodiesel and improving freight mobility reduces diesel emissions — the number one source of toxic air pollution in our community.

Many actions that reduce global warming pollution — in particular, energy and fuel use efficiency — save money over time, especially in this era of rising energy prices. Energy conservation lowers the costs of powering our homes and businesses; fuel efficiency saves us money at the pump. According to the American Council for an Energy-Efficient Economy, the U.S. could save $75 billion a year by increasing energy efficiency in buildings by 30 percent. Similarly, according to the Union of Concerned Scientists, a 40 mile-per-gallon fuel economy standard for cars and light trucks would save consumers $16 billion annually, while reducing global warming pollution from those vehicles by 20 percent.

In addition, there is growing evidence that investing in climate solutions bolsters economic vitality by creating jobs and business opportunities. A recent study by the University of California at Berkeley (www.calclimate.berkeley.edu) concluded that the State of California's plan to achieve 1990 levels of greenhouse gas emissions by 2020 will boost California's Gross State Product by $60 billion and create 17,000 new jobs. The study, using a state-of-the-art economic forecasting model, concluded California would see the economic and employment benefits "largely because innovation and efficiency improvements — driven by climate policy — save money, allowing consumers to redirect their spending from imported energy to in-state goods and services, providing new stimulus to the California economy."

Although a similar study has not been conducted on Seattle's Climate Protection Initiative, local researchers agree that reducing the city's dependence on gasoline, diesel and natural gas will have economic benefits. According to the Seattle-based Sightline Institute, much of what we spend on oil and gas "gets immediately siphoned out of the region's economy, leaving less money to circulate locally, among the region's residents and businesses." The Institute estimates that the residents and businesses of Washington State export about $9.6 billion annually in this way.



PROJECTED 2012 SEATTLE EMISSIONS SOURCES

Cars and trucks: trucking and passenger transportation, including gasoline, diesel, and natural gas vehicles; **Maritime:** Ships, trains, ferries, construction equipment; **Airports:** air travel; **Heating:** natural gas (including commercial and industrial uses), heating oil, and propane heat; **City Light:** Seattle City Light emissions; **Coal:** coal from various Seattle-based industries; **Other:** closed landfills, non-road gasoline, distillate oil, liquid propane gas, fireplaces.

Action #18
Monitor and Report on Progress

As the saying goes, what gets measured gets managed. A critical part of Seattle's Climate Action Plan is to measure progress in meeting the target of reducing Seattle's climate pollution by seven percent by 2012 compared to 1990 levels. As the leader of the U.S. Mayors Climate Protection Agreement, Seattle's progress in reducing emissions, and our experience with which actions are most effective, will be of great interest to mayors and cities across the country.

The most significant measurement is to update regularly Seattle's inventory of greenhouse gas emissions and that is already underway. A report on 2005 emissions is scheduled to be completed in early 2007.

Progress will also be measured through several other important performance indicators:

- Avoided emissions from Seattle's recycling program
- Emissions from City operations and facilities
- Per capita residential energy use in Seattle (natural gas and electricity use)
- Percentage of trips made using modes of transportation other than single occupancy vehicles
- Vehicle miles traveled
- Progress in increasing density as measured by the percentage of people who live in pedestrian and transit oriented neighborhoods

The other critical element is to monitor progress on each of the action items contained in this Plan so that, as needed, program revisions and corrections are timely.

Actions to monitor and report on progress

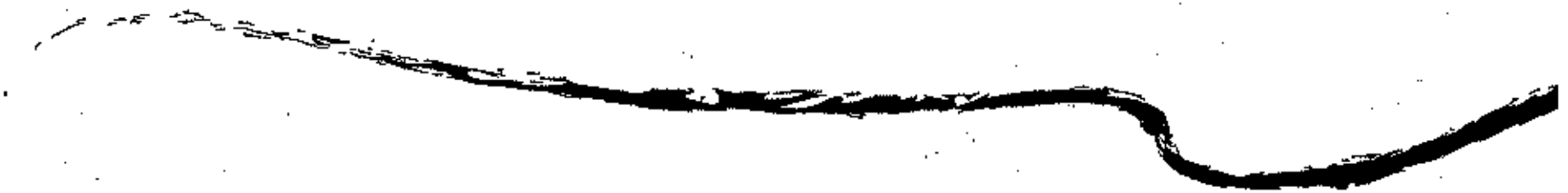
- The Office of Sustainability and Environment (OSE) will update Seattle's greenhouse gas emissions inventory every three years using widely accepted protocols. Because we are working with so many partners on our climate protection actions, our goal is to produce an inventory that allows Seattle's progress to be measured against the region's progress. To that end, we've convened an Ad Hoc GHG Inventory Committee consisting of key City staff and representatives from those key partners — the Port of Seattle, the Puget Sound Clean Air Agency, the Puget Sound Clean Cities Coalition and ICLEI — Local Governments for Sustainability.

- Greenhouse gas emissions from transportation sources — the major source of Seattle's climate pollution — are difficult to measure accurately because fuel sales data are collected only at the state level and don't include biodiesel sales. The Puget Sound Clean Air Agency collects regional emissions data and is considering a leadership role in collecting and providing emissions data to Seattle and other Puget Sound cities and counties. OSE will work closely with the Clean Air Agency to see if local fuel sales data can be collected and reported regularly.

- OSE will lead implementation and provide technical support for this action plan including convening an interdepartmental Climate Team that will coordinate, track and report on implementation progress and develop climate protection performance measures to be integrated into departments' accountability contracts with the Mayor.

- The Mayor's Urban Sustainability Advisory Panel will be responsible for overseeing the implementation of the Seattle Climate Action Plan, including providing feedback and direction in response to progress reports and updated Plans.

- OSE, with the assistance of the Interdepartmental Climate Team and the oversight of the Advisory Panel, will update the Seattle Climate Action Plan as part of the City's biennial budget process.



Seattle's Climate Action Plan: The Importance of Recycling and Urban Forestry

The 18 Actions presented in this plan reduce the levels of greenhouse gas emissions within Seattle's boundaries. Although not calculated in our target for reducing greenhouse gas emissions, the City's recycling and urban forestry programs also reduce climate pollution and are equally important parts of Seattle's climate protection initiative.

Recycling and waste management are potent strategies for reducing greenhouse gases because they save energy. Manufacturing goods from recycled materials typically requires less energy than producing goods from virgin materials. That means fewer fossil fuels are burned and less carbon dioxide is emitted. Waste prevention, recycling and composting divert organic wastes from landfills, reducing the methane that would be released if these materials decomposed in a landfill. And waste prevention and recycling paper products allows more trees to remain standing in the forest, where they can continue to remove carbon dioxide from the atmosphere.

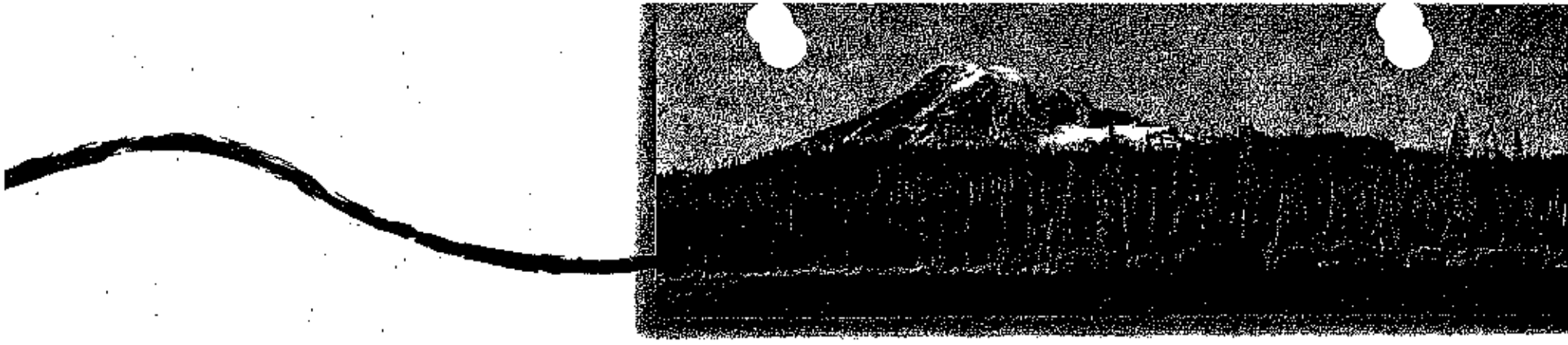
What Seattle is doing: Seattle Public Utilities has a long history of waste reduction and recycling through a wide variety of programs and incentives, including:

- Banning recyclable paper and cardboard in commercial garbage;
- Banning recyclable paper, cardboard and glass, metal and plastic bottles in household garbage;
- Providing convenient curbside or on-site recycling collection to households as part of their solid waste collection services at no additional charge;
- Setting volume-based garbage collection fees;
- Providing convenient curbside collection of yard debris and food waste to households for a modest fee;
- Providing convenient curbside collection of yard debris and food waste to households for a modest fee;
- Encouraging waste minimization and recycling through education and outreach.

In 2005, all these incentives and programs led Seattle households and businesses to recycle nearly 335,000 tons of paper, cardboard, glass, metal and plastic food and beverage containers, plastic bags, yard debris, food scraps, textiles and other materials. That translates to reducing GHG emissions by 563,000 metric tons of carbon dioxide equivalents (as calculated by EPA's model using Seattle specific data). While most of the avoided emissions occurred in places other than in Seattle (for example, manufacturing plants using recycled aluminum aren't located in Seattle) they are no less important in addressing the global climate problem.

Urban forests — like all forests and vegetation — remove carbon-dioxide (CO_2) from the atmosphere during photosynthesis, storing that carbon in their tissues. Seattle's urban forest includes all the trees and under-plantings in the city — trees along streets, in parks, greenbelts, on college campuses, and on private property. Preserving and protecting these trees prevents CO_2 from being released and planting more trees and understory enhances removal of CO_2 from the atmosphere. Measures to protect, restore, and sustainably manage the city's forests offer significant climate change mitigation potential.

What Seattle is doing: Although known as the "Emerald City," Seattle's urban forest is in decline. Since 1972, the city has gone from approximately 40 percent tree canopy cover to only 18 percent today. And 70 percent of Seattle's forested parklands are so heavily infested with ivy and other invasive plants that, without intervention, they will become ecological dead-zones. In many cases, deciduous trees make up a disproportionate share



of the forest, replacing native evergreen conifers that deliver more climate benefits by "breathing in" CO2 year around. To reverse the trend, the City has launched a major urban forest initiative.

One element of that initiative is the Green Seattle Partnership, a public-private venture between the Cascade Land Conservancy and the City of Seattle. The Partnership is raising funds, volunteers, and public awareness to restore 2500 acres of forested city park lands. By 2025, the program will completely remove ivy and other invasive species and replant the 2500 acres with native trees and plants. (For more information: www.greenseattle.org.)

The Green Seattle Partnership is part of the city's first-ever comprehensive plan for managing, restoring and expanding Seattle's urban forest. The draft Urban Forest Management Plan, which will be finalized in early 2007, calls for increasing Seattle's canopy cover by two-thirds in 30 years and builds on the parkland restoration commitments of the Green Seattle Partnership by:

- Adding 649,000 trees citywide over 30 years;
- Improving the health of City-owned street trees by increasing pruning to an industry-standard cycle of every five to seven years;
- Creating a long-term program to educate landowners about the value of trees;
- Devising incentives and regulations that encourage residential planting;
- Coordinating tree management among all City departments with tree maintenance responsibility (Parks, Transportation, City Light, Seattle Public Utilities), including a comprehensive inventory and analysis of the urban forest;
- Creating a partnership between citizen, government and business to bring additional financial, volunteer and management resources to tree restoration.

Estimating the carbon sequestration benefits of an urban forest is an extraordinarily complex undertaking because there are so many variables, among them:

- How much CO2 trees take up and store depends on the tree species, age and size. Bigger trees do more photosynthesis and take up more CO2;
- Deciduous trees take up CO2 in the spring and summer as they leaf-out, and, when their leaves fall in autumn, much of that CO2 is emitted as the leaves decompose. But if the leaves are composted and added to soil, some of the CO2 is sequestered;
- Evergreen trees sequester carbon year around. In a rural or mountain forest, the lifetime of a conifer is predictable and so the CO2 benefits can be calculated relatively accurately. In an urban setting, however, the trees are subject to a lot more stress — invasive species, development, and root compaction — and are less likely to reach maturity.

Because of these difficulties the net climate protection benefits of Seattle's urban forest have not been calculated. Nonetheless, it is a fact of nature that trees and plants are the "lungs of the earth" and the climate benefits only add to the economic, social and environmental benefits of a healthy, sustainable urban forest.



Adapting to Climate Change

The consensus among climate experts is that climate change is happening now and is likely to increase. Average global surface temperatures rose 1.1 degrees Fahrenheit during the 20th century. Northwest winters have warmed 2.7 degrees since 1950, in part because of cycles in ocean conditions. Global sea levels have risen around four to eight inches. Even if the world was to stop burning fossil fuels tomorrow, existing levels of atmospheric CO2 would continue to contribute to warming temperatures, melting sea ice, disappearing glaciers and the myriad other climate changes and impacts already being observed.

Our approach is that we can and must reduce our levels of climate pollution to slow the rate of climate change. But we must also plan for and adapt to the climate change that is inevitable here in the Pacific Northwest. Building on adaptation efforts already underway at Seattle City Light and Seattle Public Utilities, the City will develop and implement a comprehensive strategy to ensure that climate impact scenarios are appropriately integrated into City policies, operations and services.

Projected climate impacts in the Pacific Northwest

The University of Washington is home to the Climate Impacts Group (CIG), an interdisciplinary group of scientists whose focus is aimed at understanding the consequences of climate fluctuations for the Pacific Northwest. According to the CIG, as a result of global warming, in the next 20 to 40 years, our region will likely see:

- Regional warming (3-5°F by 2040s) which is likely to be faster than global warming (1-4°F by 2040s);
- Decreased mountain snowpack, which provides much of our area's water supply and hydroelectricity generation;
- Expected decreases in water levels in south Puget Sound are of 1.3 feet by 2050, higher than in most areas of the world because changes in Pacific Ocean wind patterns drive more seawater into Puget Sound;
- Higher winter and lower spring streamflows in rivers that depend on snowmelt; already snowmelt is occurring 12 days earlier than it did 50 years ago;
- Increased winter flooding;
- Potential increases in forest fires;
- Impacts on salmon habitat from increased winter floods, decreased summer streamflows and warmer water temperatures;
- Increased landslides due to increased winter rainfall.

It is vital that the City — and all levels of government — plan and prepare for the climate change that is inevitable. Because Seattle's water and hydroelectricity are so dependent on the hydrology cycle in the Cascade Mountains, the City has focused its planning and adaptation analysis work there.



Water supply

Seattle Public Utilities (SPU) supplies drinking water to more than 1.45 million people in Seattle and surrounding communities. Most of that water originates in the South Fork Tolt River and Cedar River watersheds, both in the Cascade Mountains. Given the projected climate changes in the Cascades — reduced snowpack, earlier snowmelt, higher air temperatures — the impacts for the water utility could be significant.

To understand and plan for the potential impacts on both water supply and demand, SPU contracted with the University of Washington's Climate Impacts Group to develop a method to downscale climate models to a regional level, producing a series of modeled results of climate change impacts on water supply in the Tolt and Cedar watersheds. The averaged modeled results of the study show that in 2020, there would be approximately 7 percent less reliable yield in water supply — 12 million gallons a day, which would not affect SPU's abilities to meet projected demands. In 2040, the study projects a reduction in yield of approximately 24 million gallons a day. If this were to occur, existing water resources would still be sufficient to meet the forecasted water demand through 2053, assuming no further decreases in yield after 2040. Nonetheless, SPU is continuing to evaluate new supply alternatives and to track climate science developments in the event that conditions indicate new supplies are needed sooner.

Over the years, in response to varying weather conditions, SPU has developed and applied a number of adaptation strategies to enhance the water supply system while also meeting stream flow needs for fish. Many of these techniques will also be used in the future to adjust to further climate change. The winter of 2005 is a case in point of how adaptation is already working. That year, record low winter snowpack created deep concern about the ability to meet water supply needs for the year. But the low snowpack also reduced the probability of floods from snow melt, allowing SPU water managers to capture more water in storage than a normal year. This provided enough water to return to normal supply conditions by early summer despite the lowest snowpack on record.

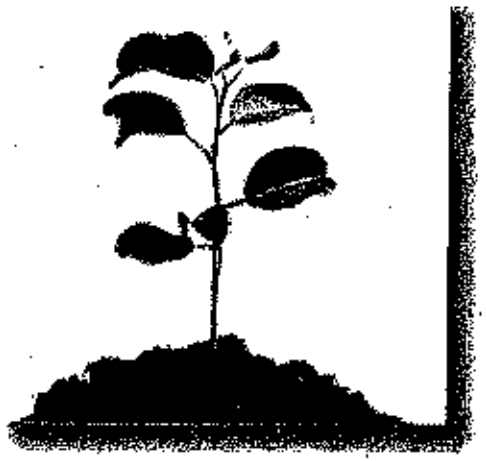
SPU will continue to expand its understanding of climate change science to further refine its understanding of potential climate impacts and how the water system can adapt over time.

Hydroelectricity

Seattle City Light's hydroelectric projects on the Skagit and Pend Oreille Rivers provide about half of the power its customers need. The remainder comes from a mix of power sources, including long-term contracts with the Bonneville Power Administration. The projected climate changes in the Cascades — reduced snowpack, loss of glaciers, earlier snowmelt — have the potential for significant impacts on City Light's hydrosystem.

To better understand and plan for these impacts, City Light supported research at the UW's Atmospheric Sciences Department to model the effects of climate change specific to the Skagit watershed. City Light will continue to support research of this kind and integrate the information into its planning for operations and future resource needs. In the long term, SCL will look at the potential need to modify operation on the Skagit. To be consistent with National Energy Reliability Council requirements, City Light has already adopted a more conservative planning standard for its Integrated Resource Plan, effectively reducing the amount of generation the utility can count on from its hydro resources in the future.

City Light is also planning for more variability in the precipitation levels in river basins, including the increased potential for drought and floods. The Utility's Power Management Division is working closely with the Natural Resources and Environmental Planning Unit to determine potential effects on the salmon and steelhead in the Skagit.



What's next

There are a number of other likely climate impacts the City must consider in its long term planning. For example:

- Storm water management: if rainfall becomes more intense, i.e., falling harder over shorter periods of time, will our existing system be able to handle the increase? Or will our streets flood more often? What kind of infrastructure, policy or land management changes could be adopted to slow and hold excess stormwater?

- Urban forestry: how will the native conifers in our parks and green spaces manage over the long term with warmer temperatures and fewer winter freezes? Will the trees be more prone to insects and diseases? Should our plans to plant more trees include different species that are native to warmer climates? Will City landscaping require more maintenance to survive such as regular summer watering? Would increased investment in urban forestry help manage the drainage challenges mentioned above?

- Building codes: as summer temperatures increase, so will the demand for air conditioning. Should building codes be revised to encourage techniques that avoid or minimize cooling needs such as less thermal mass, natural ventilation and larger floor-to-ceiling heights. And should mechanical ventilation be added as a requirement for buildings such as nursing homes?

- Longer and hotter heat spells: many cities are already experiencing more very hot days in the summer, contributing to increased smog and a variety of public health issues, particularly for vulnerable populations. How likely is it that Seattle will experience a "heat emergency"? Should our emergency response plans be expanded to include heat emergencies?

- Sea level rise: what level of sea level rise will Seattle experience over what period of time? What will be the impact on Seattle shorelines for development regulations, the location and design of shoreline facilities and habitat restoration projects?

To address these and other climate impact issues, the Office of Sustainability and Environment will convene an interdepartmental team to prioritize issues and recommend to the Mayor specific strategies, actions and timing. Given that some adaptive strategies may require years to implement, this is a priority issue and OSE will deliver a recommended Citywide adaptation strategy by the end of 2007.

Many thanks to all who helped in developing and writing Seattle's Climate Action Plan. It was a team effort, which makes it all the more likely to succeed.

Mayor Nickels' Green Ribbon Commission on Climate Protection

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There is no single solution to the threat of climate change, no magic pill to reduce emissions. Instead, success will depend on people taking small steps, every day, at home, at work, on the road and in their community.

Seattleites have done it before. Rather than investing in costly new power plants and water systems decades ago to meet the needs of a growing population, the people of Seattle chose conservation instead. Today, we use less water than we did in 1975 even though our population has grown 25 percent.

The solution begins with you. Here are steps you can take to reduce emissions to make a difference for the future of our city and our planet.

In Your Home

Turn down, turn off and unplug. Set thermostats at 68 degrees when you're home and 55 or lower when you're away or at night. Turn off lights in empty rooms and unplug electronics and cell phone chargers that aren't in use.

Use efficient bulbs. Compact fluorescent light bulbs (CFLs) are 75 percent more efficient than incandescent bulbs and last much longer. According to EPA, if every U.S. household replaced one bulb with a CFL, it would cut the climate pollution of a million cars.

Conserve water. Your hot water tank is your home's second largest user of energy. Set your tank at 120 degrees, take shorter showers, use water-efficient dishwashers and washing machines, run them only when full and wash clothes in cold water. You'll save money on energy and water.

Install an efficient furnace. Older gas furnaces and boilers waste energy. Modern systems can be as high as 97 percent efficient, meaning the energy you pay for actually heats your home. An ENERGY STAR® brand furnace can save you up to 40 percent on heating bills.

Use a push or electric mower. Going manual or electric is cleaner and quieter.

Tighten up that fireplace. Wood-burning fireplaces can be a big energy drain, sucking heating dollars up the chimney. Energy-saving options include low-cost removable flue sealers to fireplace doors or a new high-efficiency gas insert.

Insulate. Insulating basement walls and attics can reduce your energy bill by as much as 30 percent. Plug leaks around doors, windows, attic hatches and in walls.

Freeze out pollution. Set the fridge at 35 to 38 degrees and the freezer at zero for maximum efficiency. Clean coils regularly. Keep the rubber door seals clean and tight. Keep the fridge and freezer away from heat sources.

Recycle and compost. Waste prevention, recycling and composting divert organic wastes from landfills, reducing methane that would be released if these materials decomposed in the dump.

Utilize your utility. Both Puget Sound Energy (1-800-562-1482, pse.com/solutions) and Seattle City Light (206-684-3800, seattle.gov/light/conserve) want to work with you to improve energy efficiency. They can provide information, technical assistance and even grants and rebates to help pay for energy efficiency improvements.

On the Road

Drive less. Use public transit or ride-share. Walk, cycle, jog or in-line skate and get some exercise at the same time. Shop close to home or work and combine all your errands into one trip. You'll save time, money and fuel, and avoid traffic.

Drive smart. Keep cars and trucks tuned and tires properly inflated. Don't idle when you're stuck—about 15 seconds is the breakeven point. Forget jack rabbit starts; they cut fuel efficiency by 31 percent! On the highway, drive the speed limit. You'll do more than cut emissions, you will avoid tickets, improve safety, reduce stress and lower car maintenance bills.

Drive the cleanest vehicle you can. If you double the mileage of your vehicle, you'll halve the greenhouse gas emissions. Plus, new gas-electric hybrid vehicles are eligible for a federal tax credit. Alternative fuels like biodiesel and ethanol also cut emissions.

At Work

Join the Seattle Climate Partnership.

Be a leader by linking with organizations such as Starbucks, REI Inc., the University of Washington, Lafarge North America and the Group Health Cooperative. Share best practices and leverage the power of cooperation. Contact the Office of Sustainability and Environment (www.seattle.gov/environment).

Understand the risk. Limiting exposure to new carbon regulation, increased energy costs, extreme weather, and bad public relations is good business.

Be a change agent. Support climate protection policies in your firm and at the local, state and federal levels of government. Work with your suppliers, employees and customers to be more energy-efficient.

Invest in a greener future. Review your financial strategies to minimize exposure to climate risk and maximize upside in climate-solution investments.

Assess your impact, then act. Conduct an inventory of your greenhouse gas emissions, set reduction targets and develop an action plan. It's not only climate-friendly; it makes long-term sense for your bottom line. Among the most fruitful things you can do:

Manage facility energy use. Lighting is likely your biggest energy consumer. Use motion sensors and compact fluorescent lights. Tune your heating and cooling gear. Buy ENERGY STAR® equipment and power-efficient computers.

Employee commute programs. Incorporate transit passes and incentives into benefits and provide lockers and showers for bicycle commuters.

Green the fleet and ship wisely. Use the most fuel efficient vehicle for the job and consider less carbon-intensive shipping methods like rail or marine shipping instead of air to cut emissions and costs.

Reduce business travel emissions. Flying is the most carbon-intensive travel method. Consider combining trips, using the train for shorter trips, and telephone-, video- and internet-conferencing.

In Your Community

Expanding or moving facilities? Consider the impact of location.

Site close to public transportation and business hubs so employees and customers can get to you without a car. Incorporate "green building" to increase energy efficiency.

Rally your neighbors. Start a neighborhood energy conservation project and apply for a City Neighborhood Climate Protection Fund matching grant.

Reduce, reuse and recycle. Nearly every product requires energy to produce, distribute and dispose of. Recycle, because manufacturing with recycled materials cuts energy use. Choose pre-owned products, products that have recycled content and products with less packaging. Buy at salvage yards, construction demolition stores and consignment and thrift shops.

Offset emissions. While it's not a replacement for direct action, carbon offset programs, which pool money from individuals or organizations for emission-reduction projects elsewhere, are an important climate protection tool.

Talk about it! Your voice can make a difference. Start by taking actions listed here – and then encourage your friends, neighbors and family to act. Make even more of a difference by supporting strong local, state and federal climate protection policies.



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Office of the Governor
ARNOLD SCHWARZENEGGER
THE PEOPLE'S GOVERNOR

PRESS RELEASE

09/27/2006 GAAS:684:06 FOR IMMEDIATE RELEASE

Gov. Schwarzenegger Signs Landmark Legislation to Reduce Greenhouse Gas Emissions

Joined by national and international dignitaries who have been leaders in the fight against global climate change, Gov. Schwarzenegger signed AB 32 by Assembly Speaker Fabian Nunez (D-Los Angeles), California's landmark bill that establishes a first-in-the-world comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions of greenhouse gases.

"When I campaigned for governor three years ago, I said I wanted to make California No. 1 in the fight against global warming. This is something we owe our children and our grandchildren," said Gov. Schwarzenegger at signing ceremonies in San Francisco and Los Angeles. "Some have challenged whether AB 32 is good for businesses. I say unquestionably it is good for businesses. Not only large, well-established businesses, but small businesses that will harness their entrepreneurial spirit to help us achieve our climate goals. Using market-based incentives, we will reduce carbon emissions to 1990 levels by the year 2020. That's a 25 percent reduction. And by 2050, we will reduce emissions to 80 percent below 1990 levels. We simply must do everything in our power to slow down global warming before it's too late."

AB 32 requires the California Air Resources Board (CARB) to develop regulations and market mechanisms that will ultimately reduce California's greenhouse gas emissions by 25 percent by 2020. Mandatory caps will begin in 2012 for significant sources and ratchet down to meet the 2020 goals. In the interim, CARB will begin to measure the greenhouse gas emissions of the industries it determines as significant sources of greenhouse gas emissions. The bill also provides the Governor the ability to invoke a safety valve and suspend the emissions caps for up to one year in the case of an emergency or significant economic harm.

National and international luminaries joined the Governor to celebrate California's leadership in fighting climate change. At the San Francisco bill signing ceremony, British Prime Minister Tony Blair participated via satellite to congratulate California on its commitment to the environment. In July, the Gov. Schwarzenegger signed a unique agreement with Prime Minister Blair to become partners and act aggressively to address climate change and promote energy diversity. The Governor was also joined at the San Francisco bill signing ceremony by New York Governor George Pataki, who has been extremely supportive of Gov. Schwarzenegger's environmental efforts at the state and national levels.

At the Los Angeles event, the Virgin Group's Sir Richard Branson joined Gov. Schwarzenegger via satellite to applaud the Governor for his leadership and discussed Branson's appeal to other airlines to take voluntary steps to reduce greenhouse gas.

Japanese Prime Minister Junichiro Koizumi, whom the Governor met with during his 2005 trade mission to Japan and who is a strong supporter of the Kyoto Protocol, sent a letter in support of the legislation. "I would like to commend you, Gov. Schwarzenegger, and [the] people of California for taking a leadership role in protecting the earth's environment," wrote Prime Minister Koizumi. At the Prime Minister's request, the letter, attached, was read by the Japanese counsel general.

Specifically, AB 32, the California Global Warming Solutions Act of 2006, requires CARB to:

- Establish a statewide greenhouse gas emissions cap for 2020, based on 1990 emissions by January 1, 2008.
- Adopt mandatory reporting rules for significant sources of greenhouse gases by January 1, 2009.
- Adopt a plan by January 1, 2009 indicating how emission reductions will be achieved from significant greenhouse gas sources via regulations, market mechanisms and other actions.
- Adopt regulations by January 1, 2011 to achieve the maximum technologically feasible and cost-effective reductions in greenhouse gas, including provisions for using both market mechanisms and alternative compliance mechanisms.
- Convene an Environmental Justice Advisory Committee and an Economic and Technology Advancement Advisory Committee to advise CARB.
- Ensure public notice and opportunity for comment for all CARB actions.
- Prior to imposing any mandates or authorizing market mechanisms, CARB must evaluate several factors, including but not limited to impacts on California's economy, the environment and public health; equity between regulated entities; electricity reliability, conformance with other environmental laws and ensure that the rules do not disproportionately impact low-income communities.

Because of California's massive and growing economy, the state is the 12th largest emitter of carbon in the world despite leading the nation in energy efficiency standards and lead role in protecting its environment.



Caltrans Home
Resource Conservation
DGS Management Memo 01-14
DGS Management Memo 03-14
DGS Management Memo 04-11
DGS Management Memo 05-14
DGS: Office of Sustainability
Green California
California ISO Status Charts
ted Links
Executive Order W-83-94
Executive Order S-07-04
Executive Order S-12-04
Executive Order S-20-04
Executive Order S-06-06
Executive Order S-03-05
Implementation of Standard Operating Efficiency
P edures

Executive Order

EXECUTIVE DEPARTMENT

STATE OF CALIFORNIA



EXECUTIVE ORDER S-3-05
by the
Governor of the State of California

WHEREAS, California is particularly vulnerable to the impacts of climate change; and

WHEREAS, increased temperatures threaten to greatly reduce the Sierra snowpack, one of the State's primary sources of water; and

WHEREAS, increased temperatures also threaten to further exacerbate California's air quality problems and adversely impact human health by increasing heat stress and related deaths, the incidence of infectious disease, and the risk of asthma, respiratory and other health problems; and

WHEREAS, rising sea levels threaten California's 1,100 miles of valuable coastal real estate and natural habitats; and

WHEREAS, the combined effects of an increase in temperatures and diminished water supply and quality threaten to alter micro-climates within the state, affect the abundance and distribution of pests and pathogens, and result in variations in crop quality and yield; and

WHEREAS, mitigation efforts will be necessary to reduce greenhouse gas emissions and adaptation efforts will be necessary to prepare Californians for the consequences of global warming; and

WHEREAS, California has taken a leadership role in reducing greenhouse gas emissions by: implementing the California Air Resources Board motor vehicle greenhouse gas emission reduction regulations; implementing the Renewable

Energy Conservation Measures

Comments

Portfolio Standard that the Governor accelerated; and implementing the most effective building and appliance efficiency standards in the world; and

WHEREAS, California-based companies and companies with significant activities in California have taken leadership roles by reducing greenhouse gas (GHG) emissions, including carbon dioxide, methane, nitrous oxide and hydrofluorocarbons, related to their operations and developing products that will reduce GHG emissions; and

WHEREAS, companies that have reduced GHG emissions by 25 percent to 70 percent have lowered operating costs and increased profits by billions of dollars; and

WHEREAS, technologies that reduce greenhouse gas emissions are increasingly in demand in the worldwide marketplace, and California companies investing in these technologies are well-positioned to profit from this demand, thereby boosting California's economy, creating more jobs and providing increased tax revenue; and

WHEREAS, many of the technologies that reduce greenhouse gas emissions also generate operating cost savings to consumers who spend a portion of the savings across a variety of sectors of the economy; this increased spending creates jobs and an overall benefit to the statewide economy.

NOW, THEREFORE, I, ARNOLD SCHWARZENEGGER, Governor of the State of California, by virtue of the power invested in me by the Constitution and statutes of the State of California, do hereby order effective immediately:

1. That the following greenhouse gas emission reduction targets are hereby established for California: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; by 2050, reduce GHG emissions to 80 percent below 1990 levels; and

2. That the Secretary of the California Environmental Protection Agency ("Secretary") shall coordinate oversight of the efforts made to meet the targets with: the Secretary of the Business, Transportation and Housing Agency, Secretary of the Department of Food and Agriculture, Secretary of the Resources Agency, Chairperson of the Air Resources Board, Chairperson of the Energy Commission, and the President of the Public Utilities Commission; and

3. That the Secretary shall report to the Governor and the State Legislature by January 2006 and biannually thereafter on progress made toward meeting the greenhouse gas emission targets established herein; and

4. That the Secretary shall also report to the Governor and the State Legislature by January 2006 and biannually thereafter on the impacts to California of global warming, including impacts to water supply, public health, agriculture, the coastline, and forestry, and shall prepare and report on mitigation and adaptation plans to combat these impacts; and

5. That as soon as hereafter possible, this Order shall be filed with the Office of the Secretary of State and that widespread publicity and notice be given to this Order.

IN WITNESS WHEREOF I have here unto set my hand and caused the Great Seal of the State of California to be affixed this the first day of June 2005.

/s/ Arnold Schwarzenegger

Governor of California

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4.0 ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

Impact 4.3-6 Increase In Greenhouse Gas Emissions

Land uses and development consistent with the Draft 2005 CWP Update would result in an increase in greenhouse gas emissions over existing levels. This would be a significant impact.

Human activities powered by fossil fuels such as coal, oil, and natural gas cause the waste product carbon dioxide (CO_2) to be released into the air. As discussed in the setting section the largest contributors to these emissions in Marin County are vehicular traffic and energy use in buildings. With land uses and development consistent with the *Draft 2005 CWP Update* there would be an increase in greenhouse gas emissions over existing levels. This is in part due to the projected increase in daily vehicle miles (VMT) traveled. As shown in **Exhibit 4.3-6**, daily VMT are expected to increase from an existing 7.0 million to approximately 8.8 million with the buildout of the *Draft 2005 CWP Update*.

Many different types of activities and programs can reduce Marin's carbon dioxide emissions. The most important ways to reduce emissions are through: [21]

- Changes in transportation; and
- Energy efficiency and conservation in both commercial and residential buildings.

The *Draft 2005 CWP Update* target for reducing greenhouse gas emissions countywide is 15 percent by 2015 and for County government sources 15 to 20 percent by 2015. To achieve these targets the *Draft 2005 CWP Update* contains numerous goals, policies and programs that, if adopted and implemented, would act to help minimize carbon dioxide and other greenhouse gas emissions. The Atmosphere and Climate section of the Natural Systems & Agriculture Element describes goals, policies and programs with respect to greenhouse gases. These policies and programs are intended to reduce greenhouse gas emissions countywide. Goal **AIR-4** would aim to prepare policies that promote efficient management and use of resources in order to minimize greenhouse gas emissions. Programs **AIR-4.a, AIR-4.b, AIR-4.c, AIR-4.d** and **AIR-4.e** would all be aimed at directly reducing greenhouse gas emissions resulting from energy use in buildings, from transportation, from waste disposal, from agriculture, and from government contributions.

As discussed in *Impact 4.3-1 Consistency with Clean Air Plan* numerous policies and programs in the *Draft 2005 CWP Update* would reduce the rate of vehicle miles traveled from trips in Marin County. For example, the Built Environment Element contains policies and implementing programs that would encourage development in urban areas served by transit. Policies supporting Goal **HS-3** would implement "smart" and sustainable development principles to meet the housing needs in the county. This would include a focus of providing workforce housing (e.g., Policies **HS-3.2, HS-3.3,** and **HS-3.4**). The addition of workforce housing would reduce VMT associated with worker commute travel. The Transportation section of the Built Environment Element includes numerous policies to expand pedestrian and bicycle facilities and access. Other policies and programs would promote energy efficiency and conservation in buildings. The Energy and Green Building section of the Built Environment Element addresses energy conservation and green building standards. Implementation of these policies and programs would reduce carbon dioxide and other greenhouse gases reduced emissions from electrical energy production and natural gas usage.

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[21] *Measuring Marin County's Ecological Footprint*, prepared for the County of Marin Community Development Agency by Justin Kitzes, M.S. and Steve Goldfinger, Ph.D., February 2006.

The *Marin County Greenhouse Gas Reduction Plan*[22] adopted by the Board of Supervisors in October 2006 set out policies to help achieve the County's greenhouse gas emissions targets. The target has been set to reduce greenhouse gas emissions 15 to 20 percent below 1990 levels by the year 2020 for internal government and 15 percent countywide. This target exceeds the State target for greenhouse gas emissions. The *Greenhouse Gas Reduction Plan* describes measures related to building, transportation, waste, and land use. Many of these actions and measures are supported by policies in the *Draft 2005 CWP Update* and some reflect activities that are already underway and could be expanded.

Exhibit 4.3-10 provides a list of various measures that would reduce greenhouse gas emissions in Marin County, some of which are included in the *Marin County Greenhouse Gas Reduction Plan.* The exhibit describes the various types of measure and a link to a specific program in the *Draft 2005 CWP Update*. The exhibit also provides an estimate of the yearly reduction in tons of CO_2 that could be achieved by individual measures.

22 *Marin County Greenhouse Gas Reduction Plan*, Marin County Community Development Agency, October 2006.

Exhibit 4.3-10
Draft 2005 CWP Update Programs to Reduce Greenhouse Gas Emissions

Measure / Program	*Category*	*Draft 2005 CWP Update Programs*	*Emissions Reduction (tons of CO_2)*
Adopt strict residential or commercial energy code requirements	Buildings / Energy	AIR-4.a, EN-1.a, EN-1.b, EN-1.c, EN-1.d, EN-3.a, EN-3.b, EN-3.f, EN-3.h	-
Launch an "energy efficiency challenge" campaign for community residents	Buildings / Energy	AIR-4.a, EN-1.e	-
Install solar water heating at community swimming pool	Buildings / Energy	AIR-4.a, EN-2.d	-
Install energy-efficient cogeneration power production facilities	Buildings / Energy	AIR-4.a, ED-2.d, EN-2.f	-
Initiate a community biodiesel purchasing coop or fueling station	Transportation	EN-2.d	-
Utilize biodiesel in municipal fleet	Transportation	AIR-3.b, AIR-3.c, TR-4.c	-
Encourage local buses and taxis to convert to alternative fuels by subsidizing fuel conversion equipment costs	Transportation	AIR-3.b, AIR-3.c, TR-4.c	-
Install energy-efficient exit sign lighting	Buildings / Energy	AIR-4.a, AIR-4.e, EN-1.j, EN-2.f	-
Improve water pumping energy efficiency	Buildings / Energy	AIR-4.a	
Install energy-efficient traffic lights	Buildings / Energy		-
Provide high school students with complementary bus tickets	Transportation	TR-3.c	-
Remove or replace woodstoves and fireplaces with EPA rated woodstoves	Buildings / Energy	AIR-4.a	-

Measure / Program	Category	Draft 2005 CWP Update Programs	Emissions Reduction (tons of CO_2)
Alternative Program: Carbon credits	Carbon Credits		-
Plant trees For Energy Savings	Land Use	AIR-4.k, BIO-4.1	-
Institute growth boundaries, ordinances or programs to limit suburban sprawl	Land Use	AIR-4.l, AIR-4.m, OS-2.b, OS-2.c, OS-2.g, OS-2.h, CD-1.a, CD-1.b	-
Enforce electric vehicle recharging facilities in new large parking facilities	Transportation		-
Produce electricity from agricultural waste	Waste / Recycling	AIR-4.d	633
Install new light rail systems	Transportation	AIR-4.b	82,000
Implement bus rapid transit or shuttle programs to SF	Transportation	AIR-4.b	29,800
Implement environmentally preferable purchasing program recycled paper, etc (energy efficient appliances are ignored here)	Waste / Recycling	AIR-4.e, EC-1.i, EC-1.j	36
Establish/expand recycling programs in municipal facilities	Waste / Recycling	AIR-4.c, AIR-4.e	48
Encourage telecommuting by community by offering services online or on the phone at reduced rates compared to in-person visits	Transportation	AIR-4.b, TR-1.a	3
Provide free bicycle loans for municipal staff use	Transportation	AIR-4.b	0
Implement green or reflective roofing	Buildings / Energy	AIR-4.a, AIR-4.e, EN-1.j, EN-2.d, EN-2.f	34
Limit idling of local transit buses and school buses	Transportation		21
Promote participation in a Green Business Program	Buildings / Energy	EC-1.a, EC-1.k	16

Measure / Program	*Category*	*Draft 2005 CWP Update Programs*	*Emissions Reduction (tons of CO_2)*
Perform energy-efficient lighting retrofits	Buildings / Energy	**AIR-4.a, AIR-4.e, EN-1.j, EN-2.f**	22
Install energy-efficient street lights (e.g., high pressure sodium, LEDS)	Buildings / Energy	**AIR-4.a, AIR-4.e, EN-1.j, EN-2.f**	182
Implement a form of community choice aggregation	Buildings / Energy	**EN-2.g**	294,165
Expand local or regional bus service in range and/or frequency	Transportation	**AIR-4.b, TR-3.a**	10,000
Offer a halogen torchiere lamp exchange to community members	Buildings / Energy	**AIR-4.a**	5
Offer an LED Christmas light trade-in to community members	Buildings / Energy	**AIR-4.a**	18
Purchase "green electricity" from solar, geothermal, wind, hydroelectric sources through green tags	Buildings / Energy	**AIR-4.a, AIR-4.e, EN-1.j, EN-2.f**	4,260
Purchase "green electricity" from solar, geothermal, wind, hydroelectric sources through green tags	Buildings / Energy	**AIR-4.a, AIR-4.e, EN-1.j, EN-2.f**	2,840
Purchase "green electricity" from solar, geothermal, wind, hydroelectric sources through green tags	Buildings / Energy	**AIR-4.a, AIR-4.e, EN-1.j, EN-2.f**	1,420
Establish system for reuse or recycling of construction and demolition materials	Waste / Recycling	**EN-3.e, PFS-4.b**	30,000
Install solar panels on municipal facilities	Buildings / Energy	**AIR-4.a, AIR-4.e, EN-1.j, EN-2.f**	736
Implement solid waste reduction program through creation of reuse facilities / programs	Waste / Recycling	**AIR-4.c, PFS-4.c, PFS-4.d**	33,000

Measure / Program	Category	Draft 2005 CWP Update Programs	Emissions Reduction (tons of CO_2)
Encourage community car-sharing (run a program as municipality/ support for-profits that give car-sharing services, e.g., Zipcar)	Transportation	**AIR-4.b, TR-1.c**	11,880
Install an anaerobic digester at the wastewater treatment facility	Waste / Recycling	**PFS-4.h**	3,200
Increase gas tax	Transportation		32,000
Promotion/informative campaign on 'How to Get Around'	Transportation	**AIR-4.b, TR-2.a**	319
Community energy efficiency rebate program	Buildings / Energy	**AIR-4.a, EN-1.e, EN-2.c**	830
Expand community bicycle infrastructure (e.g., dedicated bicycle lanes, additional bicycle parking spaces)	Transportation	**TR-2.b, TR-2.c, TR-2.d, TR-2.e, TR-2.g, TR-2.h, TR-2.I, TR-2.l**	400
Encourage car-pooling, telecommuting and the use of mass-transit by community members by billboard promotions	Transportation	**AIR-4.b, TR-1.a, TR-1.c**	159
Decrease average daily time street lights are on	Buildings / Energy		14
Encourage car-pooling or van-pooling by municipal employees	Transportation	**AIR-4.b, AIR-4.e, TR-1.c**	1,192
Establish/expand recycling programs in the community	Waste / Recycling	**AIR-4.c, PFS-4.d**	119,300
Perform heating, cooling and ventilation system retrofits (e.g., chillers, boilers, fans, pumps, belts, fuel-switching from electric to gas heating)	Buildings / Energy	**AIR-4.a, AIR-4.e, EN-1.j**	48
Offer incentives for PV installations in the community	Buildings / Energy	**AIR-4.a, EN-2.e**	8,411

Measure / Program	Category	Draft 2005 CWP Update Programs	Emissions Reduction (tons of CO_2)
Produce electricity from recovered methane in local landfills	Waste / Recycling	AIR-4.c	5,300
Institute a lights-out-at-night policy	Buildings / Energy	AIR-4.e	28
Encourage telecommuting by municipal employees	Transportation	AIR-4.b, TR-1.a	48
Implement Tidal Power Project	Buildings / Energy	AIR-4.a, EN-2.d	446,408
Develop park and ride facilities	Transportation	AIR-4.b	16,400
Improve traffic signal synchronization / decrease stop rate and time	Transportation	TR-2.k	16,000
Offer prioritized parking for hybrid Cars	Transportation	AIR-4.b	4,615
Allow bikes on trains/busses	Transportation	AIR-4.b	191
Install occupancy sensors	Buildings / Energy	AIR-4.a, AIR-4.e, EN-1.j	28
Expand the "safe routes to school" program	Transportation	TR-2.b, TR-2.j, TR-2.k	239
Foster downtown neighborhood development	Land Use	CD-2.a, CD-2.b, CD-2.c, CD-2.e, CD-2.f, CD-2.g, CD-2.h, CD-3.a	775
Install ENERGY STAR monitors	Buildings / Energy	AIR-4.a, AIR-4.e, EN-1.j, EN-2.f	5
Install ENERGY STAR printers	Buildings / Energy	AIR-4.a, AIR-4.e, EN-1.j, EN-2.f	3
Install ENERGY STAR copiers	Buildings / Energy	AIR-4.a, AIR-4.e, EN-1.j, EN-2.f	2
Install ENERGY STAR water coolers	Buildings / Energy	AIR-4.a, AIR-4.e, EN-1.j, EN-2.f	1
Implement a police on bicycles program	Transportation	AIR-4.b, AIR-4.e	15

Measure / Program	Category	Draft 2005 CWP Update Programs	Emissions Reduction (tons of CO_2)
Utilize fuel-efficient vehicles (e.g., scooters) for parking enforcement	Transportation	**AIR-4.b, AIR-4.e, TR-4.c**	31
Install energy-efficient vending machines	Buildings / Energy	**AIR-4.a, AIR-4.e, EN-1.j, EN-2.f**	11
Purchase fuel efficient (e.g., hybrid) and / or smaller fleet vehicles	Transportation	**AIR-4.b, AIR-3.c, AIR-3.c, AIR-4.e, TR-4.c**	173
		Total Projected CO_2 Reduction	***1,157,265***

Source: Marin Community Development Agency and International Council for Local Environmental Initiatives.

However, because of uncertainties pertaining to the timely and effective implementation of the proposed Countywide greenhouse gas reduction measures beyond the control of Marin County government this would be a significant project impact and the project would make a cumulatively significant contribution to a cumulative greenhouse gas emissions impact.

Mitigation Measure 4.3-5 In order to reduce project related and cumulative impacts the following mitigation would be required:

Mitigation Measure 4.3-5(a) Revise Program **AIR-4.f** of the Natural Systems & Agriculture Element as follows:

> **AIR-4.f** *Establish a Climate Change Planning Process.* Approve and begin implementation of the *Marin County Greenhouse Gas Reduction Plan.* Integrate *Marin County Greenhouse Gas Reduction Plan* ~~climate change planning and program implementation~~ into long range and current planning functions and other related agencies. Establish and maintain a process to implement, measure, evaluate, and modify implementing programs, using the Cities for Climate Protection Campaign as a model.

Mitigation Measure 4.3-5(b) Implement proposed State programs to reduce greenhouse gas emissions including the Renewable Portfolio Standards, California Fuel Efficiency (CAFÉ) standards and a carbon cap and trade programs.

Significance After Mitigation Implementation of the County's *Greenhouse Gas Reduction Plan*, the goals, policies, and programs of the *Draft 2005 CWP Update* and Mitigation Measures 4.3-6(a) and 4.3-3(b) and 4.3-3(c) should reduce the rate of increase in greenhouse gas emissions. It is uncertain whether greenhouse gas emissions would be reduced countywide to below existing levels within the timeframe of the Countywide Plan. This, therefore, would be a significant unavoidable project and cumulative impact.

Responsibility and Monitoring The Board of Supervisors would be responsible for adopting the program described in Mitigation Measure 4.3-6(a) as part of the *Marin Countywide Plan 2005.* Implementation would be the responsibility of both Marin County and the Marin County incorporated

cities and towns. The Marin County Community Development Agency would be responsible for monitoring implementation. For mitigation measure 4.3-6(b), the California State Air Resources Board would be responsible for implementation and monitoring.

Although the private automobile would continue to be the dominant mode of transport in Marin County due to already established auto-oriented land use patterns, with the *Draft 2005 CWP Update*, Marin County seeks to stem the increase in VMT per person by moving toward the vision outlined in *Moving Forward: A 25-Year Vision for Transportation in Marin County*[21]. This document calls for an integrated, multi-modal system that relies on travel by bus, rail, ferry, bicycle, and foot to supplement and supplant automobile use.

Achieving this vision would require more than expansion and enhancement of alternative modes of transport; the location, density, and design of future development would strongly influence travel behavior. Denser development, located near transit and a mix of other useful destinations, with safe and pleasant pedestrian environments has been shown to decrease the number of vehicle miles traveled per person by increasing the use of alternative modes of transportation.

As discussed in ***Section 4.3 Air Quality*** (see *Impact 4.3-1 Consistency with Clean Air Plan*), numerous policies and programs in the *Draft 2005 CWP Update* would reduce the rate of vehicle miles traveled from trips in Marin County. For example, the *Built Environment Element* contains policies and implementing programs that would encourage development in urban areas served by transit. Policies supporting Goal **HS-3** would implement "smart" and sustainable development principles to meet the housing needs in the county. This would include a focus of providing workforce housing (Policies **HS-3.2, HS-3.3,** and **HS-3.4**). The addition of workforce housing would reduce VMT associated with worker commute travel. The Transportation section of the *Built Environment Element* includes numerous policies to expand pedestrian and bicycle facilities and access.

The *Draft 2005 CWP Update* seeks to create a built environment that would foster the use of alternative modes of transport by focusing future development in the City-Centered Corridor in denser, mixed use environments near transit. Policy **CD-2.2** would establish a Housing Bank. The Housing Bank would include 1,694 housing units that would be transferred from various environmentally sensitive areas. These areas would include sites with sensitive habitat or within the Ridge and Upland Greenbelt, the Baylands corridor or properties lacking public water or sewer. The housing units would be transferred to the City-Centered Corridor. The Housing Bank units would be constructed on designated sites within the Housing Overlay Designation. One of the criteria for the establishment of the Housing Overlay Designation is that housing shall be located within one-half mile of a transit node or transit route with daily, regular scheduled service (Policy **CD-2.3**).

The anticipated transportation benefits of these policies and the resulting land use changes include reduced vehicle-miles traveled (VMT) per person and an increased number of transit trips. The Marin County Travel Model forecasts improvements in both of these indicators under the *Draft 2005 CWP Update* future conditions (i.e., year 2030): a half percent decrease in VMT; a one percent increase in transit trips within Marin County; and a three percent increase in transit trips originating in Marin County destined for San Francisco compared to future conditions under the *1994 CWP*. Another indicator of the positive impacts of the *Draft 2005 CWP Update* would be a 0.5 percent decrease in VMT per person compared to the *1994 CWP*.

Though these improvements may seem small, they should be viewed in the context of the anticipated land use changes and the creation of the Housing Bank. The 1,694 housing units, transferred primarily from West Marin, would be constructed on parcels assigned with a Housing Overlay Designation in

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21 *Moving Forward A 25-Year Transportation Vision For Marin County*, Marin County Congestion Management Agency, Marin County Board of Supervisors, Marin County Transit District, February 2003.

the City-Centered Corridor (see **Exhibit 3.0-6**). The number of housing units relocated to the City-Centered Corridor (1,694) would represent approximately 31 percent of the total number of new housing units developed in the unincorporated area by 2030 (5,391 housing units, see **Exhibit 3.0-14**) but only 12 percent of the total new housing development in Marin County (in both incorporated and unincorporated areas) and only one percent of the total number of housing units in Marin County by 2030 (121,847 housing units, see **Exhibit 3.0-14**). [22]

Because the number of new housing units reallocated to the City-Centered Corridor would be small relative to both the growth in housing units and the total number of housing units, the impact to alternative transportation use would be correspondingly small. A more substantial decrease in VMT per person and an increase in the use of alternative transport modes would require focusing a larger percentage of future development into denser, transit-oriented developments, a substantial investment in improving alternate modes of transport, significant incentives for using alternative modes of transport, and significant disincentives for traveling by single occupant automobile.

This would be a significant project impact and the project would make a cumulatively significant contribution to a cumulative transportation impact.

Mitigation Measure 4.2-1 Add a new policy and program to the Transportation section of the *Built Environment Element*:

> Policy TR-1.(new) *Reduce Vehicle Miles Traveled (VMT).* Reduce vehicle miles traveled per person by single-occupant automobile by ten percent.
>
> Program TR-1.(new) *VMT Reduction Monitoring.* Develop a program for monitoring VMT and implementing targeted strategies for reducing VMT per person including:
>
> - All new residential projects over 50 units shall be within five miles of a major public transportation node.
> - Require that all new multi-family residential projects over ten dwelling units have TDM measures in place such as charging parking fees separate from rent, subsidized public transportation passes, or ride-matching programs based on site specific review.
> - New residential development should provide safe, convenient connections to existing pedestrian and bicycle facilities and should provide secure bicycle parking.
> - Complete key regional bikeways including the Cal-Park Hill Path and Tunnel.
> - Require that new employers of 50 employees or more implement TDM programs such as parking cash out, subsidized transit passes, ridesharing incentives, and bicycle storage facilities.

Significance After Mitigation As a general trend, VMT per capita continues to increase year after year as personal wealth increases, cities continue to expand outwards, and affordable housing continues to be constructed further and further from job centers. This trend is difficult to stop or reverse without policy intervention. Because of this, aggressive programs such as those proposed in

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[22] The source of some of the 1,694 housing units would be from locations within the City-Centered Corridor (for example on sites within the Ridge and Upland Greenbelt), so the percentages would likely be less than cited here.

TRANSIT IMPACTS AND MITIGATION MEASURES

Impact 4.2-27 Increased Demand for Public Transit Services

Land uses and development consistent with Draft 2005 CWP Update would result in increased demand for transit services. However, implementation of policies included in the Draft 2005 CWP Update would result in improved transit services. Therefore, this would be a less-than-significant impact.

Implementation of the *Draft 2005 CWP Update* would result in additional housing units and nonresidential floor area. A portion of the people associated with the additional development would use public transit, thus increasing the number of transit users, particularly since much of the new development would occur within a half-mile of transit nodes and routes. This increased demand could significantly impact transit services by creating overcrowded conditions and decreasing on-time performance.

The *Draft 2005 CWP Update* contains numerous policies and programs that, if adopted and implemented, would improve transit service, and increase capacity, safety, and access. These policies are consistent with plans that have been previously adopted by the County, including the *Marin County Transit District Short Range Transit Plan* (Short Range Transit Plan), and the *Marin County Unincorporated Areas Bicycle and Pedestrian Master Plan*. Because the Short Range Transit Plan is effective until 2015, some policies and programs of the *Draft 2005 CWP Update* may extend beyond the scope of the Short Range Transit Plan.

Policy **TR-3.1** would encourage and support the expansion of local bus service to all areas of the county. Policy **TR-3.2** would promote rail service on the Northwestern Pacific Railroad right-of-way, a multi-use path that follows the rail corridor, expanded regional ferry service, and enhanced regional express bus services. Policy **TR-3.3** would support the development of intermodal transit hubs that expand alternative transportation use. Policy **TR-3.4** would fund paratransit service and integrate it with fixed-route service to efficiently meet the needs of transit-dependent persons. Policy **TR-3.5** would increase transit's catchment radius by encouraging the use of bicycles to access transit, by providing secure bike parking at transit centers and providing for the storage of bicycles on transit vehicles. Policy **TR-3.6** would require coordination with local, State, and federal agencies and local communities to provide alternatives to automobile travel to recreational areas in West Marin.

To the extent that Marin County has jurisdiction and involvement in decision making, implementation of these policies would increase transit service and, therefore, reduce potential transit impacts to a less-than-significant level. Furthermore, the project would make a less than cumulatively considerable contribution to a cumulative demand for public transit services impact.

Mitigation Measure 4.2-27 None required.

BICYCLE AND PEDESTRIAN IMPACTS AND MITIGATION MEASURES

Impact 4.2-26 ***Increased Demand for Bicycle and Pedestrian Facilities and Impacts on Safety and Access***

Land uses and development consistent with Draft 2005 CWP Update would result in increased urban land uses and, consequently, demand for bicycle and pedestrian facilities. At the same time, additional automobile traffic would increase conflicts between bicycle, pedestrians and automobiles. Implementation of policies included in the Draft 2005 CWP Update would result in improvements in bicycle and pedestrian facilities that would accommodate increased bicycle and pedestrian demand and improve safety and access. Therefore, this would be a less-than-significant impact.

Implementation of the *Draft 2005 CWP Update* would result in the development of additional housing units and nonresidential floor area. Some portion of the people traveling to and from that development would walk or bike. Thus, the demand for bicycle and pedestrian facilities would increase, particularly since some of the new development in the City-Centered corridor would occur near transit and important community facilities.

The *Draft 2005 CWP Update* contains numerous policies and programs that, if adopted and implemented, would improve bicycle and pedestrian facilities, and increase capacity, safety, and access. These policies are consistent with plans that have been previously adopted by the County, including the *Marin County Unincorporated Areas Bicycle and Pedestrian Master Plan*.

Policy **TR-2.1** would ensure that all areas of the county have adequate bicycle and pedestrian links. It would also ensure that streetscape improvements and standards are pedestrian and bicycle friendly. Policy **TR-2.2** would require new development to provide trails or paths for use by bicycles and / or on-street bicycle and pedestrian facilities. Policy **TR-2.3** would explore the possibility of creating bicycle and pedestrian trails that would connect the urbanized areas of the County to the State and federal parklands in the county. Policy **TR-2.4** would seek grants and other funding to construct new bicycle and pedestrian infrastructure. Policy **TR-1.6** would improve pedestrian, bicycle, and transit access to and within west Marin, and would not allow increases in roadway capacity. Policy **TR-1.2** would develop methods and adopt standards to assess the performance of pedestrian and bicycle facilities that the County would use to measure the success of facilities against the goals of the County *Transportation Vision*. Policy **TR-1.1** would encourage the use of alternative transportation including bicycling and walking.

Furthermore, Marin County is one of four communities throughout the United States designated as a Nonmotorized Transportation Pilot Program. The County will receive a total of $25 million over the next four years to build a bicycle and pedestrian network that will connect directly with transit stations, schools, residences, businesses, recreation areas, and other community activity centers.

Implementation of these policies along with the Nonmotrized Transportation Pilot Program, would ensure adequate capacity of pedestrian and bicycle facilities and improve safety, therefore, reducing potential project pedestrian and bicycle impacts related to increased demand and auto traffic to a less-than-significant level and the project would make a less than cumulatively considerable contribution to cumulative impacts.

Mitigation Measure 4.2-26 None required.

ENDORSING THE U.S. MAYORS CLIMATE PROTECTION AGREEMENT

WHEREAS, the U.S. Conference of Mayors has previously adopted strong policy resolutions calling for cities, communities and the federal government to take actions to reduce global warming pollution; and

WHEREAS, the Inter-Governmental Panel on Climate Change (IPCC), the international community's most respected assemblage of scientists, has found that climate disruption is a reality and that human activities are largely responsible for increasing concentrations of global warming pollution; and

WHEREAS, recent, well-documented impacts of climate disruption include average global sea level increases of four to eight inches during the 20th century; a 40 percent decline in Arctic sea-ice thickness; and nine of the ten hottest years on record occurring in the past decade; and

WHEREAS, climate disruption of the magnitude now predicted by the scientific community will cause extremely costly disruption of human and natural systems throughout the world including: increased risk of floods or droughts; sea-level rises that interact with coastal storms to erode beaches, inundate land, and damage structures; more frequent and extreme heat waves; more frequent and greater concentrations of smog; and

WHEREAS, on February 16, 2005, the Kyoto Protocol, an international agreement to address climate disruption, went into effect in the 141 countries that have ratified it to date; 38 of those countries are now legally required to reduce greenhouse gas emissions on average 5.2 percent below 1990 levels by 2012; and

WHEREAS, the United States of America, with less than five percent of the world's population, is responsible for producing approximately 25 percent of the world's global warming pollutants; and

WHEREAS, the Kyoto Protocol emissions reduction target for the U.S. would have been 7 percent below 1990 levels by 2012; and

WHEREAS, many leading US companies that have adopted greenhouse gas reduction programs to demonstrate corporate social responsibility have also publicly expressed preference for the US to adopt precise and mandatory emissions targets and timetables as a means by which to remain competitive in the international marketplace, to mitigate financial risk and to promote sound investment decisions; and

WHEREAS, state and local governments throughout the United States are adopting emission reduction targets and programs and that this leadership is bipartisan, coming from Republican and Democratic governors and mayors alike; and

WHEREAS, many cities throughout the nation, both large and small, are reducing global warming pollutants through programs that provide economic and quality of life benefits such as reduced energy bills, green space preservation, air quality improvements, reduced traffic congestion, improved transportation choices, and economic development and job creation through energy conservation and new energy technologies; and

WHEREAS, mayors from around the nation have signed the U.S. Mayors Climate Protection Agreement which, as amended at the 73rd Annual U.S. Conference of Mayors meeting, reads:

The U.S. Mayors Climate Protection Agreement

A. We urge the federal government and state governments to enact policies and programs to meet or beat the target of reducing global warming pollution levels to 7 percent below 1990 levels by 2012, including efforts to: reduce the United States' dependence on fossil fuels and accelerate the development of clean, economical energy resources and fuel-efficient technologies such as conservation, methane recovery for energy generation, waste to energy, wind and solar energy, fuel cells, efficient motor vehicles, and biofuels;
B. We urge the U.S. Congress to pass bipartisan greenhouse gas reduction legislation that includes 1) clear timetables and emissions limits and 2) a

flexible, market-based system of tradable allowances among emitting industries; and

C. We will strive to meet or exceed Kyoto Protocol targets for reducing global warming pollution by taking actions in our own operations and communities such as:

1. Inventory global warming emissions in City operations and in the community, set reduction targets and create an action plan.
2. Adopt and enforce land-use policies that reduce sprawl, preserve open space, and create compact, walkable urban communities;
3. Promote transportation options such as bicycle trails, commute trip reduction programs, incentives for car pooling and public transit;
4. Increase the use of clean, alternative energy by, for example, investing in "green tags", advocating for the development of renewable energy resources, recovering landfill methane for energy production, and supporting the use of waste to energy technology;
5. Make energy efficiency a priority through building code improvements, retrofitting city facilities with energy efficient lighting and urging employees to conserve energy and save money;
6. Purchase only Energy Star equipment and appliances for City use;
7. Practice and promote sustainable building practices using the U.S. Green Building Council's LEED program or a similar system;
8. Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program including anti-idling messages; convert diesel vehicles to bio-diesel;
9. Evaluate opportunities to increase pump efficiency in water and wastewater systems; recover wastewater treatment methane for energy production;
10. Increase recycling rates in City operations and in the community;
11. Maintain healthy urban forests; promote tree planting to increase shading and to absorb CO2; and

12. Help educate the public, schools, other jurisdictions, professional associations, business and industry about reducing global warming pollution.

NOW, THEREFORE, BE IT RESOLVED that The U.S. Conference of Mayors endorses the U.S. Mayors Climate Protection Agreement as amended by the 73rd annual U.S. Conference of Mayors meeting and urges mayors from around the nation to join this effort.

BE IT FURTHER RESOLVED, The U.S. Conference of Mayors will work in conjunction with ICLEI Local Governments for Sustainability and other appropriate organizations to track progress and implementation of the U.S. Mayors Climate Protection Agreement as amended by the 73rd annual U.S. Conference of Mayors meeting.

Buildings/Global Warming

American Institute of Architects, U.S. Green Building Council, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Architecture 2030 and Other Key Building Sector Leaders

For Immediate Release

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Building Sector Unites to Confront Global Climate Change

Santa Fe (December 4, 2006) – recognizing that the Building Sector is responsible for almost half of all greenhouse gas (GHG) emissions annually, key leaders in this Sector have banded together to confront the global-warming crisis. Last week, the American Institute of Architects (AIA), U.S. Green Building Council (USGBC), American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), Architecture 2030 and about 20 other leaders attended a special meeting at the 2006 Greenbuild International Conference and Expo, a conference presented annually by the USGBC. According to Rick Fedrizzi, President, CEO & Founding Chairman of USGBC, "Eliminating the built environment's negative contribution to climate change is not just a strategic priority, it's our collective responsibility to generations to come. Science tells us we have 3650 days to meet that goal, and urgent action is required."

During the meeting, the group reached a consensus on three critical issues facing the Building Sector as it works to bring energy consumption and GHG emissions in this sector under control: the need for a common goal, the definition of this goal and a baseline to measure progress against. "The building industry is coming together around the common goal of Architecture 2030's targets for reductions in energy use. The organizations and individuals in this meeting need to reach out to the entire industry, encouraging them all to work together in achieving these targets.", said R.K. Stewart, President-elect of AIA.

In a show of solidarity and commitment, these leaders have adopted 'The 2030 Challenge' targets. The 2030 Challenge, a global initiative officially launched by Architecture 2030 in January 2006, calls for all new buildings and major renovations to reduce their fossil-fuel GHG-emitting energy consumption by 50 percent immediately, increasing this reduction to 60% in 2010, 70% in 2015, 80% in 2020, 90% in 2025, and finally, that all new buildings would be carbon neutral by the year 2030. Terry Townsend, President of ASHRAE, stated that, "ASHRAE is committed to developing the tools needed to accomplish the Architecture 2030 challenge."

Building Sector Unites to Confront Global Climate Change (p2)

The 2030 Challenge targets had previously been adopted by the 78,000 member AIA, the US Conference of Mayors (for all buildings in all cities; Resolution #50) and individual cities and counties; endorsed by the International Council for Local Environmental Initiatives (ICLEI) and incorporated into their "Statement of Action"; integrated into the EPA's Target Finder; and promoted by the National Wildlife Federation and others. However, last week's collaborative adoption creates a powerful consensus, allowing for the sharing of information and support.

A critical component to the success of this effort is the definition of a baseline by which all reductions will be measured. A complete regional database of actual energy use for all building types is not currently available. To provide an immediate and interim solution, the group adopted the data supplied by the Energy Information Agency's (US Department of Energy), which is currently used by the EPA in their Target Finder program.

All participants agreed that collaboration is necessary to reach the goal and each will develop the tools necessary for their membership to accomplish this. The participants are openly inviting other industry leaders to join forces with them. Edward Mazria, founder and Executive Director of Architecture 2030, said, "The task we face is daunting. Working separately, we could accomplish something significant in each of our respective spheres. But by working together, we actually have a chance to influence the course of history."

# # #

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Executive Summary

The scientific evidence is now overwhelming: climate change presents very serious global risks, and it demands an urgent global response.

This independent Review was commissioned by the Chancellor of the Exchequer, reporting to both the Chancellor and to the Prime Minister, as a contribution to assessing the evidence and building understanding of the economics of climate change.

The Review first examines the evidence on the economic impacts of climate change itself, and explores the economics of stabilising greenhouse gases in the atmosphere. The second half of the Review considers the complex policy challenges involved in managing the transition to a low-carbon economy and in ensuring that societies can adapt to the consequences of climate change that can no longer be avoided.

The Review takes an international perspective. Climate change is global in its causes and consequences, and international collective action will be critical in driving an effective, efficient and equitable response on the scale required. This response will require deeper international co-operation in many areas - most notably in creating price signals and markets for carbon, spurring technology research, development and deployment, and promoting adaptation, particularly for developing countries.

Climate change presents a unique challenge for economics: it is the greatest and widest-ranging market failure ever seen. The economic analysis must therefore be global, deal with long time horizons, have the economics of risk and uncertainty at centre stage, and examine the possibility of major, non-marginal change. To meet these requirements, the Review draws on ideas and techniques from most of the important areas of economics, including many recent advances.

The benefits of strong, early action on climate change outweigh the costs

The effects of our actions now on future changes in the climate have long lead times. What we do now can have only a limited effect on the climate over the next 40 or 50 years. On the other hand what we do in the next 10 or 20 years can have a profound effect on the climate in the second half of this century and in the next.

No-one can predict the consequences of climate change with complete certainty; but we now know enough to understand the risks. Mitigation - taking strong action to reduce emissions - must be viewed as an investment, a cost incurred now and in the coming few decades to avoid the risks of very severe consequences in the future. If these investments are made wisely, the costs will be manageable, and there will be a wide range of opportunities for growth and development along the way. For this to work well, policy must promote sound market signals, overcome market failures and have equity and risk mitigation at its core. That essentially is the conceptual framework of this Review.

The Review considers the economic costs of the impacts of climate change, and the costs and benefits of action to reduce the emissions of greenhouse gases (GHGs) that cause it, in three different ways:

- Using disaggregated techniques, in other words considering the physical impacts of climate change on the economy, on human life and on the

environment, and examining the resource costs of different technologies and strategies to reduce greenhouse gas emissions;

- Using economic models, including integrated assessment models that estimate the economic impacts of climate change, and macro-economic models that represent the costs and effects of the transition to low-carbon energy systems for the economy as a whole;

- Using comparisons of the current level and future trajectories of the 'social cost of carbon' (the cost of impacts associated with an additional unit of greenhouse gas emissions) with the marginal abatement cost (the costs associated with incremental reductions in units of emissions).

From all of these perspectives, the evidence gathered by the Review leads to a simple conclusion: the benefits of strong, early action considerably outweigh the costs.

The evidence shows that ignoring climate change will eventually damage economic growth. Our actions over the coming few decades could create risks of major disruption to economic and social activity, later in this century and in the next, on a scale similar to those associated with the great wars and the economic depression of the first half of the 20th century. And it will be difficult or impossible to reverse these changes. Tackling climate change is the pro-growth strategy for the longer term, and it can be done in a way that does not cap the aspirations for growth of rich or poor countries. The earlier effective action is taken, the less costly it will be.

At the same time, given that climate change is happening, measures to help people adapt to it are essential. And the less mitigation we do now, the greater the difficulty of continuing to adapt in future.

***

The first half of the Review considers how the evidence on the economic impacts of climate change, and on the costs and benefits of action to reduce greenhouse gas emissions, relates to the conceptual framework described above.

The scientific evidence points to increasing risks of serious, irreversible impacts from climate change associated with business-as-usual (BAU) paths for emissions.

The scientific evidence on the causes and future paths of climate change is strengthening all the time. In particular, scientists are now able to attach probabilities to the temperature outcomes and impacts on the natural environment associated with different levels of stabilisation of greenhouse gases in the atmosphere. Scientists also now understand much more about the potential for dynamic feedbacks that have, in previous times of climate change, strongly amplified the underlying physical processes.

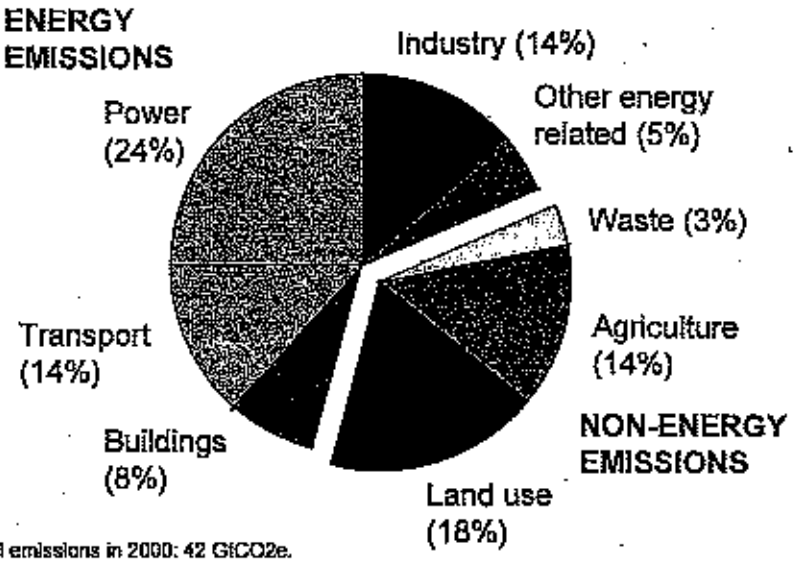
The stocks of greenhouse gases in the atmosphere (including carbon dioxide, methane, nitrous oxides and a number of gases that arise from industrial processes) are rising, as a result of human activity. The sources are summarised in Figure 1 below.

The current level or stock of greenhouse gases in the atmosphere is equivalent to around 430 parts per million (ppm) CO_2 [1], compared with only 280ppm before the Industrial Revolution. These concentrations have already caused the world to warm by more than half a degree Celsius and will lead to at least a further half degree warming over the next few decades, because of the inertia in the climate system.

Even if the annual flow of emissions did not increase beyond today's rate, the stock of greenhouse gases in the atmosphere would reach double pre-industrial levels by 2050 - that is 550ppm CO_2e - and would continue growing thereafter. But the annual flow of emissions is accelerating, as fast-growing economies invest in high-carbon infrastructure and as demand for energy and transport increases around the world. The level of 550ppm CO_2e could be reached as early as 2035. At this level there is at least a 77% chance - and perhaps up to a 99% chance, depending on the climate model used - of a global average temperature rise exceeding 2°C.

[1] Referred to hereafter as CO_2 equivalent, CO_2e

Figure 1 Greenhouse gas emissions in 2000, by source



Source: Prepared by Stern Review, from data drawn from World Resources Institute Climate Analysis Indicators Tool, CAIT, on-line database version 3.0.

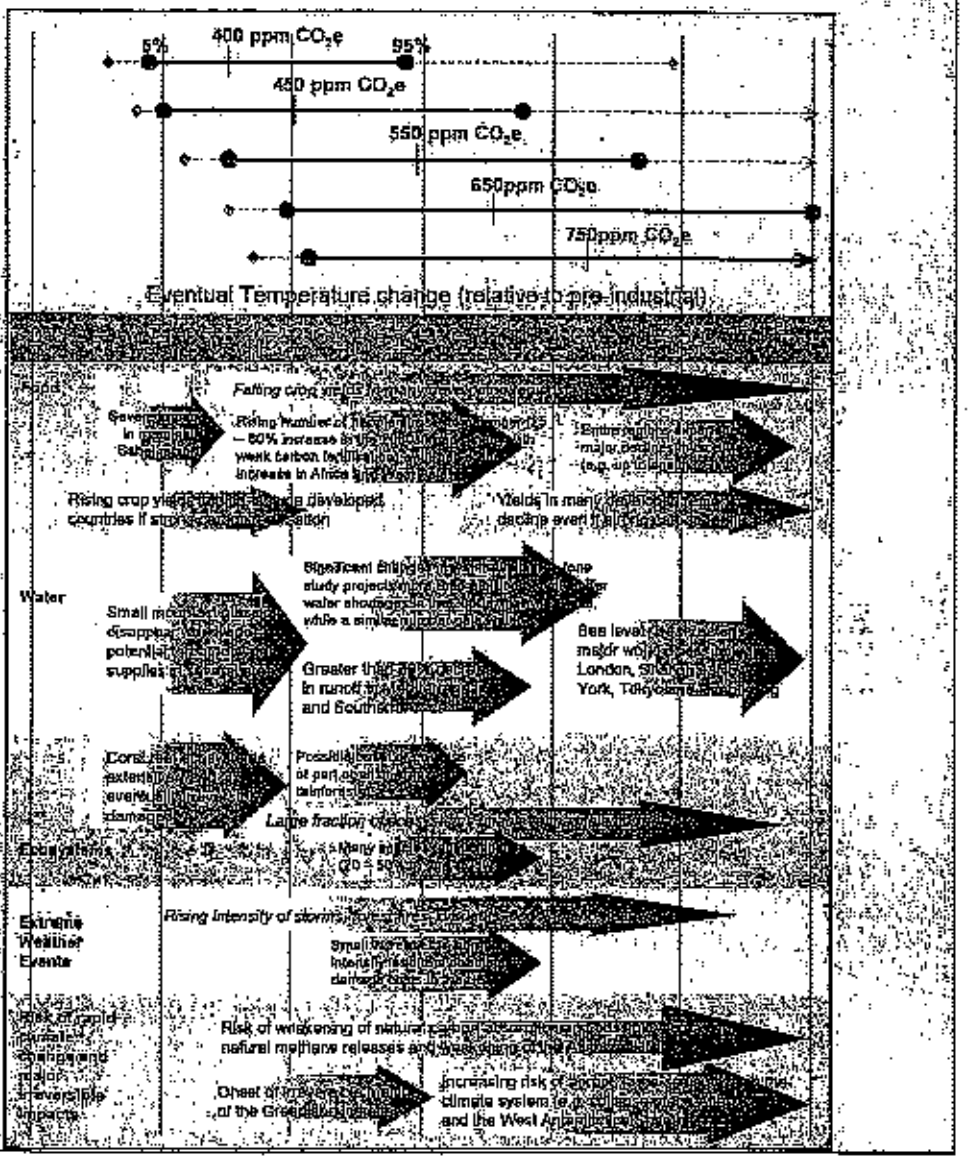
Under a BAU scenario, the stock of greenhouse gases could more than treble by the end of the century, giving at least a 50% risk of exceeding 5°C global average temperature change during the following decades. This would take humans into unknown territory. An illustration of the scale of such an increase is that we are now only around 5°C warmer than in the last ice age.

Such changes would transform the physical geography of the world. A radical change in the physical geography of the world must have powerful implications for the human geography - where people live, and how they live their lives.

Figure 2 summarises the scientific evidence of the links between concentrations of greenhouse gases in the atmosphere, the probability of different levels of global average temperature change, and the physical impacts expected for each level. The risks of serious, irreversible impacts of climate change increase strongly as concentrations of greenhouse gases in the atmosphere rise.

Figure 2 Stabilisation levels and probability ranges for temperature increases

The figure below illustrates the types of impacts that could be experienced as the world comes into equilibrium with more greenhouse gases. The top panel shows the range of temperatures projected at stabilisation levels between 400ppm and 750ppm CO_2e at equilibrium. The solid horizontal lines indicate the 5 - 95% range based on climate sensitivity estimates from the IPCC 2001[2] and a recent Hadley Centre ensemble study[3]. The vertical line indicates the mean of the 50th percentile point. The dashed lines show the 5 - 95% range based on eleven recent studies[4]. The bottom panel illustrates the range of impacts expected at different levels of warming. The relationship between global average temperature changes and regional climate changes is very uncertain, especially with regard to changes in precipitation (see Box 4.2). This figure shows potential changes based on current scientific literature.



[2] Wigley, T.M.L. and S.C.B. Raper (2001): 'Interpretation of high projections for global-mean warming', Science 293: 451-454 based on Intergovernmental Panel on Climate Change (2001): 'Climate change 2001: the scientific basis. Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change' [Houghton JT, Ding Y, Griggs DJ, et al. (eds.)], Cambridge: Cambridge University Press.

[3] Murphy, J.M., D.M.H. Sexton D.N. Barnett et al. (2004): 'Quantification of modelling uncertainties in a large ensemble of climate change simulations', Nature 430: 768 - 772

[4] Meinshausen, M. (2006): 'What does a 2°C target mean for greenhouse gas concentrations? A brief analysis based on multi-gas emission pathways and several climate sensitivity uncertainty estimates', Avoiding dangerous climate change, In H.J. Schellnhuber et al. (eds.), Cambridge: Cambridge University Press, pp.265 - 280.

Climate change threatens the basic elements of life for people around the world - access to water, food production, health, and use of land and the environment.

Estimating the economic costs of climate change is challenging, but there is a range of methods or approaches that enable us to assess the likely magnitude of the risks and compare them with the costs. This Review considers three of these approaches.

This Review has first considered in detail the physical impacts on economic activity, on human life and on the environment.

On current trends, average global temperatures will rise by 2 - 3°C within the next fifty years or so. [5] The Earth will be committed to several degrees more warming if emissions continue to grow.

Warming will have many severe impacts, often mediated through water:

- Melting glaciers will initially increase flood risk and then strongly reduce water supplies, eventually threatening one-sixth of the world's population, predominantly in the Indian sub-continent, parts of China, and the Andes in South America.

- Declining crop yields, especially in Africa, could leave hundreds of millions without the ability to produce or purchase sufficient food. At mid to high latitudes, crop yields may increase for moderate temperature rises (2 - 3°C), but then decline with greater amounts of warming. At 4°C and above, global food production is likely to be seriously affected.

- In higher latitudes, cold-related deaths will decrease. But climate change will increase worldwide deaths from malnutrition and heat stress. Vector-borne diseases such as malaria and dengue fever could become more widespread if effective control measures are not in place.

- Rising sea levels will result in tens to hundreds of millions more people flooded each year with warming of 3 or 4°C. There will be serious risks and increasing pressures for coastal protection in South East Asia (Bangladesh and Vietnam), small islands in the Caribbean and the Pacific, and large coastal cities, such as Tokyo, New York, Cairo and London. According to one estimate, by the middle of the century, 200 million people may become permanently displaced due to rising sea levels, heavier floods, and more intense droughts.

- Ecosystems will be particularly vulnerable to climate change, with around 15 - 40% of species potentially facing extinction after only 2°C of warming. And ocean acidification, a direct result of rising carbon dioxide levels, will have major effects on marine ecosystems, with possible adverse consequences on fish stocks.

[5] All changes in global mean temperature are expressed relative to pre-industrial levels (1750 - 1850).

The damages from climate change will accelerate as the world gets warmer.

Higher temperatures will increase the chance of triggering abrupt and large-scale changes.

- Warming may induce sudden shifts in regional weather patterns such as the monsoon rains in South Asia or the El Niño phenomenon - changes that would have severe consequences for water availability and flooding in tropical regions and threaten the livelihoods of millions of people.

- A number of studies suggest that the Amazon rainforest could be vulnerable to climate change, with models projecting significant drying in this region. One model, for example, finds that the Amazon rainforest could be significantly, and possibly irrevocably, damaged by a warming of 2 - 3°C.

- The melting or collapse of ice sheets would eventually threaten land which today is home to 1 in every 20 people.

While there is much to learn about these risks, the temperatures that may result from unabated climate change will take the world outside the range of human experience. This points to the possibility of very damaging consequences.

The impacts of climate change are not evenly distributed - the poorest countries and people will suffer earliest and most. And if and when the damages appear it will be too late to reverse the process. Thus we are forced to look a long way ahead.

Climate change is a grave threat to the developing world and a major obstacle to continued poverty reduction across its many dimensions. First, developing regions are at a geographic disadvantage: they are already warmer, on average, than developed regions, and they also suffer from high rainfall variability. As a result, further warming will bring poor countries high costs and few benefits. Second, developing countries - in particular the poorest - are heavily dependent on agriculture, the most climate-sensitive of all economic sectors, and suffer from inadequate health provision and low-quality public services. Third, their low incomes and vulnerabilities make adaptation to climate change particularly difficult.

Because of these vulnerabilities, climate change is likely to reduce further already low incomes and increase illness and death rates in developing countries. Falling farm incomes will increase poverty and reduce the ability of households to invest in a better future, forcing them to use up meagre savings just to survive. At a national level, climate change will cut revenues and raise spending needs, worsening public finances.

Many developing countries are already struggling to cope with their current climate. Climatic shocks cause setbacks to economic and social development in developing countries today even with temperature increases of less than 1°C.. The impacts of unabated climate change, - that is, increases of 3 or 4°C and upwards - will be to increase the risks and costs of these events very powerfully.

Impacts on this scale could spill over national borders, exacerbating the damage further. Rising sea levels and other climate-driven changes could drive millions of people to migrate: more than a fifth of Bangladesh could be under water with a 1m rise in sea levels, which is a possibility by the end of the century. Climate-related

shocks have sparked violent conflict in the past, and conflict is a serious risk in areas such as West Africa, the Nile Basin and Central Asia.

Climate change may initially have small positive effects for a few developed countries, but is likely to be very damaging for the much higher temperature increases expected by mid- to late-century under BAU scenarios.

In higher latitude regions, such as Canada, Russia and Scandinavia, climate change may lead to net benefits for temperature increases of 2 or 3°C, through higher agricultural yields, lower winter mortality, lower heating requirements, and a possible boost to tourism. But these regions will also experience the most rapid rates of warming, damaging infrastructure, human health, local livelihoods and biodiversity.

Developed countries in lower latitudes will be more vulnerable - for example, water availability and crop yields in southern Europe are expected to decline by 20% with a 2°C increase in global temperatures. Regions where water is already scarce will face serious difficulties and growing costs.

The increased costs of damage from extreme weather (storms, hurricanes, typhoons, floods, droughts, and heat waves) counteract some early benefits of climate change and will increase rapidly at higher temperatures. Based on simple extrapolations, costs of extreme weather alone could reach 0.5 - 1% of world GDP per annum by the middle of the century, and will keep rising if the world continues to warm.

- A 5 or 10% increase in hurricane wind speed, linked to rising sea temperatures, is predicted approximately to double annual damage costs, in the USA.

- In the UK, annual flood losses alone could increase from 0.1% of GDP today to 0.2 - 0.4% of GDP once the increase in global average temperatures reaches 3 or 4°C.

- Heat waves like that experienced in 2003 in Europe, when 35,000 people died and agricultural losses reached $15 billion, will be commonplace by the middle of the century.

At higher temperatures, developed economies face a growing risk of large-scale shocks - for example, the rising costs of extreme weather events could affect global financial markets through higher and more volatile costs of insurance.

Integrated assessment models provide a tool for estimating the total impact on the economy; our estimates suggest that this is likely to be higher than previously suggested.

The second approach to examining the risks and costs of climate change adopted in the Review is to use integrated assessment models to provide aggregate monetary estimates.

Formal modelling of the overall impact of climate change in monetary terms is a formidable challenge, and the limitations to modelling the world over two centuries or more demand great caution in interpreting results. However, as we have explained, the lags from action to effect are very long and the quantitative analysis needed to inform action will depend on such long-range modelling exercises. The monetary impacts of climate change are now expected to be more serious than many earlier studies suggested, not least because those studies tended to exclude some of the

most uncertain but potentially most damaging impacts. Thanks to recent advances in the science, it is now possible to examine these risks more directly, using probabilities.

Most formal modelling in the past has used as a starting point a scenario of 2-3°C warming. In this temperature range, the cost of climate change could be equivalent to a permanent loss of around 0-3% in global world output compared with what could have been achieved in a world without climate change. Developing countries will suffer even higher costs.

However, those earlier models were too optimistic about warming: more recent evidence indicates that temperature changes resulting from BAU trends in emissions may exceed 2-3°C by the end of this century. This increases the likelihood of a wider range of impacts than previously considered. Many of these impacts, such as abrupt and large-scale climate change, are more difficult to quantify. With 5-6°C warming - which is a real possibility for the next century - existing models that include the risk of abrupt and large-scale climate change estimate an average 5-10% loss in global GDP, with poor countries suffering costs in excess of 10% of GDP. Further, there is some evidence of small but significant risks of temperature rises even above this range. Such temperature increases would take us into territory unknown to human experience and involve radical changes in the world around us.

With such possibilities on the horizon, it was clear that the modelling framework used by this Review had to be built around the economics of risk. Averaging across possibilities conceals risks. The risks of outcomes much worse than expected are very real and they could be catastrophic. Policy on climate change is in large measure about reducing these risks. They cannot be fully eliminated, but they can be substantially reduced. Such a modelling framework has to take into account ethical judgements on the distribution of income and on how to treat future generations.

The analysis should not focus only on narrow measures of income like GDP. The consequences of climate change for health and for the environment are likely to be severe. Overall comparison of different strategies will include evaluation of these consequences too. Again, difficult conceptual, ethical and measurement issues are involved, and the results have to be treated with due circumspection.

The Review uses the results from one particular model, PAGE2002, to illustrate how the estimates derived from these integrated assessment models change in response to updated scientific evidence on the probabilities attached to degrees of temperature rise. The choice of model was guided by our desire to analyse risks explicitly - this is one of the very few models that would allow that exercise. Further, its underlying assumptions span the range of previous studies. We have used this model with one set of data consistent with the climate predictions of the 2001 report of the Intergovernmental Panel on Climate Change, and with one set that includes a small increase in the amplifying feedbacks in the climate system. This increase illustrates one area of the increased risks of climate change that have appeared in the peer-reviewed scientific literature published since 2001.

We have also considered how the application of appropriate discount rates, assumptions about the equity weighting attached to the valuation of impacts in poor countries, and estimates of the impacts on mortality and the environment would increase the estimated economic costs of climate change.

Using this model, and including those elements of the analysis that can be incorporated at the moment, we estimate the total cost over the next two centuries of climate change associated under BAU emissions involves impacts and risks that are equivalent to an average reduction in global per-capita consumption of at least 5%, now and forever. While this cost estimate is already strikingly high, it also leaves out much that is important.

The cost of BAU would increase still further, were the model systematically to take account of three important factors:

- First, including direct impacts on the environment and human health (sometimes called 'non-market' impacts) increases our estimate of the total cost of climate change on this path from 5% to 11% of global per-capita consumption. There are difficult analytical and ethical issues of measurement here. The methods used in this model are fairly conservative in the value they assign to these impacts.

- Second, some recent scientific evidence indicates that the climate system may be more responsive to greenhouse-gas emissions than previously thought, for example because of the existence of amplifying feedbacks such as the release of methane and weakening of carbon sinks. Our estimates, based on modelling a limited increase in this responsiveness, indicate that the potential scale of the climate response could increase the cost of climate change on the BAU path from 5% to 7% of global consumption, or from 11% to 14% if the non-market impacts described above are included.

- Third, a disproportionate share of the climate-change burden falls on poor regions of the world. If we weight this unequal burden appropriately, the estimated global cost of climate change at 5-6°C warming could be more than one-quarter higher than without such weights.

Putting these additional factors together would increase the total cost of BAU climate change to the equivalent of around a 20% reduction in consumption per head, now and into the future.

In summary, analyses that take into account the full ranges of both impacts and possible outcomes - that is, that employ the basic economics of risk - suggest that BAU climate change will reduce welfare by an amount equivalent to a reduction in consumption per head of between 5 and 20%. Taking account of the increasing scientific evidence of greater risks, of aversion to the possibilities of catastrophe, and of a broader approach to the consequences than implied by narrow output measures, the appropriate estimate is likely to be in the upper part of this range.

Economic forecasting over just a few years is a difficult and imprecise task. The analysis of climate change requires, by its nature, that we look out over 50, 100, 200 years and more. Any such modelling requires caution and humility, and the results are specific to the model and its assumptions. They should not be endowed with a precision and certainty that is simply impossible to achieve. Further, some of the big uncertainties in the science and the economics concern the areas we know least about (for example, the impacts of very high temperatures), and for good reason - this is unknown territory. The main message from these models is that when we try to take due account of the upside risks and uncertainties, the probability-weighted costs look very large. Much (but not all) of the risk can be reduced through a strong mitigation policy, and we argue that this can be achieved at a far lower cost than

those calculated for the impacts. In this sense, mitigation is a highly productive investment.

Emissions have been, and continue to be, driven by economic growth; yet stabilisation of greenhouse-gas concentrations in the atmosphere is feasible and consistent with continued growth.

CO_2 emissions per head have been strongly correlated with GDP per head. As a result, since 1850, North America and Europe have produced around 70% of all the CO_2 emissions due to energy production, while developing countries have accounted for less than one quarter. Most future emissions growth will come from today's developing countries, because of their more rapid population and GDP growth and their increasing share of energy-intensive industries.

Yet despite the historical pattern and the BAU projections, the world does not need to choose between averting climate change and promoting growth and development. Changes in energy technologies and the structure of economies have reduced the responsiveness of emissions to income growth, particularly in some of the richest countries. With strong, deliberate policy choices, it is possible to 'decarbonise' both developed and developing economies on the scale required for climate stabilisation, while maintaining economic growth in both.

Stabilisation - at whatever level - requires that annual emissions be brought down to the level that balances the Earth's natural capacity to remove greenhouse gases from the atmosphere. The longer emissions remain above this level, the higher the final stabilisation level. In the long term, annual global emissions will need to be reduced to below 5 $GtCO_2e$, the level that the earth can absorb without adding to the concentration of GHGs in the atmosphere. This is more than 80% below the absolute level of current annual emissions.

This Review has focused on the feasibility and costs of stabilisation of greenhouse gas concentrations in the atmosphere in the range of 450-550ppm CO_2e.

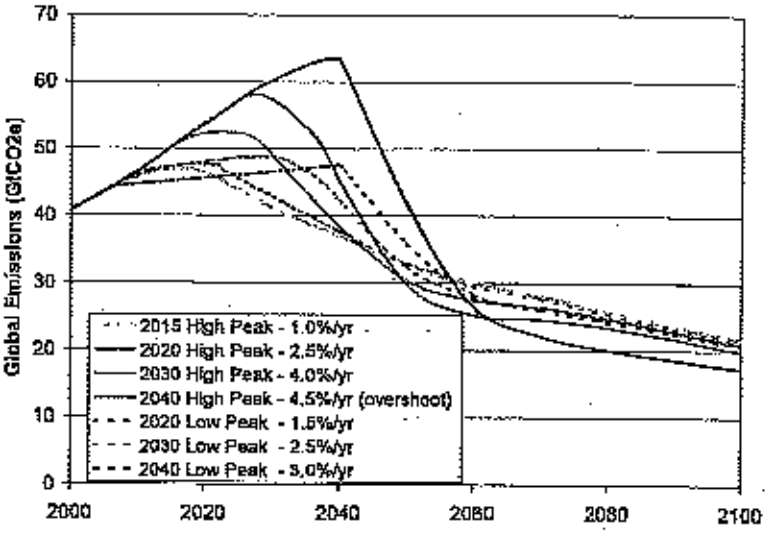
Stabilising at or below 550ppm CO_2e would require global emissions to peak in the next 10 - 20 years, and then fall at a rate of at least 1 - 3% per year. The range of paths is illustrated in Figure 3. By 2050, global emissions would need to be around 25% below current levels. These cuts will have to be made in the context of a world economy in 2050 that may be 3 - 4 times larger than today - so emissions per unit of GDP would need to be just one quarter of current levels by 2050.

To stabilise at 450ppm CO_2e, without overshooting, global emissions would need to peak in the next 10 years and then fall at more than 5% per year, reaching 70% below current levels by 2050.

Theoretically it might be possible to "overshoot" by allowing the atmospheric GHG concentration to peak above the stabilisation level and then fall, but this would be both practically very difficult and very unwise. Overshooting paths involve greater risks, as temperatures will also rise rapidly and peak at a higher level for many decades before falling back down. Also, overshooting requires that emissions subsequently be reduced to extremely low levels, below the level of natural carbon absorption, which may not be feasible. Furthermore, if the high temperatures were to weaken the capacity of the Earth to absorb carbon - as becomes more likely with overshooting - future emissions would need to be cut even more rapidly to hit any given stabilisation target for atmospheric concentration.

Figure 3 Illustrative emissions paths to stabilise at 550ppm CO_2e.

The figure below shows six illustrative paths to stabilisation at 550ppm CO_2e. The rates of emissions cuts given in the legend are the *maximum* 10-year average rate of decline of global emissions. The figure shows that delaying emissions cuts (shifting the peak to the right) means that emissions must be reduced more rapidly to achieve the same stabilisation goal. The rate of emissions cuts is also very sensitive to the height of the peak. For example, if emissions peak at 48 $GtCO_2$ rather than 52 $GtCO_2$ in 2020, the rate of cuts is reduced from 2.5%/yr to 1.5%/yr.



Source: Reproduced by the Stern Review based on Meinshausen, M. (2006), 'What does a 2°C target mean for greenhouse gas concentrations? A brief analysis based on multi-gas emission pathways and several climate sensitivity uncertainty estimates', Avoiding dangerous climate change, in H.J. Schellnhuber et al. (eds.), Cambridge: Cambridge University Press, pp.265 - 280.

Achieving these deep cuts in emissions will have a cost. The Review estimates the annual costs of stabilisation at 500-550ppm CO_2e to be around 1% of GDP by 2050 - a level that is significant but manageable.

Reversing the historical trend in emissions growth, and achieving cuts of 25% or more against today's levels is a major challenge. Costs will be incurred as the world shifts from a high-carbon to a low-carbon trajectory. But there will also be business opportunities as the markets for low-carbon, high-efficiency goods and services expand.

Greenhouse-gas emissions can be cut in four ways. Costs will differ considerably depending on which combination of these methods is used, and in which sector:

- Reducing demand for emissions-intensive goods and services
- Increased efficiency, which can save both money and emissions
- Action on non-energy emissions, such as avoiding deforestation
- Switching to lower-carbon technologies for power, heat and transport

Estimating the costs of these changes can be done in two ways. One is to look at the resource costs of measures, including the introduction of low-carbon technologies and changes in land use, compared with the costs of the BAU alternative. This

provides an upper bound on costs, as it does not take account of opportunities to respond involving reductions in demand for high-carbon goods and services.

The second is to use macroeconomic models to explore the system-wide effects of the transition to a low-carbon energy economy. These can be useful in tracking the dynamic interactions of different factors over time, including the response of economies to changes in prices. But they can be complex, with their results affected by a whole range of assumptions.

On the basis of these two methods, central estimate is that stabilisation of greenhouse gases at levels of 500-550ppm CO_2e will cost, on average, around 1% of annual global GDP by 2050. This is significant, but is fully consistent with continued growth and development, in contrast with unabated climate change, which will eventually pose significant threats to growth.

Resource cost estimates suggest that an upper bound for the expected annual cost of emissions reductions consistent with a trajectory leading to stabilisation at 550ppm CO_2e is likely to be around 1% of GDP by 2050.

This Review has considered in detail the potential for, and costs of, technologies and measures to cut emissions across different sectors. As with the impacts of climate change, this is subject to important uncertainties. These include the difficulties of estimating the costs of technologies several decades into the future, as well as the way in which fossil-fuel prices evolve in the future. It is also hard to know how people will respond to price changes.

The precise evolution of the mitigation effort, and the composition across sectors of emissions reductions, will therefore depend on all these factors. But it is possible to make a central projection of costs across a portfolio of likely options, subject to a range.

The technical potential for efficiency improvements to reduce emissions and costs is substantial. Over the past century, efficiency in energy supply improved ten-fold or more in developed countries, and the possibilities for further gains are far from being exhausted. Studies by the International Energy Agency show that, by 2050, energy efficiency has the potential to be the biggest single source of emissions savings in the energy sector. This would have both environmental and economic benefits: energy-efficiency measures cut waste and often save money.

Non-energy emissions make up one-third of total greenhouse-gas emissions; action here will make an important contribution. A substantial body of evidence suggests that action to prevent further deforestation would be relatively cheap compared with other types of mitigation, if the right policies and institutional structures are put in place.

Large-scale uptake of a range of clean power, heat, and transport technologies is required for radical emission cuts in the medium to long term. The power sector around the world will have to be least 60%, and perhaps as much as 75%, decarbonised by 2050 to stabilise at or below 550ppm CO_2e. Deep cuts in the transport sector are likely to be more difficult in the shorter term, but will ultimately be needed. While many of the technologies to achieve this already exist, the priority is to bring down their costs so that they are competitive with fossil-fuel alternatives under a carbon-pricing policy regime.

A portfolio of technologies will be required to stabilise emissions. It is highly unlikely that any single technology will deliver all the necessary emission savings, because all technologies are subject to constraints of some kind, and because of the wide range of activities and sectors that generate greenhouse-gas emissions. It is also uncertain which technologies will turn out to be cheapest. Hence a portfolio will be required for low-cost abatement.

The shift to a low-carbon global economy will take place against the background of an abundant supply of fossil fuels. That is to say, the stocks of hydrocarbons that are profitable to extract (under current policies) are more than enough to take the world to levels of greenhouse-gas concentrations well beyond 750ppm CO_2e, with very dangerous consequences. Indeed, under BAU, energy users are likely to switch towards more carbon-intensive coal and oil shales, increasing rates of emissions growth.

Even with very strong expansion of the use of renewable energy and other low-carbon energy sources, hydrocarbons may still make over half of global energy supply in 2050. Extensive carbon capture and storage would allow this continued use of fossil fuels without damage to the atmosphere, and also guard against the danger of strong climate-change policy being undermined at some stage by falls in fossil-fuel prices.

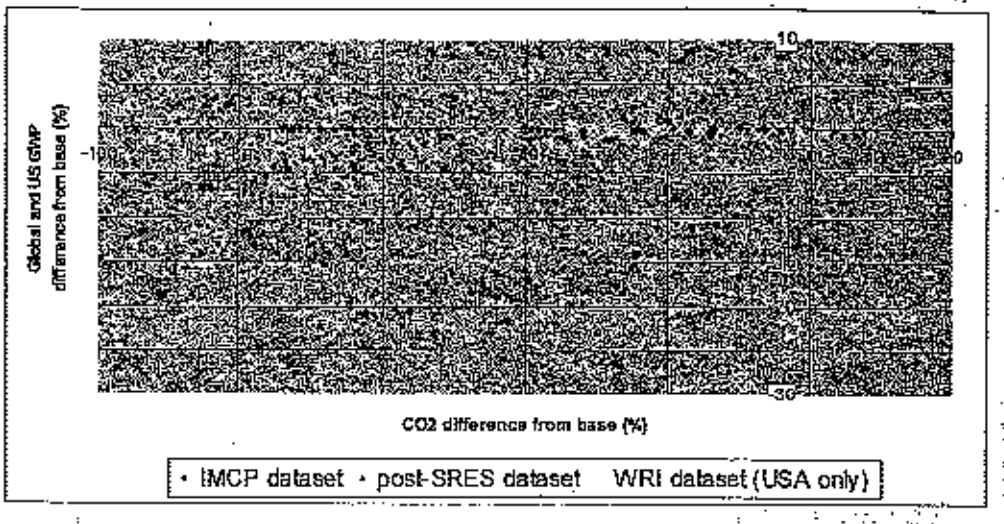
Estimates based on the likely costs of these methods of emissions reduction show that the annual costs of stabilising at around 550ppm CO_2e are likely to be around 1% of global GDP by 2050, with a range from –1% (net gains) to +3.5% of GDP.

Looking at broader macroeconomic models confirms these estimates.

The second approach adopted by the Review was based comparisons of a broad range of macro-economic model estimates (such as that presented in Figure 4 below). This comparison found that the costs for stabilisation at 500-550ppm CO_2e were centred on 1% of GDP by 2050, with a range of -2% to +5% of GDP. The range reflects a number of factors, including the pace of technological innovation and the efficiency with which policy is applied across the globe: the faster the innovation and the greater the efficiency, the lower the cost. These factors can be influenced by policy.

The average expected cost is likely to remain around 1% of GDP from mid-century, but the range of estimates around the 1% diverges strongly thereafter, with some falling and others rising sharply by 2100, reflecting the greater uncertainty about the costs of seeking out ever more innovative methods of mitigation.

Figure 4 Model cost projections scatter plot
Costs of CO_2 reductions as a fraction of world GDP against level of reduction



Source: Barker, T., M.S. Qureshi and J. Köhler (2006): 'The costs of greenhouse-gas mitigation with induced technological change: A Meta-Analysis of estimates in the literature', 4CMR, Cambridge Centre for Climate Change Mitigation Research, Cambridge: University of Cambridge.

A broad range of modelling studies, which include exercises undertaken by the IMCP, EMF and USCCSP as well at work commissioned by the IPCC, show that costs for 2050 consistent with an emissions trajectory leading to stabilisation at around 500-550ppm CO_2e are clustered in the range of –2% to 5% of GDP, with an average around 1% of GDP. The range reflects uncertainties over the scale of mitigation required, the pace of technological innovation and the degree of policy flexibility.

The figure above uses Barker's combined three-model dataset to show the reduction in annual CO_2 emissions from the baseline and the associated changes in world GDP. The wide range of model results reflects the design of the models and the choice of assumptions included within them, which itself reflects uncertainties and differing approaches inherent in projecting the future. This shows that the full range of estimates drawn from a variety of stabilisation paths and years extends from –4% of GDP (that is, net gains) to +15% of GDP costs, but this mainly reflects outlying studies; most estimates are still centred around 1% of GDP. In particular, the models arriving at higher cost estimates make assumptions about technological progress that are very pessimistic by historical standards.

Stabilisation at 450ppm CO_2e is already almost out of reach, given that we are likely to reach this level within ten years and that there are real difficulties of making the sharp reductions required with current and foreseeable technologies. Costs rise significantly as mitigation efforts become more ambitious or sudden. Efforts to reduce emissions rapidly are likely to be very costly.

An important corollary is that there is a high price to delay. Delay in taking action on climate change would make it necessary to accept both more climate change and, eventually, higher mitigation costs. Weak action in the next 10-20 years would put stabilisation even at 550ppm CO_2e beyond reach – and this level is already associated with significant risks.

The transition to a low-carbon economy will bring challenges for competitiveness but also opportunities for growth.

Costs of mitigation of around 1% of GDP are small relative to the costs and risks of climate change that will be avoided. However, for some countries and some sectors, the costs will be higher. There may be some impacts on the competitiveness of a small number of internationally traded products and processes. These should not be overestimated, and can be reduced or eliminated if countries or sectors act together; nevertheless, there will be a transition to be managed. For the economy as a whole, there will be benefits from innovation that will offset some of these costs. All economies undergo continuous structural change; the most successful economies are those that have the flexibility and dynamism to embrace the change.

There are also significant new opportunities across a wide range of industries and services. Markets for low-carbon energy products are likely to be worth at least $500bn per year by 2050, and perhaps much more. Individual companies and countries should position themselves to take advantage of these opportunities.

Climate-change policy can help to root out existing inefficiencies. At the company level, implementing climate policies may draw attention to money-saving opportunities. At the economy-wide level, climate-change policy may be a lever for reforming inefficient energy systems and removing distorting energy subsidies, on which governments around the world currently spend around $250bn a year.

Policies on climate change can also help to achieve other objectives. These co-benefits can significantly reduce the overall cost to the economy of reducing greenhouse-gas emissions. If climate policy is designed well, it can, for example, contribute to reducing ill-health and mortality from air pollution, and to preserving forests that contain a significant proportion of the world's biodiversity.

National objectives for energy security can also be pursued alongside climate change objectives. Energy efficiency and diversification of energy sources and supplies support energy security, as do clear long-term policy frameworks for investors in power generation. Carbon capture and storage is essential to maintain the role of coal in providing secure and reliable energy for many economies.

Reducing the expected adverse impacts of climate change is therefore both highly desirable and feasible.

This conclusion follows from a comparison of the above estimates of the costs of mitigation with the high costs of inaction described from our first two methods (the aggregated and the disaggregated) of assessing the risks and costs of climate change impacts.

The third approach to analysing the costs and benefits of action on climate change adopted by this Review compares the marginal costs of abatement with the social cost of carbon. This approach compares estimates of the changes in the expected benefits and costs over time from a little extra reduction in emissions, and avoids large-scale formal economic models.

Preliminary calculations adopting the approach to valuation taken in this Review suggest that the social cost of carbon today, if we remain on a BAU trajectory, is of the order of $85 per tonne of CO_2 - higher than typical numbers in the literature, largely because we treat risk explicitly and incorporate recent evidence on the risks,

but nevertheless well within the range of published estimates. This number is well above marginal abatement costs in many sectors. Comparing the social costs of carbon on a BAU trajectory and on a path towards stabilisation at 550ppm CO2e, we estimate the excess of benefits over costs, in net present value terms, from implementing strong mitigation policies this year, shifting the world onto the better path: the net benefits would be of the order of $2.5 trillion. This figure will increase over time. This is not an estimate of net benefits occurring in this year, but a measure of the benefits that could flow from actions taken this year; many of the costs and benefits would be in the medium to long term.

Even if we have sensible policies in place, the social cost of carbon will also rise steadily over time, making more and more technological options for mitigation cost-effective. This does not mean that consumers will always face rising prices for the goods and services that they currently enjoy, as innovation driven by strong policy will ultimately reduce the carbon intensity of our economies, and consumers will then see reductions in the prices that they pay as low-carbon technologies mature.

The three approaches to the analysis of the costs of climate change used in the Review all point to the desirability of strong action, given estimates of the costs of action on mitigation. But how much action? The Review goes on to examine the economics of this question.

The current evidence suggests aiming for stabilisation somewhere within the range 450 - 550ppm CO_2e. Anything higher would substantially increase the risks of very harmful impacts while reducing the expected costs of mitigation by comparatively little. Aiming for the lower end of this range would mean that the costs of mitigation would be likely to rise rapidly. Anything lower would certainly impose very high adjustment costs in the near term for small gains and might not even be feasible, not least because of past delays in taking strong action.

Uncertainty is an argument for a more, not less, demanding goal, because of the size of the adverse climate-change impacts in the worst-case scenarios.

The ultimate concentration of greenhouse gases determines the trajectory for estimates of the social cost of carbon; these also reflect the particular ethical judgements and approach to the treatment of uncertainty embodied in the modelling. Preliminary work for this Review suggests that, if the target were between 450-550ppm CO_2e, then the social cost of carbon would start in the region of $25-30 per tonne of CO_2 – around one third of the level if the world stays with BAU.

The social cost of carbon is likely to increase steadily over time because marginal damages increase with the stock of GHGs in the atmosphere, and that stock rises over time. Policy should therefore ensure that abatement efforts at the margin also intensify over time. But it should also foster the development of technology that can drive down the average costs of abatement; although pricing carbon, by itself, will not be sufficient to bring forth all the necessary innovation, particularly in the early years.

The first half of the Review therefore demonstrates that strong action on climate change, including both mitigation and adaptation, is worthwhile, and suggests appropriate goals for climate-change policy.

The second half of the Review examines the appropriate form of such policy, and how it can be placed within a framework of international collective action.

Policy to reduce emissions should be based on three essential elements: carbon pricing, technology policy, and removal of barriers to behavioural change.

There are complex challenges in reducing greenhouse-gas emissions. Policy frameworks must deal with long time horizons and with interactions with a range of other market imperfections and dynamics.

A shared understanding of the long-term goals for stabilisation is a crucial guide to policy-making on climate change: it narrows down strongly the range of acceptable emissions paths. But from year to year, flexibility in what, where and when reductions are made will reduce the costs of meeting these stabilisation goals.

Policies should adapt to changing circumstances as the costs and benefits of responding to climate change become clearer over time. They should also build on diverse national conditions and approaches to policy-making. But the strong links between current actions and the long-term goal should be at the forefront of policy.

Three elements of policy for mitigation are essential: a carbon price, technology policy, and the removal of barriers to behavioural change. Leaving out any one of these elements will significantly increase the costs of action.

Establishing a carbon price, through tax, trading or regulation, is an essential foundation for climate-change policy.

The first element of policy is carbon pricing. Greenhouse gases are, in economic terms, an externality: those who produce greenhouse-gas emissions are bringing about climate change, thereby imposing costs on the world and on future generations, but they do not face the full consequences of their actions themselves.

Putting an appropriate price on carbon – explicitly through tax or trading, or implicitly through regulation – means that people are faced with the full social cost of their actions. This will lead individuals and businesses to switch away from high-carbon goods and services, and to invest in low-carbon alternatives. Economic efficiency points to the advantages of a common global carbon price: emissions reductions will then take place wherever they are cheapest.

The choice of policy tool will depend on countries' national circumstances, on the characteristics of particular sectors, and on the interaction between climate-change policy and other policies. Policies also have important differences in their consequences for the distribution of costs across individuals, and their impact on the public finances. Taxation has the advantage of delivering a steady flow of revenue, while, in the case of trading, increasing the use of auctioning is likely to have strong benefits for efficiency, for distribution and for the public finances. Some administrations may choose to focus on trading initiatives, others on taxation or regulation, and others on a mix of policies. And their choices may vary across sectors.

Trading schemes can be an effective way to equalise carbon prices across countries and sectors, and the EU Emissions Trading Scheme is now the centrepiece of European efforts to cut emissions. To reap the benefits of emissions trading, schemes must provide incentives for a flexible and efficient response. Broadening the scope of trading schemes will tend to lower costs and reduce volatility. Clarity and predictability about the future rules and shape of schemes will help to build confidence in a future carbon price.

In order to influence behaviour and investment decisions, investors and consumers must believe that the carbon price will be maintained into the future. This is particularly important for investments in long-lived capital stock. Investments such as power stations, buildings, industrial plants and aircraft last for many decades. If there is a lack of confidence that climate change policies will persist, then businesses may not factor a carbon price into their decision-making. The result may be overinvestment in long-lived, high-carbon infrastructure – which will make emissions cuts later on much more expensive and difficult.

But establishing credibility takes time. The next 10 to 20 years will be a period of transition, from a world where carbon-pricing schemes are in their infancy, to one where carbon pricing is universal and is automatically factored into decision making. In this transitional period, while the credibility of policy is still being established and the international framework is taking shape, it is critical that governments consider how to avoid the risks of locking into a high-carbon infrastructure, including considering whether any additional measures may be justified to reduce the risks.

Policies are required to support the development of a range of low-carbon and high-efficiency technologies on an urgent timescale.

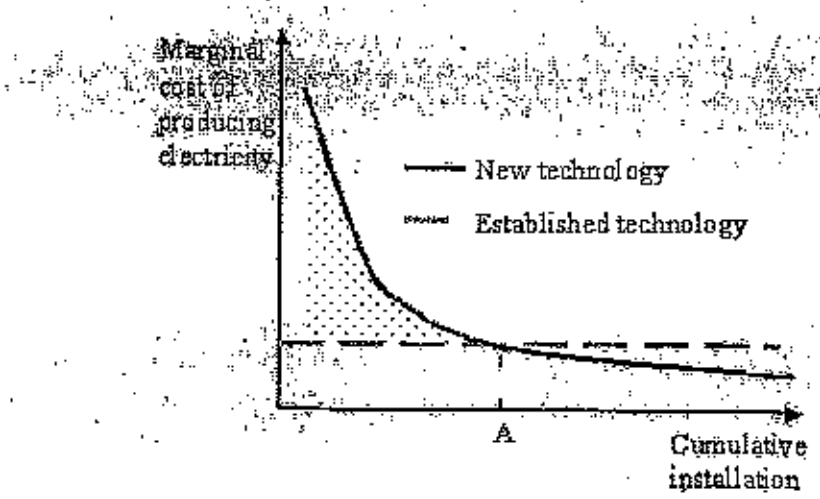
The second element of climate-change policy is technology policy, covering the full spectrum from research and development, to demonstration and early stage deployment. The development and deployment of a wide range of low-carbon technologies is essential in achieving the deep cuts in emissions that are needed. The private sector plays the major role in R&D and technology diffusion, but closer collaboration between government and industry will further stimulate the development of a broad portfolio of low carbon technologies and reduce costs.

Many low-carbon technologies are currently more expensive than the fossil-fuel alternatives. But experience shows that the costs of technologies fall with scale and experience, as shown in Figure 5 below.

Carbon pricing gives an incentive to invest in new technologies to reduce carbon; indeed, without it, there is little reason to make such investments. But investing in new lower-carbon technologies carries risks. Companies may worry that they will not have a market for their new product if carbon-pricing policy is not maintained into the future. And the knowledge gained from research and development is a public good; companies may under-invest in projects with a big social payoff if they fear they will be unable to capture the full benefits. Thus there are good economic reasons to promote new technology directly.

Public spending on research, development and demonstration has fallen significantly in the last two decades and is now low relative to other industries. There are likely to be high returns to a doubling of investments in this area to around $20 billion per annum globally, to support the development of a diverse portfolio of technologies.

Figure 5: The costs of technologies are likely to fall over time



Historical experience of both fossil-fuel and low-carbon technologies shows that as scale increases, costs tend to fall. Economists have fitted 'learning curves' to costs data to estimate the size of this effect. An illustrative curve is shown, above, for a new electricity generation technology; the technology is initially much more expensive than the established alternative, but as its scale increases, the costs fall, and beyond Point A it becomes cheaper. Work by the International Energy Agency and others shows that such relationships hold for a range of different energy technologies.

A number of factors explain this, including the effects of learning and economies of scale. But the relationship is more complex than the figure suggests. Step-change improvements in a technology might accelerate progress, while constraints such as the availability of land or materials could result in increasing marginal costs.

In some sectors - particularly electricity generation, where new technologies can struggle to gain a foothold - policies to support the market for early-stage technologies will be critical. The Review argues that the scale of existing deployment incentives worldwide should increase by two to five times, from the current level of around $34 billion per annum. Such measures will be a powerful motivation for innovation across the private sector to bring forward the range of technologies needed.

The removal of barriers to behavioural change is a third essential element, one that is particularly important in encouraging the take-up of opportunities for energy efficiency.

The third element is the removal of barriers to behavioural change. Even where measures to reduce emissions are cost-effective, there may be barriers preventing action. These include a lack of reliable information, transaction costs, and behavioural and organisational inertia. The impact of these barriers can be most clearly seen in the frequent failure to realise the potential for cost-effective energy efficiency measures.

Regulatory measures can play a powerful role in cutting through these complexities, and providing clarity and certainty. Minimum standards for buildings and appliances have proved a cost-effective way to improve performance, where price signals alone may be too muted to have a significant impact.

Information policies, including labelling and the sharing of best practice, can help consumers and businesses make sound decisions, and stimulate competitive

markets for low-carbon and high-efficiency goods and services. Financing measures can also help, through overcoming possible constraints to paying the upfront cost of efficiency improvements.

Fostering a shared understanding of the nature of climate change, and its consequences, is critical in shaping behaviour, as well as in underpinning national and international action. Governments can be a catalyst for dialogue through evidence, education, persuasion and discussion. Educating those currently at school about climate change will help to shape and sustain future policy-making, and a broad public and international debate will support today's policy-makers in taking strong action now.

Adaptation policy is crucial for dealing with the unavoidable impacts of climate change, but it has been under-emphasised in many countries.

Adaptation is the only response available for the impacts that will occur over the next several decades before mitigation measures can have an effect.

Unlike mitigation, adaptation will in most cases provide local benefits, realised without long lead times. Therefore some adaptation will occur autonomously, as individuals respond to market or environmental changes. Some aspects of adaptation, such as major infrastructure decisions, will require greater foresight and planning. There are also some aspects of adaptation that require public goods delivering global benefits, including improved information about the climate system and more climate-resilient crops and technologies.

Quantitative information on the costs and benefits of economy-wide adaptation is currently limited. Studies in climate-sensitive sectors point to many adaptation options that will provide benefits in excess of cost. But at higher temperatures, the costs of adaptation will rise sharply and the residual damages remain large. The additional costs of making new infrastructure and buildings resilient to climate change in OECD countries could be $15 – 150 billion each year (0.05 – 0.5% of GDP).

The challenge of adaptation will be particularly acute in developing countries, where greater vulnerability and poverty will limit the capacity to act. As in developed countries, the costs are hard to estimate, but are likely to run into tens of billions of dollars.

Markets that respond to climate information will stimulate adaptation among individuals and firms. Risk-based insurance schemes, for example, provide strong signals about the size of climate risks and therefore encourage good risk management.

Governments have a role in providing a policy framework to guide effective adaptation by individuals and firms in the medium and longer term. There are four key areas:

- High-quality climate information and tools for risk management will help to drive efficient markets. Improved regional climate predictions will be critical, particularly for rainfall and storm patterns.

- Land-use planning and performance standards should encourage both private and public investment in buildings and other long-lived infrastructure to take account of climate change.

- Governments can contribute through long-term polices for climate-sensitive public goods, including natural resources protection, coastal protection, and emergency preparedness.

- A financial safety net may be required for the poorest in society, who are likely to be the most vulnerable to the impacts and least able to afford protection (including insurance).

Sustainable development itself brings the diversification, flexibility and human capital which are crucial components of adaptation. Indeed, much adaptation will simply be an extension of good development practice – for example, promoting overall development, better disaster management and emergency response. Adaptation action should be integrated into development policy and planning at every level.

An effective response to climate change will depend on creating the conditions for international collective action.

This Review has identified many actions that communities and countries can take on their own to tackle climate change.

Indeed, many countries, states and companies are already beginning to act. However, the emissions of most individual countries are small relative to the global total, and very large reductions are required to stabilise greenhouse gas concentrations in the atmosphere. Climate change mitigation raises the classic problem of the provision of a global public good. It shares key characteristics with other environmental challenges that require the international management of common resources to avoid free riding.

The UN Framework Convention on Climate Change (UNFCCC), Kyoto Protocol and a range of other informal partnerships and dialogues provide a framework that supports co-operation, and a foundation from which to build further collective action.

A shared global perspective on the urgency of the problem and on the long-term goals for climate change policy, and an international approach based on multilateral frameworks and co-ordinated action, are essential to respond to the scale of the challenge. International frameworks for action on climate change should encourage and respond to the leadership shown by different countries in different ways, and should facilitate and motivate the involvement of all states. They should build on the principles of effectiveness, efficiency and equity that have already provided the foundations of the existing multilateral framework.

The need for action is urgent: demand for energy and transportation is growing rapidly in many developing countries, and many developed countries are also due to renew a significant proportion of capital stock. The investments made in the next 10-20 years could lock in very high emissions for the next half-century, or present an opportunity to move the world onto a more sustainable path.

International co-operation must cover all aspects of policy to reduce emissions – pricing, technology and the removal of behavioural barriers, as well as action on emissions from land use. And it must promote and support adaptation. There are significant opportunities for action now, including in areas with immediate economic benefits (such as energy efficiency and reduced gas flaring) and in areas where large-scale pilot programmes would generate important experience to guide future negotiations.

Agreement on a broad set of mutual responsibilities across each of the relevant dimensions of action would contribute to the overall goal of reducing the risks of climate change. These responsibilities should take account of costs and the ability to bear them, as well as starting points, prospects for growth and past histories.

Securing broad-based and sustained co-operation requires an equitable distribution of effort across both developed and developing countries. There is no single formula that captures all dimensions of equity, but calculations based on income, historic responsibility and per capita emissions all point to rich countries taking responsibility for emissions reductions of 60-80% from 1990 levels by 2050.

Co-operation can be encouraged and sustained by greater transparency and comparability of national action.

Creating a broadly similar carbon price signal around the world, and using carbon finance to accelerate action in developing countries, are urgent priorities for international co-operation.

A broadly similar price of carbon is necessary to keep down the overall costs of making these reductions, and can be created through tax, trading or regulation. The transfer of technologies to developing countries by the private sector can be accelerated through national action and international co-operation.

The Kyoto Protocol has established valuable institutions to underpin international emissions trading. There are strong reasons to build on and learn from this approach. There are opportunities to use the UNFCCC dialogue and the review of the effectiveness of the Kyoto Protocol, as well as a wide range of informal dialogues, to explore ways to move forward.

Private sector trading schemes are now at the heart of international flows of carbon finance. Linking and expanding regional and sectoral emissions trading schemes, including sub-national and voluntary schemes, requires greater international co-operation and the development of appropriate new institutional arrangements.

Decisions made now on the third phase of the EU ETS provide an opportunity for the scheme to influence, and become the nucleus of, future global carbon markets.

The EU ETS is the world's largest carbon market. The structure of the third phase of the scheme, beyond 2012, is currently under debate. This is an opportunity to set out a clear, long-term vision to place the scheme at the heart of future global carbon markets.

There are a number of elements which will contribute to a credible vision for the EU ETS. The overall EU limit on emissions should be set at a level that ensures scarcity in the market for emissions allowances, with stringent criteria for allocation volumes across all relevant sectors. Clear and frequent information on emissions during the trading period would improve transparency in the market, reducing the risks of unnecessary price spikes or of unexpected collapses.

Clear revision rules covering the basis for allocations in future trading periods would create greater predictability for investors. The possibility of banking (and perhaps borrowing) emissions allowances between periods could help smooth prices over time.

Broadening participation to other major industrial sectors, and to sectors such as aviation, would help deepen the market, and increased use of auctioning would promote efficiency.

Enabling the EU ETS to link with other emerging trading schemes (including in the USA and Japan), and maintaining and developing mechanisms to allow the use of carbon reductions made in developing countries, could improve liquidity while also establishing the nucleus of a global carbon market.

Scaling up flows of carbon finance to developing countries to support effective policies and programmes for reducing emissions would accelerate the transition to a low-carbon economy.

Developing countries are already taking significant action to decouple their economic growth from the growth in greenhouse gas emissions. For example, China has adopted very ambitious domestic goals to reduce energy used for each unit of GDP by 20% from 2006-2010 and to promote the use of renewable energy. India has created an Integrated Energy Policy for the same period that includes measures to expand access to cleaner energy for poor people and to increase energy efficiency.

The Clean Development Mechanism, created by the Kyoto Protocol, is currently the main formal channel for supporting low-carbon investment in developing countries. It allows both governments and the private sector to invest in projects that reduce emissions in fast-growing emerging economies, and provides one way to support links between different regional emissions trading schemes.

In future, a transformation in the scale of, and institutions for, international carbon finance flows will be required to support cost-effective emissions reductions. The incremental costs of low-carbon investments in developing countries are likely to be at least $20-30 billion per year. Providing assistance with these costs will require a major increase in the level of ambition of trading schemes such as the EU ETS. This will also require mechanisms that link private-sector carbon finance to policies and programmes rather than to individual projects. And it should work within a context of national, regional or sectoral objectives for emissions reductions. These flows will be crucial in accelerating private investment and national government action in developing countries.

There are opportunities now to build trust and to pilot new approaches to creating large-scale flows for investment in low-carbon development paths. Early signals from existing emissions trading schemes, including the EU ETS, about the extent to which they will accept carbon credits from developing countries, would help to maintain continuity during this important stage of building markets and demonstrating what is possible.

The International Financial Institutions have an important role to play in accelerating this process: the establishment of a Clean Energy Investment Framework by the World Bank and other multilateral development banks offers significant potential for catalysing and scaling up investment flows.

Greater international co-operation to accelerate technological innovation and diffusion will reduce the costs of mitigation.

The private sector is the major driver of innovation and the diffusion of technologies around the world. But governments can help to promote international collaboration to overcome barriers in this area, including through formal arrangements and through arrangements that promote public-private co-operation such as the Asia Pacific Partnership. Technology co-operation enables the sharing of risks, rewards and progress of technology development and enables co-ordination of priorities.

A global portfolio that emerges from individual national R&D priorities and deployment support may not be sufficiently diverse, and is likely to place too little weight on some technologies that are particularly important for developing countries, such as biomass.

International R&D co-operation can take many forms. Coherent, urgent and broadly based action requires international understanding and co-operation. These may be embodied in formal multilateral agreements that allow countries to pool the risks and rewards for major investments in R&D, including demonstration projects and dedicated international programmes to accelerate key technologies. But formal agreements are only one part of the story - informal arrangements for greater co-ordination and enhanced linkages between national programmes can also play a very prominent role.

Both informal and formal co-ordination of national policies for deployment support can accelerate cost reductions by increasing the scale of new markets across borders. Many countries and US states now have specific national objectives and policy frameworks to support the deployment of renewable energy technologies. Transparency and information-sharing have already helped to boost interest in these markets. Exploring the scope for making deployment instruments tradable across borders could increase the effectiveness of support, including mobilising the resources that will be required to accelerate the widespread deployment of carbon capture and storage and the use of technologies that are particularly appropriate for developing countries.

International co-ordination of regulations and product standards can be a powerful way to encourage greater energy efficiency. It can raise their cost effectiveness, strengthen the incentives to innovate, improve transparency, and promote international trade.

The reduction of tariff and non-tariff barriers for low-carbon goods and services, including within the Doha Development Round of international trade negotiations, could provide further opportunities to accelerate the diffusion of key technologies.

Curbing deforestation is a highly cost-effective way of reducing greenhouse gas emissions.

Emissions from deforestation are very significant – they are estimated to represent more than 18% of global emissions, a share greater than is produced by the global transport sector.

Action to preserve the remaining areas of natural forest is needed urgently. Large-scale pilot schemes are required to explore effective approaches to combining national action and international support.

Policies on deforestation should be shaped and led by the nation where the particular forest stands. But those countries should receive strong help from the international community, which benefits from their actions to reduce deforestation. At a national level, defining property rights to forestland, and determining the rights and responsibilities of landowners, communities and loggers, is key to effective forest management. This should involve local communities, respect informal rights and social structures, work with development goals and reinforce the process of protecting the forests.

Research carried out for this report indicates that the opportunity cost of forest protection in 8 countries responsible for 70 per cent of emissions from land use could be around $5 billion per annum initially, although over time marginal costs would rise.

Compensation from the international community should take account of the opportunity costs of alternative uses of the land, the costs of administering and enforcing protection, and the challenges of managing the political transition as established interests are displaced.

Carbon markets could play an important role in providing such incentives in the longer term. But there are short-term risks of destabilising the crucial process of strengthening existing strong carbon markets if deforestation is integrated without agreements that strongly increase demand for emissions reductions. These agreements must be based on an understanding of the scale of transfers likely to be involved.

Adaptation efforts in developing countries must be accelerated and supported, including through international development assistance.

The poorest developing countries will be hit earliest and hardest by climate change, even though they have contributed little to causing the problem. Their low incomes make it difficult to finance adaptation. The international community has an obligation to support them in adapting to climate change. Without such support there is a serious risk that development progress will be undermined.

It is for the developing countries themselves to determine their approach to adaptation in the context of their own circumstances and aspirations. Rapid growth and development will enhance countries' ability to adapt. The additional costs to developing countries of adapting to climate change could run into tens of billions of dollars.

The scale of the challenge makes it more urgent than ever for developed countries to honour their existing commitments – made in Monterrey in 2002, and strengthened at EU Councils in June 2005 and at the July 2005 G8 Gleneagles Summit – to double aid flows by 2010.

Donors and multilateral development institutions should mainstream and support adaptation across their assistance to developing countries. The international community should also support adaptation through investment in global public goods, including improved monitoring and prediction of climate change, better modelling of regional impacts, and the development and deployment of drought- and flood-resistant crops.

In addition, efforts should be increased to build public-private partnerships for climate-related insurance; and to strengthen mechanisms for improving risk management and preparedness, disaster response and refugee resettlement.

Strong and early mitigation has a key role to play in limiting the long- run costs of adaptation. Without this, the costs of adaptation will rise dramatically.

Building and sustaining collective action is now an urgent challenge.

The key building blocks for any collective action include developing a shared understanding of the long-term goals for climate policy, building effective institutions for co-operation, and demonstrating leadership and working to build trust with others.

Without a clear perspective on the long-term goals for stabilisation of greenhouse gas concentrations in the atmosphere, it is unlikely that action will be sufficient to meet the objective.

Action must include mitigation, innovation and adaptation. There are many opportunities to start now, including where there are immediate benefits and where large-scale pilot programmes will generate valuable experience. And we have already begun to create the institutions to underpin co-operation.

The challenge is to broaden and deepen participation across all the relevant dimensions of action – including co-operation to create carbon prices and markets, to accelerate innovation and deployment of low-carbon technologies, to reverse emissions from land-use change and to help poor countries adapt to the worst impacts of climate change.

There is still time to avoid the worst impacts of climate change if strong collective action starts now.

This Review has focused on the economics of risk and uncertainty, using a wide range of economic tools to tackle the challenges of a global problem which has profound long-term implications. Much more work is required, by scientists and economists, to tackle the analytical challenges and resolve some of the uncertainties across a broad front. But it is already very clear that the economic risks of inaction in the face of climate change are very severe.

There are ways to reduce the risks of climate change. With the right incentives, the private sector will respond and can deliver solutions. The stabilisation of greenhouse gas concentrations in the atmosphere is feasible, at significant but manageable costs.

The policy tools exist to create the incentives required to change investment patterns and move the global economy onto a low-carbon path. This must go hand-in-hand with increased action to adapt to the impacts of the climate change that can no longer be avoided.

Above all, reducing the risks of climate change requires collective action. It requires co-operation between countries, through international frameworks that support the achievement of shared goals. It requires a partnership between the public and private sector, working with civil society and with individuals. It is still possible to avoid the worst impacts of climate change; but it requires strong and urgent collective action. Delay would be costly and dangerous.

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Climate Change 2007: The Physical Science Basis

Summary for Policymakers

Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change

This Summary for Policymakers was formally approved at the 10th Session of Working Group I of the IPCC, Paris, February 2007.

Note:
Text, tables and figures given here are final but subject to copy-editing.

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INTRODUCTION

The Working Group I contribution to the IPCC Fourth Assessment Report describes progress in understanding of the human and natural drivers of climate change[1], observed climate change, climate processes and attribution, and estimates of projected future climate change. It builds upon past IPCC assessments and incorporates new findings from the past six years of research. Scientific progress since the TAR is based upon large amounts of new and more comprehensive data, more sophisticated analyses of data, improvements in understanding of processes and their simulation in models, and more extensive exploration of uncertainty ranges.

The basis for substantive paragraphs in this Summary for Policymakers can be found in the chapter sections specified in curly brackets.

HUMAN AND NATURAL DRIVERS OF CLIMATE CHANGE

Changes in the atmospheric abundance of greenhouse gases and aerosols, in solar radiation and in land surface properties alter the energy balance of the climate system. These changes are expressed in terms of radiative forcing[2], which is used to compare how a range of human and natural factors drive warming or cooling influences on global climate. Since the Third Assessment Report (TAR), new observations and related modelling of greenhouse gases, solar activity, land surface properties and some aspects of aerosols have led to improvements in the quantitative estimates of radiative forcing.

Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years (see Figure SPM-1). The global increases in carbon dioxide concentration are due primarily to fossil fuel use and land-use change, while those of methane and nitrous oxide are primarily due to agriculture. {2.3, 6.4, 7.3}

- Carbon dioxide is the most important anthropogenic greenhouse gas (see Figure SPM-2). The global atmospheric concentration of carbon dioxide has increased from a pre-industrial value of about 280 ppm to 379 ppm[3] in 2005. The atmospheric concentration of carbon dioxide in 2005 exceeds by far the natural range over the last 650,000 years (180 to 300 ppm) as determined from ice cores. The annual carbon dioxide concentration growth-rate was larger during the last 10 years (1995 – 2005 average: 1.9 ppm per year), than it has been since the beginning of continuous direct atmospheric measurements (1960 – 2005 average: 1.4 ppm per year) although there is year-to-year variability in growth rates. {2.3, 7.3}
- The primary source of the increased atmospheric concentration of carbon dioxide since the pre-industrial period results from fossil fuel use, with land use change providing another significant but smaller contribution. Annual fossil carbon dioxide emissions[4] increased from an average of 6.4 [6.0 to 6.8][5] GtC

[1] *Climate change* in IPCC usage refers to any change in climate over time, whether due to natural variability or as a result of human activity. This usage differs from that in the Framework Convention on Climate Change, where climate change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods.

[2] *Radiative forcing* is a measure of the influence that a factor has in altering the balance of incoming and outgoing energy in the Earth-atmosphere system and is an index of the importance of the factor as a potential climate change mechanism. Positive forcing tends to warm the surface while negative forcing tends to cool it. In this report radiative forcing values are for 2005 relative to pre-industrial conditions defined at 1750 and are expressed in watts per square metre ($W m^{-2}$). See Glossary and Section 2.2 for further details.

[3] ppm (parts per million) or ppb (parts per billion, 1 billion = 1,000 million) is the ratio of the number of greenhouse gas molecules to the total number of molecules of dry air. For example: 300 ppm means 300 molecules of a greenhouse gas per million molecules of dry air.

[4] Fossil carbon dioxide emissions include those from the production, distribution and consumption of fossil fuels and as a by-product from cement production. An emission of 1 GtC corresponds to 3.67 $GtCO_2$.

[5] In general, uncertainty ranges for results given in this Summary for Policymakers are 90% uncertainty intervals unless stated otherwise, i.e., there is an estimated 5% likelihood that the value could be above the range given in square brackets and 5% likelihood that the value could be below that range. Best estimates are given where available. Assessed uncertainty intervals are not always symmetric about the corresponding best estimate. Note that a number of uncertainty ranges in the Working Group I TAR corresponded to 2-sigma (95%), often using expert judgement.

(23.5 [22.0 to 25.0] $GtCO_2$) per year in the 1990s, to 7.2 [6.9 to 7.5] GtC (26.4 [25.3 to 27.5] $GtCO_2$) per year in 2000–2005 (2004 and 2005 data are interim estimates). Carbon dioxide emissions associated with land-use change are estimated to be 1.6 [0.5 to 2.7] GtC (5.9 [1.8 to 9.9] $GtCO_2$) per year over the 1990s, although these estimates have a large uncertainty. {7.3}

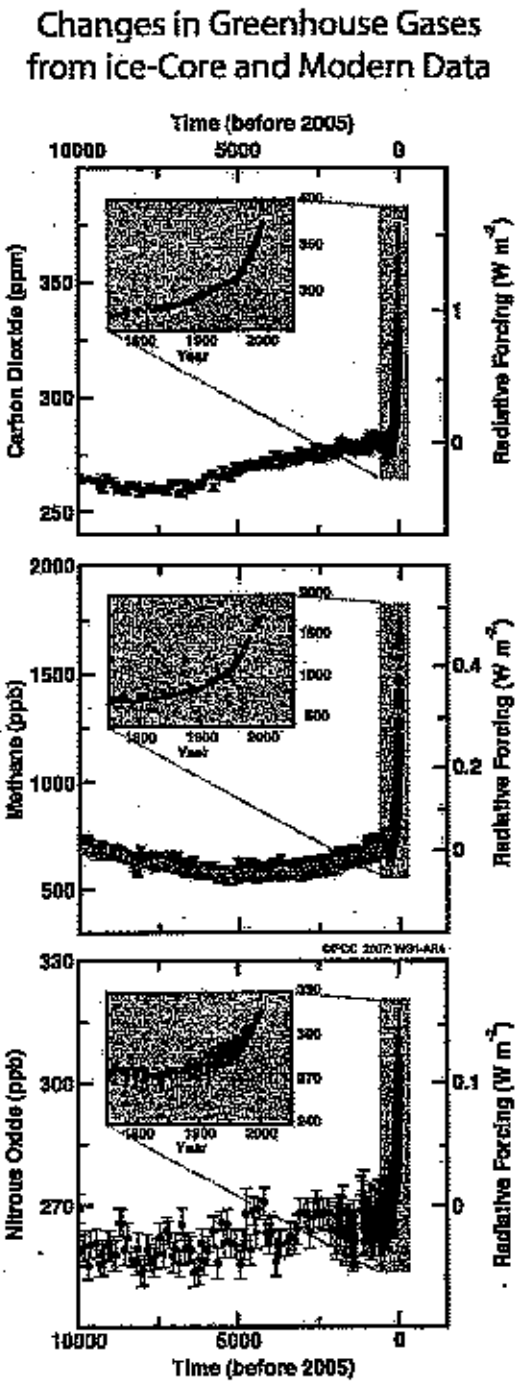

FIGURE SPM-1. Atmospheric concentrations of carbon dioxide, methane and nitrous oxide over the last 10,000 years (large panels) and since 1750 (inset panels). Measurements are shown from ice cores (symbols with different colours for different studies) and atmospheric samples (red lines). The corresponding radiative forcings are shown on the right hand axes of the large panels. {Figure 6.4}

- The global atmospheric concentration of methane has increased from a pre-industrial value of about 715 ppb to 1732 ppb in the early 1990s, and is 1774 ppb in 2005. The atmospheric concentration of methane in 2005 exceeds by far the natural range of the last 650,000 years (320 to 790 ppb) as determined from ice cores. Growth rates have declined since the early 1990s, consistent with total emissions (sum of anthropogenic and natural sources) being nearly constant during this period. It is *very likely*[6] that the observed increase in methane concentration is due to anthropogenic activities, predominantly agriculture and fossil fuel use, but relative contributions from different source types are not well determined. {2.3, 7.4}
- The global atmospheric nitrous oxide concentration increased from a pre-industrial value of about 270 ppb to 319 ppb in 2005. The growth rate has been approximately constant since 1980. More than a third of all nitrous oxide emissions are anthropogenic and are primarily due to agriculture. {2.3, 7.4}

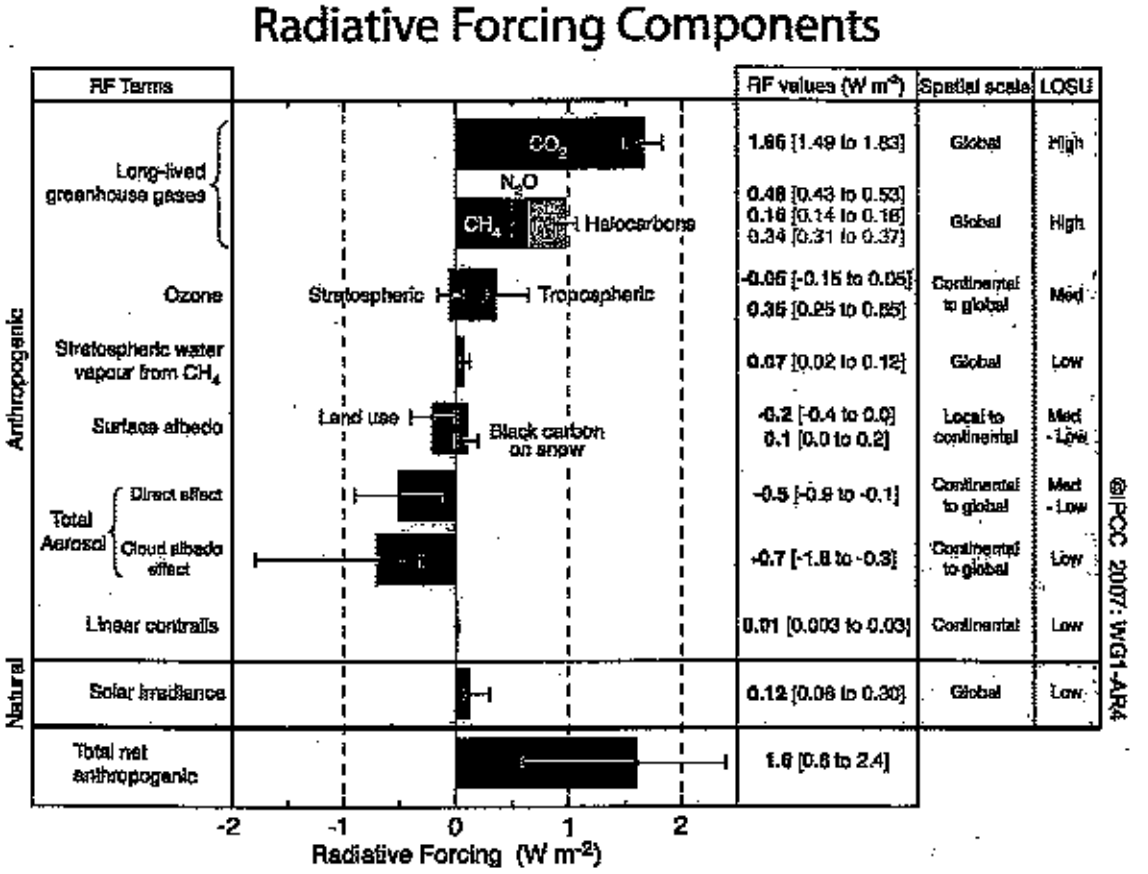

FIGURE SPM-2. Global-average radiative forcing (RF) estimates and ranges in 2005 for anthropogenic carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and other important agents and mechanisms, together with the typical geographical extent (spatial scale) of the forcing and the assessed level of scientific understanding (LOSU). The net anthropogenic radiative forcing and its range are also shown. These require summing asymmetric uncertainty estimates from the component terms, and cannot be obtained by simple addition. Additional forcing factors not included here are considered to have a very low LOSU. Volcanic aerosols contribute an additional natural forcing but are not included in this figure due to their episodic nature. Range for linear contrails does not include other possible effects of aviation on cloudiness. {2.9, Figure 2.20}

[6] In this Summary for Policymakers, the following terms have been used to indicate the assessed likelihood, using expert judgement, of an outcome or a result: *Virtually certain* > 99% probability of occurrence, *Extremely likely* > 95%, *Very likely* > 90%, *Likely* > 66%, *More likely than not* > 50%, *Unlikely* < 33%, *Very unlikely* < 10%, *Extremely unlikely* < 5%. (See Box TS.1.1 for more details).

The understanding of anthropogenic warming and cooling influences on climate has improved since the Third Assessment Report (TAR), leading to *very high confidence*[7] that the globally averaged net effect of human activities since 1750 has been one of warming, with a radiative forcing of +1.6 [+0.6 to +2.4] W m^{-2}. (see Figure SPM-2). {2.3. 6.5, 2.9}

- The combined radiative forcing due to increases in carbon dioxide, methane, and nitrous oxide is +2.30 [+2.07 to +2.53] W m^{-2}, and its rate of increase during the industrial era is *very likely* to have been unprecedented in more than 10,000 years (see Figures SPM-1 and SPM-2). The carbon dioxide radiative forcing increased by 20% from 1995 to 2005, the largest change for any decade in at least the last 200 years. {2.3, 6.4}
- Anthropogenic contributions to aerosols (primarily sulphate, organic carbon, black carbon, nitrate and dust) together produce a cooling effect, with a total direct radiative forcing of -0.5 [-0.9 to -0.1] W m^{-2} and an indirect cloud albedo forcing of -0.7 [-1.8 to -0.3] W m^{-2}. These forcings are now better understood than at the time of the TAR due to improved *in situ*, satellite and ground-based measurements and more comprehensive modelling, but remain the dominant uncertainty in radiative forcing. Aerosols also influence cloud lifetime and precipitation. {2.4, 2.9, 7.5}
- Significant anthropogenic contributions to radiative forcing come from several other sources. Tropospheric ozone changes due to emissions of ozone-forming chemicals (nitrogen oxides, carbon monoxide, and hydrocarbons) contribute +0.35 [+0.25 to +0.65] W m^{-2}. The direct radiative forcing due to changes in halocarbons[8] is +0.34 [+0.31 to +0.37] W m^{-2}. Changes in surface albedo, due to land-cover changes and deposition of black carbon aerosols on snow, exert respective forcings of -0.2 [-0.4 to 0.0] and +0.1 [0.0 to +0.2] W m^{-2}. Additional terms smaller than ±0.1 W m^{-2} are shown in Figure SPM-2. {2.3, 2.5, 7.2}
- Changes in solar irradiance since 1750 are estimated to cause a radiative forcing of +0.12 [+0.06 to +0.30] W m^{-2}, which is less than half the estimate given in the TAR. {2.7}

Direct Observations of Recent Climate Change

Since the TAR, progress in understanding how climate is changing in space and in time has been gained through improvements and extensions of numerous datasets and data analyses, broader geographical coverage, better understanding of uncertainties, and a wider variety of measurements. Increasingly comprehensive observations are available for glaciers and snow cover since the 1960s, and for sea level and ice sheets since about the past decade. However, data coverage remains limited in some regions.

Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level (see Figure SPM-3). {3.2, 4.2, 5.5}

- Eleven of the last twelve years (1995 -2006) rank among the 12 warmest years in the instrumental record of global surface temperature[9] (since 1850). The updated 100-year linear trend (1906–2005) of 0.74 [0.56 to 0.92]°C is therefore larger than the corresponding trend for 1901-2000 given in the TAR of 0.6 [0.4 to 0.8]°C. The linear warming trend over the last 50 years (0.13 [0.10 to 0.16]°C per decade) is nearly twice that for the last 100 years. The total temperature increase from 1850 – 1899 to 2001 – 2005 is 0.76 [0.57 to 0.95]°C. Urban heat island effects are real but local, and have a negligible influence (less than 0.006°C per decade over land and zero over the oceans) on these values. {3.2}

[7] In this Summary for Policymakers the following levels of confidence have been used to express expert judgments on the correctness of the underlying science: *very high confidence* at least a 9 out of 10 chance of being correct; *high confidence* about an 8 out of 10 chance of being correct. (See Box TS.1.1)

[8] Halocarbon radiative forcing has been recently assessed in detail in IPCC's Special Report on Safeguarding the Ozone Layer and the Global Climate System (2005).

[9] The average of near surface air temperature over land, and sea surface temperature.

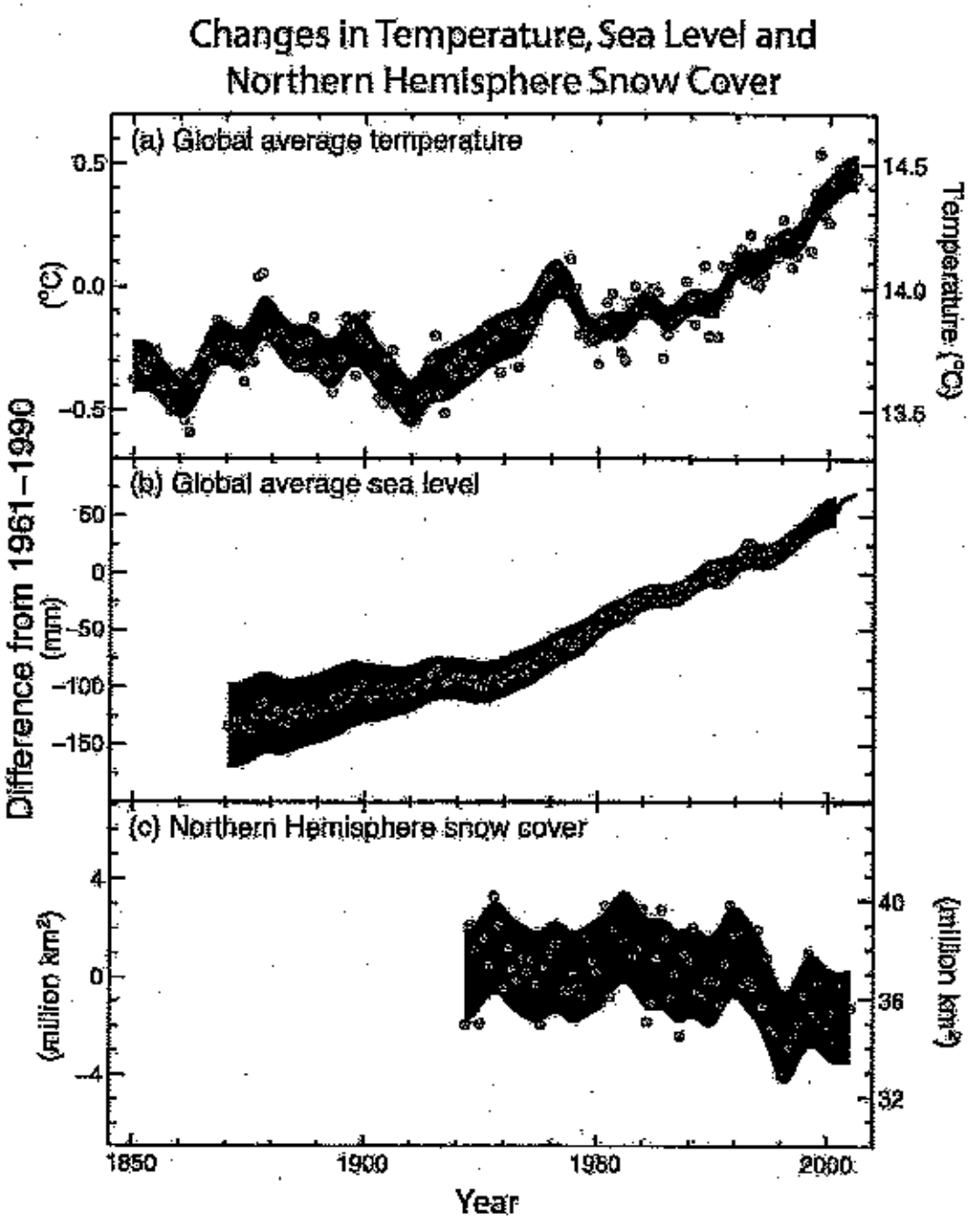

FIGURE SPM-3. Observed changes in (a) global average surface temperature; (b) global average sea level rise from tide gauge (blue) and satellite (red) data and (c) Northern Hemisphere snow cover for March-April. All changes are relative to corresponding averages for the period 1961-1990. Smoothed curves represent decadal averaged values while circles show yearly values. The shaded areas are the uncertainty intervals estimated from a comprehensive analysis of known uncertainties (a and b) and from the time series (c). {FAQ 3.1, Figure 1, Figure 4.2 and Figure 5.13}

- New analyses of balloon-borne and satellite measurements of lower- and mid-tropospheric temperature show warming rates that are similar to those of the surface temperature record and are consistent within their respective uncertainties, largely reconciling a discrepancy noted in the TAR. {3.2, 3.4}

- The average atmospheric water vapour content has increased since at least the 1980s over land and ocean as well as in the upper troposphere. The increase is broadly consistent with the extra water vapour that warmer air can hold. {3.4}
- Observations since 1961 show that the average temperature of the global ocean has increased to depths of at least 3000 m and that the ocean has been absorbing more than 80% of the heat added to the climate system. Such warming causes seawater to expand, contributing to sea level rise (see Table SPM-1). {5.2, 5.5}

Table SPM-1. Observed rate of sea level rise and estimated contributions from different sources. {5.5, Table 5.3}

	Rate of sea level rise (mm per year)	
Source of sea level rise	**1961 – 2003**	**1993 – 2003**
Thermal expansion	0.42 ± 0.12	1.6 ± 0.5
Glaciers and ice caps	0.50 ± 0.18	0.77 ± 0.22
Greenland ice sheet	0.05 ± 0.12	0.21 ± 0.07
Antarctic ice sheet	0.14 ± 0.41	0.21 ± 0.35
Sum of individual climate contributions to sea level rise	1.1 ± 0.5	2.8 ± 0.7
Observed total sea level rise	1.8 ± 0.5[a]	3.1 ± 0.7[a]
Difference (Observed minus sum of estimated climate contributions)	0.7 ± 0.7	0.3 ± 1.0

Table note:
[a] Data prior to 1993 are from tide gauges and after 1993 are from satellite altimetry.

- Mountain glaciers and snow cover have declined on average in both hemispheres. Widespread decreases in glaciers and ice caps have contributed to sea level rise (ice caps do not include contributions from the Greenland and Antarctic ice sheets). (See Table SPM-1.) {4.6, 4.7, 4.8, 5.5}
- New data since the TAR now show that losses from the ice sheets of Greenland and Antarctica have *very likely* contributed to sea level rise over 1993 to 2003 (see Table SPM-1). Flow speed has increased for some Greenland and Antarctic outlet glaciers, which drain ice from the interior of the ice sheets. The corresponding increased ice sheet mass loss has often followed thinning, reduction or loss of ice shelves or loss of floating glacier tongues. Such dynamical ice loss is sufficient to explain most of the Antarctic net mass loss and approximately half of the Greenland net mass loss. The remainder of the ice loss from Greenland has occurred because losses due to melting have exceeded accumulation due to snowfall. {4.6, 4.8, 5.5}
- Global average sea level rose at an average rate of 1.8 [1.3 to 2.3] mm per year over 1961 to 2003. The rate was faster over 1993 to 2003, about 3.1 [2.4 to 3.8] mm per year. Whether the faster rate for 1993 to 2003 reflects decadal variability or an increase in the longer-term trend is unclear. There is *high confidence* that the rate of observed sea level rise increased from the 19th to the 20th century. The total 20th century rise is estimated to be 0.17 [0.12 to 0.22] m. {5.5}
- For 1993-2003, the sum of the climate contributions is consistent within uncertainties with the total sea level rise that is directly observed (see Table SPM-1). These estimates are based on improved satellite and *in-situ* data now available. For the period of 1961 to 2003, the sum of climate contributions is estimated to be smaller than the observed sea level rise. The TAR reported a similar discrepancy for 1910 to 1990. {5.5}

At continental, regional, and ocean basin scales, numerous long-term changes in climate have been observed. These include changes in Arctic temperatures and ice, widespread changes in precipitation amounts, ocean salinity, wind patterns and aspects of extreme weather including droughts, heavy precipitation, heat waves and the intensity of tropical cyclones[10]. {3.2, 3.3, 3.4, 3.5, 3.6, 5.2}

- Average Arctic temperatures increased at almost twice the global average rate in the past 100 years. Arctic temperatures have high decadal variability, and a warm period was also observed from 1925 to 1945. {3.2}
- Satellite data since 1978 show that annual average Arctic sea ice extent has shrunk by 2.7 [2.1 to 3.3]% per decade, with larger decreases in summer of 7.4 [5.0 to 9.8]% per decade. These values are consistent with those reported in the TAR. {4.4}
- Temperatures at the top of the permafrost layer have generally increased since the 1980s in the Arctic (by up to 3°C). The maximum area covered by seasonally frozen ground has decreased by about 7% in the Northern Hemisphere since 1900, with a decrease in spring of up to 15%. {4.7}
- Long-term trends from 1900 to 2005 have been observed in precipitation amount over many large regions[11]. Significantly increased precipitation has been observed in eastern parts of North and South America, northern Europe and northern and central Asia. Drying has been observed in the Sahel, the Mediterranean, southern Africa and parts of southern Asia. Precipitation is highly variable spatially and temporally, and data are limited in some regions. Long-term trends have not been observed for the other large regions assessed[11]. {3.3, 3.9}
- Changes in precipitation and evaporation over the oceans are suggested by freshening of mid and high latitude waters together with increased salinity in low latitude waters. {5.2}
- Mid-latitude westerly winds have strengthened in both hemispheres since the 1960s. {3.5}
- More intense and longer droughts have been observed over wider areas since the 1970s, particularly in the tropics and subtropics. Increased drying linked with higher temperatures and decreased precipitation have contributed to changes in drought. Changes in sea surface temperatures (SST), wind patterns, and decreased snowpack and snow cover have also been linked to droughts. {3.3}
- The frequency of heavy precipitation events has increased over most land areas, consistent with warming and observed increases of atmospheric water vapour. {3.8, 3.9}
- Widespread changes in extreme temperatures have been observed over the last 50 years. Cold days, cold nights and frost have become less frequent, while hot days, hot nights, and heat waves have become more frequent (see Table SPM-2). {3.8}
- There is observational evidence for an increase of intense tropical cyclone activity in the North Atlantic since about 1970, correlated with increases of tropical sea surface temperatures. There are also suggestions of increased intense tropical cyclone activity in some other regions where concerns over data quality are greater. Multi-decadal variability and the quality of the tropical cyclone records prior to routine satellite observations in about 1970 complicate the detection of long-term trends in tropical cyclone activity. There is no clear trend in the annual numbers of tropical cyclones. {3.8}

[10] Tropical cyclones include hurricanes and typhoons.

[11] The assessed regions are those considered in the regional projections Chapter of the TAR and in Chapter 11 of this Report.

Table SPM-2. Recent trends, assessment of human influence on the trend, and projections for extreme weather events for which there is an observed late 20th century trend. {Tables 3.7, 3.8, 9.4, Sections 3.8, 5.5, 9.7, 11.2-11.9}

Phenomenon[a] and direction of trend	Likelihood that trend occurred in late 20th century (typically post 1960)	Likelihood of a human contribution to observed trend[b]	Likelihood of future trends based on projections for 21st century using SRES scenarios
Warmer and fewer cold days and nights over most land areas	*Very likely*[c]	*Likely*[d]	*Virtually certain*[d]
Warmer and more frequent hot days and nights over most land areas	*Very likely*[e]	*Likely (nights)*[d]	*Virtually certain*[d]
Warm spells / heat waves. Frequency increases over most land areas	*Likely*	*More likely than not*[f]	*Very likely*
Heavy precipitation events. Frequency (or proportion of total rainfall from heavy falls) increases over most areas	*Likely*	*More likely than not*[f]	*Very likely*
Area affected by droughts increases	*Likely* in many regions since 1970s	*More likely than not*	*Likely*
Intense tropical cyclone activity increases	*Likely* in some regions since 1970	*More likely than not*[f]	*Likely*
Increased incidence of extreme high sea level (excludes tsunamis)[g]	*Likely*	*More likely than not*[f,g]	*Likely*[i]

Table notes:

[a] See Table 3.7 for further details regarding definitions.

[b] See Table TS-4, Box TS.3.4 and Table 9.4.

[c] Decreased frequency of cold days and nights (coldest 10%).

[d] Warming of the most extreme days and nights each year.

[e] Increased frequency of hot days and nights (hottest 10%).

[f] Magnitude of anthropogenic contributions not assessed. Attribution for these phenomena based on expert judgement rather than formal attribution studies.

[g] Extreme high sea level depends on average sea level and on regional weather systems. It is defined here as the highest 1% of hourly values of observed sea level at a station for a given reference period.

[h] Changes in observed extreme high sea level closely follow the changes in average sea level {5.5.2.6}. It is *very likely* that anthropogenic activity contributed to a rise in average sea level. {9.5.2}

[i] In all scenarios, the projected global average sea level at 2100 is higher than in the reference period {10.6}. The effect of changes in regional weather systems on sea level extremes has not been assessed.

Some aspects of climate have not been observed to change. {3.2, 3.8, 4.4, 5.3}

- A decrease in diurnal temperature range (DTR) was reported in the TAR, but the data available then extended only from 1950 to 1993. Updated observations reveal that DTR has not changed from 1979 to 2004 as both day- and night-time temperature have risen at about the same rate. The trends are highly variable from one region to another. {3.2}
- Antarctic sea ice extent continues to show inter-annual variability and localized changes but no statistically significant average trends, consistent with the lack of warming reflected in atmospheric temperatures averaged across the region. {3.2, 4.4}

- There is insufficient evidence to determine whether trends exist in the meridional overturning circulation of the global ocean or in small scale phenomena such as tornadoes, hail, lightning and dust-storms. {3.8, 5.3}

A Paleoclimatic Perspective

Paleoclimatic studies use changes in climatically sensitive indicators to infer past changes in global climate on time scales ranging from decades to millions of years. Such proxy data (e.g., tree ring width) may be influenced by both local temperature and other factors such as precipitation, and are often representative of particular seasons rather than full years. Studies since the TAR draw increased confidence from additional data showing coherent behaviour across multiple indicators in different parts of the world. However, uncertainties generally increase with time into the past due to increasingly limited spatial coverage.

Paleoclimate information supports the interpretation that the warmth of the last half century is unusual in at least the previous 1300 years. The last time the polar regions were significantly warmer than present for an extended period (about 125,000 years ago), reductions in polar ice volume led to 4 to 6 metres of sea level rise. {6.4, 6.6}

- Average Northern Hemisphere temperatures during the second half of the 20th century were *very likely* higher than during any other 50-year period in the last 500 years and *likely* the highest in at least the past 1300 years. Some recent studies indicate greater variability in Northern Hemisphere temperatures than suggested in the TAR, particularly finding that cooler periods existed in the 12 to 14th, 17th, and 19th centuries. Warmer periods prior to the 20th century are within the uncertainty range given in the TAR. {6.6}
- Global average sea level in the last interglacial period (about 125,000 years ago) was *likely* 4 to 6 m higher than during the 20th century, mainly due to the retreat of polar ice. Ice core data indicate that average polar temperatures at that time were 3 to 5°C higher than present, because of differences in the Earth's orbit. The Greenland ice sheet and other Arctic ice fields *likely* contributed no more than 4 m of the observed sea level rise. There may also have been a contribution from Antarctica. {6.4}

Understanding and Attributing Climate Change

This Assessment considers longer and improved records, an expanded range of observations, and improvements in the simulation of many aspects of climate and its variability based on studies since the TAR. It also considers the results of new attribution studies that have evaluated whether observed changes are quantitatively consistent with the expected response to external forcings and inconsistent with alternative physically plausible explanations.

Most of the observed increase in globally averaged temperatures since the mid-20th century is *very likely* due to the observed increase in anthropogenic greenhouse gas concentrations[12]. This is an advance since the TAR's conclusion that "most of the observed warming over the last 50 years is *likely* to have been due to the increase in greenhouse gas concentrations". Discernible human influences now extend to other aspects of climate, including ocean warming, continental-average temperatures, temperature extremes and wind patterns (see Figure SPM-4 and Table SPM-2). {9.4, 9.5}

- It is *likely* that increases in greenhouse gas concentrations alone would have caused more warming than observed because volcanic and anthropogenic aerosols have offset some warming that would otherwise have taken place. {2.9, 7.5, 9.4}
- The observed widespread warming of the atmosphere and ocean, together with ice mass loss, support the conclusion that it is *extremely unlikely* that global climate change of the past fifty years can be explained without external forcing, and *very likely* that it is not due to known natural causes alone. {4.8, 5.2, 9.4, 9.5, 9.7}

[12] Consideration of remaining uncertainty is based on current methodologies.

- Warming of the climate system has been detected in changes of surface and atmospheric temperatures, temperatures in the upper several hundred metres of the ocean and in contributions to sea level rise. Attribution studies have established anthropogenic contributions to all of these changes. The observed pattern of tropospheric warming and stratospheric cooling is *very likely* due to the combined influences of greenhouse gas increases and stratospheric ozone depletion. {3.2, 3.4, 9.4, 9.5}
- It is *likely* that there has been significant anthropogenic warming over the past 50 years averaged over each continent except Antarctica (see Figure SPM-4). The observed patterns of warming, including greater warming over land than over the ocean, and their changes over time, are only simulated by models that include anthropogenic forcing. The ability of coupled climate models to simulate the observed temperature evolution on each of six continents provides stronger evidence of human influence on climate than was available in the TAR. {3.2, 9.4}

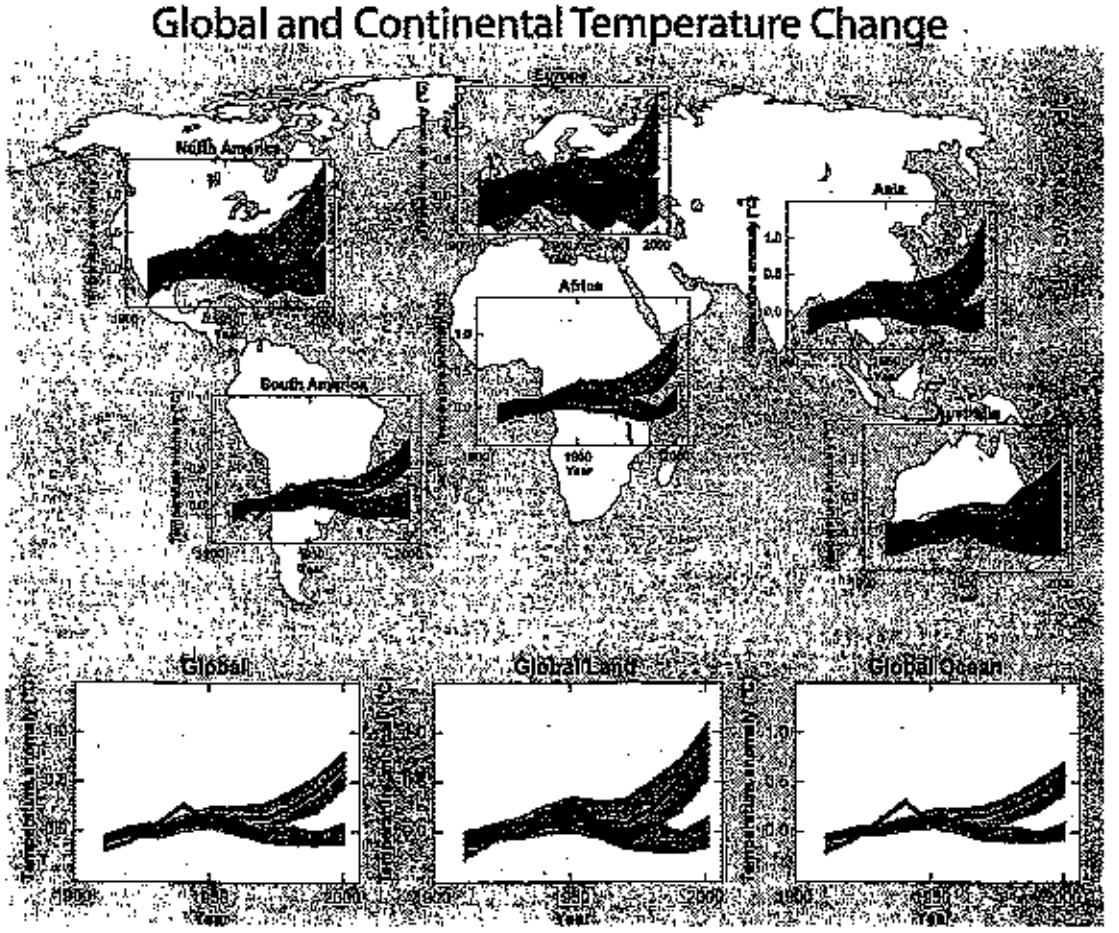

FIGURE SPM-4. Comparison of observed continental- and global-scale changes in surface temperature with results simulated by climate models using natural and anthropogenic forcings. Decadal averages of observations are shown for the period 1906–2005 (black line) plotted against the centre of the decade and relative to the corresponding average for 1901–1950. Lines are dashed where spatial coverage is less than 50%. Blue shaded bands show the 5–95% range for 19 simulations from 5 climate models using only the natural forcings due to solar activity and volcanoes. Red shaded bands show the 5–95% range for 58 simulations from 14 climate models using both natural and anthropogenic forcings. {FAQ 9.2, Figure 1}

- Difficulties remain in reliably simulating and attributing observed temperature changes at smaller scales. On these scales, natural climate variability is relatively larger making it harder to distinguish changes expected due to external forcings. Uncertainties in local forcings and feedbacks also make it difficult to estimate the contribution of greenhouse gas increases to observed small-scale temperature changes. {8.3, 9.4}
- Anthropogenic forcing is *likely* to have contributed to changes in wind patterns[13], affecting extra-tropical storm tracks and temperature patterns in both hemispheres. However, the observed changes in the Northern Hemisphere circulation are larger than simulated in response to 20th century forcing change. {3.5, 3.6, 9.5, 10.3}
- Temperatures of the most extreme hot nights, cold nights and cold days are *likely* to have increased due to anthropogenic forcing. It is *more likely than not* that anthropogenic forcing has increased the risk of heat waves (see Table SPM-2). {9.4}

Analysis of climate models together with constraints from observations enables an assessed *likely* range to be given for climate sensitivity for the first time and provides increased confidence in the understanding of the climate system response to radiative forcing. {6.6, 8.6, 9.6, Box 10.2}

- The equilibrium climate sensitivity is a measure of the climate system response to sustained radiative forcing. It is not a projection but is defined as the global average surface warming following a doubling of carbon dioxide concentrations. It is *likely* to be in the range 2 to 4.5°C with a best estimate of about 3°C, and is *very unlikely* to be less than 1.5°C. Values substantially higher than 4.5°C cannot be excluded, but agreement of models with observations is not as good for those values. Water vapour changes represent the largest feedback affecting climate sensitivity and are now better understood than in the TAR. Cloud feedbacks remain the largest source of uncertainty. {8.6, 9.6, Box 10.2}
- It is *very unlikely* that climate changes of at least the seven centuries prior to 1950 were due to variability generated within the climate system alone. A significant fraction of the reconstructed Northern Hemisphere interdecadal temperature variability over those centuries is *very likely* attributable to volcanic eruptions and changes in solar irradiance, and it is *likely* that anthropogenic forcing contributed to the early 20th century warming evident in these records. {2.7, 2.8, 6.6, 9.3}

Projections of Future Changes in Climate

A major advance of this assessment of climate change projections compared with the TAR is the large number of simulations available from a broader range of models. Taken together with additional information from observations, these provide a quantitative basis for estimating likelihoods for many aspects of future climate change. Model simulations cover a range of possible futures including idealised emission or concentration assumptions. These include SRES[14] illustrative marker scenarios for the 2000–2100 period and model experiments with greenhouse gases and aerosol concentrations held constant after year 2000 or 2100.

For the next two decades a warming of about 0.2°C per decade is projected for a range of SRES emission scenarios. Even if the concentrations of all greenhouse gases and aerosols had been kept constant at year 2000 levels, a further warming of about 0.1°C per decade would be expected. {10.3, 10.7}

[13] In particular, the Southern and Northern Annular Modes and related changes in the North Atlantic Oscillation. {3.6, 9.5, Box TS.3.1}

[14] SRES refers to the IPCC Special Report on Emission Scenarios (2000). The SRES scenario families and illustrative cases, which did not include additional climate initiatives, are summarized in a box at the end of this Summary for Policymakers. Approximate CO_2 equivalent concentrations corresponding to the computed radiative forcing due to anthropogenic greenhouse gases and aerosols in 2100 (see p. 823 of the TAR) for the SRES B1, AIT, B2, A1B, A2 and A1FI illustrative marker scenarios are about 600, 700, 800, 850, 1250 and 1550 ppm respectively. Scenarios B1, A1B, and A2 have been the focus of model inter-comparison studies and many of those results are assessed in this report.

- Since IPCC's first report in 1990, assessed projections have suggested global averaged temperature increases between about 0.15 and 0.3°C per decade for 1990 to 2005. This can now be compared with observed values of about 0.2°C per decade, strengthening confidence in near-term projections. {1.2, 3.2}
- Model experiments show that even if all radiative forcing agents are held constant at year 2000 levels, a further warming trend would occur in the next two decades at a rate of about 0.1°C per decade, due mainly to the slow response of the oceans. About twice as much warming (0.2°C per decade) would be expected if emissions are within the range of the SRES scenarios. Best-estimate projections from models indicate that decadal-average warming over each inhabited continent by 2030 is insensitive to the choice among SRES scenarios and is *very likely* to be at least twice as large as the corresponding model-estimated natural variability during the 20th century. {9.4, 10.3, 10.5, 11.2–11.7, Figure TS-29}

Continued greenhouse gas emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would *very likely* be larger than those observed during the 20th century. {10.3}

- Advances in climate change modelling now enable best estimates and *likely* assessed uncertainty ranges to be given for projected warming for different emission scenarios. Results for different emission scenarios are provided explicitly in this report to avoid loss of this policy-relevant information. Projected globally-averaged surface warmings for the end of the 21st century (2090–2099) relative to 1980–1999 are shown in Table SPM-3. These illustrate the differences between lower to higher SRES emission scenarios and the projected warming uncertainty associated with these scenarios. {10.5}
- Best estimates and *likely* ranges for globally average surface air warming for six SRES emissions marker scenarios are given in this assessment and are shown in Table SPM-3. For example, the best estimate for the low scenario (B1) is 1.8°C (*likely* range is 1.1°C to 2.9°C), and the best estimate for the high scenario (A1FI) is 4.0°C (*likely* range is 2.4°C to 6.4°C). Although these projections are broadly consistent with the span quoted in the TAR (1.4 to 5.8°C), they are not directly comparable (see Figure SPM-5). The AR4 is more advanced as it provides best estimates and an assessed likelihood range for each of the marker scenarios. The new assessment of the *likely* ranges now relies on a larger number of climate models of increasing complexity and realism, as well as new information regarding the nature of feedbacks from the carbon cycle and constraints on climate response from observations. {10.5}

Table SPM-3. Projected globally averaged surface warming and sea level rise at the end of the 21st century. {10.5, 10.6, Table 10.7}

	Temperature Change (°C at 2090-2099 relative to 1980-1999)[a]		Sea Level Rise (m at 2090-2099 relative to 1980-1999)
Case	Best estimate	*Likely* range	Model-based range excluding future rapid dynamical changes in ice flow
Constant Year 2000 concentrations[b]	0.6	0.3 – 0.9	NA
B1 scenario	1.8	1.1 – 2.9	0.18 – 0.38
A1T scenario	2.4	1.4 – 3.8	0.20 – 0.45
B2 scenario	2.4	1.4 – 3.8	0.20 – 0.43
A1B scenario	2.8	1.7 – 4.4	0.21 – 0.48
A2 scenario	3.4	2.0 – 5.4	0.23 – 0.51
A1FI scenario	4.0	2.4 – 6.4	0.26 – 0.59

Table notes:

[a] These estimates are assessed from a hierarchy of models that encompass a simple climate model, several Earth Models of Intermediate Complexity (EMICs), and a large number of Atmosphere-Ocean Global Circulation Models (AOGCMs).

[b] Year 2000 constant composition is derived from AOGCMs only.

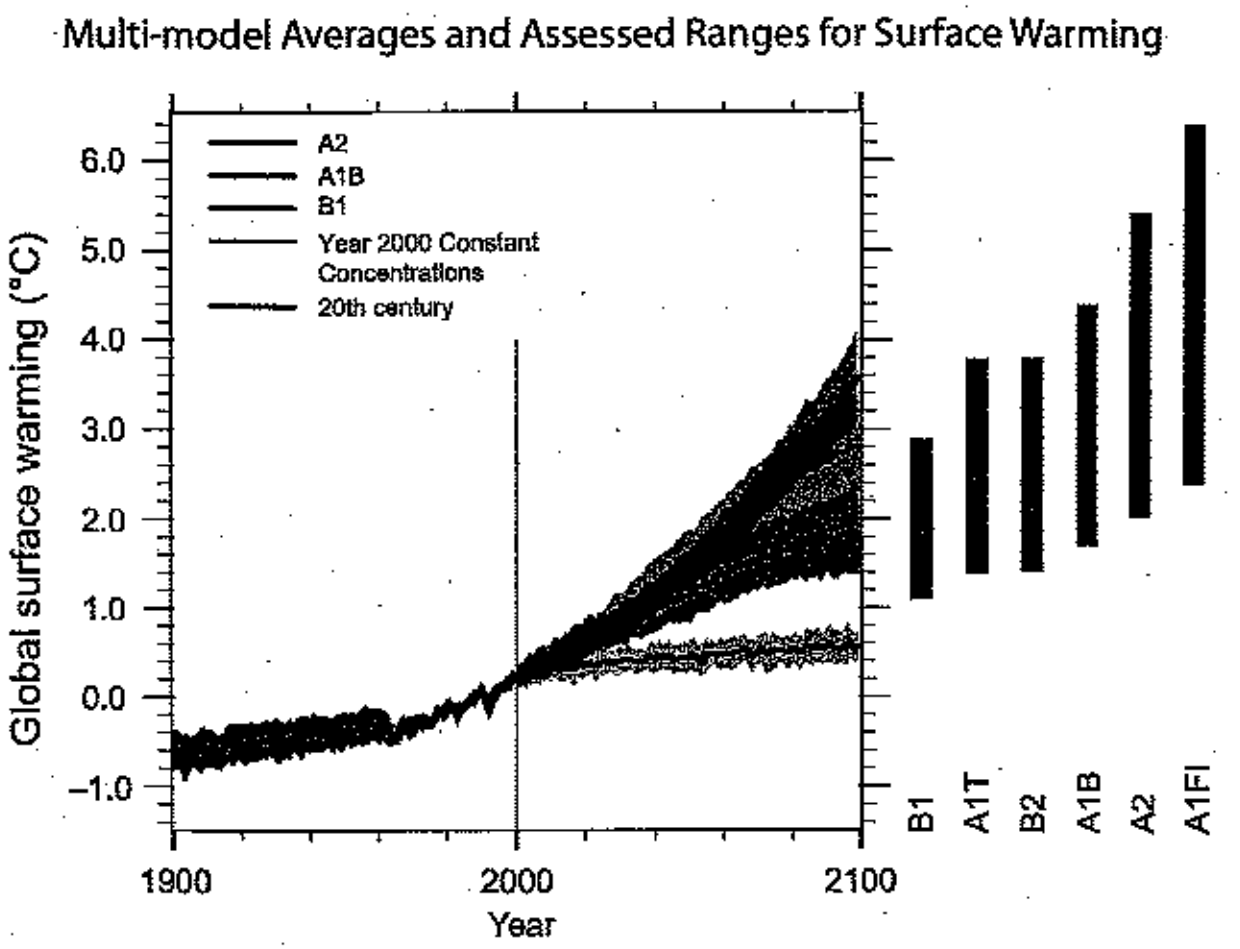

FIGURE SPM-5. Solid lines are multi-model global averages of surface warming (relative to 1980-99) for the scenarios A2, A1B and B1, shown as continuations of the 20th century simulations. Shading denotes the plus/minus one standard deviation range of individual model annual averages. The orange line is for the experiment where concentrations were held constant at year 2000 values. The gray bars at right indicate the best estimate (solid line within each bar) and the *likely* range assessed for the six SRES marker scenarios. The assessment of the best estimate and *likely* ranges in the gray bars includes the AOGCMs in the left part of the figure, as well as results from a hierarchy of independent models and observational constraints. {Figures 10.4 and 10.29}

- Warming tends to reduce land and ocean uptake of atmospheric carbon dioxide, increasing the fraction of anthropogenic emissions that remains in the atmosphere. For the A2 scenario, for example, the climate-carbon cycle feedback increases the corresponding global average warming at 2100 by more than 1°C. Assessed upper ranges for temperature projections are larger than in the TAR (see Table SPM-3) mainly because the broader range of models now available suggests stronger climate-carbon cycle feedbacks. {7.3, 10.5}

- Model-based projections of global average sea level rise at the end of the 21st century (2090-2099) are shown in Table SPM-3. For each scenario, the midpoint of the range in Table SPM-3 is within 10% of the TAR model average for 2090-2099. The ranges are narrower than in the TAR mainly because of improved information about some uncertainties in the projected contributions[15]. {10.6}

- Models used to date do not include uncertainties in climate-carbon cycle feedback nor do they include the full effects of changes in ice sheet flow, because a basis in published literature is lacking. The projections include a contribution due to increased ice flow from Greenland and Antarctica at the rates observed for 1993-2003, but these flow rates could increase or decrease in the future. For example, if this contribution were to grow

[15] TAR projections were made for 2100, whereas projections in this Report are for 2090-2099. The TAR would have had similar ranges to those in Table SPM-2 if it had treated the uncertainties in the same way.

linearly with global average temperature change, the upper ranges of sea level rise for SRES scenarios shown in Table SPM-3 would increase by 0.1 m to 0.2 m. Larger values cannot be excluded, but understanding of these effects is too limited to assess their likelihood or provide a best estimate or an upper bound for sea level rise. {10.6}

- Increasing atmospheric carbon dioxide concentrations leads to increasing acidification of the ocean. Projections based on SRES scenarios give reductions in average global surface ocean pH[16] of between 0.14 and 0.35 units over the 21st century, adding to the present decrease of 0.1 units since pre-industrial times. {5.4, Box 7.3, 10.4}

There is now higher confidence in projected patterns of warming and other regional-scale features, including changes in wind patterns, precipitation, and some aspects of extremes and of ice. {8.2, 8.3, 8.4, 8.5, 9.4, 9.5, 10.3, 11.1}

- Projected warming in the 21st century shows scenario-independent geographical patterns similar to those observed over the past several decades. Warming is expected to be greatest over land and at most high northern latitudes, and least over the Southern Ocean and parts of the North Atlantic ocean (see Figure SPM-6). {10.3}

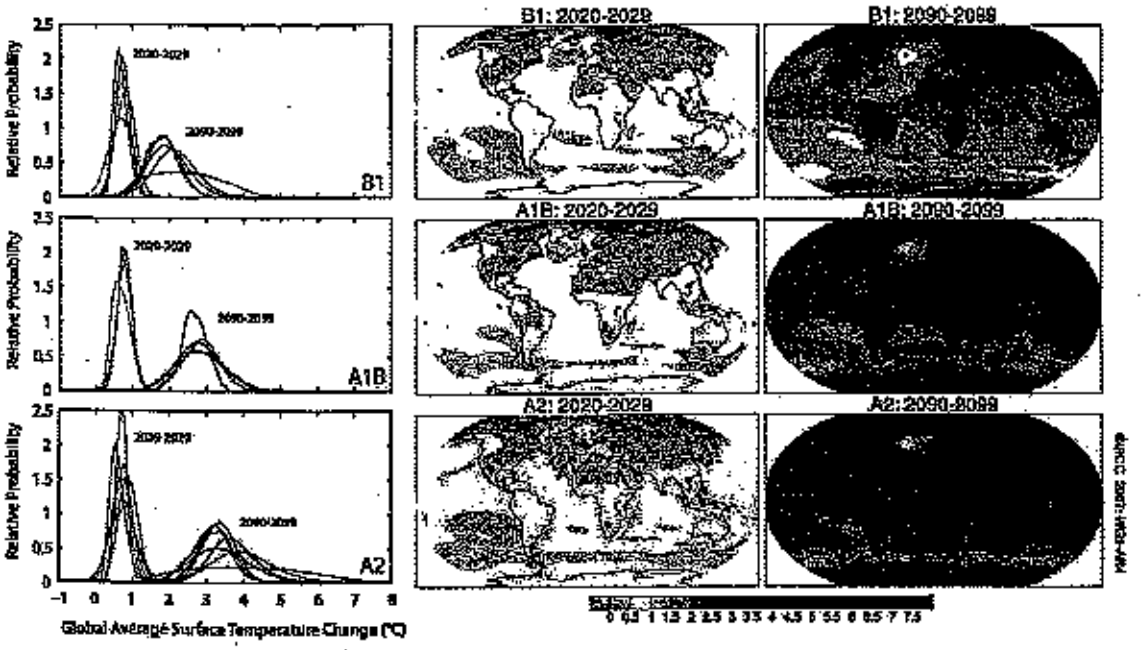

FIGURE SPM-6. Projected surface temperature changes for the early and late 21st century relative to the period 1980–1999. The central and right panels show the Atmosphere-Ocean General Circulation multi-Model average projections for the B1 (top), A1B (middle) and A2 (bottom) SRES scenarios averaged over decades 2020–2029 (center) and 2090–2099 (right). The left panel shows corresponding uncertainties as the relative probabilities of estimated global average warming from several different AOGCM and EMICs studies for the same periods. Some studies present results only for a subset of the SRES scenarios, or for various model versions. Therefore the difference in the number of curves, shown in the left-hand panels, is due only to differences in the availability of results. {Figures 10.8 and 10.28}

[16] Decreases in pH correspond to increases in acidity of a solution. See Glossary for further details.

- Snow cover is projected to contract. Widespread increases in thaw depth are projected over most permafrost regions. {10.3, 10.6}
- Sea ice is projected to shrink in both the Arctic and Antarctic under all SRES scenarios. In some projections, Arctic late-summer sea ice disappears almost entirely by the latter part of the 21st century. {10.3}
- It is *very likely* that hot extremes, heat waves, and heavy precipitation events will continue to become more frequent. {10.3}
- Based on a range of models, it is *likely* that future tropical cyclones (typhoons and hurricanes) will become more intense, with larger peak wind speeds and more heavy precipitation associated with ongoing increases of tropical SSTs. There is less confidence in projections of a global decrease in numbers of tropical cyclones. The apparent increase in the proportion of very intense storms since 1970 in some regions is much larger than simulated by current models for that period. {9.5, 10.3, 3.8}
- Extra-tropical storm tracks are projected to move poleward, with consequent changes in wind, precipitation, and temperature patterns, continuing the broad pattern of observed trends over the last half-century. {3.6, 10.3}
- Since the TAR there is an improving understanding of projected patterns of precipitation. Increases in the amount of precipitation are *very likely* in high-latitudes, while decreases are *likely* in most subtropical land regions (by as much as about 20% in the A1B scenario in 2100, see Figure SPM-7), continuing observed patterns in recent trends. {3.3, 8.3, 9.5, 10.3, 11.2 to 11.9}
- Based on current model simulations, it is *very likely* that the meridional overturning circulation (MOC) of the Atlantic Ocean will slow down during the 21st century. The multi-model average reduction by 2100 is 25% (range from zero to about 50%) for SRES emission scenario A1B. Temperatures in the Atlantic region are projected to increase despite such changes due to the much larger warming associated with projected increases of greenhouse gases. It is *very unlikely* that the MOC will undergo a large abrupt transition during the 21st century. Longer-term changes in the MOC cannot be assessed with confidence. {10.3, 10.7}

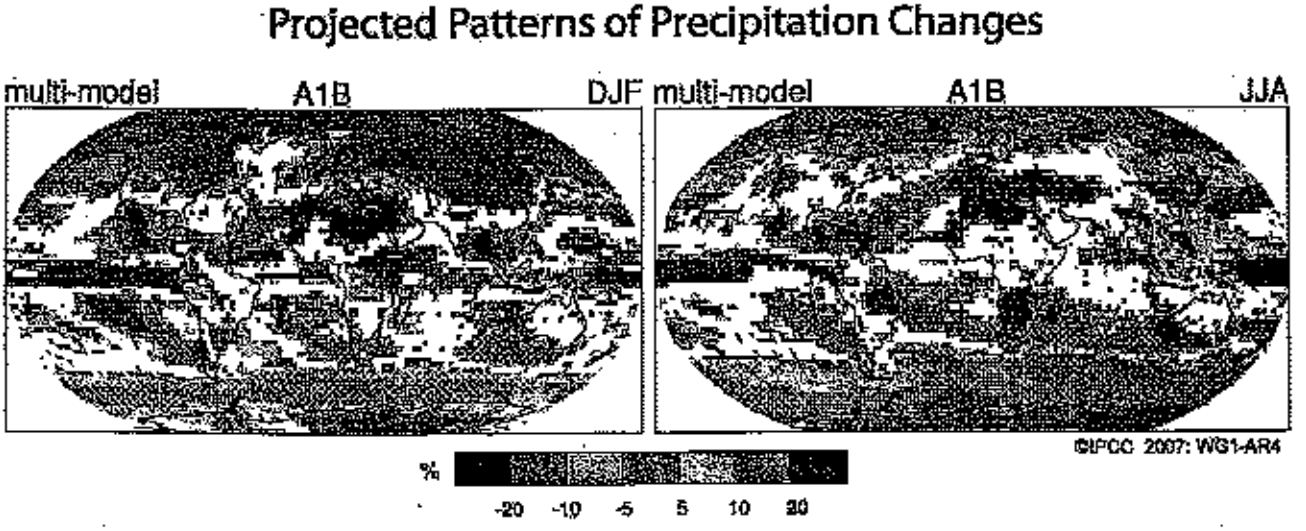

FIGURE SPM-7. Relative changes in precipitation (in percent) for the period 2090–2099, relative to 1980–1999. Values are multi-model averages based on the SRES A1B scenario for December to February (left) and June to August (right). White areas are where less than 66% of the models agree in the sign of the change and stippled areas are where more than 90% of the models agree in the sign of the change. {Figure 10.9}

Anthropogenic warming and sea level rise would continue for centuries due to the timescales associated with climate processes and feedbacks, even if greenhouse gas concentrations were to be stabilized. {10.4, 10.5, 10.7}

- Climate carbon cycle coupling is expected to add carbon dioxide to the atmosphere as the climate system warms, but the magnitude of this feedback is uncertain. This increases the uncertainty in the trajectory of carbon dioxide emissions required to achieve a particular stabilisation level of atmospheric carbon dioxide concentration. Based on current understanding of climate carbon cycle feedback, model studies suggest that to stabilise at 450 ppm carbon dioxide, could require that cumulative emissions over the 21st century be reduced from an average of approximately 670 [630 to 710] GtC (2460 [2310 to 2600] $GtCO_2$) to approximately 490 [375 to 600] GtC (1800 [1370 to 2200] $GtCO_2$). Similarly, to stabilise at 1000 ppm this feedback could require that cumulative emissions be reduced from a model average of approximately 1415 [1340 to 1490] GtC (5190 [4910 to 5460] $GtCO_2$) to approximately 1100 [980 to 1250] GtC (4030 [3590 to 4580] $GtCO_2$). {7.3, 10.4}
- If radiative forcing were to be stabilized in 2100 at B1 or A1B levels[11] a further increase in global average temperature of about 0.5°C would still be expected, mostly by 2200. {10.7}
- If radiative forcing were to be stabilized in 2100 at A1B levels[11], thermal expansion alone would lead to 0.3 to 0.8 m of sea level rise by 2300 (relative to 1980–1999). Thermal expansion would continue for many centuries, due to the time required to transport heat into the deep ocean. {10.7}
- Contraction of the Greenland ice sheet is projected to continue to contribute to sea level rise after 2100. Current models suggest ice mass losses increase with temperature more rapidly than gains due to precipitation and that the surface mass balance becomes negative at a global average warming (relative to pre-industrial values) in excess of 1.9 to 4.6°C. If a negative surface mass balance were sustained for millennia, that would lead to virtually complete elimination of the Greenland ice sheet and a resulting contribution to sea level rise of about 7 m. The corresponding future temperatures in Greenland are comparable to those inferred for the last interglacial period 125,000 years ago, when paleoclimatic information suggests reductions of polar land ice extent and 4 to 6 m of sea level rise. {6.4, 10.7}
- Dynamical processes related to ice flow not included in current models but suggested by recent observations could increase the vulnerability of the ice sheets to warming, increasing future sea level rise. Understanding of these processes is limited and there is no consensus on their magnitude. {4.6, 10.7}
- Current global model studies project that the Antarctic ice sheet will remain too cold for widespread surface melting and is expected to gain in mass due to increased snowfall. However, net loss of ice mass could occur if dynamical ice discharge dominates the ice sheet mass balance. {10.7}
- Both past and future anthropogenic carbon dioxide emissions will continue to contribute to warming and sea level rise for more than a millennium, due to the timescales required for removal of this gas from the atmosphere. {7.3, 10.3}

The Emission Scenarios of the IPCC Special Report on Emission Scenarios (SRES)[17]

A1. The A1 storyline and scenario family describes a future world of very rapid economic growth, global population that peaks in mid-century and declines thereafter, and the rapid introduction of new and more efficient technologies. Major underlying themes are convergence among regions, capacity building and increased cultural and social interactions, with a substantial reduction in regional differences in per capita income. The A1 scenario family develops into three groups that describe alternative directions of technological change in the energy system. The three A1 groups are distinguished by their technological emphasis: fossil intensive (A1FI), non-fossil energy sources (A1T), or a balance across all sources (A1B) (where balanced is defined as not relying too heavily on one particular energy source, on the assumption that similar improvement rates apply to all energy supply and end use technologies).

A2. The A2 storyline and scenario family describes a very heterogeneous world. The underlying theme is self-reliance and preservation of local identities. Fertility patterns across regions converge very slowly, which results in continuously increasing population. Economic development is primarily regionally oriented and per capita economic growth and technological change more fragmented and slower than other storylines.

B1. The B1 storyline and scenario family describes a convergent world with the same global population that peaks in mid-century and declines thereafter, as in the A1 storyline, but with rapid change in economic structures toward a service and information economy, with reductions in material intensity and the introduction of clean and resource efficient technologies. The emphasis is on global solutions to economic, social and environmental sustainability, including improved equity, but without additional climate initiatives.

B2. The B2 storyline and scenario family describes a world in which the emphasis is on local solutions to economic, social and environmental sustainability. It is a world with continuously increasing global population, at a rate lower than A2, intermediate levels of economic development, and less rapid and more diverse technological change than in the B1 and A1 storylines. While the scenario is also oriented towards environmental protection and social equity, it focuses on local and regional levels.

An illustrative scenario was chosen for each of the six scenario groups A1B, A1FI, A1T, A2, B1 and B2. All should be considered equally sound.

The SRES scenarios do not include additional climate initiatives, which means that no scenarios are explicitly assume implementation of the United Nations Framework Convention on Climate Change or the emissions targets of the Kyoto Protocol.

[17] Emission scenarios are not assessed in this Working Group One report of the IPCC. This box summarizing the SRES scenarios is taken from the TAR and has been subject to prior line by line approval by the Panel.

Resolution No.50

Submitted By:

The Honorable Martin Chavez
Mayor of Albuquerque

The Honorable Greg Nickels
Mayor of Seattle

The Honorable Richard M. Daley
Mayor of Chicago

The Honorable Manuel A. Diaz
Mayor of Miami

ADOPTING THE "2030 CHALLENGE" FOR CITY BUILDINGS

1. **WHEREAS**, the U.S. Conference of Mayors has previously adopted strong policy resolutions for cities, communities, and the federal government to take actions to reduce fossil fuel consumption and global warming pollution; and

2. **WHEREAS**, the Inter-Governmental Panel on Climate Change (IPCC), the international community's most respected assemblage of scientists, has found that climate disruption is a reality and that human activities are largely responsible for increasing concentrations of global warming pollution; and

3. **WHEREAS**, the U.S. Building Sector has been shown to be the major consumer of fossil fuel and producer of global warming causing greenhouse gases; and

4. **WHEREAS**, the federal government through programs fostered within many of its key agencies and numerous state governments as well as municipalities across the U.S. have adopted high performance green building principles; and

5. **WHEREAS**, a recent study completed by Lawrence Berkeley National Laboratory, the most definitive cost-benefit analysis of green buildings ever conducted, concluded that the financial benefits of green design are

between $50 and $70 per square foot, more than 10 times the additional cost associated with building green; and

6. **WHEREAS**, the large positive impact on employee productivity and health gains suggests that green building has a cost-effective impact beyond just the utility bill savings; and

7. **WHEREAS**, studies have indicated that student attendance and performance is higher in high performance school buildings; and

8. **WHEREAS**, recognizing that a building's initial construction costs represent only 20-30 percent of the building's entire costs over its 30 to 40 year life, emphasis should be placed on the "life cycle costs" of a public building rather than on solely its initial capital costs; and

9. **WHEREAS**, the construction industry in the U.S. represents a significant portion of our economy and a significant portion of the building industry is represented by small business and an increase in sustainable building practices will encourage and promote new and innovative small business development throughout the nation; and

10. **WHEREAS**, the American Institute of Architects (AIA), the national professional organization representing architects has adopted a position statement calling for the immediate energy reduction of all new and renovated buildings to one-half the national average for that building type, with increased reductions of 10% every five years so that by the year 2030 all buildings designed will be carbon neutral, meaning they will use no fossil fuel energy.

11. **NOW, THEREFORE, BE IT RESOLVED** that the U.S. Conference of Mayors will encourage its members to adopt the following "2030 Challenge" for building performance targets:

    - New construction of City buildings shall be designed to and achieve a minimum delivered fossil-fuel energy consumption performance standard of one half

the U.S. average for that building type as defined by the U.S. Department of Energy.

- Renovation projects of City buildings shall be designed to and achieve a minimum delivered fossil-fuel energy consumption performance standard of one half the U.S. average for that building type as defined by the U.S. Department of Energy.
- All other new construction, renovations, repairs, and replacements of City buildings shall employ cost-effective, energy-efficient, green building practices to the maximum extent possible; and

12. **NOW, THEREFORE, BE IT FURTHER RESOLVED** that the U.S. Conference of Mayors will work to increase the fossil-fuel reduction standard for all new buildings to carbon neutral by 2030, in the following increments:

    60% in 2010
    70% in 2015
    80% in 2020
    90% in 2025

    Carbon-neutral by 2030 (meaning new buildings will use no fossil fuel GHG emitting energy to operate); and

13. **BE IT FURTHER RESOLVED** that the U.S. Conference of Mayors will urge mayors from around the nation to join this effort by developing plans to fully implement the above mentioned targets as part of their procurement process and by establishing policies to insure compliance and measure results; and

14. **BE IT FURTHER RESOLVED** that the U.S. Conference of Mayors will urge mayors from around the nation to develop plans to fully implement the above mentioned targets for *all* new and renovated buildings within the City; and

15. **BE IT FINALLY RESOLVED** that the U.S. Conference of Mayors will work in conjunction with ICLEI Local Governments for Sustainability and other appropriate organizations to join this effort to develop plans to fully implement similar targets as mentioned above.

Project cost: Unknown

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Global Warming's Impact on California

California Climate Choices

A Fact Sheet of the Union of Concerned Scientists

Emissions Scenarios*	Summary of Projected Global Warming Impact, 2070 to 2099 (as compared with 1961–1990)	Statewide Temperature Rise
Higher Emissions: Rapid, fossil-fuel intensive growth		
Medium-High Emissions: Primarily fossil-fuel dependent growth with improvements in energy efficiency	• 70–80% loss in Sierra snowpack • 14–22 inches of sea level rise • 2.5–4 times as many heat wave days in major urban centers • 2–6 times as many heat-related deaths in major urban centers • 75–85% increase in days conducive to ozone formation • 2–2.5 times more critically dry years • 10% increase in electricity demand • 30% decrease in forest yields (pine) • 55% increase in the expected risk of large wildfires	Medium Warming Range: 5.5–8°F
Lower Emissions: Less fossil-fuel dependent growth with heavy investment in cleaner technologies	• 30–60% loss in Sierra snowpack • 6–14 inches of sea level rise • 2–2.5 times as many heat wave days in major urban centers • 2–3 times as many heat-related deaths for major urban centers • 25–35% increase in days conducive to ozone formation • Up to 1.5 times more critically dry years • 3–6 % increase in electricity demand • 7–14% decrease in forest yields (pine) • 10–35% increase in the risk of large wildfires	Lower Warming Range: 3.0–5.5°F

*Emissions scenarios defined by the Intergovernmental Panel on Climate Change.

Source: Cayan, D., A. Tnees, M. Hanemann, G. Franco, and B. Croes. 2006. *Climate Change Scenarios for California: an Overview.* California Climate Change Center report.

The More Global Warming Emissions are Reduced, the Less Severe the Consequences Will Be

CALIFORNIA HAS A CHOICE: continue emitting large quantities of global warming pollutants from its cars, power plants, and factories, or be a climate leader by making significant cuts in emissions and slowing global warming.

Heat-trapping emissions have to be greatly reduced in order to avoid the most severe consequences of global warming. If the industrialized world were to follow California's lead of reducing emissions 80 percent below 1990 levels by 2050, and industrializing nations followed thereafter, global emissions would remain in or below the lower emissions scenario (see table above), thus increasing the likelihood that California and the world would be on track to avoid the more severe effects of climate change. Emission reduction targets such as those set by the state of California could create the incentives and spur innovation necessary to lead a global transition to cleaner and more resource-efficient technologies. ■



Bureau of Land Management

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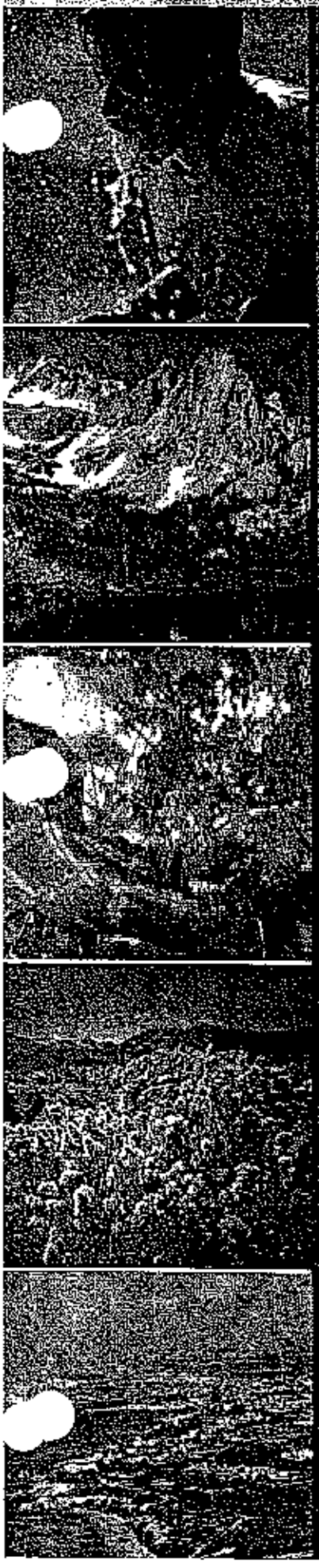


Our Changing Climate

Assessing the Risks to California

A Summary Report from
the California Climate Change Center

Because most global warming emissions remain in the atmosphere for decades or centuries, the choices we make today greatly influence the climate our children and grandchildren inherit. The quality of life they experience will depend on if and how rapidly California and the rest of the world reduce these emissions.

In California and throughout western North America, signs of a changing climate are evident. During the last 50 years, winter and spring temperatures have been warmer, spring snow levels in lower and mid-elevation mountains have dropped, snowpack has been melting one to four weeks earlier, and flowers are blooming one to two weeks earlier.



These regional changes are consistent with global trends. During the past 100 years, average temperatures have risen more than one degree Fahrenheit worldwide. Research indicates that much of this warming is due to human activities, primarily burning fossil fuels and clearing forests, that release carbon dioxide (CO_2) and other gases into the atmosphere, trapping in heat that would otherwise escape into space. Once in the atmosphere, these heat-trapping emissions remain there for many years—CO_2, for example, lasts about 100 years. As a result, atmospheric concentration of CO_2 has increased more than 30 percent above pre-industrial levels. If left unchecked, by the end of the century CO_2 concentrations could reach levels three times higher than pre-industrial times, leading to dangerous global warming that threatens our public health, economy and environment.

The latest projections, based on state-of-the-art climate models, indicate that if global heat-trapping emissions proceed at a medium to high rate, temperatures in California are expected to rise 4.7 to 10.5°F by the end of the century. In contrast, a lower emissions rate would keep the projected warming to 3 to 5.6°F. These temperature increases would have widespread consequences including substantial loss of snowpack, increased risk of large wildfires, and reductions in the quality and quantity of certain agricultural products. The state's vital resources and natural landscapes are already under increasing stress due to California's rapidly growing population, which is expected to grow from 35 million today to 55 million by 2050.

This document summarizes the recent findings of the California Climate Change Center's "Climate Scenarios" project, which analyzed a range of impacts that projected rising temperatures would likely have on California. The growing severity of the consequences as temperature rises underscores the importance of reducing emissions to minimize further warming. At the same time, it is essential to identify those consequences that may be unavoidable, for which we will need to develop coping and adaptation strategies.

In 2003, the California Energy Commission's Public Interest Energy Research (PIER) program established the California Climate Change Center to conduct climate change research relevant to the state. This center is a virtual organization with three research activities at Scripps Institution of Oceanography and the University of California, Berkeley complemented by a number of research institutions. Priority research areas defined in PIER's five-year Climate Change Research Plan are monitoring, analysis and modeling of climate, analysis of options to reduce greenhouse gas emissions, assessment of physical impacts and of adaptation strategies, and analysis of the economic consequences of both climate change impacts as well as the efforts designed to reduce emissions.

Executive Order S-3-05, signed by Governor Arnold Schwarzenegger on June 1, 2005, called for the California Environmental Protection Agency (CalEPA) to prepare biennial science reports on the potential impact of continued global warming on certain sectors of the California economy. CalEPA entrusted PIER and its California Climate Change Center to lead this effort. The "Climate Scenarios" analysis summarized here is the first of these biennial science reports, and is the product of a multi-institution collaboration among the California Air Resources Board, California Department of Water Resources, California Energy Commission, CalEPA and the Union of Concerned Scientists.

Cover photos: Tsunsen Photo (2004) from top to bottom; Photo: Paul Sakuma; iStockphoto; IndexStock; Picturequest; iStockphoto; Above: Bureau of Land Management; Background: IndexStock

California's Future Climate

California's climate is expected to become considerably warmer during this century. How much warmer depends on the rate at which human activities, such as the burning of fossil fuels, continue. The projections presented here illustrate the climatic changes that are likely from three different heat-trapping emissions scenarios (see figure below).

Projected Warming

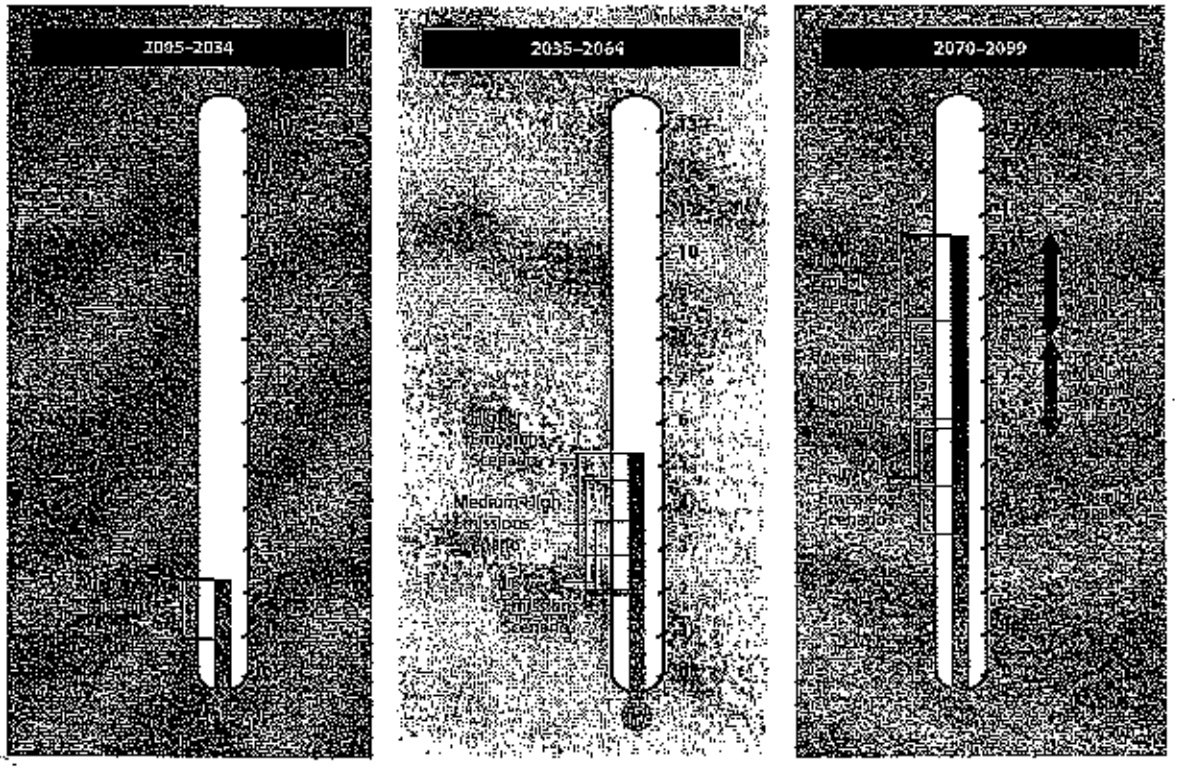
Temperatures are expected to rise substantially in all three emissions scenarios. During the next few decades, the three scenarios project average temperatures to rise between 1 and 2.3°F; however, the projected temperature increases begin to diverge at mid-century so that, by the end of the century, the temperature increases projected in the higher emissions scenario are approximately twice as high as those projected in the lower emissions scenario. Some climate models indicate that warming would be greater in summer than in winter, which would have widespread effects on ecosystem health, agricultural production, water use and availability, and energy demand.

Toward the end of the century, depending on future heat-trapping emissions, statewide average temperatures are expected to rise between 3 and 10.5°F. The analysis presented here examines the future climate under three projected warming ranges:[1]

- **Lower warming range:** projected temperature rises between 3 and 5.5°F
- **Medium warming range:** projected temperature rises between 5.5 and 8°F
- **Higher warming range:** projected temperature rises between 8 and 10.5°F

Precipitation

On average, the projections show little change in total annual precipitation in California. Furthermore, among several models, precipitation projections do not show a consistent trend during the next century. The Mediterranean seasonal precipitation pattern is expected to continue, with most precipitation falling during winter from North Pacific storms. One of the three climate models projects slightly wetter winters, and another projects slightly drier winters with a 10 to 20 percent decrease in total annual precipitation. However, even modest changes would have a significant impact because California ecosystems are conditioned to historical precipitation levels and water resources are nearly fully utilized.

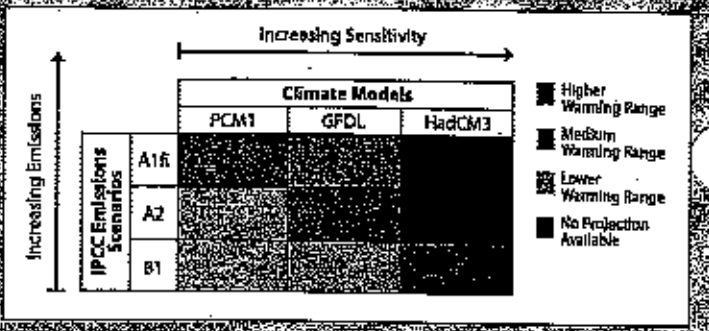


California is expected to experience dramatically warmer temperatures during the 21st century. This figure shows projected increases in statewide annual temperatures for three 30-year periods. Ranges for each emissions scenario represent results from state-of-the-art climate models.

[1] These warming ranges are for illustrative purposes only. These ranges were defined in the original Climate Scenarios analysis to capture the full range of projected temperature rise. The exact values for the warming ranges as presented in the original summary report are: lower warming range (3 to 5.4°F); medium warming range (5.5 to 7.9°F); and higher warming range (8 to 10.4°F).

Projecting Future Climate

How much temperatures rise depends in large part on how much and how quickly heat-trapping emissions accumulate in the atmosphere and how the climate responds to these emissions. The projections presented in this report are based on three different heat-trapping emissions scenarios and three climate models.



Emissions Scenarios

The three global emissions scenarios used in this analysis were selected from a set of scenarios developed by the Intergovernmental Panel on Climate Change's (IPCC) *Special Report on Emissions Scenarios* based on different assumptions about population growth and economic development (measured as gross domestic product).

- **The lower emissions scenario (B1)** characterizes a world with high economic growth and a global population that peaks by mid-century and then declines. There is a shift in values towards less fossil fuel intensive industries and the use of clean and resource efficient technologies. Heat trapping emissions peak about mid-century and then decline. CO$_2$ concentration approximately doubles relative to pre-industrial levels by 2100.
- **The medium-high emissions scenario (A2)** assumes continuous population growth and lower economic and technological growth. The income gap between now industrialized and developing parts of the world does not narrow. Heat trapping emissions increase throughout the century. Atmospheric CO$_2$ concentration approximately triples relative to pre-industrial levels, by 2100.
- **The higher emissions scenario (A1fi)** is a future with high fossil fuel intensive economic growth and a global population that peaks mid-century then declines. New and more efficient technologies are introduced throughout the century. Heat trapping emissions increase through the 21st century. CO$_2$ concentration more than triples relative to pre-industrial levels, by 2100.

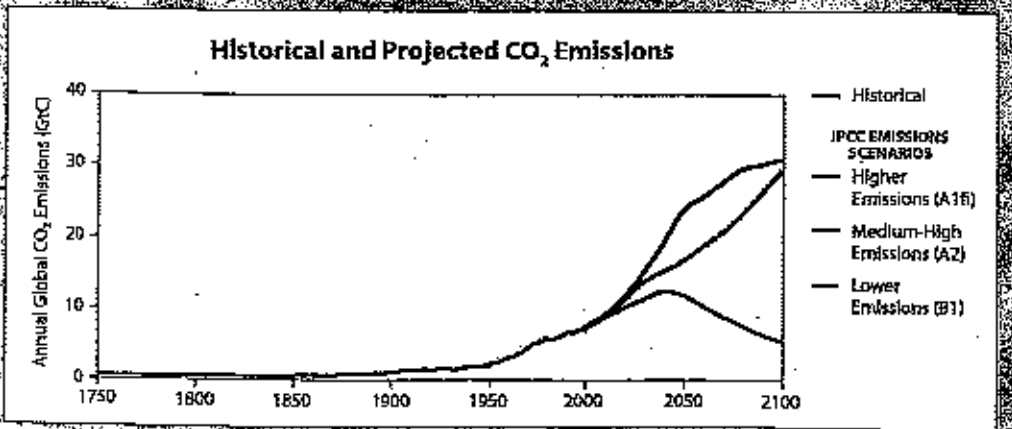
Climate Sensitivity

The three projections in this analysis represent a range of possible changes in the earth's climate that could occur as a result of increasing atmospheric CO$_2$ concentrations. These changes in climate will depend on, and be in response to, many complex physical processes including a number of feedbacks that might act to either amplify or lessen warming. For example, as temperatures rise, more water vapor will enter the atmosphere, which can trap more heat and further increase temperatures. This is a positive feedback. Changes created by this water vapor could, in turn, affect clouds, which can trap heat and contribute to warming, or reflect sunlight back into space, another positive feedback. Other feedbacks may be negative, such as increased CO$_2$ uptake by the oceans. Scientific understanding of these processes and their feedbacks is still evolving, but is not yet fully understood. The projections presented in this report are based on three different global climate models. The three global climate models used in this analysis are:

National Center for Atmospheric Research Parallel Climate Model (PCM1): low climate sensitivity

Geophysical Fluids Dynamics Laboratory (GFDL R30): medium climate sensitivity

United Kingdom Met Office Hadley Centre Climate Model Version 3 (HadCM3): medium-high climate sensitivity



As fossil fuels were burned on a large scale during the industrial age, they released CO$_2$ and other heat-trapping gases into the atmosphere. Other human activities, such as deforesting and land clearing, also released CO$_2$ into the atmosphere. Although the rapid industrial age increase in heat-trapping gases is the primary cause of recent climate change, natural factors also influence climate.

Public Health

Continued global warming will affect Californians' health by exacerbating air pollution, intensifying heat waves, and expanding the range of infectious diseases. The primary concern is not so much the change in *average* climate but the projected increase in *extreme* conditions, which pose the most serious health risks.

Poor Air Quality Made Worse

Californians currently experience the worst air quality in the nation, with more than 90 percent of the population living in areas that violate the state's air quality standard for either ground-level ozone or airborne particulate matter. These pollutants can cause or aggravate a wide range of health problems including asthma and other acute respiratory and cardiovascular diseases, and can decrease lung function in children. Combined, ozone and particulate matter contribute to 8,800 deaths and $71 billion in healthcare costs every year. If global background ozone levels increase as projected in some scenarios, it may become impossible to meet local air quality standards.

Higher temperatures are expected to increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, if temperatures rise to the medium warming range, there will be 75 to 85 percent more days with weather conducive to ozone formation in Los Angeles and the San Joaquin Valley, relative to today's conditions. This is more than twice the increase expected if temperature rises are kept in the lower warming range.

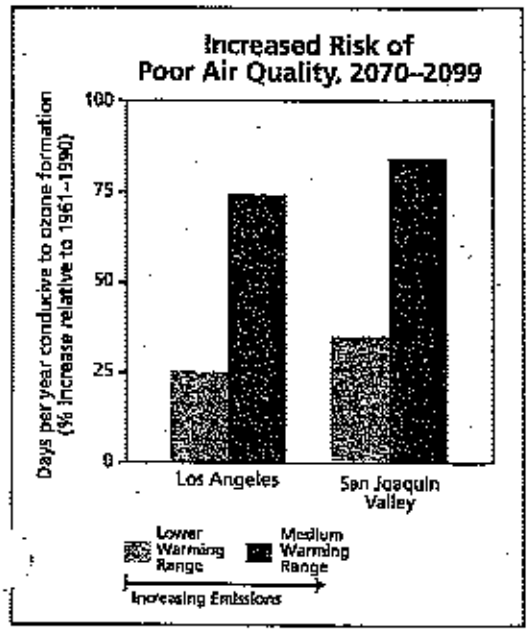
Air quality could be further compromised by increases in wildfires, which emit fine particulate matter that can travel long distances depending on wind conditions. The most recent analysis suggests that if heat-trapping gas emissions are not significantly reduced, large wildfires could become up to 55 percent more frequent toward the end of the century.

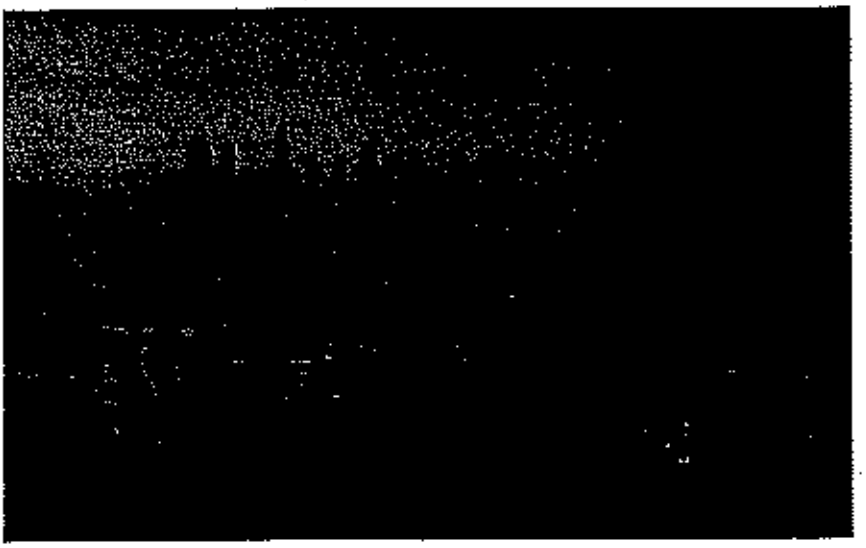
More Severe Heat

By 2100, if temperatures rise to the higher warming range, there could be up to 100 more days per year with temperatures above 90°F in Los Angeles and above 95°F in Sacramento. This is a striking increase over historical patterns (see chart on p. 6), and almost twice the increase projected if temperatures remain within or below the lower warming range.

As temperatures rise, Californians will face greater risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat. By mid century, extreme heat events in urban centers such as Sacramento, Los Angeles, and San Bernardino could cause two to three times more heat-related deaths than occur today. The members of the population most vulnerable to the effects of extreme heat include people who are already ill; children; the elderly;

As temperatures rise, Californians will face greater risk of death from dehydration, heat stroke, heart attack, and other heat-related illnesses.

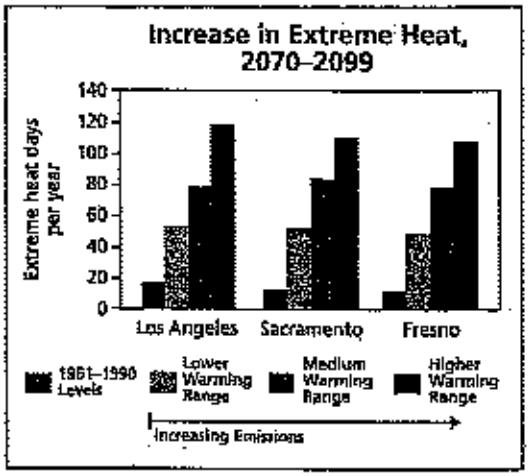


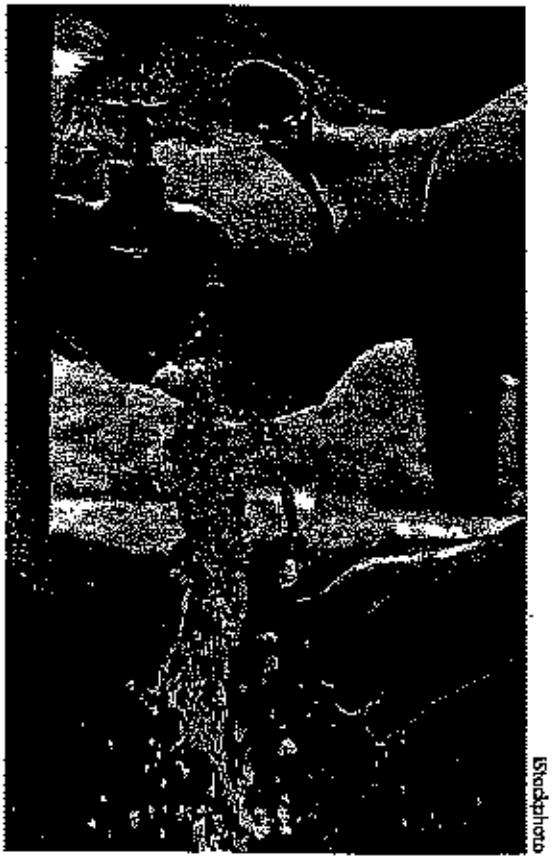


Cars and power plants emit pollutants that contribute to global warming and poor air quality. As temperatures increase, it will be increasingly difficult to meet air quality standards throughout the state.

and the poor, who may lack access to air conditioning and medical assistance.

More research is needed to better understand the potential effects of higher temperatures and the role that adaptation can play in minimizing these effects. For example, expanding air conditioner use can help people cope with extreme heat; however, it also increases energy consumption, which, using today's fossil fuel-heavy energy sources, would contribute to further global warming and air pollution.





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Water Resources



If global warming emissions continue unabated, Sierra Nevada snowpack could decline 70 to 90 percent, with cascading effects on winter recreation, water supply, and natural ecosystems.

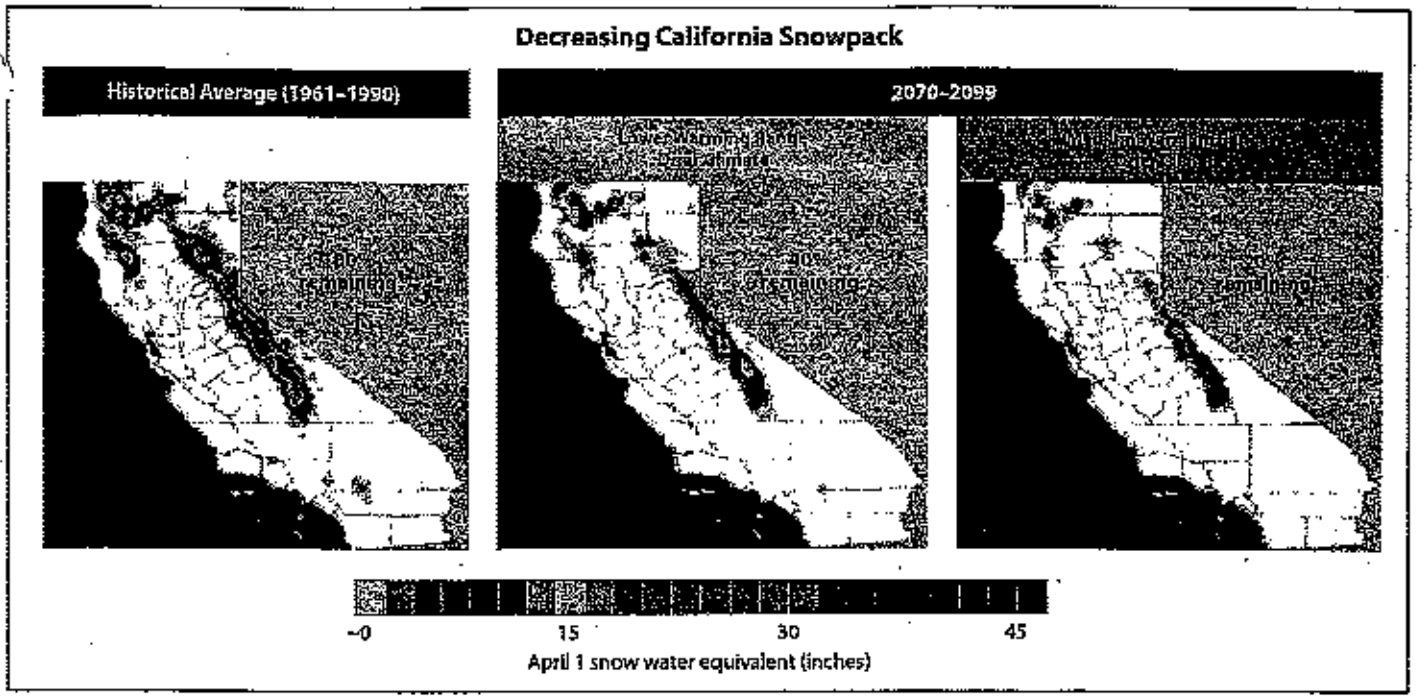
Most of California's precipitation falls in the northern part of the state during the winter while the greatest demand for water comes from users in the southern part of the state during the spring and summer. A vast network of man-made reservoirs and aqueducts capture and transport water throughout the state from northern California rivers and the Colorado River. The current distribution system relies on Sierra Nevada mountain snowpack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snowpack, increasing the risk of summer water shortages.

Decreasing Sierra Nevada Snowpack

If heat-trapping emissions continue unabated, more precipitation will fall as rain instead of snow, and the snow that does fall will melt earlier, reducing the Sierra Nevada spring snowpack by as much as 70 to 90 percent. How much snowpack will be lost depends in part on future precipitation patterns, the projections for which remain uncertain. However, even under wetter climate projections, the loss of snowpack would pose challenges to water managers, hamper hydropower generation, and nearly eliminate skiing and other snow-related recreational activities. If global warming emissions are significantly curbed and temperature increases are kept in the lower warming range, snowpack losses are expected to be only half as large as those expected if temperatures were to rise to the higher warming range.

Challenges in Securing Adequate Water Supplies

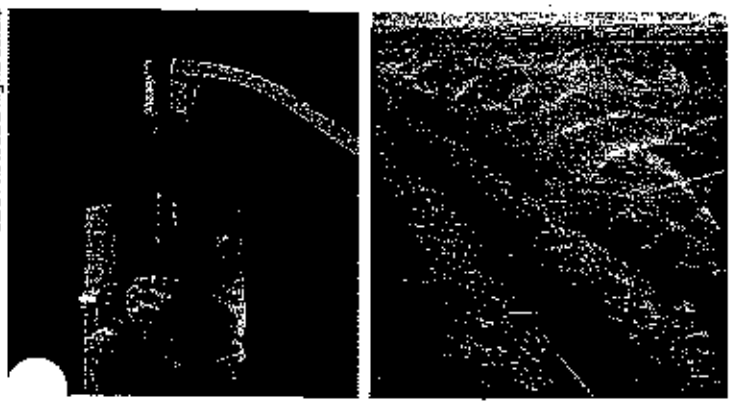
Continued global warming will increase pressure on California's water resources, which are already over-stretched by the demands of a growing



economy and population. Decreasing snowmelt and spring stream flows coupled with increasing demand for water resulting from both a growing population and hotter climate could lead to increasing water shortages. By the end of the century, if temperatures rise to the medium warming range and precipitation decreases, late spring stream flow could decline by up to 30 percent. Agricultural areas could be hard hit, with California farmers losing as much as 25 percent of the water supply they need.

Water supplies are also at risk from rising sea levels. An influx of saltwater would degrade California's estuaries, wetlands, and groundwater aquifers. In particular, saltwater intrusion would threaten the quality and reliability of the major state fresh water supply that is pumped from the southern edge of the Sacramento/San Joaquin River Delta.

Coping with the most severe consequences of global warming would require major changes in water management and allocation systems. As more winter precipitation falls as rain instead of snow, water managers will have to balance the need to fill constructed reservoirs for water supply and the need to maintain reservoir space for winter flood control. Some additional storage could be developed; however, the economic and environmental costs would be high.



Left: Photodisc. Right: Corbis

...ng temperatures, potentially exacerbated by decreasing precipitation, could increase the risk of water shortages in urban and agricultural sectors.

Potential Reduction in Hydropower

Higher temperatures will likely increase electricity demand due to higher air conditioning use. Even if the population remained unchanged, toward the end of the century annual electricity demand could increase by as much as 20 percent if temperatures rise into the higher warming range. (Implementing aggressive efficiency measures could lower this estimate.)

At the same time, diminished snow melt flowing through dams will decrease the potential for hydropower production, which now comprises about 15 percent of California's in-state electricity production. If temperatures rise to the medium warming range and precipitation decreases by 10 to 20 percent, hydropower production may be reduced by up to 30 percent. However, future precipitation projections are quite uncertain so it is possible that precipitation may increase and expand hydropower generation.

Loss of Winter Recreation

Continued global warming will have widespread implications for winter tourism. Declines in Sierra Nevada snowpack would lead to later starting and earlier closing dates of the ski season. Toward the end of the century, if temperatures rise to the lower warming range, the ski season at lower and middle elevations could shorten by as much as a month. If temperatures reach the higher warming range and precipitation declines, there might be many years with insufficient snow for skiing and snowboarding.



Agriculture

California is home to a $30 billion agriculture industry that employs more than one million workers. It is the largest and most diverse agriculture industry in the nation, producing more than 300 commodities including half the country's fruits and vegetables. Increased heat-trapping emissions are expected to cause widespread changes to this industry, reducing the quantity and quality of agricultural products statewide.

Although higher carbon dioxide levels can stimulate plant production and increase plant water-use efficiency, California farmers will face greater water demand for crops and a less reliable water supply as temperatures rise. Crop growth and development will change, as will the intensity and frequency of pest and disease outbreaks. Rising temperatures will likely aggravate ozone pollution, which makes plants more susceptible to disease and pests and interferes with plant growth.

To prepare for these changes, and to adapt to changes already under way, major efforts will be needed to move crops to new locations, respond to climate variability, and develop new cultivars and agricultural technologies. With adequate research and advance preparation, some of the consequences could be reduced.

Increasing Temperature

Plant growth tends to be slow at low temperatures, increasing with rising temperatures up to a threshold. However, faster growth can result in less-than-optimal development for many crops, so rising temperatures are likely to worsen the quantity and quality of yield for a number of California's agricultural products. Crops that are likely to be hard hit include:

Wine Grapes

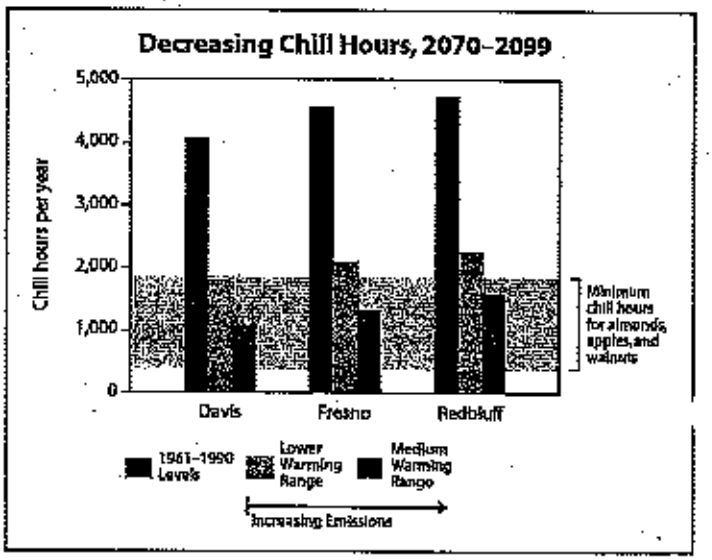
California is the nation's largest wine producer and the fourth-largest wine producer worldwide. High-quality wines produced throughout the Napa and Sonoma Valleys and along the northern and central coasts generate $3.2 billion in revenue each year. High temperatures during the growing season can cause premature ripening and reduce grape quality. Temperature increases are expected to have only modest effect on grape quality in most regions over the next few decades. However, toward the end of the century, wine grapes could ripen as much as one to two months earlier, which will affect grape quality in all but the coolest coastal locations (Mendocino and Monterey Counties).



IndexOpen

Fruits and Nuts

Many fruit and nut trees are particularly sensitive to temperature changes because of heat-accumulation limits and chill-hour requirements. Heat accumulation, which refers to the total hours during which temperatures reach between 45 and 95°F, is critical for fruit development. Rising temperatures could increase fruit development rates and decrease fruit size.



For example, peaches and nectarines developed and were harvested early in 2004 because of warm spring temperatures. The fruits were smaller than normal, which placed them in a lower quality category.

A minimum number of chill hours (hours during which temperatures drop below 45°F) is required for proper bud setting; too few hours can cause late or irregular bloom, decreasing fruit quality and subsequent marketable yield. California is currently classified as a moderate to high chill-hour region, but chill hours are diminishing in many areas of the state. If temperatures rise to the medium warming range, the number of chill hours in the entire Central Valley is expected to approach a critical threshold for some fruit trees.

Milk

California's $3 billion dairy industry supplies nearly one-fifth of the nation's milk products. High temperatures can stress dairy cows, reducing milk production. Production begins to decline at temperatures as low as 77°F and can drop substantially as temperatures climb above 90°F. Toward the end of the century, if temperatures rise to the higher warming range, milk production is expected to decrease by up to 20 percent. This is more



Increasing temperatures will likely decrease the quantity and quality of some agricultural commodities, such as certain varieties of fruit trees, wine grapes, and dairy products.

than twice the reduction expected if temperatures stay within or below the lower warming range.

Expanding Ranges of Agricultural Weeds

Noxious and invasive weeds currently infest more than 20 million acres of California farmland, costing hundreds of millions of dollars annually in control measures and lost productivity. Continued climate change will likely shift the ranges of existing invasive plants and weeds and alter competition patterns with native plants. Range expansion is expected in many species while range contractions are less likely in rapidly evolving species with significant populations already established. Should range contractions occur, it is likely that new or different weed species will fill the emerging gaps.

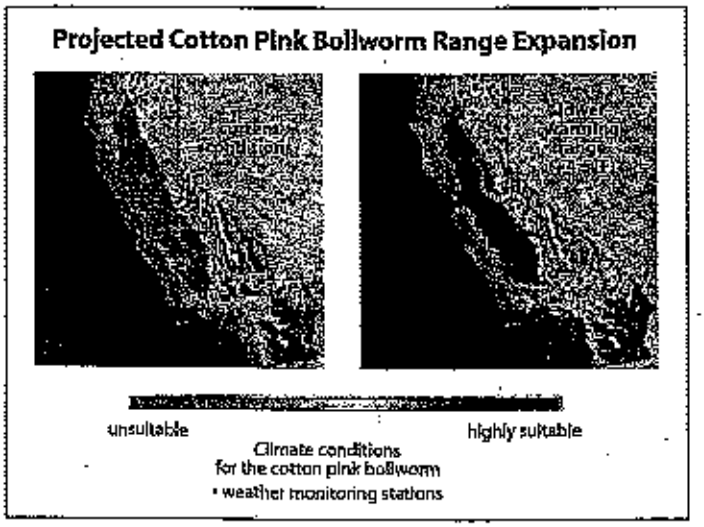
Increasing Threats from Pests and Pathogens

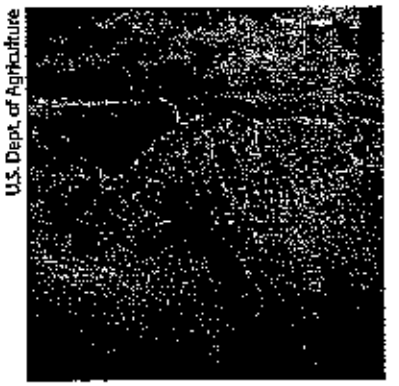
California farmers contend with a wide range of crop-damaging pests and pathogens. Continued climate change is likely to alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates. For example, the pink bollworm, a common pest of cotton crops, is currently a problem only in southern desert valleys because it cannot survive winter frosts elsewhere in the state. However, if winter temperatures rise 3 to 4.5°F, the pink bollworm's range would likely expand northward, which could lead to substantial economic and ecological consequences for the state.

Temperature is not the only climatic influence on pests. For example, some insects are unable to cope in extreme drought, while others cannot survive in extremely wet conditions. Furthermore, while warming speeds up the lifecycles of many insects, suggesting that pest problems could increase, some insects may grow more slowly as elevated CO_2 levels decrease the protein content of the leaves on which they feed.

Multiple and Interacting Stresses

Although the effects on specific crops of individual factors (e.g., temperatures, pests, water supply) are increasingly well understood, trying to quantify interactions among these and other environmental factors is challenging. For example, the quality of certain grape varieties is expected to decline as temperatures rise. But the wine-grape industry also faces increasing risks from pests such as the glassy-winged sharpshooter, which transmits Pierce's disease. In 2002, this bacterial disease caused damage worth $13 million in Riverside County alone. The optimum temperature for growth of Pierce's disease is 82°F, so this disease is currently uncommon in the cooler northern and coastal regions of the state. However, with continued warming, these regions may face increased risk of the glassy-winged sharpshooter feeding on leaves and transmitting Pierce's disease.





As temperatures rise, the climate is expected to become more favorable for the pink bollworm (above), a major cotton pest in southern California. The pink bollworm's geographic range is limited by winter frosts that kill over-wintering dormant larvae. As temperatures rise, winter frosts will decrease, greatly increasing the winter survival and subsequent spread of the pest throughout the state.



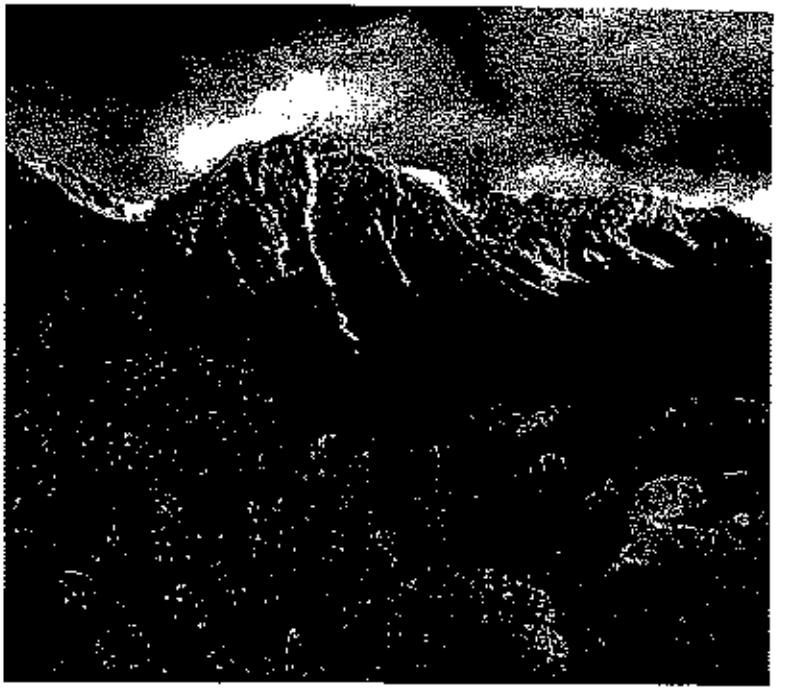
Forests and Landscapes

California is one of the most climatically and biologically diverse areas in the world, supporting thousands of plant and animal species. The state's burgeoning population and consequent impact on local landscapes is threatening much of this biological wealth. Global warming is expected to intensify this threat by increasing the risk of wildfire and altering the distribution and character of natural vegetation.

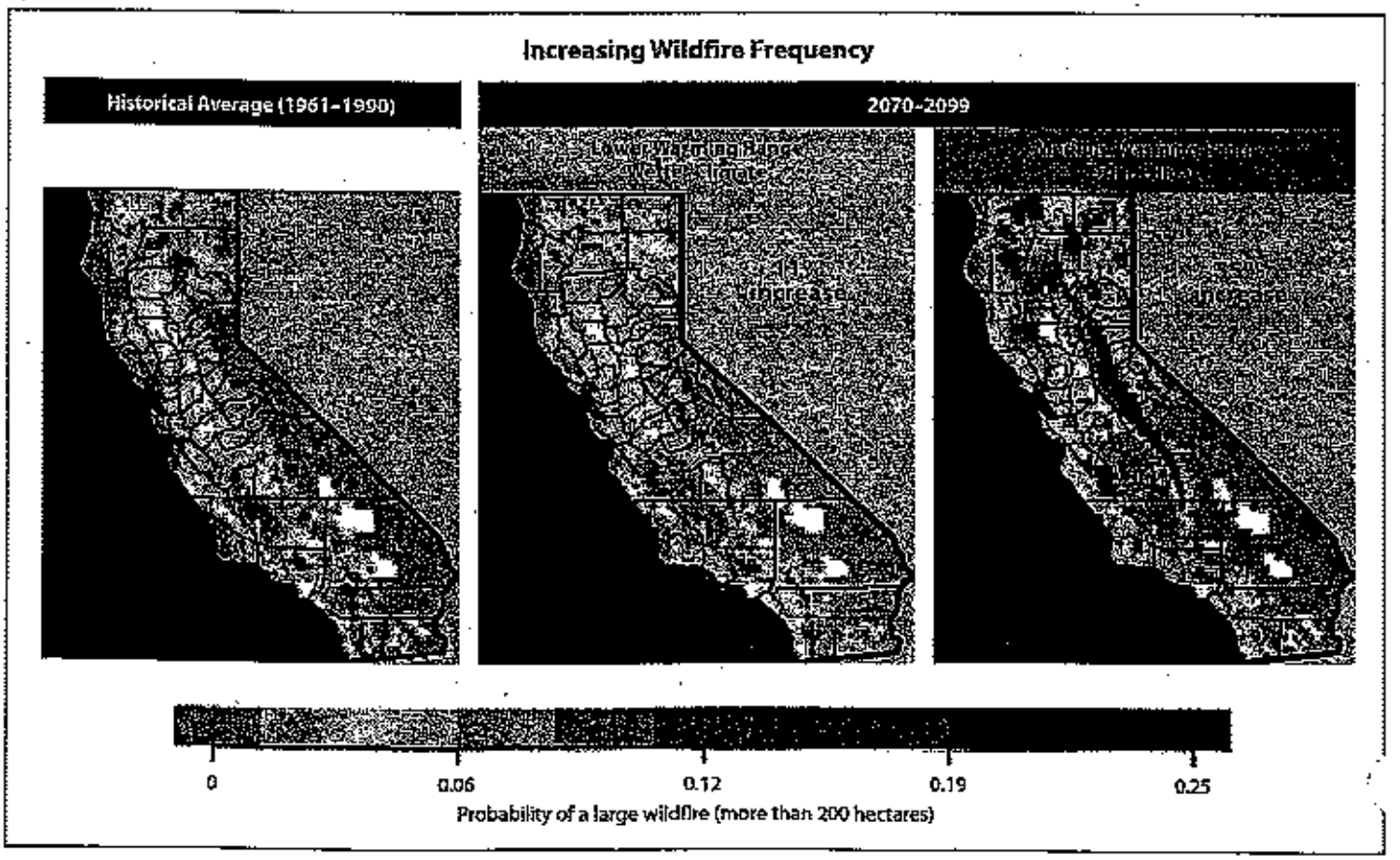
Increasing Wildfires

Fire is an important ecosystem disturbance. It promotes vegetation and wildlife diversity, releases nutrients into the soil, and eliminates heavy accumulation of underbrush that can fuel catastrophic fires. However, if temperatures rise into the medium warming range, the risk of large wildfires in California could increase by as much as 55 percent, which is almost twice the increase expected if temperatures stay in the lower warming range.

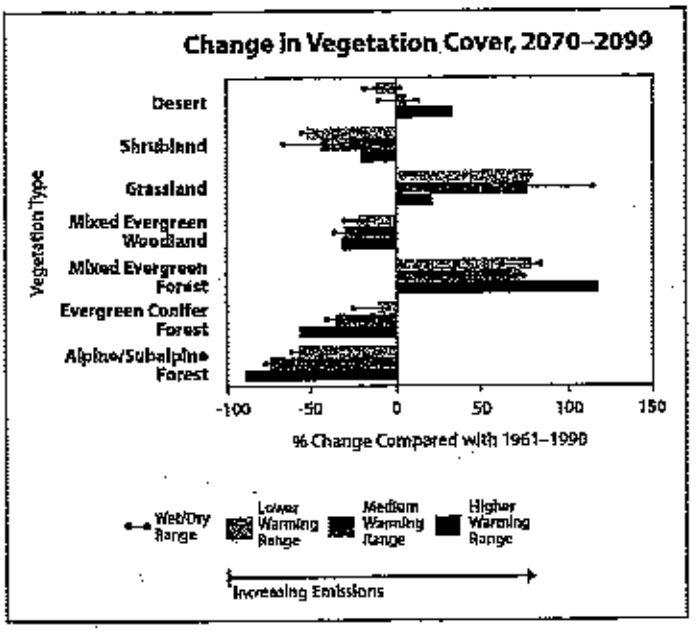
Because wildfire risk is determined by a combination of factors including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state. In many regions, wildfire activity will depend critically on future precipitation patterns. For

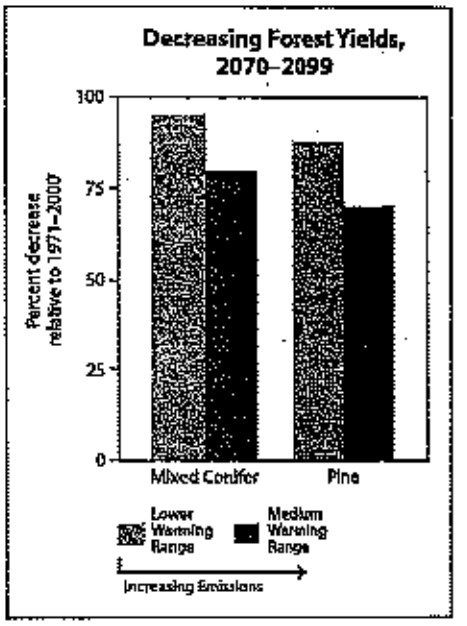


Global warming threatens alpine and subalpine ecosystems, which have no place to move as temperatures rise.



Vegetation cover over the 21st century will depend on both temperature and precipitation. The lower and medium warming range bars reflect vegetation cover under a wetter climate (blue) and a drier climate (brown) projected in the different climate models. For the higher warming range, only a drier climate was considered.





example, if precipitation increases as temperatures rise, wildfires in the grasslands and chaparral ecosystems of southern California are expected to increase by approximately 30 percent toward the end of the century because more winter rain will stimulate the growth of more plant "fuel" available to burn in the fall. In contrast, a hotter, drier climate could promote up to 90 percent more northern California fires by the end of the century by drying out and increasing the flammability of forest vegetation.

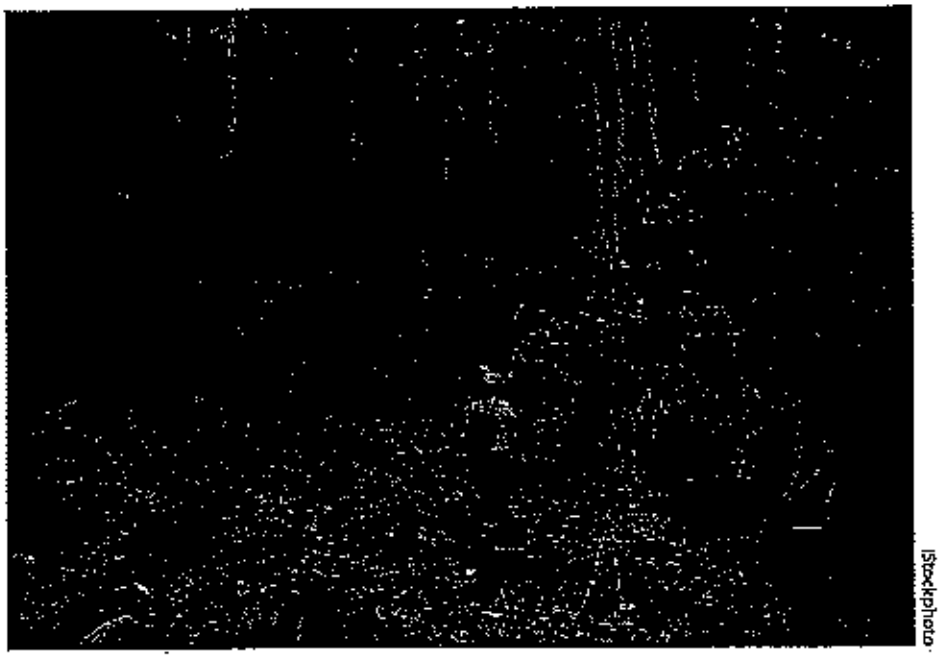
Shifting Vegetation

Land use and other changes resulting from economic development are altering natural habitats throughout the state. Continued global warming will intensify these pressures on the state's natural ecosystems and biological diversity. For example, in northern California, warmer temperatures are expected to shift dominant forest species from Douglas and White Fir to madrone and oaks. In inland regions, increases in fire frequency are expected to promote expansion of grasslands into current shrub and woodland areas. Alpine and subalpine ecosystems are among the most threatened in the state; plants suited to these regions have limited opportunity to migrate "up slope" and are expected to decline by as much as 60 to 80 percent by the end of the century as a result of increasing temperatures.

Declining Forest Productivity

Forestlands cover 45 percent of the state; 35 percent of this is commercial forests such as pine plantations. Recent projections suggest that continued global warming could adversely affect the health and productivity of California's forests. If average statewide temperatures rise to the medium warming range, the productivity of mixed conifer forests is expected to diminish by as much as 18 percent by the end of the century. Yield reductions from pine plantations are expected to be even more severe, with up to a 30 percent decrease by the end of the century.

The risk of large wildfires in California could increase by as much as 55 percent.



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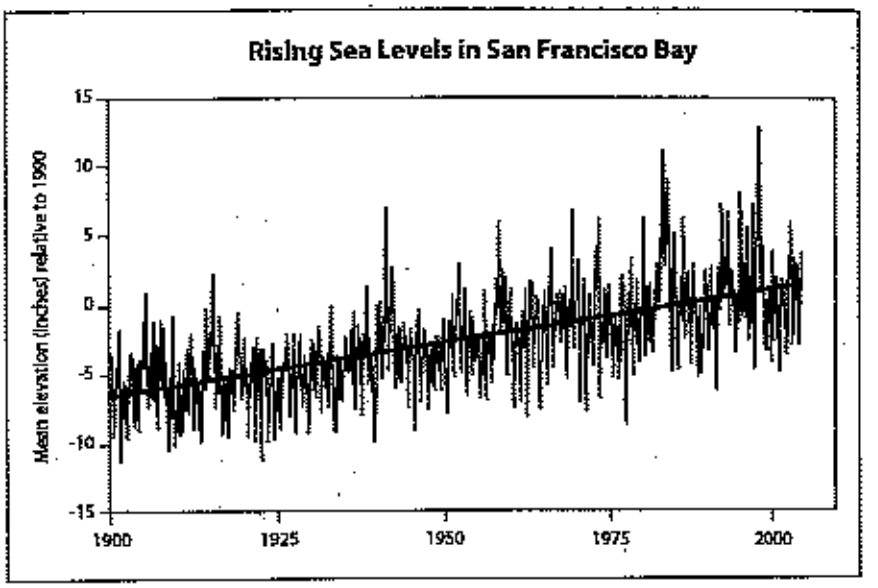
Rising Sea Levels

California's 1,100 miles of coastline are a major attraction for tourism, recreation, and other economic activity. The coast is also home to unique ecosystems that are among the world's most imperiled. As global warming continues, California's coastal regions will be increasingly threatened by rising sea levels, more intense coastal storms, and warmer water temperatures.

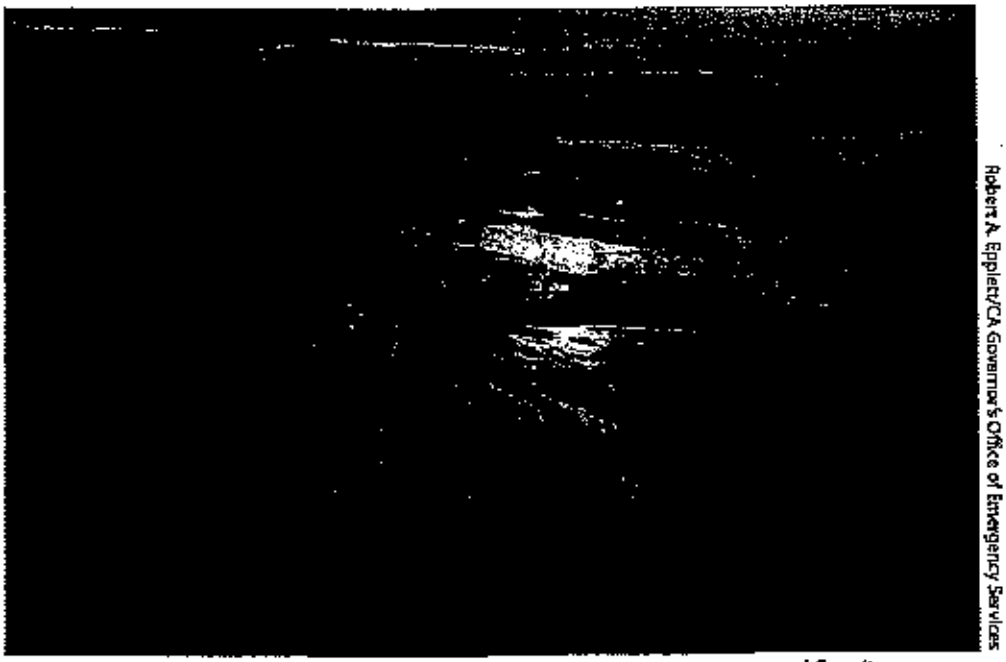
During the past century, sea levels along California's coast have risen about seven inches. If heat-trapping emissions continue unabated and temperatures rise into the higher warming range, sea level is expected to rise an additional 22 to 35 inches by the end of the century. Elevations of this magnitude would inundate coastal areas with salt water, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats.



Increasing Coastal Floods

The combination of increasingly severe winter storms, rising mean sea levels, and high tides is expected to cause more frequent and severe flooding, erosion, and damage to coastal structures. Many California coastal areas are at significant risk for flood damage. For example, the city of Santa Cruz is built on the 100-year floodplain and is only 20 feet above sea level. Although levees have been built to contain the 100-year flood, a 12-inch increase in sea levels (projected for the medium warming range of temperatures) would mean storm-surge-induced flood events at the 100-year level would likely occur once every 10 years.

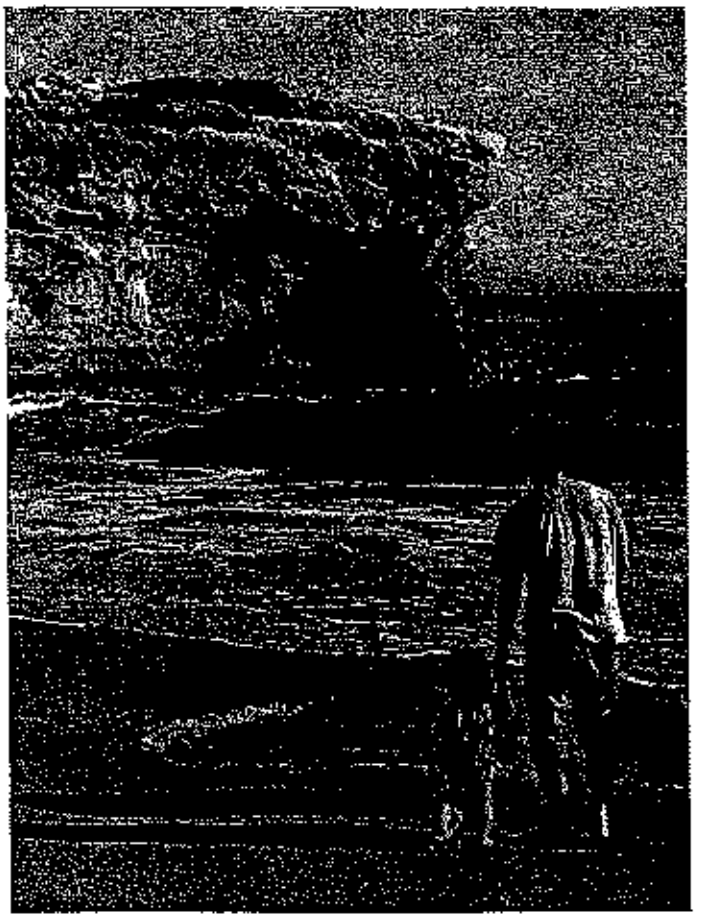
Flooding can create significant damage and enormous financial losses. Despite extensive engineering efforts, major floods have repeatedly breached levees that protect freshwater supplies and islands in the San Francisco Bay Delta as well as fragile marine estuaries and wetlands throughout the



Robert A. Eplett/CA Governor's Office of Emergency Services

Rising sea levels and more intense storm surges could increase the risk for coastal flooding.

Sea levels could rise up to three feet by the end of the century, accelerating coastal erosion, threating vital levees, and disrupting wetlands.



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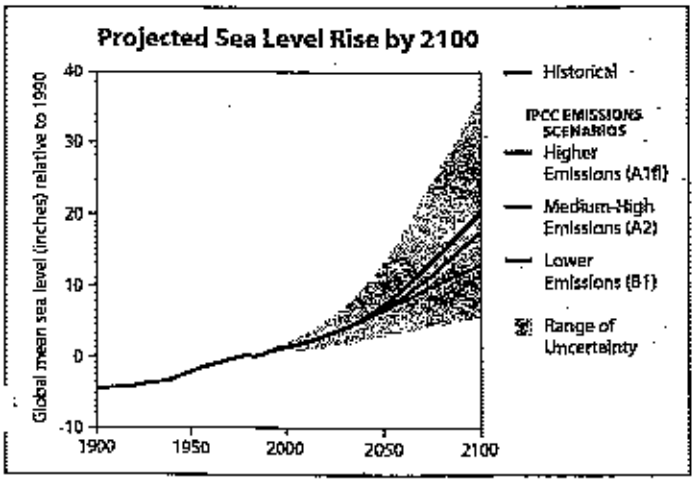
Many California beaches are threatened from rising sea levels and increased erosion, an expected consequence of continued global warming.

state. Continued sea level rise will further increase vulnerability to levee failures. Some of the most extreme flooding during the past few decades has occurred during El Niño winters, when warmer waters fuel more intense storms. During the winters of 1982–1983 and 1997–1998, for example, abnormally high seas and storm surges caused millions of dollars' worth of damage in the San Francisco Bay area. Highways were flooded as six-foot waves crashed over waterfront bulkheads, and valuable coastal real estate was destroyed.

Continued global warming will require major changes in flood management. In many regions such as the Central Valley, where urbanization and limited river channel capacity already exacerbate rising flood risks, flood damage and flood control costs could amount to several billion dollars.



Shrinking Beaches

Many of California's beaches may shrink in the future because of rising seas and increased erosion from winter storms. Currently, many beaches are protected from erosion through manmade sand replenishment (or "nourishment") programs, which bring in sand from outside sources to replace the diminishing supply of natural sand. In fact, many of the wide sandy beaches in southern California around Santa Monica, Venice, and Newport Beach were created and are maintained entirely by sand nourishment programs. As sea levels rise, increasing volumes of replacement sand will be needed to maintain current beach width and quality. California beach nourishment programs currently cost millions of dollars each year. As global warming continues, the costs of beach nourishment programs will rise, and in some regions beach replenishment may no longer be viable.

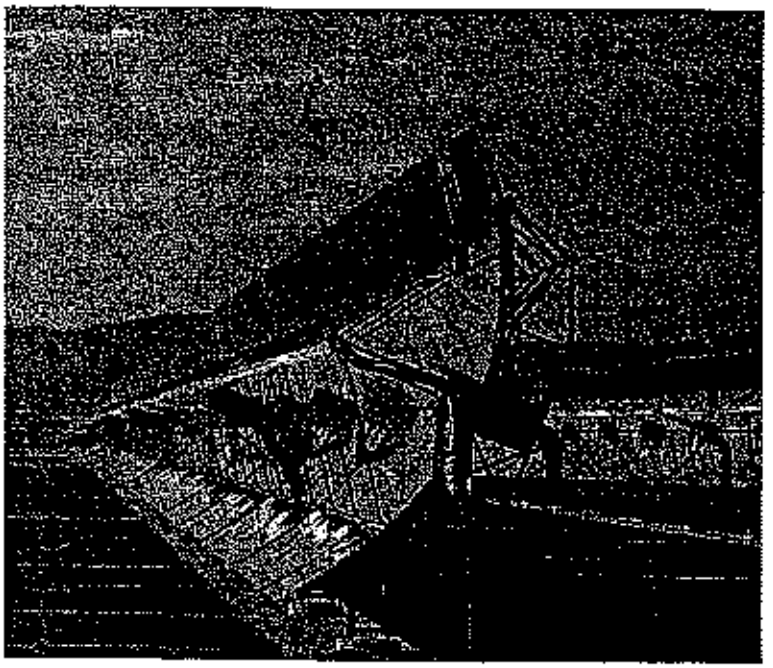
Multiple Causes of Coastal Flooding

Several factors play a role in sea level and coastal flooding, including tides, waves, temperature, and storm activity. Sea levels fluctuate daily, monthly, and seasonally, with the highest tides occurring winter and in summer during new and full moons. Sea levels often rise even higher during El Niño winters, when the eastern Pacific Ocean is warmer than usual and storm tracks patterns are strengthened.

Coastal flooding usually occurs during winter storms, which bring strong winds and high waves. Storm winds tend to raise water levels along the coast and produce high waves at the same time, compounding the effect of damaging waves—a doubling of wave height is equivalent to a fourfold increase in wave energy. When these factors coincide with high tides, the chances for coastal flooding are greatly heightened.

As sea levels rise, flood stages in the Sacramento/San Joaquin Delta of the San Francisco Bay estuary may also rise, putting increasing pressure on Delta levees. This threat may be particularly significant because recent estimates indicate the additional force exerted upon the levees is equivalent to the square of the water level rise. Estimates using historical observations and climate model projections suggest that extreme high water levels in the Delta will increase markedly if sea level rises at the historical rate. These extremes are most likely to occur during storm events, leading to more severe damage from waves and floods.

Top left & right: Photos.com. Bottom: CA Fuel Cell Partnership.







Cleaner energy and vehicle technologies can help California reduce global warming emissions, improve air quality, and protect public health.

Managing Global Warming

Continued global warming will have widespread and significant impacts on the Golden State. Solutions are available today to reduce emissions and minimize these impacts.

The projections presented in this analysis suggest that many of the most severe consequences that are expected from the medium and higher warming ranges could be avoided if heat-trapping emissions can be reduced to levels that will hold temperature increases at or below the lower warming range (i.e., an increase of no more than 5.5°F). However, even if emissions are substantially reduced, research indicates that some climatic changes are unavoidable. Although not the solution to global warming, plans to cope with these changes are essential.

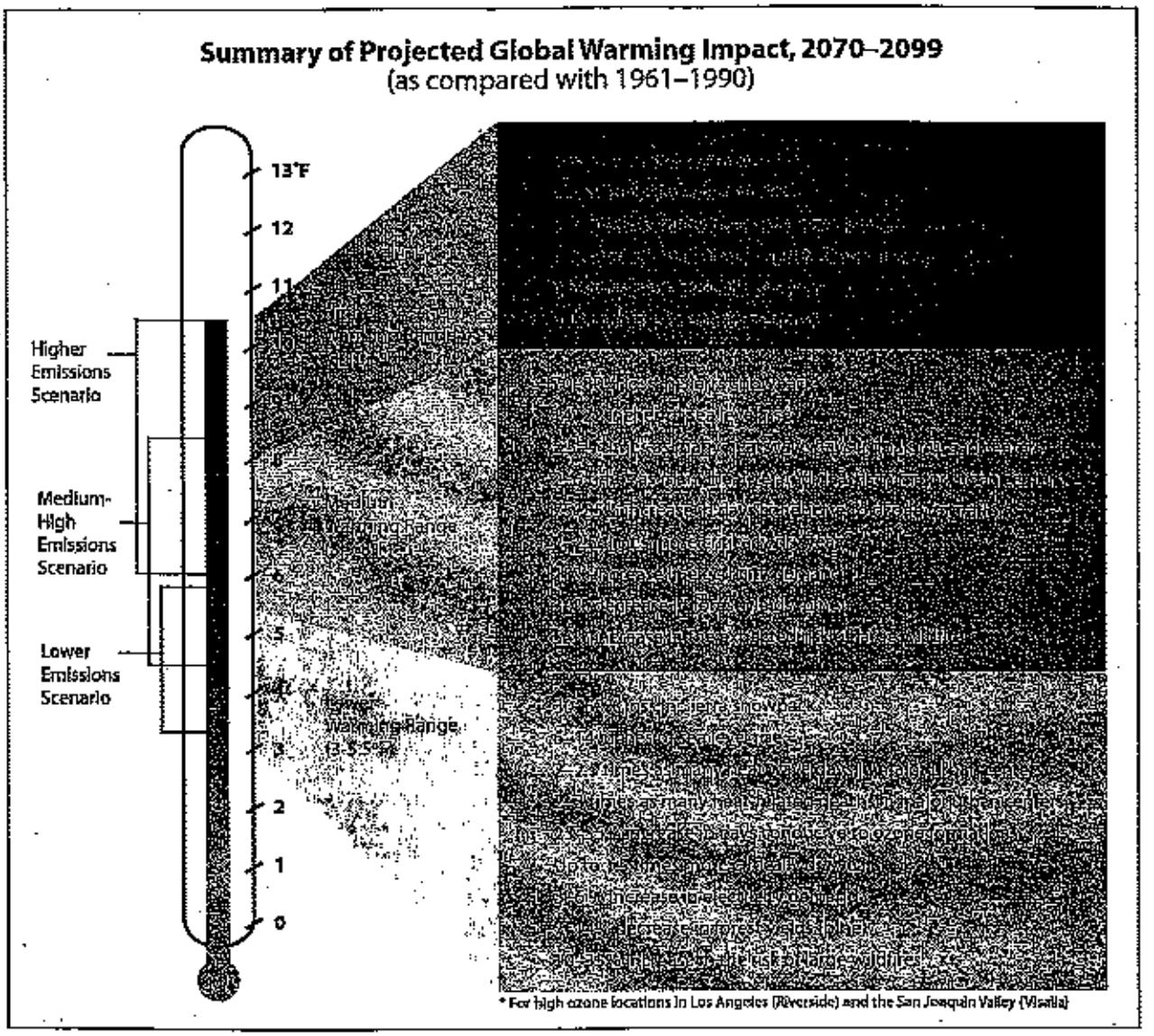
California's actions can drive global progress to address global warming.

Reducing Heat-Trapping Emissions

Reducing heat-trapping emissions is the most important way to slow the rate of global warming. On June 1, 2005, Governor Arnold Schwarzenegger signed an executive order (#S-3-05) that sets goals for significantly lowering the state's share of global warming pollution. The executive order calls for a reduction in heat-trapping emissions to 1990 levels by 2020 and for an 80 percent emissions reduction below 1990 levels by 2050. These emission reduction targets will help stimulate technological innovation needed to help transition to more efficient and renewable transportation and energy systems.

Coping with Unavoidable Climatic Changes

Because global warming is already upon us, and some amount of additional warming is inevitable, we must prepare for the changes that are already under way.



Preparing for these unavoidable changes will require minimizing further stresses on sensitive ecosystems and implementing management practices that integrate climate risks into long-term planning strategies.

California's Leadership

California has been a leader in both the science of climate change and in identifying solutions. The California Climate Change Center is one of the first—and perhaps the only—state-sponsored research institution in the nation dedicated to climate change research, and other state agencies such as the Air Resources Board support similar research. Continuing this strong research agenda is critical for developing effective strategies for addressing global warming in California.

The state has also been at the forefront of efforts to reduce heat-trapping emissions, passing precedent-setting policies such as aggressive standards for tailpipe emissions, renewable energy, and energy efficiency. However, existing policies are not likely to be sufficient to meet the ambitious emission reduction goals set by the governor. To meet these ambitious goals California will need to build on its legacy of environmental leadership and develop new strategies and technologies to reduce emissions.

By reducing heat-trapping emissions, severe consequences can be avoided.

California alone cannot stabilize the climate. However, the state's actions can drive global progress. If the industrialized world were to follow the emission reduction targets established in California's executive order, and industrializing nations reduced emissions according to the lower emissions path (B1) presented in this analysis, we would be on track to keep temperatures from rising to the medium or higher (and possibly even the lower) warming ranges and thus avoid the most severe consequences of global warming.

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THE INDEPENDENT

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Global warming: passing the 'tipping point'

Our special investigation reveals that critical rise in world temperatures is now unavoidable

By Michael McCarthy, Environment Editor

Published: 11 February 2006

...ucial global warming "tipping point" for the Earth, highlighted only last week by the British Government, has already been ...sed, with devastating consequences.

Research commissioned by The Independent reveals that the accumulation of greenhouse gases in the atmosphere has now crossed a threshold, set down by scientists from around the world at a conference in Britain last year, beyond which really dangerous climate change is likely to be unstoppable.

The implication is that some of global warming's worst predicted effects, from destruction of ecosystems to increased hunger and water shortages for billions of people, cannot now be avoided, whatever we do. It gives considerable force to the contention by the green guru Professor James Lovelock, put forward last month in The Independent, that climate change is now past the point of no return.

The danger point we are now firmly on course for is a rise in global mean temperatures to 2 degrees above the level before the Industrial Revolution in the late 18th century.

At the moment, global mean temperatures have risen to about 0.6 degrees above the pre-industrial era - and worrying signs of climate change, such as the rapid melting of the Arctic ice in summer, are already increasingly evident. But a rise to 2 degrees would be far more serious.

By that point it is likely that the Greenland ice sheet will already have begun irreversible melting, threatening the world with a sea-level rise of several metres. Agricultural yields will have started to fall, not only in Africa but also in Europe, the US and Russia, putting up to 200 million more people at risk from hunger, and up to 2.8 billion additional people at risk of water shortages for both drinking and irrigation. The Government's conference on Avoiding Dangerous Climate Change, held at the UK Met Office in Exeter a year ago, highlighted a clear threshold in the accumulation of greenhouse gases such as carbon dioxide (CO_2) in the atmosphere, which should not be surpassed if the 2 degree point was to be avoided with "relatively high certainty".

This was for the concentration of CO_2 and other gases such as methane and nitrous oxide, taken together in their global warming effect, to stay below 400ppm (parts per million) in CO_2 terms - or in the jargon, the "equivalent concentration" of CO_2 should remain ... that level.

The warning was highlighted in the official report of the Exeter conference, published last week. However, an investigation by The Independent has established that the CO2 equivalent concentration, largely unnoticed by the scientific and political communities, has now risen beyond this threshold.

This number is not a familiar one even among climate researchers, and is not readily available. For example, when we put the question to a very senior climate scientist, he said: "I would think it's definitely over 400 - probably about 420." So we asked one of the world's leading experts on the effects of greenhouse gases on climate, Professor Keith Shine, head of the meteorology department at the University of Reading, to calculate it precisely. Using the latest available figures (for 2004), his calculations show the equivalent concentration of C02, taking in the effects of methane and nitrous oxide at 2004 levels, is now 425ppm. This is made up of CO2 itself, at 379ppm; the global warming effect of the methane in the atmosphere, equivalent to another 40ppm of CO2; and the effect of nitrous oxide, equivalent to another 6ppm of CO2.

The tipping point warned about last week by the Government is already behind us.

"The passing of this threshold is of the most enormous significance," said Tom Burke, a former government adviser on the green issues, now visiting professor at Imperial College London. "It means we have actually entered a new era - the era of dangerous climate change. We have passed the point where we can be confident of staying below the 2 degree rise set as the threshold for danger. What this tells us is that we have already reached the point where our children can no longer count on a safe climate."

The scientist who chaired the Exeter conference, Dennis Tirpak, head of the climate change unit of the OECD in Paris, was even more direct. He said: "This means we will hit 2 degrees [as a global mean temperature rise]."

Professor Burke added: "We have very little time to act now. Governments must stop talking and start spending. We already have the technology to allow us to meet our growing need for energy while keeping a stable climate. We must deploy it now. Doing so will cost less than the Iraq war so we know we can afford it."

The 400ppm threshold is based on a paper given at Exeter by Malte Meinhausen of the Swiss Federal Institute of Technology. Dr Meinhausen reviewed a dozen studies of the probability of exceeding the 2 degrees threshold at different CO2 equivalent levels. Taken together they show that only by remaining above 400 is there a very high chance of not doing so.

Some scientists have been reluctant to talk about the overall global warming effect of all the greenhouses gases taken together, because there is another consideration - the fact that the "aerosol", or band of dust in the atmosphere from industrial pollution, actually reduces the warming.

As Professor Shine stresses, there is enormous uncertainty about the degree to which this is happening, so making calculation of the overall warming effect problematic. However, as James Lovelock points out - and Professor Shine and other scientists accept - in the event of an industrial downturn, the aerosol could fall out of the atmosphere in a matter of weeks, and then the effect of all the greenhouse gases taken together would suddenly be fully felt.

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Global warming: the final verdict

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A study by the world's leading experts says global warming will happen faster and be more devastating than previously thought

Robin McKie, science editor
Sunday January 21, 2007
The Observer

Global warming is destined to have a far more destructive and earlier impact than previously estimated, the most authoritative report yet produced on climate change will warn next week.

A draft copy of the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, obtained by The Observer, shows the frequency of devastating storms - like the ones that battered Britain last week - will increase dramatically. Sea levels will rise over the century by around half a metre; snow will disappear from all but the highest mountains; deserts will spread; oceans become acidic, leading to the destruction of coral reefs and atolls; and deadly heatwaves will become more prevalent.

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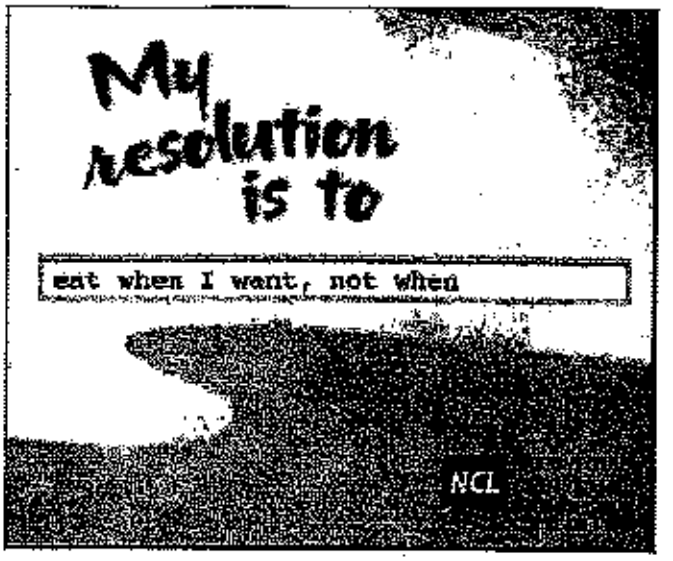

The impact will be catastrophic, forcing hundreds of millions of people to flee their devastated homelands, particularly in tropical, low-lying areas, while creating waves of immigrants whose movements will strain the economies of even the most affluent countries.

'The really chilling thing about the IPCC report is that it is the work of several thousand climate experts who have widely differing views about how greenhouse gases will have their effect. Some think they will have a major impact, others a lesser role. Each paragraph of this report was therefore argued over and scrutinised intensely. Only points that were considered indisputable survived this process. This is a very conservative document - that's what makes it so scary,' said one senior UK climate expert.

Climate concerns are likely to dominate international politics next month. President Bush is to make the issue a part of his state of the union address on Wednesday while the IPCC report's final version is set for release on 2 February in a set of global news conferences.

Although the final wording of the report is still being worked on, the draft indicates that scientists now have their clearest idea so far about future climate changes, as well as about recent events. It points out that:

· 12 of the past 13 years were the warmest since records began;

· ocean temperatures have risen at least three kilometres beneath the surface;

· glaciers, snow cover and permafrost have decreased in both hemispheres;

· sea levels are rising at the rate of almost 2mm a year;

· cold days, nights and frost have become rarer while hot days, hot nights and heatwaves have become more frequent.

And the cause is clear, say the authors: 'It is very likely that [man-made] greenhouse gas increases caused most of the average temperature increases since the mid-20th century,' says the report.

To date, these changes have caused global temperatures to rise by 0.6C. The most likely outcome of continuing rises in greenhouses gases will be to make the planet a further 3C hotter by 2100, although the report acknowledges that rises of 4.5C to 5C could be experienced. Ice-cap melting, rises in sea levels, flooding, cyclones and storms will be an inevitable consequence.

Past assessments by the IPCC have suggested such scenarios are 'likely' to occur this century. Its latest report, based on sophisticated computer models and more detailed observations of snow cover loss, sea level rises and the spread of deserts, is far more robust and confident. Now the panel writes of changes as 'extremely likely' and 'almost certain'.

And in a specific rebuff to sceptics who still argue natural variation in the Sun's output is the real cause of climate change, the panel says mankind's industrial emissions have had five times more effect on the climate than any fluctuations in solar radiation. We are the masters of our own destruction, in short.

There is some comfort, however. The panel believes the Gulf Stream will go on bathing Britain with its warm waters for the next 100 years. Some researchers have said it could be disrupted by cold waters pouring off Greenland's melting ice sheets, plunging western Europe into a mini Ice Age, as depicted in the disaster film The Day After Tomorrow.

The report reflects climate scientists' growing fears that Earth is nearing the stage when carbon dioxide rises will bring irreversible change to the planet. 'We are seeing vast sections of Antarctic ice disappearing at an alarming rate,' said climate expert Chris Rapley, in a phone call to The Observer from the Antarctic Peninsula last week. 'That means we can expect to see sea levels rise at about a metre a century from now on - and that will have devastating consequences.'

However, there is still hope, said Peter Cox of Exeter University. 'We are like alcoholics who have got as far as admitting there is a problem. It is a start. Now we have got to start drying out - which means reducing our carbon output.'

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DECEMBER 12, 2005

BATTLING CLIMATE CHANGE

The Race Against Climate Change

How top companies are reducing emissions of CO_2 and other greenhouse gases



Slide Show >>

On Nov. 21 power company executives from all over the country gathered in the Pit, a spacious General Electric () auditorium in Crotonville, N.Y., to meet with GE CEO Jeffrey R. Immelt and his team. The day was overcast and cold, but the discussion was about the warming climate. At one point in the meeting, David J. Slump, GE Energy's chief marketing executive, asked for an informal vote. How many of the 30 or so utility and GE business executives thought that, once President George W. Bush was no longer in office, the U.S. would impose mandatory curbs on the emissions of carbon dioxide and other greenhouse gases linked to global warming? Four out of five of them agreed. "Forget the science debate," says Cinergy Corp. () CEO James E. Rogers, who was at the meeting. "The regulations will change someday. And if we're not ready, we're in trouble."

The world is changing faster than anyone expected. Not only is the earth warming, bringing more intense storms and causing Arctic ice to vanish, but the political and policy landscape is being transformed even more dramatically. Already, certain industries are facing mandatory limits on emissions of carbon dioxide and other greenhouse gases in some of the 129 countries that have signed the Kyoto Protocol. This month representatives of those nations are gathering in Montreal to develop post-Kyoto plans. Meanwhile, U.S. cities and states are rushing to impose their own regulations.

A surprising number of companies in old industries such as oil and materials as well as high tech are preparing for this profoundly altered world. They are moving swiftly to measure and slash their greenhouse gas emissions. And they are doing it despite the Bush Administration's opposition to mandatory curbs.

This change isn't being driven by any sudden boardroom conversion to environmentalism. It's all about hard-nosed business calculations. "If we stonewall this thing to five years out, all of a sudden the cost to us and ultimately to our consumers can be gigantic," warns Rogers, who will manage 20 coal-fired power plants if Cinergy's pending merger with Duke Energy is completed next year.

One new twist in the whole discussion of global warming is the arrival of a corps of sharp-pencilled financiers. Bankers, insurers, and institutional investors have begun to tally the trillions of dollars in financial risks that climate change poses. They are now demanding that companies in which they

hold stakes (or insure) add up risks related to climate change and alter their business plans accordingly. For utilities like Cinergy that could mean switching billions in planned investments from the usual coal-fired power plants to new, cleaner facilities.

The pressure is forcing more players to wrestle with environmental risks, even if the coming regulations aren't right around the corner. As the debate over climate change shifts from scientific data to business-speak such as "efficiency investment" and "material risk," CEOs are suddenly understanding why climate change is important. "It doesn't matter whether carbon emission reductions are mandated or not," explains David Struhs, vice-president of environmental affairs at International Paper Co. () "Everything we're doing makes sense to our shareholders and to our board, regardless of what direction the government takes." The nation's biggest paper company, with $25.5 billion in sales, IP has upped its use of wood waste to 20% of its fuel mix, from 13% in 2002. That's cut both net CO_2 output and energy costs.

REALITY DAWNS

Adding to the pressure on CEOs, the public has largely accepted global warming as reality. And as in the case of IP, the economic logic can be compelling. Far from breaking the bank, cutting energy use and greenhouse emissions can actually fatten the bottom line and create new business opportunities, while simultaneously greening up companies' reputations. One company that has hiked its visibility on this changed landscape is GE. It formed a new Ecomagination division last May to offer everything from more efficient locomotives to advanced, low-emitting coal power plants.

Scores of companies have already taken action to fight climate change. Who are the leaders? In this special report, *BusinessWeek* has teamed up with the Climate Group, a British organization that serves as a clearing house for information on carbon reduction, and Innovest Strategic Value Advisors, a leading Wall Street green investment research firm. Together with a panel of expert judges drawn from academic institutions, we have identified and ranked the companies that have shown the greatest initiative in cutting their greenhouse gas emissions. We have also identified best practices, effective policies, and what kinds of results to expect.

Details about how the judges made their selections and a wealth of material on the companies and individuals in the rankings can be found at businessweek.com/go/carbon. The lists feature some gold-plated names: Citigroup () is working with Fannie Mae () to encourage sales of energy-efficient homes. IBM () saved hundreds of millions of dollars by cutting energy use, while Unilever managed to slash its greenhouse gas output by more than 10% in a single year.

Topping the company ranking is an experienced hand at making the most out of changing regulations, DuPont (). Back in the mid-1980s, DuPont created a profitable business selling substitutes for chlorofluorocarbon (CFC) refrigerants that were destroying the earth's protective ozone layer. Tackling climate change was a natural extension of that experience. After studying the data, "we came to the conclusion that the science was compelling and that action should be taken," says DuPont Chairman and CEO Charles O. "Chad" Holliday Jr.

BEATING GOALS

In 1994, DuPont committed to cutting its gas emissions by 40% by the year 2000 from its 1990 levels. By 2000 the company had met its original target and set an even more ambitious one -- a 65% reduction by 2010. But the gains have been so dramatic that DuPont has already hit that goal too. It also uses 7% less energy than it did in 1990, despite producing 30% more goods. That has saved

billion.

Saving money and reducing risks are both powerful incentives, and they help explain why investors and insurers are pressuring CEOs to tackle climate change.

.surers in particular are staggered by their mounting bills for hurricanes, floods, fires, hailstorms, disease, heat waves, and crop loss. Many scientists agree that higher temperatures are causing more powerful storms and perhaps intensifying extreme weather events, ranging from drought and wild fires to ice storms.

Even tiny weather changes bring awesome costs. A slight uptick in intense storm activity could boost annual wind-related insured losses, to as much as $150 billion a year -- an increase equivalent to two or three Hurricane Andrews in an average season, according to a 2005 study by the Association of British Insurers. Indeed, insured losses from catastrophic weather events have already increased fifteenfold in the past 30 years. "Risk of climate change is real. It's here. It's affecting our business today," says John Coomber, CEO of insurer Swiss Re.

Rising temperatures aren't the only factor in the increasing toll from weather-related disasters, of course. Development along coastlines and other high-vulnerability areas is surging, concedes Evan Mills, an energy scientist at the U.S. Energy Dept.'s Lawrence Berkeley National Laboratory. But overall, "weather-related losses are becoming more erratic and growing much faster than such shifts can explain," he says.

The insurance exposure extends beyond weather events to management decisions. Corporate directors and officers are protected from personal liability for mismanagement by so-called D&O policies. If executives at companies that hold the policies don't take stock of their environmental risk ›osure, they could be on the firing line for mismanagement -- with insurers picking up the tab. Says Chris Walker, managing director of Swiss Re's Greenhouse Gas Risk Solutions: "Property. Life. Health. Crops. D&O -- you name it. It's the perfect storm for insurers."

That's why climate change is causing insurance companies to ally with institutional investors, banks, and rating agencies. Together they are pushing companies to start thinking about greenhouse emissions as a material risk, just like other forms of financial risk that can impair future earnings. JPMorgan Chase & Co. (), for instance, is helping analysts and bankers model the impact of carbon on the banks' clients. "Global warming is on the radar screen of a lot of financial institutions," said Denise Furey, senior director of Fitch Ratings Ltd., at a recent climate conference.

The specter of new regulations on carbon emissions has already galvanized executives at Alcoa Inc. (), another company on the *BusinessWeek*/Climate Group list. To reduce its greenhouse emissions and save energy, too, Alcoa improved a key step in the aluminum production process, helping to cut total greenhouse gas output by 25%.

A handful of big coal burners have also leaped to the forefront. American Electric Power (), Cinergy, and TXU () all did detailed studies of the risks posed by climate change -- and by expected new rules. Their biggest challenge: planning new power plants for an uncertain future. At some point in the next 40 years -- the operating life of a plant -- the U.S. is certain to join in a round of international greenhouse discussions, says Michael G. Morris, CEO of AEP, the nation's biggest coal consumer: "That's clear in my mind, and in our board's mind." If the U.S. rules are similar to Europe's, where it

already costs a company more than $20 to release a ton of CO_2, utilities and rate payers could face billions in expenses.

That would force utilities to invest more in lower-carbon alternatives such as wind power, "clean" coal, or natural gas, which emits one-third as much carbon per kilowatt as coal. But executives need to know soon what rules they will have to meet. That's why many are in favor of mandatory limits -- though they hesitate to say it publicly because of the opposition in Washington.

ISOLATED

The President remains opposed to any policy that would require carbon cutbacks. Instead, the White House asserts that climate change can be tackled with voluntary action and with major investments in alternatives to fossil fuels, such as hydrogen.

Yet the White House is growing increasingly isolated. U.S. public opinion is shifting. In October, a Fox News poll found that 77% of Americans believe global warming is happening, and of those, 76% say it's at least partly due to human activity. That's making greenhouse gas reductions trendy: The 2006 Super Bowl in Detroit, for one, aims to offset all of the new CO_2 the championship generates by planting thousands of trees in the hills and towns near Ford Field.

More substantively, states are stepping into the breach with their own regulations. Nine Northeastern and Mid-Atlantic states have formed the Regional Greenhouse Gas Initiative (RGGI). By 2009 the initiative aims to set up a "cap-and-trade program" covering carbon dioxide emissions by nearly 200 power plants operating in Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. Companies would be given an upper limit on greenhouse gases they may release. If they can cut their emissions below that level, they can sell the unused allowances to companies that are emitting above their cap level.

This initiative could bring a major change in the politics of global warming. First, state action will compel more companies to seek nationwide regulation from Congress, explains Eileen Claussen, president of the Pew Center on Global Climate Change. "Companies don't want to see a patchwork of state regulations. As more states get involved, it ups the ante."

Plus, two likely candidates for the 2008 Republican Presidential nomination are on board. New York Governor George E. Pataki launched the regional initiative in 2003, and Massachusetts Governor Mitt Romney backs it in principle.

Meanwhile in Washington, the Republican-led Congress is opposing the Administration's hard line. On June 22, over the objections of the White House, the Senate voted 54-43 for a resolution calling on Congress to "enact a comprehensive and effective national program of mandatory market-based limits and incentives on emissions of greenhouse gases."

Some evangelical Christian groups, traditional allies of the Bush White House, have joined the call for action. "This used to be seen as just the passion of a few environmentalists on the left," says Jim Jewell of the National Association of Evangelicals, which includes 52 denominations serving 30 million parishioners. "But support on the issue has broadened. God's call on his people is to care for his creation."

In the battle in the nation's capital, it will help that some people believe God is on the side of

greenhouse gas reductions. For most business executives, though, the real driver is the bottom line. Often, the best way to slash emissions is simply to reduce energy consumption. Because carbon is basically a proxy for fossil energy, cutting carbon equals cutting costs, argues energy guru Amory B. Lovins, head of the Rocky Mountain Institute (RMI), a nonprofit energy and environment policy think tank: "Efficiency is cheaper than fuel."

That approach is what landed Geneva's STMicroelectronics, the world's No. 6 chipmaker, on the *BusinessWeek*/Climate Group ranking. Lovins and the RMI helped cut the company's energy use by 5% per year. Many changes were surprisingly low-tech, such as putting in larger air-conditioner ducts. That enabled air-circulating fans to do their job at half speed, using just a seventh of the energy. Last year, with $40 million in improvements, the company saved $173 million.

When mandatory regulations are issued they essentially put a price tag on carbon emissions. That obviously makes cleaner, more efficient projects more financially attractive, spurring new business opportunities. GE, for one, is seizing the moment with its new Ecomagination division. And scores of small companies are bringing new clean-technology innovations to market. Massachusetts Institute of Technology chemical engineer Isaac Berzin started GreenFuel Technologies Corp. to harness the power of algae to grab CO_2 from the exhaust of a gas-fired power plant. At a pilot site atop MIT's on-campus power station, the GreenFuel device cuts CO_2 by 82% on sunny days and by 50% on overcast days.

How far can this effort go? Some economists say cutting emissions and boosting efficiency will spur economic growth this century. The engineering challenges are immense and will require research and development investment in fields that have been relatively neglected until now: alternative energies, carbon sequestration, higher efficiency engineering, new lightweight materials for buildings and vehicles, and rebuilding old industrial and energy infrastructure with clean gear.

Yet despite the claims of the global-warming skeptics, the cost can be affordable. As the examples of companies in the *BusinessWeek*/Climate Group ranking show, there often is a boost to the bottom line. Far more substantial cuts are needed to make a real dent in the global-warming problem. And clearly, the developing nations need to be on board with cleaner technologies as well. But the news is that many companies are energetically tackling this growing environmental challenge.

By Adam Aston and Burt Helm, with Michael Arndt in Chicago, Amy Barrett in Philadelphia, and John Carey in Washington

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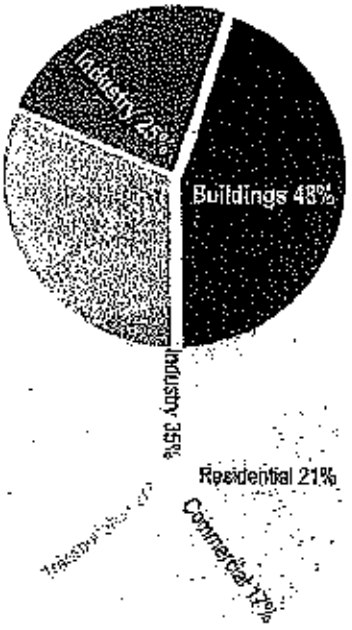
AIA Architects and Climate Change

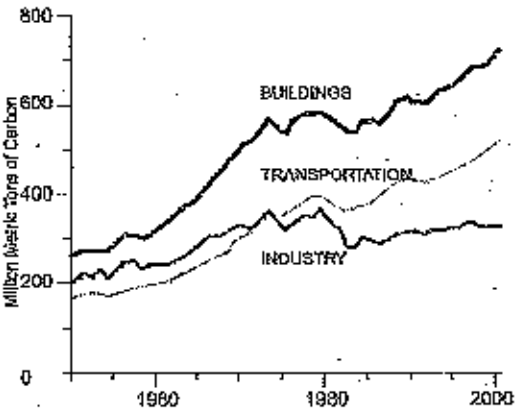


GRAPHIC 1: Combining the annual energy required to operate residential, commercial, and industrial buildings along with the embodied energy of industry-produced building materials like carpet, tile, glass, and concrete exposes buildings as the largest energy consuming and greenhouse gas emitting sector.

Key Points

- *The biggest source of emissions and energy consumption both in this country and around the globe: buildings.*
- *The Building Sector, as the major U.S. and global source of demand for energy and materials that produce by-product greenhouse gases, is poised to fuel the world's rush toward climate change.*

Buildings Account For Half Of All Greenhouse Gas Emissions



GRAPHIC 2: U.S. CO2 Emissions by Sector.

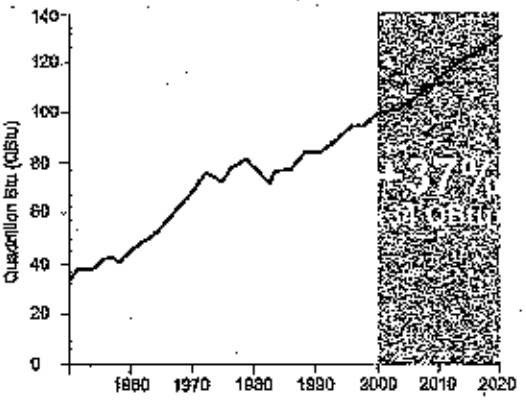
In our quest to dramatically cut greenhouse gas emissions and lessen our dependence on fossil fuels, we have overlooked the biggest source of emissions and energy consumption both in this country and around the globe: buildings and the energy they consume each year. Buildings and their construction account for nearly half of all the greenhouse gas emissions and energy consumed in this country each year. This includes energy used in the production and transportation of materials to building construction sites, as well as the energy used to operate buildings. Globally the percentage is even greater. The Building Sector is the key source of demand for energy and materials that produce by-product greenhouse gases.

U.S. annual energy consumption is projected to increase by 37% (34 quadrillion Btu) and greenhouse gas emissions by 36% over the next twenty years. Annual global energy consumption is projected to increase by 54% (230 quadrillion Btu) over this same period.

Building Sector Emissions Are Increasing Dramatically

Buildings have a lifespan that lasts for 50 to 100 years throughout which they consume energy and produce emissions. The Building Sector as the major U.S. and global greenhouse gas emitting sector, is poised to fuel the world's rush toward climate change. The U.S. alone is projected to need 1,300 to 1,900 new power plants over the next 20 years (about one power plant per week). Most of this new energy will be needed to operate buildings.

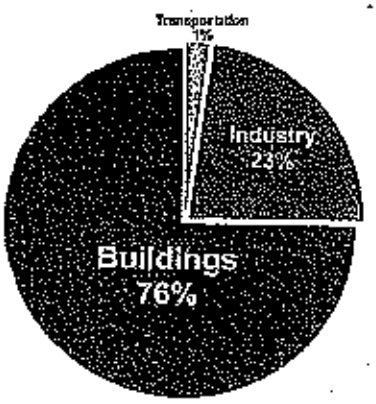
The United States will add 22 million buildings that will not only consume electricity produced at a central power plant, but also directly burn oil, natural gas and/or propane in boilers, furnaces and hot water heaters. In fact, 58% of end-use energy needed to operate a building is consumed by the burning of fuel onsite.



GRAPHIC 3: U.S. Energy Consumption Projections

1 quadrillion Btu is equal to annual energy output of 40 - 1,000MW power plants.

AIA Architects and Climate Change



GRAPHIC 4: 76% of all power plant generated electricity is used just to operate buildings.

Key Points

- *Architects know that buildings can be designed to operate with less than half the energy of today's average U.S. building at little or no additional cost*

- *By the year 2035, three quarters of the built environment in the U.S. will be either new or renovated.*

This Background Sheet was prepared in collaboration with Edward Mazria AIA, founder of Architecture 2030. For further information see www.architecture2030.org or contact: info@architecture2030.org. The AIA, through its Sustainable Design Task Force and its Committee on the Environment, is working to develop a detailed action plan to meet the greenhouse gas reduction goals set out above.

A Perspective On How To Curb Emissions

Scientists tell us that in order to avoid dangerous climate change we must keep global warming under 2°C above pre-industrial levels (we are currently at 0.7°C above pre-industrial levels). To avoid exceeding this threshold a way forward would involve:

- Promoting sustainable design including resource conservation to achieve a minimum 50 percent reduction from the current level of consumption of fossil fuels used to construct and operate new and renovated buildings by the year 2010.

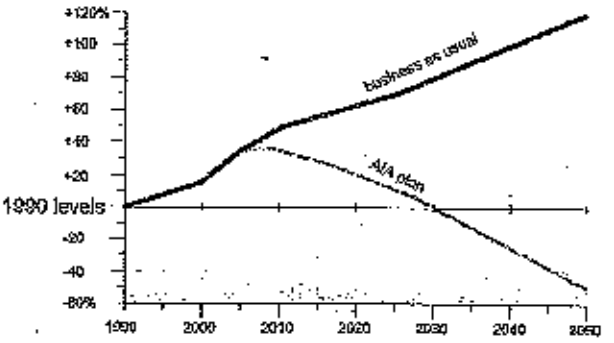
- Promoting further reductions of fossil fuel consumption by 10 percent or more in each of the following five year intervals so that the cumulative reduction from today's baseline is:

  60% in 2015
  70% in 2020
  80% in 2025
  90% in 2030
  carbon-neutral by 2035 (Meaning that the construction and operation of buildings will no longer require the consumption of fossil fuel energy or the emission of greenhouse gases.)

- Driving these reductions through: 1) creating building performance standards in building codes and standards to address private sector structures, and 2) creating governmental mandates that federal and state buildings meet energy efficiency targets.

- Supporting government action to use incentive-based regulatory means to reduce greenhouse gas emissions.

Architects know that buildings can be designed to operate with far less energy than today's average U.S. building at little or no additional cost. This is accomplished through proper siting, building form, glass properties and location, material selection and by incorporating natural heating, cooling and ventilation and day-lighting strategies.



GRAPHIC 5: By enacting a Building Sector initiative like this we can meet a greenhouse gas reduction target of 40% to 60% below 1990 levels by 2050.

With about 5 billion square feet (sf) of new construction, 5 billion sf of renovation and 1.75 billion sf of demolition taking place in the U.S. each year, by the year 2035, three quarters of the built environment in the U.S. will be either new or renovated. This transformation over the next 30 years represents a historic opportunity for the U.S. architecture and building community, with the support of the federal government, to lead in addressing greenhouse gas emission reductions.

Resubmitted 11/2006

NEXUS
REALTY GROUP, INC.

1241 North McDowell Boulevard • P.O. Box C • Petaluma • CA 94953
Fax: (707) 769-5282 • Phone: (707) 769-5280

May 2, 2005

Hand Delivered

Petaluma City Council
C/o Mike Bierman, City Manager
15 English Street
Petaluma, CA 94952

Dear City Council:

69

I would like to express my personal and professional concerns about the proposed Land Use Element of the Draft General Plan. In General, the land use classifications are too extreme at both ends of the density scale. A more balanced approach is more likely to be achieved given the market conditions and economic considerations behind development and redevelopment of property. I would like to again suggest that a comprehensive land use absorption study be completed in advance of approving the proposed land use map and completing the environmental impact report for the Draft General Plan.

A

B

I would appreciate it if the council would take a straw poll on each of the following concerns:

1. The Mixed Use land use designation is being over used and is too vague for land use planning. This land use designation should clearly define what percentage of the development shall be residential and what percentage shall be commercial. Fewer properties should be converted to Mixed Use particularly near the Urban Growth Boundary where the densities should be feathered.
2. The very low Land Use Densities outlined in the Rural Residential and Very Low Density Residential designations provide little motivation for properties to develop within the City Limits and will prevent us from achieving our workforce housing goals. Eliminate the Rural Residential and Very Low Density Residential land use designations. Give all residential lands along the urban limit line a Low-Density land use designation.
3. High Density Residential density of 18.1 to 30 dwelling units per acre can't be supported by the current infrastructure at most properties. Our streets, water lines, sewer lines, and utilities have limited capacities. Making long-term housing projections based on questionable infrastructure capacity will undermine the credibility of the land use element. It would be better to create

C

D

E

a High Density Residential Designation but only give it to existing developments, which have been built out with such a density. Require project proponents to obtain a High Density Residential Designation through a General Plan Land Use amendment after they have demonstrated that there is adequate infrastructure to support their project.

F

4. Feathering of Density should continue to be an important element in our new General Plan. Spot zoning and parcel specific land use designations should be discouraged. Also, high-density developments on lands near our Urban Growth Boundary should not be allowed.

G

5. There is no Land Use Designation, which allows for Bulk Retail. Uses such as Furniture Sales found in the Piner Road and Airway Drive areas of Santa Rosa should be allowed in Petaluma if we are hoping to reduce the outflow of sales tax revenues from our community. We should either create a new designation or modify an existing land use designation and zoning ordinance to make bulk retail a permitted principal use.

H

6. The Urban Separator designation has outlived its usefulness since the adoption of the Urban Growth Boundary and should be eliminated. The designation is not properly defined and the inconsistent application of both the designation and the implementation on projects such as the Southgate Development subjects the City to potential litigation. The City can preserve its goals by establishing a general plan policy and applying it consistently during the project approval process.

I

7. The name of the Business Park land use designation is confusing and does not share the same boundaries as the established business parks in Petaluma. The Office Land Use Designation should be retained.

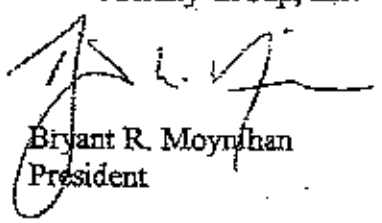
J

8. Too many properties are being converted from Industrial to Office land use designation, which will create non-conforming uses when the zoning ordinance is updated. If the goal is to encourage higher floor area ratios, the Industrial Land Use and underlying zoning should be adjusted to allow higher coverage.

While I doubt everyone will agree on every point. It would be good to provide the staff with a consensus on each of these issues. Unless a majority of the council gives clear direction, the staff proposal will be unchanged. I hope the end product will be well thought-out and sensitive to the growth needs of the community.

Thank you for your time and consideration.

Sincerely,
Nexus Realty Group, Inc.



Bryant R. Moynihan
President

O.W.L. FOUNDATION
Open Space Water Resource Protection Land Use
OWLFOUNDATION.NET

O.W.L. Foundation

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Ray Peterson
Eric Johnson
www.owlfoundation.net

12/3/06

Pamela Tuft
General Plan Manager
City of Petaluma
27 Howard Street
Petaluma, CA 94952

RE: Comments on Petaluma General Plan 2025 Draft Environmental Impact Report State Clearinghouse No. 2004082065

70

Dear Ms. Tuft;

The O.W.L. Foundation ("O.W.L.") submits this letter providing written comments on the Draft Environmental Impact Report ("DEIR") dated July 2006 for The City of Petaluma ("City") General Plan 2025. We have structured this comment letter to list our comments in numbered paragraph form, and we are requesting that the City prepare its responses in a form that corresponds to our numbered paragraphs. We assume that the City will respond fully to each of these comments in light of the strict requirements of CEQA, as discussed at the end of this letter.

UWMP Required

As a water supplier with more than 3,000 connections, the City is required by law[1] to produce an Urban Water Management Plan ("UWMP") every five years ending in 5 or zero. The City's UWMP was due by the end of December 2005 and has still failed to make an appearance, placing the City in violation of the Urban Water Management Planning Act[2]

A

[1] Water Code Sections 10610 - 10656
[2] ibid.

1390 N. McDowell Blvd., Ste G 360, Petaluma, CA 94954 * Tel. (707) 769-2008
owl@owlfoundation.net
California Non-Profit, 501(c)(3) organization

1. The DEIR contains no reference to a 2005 Urban Water Management Plan, either prepared by SCWA or the City of Petaluma. Please explain why the City has no UWMP. If the City deems an UWMP unnecessary, then please explain why an UWMP is not needed.

B 2. The City's General Plan EIR should state whether or not the City has a current Urban Water Management Plan. Besides not having an important water resource planning document available for the City and to the public, the lack of a current Urban Water Management Plan will negatively affect State funding opportunities including crucial aid for drought relief. Please explain what contingencies the City has adopted to meet water supply needs during a catastrophic cutoff of supplies during a drought, in lieu of state assistance.

3. According to the Restructured Agreement for Water Supply—the City of Petaluma is a party to this Agreement as signed by Mayor David Glass on May 15, 2006—we read:

> *"In order to mitigate against drought, earthquake, spills, temporary impairments and other events impacting the quantity or quality of water available from the Transmission System, and other emergencies that can befall an urban water supply, it is highly desirable that each Water Contractor achieve and maintain local production capacity capable of satisfying approximately forty percent of the Water Contractor's average day of the maximum month demand."*

C There is no evidence in the General Plan or the DEIR that the City of Petaluma has or will have a local production capacity capable of satisfying approximately forty percent of Petaluma's average day of the maximum month demand. Please describe the source for this local production capacity and how it will achieve the stated goal of supplying forty percent of the City's average day of the maximum month demand.

D 4. If the City does not have an Urban Water Management Plan, the combination of not having adequate backup water supply and disqualification from State drought assistance puts the City in a precariously risky position in regard to water supply. Please expand upon the rationale behind this unusual step.

SCWA Supplies

It appears that the City has dramatically overestimated future water supplies available to the Sonoma County Water Agency. For example, despite the acknowledgment of 3 groundwater wells operated by SCWA in the Santa Rosa Plain, page 8-2, the DEIR fails to mention that this groundwater basin, the Santa Rosa Plain Groundwater Basin, is in overdraft. E

Considerable evidence that the Santa Rosa Plain Groundwater Basin is in groundwater overdraft became part of the Administrative Record in *O.W.L. Foundation et. al. v. Rohnert Park et. al.* We are submitting the Administrative Record in that case into the present record of the Petaluma General Plan 2025 and DEIR process.[3] You will find evidence in these documents that either prove outright or strongly suggest overdraft conditions, contributors include the USGS, DWR, the Sonoma County Department of Transportation and Public works and numerous independent consultants. F

The City's impact on these so-called "emergency" wells will be considerable. Therefore, the City's water consumption via SCWA will have a substantial effect on the Santa Rosa Plain Groundwater Basin and therefore will require a Water Supply Assessment for the Santa Rosa Plain Groundwater Basin pursuant to SB 610. Please consult the Final Decision in *O.W.L. Foundation v. Rohnert Park*, which we have provided on the DVD[4]. G

5. Monitoring wells surrounding the SCWA wells in the Laguna de Santa Rosa in the Santa Rosa Plain[5] Groundwater Basin suggest a declining water table. At what date does the City estimate that these three wells will run dry? (cf. SCWA monitoring well data on the accompanying DVD under /SCWA materials/ et. al.) H

6. Since these three SCWA wells were originally drilled for emergency purposes only, and are marked "emergency wells" on SCWA maps and charts, does the City agree that its need to buy water from these wells constitutes an emergency? If not, please explain why not. I

7. The Introduction states: "Modest population growth translates into water demands increasing from 3,600 million gallons per year (11,000 acre-feet per year) in the baseline year of 2002, to

[3] Please see attached data DVD for the aforementioned Administrative Record and numerous other documents.
[4] cf. /O.W.L. v. RP Doc/et. al.
[5] cf. DVD/SCWA Materials/ Data from 1-13-05 and / Data from 11-18-04, etc.

approximately 5,100 million gallons per year (15,650 acre-feet) in 2025." This jump in consumption, from 3.6 billion gallons a year to 5.1 billion gallons a year is approximately a 41 percent jump in water use. Please reconcile the disparity between a description of "modest" growth" with the clearly immodest jump of 41%. Either the City expects the population to burgeon by nearly half again as many people in a scant 3 years, or individual water consumption is expected to make a dramatic increase. Please explain. J

8. Based on the assumed baseline year of 2002 *supra*, Table 8.1-3 shows SCWA deliveries increasing 7% from 2002 to 2005. Since SCWA deliveries include groundwater pumped from the Santa Rosa Plain Groundwater Basin, these deliveries are incorrectly labeled "surface water" in the table. Please rectify or explain why rectification is not needed. K

9. Also in Table 8.1-3, SCWA water deliveries are predicted to jump 21% from the aforementioned baseline year of 2002 to the year 2025. What assumptions regarding population growth substantiate this 21% increase? What assumptions regarding *per capita* water consumption lie behind this figure? L

10. Please explain the City's estimate of current *per capita* water consumption per year? What does the City project *per capita* use per year will be in 2025? M

11. If the City maintains that the three SCWA wells in the Laguna de Santa Rosa are "production" wells, and not emergency wells, then what guarantees has the City installed to prevent its own emergency wells from turning into production wells? If no guarantees exist, please explain why they do not exist or are not needed. N

12. In Section 3.5 Public Utilities and Energy, the DEIR states:

> *"Most of the water supply is provided by Lake Mendocino and Lake Sonoma..."* and *"Water ...is diverted ...by six Ranney collectors that draw water from the aquifer below the Russian River."*

Water supply is not <u>provided</u> by Lake Mendocino and Lake Sonoma. Water supply is <u>stored</u> in Lake Mendocino and Lake Sonoma. Notably, the water stored in Lake Mendocino is largely water diverted from the Eel River watershed. Thus, the Eel River watershed, not Lake

Mendocino, actually provides much of the City's water supply. Because the SCWA water supply is actually withdrawn "from the aquifer below the Russian River" there is no guarantee all that water withdrawn by SCWA actually is transferred from water supplies stored in Lake Mendocino and Lake Sonoma. Recent scientific studies by Lawrence Berkeley Laboratory indicate that the Ranney collectors actually de-saturate aquifer materials between the infiltration ponds and the Ranney collector intake locations. This is strong evidence that the Ranney collectors are also extracting significant proportions of groundwater. The DEIR should more technically correct about the source of water supply.

O

13. Year-to-year water demand typically can vary by plus or minus 5% of predicted trends. The DEIR's predicted shortfall of 186 acre-feet per year in 2025 could actually be nearly 1000 acre-feet per year based on an average demand of 15,768 acre-feet per year plus 5%. One thousand acre-feet per year represent an average of 2.7 million gallons per day over a course of four summer months. The DEIR makes an oversimplified assumption that future groundwater pumping would be limited 0.5 million gallons per day in light of SCWA supply shortfall. A more realistic water supply analysis would assume that water demand varies from year to year as a result of variable climatic and use patterns. Instead, the DEIR uses the simplified assumption of no demand variation to conclude that the City's maximum pumping from its groundwater wells will be only 0.5 mgd.. The City must plan for an approximate 5% cushion of water supply within its supply limits to accommodate year-to-year demand variation. Please explain why this necessary margin was omitted.

P

Groundwater Use

Groundwater pumping poses several known risks for the City and has since the 1950's. For example, The Sonoma County Economic Development Board points to growing seawater contamination caused by groundwater pumping.

> **Seawater Intrusion** When ground water is pumped from a coastal aquifer faster than it can be replenished from surface sources, seawater intrudes and contaminates the aquifer. Areas in Sonoma Valley and Petaluma Valley adjacent to San Pablo Bay have experienced growing saline contamination.[6]

[6] http://www.sonoma-county.org/edb/regguide/reghistorygroundwtrlaw.htm

Increased groundwater pumping will exacerbate this contamination. Prolonged pumping could lead to irreversible contamination of Petaluma's coastal aquifer.

Q 14. What is the current calculation of seawater intrusion into the Petaluma Coastal Aquifer?

15. How much does this seawater intrusion increase every year as a direct result of operating the
R City's municipal well field?

16. What will the increase of seawater intrusion be after adding the projected build-out of
S additional wells?

17. When (estimated date) will seawater intrusion levels be considered irreversible? How will
T "irreversible" be defined?

18. Has the City made any measurements or calculations to detect ground subsidence within
U Petaluma city limits? If not, please explain why the City has not made such measurements.

V 19. If so, how much subsidence has been measured and where?

20. Has the City projected estimates of ground subsidence due to increased groundwater
W pumping? If not, please explain why the City has no estimates.

21. The DEIR's predictions of supply and demand comparisons do not consider dry year
X scenarios. The SCWA Draft Urban Water Management Plan 2005 predicts SCWA supply deficits for single-dry years in and after 2020 even if SCWA diversion rights are increased to 101,000 acre-feet per year. SCWA estimates a deficit of 12% for a single-dry year in 2025. If Petaluma faced a 12% deficit and planned to use groundwater to supplement SCWA supplies as indicated in the DEIR, Petaluma's summer month groundwater pumping would need to be close to 6 million gallons per day, over 10 times what the DEIR has predicted. The DEIR does not adequately consider non-average years (e.g droughts) in evaluating water supply sufficiency. Please explain the rationale behind this underestimation. What contingencies has the City
Y considered or adopted to rectify this disparity in supplies when it occurs?

22. Regarding Section 3.6 Hydrology and Water Quality, the Table of Contents labels section 3.6 as "Hydrology" but section is actually called "Hydrology and Water Quality" in the report. Please rectify or explain this disparity. Z

23. The DEIR states:

> *"Tidal influence extends ...to near the confluence of Lynch Creek above downtown Petaluma."* and *"Downstream of the weir ...the tide has historically had a significant influence on flood levels."*

Sea level rise from global warming, which could be significant in the next 20 to 100 years, would obviously have an impact on flooding in Petaluma. Impacts of global warming, including sea level rise, should be considered in Petaluma's General Plan especially considering Petaluma's vulnerability to flooding. Please explain why these estimates are missing or provide the rationale behind not including them. AA

24. In regard to conditions prior to the "New Year's Flood", the DEIR states:

> *"The upper watershed feeding Petaluma Creek and Willow Brook were especially saturated, and the resulting flooding upstream of Corona Road was substantial."*

What saturation data is the statement based on? What does "especially saturated" mean? Is this degree of saturation unusual for late December or early January? Do all soils in the watershed have high clay content including, for example, the sandy soils west and northwest of Petaluma mapped as groundwater recharge areas by the California Department of Water Resources? The DEIR attributes the "New Year's Flood" to "especially saturated" conditions, but provides no information justifying why such conditions would necessarily be so unusual at the time of flooding or into the future. Please explain. BB

25. The General Plan should recommend preservation of recharge areas and floodplain storage areas as an effective means to reduce flooding, as well as ensuring groundwater recharge. What steps has the City taken to preserve state-identified groundwater recharge areas? If no steps have been taken, please provide the rationale behind not preserving state-identified groundwater CC

recharge lands and what contingencies the City has implemented to compensate for a projected loss of recharge and increased flooding?

26. What is the cumulative impact of Petaluma's urbanization—including channelization of creeks, creation of storm drains, development of floodplain storage areas (e.g. Denham Flat and the Outlet and Auto Malls), increase of runoff due to paving and rooftop drainage (e.g. industrial parks and housing developments with wide streets, parking lots, big roofs and driveways, and small open areas)—on exacerbation of flooding? For example DEIR attributes the "New Year's Flood" to saturation conditions in rural areas upstream of Petaluma, but provides no analysis of flood-inducing conditions within and downstream of Petaluma. Please explain. DD

27. If tides influence flooding, then certainly surface flows into the Petaluma River downstream of the weir will also influence flooding. However, the DEIR appears to have omitted these calculations altogether. Please provide the City's estimates of surface flows into the Petaluma River downstream of the weir and the impacts these flows will have on overall flooding. EE

28. Global climate change models predict the type of storm (related to "Pineapple Express") experienced in the "New Year's Flood" will become more frequent in the future. Please explain why Petaluma's General Plan and/or the DEIR have no recognition, estimates or calculations regarding the impending change in rainfall patterns. FF

29. The DEIR gives no results from the modeling analysis of impacts associated with a 100-year storm with 2025 buildout. What were the modeling results? Did 2025 buildout change flooding conditions? GG

30. Will the City continue to allow development in the flooded areas that were affected by the New Year's Flood? If so, please explain why development will continue to be permitted in these flood-prone areas and provide the rationale behind this decision. HH

31. Scientists predict sea level rise of at least 1 to 3 feet in the next 100 years. Did the model analysis of impacts associated with a "100-year storm" consider change in sea level in 100 years? If not, please explain why not. II

32. Overall, the discussion of the cause of the "New Year's Flood" in the General Plan is highly oversimplified. Please expand on the cause of this flooding by providing the City's understanding of meteorological and geological interactions with a special emphasis on man-made alterations to the terrain as a contributing factor. JJ

33. The DEIR implies that nutrient levels in the Petaluma River are not exacerbated by the Petaluma's urbanization. Does urban runoff affect "nutrient levels" in the Petaluma River? If not, please explain why the City does not believe urban runoff contributes to nutrient levels in the Petaluma River. KK

34. In the "Groundwater" subsection, the DEIR states:

> *"When impervious surfaces are placed over groundwater recharge areas, the percolation of surface water into the underlying water table is impaired and the surface water runs off, sometimes resulting in a decrease in groundwater recharge."*

Notably, the location and context of this statement downplays the contribution of impervious surfaces to increasing urban storm runoff (including the pollution from urban storm runoff). Even though the DEIR acknowledges the role of impervious surfaces on groundwater recharge (e.g. paving, rooftops, compacted soils), the DEIR does not tie the role of increasing impervious surfaces to flooding conditions. What, exactly, is the increase in storm runoff due to impervious surfaces covering groundwater recharge areas? How much groundwater recharge is lost due to impervious surfaces created as a result of increased urbanization? What is the estimated amount of additional pollution that these surfaces contribute to stream, creek and river pollution levels? Please itemize these pollutants. LL MM

35. Figure 3.6-2 provides no location of Petaluma City Limits and Urban Growth Boundary to compare to groundwater basin locations. Figure 3.6-2 provides no labeling of groundwater basin names, yet claims to be a groundwater basin map. Please rectify these omissions or provide a rationale for leaving them out. NN

36. Petaluma Valley Basin boundaries in Figure 3.6-2 do not agree with the "City groundwater subbasin" boundaries defined in Figure 3 of the Technical Memorandum No. 4 Groundwater OO

Feasibility Study. Figure 3.6-2 does not reference the DWR Bulletin 118 Update 2003 from which Figure 3.6-2 was obtained. Please rectify these omissions or provide a rationale for leaving them out.

37. The DEIR incorrectly states:

> *"The City of Petaluma is located in the Petaluma Valley groundwater basin..."*

Portions of areas within Petaluma City Limits and the Petaluma Urban Growth Boundary are located within the Wilson Grove Formation Highlands groundwater basin. Therefore, the City of Petaluma is located within two groundwater basins. Please rectify these omissions or provide a rationale for leaving them out. PP

38. Figure 3.6-2 incorrectly excludes portions of the Wilson Grove Formation Highlands groundwater basin within the San Francisco Bay Hydrologic Region. The correct mapping can be found in Figure 20 of the DWR Bulletin 118 Update 2003. Please rectify these omissions or provide a rationale for leaving them out. QQ

39. Figure 3 in the Technical Memorandum No. 4 Groundwater Feasibility Study defines a "City groundwater subbasin" that straddles two groundwater basins defined by the California Department of Water Resources (DWR) in the Bulletin 118 Update 2003 – Petaluma Valley and Wilson Grove Formation Highlands. West Yost Associates has apparently failed to utilize updated groundwater basin definitions provided by DWR in 2003. Please rectify these omissions or provide a rationale for leaving them out.

40. Because the City of Petaluma extracts groundwater for its urban water supply, the City must analyze sufficiency of groundwater resources in both the Wilson Grove Formation Highlands and the Petaluma Valley groundwater basins when performing future water supply assessments required by State law.

41. The General Plan indicates peak demand would exceed the Impairment MOU limit by 5.0 million gallons per day. Can groundwater pumping by expected to make up a shortfall of 5.0 million gallons per day? If so, what groundwater supply assessment has been made to RR

demonstrate this projected sufficiency? However, the DEIR only analyzes a peak demand shortfall amounting to 0.5 million gallons per day. Why aren't the DEIR and General Plan consistent in regard to peak demand shortfall? Please explain this disparity.

42. The General Plan predicts peak demand shortfalls beginning in 2007 and annual demand shortfalls beginning in 2010, yet the DEIR does not predict any shortfalls beginning until the 2020's. Why aren't the DEIR and General Plan consistent? Please explain. SS

43. Apparently the DEIR does not consider constraints related to the Temporary Impairment MOU. Why not? TT

"Recycled" water use

The DEIR projects substantial reliance on tertiary-treated sewage to supplement the diminishing availability of fresh water. This reliance includes depositing tertiary-treated sewage on large swaths of open land for irrigation.

Recent discoveries[7] confirm that tertiary-treated sewage contains many chemicals that are injurious to human health and environmentally damaging which could, if allowed to sink into a natural aquifer, contaminate groundwater resources. Sewage treatment plants in Sonoma County are not designed to remove pharmaceuticals; viruses or Phthalates; to name only three categories of contaminates known to survive tertiary treatment.

44. Neither in Goal 8-G-3 nor in Goal 8-G-4 is there any mention of monitoring of the streams or runoff in areas of tertiary-treated wastewater applications, either for substances regulated under the Clean Water Act, or for emerging contaminants. This omission is particularly nettlesome in an area that floods so frequently. Please explain the rationale for this omission. UU

45. The "Wastewater" subsection contains no prediction of how much recycled water will be used in the future by the City of Petaluma in lieu of using SCWA water. Please explain how much "wastewater" will be used in the future in lieu of using SCWA water. VV

[7] cf. Data DVD/wastewater/etc.

46. Technically, it is possible to clean sewage so that nothing but the molecule H_2O remains. Modern treatment plants employing reverse osmosis and other techniques clean raw sewage water to this degree of purity, i.e. only water remains, everything else is removed. The DEIR makes no mention of modern treatment plants. Please explain why this technology is missing from the City's plans. Does the City intend to continue indefinitely the use of chemical-laden sewage in schools, golf courses and other high traffic areas frequented by humans? WW

47. The DEIR provides no discussion or analysis in this section about the impacts of use of recycled water on water quality, including both surface and groundwater quality. Please explain the projected impacts on groundwater quality due to prolonged use of treated sewage water.

Emerging toxicants

In addition to the above-mentioned dangers of chemicals remaining in wastewater after treatment is the appearance of completely new compounds called "emerging contaminants" that were not added to the waste stream. These contaminants are produced within treated sewage itself and are not introduced to the waste stream. Acetaminophen[8] is one of the most widely consumed drugs in the world. When taken according to directions, Acetaminophen is a relatively safe drug. However, exceeding the recommended dose, or if taken with alcohol, Acetaminophen can cause hepatic failure. Indeed, this common drug is the leading cause of liver failure in both the U.S. and in the U.K.

Scientists were alarmed to discover in 2005 that Acetaminophen and sewage plants pose a completely new danger, two new dangers in fact. When exposed to the chlorination process, Acetaminophen spawns two entirely new toxicants, 1,4-Benzoquinone and *N*-Acetyl-*p*-benzoquinone Imine. I am attaching the results of a study performed by Mary Bender and William A. MacCrehan of the Analytical Chemistry Division, National Institute of Standards and Technology in Gaithersburg, MD that describes this transformation[9].

Unwanted and unsuspected chemical reactions are taking place within wastewater and these new

[8] Acetaminophen, also known as Paracetamol, is sold under the brand name "Tylenol" in the U.S. and "Panadol" in the U.K. It is a common additive to other analgesics making the drug nearly ubiquitous.

[9]

toxic compounds can proliferate into the environment. This recent discovery underscores the necessity for extensive testing before wastewater is dumped on to lawns, pastures or sports fields. Most of the contamination in a discharge event settles into the upper reaches of soil, exactly where people might come in contact with it, eventually all of it can sink below the surface where there is a very real risk of aquifer contamination.

48. How much Acetaminophen, in parts per billion of wastewater or in total metric weight does the City estimate will be dumped on to lawns, pastures and sports fields? XX

49. How much 1,4-Benzoquinone and *N*-Acetyl-*p*-benzoquinone Imine, in parts per billion or in total metric weight, is created as a result of the exposure to chlorine in the waste stream a one year period?

50. How much 1,4-Benzoquinone and *N*-Acetyl-*p*-benzoquinone Imine in parts per billion or total metric weight does the City estimate is created by domestic chlorination units? How much is created by exposure to household cleansers that contain chlorine? What test has the City used to determine this quantity? If not tested, please explain why not.

51. How much 1,4-Benzoquinone and *N*-Acetyl-*p*-benzoquinone Imine does the City estimate will be released dumped on to lawns, pastures and sports fields? If no estimates have been made, please explain the rationale for making no estimates.

Dangerous Drugs in Wastewater

A wide range of pharmaceuticals exists in wastewater, not just Acetaminophen. Reports from all over the world affirm that drugs, both legal prescription drugs and illegal drugs, even veterinary drugs, are not removed from old-fashioned sewage treatment plants and are reintroduced into the environment. In northern Italy, in the Po River Basin, authorities test Po River water for both the excreted metabolite byproduct of cocaine, and for pure cocaine itself that is not metabolized to calculate the estimated levels of abuse of this drug in the population living in the basin[10].

52. Has the City performed scientific examinations to detect pharmaceuticals in wastewater? If so, what were the results of that test? If not, please explain why no scientific tests were YY

[10] cf. /Waste water/Pharmaceuticals/ Where rivers run high on cocaine - Health - Times Online.pdf

performed.

53. How much benzoylecgonine (BE), cocaine, and diacetylmorphine, in parts per billion or in total metric weight does the City estimate will be dumped on to lawns, pastures and sports fields? If no estimates have been made, please explain why this examination was skipped or deemed unnecessary.

54. How much Ethinylestradiol, Levonorgesirel, and Norethisterone does the City estimate will be dumped on to lawns, pastures and sports fields? If no estimates have been made, please explain why this examination was skipped or deemed unnecessary.

55. Does the City intend to dump other estrogens or progestagens on to lawns, pastures and sports fields? If so, which ones and in what amounts does the City plan to dump? If no estimates have been made, please explain why this examination was skipped or deemed unnecessary.

56. How much interleukin-4 PE38KDEL cytotoxin does the City estimate is in the wastewater, in parts per billion that will be dumped on to lawns, pastures and sports fields? What does the City estimate are the amounts of other cytotoxins, in parts per billion that will be dumped on to lawns, pastures and sports fields? If no estimates have been made, please explain why this examination was skipped or deemed unnecessary.

Phthalates

Phthalates[1] are dangerous endocrine disruptors that can feminize unborn males, male neonates and young boys by mutilating male genitals. They are strongly suspected to be an underlying etiology of the dramatic rise in breast cancer and in the worldwide phenomenon of falling sperm counts. Exposure to phthalates also triggers early menarche and breast enlargement in girls as young as 10 years old.

Phthalate esters are additives used mainly as plasticizers to add flexibility to polyvinyl chloride (PVC), polyvinyl acetate, polystyrene, cellulose nitrate, polyamides, and polyesters. Phthalates serve as intermolecular lubricants that impart flexibility. But these chemicals lack a covalent bond and are not chemically bound to the polymer and as a result, easily migrate into the

[1] cf. /Waste water/Phthalates/et. al.

environment in significant quantities. Phthalates are also found in soaps, shampoos, paints, pesticides, nail polish, caulk, and other common products. In light of the inability of Sonoma County treatment plants to remove these endocrine disruptors they must be presumed to exist in wastewater.

57. How many parts per billion of Di(2-ethylhexyl) phthalate (DEHP) does the City expect to dump on to lawns, pastures and sports fields? If no estimates have been made, please explain why this examination was skipped or deemed unnecessary. ZZ

58. How many parts per billion of Di-butyl phthalate (DBP) does the City expect to dump on to lawns, pastures and sports fields? If no estimates have been made, please explain why this examination was skipped or deemed unnecessary.

59. How many parts per billion of Di-isononyl phthalate (DINP) does the City expect to dump dumped on to lawns, pastures and sports fields? If no estimates have been made, please explain why this examination was skipped or deemed unnecessary.

60. How many parts per billion of Di-isodecyl phthalate (DIDP) does the City expect to dump on to lawns, pastures and sports fields? If no estimates have been made, please explain why this examination was skipped or deemed unnecessary.

61. How many parts per billion of Benzyl butyl phthalate (BBP) does the City expect to dump on to lawns, pastures and sports fields? If no estimates have been made, please explain why this examination was skipped or deemed unnecessary.

In conclusion, we note that the statute known as CEQA, its implementing Guidelines and case law interpreting the statute and the Guidelines provide the following—That the evaluation and response to public comments is an essential part of the CEQA process. Failure to comply with that requirement can lead to disapproval of the project. Further, in a final EIR, the lead agency must evaluate and respond to all the relevant comments on the Draft EIR that it receives within the public review period.

The responses must describe the disposition of the environmental issues raised in the comments. The lead agency must specifically explain its reasons for rejecting these suggestions, receiving comments and for proceeding with the project and its environmental impacts. There must be a good faith, reasoned analysis and response.

Conclusory statements unsupported by factual information will not suffice. We look forward to receiving the City's written responses to our comments that are consistent with these principles under CEQA, the Guidelines and applicable case law.

Sincerely,



H.R. Downs
President

O.W.L. Directory of Folders/Documents on CD
In Response to the Draft GP 2025 & DEIR

- O.W.L. GP & DEIR CD
  - AB 3030 Plans in Spreadsheet
  - CanonManorWest
  - DWR
    - Bulletin 118
    - DWR booklets
  - Global Warming
  - Klehfelder
  - OWL v RP DOX
  - Rohnert Park Dox
    - EIS Scoping Report Graton Rancheria casino
      - files
        - appendices
        - document
        - figures
        - images
      - EnvironmentalImpactReportMay2000
    - O.W.L. v. RP
      - RP Brief
        - Border Dispute
        - O.W.L. COMPLAINT
          - Related dox
        - OPENING BRIEF
        - Rebuttal
        - Steve Comments
        - Supplemental from RP
      - RP DWSA
    - RP Final WSA
    - RP GP 2000
      - AppendexA_SCRPC_and_John_KingvCity_of_RP
      - Chapter1_Intro-and-Overview
      - Chapter2_Land-Use-and_Growth_Management
      - Chapter3_Community_Design
      - Chapter4_Transportation
      - Chapter5_OpenSpace_Parks-and-Public-Facilities
      - Chapter6_Environmental_Conservation
      - Chapter7_Health-and-Safety
      - Chapter8_Noise
      - Chapter9_Housing
      - General Plan 4th Edition
      - Glossary_of_terms
    - University Dist Spec Plan
- SCWA Materials
  - Data from 1-13-05
    - Emergency_Well_Data_01_05
  - Data from 11-18-04
    - Monitoring Well Water Levels
    - Well Details
- Waste water
  - Contamination misc
  - Pharmaceuticals
  - phthalates
  - pollutants-1
    - Drugs-Chemicals-in-sewage-sludge.rtfd
  - U.S. Supreme Court Discharge Opinion

420.1

- OWL-PET GP_DEIR (D:)
  - AB 3030 Plans in Spreadsheet
    - AB 3030 plans Central District 1-29-04.xls
    - AB 3030 plans Northern District 1-29-04.xls
    - AB 3030 plans San Joaquin District 2-17-04.xls
    - AB 3030 plans Southern District 1-29-04.xls
  - CanorManorWest
    - CanorManorWestFinal.pdf
    - CanorManorWestSubdivisionAcessment.pdf
    - Environmental Impact Report - Vol 1.pdf
    - Environmental Impact Report - Vol 2.pdf
  - DWR
    - CAgwMgmt10jan05-final.pdf
    - GroundWaterREsources1972.pdf
    - GroundWaterREsources1972Bulletin118...4.pdf
    - GroundWaterResourcesDec1975.pdf
    - GroundWaterResourcesSept1972.pdf
    - Guidebook_101003.pdf
    - gw_manage_dwr_1999.pdf
  - Bulletin 118
    - Bulletin118_Entire.pdf
    - Bulletin118-Chapter7.pdf
    - STATUS_CAgwMgmt.pdf
  - DWR booklets
    - act.pdf
    - Adjudicated-Basins.pdf
    - ADJWM.pdf
    - Bulletin118_Entire.pdf
    - Ca_Wdl_1977.pdf
    - Groundwater_Management_In_CA-DWR.pdf
    - gwm_report.pdf
    - Numbering-wells-InCA.pdf
    - water_facts_2.pdf
    - water_facts_4.pdf
    - water_facts_6.pdf
  - GlobalWarming
    - AbruptClimateChange2003.pdf
    - Development_Climate_Change.pdf
    - EPA - Global Warming - Resource Center - Publications.webarchive
    - Estimates of Future Sea Level Rise_John S. Hoffman.pdf
    - GREENHOUSE GAS EMISSIONS OF WATER USE AND WASTEWATER OPERAT.pdf
  - Kleinfelder
    - Figure04.pdf
    - Figure07.pdf
    - Figure10.pdf
    - Kleinfelder Report.pdf
    - Kleinfelder.pdf
    - Plate11.pdf
    - Plate12.pdf
    - Plate13.pdf
    - Plate14.pdf
    - Plate15.pdf
  - OWL V RP DOX
    - OWL_ Final Judgment.PDF
    - OWL_ Petitioners Opening Brief.PDF
    - OWL_ Petitioners_ Reply Brief.PDF
    - OWL_ Petitioners_ Supplement Reply Brief.PDF
    - OWL_ Verified First Amended Petition and Complaint.PDF
    - OWL_ Verified Petition for Writ of Mandamus.PDF
  - RohnertPark DOX
    - CityofRohnertParkGeneralPlanOct1999.pdf
    - GeneralPlanMitigationMonitorMay011990toJun301991.pdf
    - MeetingWaterDemandsInRPJuly1979.pdf
    - RohnertParkDraftZoningOrdinance2002.pdf
    - RohnertParkWaterDemands.pdf
    - RP_04_pump_Totals.pdf
    - RPEnvironmentalImpactreportOct1999.pdf
  - EIS Scoping Report Graton Rancheria casino
    - EIS Scoping Report.htm
    - files
      - appendices
        - Appendix-A_NOI.pdf
        - Appendix-B_Local-Notice.pdf
        - Appendix-C_Comment-Letter-List.pdf
        - Appendix-D_Comment-Letters.pdf
        - Appendix-E_Reporter-Transcriptsk.pdf
        - Appendix-F_Rough-Notes-From.pdf
        - FIG-Cover-Binder-Vol-I-11X17.pdf
        - FIG-Cover-Binder-Vol-II-11X17.pdf
      - document
        - 1-Introv-4.pdf
        - 2-Proposed-Action-and-Alt-1-v4.pdf
        - 3-Issues-v-4.pdf
        - 4-EIS-v-4.pdf
        - TOC-v-4.pdf
      - figures
        - FIG-2-1-Regional-Location.pdf
        - FIG-2-2-Site-and-Vicinity.pdf
        - FIG-2-3-Aerial-Site-Map .pdf
        - FIG-2-4-Alternate-Off-Site-Location-Map.pdf
        - FIG-Cover.pdf
        - FIG-Title.pdf
      - images
        - aes.gif
        - folder.gif
        - pdf.gif
    - EnvironmentalImpactReportMay2000
      - part2.pdf
      - Part 1.pdf
    - O.W.L. v. RP
      - Complaint Amended .PDF
      - Ed_Casey_Comments_1.TR_RP.pdf
      - O.W.L. Complaint w_Exhs.PDF
      - O.W.L. Complaint w_o Exhs.PDF
      - O.W.L. Conformed Pages.PDF
      - O.W.L. Verified Petition_Complaint.PDF
      - O_W_L_ 53106_ txt .pdf
      - sb_610_bill_20011009_chaptered.pdf
      - RP Brief
        - Additional Authorities .pdf
        - ED_Rebuttal.pdf
        - Microsoft Word - 771410_1_DOC.pdf
        - Real Parties' Joinder In City's Brief.pdf
        - Respondents_ Points & Authors in Oppo.PDF
        - sb_610_bill_20011009_chaptered.pdf
      - Border Dispute
        - CalWater2004Status1.ppt
        - hu-standards.pdf
        - wbd-factsheet.doc

- O.W.L. COMPLAINT
  - Complaint Amended .PDF
  - O.W.L. Complaint w_Exhs.PDF
  - O.W.L. Complaint w_o Exhs.PDF
- Related docs
  - Case_Management_Statement.pdf
  - Whelan.pdf
- OPENING BRIEF
  - 736531_HRD_SFC.doc
  - Conformed Additional Authorities.PDF
  - Conformed Opening Brief.PDF
  - Conformed Request for Judicial Notice.PDF
- Rebuttal
  - 770555_1.DOC
  - EJC VERSION OWL REPLY BRIEF.DOC
- Steve Comments
  - Additional_Technical_Comments.doc
  - PFS_model_criticisms.doc
- Supplemental from RP
  - Joinder.pdf
  - Supplemental Brief.pdf
- RP DWSA
  - Draft Water Supply Assessment Presentation.pdf
  - Draft Water Supply Assessment.pdf
- RP Final WSA
  - F00_ExecSumm.pdf
  - F00_TOC.pdf
  - F01_Intro.pdf
  - F02_SvcArea.pdf
  - F03_Grndwtr.pdf
  - F04_CityDmnd.pdf
  - F05_Sufficiency.pdf
  - F06_Fig1.pdf
  - F07_Fig2_3-1.pdf
  - F08_Fig3-2.pdf
  - F09_Fig3-3.pdf
  - F10_Fig3-4.pdf
  - F11_Fig3-5.pdf
  - F12_Fig3-6.pdf
  - F13_Fig3-7.pdf
  - F14_Fig3-8.pdf
  - F15_Fig3-9.pdf
  - F16_Fig3-10.pdf
  - F22_Fig3-16.pdf
  - F23_Fig3-17.pdf
  - F24_Fig3-18.pdf
  - F25_Fig3-19.pdf
  - F26_Fig3-20.pdf
  - F28_Fig3-22.pdf
  - F29_Fig3-23.pdf
  - F30_Fig3-24.pdf
  - F31_Fig3-25.pdf
  - F32_Fig3-26.pdf
  - F33_Fig3-27.pdf
  - F34_Fig3-28.pdf
  - F35_Fig3-29.pdf
  - F36_Fig3-30.pdf
  - F37_Fig3-31.pdf
  - F38_Fig3-32.pdf
  - F39_Fig3-33.pdf
  - F40_Fig3-34.pdf
  - F41_Fig3-35.pdf
  - F42_Tables.pdf
  - F43_ApdxA.pdf
  - F44_ApdxB.pdf
  - F45_ApdxC.pdf
- RP GP 2000
  - AppendexA_SCRPC_and_John_KingvCity_of_RP
  - AppendixA-Settlement.pdf
- Chapter1_Intro-and-Overview
  - Sec1-1.6_Process.pdf
  - Sec1.1_History.pdf
  - Sec1.2_Purpose.pdf
  - Sec1.3_GPRequirements.pdf
  - Sec1.4_ObjectivesThemes.pdf
  - Sec1.5_Regional.pdf
  - Sec1.6_Process.pdf
  - Sec1.7_Organization.pdf
  - Sec1.8_Applicability.pdf
- Chapter2_Land-Use-and_Growth_Management
  - Sec2.1_Background.pdf
  - Sec2.2_GPDiagramUseClassifications.pdf
  - Sec2.3_GPBuildout.pdf
  - Sec2.4_LandUseGoalsPolicies.pdf
  - Sec2.5_GrowthMgmt.pdf
- Chapter3_CommUnity_Design
  - Sec3-1.1a_UrbanFormViewsEdges.pdf
  - Sec3.1a_UrbanFormViewsEdges.pdf
  - Sec3.1b_GoalsPolicies.pdf
  - Sec3.2b_GoalsPolicies1.pdf
  - Sec3.3_CommercialCenters.pdf
  - Sec3.4_PublicArt.pdf
- Chapter4_Transportation
  - Sec4.1_StreetSystem.pdf
  - Sec4.1_TransGoalsPolicies.pdf
  - Sec4.2_TransDemandMgmt.pdf
  - Sec4.3_Transit.pdf
  - Sec4.4_PedBicycle.pdf
- Chapter5_OpenSpace_Parks-and-Public-Facilities
  - Sec4-1.4_PedBicycle.pdf
  - Sec5.1_OpenSpace.pdf
  - Sec5.2_Parks.pdf
  - Sec5.4_Wastewater.pdf
  - Sec5.5_WaterSupply.pdf
- Chapter6_Environmental_Conservation
  - Sec6.1_Historic.pdf
  - Sec6.2_Habitat.pdf
  - Sec6.3_WaterQuality.pdf
  - Sec6.4_AirQuality.pdf
- Chapter7_Health-and-Safety
  - Sec7.1_Seismic.pdf
  - Sec7.2_Drainage.pdf
  - Sec7.3_SolidWaste.pdf
  - Sec7.4_HazMat.pdf
  - Sec7.5_EmergencyMgmt.pdf

- Chapter8_Noise
  - Sec8.1_NoiseChar.pdf
  - Sec8.2_NoiseNP.pdf
  - Sec8.3_NoiseGoals.pdf
- Chapter9_Housing
  - Sec9.0_HsgIntro.pdf
  - Sec9.1_HsgCharNeeds.pdf
  - Sec9.2_ProjectedNeeds.pdf
  - Sec9.3_Constraints.pdf
  - Sec9.4_Opportunities.pdf
  - Sec9.5_GoalsPolicies.pdf
  - Sec9APPDX-1.pdf
  - Sec9APPDX.pdf
- General Plan 4th Edition
  - ListTablesFigures.pdf
  - Log102202.pdf
  - TitlePage.pdf
  - TOC.pdf
- Glossary_of_terms
  - Glossary.pdf
- University Dist Spec Plan
  - UnivDistrEIR-03.pdf
  - UnivDistSpecPlan.pdf
- SCWA Materials
  - Draft Restructured Agreement for Water Supply-050625.pdf
  - EPA waterSDWIS-SonomaCounty.pdf
  - MMWD Ltr to SCWA.pdf
  - SCWA_EmergencyWells-SFC.pdf
  - SCWA_memo_000177.pdf
  - SCWA_memo_091277.pdf
  - SCWA_memo_121679.pdf
  - SCWA_notes_112878.pdf
  - UrbanWaterManagementPlanSept1996.pdf
  - UrbanWaterMangementPlanFeb202001.pdf
  - WaterProjectEIR.NOP.pdf
  - Data from 1-19-05
    - Emergency_Well_Data_01_05
  - 3emergency_wells_depth-to-water.pdf
  - 3emergency_wells_production_1999-2002.pdf
  - 5616_VER.XLS
  - Historical Water Levels.xls
  - HistoricalWaterLevelsPG.pdf
  - Occ MW 1.xls
  - Occ MW 2 .xls
  - Occ MW 3.xls
  - Occ MW 4.xls
  - Occ MW 5.xls
  - Santa Rosa MW.xls
  - SCWAWellsPumping 01-03.xls
  - Seb MW 1.xls
  - Seb MW 2.xls
  - Seb MW 3.xls
  - Seb MW 4.xls
  - Seb MW 5.xls
  - Seb MW 7.xls
  - SR_PLAIN-GRND_WATER.pdf
  - Todd Rd Blue.xls
  - Todd Rd Red.xls
  - Todd Rd White.xls
  - Well Constr Monitoring.xls
  - Well Constr Pumping.xls
  - Data from 1-18-04
    - Historical Water Levels.xls
    - SR_PLAIN-GRND_WATER.pdf
  - Monitoring Well Water Levels
    - Occ MW 1.xls
    - Occ MW 2 .xls
    - Occ MW 3.xls
    - Occ MW 4.xls
    - Occ MW 5.xls
    - Santa Rosa MW.xls
    - Seb MW 1.xls
    - Seb MW 2.xls
    - Seb MW 3.xls
    - Seb MW 4.xls
    - Seb MW 5.xls
    - Seb MW 7.xls
    - Todd Rd Blue.xls
    - Todd Rd Red.xls
    - Todd Rd White.xls
  - Well Details
    - Well Constr Monitoring.xls
    - Well Constr Pumping.xls
  - Waste Water
    - Contamination misc
- Contamination misc
  - 303d.doc
  - CHART- Contaminant Removal Guide.pdf
  - dwregulations-06-01-04.pdf
  - dwstatutes-01-01-05.pdf
  - MetroActive News & Issues | Russian River Mercury Contaminat.pdf
  - MMWR_Surveillance_Waterborne_dis_Drinking_Water.pdf
  - rcra_gw.pdf
  - Reverse Osmosis.webloc
  - Surveillance for Waterborne-Disease Outbreaks — US, 1993-19.pdf
  - Water & Process Technologies_ Crossflow Membrane Filtration .pdf
  - waterquality.pdf
- Pharmaceuticals
  - _Pharma_Personalcare_Products_In_Environ.pdf
  - 0403051.pdf
  - CancerEpidmiologyInYoungAdults.pdf
  - CHART-Filtration and Separation Spectrum.pdf
  - Perchlorate_Reversal.pdf
  - Pharm_final.pdf
  - The Observer | UK News | Stay calm everyone, there's Prozac .pdf
  - Transformation of Acetaminophen by Chlorination Produces the.pdf
  - Transformation of Acetaminophen.PDF
  - Where rivers run high on cocaine - Health - Times Online.pdf
- phthalates
  - "Gender benders" cause sperm burn out - 03 July 2002 - Print.pdf
  - Asthma Phthalates and children.pdf
  - CDC_Phthalates.pdf
  - Chemical & Engineering News_ Cover Story - Panel Ranks Risks.pdf
  - di2ethylhexylphthalate.pdf
  - Endocrine Estrogen Letter - Newsletter - coverage, inform.webloc
  - EPA Ground Water & Drinking Water > breadcrumb.pdf
  - Freshwater Society.webloc
  - frontline_ fooling with nature_ interviews _ theo colborn.pdf
  - 'Gender-bending' chemicals found to 'feminise' boys - sex - .pdf
  - Guardian | Chemicals in plastics harming unborn boys.pdf
  - New Scientist Breaking News - 'Gender-bending' chemicals .webloc
  - NotTooPretty_final.pdf

pharmaceuticals_000.pdf
Phthalates Overview - Environment California.pdf
Pollution_Hits_Home.pdf
Relationship between Environmental Exposures to Phthalates a.pdf
Report on environmental chemicals CDC.pdf
Scientific American - Ubiquitous Chemical Associated with .webloc
Scientific American_ Ubiquitous Chemical Associated with Abn.pdf
The Association between Asthma and Allergic Symptoms in C.webloc
Theo Colborn Interview Mother Jones.pdf
pollutants
A Case for Revisiting the Safety of Pesticides.pdf
Antimicrobial Resistance Markers of Integron-bearing E-coli.pdf
Babies in womb exposed to 'gender-bending' chemicals.pdf
Cadmium's Disguise Dupes the Estrogen Receptor.pdf
Chemical Communication Threatened by Endocrine-Disrupting.pdf
COPD, October 2005.pdf
Cryptorchidism and Hypospadias Study.pdf
Disposal of Pharmaceuticals and Aquatic Contamination.pdf
Do fish hold cancer clue for humans_.pdf
Drinking Water and Women's Health.pdf
Effects of Migrant and Seasonal Farm Labor on Women's Health.pdf
Environmental Toxins Associated With Recurrent Pregnancy Los.pdf
Hypospadias in the Neonate.pdf
More intersex fish in Potomac.pdf
National Occupational Reproductive Research Agenda.pdf
Pediatric Environmental Exposure_ DEHP.pdf
Petrovic M et al (2004) Endocrine disrupting compounds and o.pdf
Phthalates and systemic lupus erythematosus.pdf
Pollution and Malnutrition to Increase Disease Worldwide.pdf
Prenatal Exposure to Phthalates May Adversely Affect Male In.pdf
Proximity to Pesticide Use May Increase Risk of Birth Defect.pdf
Removal_EDCs_Water_Treatment.pdf
Using a Customized DNA Microarray for Expression Profiling.pdf
West Nile, Rift Valley, and Sandfly Arboviruses.pdf
Drugs-Chemicals-in-sewage-sludge.rtf
TXT.rtf
unknown.gif
US Supreme Court Discharge Opinion
Opinion - 2005-05 - S.D. Warren v. Maine BEP, .1.pdf

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56 Rocca Drive
Petaluma, Ca. 94052
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General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, Ca. 94952

December 4, 2006

Dear Ms. Tuft,

The following lists concerns pertaining to the PETALUMA GENERAL PLAN 2025 DRAFT ENVIRONMENTAL IMPACT REPORT specificaly SECTION 3.6 HYDROLOGY AND WATER QUALITY.

I have concerns pertaining to the terracing of the upper reach conjoining with Denmen Flats. The widening and terracing of the channel up to Denmen Flats I believe would facilitate the draining of Denmen Flats. I further believe this would raise the river stage down stream durring storm events resulting in an increase in the base flood elivation. I see no clear identification of this potential impact in the Draft EIR, and therefore no appropriate mitigation. 71 A

For example durring the Dec. 31, 2005 flood the waters came within two feet of over topping the walls of the Corps of Engineers flood control project at its upper reach near the wier. Would the draining and the subsequent higher river stage during a storm event result in over topping the walls of the Corps of Eng. flood project. B

Another obvious area of issue would be down town as durring the New Years Eve flood the waters came within one foot of flooding First Street.

This DRAFT EIR doesn't suggest not building in the flood plain wich raises the issue of the method of developing and keeping the floores above the base flood elivation. It is not posible to evaluate the impact with out knowing the method. The prefered method by developers is dirt fill building pads and even with the city having a zero net fill ordinance, nothing but dirt fill has been used. C

Prior to the New Years Eve flood of 2005 there had been some flooding on Holm Road east of the Free Way but during the New Years Eve flood the entire area between the Free Way and McDowell Blvd. N. flooded beyond Corona Rd. The one obvious thing that had been occuring was the continuing development in Denmen Flats all of wich had used dirt fill building pads (see Figures 3.6-3 and 3.6-4). All though this area was in the FEMA 100 YEAR FLOOD PLAIN, untill the flood of 2005 the entire area had not flooded. This raises the question of displacement of the flood plains capacity to retain the flood waters when dirt fill building pads are used.

Even though this DRAFT EIR proposes the continued use of the zero net fill policy it is clear that D

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the zero net fill policy does not work so long as you continue to use dirt fill building pads. I find no identification of this impact and therefore no mitigation in this DRAFT EIR.

Considering the New Years Eve flood/storm was not a 100 year storm across the entire Petaluma water shed only a percentage of the northern Petaluma water shed was covered by the 100 yr. storm. The 100 yr. storm event covered Santa Rosa, Rohnert Park, Penngrove, and Sonoma Mt. and it was less rain fall as you come south and through the rest of the water shed. The city of Petalumas Dept. of water resources and conservation evaluated the New Years Eve storm as aproximately a 40 year storm event. Therefore the reference in the DRAT EIR to this storm as a 100 year storm event and subsequent evaluation may not be accurate. Atrue 100 year storm event covering the majority of the Petaluma water shed as I believe is possible as indicated by the 1982 storm and flooding of record wich was produced by six inches + in that 24 hour period can be expected to produce far greater flooding. E

In this Draft EIR list of contributarys to the Petaluma River I do not find listed the today underground piped creek known as the Cherry Magnolia Conduit. This is a seven foot diameter concrete pipe that today is beyond capacity durring large storm events. Youmay wish to refere to the Hydrology Report Titled Magnolia Park Subdivision Petaluma California, Preliminary Drainage Study , July 2000, Prepared by CSW/ Stuber-Stroch Engineering Group Inc. F

The flows from this conduit and the over the road flows on Magnolia Ave. may when evaluated increase the flooding impact on the community.

The Draft EIR Referes to the use of detention,retention basin systems. Can you be more specific? Location ? Capacity? Timing? G

Starting on page 3.6-9 and also in table ES-5 summary I began to find referances to the SWCA, could you possibly have meant the SCWA (Sonoma County Water Agency) ? If so it may be wise to correct that. H

Further I have concerns about the process and wether or not comments are being recieved and evaluated for example the above comments and concerns expressed above delivered this day. I note the agenda reads as follows: Public Hearing and Discussion of Draft General Plan 2025 and Draft Environmental Impact Report (wrap up). (Tuft)-continued from November 20, 2006 meeting. I

5B General Plan

SINCERELY

Geoffrey B Centurey

(2)

Chapter 6 + DEIR

Tuft, Pamela

From: Gregory L. Colvin [colving@silklaw.com]
Sent: Monday, December 04, 2006 4:22 PM
To: Tuft, Pamela
Cc: CityCouncil
Subject: Gen Plan & EIR
Importance: High

December 3, 2006

Pamela Tuft
General Plan Manager
City of Petaluma
27 Howard St.
Petaluma, CA 94952

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Re: **Draft EIR for the General Plan 2025**

Dear Ms. Tuft:

I believe that the City and its EIR consultants should take another look at the environmental impact of the draft General Plan's provisions for Parks and Recreation covered in section 3.3 of the DEIR.

This letter is submitted under the CEQA rules that require good faith response to questions about the DEIR. By continuing to take public commentary via hearings and otherwise, it appears that the city has extended the 45-day comment period beyond October 31, 2006.

As you know, many of us have been concerned about the inadequate plans for public park facilities at Windsor and D Street, where a 58-acre parcel is slated for residential development by Davidon Homes. The General Plan as drafted lists only a passive neighborhood park of 3 acres at the site. We have these questions to be answered:

1. At the last Rec and Parks Commission meeting, Mr. Carr reported that he and Davidon had in fact agreed on 23 acres of public land on the site, including 6 acres of trail and 14 acres of urban separator in addition to the 3 acre neighborhood park. The last development map made public by Davidon with its 2004 proposal does not indicate where the 3 acre park would be or what facilities it would have, does not show a 200 foot urban separator, and appears to occupy the whole site with residences, fitting the so-called public land tightly between the homes.

   a. Where, in the Gen Plan or the DEIR, is any reference made to the 6 acres of trail to be provided? A

   b. Where, in the Gen Plan or the DEIR, is any reference made to the 14 acres of urban separator? Will the urban separator include trails or any public access? B C

2. What will the environmental impact be of maintaining the classification of the park at this site limited to "neighborhood" if that means no parking spaces, no restrooms, no playground, no transit shelter or bike racks, no community buildings, etc., since Windsor as an entrance area to Putnam Park is already known to attract the public from all over town? D

3. What will be the environmental impact of maintaining such a park as "passive" in view of the need on the Westside for active recreational facilities, such as ball fields, and smaller uses such as tennis and volleyball courts? What scientific or engineering analysis has been done at this site to determine that it is or is not suitable for such active sports? E

4. Referring also to the impact on historic preservation of the red barn and other F

buildings here, what will be the result of making no provision to protect those resources from the planned destruction? What would be the impact on public patterns of facility use and transportation if the barn is not made available for community events and even more residents continue to travel by auto to the Eastside to Lucchesi Park because of the lack of such public buildings on the Westside?

5. If the city does not make special provision for more extensive public park land use in the area adjacent to Helen Putnam County Regional Park, south of Windsor Drive in particular, what is the environmental impact of losing—forever—the opportunity to expand Putnam Park between Western and D Street? G

6. At present, the Davidon site has a creek with oak trees in a natural setting, old historic buildings, threatened and/or endangered species (red-legged frog), abundant wildlife, and a key location in the Petaluma Ring Trail and the Bay Area Ridge Trail. What is the environmental impact of losing that unique asset, close to the city, upon the potential for outdoor recreation and education for our families and schoolchildren? H

We understand that the Gen Plan and the DEIR is not the place to design the park, of whatever size or nature, to be installed at the Davidon site. We also understand that the Davidon project will be accompanied by a DEIR of its own.

Nevertheless, the city has chosen to make some very specific decisions about this public park location in the Gen Plan that will have environmental impact for generations: the number of acres, the designation as "neighborhood" rather than community, and the designation of "passive" rather than active.

We do not believe these choices have been given adequate environmental analysis. This should be done before the EIR is made final.

Very truly yours,

Greg Colvin

Political Director, Petalumans for Responsible Planning

cc: Petaluma City Council
11 English Street
Petaluma, CA 94952

EIR
Mets

GENERAL PLAN INPUT

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DRAFT GENERAL PLAN 2025

submitted at Petaluma City Council General Plan/EIR Hearing

12-4-06

I would appreciate consideration of the following comments. I am submitting one set for General Plan Review and one set for EIR review.

I am a 5th generation Petaluman. I am raising a child here and hope that my family will continue to live here a long time beyond 2025. I have a business here. I love my community, both its rich history and its vibrant present. I want to participate in its having a bountiful future, as well.

I have donated a lot of time to the City of Petaluma, including ten years on the Pedestrian Bicycle Advisory Committee, during at least 6 of which I was chair. Previous to that, I attended well over half of all the meetings of the Petaluma River Access and Enhancement Committee, in part spurred by the day that the Northbay Rowing Club decided to build it boathouse at the end of H St. and we neighbors thought differently about whether that was appropriate use of public riverfront property. I was an attendee and signer of the Central Petaluma Specific Plan.

I also have participated for the last four years or so—since the initial workshops-- in the creation of this General Plan Draft, including the presentation to General Plan staff of over 60 pages of questions and suggestions (while with the Pedestrian Bicycle committee) on the "Existing Conditions, Opportunities and Challenges Report: Executive Summary, from October 10, 2002.

Tonight I submit 7 comments. I have been told that tonight is a formal General Plan hearing and that all comments submitted will have full consideration. Thank you.

1) Petaluma River Access and Enhancement Plan: implement it fully by explicit General Plan language, currently missing from the draft General Plan A

CONTEXT: The River Plan ensures that trails are to be placed on the Petaluma River side of any development all along the Petaluma River in the miles of the Petaluma River covered by the Plan. As we have seen on the corner of 1st Street and D St, and at Foundry Wharf, developers often would rather put their buildings next to the water and have the public access behind the building. This is not the intent of the River Plan. This protection for riverside access must be written more strongly into this General Plan

WHERE TO ADD IT IN THE GENERAL PLAN:

CHAPTER TWO

- Amend Goal 2-G-5 [p. 2-22]: Add onto existing goal, after "enable public access and stewardship": "and provide continuous river-side public trails in these Petaluma

River Corridor areas and all areas covered by the Petaluma River Access and Enhancement Plan" implementation 2-22, 3-19

- ADD a Goal after 2-G 5 [p. 2-22]: "Fully implement the adopted Petaluma River Access and Enhancement Plan."
- Amend program 3-P-37 #C [p. 2-22] to be the following: All development on lands affected by the Petaluma River Corridor or lands in the Petaluma River Access and Enhancement Plan area shall be subject to a discretionary review process either at Planning Commission or SPARC.

  We need a watchdog on river matters and this discretionary process will ensure that, similar to a special review that the Coastal Commission provides.

CHAPTER THREE

- Amend Goal 3-G-10: Add onto "Incorporate the River a s a focal for development along the Boulevard": and fully implement the River Access and Enhancement Plan. The later language in policy 3-)-52 is too weak, without the clarity of "full implementation."

THE EIR IS LACKING:

In 8-P 28 [p. 3.6-8], this EIR does not reference the River Plan, but references the "PRC set aside." Where is it clarified, and compared to the City- adopted Petaluma River Access and Enhancement Plan? That adopted plan needs to be explicitly implemented in strong language in this General Plan and the impacts of either doing that or not doing that need to be directly discussed directly in this EIR. B

Section 3.6 [p. 3.6-10] discusses "flood terracing" in the Denman Reach as a mitigation, but does not adequately discuss the potentials for flooding downstream from that mitigation. In fact, it causes me to wonder whether that "flood terracing" proposed for Denman Reach and (one supposes) Denman Flat is using that Petaluma River Plan as a pretext for draining Denman Reach, imperiling the lower lands and opening that traditionally soggy area for development purposes. This is turning the purpose of the River Plan on its head along with increasing potential for flooding downstream. See "Impact 3.6-3, which says "Buildout of the proposed General Plan may increase drainage flows as a result of impervious surfaces, thereby altering the existing drainage patterns. (Significant)"

In addition, this EIR does not discuss the potential of leaving the entire area around the Factory Outlets (the conjunction of two creeks and the rail line) as a park/bird sanctuary/flood area in order to mitigate both upstream development (including Denman Flats) and the building of Rainier cross-town connector. The creation of a wetlands in Corona Reach (the lands beneath the potential Rainier over crossing) can and should be discussed as a mitigation for flooding. It is not. The public knows that the building of Rainier is not a stand-alone idea, but all along has been connected to build-out in the Corona Reach area. Those two ideas need to be separated in the EIR and they are not. Rainier will cost a lot of money for our City's car transportation needs. Opening up the wetlands beneath will balance that money by providing bicycle and pedestrian trails as well as flood protection in the only un-channelized portion of the Petaluma River and a major bird habitat already, and by providing easy East/West connections on the ground C D

on foot or by bicycle. This should include a pathway along the SCWA aqueduct, (both the existing and any new one) an off-road trail not mentioned either in the General Plan, or as a traffic mitigation in the EIR.

2) **Central Petaluma Specific Plan: implement it fully, rather than piecemeal as is the problem in the current General Plan draft.**
   a. **implement the CPSP's multi-modal traffic improvements, including the road diet of Petaluma Blvd. North and South as written, and use redevelopment funds to do so.**
   b. **rewrite chapter 3 because the sub areas include one called "CPSP", even though it does not match the "CPSP" area designated in the CPSP. Pieces of this actual CPSP area are scattered in a number of other of the fourteen planning areas.**

CONTEXT FOR POINT a: ROAD DIET: The Central Petaluma Specific Plan is an adopted plan. It works as a whole. It includes a vision of infill, road calming, design guidelines. As written, this General Plan supports the infill and the design guidelines, but avoids implementation of the road diet (e.g. for Petaluma Boulevard North and South) which is an inherent part of the plan. Those of us who participated in creating the document want the whole vision implemented. Those of us who live in the area are currently living with the results of the infill and design guidelines portions of the CPSP (i.e. historic riverfront warehouses and Hamilton's cabinet shop torn down to be replaced by 3 and 4 story townhouses and apartments) but not benefiting from the road diet. I personally signed on to the CPSP despite misgivings about the design guidelines, because one has to give a little and take a little. The road diet will solve a terrible problem on the part of Petaluma Boulevard from Van Bebber to downtown where 4 cars have been totaled just in front of my house, in the last ten years! Mirrors are knocked off of cars daily along the entire corridor. It is unpleasant to walk on the Boulevard. Bicyclists are routinely sworn at if they "take a lane" which they must do to ride there. This decision has already been made when the CPSP was adopted: implement the road diet! E

This is a mobility and air quality issue. Both the bicycle and pedestrian modality are impaired in the portions of Petaluma Boulevard North and South (which includes downtown) dealt with in the CPSP. The redevelopment funds are there. This is a redevelopment area.

In specific, in the CPSP, Petaluma Boulevard North and South are to have one slightly larger lane in each direction (as opposed to the small lanes of which the Golden Gate bus drivers now take both dangerously encouraging others to follow suit), bicycle lanes next to that, parallel parking next to the curb, while at the corners there are to be turning lanes. The Transportation Planners "Fehr & Peers Associates" are the same as those who worked on the General Plan. Their studies showed that this configuration would not slow the traffic flow, because of the addition of the turn lanes.

PROBLEM AREAS FOR CPSP ROAD DIET IMPLEMENTATION IN THE GENERAL PLAN

CHAPTER THREE

- implement road diet Blvd 3-16,
- p. 3.7 under "improve key arterial corridors

CHAPTER FIVE

- 5-4
- 5-8
- 5-15
- road definitions get in the way: arterials vs. Main street etc. 5-4–5-8 plus map
- East Washington St gets narrowed explicitly in the General Plan, but CPSP area not on Blvd? That's very strange. 3-13
- without CPSP road diet implementation, development gets built with wrong expectations 5-11
- road diet is pedestrian improvement that is being ignored, add Petaluma Blvd "No and South" 5-20
- change language 5 P 47 from "encourage gateway street traffic calming, particularly along Petaluma Boulevard South and North" to be "Implement traffic calming measures of CPSP on Petaluma Boulevard South and North" 5-29

CHAPTER NINE

- text says "implement design guidelines s in the CPSP and create guidelines for non residential areas outside CPSP" include "and traffic guidelines" 9-13 without traffic improvement, projects being approved and the streets not changed yet.
- economic health , under maintain downtown as hub, "a well articulated network of access routes into downtown" ADD 'implement CPSP road diet"

THE EIR IS LACKING REGARDING CPSP ROAD DIET IMPACTS:

Impact 3.32-1 (p. 3.2-31) states that "increased motor vehicle traffic would result in unacceptable level of service (LOS) at study intersections. (Significant and unavoidable)." It then goes on to discuss General Plan policies that reduce the impact, but nowhere does it state the need to implement the CPSP road diet, which includes bike lanes next to parallel parking on Petaluma Boulevard North and South, currently an extremely inhospitable corridor. This is a lack in the General Plan--for nowhere does it state that this aspect of the CPSP must be implemented--and also a lack in the EIR. One mitigation of the unacceptable LOS described in 3.32-1 is the adopted CPSP which will make pedestrians more likely to use the Boulevards North and South for walking and will allow bicyclists to use the road without being cursed by drivers for taking up "their" lanes. This buffer zone of car parking and bike lanes—proposed in the CPSP—would improve the air quality along the sidewalks, so that the poor lad who painted the mural on the corner of Washington Street and Petaluma Boulevard and had to wear a mask because of the car fumes there, might have had a more palatable experience. Where is the Engineers Fehr and Peers report that gave the CPSP the impetus to include the Petaluma Blvd. North and South road diet in that document? That should be included in this EIR as a mitigation, and as support for re-striping and traffic calming to encourage multi-modal transportation.

"Proposed General Plan Policies that Reduce the impact" (p. 3.2-36) include a very general "Expand the bus transit system..." (5-P-40) and "Maintain a transit system of nominal cost to riders." (5-P-42), but this has no meaning as a mitigation for the General Plan has no definitive goals policies or programs in this area. There is not even a plan to have a bus route along Petaluma Boulevard even though it is the prime north/south corridor, it has a homeless shelter, it has a lot of foot traffic, and it has a lot of housing both in place and planned for the south entryway to the city.

CONTEXT FOR POINT b: REWRITE CHAPTER THREE'S INCORRECT USAGE OF THE TERM "CPSP" AS A SUBAREA WITH THE WRONG BOUNDARIES AND SUBSEQUENT INCLUSION OF PIECES OF THE CPSP AREA IN OTHER SUBAREAS. Chapter 3 is very confusing for anyone concerned with implementation of the CPSP. The chapter uses the term erroneously as the first of 14 sub areas, gives no implementation language about the CPSP Plan itself; then moves on to other sub areas such as Downtown, East Washington Corridor, Lakeville Highway, Petaluma Boulevard North, and Petaluma Boulevard South as separate sub areas even though pieces of all of them are actually in the CPSP area! That is wrong because the components of the CPSP must be implemented in that entire Specific Plan area. No on will understand the confusing mess they've created. The good that came of making a CPSP will be watered down by subsequent unclarity from this one chapter. F

WHERE CONFUSION EXISTS REGARDING REAL "CPSP" VS. "14 SUBAREAS" IN THE GENERAL PLAN--why chapter 3 Land Use and the Land Use map needs to be completely re-written.

CHAPTER THREE

1) get boundaries right and don't confuse issue 3-8, 3-12, 3-14,
2) the real CPSP includes downtown and Pet Blvd So and Lakeville 3-8, 3-17
3) make other areas like downtown, part of pet blvd, wa and Lakeville subcategories 3-11
4) downtown as a category is too confusing—what is downtown? 3-11
5) pet blvd no 5-12
6) the term "downtown" is misleading 9-9

THE EIR IS LACKING REGARDING MITIGATING EFFECTS OF CPSP TRAFFIC IMPROVEMENTS G

Again, this EIR is inadequate where is says "the following proposed policies and programs would reduce this impact [of increased motor vehicle traffic resulting in unacceptable LOS]" because it does not discuss the impacts of a fully implemented CPSP and its multi-modal road improvements including the road diet on Petaluma Boulevard North and South. 5-P-1 says "Develop an interconnected mobility system that allows travel on multiple routes by multiple modes." but nowhere are the impacts of fully-implemented CPSP road improvement factored in, nor is the impact of a Caulfield cross-river connector on those road improvement factored in. How can we enhance the non-motor vehicle experience if we don't carry out adopted plans and monitor determine how they mitigate our "significant and unavoidable" car traffic problems?

THE ~~CPSP~~ EIR IS LACKING REGARDING ERRONEOUS LAND-USE CATEGORIES, STARTING WITH TRUNCATED CPSP: F

The map (Figure 3.1-2) is just one example of how any developer, citizen or even planner will get confused by the term CPSP, since it is used completely differently in this EIR (and the accompanying General Plan) than in the adopted CPSP. I, for instance, live on Petaluma Boulevard South in the CPSP area. But, according to this map, I live in the Petaluma Boulevard South sub area. This needs to be completely re-done. Many of the other sub areas subsequently discussed actually have pieces of them contained in the CPSP, so the generalizations made have no meaning and are misleading.

3.2-32, doesn't mention adopted CPSP and there was engineering done for that. It does not identify the areas of the CPSP.

3) PARKS:

Protect the Fairground--as a public green--not an already-almost-decided retail spot with a 7 acre park maybe

Reclaim Cavanagh Landing as a real destination pocket park, and eliminate the parking lot which has been placed to benefit the restaurant, and re-install the benches that at one time gave the public a free seat for every night's sunset.

CONTEXT REGARDING THE FAIRGROUNDS: Public process is important and there has not been any public decision made, that the citizens of Petaluma want their Fairgrounds redeveloped into anything. It was "Leakage Study" which first gave voice to this desire to turn the Fairgrounds into retail and now the new General Plan repeats that call, despite there never having been a public vote on the citizen's desires on this matter. Simultaneously this General Plan includes language expressing the desire to find ways to reflect the town's agricultural heritage. That is funny. H

The following page numbers reflect places where this occurs and where better more balanced language can be inserted.

a. agricultural heritage respected but stick retail in the center of town that is now Fairgrounds? 3-11
b. citizens must decide 3-22
c. un-decided, unagendized, un-voted on policy should not be stated in General Plan 3-22
d. on park and rec map as 7 acre park? that is a public rip off 6-5
e. get mention of fairground out of retail strategy—it's a policy decision 9-7
f. get rid of ,(in "economic health") consider retail among possible uses in mixed use area on County Fairgrounds site, in even Fairground should relocate -this is policy. What about green for citizens? 9-16

CONTEXT REGARDING CAVANAGH LANDING: This is a pocket park overlooking the Turning Basin. About fifteen years ago, its two benches which permitted I

citizens to enjoy the sunset nightly were replaced by a widened parking area--to benefit the restaurant--and by a large ugly metal box. This is a travesty. Bring back the park.

THE EIR IS LACKING REGARDING THE FAIRGROUNDS:
On p. 3.3-12, this EIR states that the Fairgrounds may become a future park of 7 acres. Where is the rest of our public green? And this "future park" is included on the Park and Rec map 3.3-1. Fairgrounds all over California area being redeveloped away from their original purposes as public greens with an agricultural and recreational component. This EIR skirts around the issue that the "Leakage Study" was what proposed redevelopment of our Fairgrounds into retail, and the impact of this change on the quality of life in Petaluma are nowhere discussed in this EIR. In fact, there has never been a public Council discussion agendizing this subject so the public can weigh in. All this EIR does is throw us a 7 acre park . The issue of the Fairgrounds is a much larger issue than a Park and Rec issue, and belongs in a discussion of the character of our town and what can ever mitigate losing that, piece by piece. H

THE EIR IS LACKING REGARDING CAVANAGH LANDING:
This park is included on the map and the chart as a "pocket park". No one uses it or even considers it a park. It has been made into a non-park. This is an example of green space, potential lunch-time solace, potential air-quality savings that is a quick fix: bring back the benches, get rid of the car parking intruding on park space, get rid of the ugly box. I

4) The General Plan wants to allow parking reductions to encourage infill; it should include commensurate encouragement of non-motorized travel in order to qualify.

CONTEXT: It is not enough for the City to just tell a project, "OK, you can have less parking." That developer must be required to build-in amenities and encouragements to the pedestrian and the bicyclists. It is not difficult to do. Curb cuts, ramps, interconnected pathways to the exterior streets and to neighboring parcels, downstairs bike storage secure areas. The language must be there to enforce it. J

WHERE TO CORRECT THIS IN THE GENERAL PLAN: 3-23, 5-15, and 9-16 under economic health

THE EIR IS LACKING REGARDING PARKING REDUCTION IMPACTS:
Impact 3.2-4 describes "Implementation of the proposed General Plan could result in increased demand for motor vehicle parking. (Less than significant)." Yet General Plan misses the boat by not reminding the City that along with "allow parking reductions to encourage infill" the City could add concurrent expectations, such as: "and the applicant will be required to add amenities to encourage pedestrians and bicycles, specifically ramps, curb cuts, interconnected pathways to exterior streets and neighboring parcels, downstairs bike storage areas." This EIR is inadequate not to have caught such a lack in the General Plan. We don't just dish out freebies; we ask for something in return.

5) Schools: clarify the joint use agreements, put them clearly on maps and make sure all Urban Separator joint use agreements permit citizens to access those Urban Separators at any time, just like in non joint-use areas such as King's Mill, etc. And encourage rather than discourage bicycling to school.

K

CONTEXT: There is too much unclarity about Urban Separator lands and the public. For example at Corona Creek School the Urban Separator is not open to the public even though it could provide a path from Corona Road south to Kenilworth and the Petaluma Center of SRJC. And, in general, schools actively discourage bicycles on campus and do a bad job of protecting them.

WHERE TO CLARIFY OUR JOINT USE AGREEMENTS IN THE GENERAL PLAN AND WHERE TO ENCOURAGE BICYCLING:

g. 4-11 include the plethora of car traffic in and out of schools as an example of "sensitive receptors", that is "children, the elderly and people with illnesses" who are particularly susceptible to air pollutants.
h. joint use, clarify in writing the joint uses and open urban separator all the time at 6-8 and add a program: "ensure all urban separator joint use remains open to public along paths to ring city" 6-16
i. add "joint uses" (onto map 7-2) 7-9.

THE EIR IS LACKING:

Nowhere in the EIR does it discuss that fact that one large mitigation against the Impact 3.10-1 (p. 3.10-8), which is "buildout of the proposed General Plan would result in population levels that could conflict with the Bay Area 2005 Ozone Strategy", is the complete turnaround of the schools' attitudes about bicycling on campus and the utilization of joint-use lands for pedestrian/bicycle travel. This is a giant lack.

L

6) PBAC should receive final conditions of approval on all projects they review

M

CONTEXT: This needs to be a policy in the Mobility section, after the policy allowing the PBAC to provide commentary on all development projects. It is not enough for the PBAC to have the opportunity to review projects and provide uncensored recommended conditions of approval for projects. Without knowing what is eventually implemented, the efforts are wasted. The amount of time that it would take--in fact, does take--for the volunteer PBAC members to track down final conditions of approval from paid staff members who must distribute that information to applicants anyway, is unfair to the volunteer labor supporting the City at all levels. This is probably the most important change to increase the effectiveness of the PBAC. It will answer the nagging questions, like: "What do you ask for that is actually implemented? Is this job worth your efforts? Are impediments you don't even know about blocking your effectiveness?"

EIR REFERENCES:

See above reference to Air Quality. At buildout, our air quality does not meet our own standards. A Committee, such as the PBAC, needs to know the results of its own recommendations by the time a project they have considered is finally approved. This

will create a more effective Committee. This Committee, if it is effective, will improve air quality in the City of Petaluma. I know from personal experience that much of what the PBAC has asked for in its years of attempting to level the playing field for non-motorized transportation, is removed from development plans at the staff level and how does this EIR account for the mitigation that actual implementation of more bike and pedestrian friendly conditions of approval might have on current and future air quality?

7) SPARC should not be gutted in this general plan. Any decision like that does not belong in that draft document, but belongsin a public forum. On the contrary, in my view SPARC's purview should be expanded to include examination of air and water quality effects of any proposed development, as well as protection of historic neighborhoods even beyond "formal historic" designations. N

CONTEXT: In the final three years I was chair of the PBAC, at Ross Parkerson the SPARC Chair's invitation, I went to every SPARC meeting in order to request re-examination of many of the important conditions of approval for projects PBAC had reviewed and which staff had removed in the SPARC packets recommended "conditions of approval." In many cases SPARC thought fit to put PBAC recommendations back in. In every case, the developer did not volunteer to put the item in, because it always cost money. But the PBAC is working to level the playing field for the bicycle and pedestrian modalities. Developers never get away with not putting a car road in. SPARC helps keep the playing field more level because their decisions--unlike the PBAC's--are final, unless appealed to Council.

WHERE THE GENERAL PLAN IS WRONG:
Chapter 11 attempts to cut SPARC off at the knees. The General Plan is not an appropriate forum for this, anyway. That is for the public to decide in a public Council setting.

j. get rid of Housing's policy statement on SPARC 11-32 and 11-33
k. get rid of programs cutting SPARC power--this was tried in public and failed, and is now getting into General Plan in Housing?? 11-50

THE EIR IS LACKING:
p. 2-7: Number 2 of the Guiding principles of the proposed General Plan is said to be "Preserve and enhance Petaluma's historic character. Nowhere in this EIR is the mitigating effect that SPARC has on ugly development or destruction of historic neighborhoods discussed. In fact, I feel SPARC's role needs to be enhanced, not curtailed, not only to include reviewing all CPSP developments--as I was told in Planning was the rule now--but to ensure that the historic character of buildings and neighborhood not deemed formally "Historic" are protected so that in 30 years the town is not unrecognizable, with its historic neighborhoods demolished by progress and infill.

I also see nowhere in this EIR, the public body that will enforce the City's proposed "green building policies" which I assume would include ensuring that adequate money, design and aesthetic attention is given to multi-modal travel in and out of any O

development project, and I conclude logically that it should be SPARC.. These green building policies have the potential to mitigate a lot of the negative impacts of general plan buildout. The EIR makes some grave statements: Impact 3.5-1: "New development that would result from the proposed General Plan would increase water demand that may exceed available supply." And Impact 3.5-2, "New development may result in the need to expand new wastewater treatment facilities..." And Impact 3.5-3: "The proposed General Plan could result in wasteful, inefficient, or unnecessary consumption of energy by residential, commercial, industrial or public uses."But nowhere does this EIR suggest the mitigation power of an effective enforcing public body such as SPARC. Nowhere does this EIR challenge Chapter 11, saying SPARC is actually a negative force in development. I noted that chapter's attempt at dismantling SPARC and this EIR should have discussed the potential positives and negatives of such a drastic change.

Sincerely,

Patricia Tuttle Brown
513 Petaluma Blvd. So.
Petaluma, CA 94952
707-762-2240

Tuft, Pamela

From: Tuft, Pamela
Sent: Tuesday, December 05, 2006 1:33 PM
To: 'cmoe6@comcast.net'
Cc: CityCouncil
Subject: RE: Draft 2025 Gen Plan & EIR

Dear Ms. Moore,

Thank you for your comments. They will be provided to the Planning Commission for consideration during their deliberation of the Draft General Plan and Draft EIR. We will relook at the applicable General Plan and EIR sections regarding landslides and instability to insure consistency between analysis and recommended policy - thank you for the observation.

The hillside ordinance will be contained within, or developed concurrently with, the City's new Development Code (Zoning Ordinance and related implementation tools). The City's Community Development Department is responsible for this work effort and I believe they have begun the preparation process. It is my understanding that the Development Code is intended to be completed as shortly after the General Plan adoption process as is possible. Please feel free to contact Mike Moore, Community Development Director at mmoore@ci.petaluma.ca.us or 778-4301 regarding your particular interests for inclusion in the Draft Ordinance.

Thank you again for being involved in the General Plan deliberation process.

Pamela Tuft, AICP
Director of General Plan Administration
City of Petaluma
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taluma, CA 94953
07) 778-4552
(707) 778-4586 (fax)

-----Original Message-----
From: cmoe6@comcast.net [mailto:cmoe6@comcast.net]
Sent: Tuesday, December 05, 2006 1:24 PM
To: Tuft, Pamela
Cc: CityCouncil
Subject: Draft 2025 Gen Plan & EIR

12/5/2006

Pamela Tuft
General Plan Manager City of Petaluma
27 Howard St.
Petaluma, CA 94952

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Re: Draft EIR for the General Plan 2025

Dear Ms. Tuft,

I understand the General Plan 2025 has been in development for some time now and is coming up to be finalized.

It is critical that a current hillside ordinance and standards plan be in place before the General Plan 2025 is approved.

e minimal guidelines within the draft GP state â€œEstablish development, design andards, and regulations in the Development Codeâ€ . This means that we still do not have these standards and makes no reference of any deadline to when they will be updated. Our current regulations are inadequate.

For example, in the draft EIR, see section 3.7 on geology, reference is made to instability and landslide potential on slopes of 25% and even 15%. Yet the proposed General Plan Policies 10-P-2 and 10-P-3 do not seem to impose restrictions on building unless the slope is greater than 30%.

The city should look at hillside regulations in Marin Countyâ€™s general plan and in oth nearby communities, for more beneficial policies.

These standards and regulations have been needed for many years. Why has the Petaluma staff fallen behind with supplying this long overdue ordinance? The current standards are inadequate and leave too much room for personal opinions.

Either the standards and hillside ordinance regulations should be included in the General Plan 2025, or the draft GP should not be approved until the Development Code is updated with a current hillside /ridgeline ordinance.

We have been waiting long enough.

Chey Moore
52 Oxford Ct
Petaluma, CA 94952

PAULA LANE ACTION NETWORK (P.L.A.N.)
a 501(c)3 public benefit nonprofit org.
P.O. Box 2903
Petaluma, CA 94953
Phone (707) 773-3215/763-2089/290-6760, skypasture@aol.com

provided to PC by CDD add to summary (no copies)

December 2, 2006

Re: P.C. Draft GP DEIR

Pamela Tuft, General Plan Administrator
City of Petaluma
27 Howard Street
Petaluma, CA 94952

Re: 11/14/06, 11/28/06 Planning Commission meetings/General Plan/
Draft EIR discussion
Request for density designation change - 1436 Western Ave.

75

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Dear Ms. Tuft:

We continue to have concerns regarding the City's General Plan review process relative to the West Hills, as well as the request and subsequent efforts by RRSC Petaluma LLC for a change in residential density for 1436 Western Avenue.

On the City of Petaluma's web site, video replay of the 11/14/06 Planning Commission meeting on the above-referenced item began at 49:42. Video replay of the continued discussion during the 11/28/06 meeting began at 1:21:00 and concluded at approximately 2:34:00.

We sincerely hope you will be able to take the time to review the actual meeting content. We hope the same for City Council members, the Mayor, and the City Manager.

To date, an extensive public process has occurred relative to the General Plan 2025, along with City Council direction, regarding West Hills properties with the Rural Residential designation. Identified during the public process have been the challenging topography, the historic character of the West Hills area with the desire to protect what is considered the rural equivalent of historic Victorian downtown, the principle of feathering densities to the UGB, questions raised in the Paula Lane area just north of Western Avenue regarding the location of the UGB itself, and identified environmental constraints to development in this area - including critical wildlife habitat and movement areas, low water pressure, impact to longstanding groundwater recharge areas, potential significant drainage problems, lighting and noise impacts in rural areas, and proposing reasonably sized homes consistent with existing communities.

Background of 1436 Western Avenue
As you may be aware, the new property owner of 1436 Western Avenue, a 16.67 acre property, requested consideration for increasing the designation from Rural Residential (up to 1 unit per 2 acres) to Very Low Density (up to 2 units per acre, or a maximum of 33 units if the property were annexed). In the County currently and in the revised General Plan in process, the property is designated Rural Residential with a density of 1 unit per 1.5 acres, or a total of 11 units. Granny units are not permitted unless the property owner desires to contract with the Community Development Commission for a 30-year agreement to offer affordable rental housing at a stable rental rate during that time period for qualified renters. In either scenario, a proposal for up to 11 units or homes with granny units, well and septic capacity must be available and proven. The 1.5 acre County General Plan density is so designated relative to the property's location to the City of Petaluma, according to a County Planning Commissioner with whom we spoke.

With regard to the Petaluma General Plan, the property is located at the Urban Growth Boundary edge. If the property were annexed and City of Petaluma services provided, a maximum of 8 units could be proposed, which is consistent with the density designation of Rural Residential.

From our community's perspective, Paula Lane at Bodega Avenue, this property is a potential hilltop development. We are concerned about nighttime lighting impacts (streetlights from Westhaven currently impact the area with bright

Background - continued
nighttime lighting - see photo documentation submitted for public record), as well as drainage impacts and interruption of biological resource habitat and movement areas.

The neighbors adjacent to this property have even greater concerns - and we believe they have reason to be concerne. On 11/14/06, a couple representing many of the neighbors spoke of their concerns in Public Comment - and the neighbors were unanimous in desiring to retain the Rural Residential density designation.

The owners' representative, Rebecca Celli, is a local Frank Howard Allen Realtor. Her residence address is the same as RRSC Petaluma LLC (109 Ravenswood Court in Petaluma). On 11/14/06, Ms. Celli contended that the property is in an area that is suburban and surrounded by Very Low Density housing designations.

This is untrue. From our review, just south of the property is Rural Residential in the county, and just west is Rural Residential with parcels ranging from 1/3 acre to 1.8 acres to 1.25 acres to 2.09 acres to 2.25 acres with additional smaller county parcels interspersed. The Rural Residential density designation under County jurisdiction for these properties reflects the character of the area as well as the appropriate designation. If a parcel is less than 0.5 acre, it is considered nonconforming and is grandfathered into the County General Plan. The term "nonconforming" is neither negative nor inappropriate nor a situation necessary to change. In our area, several nonconforming County land use designations exist. This is also a reality throughout the County. It simply reflects traditional and current land uses that, over time as General Plans or zoning change, may not be consistent with zoning and density designations as plans are put into place.

East of the parcel are Bantam Way, Petaluma Junior High and City limits with a higher density designation. North of the parcel, down the Hill, at Bodega Avenue, we understand the General Plan staff changed a Rural Residential density to Very Low Density for a property to bring the property into compliance. We wonder whether this is appropriate, given that applying a Very Low Density designation could allow for a proposal of up to 33 units, which would be out of character with the general rural area. During the public process of review and revision of the draft Land Use Map and General Plan, we recall the consensus was to retain existing residential density designations in our area of Paula Lane. While some properties may be considered nonconforming, the designation and community input reflected the best policy decision with regard to the area in general..

The availability of proposing up to 8 reasonably sized homes, consistent with the 1436 Western Avenue neighborhood's rural character, is the designation under which the property was purchased and the designation in the revised General Plan in final review, following the public process of community input and Planning Commission workshops relative to the Land Use Map, created after Alternatives A, B and C were presented and the decision was made to review the staff's alternatives and recreate an optimal Land Use Map. As noted, with annexation, a Very Low Density designation would permit a proposal for up to 33 homes on this parcel.

The property owner suggested an Urban Separator Path with a transfer of density to the other portion of the property. We do not support this request. One of the principals for the new owners stated in the 11/28/06 Planning Commission meeting they would likely only propose 15 to 20 homes. Fifteen to twenty houses on this property would completely alter the character of the longstanding community, would urbanize an area that is rural, and, in our view, pose potential multiple significant impacts - not the least of which would be destroying groundwater recharge area for the county, introducing lighting impacts, and creating new drainage issues.

With the rural community character, several residents (we counted 3 ourselves) bordering this property have livestock. This is very significant in terms of persons who reside in rural communities being able to sustain their livelihood and their choices for a rural life. Also, these county residents were not given the opportunity to vote on the 1998 Petaluma Urban Growth Boundary Measure. This is not a NIMBY issue. It is exactly the opposite. This is a situation where impacted county residents - who were not voters in the 1998 City of Petaluma UGB ballot measure - should be afforded a voice to explain their concerns, including impacting their livelihood, their quality of life and impacts to their property from runoff and drainage, many of whom are already experiencing these changes from Westhaven. The neighbors came to the meeting to express their desire to retain the existing Rural Residential designation. We submit this is far from NIMBYism.

"Letters of Support"
Rebecca Celli, representing the property owners, submitted 62 letters on 11/14/06. A copy of this form letter is contained in Appendix 3, along with pertinent information relative to those who signed this letter.

The content of the letter is misleading and describes the option under Rural Residential density to construct eight very large multimillionaire estates. In reality, of course, the maximum of 8 units upon annexation and provision of City services, could reasonably be homes consistent with the existing community, affording areas of open space and preservation of the rural character and the environment. We are of the opinion that many who signed the letter believed the term "very low density" actually meant just that, very low density. The planning term of Very Low Density in the General Plan process allows for up to 33 proposed units on this 16.67 acre property. This was apparently not disclosed to signers. We kindly refer the reader to Appendix 2 for an exchange of information between Councilwoman Nau and Ms. Celli during the 11/14/06 Planning Commission meeting.

During the 11/28/06 Planning Commission meeting, one Commissioner who stated he had driven in the area, taken photographs and measured lot lines, presented an argument that the area was already Very Low Density, based on the parcel sizes of some of the rural lots on Cleveland Lane being less than 0.5 acre. As noted previously in this letter, the densities are intermixed with smaller county parcels and parcels that are equivalent to or even greater than the County Rural Residential density designation in the County. Another concern during the 11/28/06 Planning Commission meeting was a discussion that deteriorated into project level or probable site plan comments. This appeared to be an attempt to justify support of the Very Low Density designation. For example, clustering of homes with a 75 foot urban separator would have the same cumulative impact as 33 units covering the property, as the clustering of density would result in an appearance of higher density. An urban separator or urban separator path of 75 feet with human encroachment along the western property line would also be inappropriate. This is similar to the situation on Paula Lane where an urban separator pathway was placed along the western edges of properties when, in reality, much of that area is wildlife habitat where there is no human encroachment now and such encroachment would likely be detrimental and contraindicated. For the Western Avenue and Cleveland Lane residents, an urban separator path, particularly for those who have livestock, would be ill advised.

The information presented to signers of the so-called letter of support who thought they were supporting, in concept, very low density, when in reality, Very Low Density is a higher density designation, allowing a proposal of up to 33 units on this parcel if annexed to the City of Petaluma, was fundamentally flawed. In addition, the property owner did not disclose that the 8 very large multimillionaire estate homes would be the owners' choice in terms of increasing their profit margin, when, in reality, 8 reasonably sized homes located on 2 acre parcels, would be possible and likely most consistent with the area and surrounding county residents.

Conclusion
As the City Councilmembers and General Plan staff are aware, our neighborhood organization is not antidevelopment. However, the request by RRSC Petaluma LLC is inappropriate and related to issues that have long since been settled. We appreciate the votes of Commissioners Dargie, Sullivan and Arras, as well as Councilwoman Nau, to retain the Rural Residential density designation for the property at 1436 Western Avenue. We hope the concerns expressed herein are helpful in the continuing process. We respectfully submit this letter with appendices for the public record.

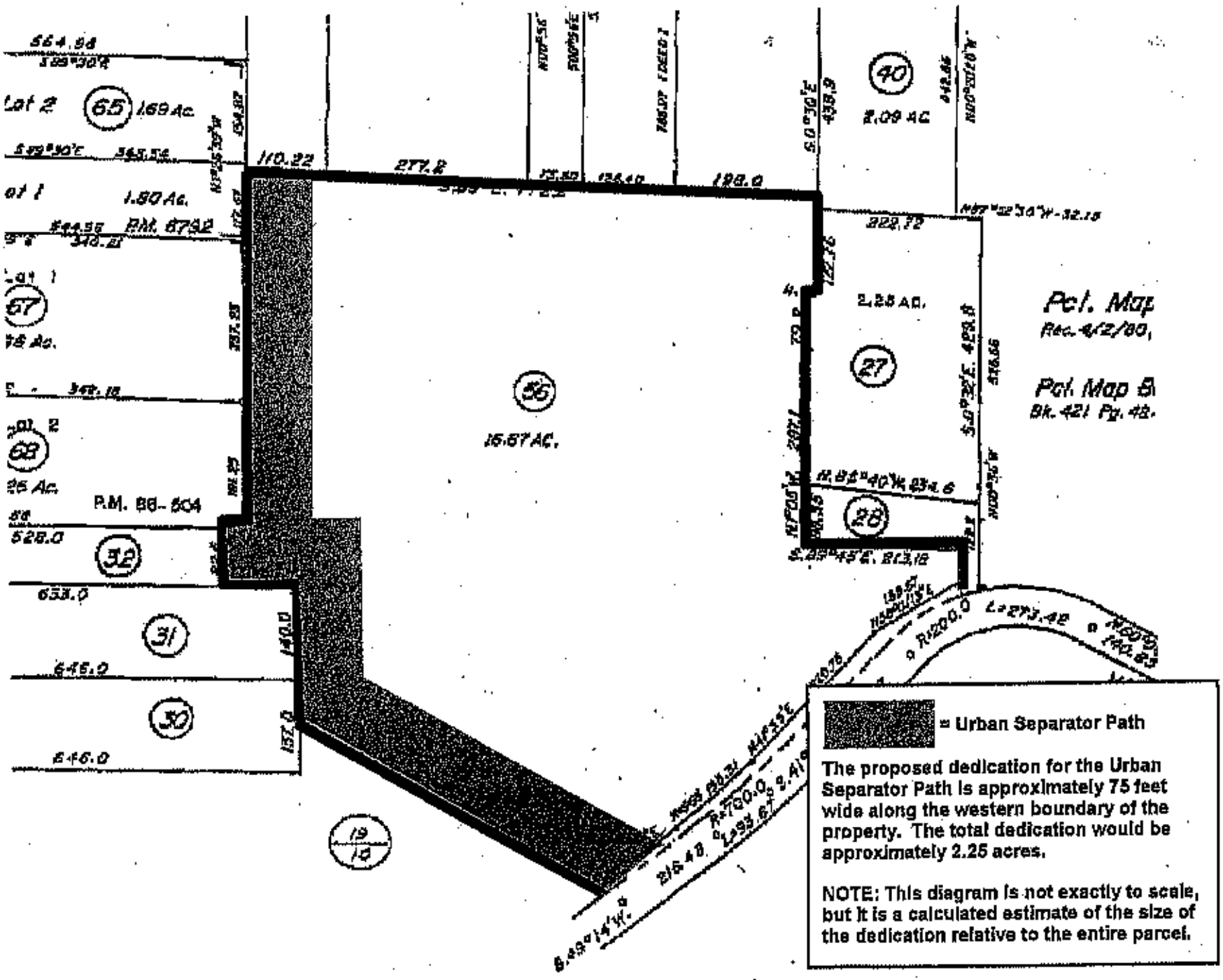
Sincerely,

Paul Selinger, for
Paula Lane Action Network

Enclosures:
1. Appendix 1: Deed/Parcel map and proposal submitted by property owner of 1436 Western Ave.
2. Appendix 2: Transcript of portion of 11/14/06 Planning Commission meeting
3. Appendix 3: Signer list re: letters submitted by Rebecca Celli, property owner rep, sample copy of letter

cc: Mayor Glass and Members of City Council
Mr. Scott Duiven, General Plan Admin.
Members of Petaluma Planning Commission
Mr. Mike Bierman, City Manager
Mr. George White, Director of Planning

APPENDIX 1



Lot 2
65
1.69 Ac.
Lot 1
1.80 Ac.
P.M. 6792
67
68
P.M. 86-504
32
31
30
19
10
56
16.67 AC.
40
2.09 AC
27
2.25 AC.
28
Pcl. Map
Pcl. Map B
Bk. 421 Pg. 48.
= Urban Separator Path
The proposed dedication for the Urban Separator Path is approximately 75 feet wide along the western boundary of the property. The total dedication would be approximately 2.25 acres.
NOTE: This diagram is not exactly to scale, but it is a calculated estimate of the size of the dedication relative to the entire parcel.

PROPOSAL FOR GENERAL PLAN DESIGNATION, ANNEXATION, ZONING AND ENTITLEMENTS

Background. This proposal is presented by RSCC Petaluma, LLC, the owner of 16.67 acres of unimproved real property commonly known as 1436 Western Avenue, Petaluma, California (the "Property"). The Property is presently located outside the limits of the City of Petaluma (the "City"), but within the City's Urban Growth Boundary. The Planning Commission (the "Commission") of the City is considering the land use designation for the Property on General Plan 2025 as a) "Rural Residential" or b) "Very Low Density Residential". Under Sonoma County jurisdiction the Property is currently zoned for residential lots of 1.5 acres each, which would yield a total of approximately 11 lots.

Proposal. The owners of the Property attending the 11-14-06 meeting listened very carefully to the needs, concerns, comments and interests of the Commission and all parties in attendance relative to the General Plan 2025.. The owners have received positive response in dialogue with various members of pertinent city officials. We want to work hand in hand with the City. The owner submits for consideration the following concept concerning the Property:

- The need to feather the Urban Growth Boundary is very important. The owner agrees to dedicate land of not more than 2.5 acres of the Property along the western boundary to use towards development of an Urban Separator Path or similar use. It is contemplated that the dedicated portion will be used for general community purposes, such as a park, walking, bicycling, or hiking paths, or comparable community uses.

- Homes bordering the Property are suburban. The Commission by designating the Property as Very Low Density will be in keeping with the majority of the surrounding properties, eliminate a rural island and bring conformity to the City. Adoption of Staff recommendation B calls for Very Low Density designation for the Property with the Urban Separator Path provided above.

RECORDING REQUESTED BY:

Old Republic Title Company

ORDER #: 0812002777-JJ
APN #: 19-090-056

WHEN RECORDED MAIL TO

RSCC Petaluma LLC
109 Ravenswood Court
Petaluma, CA 94952

OLD REPUBLIC TITLE CO.
12/30/2005 08:00 DEED
RECORDING FEE: 25.00
COUNTY TAX: 3850.00
PAID

2005191526
OFFICIAL RECORDS OF
SONOMA COUNTY
EEVE T. LEWIS
4 PGS

THE WITHIN DOCUMENT IS EXECUTED IN 2 COUNTERPARTS
THE 2 COUNTERPARTS ARE TO BE CONSTRUED AS A SINGLE DOCUMENT

SPACE ABOVE THIS LINE FOR RECORDERS USE

Grant Deed

Monument Preservation Fee is $10.00
The undersigned grantor(s) declare(s):
Documentary transfer tax is $3,850.00
(X) computed on full value of property conveyed, or
( ) computed on full value less of liens and encumbrances remaining at time of sale.
(X) Unincorporated area: ( ) City of _____

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged,
James C. Pruett and Lorrie Pruett, Trustee of the James C. and Lorrie Purett Trust and Jeffrey M. Pruett, an unmarried man and Jerold J. Pruett, a married man, as his sole and separate property
hereby GRANT(S) to
RSCC Petaluma LLC, a California limited liability company

that property in Unincorporated area of Sonoma County, State of California, described as follows:
See "Exhibit A" attached hereto and made a part hereof.

Mail Tax Statements to Grantee at address above

Date December 22, 2005

Jeffrey M. Pruett

Jerold J. Pruett

The James C. and Lorrie Pruett Trust

by: _____
James C. Pruett, Trustee

by: _____
Lorrie Pruett, Trustee

State of California
County of Sonoma
On 12-28-05 before me, Julie James

a Notary Public in and for said State, personally appeared

Jeffrey M Pruett

personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument

WITNESS my hand and official seal.

Signature _____

Name Julie James
(typed or printed)

JULIE JAMES
COMM. # 1388507
NOTARY PUBLIC-CALIFORNIA
SONOMA COUNTY
COMM. EXP. JAN. 1, 2007

FTGIS-140 8/94

(This area for official notarial seal)

MAIL TAX STATEMENTS AS DIRECTED ABOVE

RECORDING REQUESTED BY:

Old Republic Title Company

ORDER #: 0812002777-JJ
APN #: 19-090-056

WHEN RECORDED MAIL TO

RSCC Petaluma LLC
109 Ravenswood Court
Petaluma, CA 94952

SPACE ABOVE THIS LINE FOR RECORDERS USE

Grant Deed

Monument Preservation Fee Is
The undersigned grantor(s) declare(s):
Documentary transfer tax is _____
(X) computed on full value of property conveyed, or
( ) computed on full value less of liens and encumbrances remaining at time of sale.
(X) Unincorporated area: ( ) City of _____

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged,
James C. Pruett and Lorrie Pruett, Trustee of the James C. and Lorrie Purett Trust and Jeffrey M. Pruett, an unmarried man and Jerold J. Pruett, a married man, as his sole and separate property
hereby GRANT(S) to
RSCC Petaluma LLC, a California limited liability company

that property in Unincorporated area of Sonoma County, State of California, described as follows:
See "Exhibit A" attached hereto and made a part hereof.

Mail Tax Statements to Grantee at address above

Date December 22, 2005

Jeffrey M. Pruett

State of OREGON
County of Jackson

On _____ before me,
R. Hansen

Jerold J. Pruett

a Notary Public in and for said State, personally appeared
James C Pruett Trustee,
Lorrie Pruett Trustee

The James C. and Lorrie Pruett Trust

by: _____
James C. Pruett, Trustee

by: _____
Lorrie Pruett, Trustee

personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Signature _____

Name R. Hansen
(typed or printed)

OFFICIAL SEAL
R. HANSEN
NOTARY PUBLIC-OREGON
COMMISSION NO. 395723
MY COMMISSION EXPIRES SEPT. 24, 2009

(This area for official notarial seal)

FTGTS-140 8/94

MAIL TAX STATEMENTS AS DIRECTED ABOVE

State of California

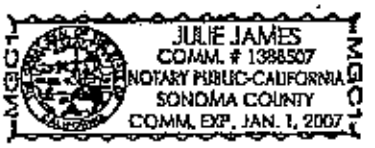
County of Sonoma

On 27th day of December, 2005 before me, Julie James a Notary Public in and for said State, personally appeared Jerold J. Pruett, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Signature _____

Name Julie James
(typed or printed)



(Seal)

JJ/JJ

EXHIBIT A

The land referred to is situated in the unincorporated area of the County of Sonoma, State of California, and is described as follows:

Beginning at the most Northerly Northwest corner of that tract of land described in Decree Quieting Title dated January 29, 1917 and recorded January 29, 1917 in Volume 347 of Deeds, page 402, Sonoma County Records; thence South 0.34' East, 1.86 chains to the North side of a house; thence West 0.18 chains to the Northwest corner of said house; thence South 0.57' West, 1.20 chains; thence South 1.05' East 4.35 chains to a stake in a stone quarry; thence South 89.45' East, 3.25 chains to a stake; thence South 0.45 East 0.84 chains to the North line of Western Avenue Extension Road; thence along said line North 82° East, 0.46 chains to a gate post; thence South 0.45 East, 0.51 chains to the center line of the road; thence Southwesterly along the center line of said road to the point of intersection of said centerline, with the extension Southeasterly, of the Northeasterly line of the tract of land conveyed to Maurice Hickey, et ux, to Henry D. Cramer by deed dated September 22, 1909 and recorded September 24, 1909 in Volume 259 of Deeds, page 103, Sonoma County Records; thence North 60° West, to the Northwesterly side of said road and the most Easterly corner of said Cramer tract; thence North 60° West, along the Northeasterly line of said Cramer tract, 154 feet to the lands of John P. Messinger as described in deed to him from Maurice Hickey, et ux, dated August 25, 1904, recorded August 1904 in Volume 210 of Deeds, page 631, Sonoma County Records; thence North 58.45 West, 5.09 chains, along the Northeasterly line of said lands of Messinger, to the East line of the tract of land conveyed to H.W. Hansen by deed from Maurice Hickey, et ux, dated May 12, 1905 recorded May 25, 1905 in Volume 217 of Deeds, page 254, Sonoma County Records; thence Northerly along the East line of said Hansen tract, to the Northeast corner thereof, being the Southeast corner, of the tract of land conveyed to Charles Schleing, et ux, by deed from Maurice Hickey, et ux, dated June 5, 1905, recorded June 13, 1905, recorded June 13, 1905 in Volume 217 of Deeds, page 351, Sonoma County Records; thence Northerly, along the East line of said Schleing tract, 8 rods and 8 feet, more or less, to the Northeast corner thereof; thence West, along the North line of said Schleing tract, 5 rods and 2 1/2 feet, more or less, to the Southeast corner of the tract of land conveyed to John Mitton by deed from Morris Hickey, et ux, dated August 13, 1901, recorded August 14, 1901, in Volume 194 of Deeds, page 611, Sonoma County Records; thence North, along the East line of said Mitton tract, 5 rods to the Northeast corner thereof, being a point on the South line of the tract of land conveyed to Richard A. Comerford by deed from J.D. Lodge, dated May 22, 1874, recorded June 4, 1874 in Volume 46 of Deeds, page 369 Sonoma County Records; thence East, along the South line of said Comerford tract, to the Southeast corner thereof; thence North, along the East line of said Comerford Tract, to the Southwest corner of the tract of land conveyed to Ira Morrill by deed from J.D. Dodge, et al, dated January 14, 1871, recorded January 16, 1871 in Volume 32 of Deeds, page 84, Sonoma County Records; thence East, along the South line thereof 47 1/3 rods, more or less, to the Southeast corner thereof, being on the West line of property formerly belonging to A.B. Derby; thence South, along the West line of said Derby tract, to the North line of the tract of land (hereinabove referred to) described in Decree Quieting Title recorded in Volume 347 of Deeds, page 402, Sonoma County Records; thence to the point of beginning. Excepting therefrom that portion conveyed by Stanley A. Slidell et ux, to the County of Sonoma, by Deed recorded January 24, 1963 in Book 1938 Official Records, page 925, Sonoma County Records.

APN: 019-090-056

RECORDING REQUESTED BY

Richard A. Corleto
WHEN RECORDED MAIL TO

ORDER # 0812002777
APN 019-090-056

Name Richard A. Corleto, Trustee
Street Address 15760 Ventura Boulevard, Suite 801
City State Encino, California 91436

3,350.

OLD REPUBLIC TITLE CO.
12/30/2005 08:00 TRD
RECORDING FEE: 29.00
PAID

2005191527
1
OFFICIAL RECORDS OF
SONOMA COUNTY
EEVE T. LEWIS
6 PGS

SPACE ABOVE THIS LINE FOR RECORDER'S USE

Deed of Trust and Assignment of Rents

This Deed of Trust, made this 22nd day of December, 2005, between

RSCC Petaluma LLC, a California limited liability company, herein called TRUSTOR, whose address is c/o Michael Robin, 109 Ravenswood Court, Petaluma, California 94952

Old Republic Title Company herein called TRUSTEE, and

Ruth B. Ziegler and Richard A. Corleto, Trustees of Trust "A" of the Ziegler Family Trust u/t/a dated December 4, 1980, herein called BENEFICIARY,

Witnesseth: That Trustor IRREVOCABLY GRANTS, TRANSFERS AND ASSIGNS to TRUSTEE IN TRUST, WITH POWER OF SALE, that property in Sonoma County, California, described as:

See Exhibit "1" attached hereto and made a part hereof for legal description

See Rider attached hereto and made a part hereof for additional terms.

Together With the rents, issues and profits thereof, SUBJECT, HOWEVER, to the right, power and authority hereinafter given to and conferred upon Beneficiary to collect and apply such rents, issues and profits.

For the Purpose of Securing:
1. Performance of each agreement of Trustor herein contained. 2. Payment of the indebtedness evidenced by one promissory note of even date herewith, and any extension or renewal thereof, in the principal sum of $3,350,000.00 executed by Trustor in favor of Beneficiary or order. 3. Payment of such further sums as the then record owner of said property hereafter may borrow from Beneficiary, when evidenced by another note (or notes) reciting it is so secured.

To Protect the Security of This Deed of Trust, Trustor Agrees:
(1) To keep said property in good condition and repair; not to remove or demolish any building thereon; to complete or restore promptly and in good and workmanlike manner any building which may be constructed, damaged or destroyed thereon and to pay when due all claims for labor performed and materials furnished therefor; to comply with all laws affecting said property or requiring any alterations or improvements to be made thereon; not to commit or permit waste thereof; not to commit, suffer or permit any act upon said property in violation of law; to cultivate, irrigate, fertilize, fumigate, prune and do all other acts which from the character or use of said property may be reasonably necessary, the specific enumerations herein not excluding the general.

(2) To provide, maintain and deliver to Beneficiary fire insurance satisfactory to and with loss payable to Beneficiary. The amount collected under any fire or other insurance policy may be applied by Beneficiary upon any indebtedness secured hereby and in such order as Beneficiary may determine, or at option of Beneficiary the entire amount so collected or any part thereof may be released to Trustor. Such application or release shall not cure or waive any default or notice of default hereunder or invalidate any act done pursuant to such notice.

(3) To appear in and defend any action or proceeding purporting to affect the security hereof or the rights or powers of Beneficiary or Trustee; and to pay all costs and expenses, including cost of evidence of title and attorney's fees in a reasonable sum, in any such action or proceeding in which Beneficiary or Trustee may appear, and in any suit brought by Beneficiary to foreclose this Deed.

(4) To pay: at least ten days before delinquency all taxes and assessments affecting said property, including assessments on appurtenant water stock; when due, all incumbrances, charges and liens, with interest, on said property or any part thereof, which appear to be prior or superior hereto; all costs, fees and expenses of this Trust.

Should Trustor fail to make any payment or to do any act as herein provided, then Beneficiary or Trustee, but without obligation so to do and without notice to or demand upon Trustor and without releasing Trustor from any obligation hereof, may: make or do the same in such manner and to such extent as either may deem necessary to protect the security hereof, Beneficiary or Trustee being authorized to enter upon said property for such purposes; appear in and defend any action or proceeding purporting to affect the security hereof or the rights or powers of Beneficiary or Trustee; pay, purchase, contest or compromise any incumbrance, charge or lien which in the judgment of either appears to be prior or superior hereto; and, in exercising any such powers, pay necessary expenses, employ counsel and pay his reasonable fees.

(5) To pay immediately and without demand all sums so expended by Beneficiary or Trustee, with interest from date of expenditure at the amount allowed by law in effect at the date hereof, and to pay for any statement provided for by law in effect at the date hereof regarding the obligation secured hereby any amount demanded by the Beneficiary not to exceed the maximum allowed by law at the time when said statement is demanded.

(6) That any award of damages in connection with any condemnation for public use of or injury to said property or any part thereof is hereby assigned and shall be paid to Beneficiary who may apply or release such moneys received by him in the same manner and with the same effect as above provided for disposition of proceeds of fire or other insurance.

(7) That by accepting payment of any sum secured hereby after its due date, Beneficiary does not waive his right either to require prompt payment when due of all other sums so secured or to declare default for failure so to pay.

(8) That at any time or from time to time, without liability therefor and without notice, upon written request of Beneficiary and presentation of this Deed and said note for endorsement, and without affecting the personal liability of any person for payment of the indebtedness secured hereby, Trustee may: reconvey any part of said property; consent to the making of any map or plat thereof; join in granting any easement thereon; or join in any extension agreement or any agreement subordinating the lien or charge hereof.

(9) That upon written request of Beneficiary stating that all sums secured hereby have been paid, and upon surrender of this Deed and said note to Trustee for cancellation and retention and upon payment of its fees, Trustee shall reconvey, without warranty, the property then held hereunder. The recitals in such reconveyance of any matters or facts shall be conclusive proof of the truthfulness thereof. The grantee in such reconveyance may be described as "the person or persons legally entitled thereto". Five years after issuance of such full reconveyance, Trustee may destroy said note and this Deed (unless directed in such request to retain them).

(10) That as additional security, Trustor hereby gives to and confers upon Beneficiary the right, power and authority, during the continuance of these Trusts, to collect the rents, issues and profits of said property, reserving unto Trustor the right, prior to any default by Trustor in payment of any indebtedness secured hereby or in performance of any agreement hereunder, to collect and retain such rents, issues and profits as they become due and payable. Upon any such default, Beneficiary may at any time without notice, either in person, by agent, or by a receiver to be appointed by a court, and without regard to the adequacy of any security for the indebtedness hereby secured, enter upon and take possession of said property or any part thereof, in his own name sue for or otherwise collect such rents, issues and profits, including those past due and unpaid, and apply the same, less costs and expenses of operation and collection, including reasonable attorney's fees, upon any indebtedness secured hereby, and in such order as Beneficiary may determine. The entering upon and taking possession of said property, the collection of such rents, issues and profits and the application thereof as aforesaid, shall not cure or waive any default or notice of default hereunder or invalidate any act done pursuant to such notice.

(11) That upon default by Trustor in payment of any indebtedness secured hereby or in performance of any agreement hereunder, Beneficiary may declare all sums secured hereby immediately due and payable by delivery to Trustee of written declaration of default and demand for sale and of written notice of default and of election to cause to be sold said property, which notice Trustee shall cause to be filed for record. Beneficiary also shall deposit with Trustee this Deed, said note and all documents evidencing expenditures secured hereby.

After the lapse of such time as may then be required by law following the recordation of said notice of default, and notice of sale having been given as then required by law, Trustee, without demand on Trustor, shall sell said property at the time and place fixed by it in said notice of sale, either as a whole or in separate parcels, and in such order as it may determine, at public auction to the highest bidder for cash in lawful money of the United States, payable at time of sale. Trustee may postpone sale of all or any portion of said property by public announcement at such time and place of sale, and from time to time thereafter may postpone such sale by public announcement at the time fixed by the preceding postponement. Trustee shall deliver to such purchaser its deed conveying the property so sold, but without any covenant or warranty, express or implied. The recitals in such deed of any matters or facts shall be conclusive proof of the truthfulness thereof. Any person, including Trustor, Trustee, or Beneficiary as hereinafter defined, may purchase at such sale.

After deducting all costs, fees and expenses of Trustee and of this Trust, including cost of evidence of title in connection with sale, Trustee shall apply the proceeds of sale to payment of: all sums expended under the terms hereof, not then repaid, with accrued interest at the amount allowed by law in effect at the date hereof; all other sums then secured hereby; and the remainder, if any, to the person or persons legally entitled thereto.

(12) Beneficiary, or any successor in ownership of any indebtedness secured hereby, may from time to time, by instrument in writing, substitute a successor or successors to any Trustee named herein or acting hereunder, which instrument, executed by the Beneficiary and duly acknowledged and recorded in the office of the recorder of the county or counties where said property is situated, shall be conclusive proof of proper substitution of such successor Trustee or Trustees, who shall, without conveyance from the Trustee predecessor, succeed to all its title, estate, rights, powers and duties. Said instrument must contain the name of the original Trustor, Trustee and Beneficiary hereunder, the book and page where this Deed is recorded and the name and address of the new Trustee.

(13) That this Deed applies to, inures to the benefit of, and binds all parties hereto, their heirs, legatees, devisees, administrators, executors, successors and assigns. The term Beneficiary shall mean the owner and holder, including pledgees, of the note secured hereby, whether or not named as Beneficiary herein. In this Deed, whenever the context so requires, the masculine gender includes the feminine and/or neuter, and the singular number includes the plural.

(14) That Trustee accepts this Trust when this Deed, duly executed and acknowledged, is made a public record as provided by law. Trustee is not obligated to notify any party hereto of pending sale under any other Deed of Trust or of any action or proceeding in which Trustor, Beneficiary or Trustee shall be a party unless brought by Trustee.

The undersigned Trustor requests that a copy of any Notice of Default and of any Notice of Sale hereunder be mailed to him at his address hereinbefore set forth.

RSCC PETALUMA LLC,
a California limited liability company

By: M. A
Michael Robin, Member

By: Richard A. Corleto
Richard A. Corleto, Member

STATE OF CALIFORNIA

COUNTY OF Sonoma

On 12-22-05 before me, the Julie James

undersigned, a Notary Public in and for said State, personally appeared

Michael Robin

(This area for official notarial seal)

personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Signature Julie James

Name Julie James (typed or printed)

JULIE JAMES
COMM. # 1388507
NOTARY PUBLIC-CALIFORNIA
SONOMA COUNTY
COMM. EXP. JAN. 1, 2007

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California
County of Los Angeles } ss.

On 12-20-05 (Date) before me, Gigi Maki, Notary Public (Name and Title of Officer (e.g., "Jane Doe, Notary Public"))

personally appeared Richard A. Collado (Name(s) of Signer(s))

☒ personally known to me
☐ proved to me on the basis of satisfactory evidence

to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

GIGI MAKI
Commission # 1355439
Notary Public - California
Los Angeles County
My Comm. Expires May 8, 2009

Place Notary Seal Above

Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer

Signer's Name: _____

☐ Individual
☐ Corporate Officer — Title(s): _____
☐ Partner — ☐ Limited ☐ General
☐ Attorney in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: _____

Signer Is Representing: _____

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

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EXHIBIT A

The land referred to is situated in the unincorporated area of the County of Sonoma, State of California, and is described as follows:

Beginning at the most Northerly Northwest corner of that tract of land described in Decree Quieting Title dated January 29, 1917 and recorded January 29, 1917 in Volume 347 of Deeds, page 402, Sonoma County Records; thence South 0.34' East, 1.86 chains to the North side of a house; thence West 0.18 chains to the Northwest corner of said house; thence South 0.57' West, 1.20 chains; thence South 1.05' East 4.35 chains to a stake in a stone quarry; thence South 89.45' East, 3.25 chains to a stake; thence South 0.45 East 0.84 chains to the North line of Western Avenue Extension Road; thence along said line North 82° East, 0.46 chains to a gate post; thence South 0.45 East, 0.51 chains to the center line of the road; thence Southwesterly along the center line of said road to the point of intersection of said centerline, with the extension Southeasterly, of the Northeasterly line of the tract of land conveyed to Maurice Hickey, et ux, to Henry D. Cramer by deed dated September 22, 1909 and recorded September 24, 1909 in Volume 259 of Deeds, page 103, Sonoma County Records; thence North 60° West, to the Northwesterly side of said road and the most Easterly corner of said Cramer tract; thence North 60° West, along the Northeasterly line of said Cramer tract, 154 feet to the lands of John P. Messinger as described in deed to him from Maurice Hickey, et ux, dated August 25, 1904, recorded August 1904 in Volume 210 of Deeds, page 631, Sonoma County Records; thence North 58.45 West, 5.09 chains, along the Northeasterly line of said lands of Messinger, to the East line of the tract of land conveyed to H.W. Hansen by deed from Maurice Hickey, et ux, dated May 12, 1905 recorded May 25, 1905 in Volume 217 of Deeds, page 254, Sonoma County Records; thence Northerly along the East line of said Hansen tract, to the Northeast corner thereof, being the Southeast corner, of the tract of land conveyed to Charles Schleing, et ux, by deed from Maurice Hickey, et ux, dated June 5, 1905, recorded June 13, 1905, recorded June 13, 1905 in Volume 217 of Deeds, page 351, Sonoma County Records; thence Northerly, along the East line of said Schleing tract, 8 rods and 8 feet, more or less, to the Northeast corner thereof; thence West, along the North line of said Schleing tract, 5 rods and 2 1/2 feet, more or less, to the Southeast corner of the tract of land conveyed to John Mitton by deed from Morris Hickey, et ux, dated August 13, 1901, recorded August 14, 1901, in Volume 194 of Deeds, page 611, Sonoma County Records; thence North, along the East line of said Mitton tract, 5 rods to the Northeast corner thereof, being a point on the South line of the tract of land conveyed to Richard A. Comerford by deed from J.D. Lodge, dated May 22, 1874, recorded June 4, 1874 in Volume 46 of Deeds, page 369 Sonoma County Records; thence East, along the South line of said Comerford tract, to the Southeast corner thereof; thence North, along the East line of said Comerford Tract, to the Southwest corner of the tract of land conveyed to Ira Morrill by deed from J.D. Dodge, et al, dated January 14, 1871, recorded January 16, 1871 in Volume 32 of Deeds, page 84, Sonoma County Records; thence East, along the South line thereof 47 1/3 rods, more or less, to the Southeast corner thereof, being on the West line of property formerly belonging to A.B. Derby; thence South, along the West line of said Derby tract, to the North line of the tract of land (hereinabove referred to) described in Decree Quieting Title recorded in Volume 347 of Deeds, page 402, Sonoma County Records; thence to the point of beginning. Excepting therefrom that portion conveyed by Stanley A. Slidell et ux, to the County of Sonoma, by Deed recorded January 24, 1963 in Book 1938 Official Records, page 925, Sonoma County Records.

APN: 019-090-056

RIDER TO SHORT FORM DEED OF TRUST AND ASSIGNMENT OF RENTS BETWEEN RSCC PETALUMA LLC, A CALIFORNIA LIMITED LIABILITY COMPANY and RUTH B. ZIEGLER AND RICHARD A. CORLETO, TRUSTEES OF TRUST "A" OF THE ZIEGLER FAMILY TRUST u/t/a dated December 4, 1980 AS BENEFICIARY:

The following provisions are included in the Promissory Note which this Deed of Trust secures and are incorporated herein:

"Events of Default.

Events Constituting a Default. The occurrence of any one or more of the following events shall constitute an event of default under this Note and the Deed of Trust in paragraph 11 (each an "Event of Default"):

Default in Payments. Maker defaults in the payment of any installment of interest or any required payment, repayment or prepayment of the principal of this Note, when and as the same becomes due and payable and such default shall continue for more than ten (10) days; or

Failure to Perform Covenant. Maker defaults in the performance of or compliance with any of the terms, covenants or conditions of this Note or the Deed of Trust (other than any payment under paragraph 5.1.1), and such default shall continue for more than fifteen (15) days after Holder shall have given notice thereof to Maker and Maker shall not have within such period commenced with due diligence and dispatch the curing of such default, or if Maker shall within such period commence with due and diligence and dispatch the curing of such default and shall thereafter fail or neglect to prosecute and complete with due diligence and dispatch the curing of such default to the satisfaction of the Maker, or if the curing of such default is impossible or impracticable; or

Bankruptcy. Maker files a petition under any provision of the bankruptcy laws of the United States or under any similar or successor Federal statute relating to bankruptcy, insolvency, arrangements or reorganizations, or under any state bankruptcy or insolvency act, or files an answer in an involuntary proceeding admitting insolvency or inability to pay debts, or if Maker shall fail to obtain a vacation, stay or dismissal of involuntary proceedings brought for the reorganization, dissolution or liquidation of Maker within sixty (60) days after the institution of such proceedings, or if Maker shall be adjudged a bankrupt, or if a trustee or receiver shall be appointed for Maker or any general partner of Maker or the Property (as described in paragraph 11) of Maker, or if the Property shall become subject to the jurisdiction of a federal bankruptcy court or similar state court, or if Maker shall make an assignment for the benefit of their respective creditors, or if there is an attachment, execution or other judicial seizure of the Property or any portion thereof or of any material portion of the material asset of Maker and such seizure is not discharged within ten (10) days. Any reasonable attorneys' fees and other expenses incurred by Holder in connection with the bankruptcy of Maker or any of the aforesaid events shall be additional indebtedness of Maker secured by the Deed of Trust;

Remedies for Default.

Acceleration. Upon the occurrence of an Event of Default and at any time thereafter if such Event of Default shall then be continuing Holder (i) may declare the indebtedness evidenced by this Note to be immediately due and payable; and (ii) may pursue any and all remedies provided for under this Note or the Deed of Trust, including the right to appoint a receiver as a matter of strict right without regard to the solvency of Maker for the purpose of preserving the Real Property, preventing waste and protecting all rights of Holder under this Note or the Deed of Trust, and all costs and expenses incurred by Holder in connection with any of the foregoing shall be paid by Maker and shall be secured by the Deed of Trust; and (iii) may pursue any and all remedies available under applicable law.

Cumulative Remedies. The remedies provided in this Note shall be in addition to, and not in substitution of the rights and remedies which would otherwise be vested in Holder for the recovery of damages, or otherwise, in the event of a breach of any of the representations, warranties, covenants, undertakings or agreements of Maker hereunder.

Notice Regarding Final Payment of Loan. As required by California Civil Code § 2924(l), at least ninety (90) days but not more than one hundred fifty (150) days prior to the due date of the final payment of the loan, Holder shall deliver or mail by first-class mail, with a certificate of mailing obtained from the United States Postal Service, to Maker, at the last known address of Maker, a written notice which shall include all of the following: (i) a statement of the name and address of the person to whom the final payment is required to be paid; (ii) the date on or before which the final payment is required to be paid; and (iii) the amount of the final payment, or if the exact amount is unknown, a good faith estimate of the amount hereof, including unpaid principal, interest and any other charges, such amount to be determined assuming timely payment in full of all scheduled installments coming due between the date the notice is prepared and the date when the final payment is due."

N:\@M-R\Petaluma Project\Rider to Deed.wpd

November 14, Planning Commission, 1436 Western Avenue (Video, City's Web Site, 49:42)

Transcript below 01:03:48 to 01:35:00 - Property owner's representative, exchange between Rebecca Celli and Councilwoman Nau

Rebecca Celli: Introduces herself as the representative of the property owner).
States we are aware General Plan 2025 land use is being reviewed, feels Very Low Density (VLD) appropriate for this parcel, offers following comments in support of our request.

The surrounding property consists almost entirely of densities higher than Rural Residential (RR) and VLD would be more consistent with the area. We submit many large estate ranch style lots are already existing in the outlying area of the western end of the city...community would be better served by a slightly higher density development, which would allow for more reasonably priced homes in close proximity to downtown Petaluma. We do understand the proposed urban separator path runs along the western boundary of the property and we would welcome discussions to accommodate the path, including walking, hiking and bike trails..

Additionally, based on discussions with numerous property owners in the city, we fell confident that the neighborhood and community support our request. As you can see by the 62 signatures we have gathered, and I'd just like to point out that this property, which is again county but at the edge of the others, even though they weren't able to develop their own property because of the Urban Growth Boundary and the half-acre parcels...Any questions?

They understand the fact that it would be developed. Additionally, we have met with and talked to the staff of various City departments and overall our request has been favorably received and a *number* of city officials and staff acknowledged that the VLD would be appropriate and consistent land use designation within the urban growth plan. Any questions?

Councilwoman Nau: There are 62 letters, but some of them are from the East side of Petaluma and they're not neighbors. (not impacted)

Rebecca Celli: They vote on the "City Plan" and they're part of the community and wish to see city parks and urban growth boundaries and are concerned of the whole of the city...They were specific people we talked to and spoke about the impact of the City and the General Plan and as a whole community.

Councilwoman Nau: But they are not impacted.

Rebecca Celli: Okay...

Councilwoman Nau: Unless they're driving to Petaluma Junior high or down Western Avenue or Bodega Avenue

**(our note: Very Low Density designation with 15 homes, 2 vehicles per home,
20 trips each daily = 600 additional vehicles on the road in that area daily(33 homes= 1,350 add'l trips).
Rural Residential designation with maximum 8 homes, 2 vehicles per home,
20 trips each daily = 320 additional vehicle trips daily.
County Rural Residential designation of maximum 11 homes, 2 vehicles,
20 trips each daily = 440 add'l daily trips.)**

Rebecca Celli: I have a question! How many people in our City that you know of have their children and even though they're living on the East side, transfer them to the Junior High?

Councilwoman Nau: I know quite a few people who choose different schools.

Rebecca Celli (interrupting): I drive it every day. I have four children. I've put two through the Junior High and I have two more. And *those* people do the same thing, which is why I talked with them.

> **(our note: The intradistrict policy regarding Kenilworth and Petaluma Junior High permits for youth from either side of tr to choose Petaluma Junior High. However, the likelihood of all signers (please see Appendix 3) having children at Petalu Junior High is very slim. In fact, our research indicates, from the list of signers of the form letter, one of the 62 signers currently has children enrolled at Petaluma Junior High. In addition, actually, taking a child to and from the Junior High is relevant only for the issue of the additional traffic that would be generated and the need for enhanced safety and precautions due to the extra traffic generated by homes, as described above in the #'s.)**

Councilwoman Nau: The East side - what you have are letters - that are all - they are all exactly the same except that some people did go through and make little handwritten - they'd like to see it even lower - so I just wanted to bring that to the public's attention who's watching this - because I don't want them to think that they are the neighbors.

Rebecca Celli: (Asks who says they want lower density, how many).

Councilwoman Nau: I don't know which one it is, but they made a little note that it should be lower, handwritten. I'm unable to find it right this minute. I just want the General Public to know that these are not the neighbors that are, I just want people to know in the audience that these are not all neighbors. And I basically have been going with Staff recommendation. As you can see, Staff is even on the fence, so I'd like to hear some more comments.

Will Dargie: Thank you.

Rebecca Celli: There were specific people we talked to and spoke about the impact of the City and the General Plan and as a whole community.

Councilwoman Nau: I understand all that. I just want the general public to know that these are not existing neighbors.

Rebecca Celli: Not all of them.

Councilwoman Nau: ...Because I went through and looked at zip codes and addresses...and you don't have any ow surrounding that property.

Rebecca Celli: There are two key neighbors that are. One on Bodega and one on Western. The Western one is right next door to the people that spoke this evening. And of the properties that have been designated Very Low Density, one is right there with them on Bodega. So the people that were home, that wanted to talk about it, it was available, and I'm sure if I went to the homes that are on the county line but not in the City and not voting, if they were educated, they might be. I just want you to know that it wasn't irrational that...

Councilwoman Nau: But, I just want people to know in the audience that these are not all neighbors, and I basically have been going with Staff recommendation. As you can see, staff is even on the fence, I'd like to see some more comment.

* * *

APPENDIX 3

Signers on Form Letter of Support - presented by Property Owners' Representative on 11/14/06 total of 62 form letters (Our review = total of 63 submitted, 1 letter duplicated, total of 62):

Western Avenue: (1)

Lorraine Adams, 1850 Western Ave., Petaluma, CA 94952

-Mrs. Adams' daughter, Joselie, appeared on 11/28/06, clarifying her mother did not understand what she was signing and opposed the proposal by the property owners. Mrs. Adams' property borders part of the 1436 Western Ave. property. The proposal is very problematic, they have livestock, already with drainage problems.

Bodega Avenue (2)

"David Smith", 3473 Bodega Ave., Petaluma, CA 94952 (2 miles from Western Ave. property)

- a representative of P.L.A.N. visited this address on 12/2/06 and spoke with the daughter of the property owner. They moved into the property about 3 weeks prior. They indicated 2 women lived there previously. They had not heard of a David Smith and did not know him, but said that Mr. Parrish of Frank Howard Allen Realtors was the realtor who sold the property.

June L. Ghiggioli, 5087 Bodega Ave., Petaluma, CA 94952 (4 miles from the Western Ave. property)

- a representative of P.L.A.N. visited this address and spoke at length with Ms. Ghiggioli. She understood "very low density" meant less houses and also did not understand the reality of 8 units - not 8 multimillion dollar estates, which would be the owners' choice to propose. She favored 8 reasonably sized units consistent with the rural homes in the area and retaining the Rural Residential designation. She and her husband asked if we desired them to contact anyone to clarify. They are willing to send a letter or speak with elected or appointed officials to clarify their position if desired and gave permission for the information to be provided herein.

Frank Howard Allen Realtors (15 + 2 spouses)

Sharon Bonelli, 300 Adobe Road, Penngrove, CA 94951
Steven E. Cohn, 2025 Appaloosa Dr., Petaluma, CA 94954
Tara Cummings, 615 N. Fair St., Petaluma, CA 94952
Tom Entwistle, 732 Ely Blvd. Petaluma, CA 94954
Gael Grove, 1019 Garfield Dr., Petaluma, CA 94954
Doug Hecker, 228 Edinburgh Lane, Petaluma, CA 94952*
Kathy Jensen, 809 Keokuk St., Petaluma, CA 94952
Nicole Musante, 821 Wildflower Ct., Petaluma, CA 94954
Sharon Nadale-DeSantis, 3215 Middle Two Rock Road, Petaluma, CA 94952

(our note: Ms. Nadale-DeSantis initiated a phone call and has indicated by message she did not understand the content of the letter and, upon further understanding, is not in favor of the proposal and regrets signing the letter)

Tony Parrish, Petaluma, CA
Edward H. Reiners, 1291 Elysian Ave., Penngrove, CA 94952
Kathleen Schmidt, 1519 Anna Way, Petaluma, CA 94954
Timothy R. Sullivan, 1223 Del Sol Way, Petaluma, CA 94954
Sonna Torrens, 6 Arrowhead Court, Petaluma, CA 94954
Ted Weber, 1841 Adobe Creek Dr., Petaluma, CA 94954

Spouse of Frank Howard Allen Realtor:

Marlene Hecker, 228 Edinburgh Lane, Petaluma, CA 94952*
Michael Torrens, 6 Arrowhead Court, Petaluma, CA 94954 *(2 letters submitted under same name and address - thus, total form letters= 61)*

Residents in vicinity of property owners' address (109 Ravenswood Ct., Petaluma) (4)

Anne Biasi, 113 Ravenswood Ct., Petaluma, CA 94952*
Sam J Biasi, 113 Ravenswood Ct., Petaluma, CA 94952*
Adrian X. Cremidis, 199 Ridgeview Dr., Petaluma, CA 94952*
Cathy Duensing, 1 Sunnyslope Ct., Petaluma, CA 94952*

WestHaven and Victoria area: (3)
Timo Rivetti, 223 Cambridge Lane, Petaluma, CA 94952*
Justin Hansel, 10 Bixby Court, Petaluma, 94952*
Alicia Hansel, 10 Bixby Court, Petaluma, 94952*

East of Petaluma Junior High: (4)
Kieran Burns, 782 El Paseo Dr., Petaluma, CA 94952
Teresa Castora, 782 El Paseo Dr., Petaluma, CA 94952-1770
Tom Cole, 790 El Paseo Dr., Petaluma, CA 94952
Paula Cole, 790 El Paseo Dr., Petaluma, CA 94952

More 94954 - East Petaluma: (25)
Amelia Annotti, 1804 Village East Dr., Petaluma, CA 94954
Brianna Bradley, 204 Wishkah Lane, Petaluma, CA 94954
Camonn Burns, 1 Del Sol Court, Petaluma, CA 94954
Claire Burns, 1 Del Sol Court, Petaluma, CA 94954
Thomas Burns, 1317 Beechwood Dr., Petaluma, CA 94954
Ciaron O'Broin 1317 Beechwood Dr., Petaluma, CA 94954
Nick Castoma, 1305 Lombardi, Petaluma, CA 94954
Betty Castora, 1804 Village East Dr., Petaluma, CA 94954
James P. Castora, 1804 Village East Dr.
Mario Del Carlo, 1804 Village East Dr., Petaluma, CA 94954
Roger A. Farrell, 288 Ely Blvd., So., Petaluma, CA 94954
Travis Fox, 619 Bordeaux Dr., Petaluma, CA 94954
Steven Hsieh, 1440 Capri Ave., Petaluma, CA 94954
Mark Jouck, 1267 Lindberg Lane, Petaluma, CA 94954
The Lius - Pauline, Kevin, Roger, William & David at 105 Tuxedo Court, Petaluma, CA 94954 (5 letters)
Molly Row, 6 Sugarloaf Ct., Petaluma, CA 94954
Kelly Ann Sovick, 1267 Lindberg Lane, Petaluma, CA 94954
Kathleen Walker, 1709 Kearny St., Petaluma, CA 94954
Daneen Weaver, 1291 San Jose Way, Petaluma, CA 94954
Matt White, 1709 Madeira Circle, Petaluma, CA 94954
Beth White, 1709 Madeira Circle, Petaluma, CA 94954

Additional signers to be researched: (7)
George Allen, 10 Troy Court, Petaluma, CA 94952
John Logan Coots, 57 Burlington Dr., Petaluma, CA 94952
William Goodanetz, 50 Queens Lane, Petaluma, CA 94952
Adam Henderson, 905 C Street, Petaluma, CA 94928
Scott Newman, PO Box , Petaluma, CA 94953
James A. Parrish, 629 Marty Lane, Petaluma, CA 94952
Angelina Simondi, 2 Rain Tree Court, Petaluma, CA 94952

*Homes in Victoria, Westhaven and on Ravenswood Court generally are $1 million plus sales. For example, a recent listing on Ravenswood Court closed for $929,000) - are these signers stating they do not wish any additional homes similar to theirs on the 1436 Western Avenue property?

To: City of Petaluma
Planning Commission and City Council

Reference 1436 Western Ave. - 16.67 acres

Dear Commission and Council Members:

I understand the City of Petaluma, through its 2025 General Plan to be adopted by the Planning Commission and City Council, is considering the land use designation for the vacant 16.67 acre parcel located between Western Avenue and Bodega Avenue (currently a cow pasture).

I am a resident/property owner in the general area of the parcel and support a Very Low Density designation for this property which is located less than 1.5 miles west of popular and quaint downtown Petaluma. I feel a Very Low Density designation, which lies in a residential family neighborhood, would be consistent with the adjacent development to the north and east of 1436 Western Ave. Other similar areas southeast and across Western Ave are also designated Very Low Density.

I understand the present land use designation for the parcel is Rural Residential, which would limit development to not more than 8 very large multi-million dollar estate lots of 2 acres plus, that are neither affordable nor in harmony with the surrounding Very Low Density areas. A Very Low Density designation for property so close to downtown Petaluma would be much better land use planning.

Furthermore, a Rural Residential designation would create an "island" of rural density inconsistent with the rest of the neighborhood.

We encourage the Petaluma City Council, the Planning Commission and Staff, the Community Development Department, and the general plan administrators to designate the above parcel as Very Low Density Residential on the 2025 Petaluma General Plan.

Thank you for your consideration.

Signature: Lorraine Adams

Name: _____

Address: 1850 Western Ave
Petaluma Ca 94952

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a 501(c)3 nonprofit public benefit org.
P.O. Box 2903
Petaluma, CA 94953
Phone (707) 773-3215/763-2009

August 30, 2006

For: Pamela Tuft, AICP, Director
Scott Duiven, Senior Planner
Department of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952

B

Subject: City of Petaluma Draft General Plan 2025: July 2006

Dear Ms. Tuft,

Our neighborhood organization, P.L.A.N., has reviewed the above-referenced draft. Several members of our neighborhood participated in the recent public workshop at the Lucchesi Center. We have not yet reviewed the updated technical appendices and understand the EIR and further water resources information will be forthcoming.

This letter will follows up our 3/22/04 comments and documentation provided to your department. We hope to provide further comments relative to the technical appendices, the EIR and water resources information in the process of completion.

P.L.A.N. is a 501(c)3 nonprofit public benefit organization focusing on preservation of wildlife habitat, historic resources, rural land and open space in the West Petaluma area. About 70 households in the Paula Lane/Sunset Drive immediate area and outlying neighborhoods (including Lohrman Lane, Bodega Avenue, Schuman Lane, Elm Drive and Cindy Lane, and north Larch Drive, to name a few) are active in our organization. P.L.A.N. is a nonpolitical organization. Our mission includes interfacing with public and private agencies to facilitate and support preservation of historic resources, rural land and open space, and wildlife habitat in our area of West Petaluma. We recently participated in public hearings related to the draft Sonoma County General Plan, as approximately 50% of the Paula Lane area is county land, the other 50% city. We also offered written comments on the county draft general plan.

We wish to provide input for your further planning process. For your records, this letter contains comments on:

- title page
- land use, growth management & the built environment
- community design, character & sustainable building
- the natural environment
- recreation, music, parks & the arts
- water resources

glossary

Title Page:

Volunteer time devoted by planning commissioners to elements of the General Plan revision process was, in o view, substantial and productive.

Representatives from our organization participated in each of the workshops in which Planning Commissioners James Rose, Stephanie McAllister, Pamela Asselmeier, Teresa Barrett, Stephen von Raesfeld, and I believe Will Dargie, participated. During those sessions, we observed important information exchange and, as a result, suggestions and guidance in the General Plan process, in conjunction with Mr. Moore and/or Mr. White, as well as Department heads for the City.

If possible, we would very much like to see names of these commissioners included in your title page information, along with the planning commissioners who have now been seated to serve Petaluma in the future. I believe the City Council representatives to the Planning Commission during the time the draft was compiled and then reviewed for revision were Mr. Mike Healy and Mr. Mike Harris.

Chapter 2: Land Use Growth Management and the Built Environment

As characterized in Figure 2-1, "Land Use", an "urban separator path" along properties in our area is shown and described on page 2-8 as: ...

> "locations where the fee title dedication of an Urban Separator may not be feasible but provision of an improved pathway for connectivity is desired and/or appropriate."

With respect to the Paula Lane area in general and the residential density designations, what appears most appropriate is an Urban Separator designation.

The "urban separator path" concept, in our view, is, admirably, an effort to recognize the need for buffering areas that were included in the UGB. Unfortunately, the concept is not realistic, in that human encroachment in most of the areas designated on the current Land Use map are areas where human encroachment does not exist and overlap with areas of critical wildlife habitat in a heavily traveled wildlife corridor. The idea of connectivity with other areas south of Bodega Avenue is also not feasible due to land topography. What is designated on a map does not equate to the actual land areas.

Also, with all due respect, it simply does not make sense to introduce this concept and expect residents on the west side - rural areas with some of the few undeveloped lands - to accept it. We objected to the concept previously. We again respectfully request a designation of Urban Separator of at least 100 to 200 feet along these properties. If this is not feasible, then a broader vision of consideration for open space preservation in our area should be undertaken. The identified environmental constraints to development in the Paula Lane area, including potential significant special status species biological resources and low water pressure with increased fire hazards, coupled with the historic agricultural community, where some homes were built in the late 1800s and early 1900s and remain intact today, are a few identified areas to support further exploration of this.

In addition, as your Department may recall, there continues to be a question about the UGB designation along Paula Lane itself, as the ballot measure approved by City residents that included the Paula Lane area did not reflect the preferred UGB expressed by community residents from this area of West Petaluma through the community workshop process. Lastly, because the General Plan is used as a blueprint for potential developme both commercial and residential, it is important to our organization that the General Plan process include an

(Chapter 2 - Land Use...continued)

awareness of the unique nature of the Paula Lane area - it is an historic neighborhood with deep agricultural roots in both Petaluma and Sonoma County; at least 50% of the residents are County residents, and approximately 50% or slightly under, are City of Petaluma residents. County residents were not permitted to vote on the UGB ballot measure which placed a portion of Petaluma's UGB in this direct area and, as stated, more over, the UGB approved did not reflect the input of community residents in this area.

Goal 2-G-1 - Land Use - Policies and Programs
pp. 2-14 and 15

2-P-3 Suggested addition to end of this policy to read:

"Preserve the overall scale and character of established residential neighborhoods, which while addressing residential density, contain distinct characteristics of Petaluma's history, wildlife habitat and corridor areas, and open spaces."

Goal 2-G-2- Land Use - Hillsides and Ridgelines

We recommend this section be reformulated.

Very few hillsides and ridgelines remain, at least on the west side of Petaluma in our area of Paula Lane. These areas, as observed by our organization and documented for five years, are important movement areas for wildlife as well as habitat for wildlife displaced by development. As discussed in the public workshops held by the Planning Commission, we respectfully request a higher level of sensitivity to the area of "Western Hills" in general.

Adoption of a fairly stringent hillside/ridgeline ordinance by the City of Petaluma should help address some of these issues. However, this section of the General Plan draft, in our view, places undue emphasis on how to develop on hillsides and ridgelines, rather than a policy statement of protecting ridgelines, hillsides and scenic areas, especially in West Petaluma. Where precedents have been established, allowing hillside development in some areas of West Petaluma, we understand. However, with what remains - we respectfully request, at least for our area of the designated "Western Hills", a recognition that these areas are the west gateways to Petaluma and, where wildlife movement areas, as well as historic areas have been identified, appropriate levels of restrictions should be clearly stated so as to not mislead developers who are looking for available land to hope to build large scale subdivisions or planned unit developments than would not be appropriate, and, as importantly, through a potential misunderstanding because policies are not clearly stated, would cause expenditure of valuable City staff time and time of those who reside in our area..

Goal 2-G-3 Land Use "Maintain a well defined boundary at the edge of urban development."

This policy discusses the Urban Separator and references the 300 feet minimum as exists on the east side of Petaluma. The "urban separator path" concept is not delineated or discussed. In our view, this confirms our perception that the "urban separator path" concept, which is not supported by our organization, is not substantive or relevant for the areas in the Paula Lane area where it was placed. We understand a desire for connected "trails" around Petaluma, but the "urban separator path" is not practical or desired. A designated Urban Separator on the west side in our area was requested and remains most appropriate. At the same time, recognition of sensitive wildlife habitat and areas where human encroachment is not feasible should be included,

(Chapter 2 - Land Use...continued)

as this aspect of life in our area has been well documented. We would be pleased to participate further in this process if it is helpful for the General Plan revision process.

2-P-23 We respectfully request this policy be amended to read:

"Support designation of land uses in the unincorporated area at **or** beyond the Urban Growth Boundary as rural, agricultural and/or open space **where appropriate.**"

"A. Work with local, state and federal funding sources to acquire open space **in areas of the** Urban Separator or beyond **and/or at or beyond** the Urban Growth Boundary where community-wide benefit is achieved.

Why are these distinctions in 2-P-23 important? As open spaces - related to enjoyment of same, but as importantly as connectivity areas for wildlife movement and providing respite for areas of Petaluma with the high level of residential density anticipated, these small changes reflect a thinking of vision, of 20 years from now, to be highly attentive in areas that perhaps were not considered necessary twenty years ago, but are now.

Goal 2-G-4-Urban Growth Boundary

Our comments are included in pages 1 and 2 of this correspondence.

Community Design, Character and Sustainable Building

We wish to compliment you and your consultants on the descriptive paragraph on page 3-3 entitled "Open Space." However, please amend "oak trees" to read "trees," as there are multiple species of mature and some very old trees in the West Petaluma area that are species other than oak. We also believe including the Paula Lane area would be appropriate in the listing of open space areas community workshop participants designated as important open space areas.

8. West Hills, p. 3-20

Again, we appreciate the accurate description of the area. We would appreciate amendment of the sentence regarding the mixed commercial use of the Bodega Avenue market area, given that this property is situated along the transitional area from Bodega Highway to Bodega Avenue as a scenic rural corridor entering Petaluma. Our suggestion is as follows:

"About one and a half acres of commercial and office use lie near the intersection of Bodega Avenue and Paula Lane; this mixed-use area will continue to provide convenience retail for rural residents along the scenic corridor entrance to Petaluma."

Further suggested changes to reflect both reality and a 20-year vision:

Goal 3-G-11 West Hills:
3-P-54 Provide a transition from the urban densities of Downtown to the rolling hills and historic agricultu lands at and beyond the UGB.

(Community Design, Character and Sustainable Building - Cont'd)

3-P-58: Preserve the historic feeling and open space areas along Bodega Avenue when permitting limited mixed use development in the node of Bodega Avenue/Paula Lane.

Note: This really is not a neighborhood center - and should not be so designated. Bodega Avenue Market is more of a landmark stopping point for motorists leaving Petaluma or entering Petaluma. The Pump and Well Building is considered an historic part of the community, but stands alone as a commercial/industrial location. The accurate description of this small mixed use commercial area is important, so as to not mislead developers looking for future commercial mixed use projects that would be inappropriate with the scenic corridor entry to Petaluma along Bodega Avenue and the rural character of the area itself.

3-P-59 This policy reads: *"Require dedication of the Urban Separator along the western and southern boundaries of the City."*
Comment: The "urban separator path" is defined differently from the "Urban Separator" and is not included in this section. As stated previously in this correspondence, an Urban Separator designation is requested in the Paula Lane area. Dedication of the Urban Separator would then be appropriate.

3-P-61: **Request amending this policy to read:**
Create open space areas to facilitate wildlife movement and preserve community character where possible. Where properties are developed in residential areas, ensure continued areas for wildlife connectivity and, where appropriate, public trails and open spaces to connect lands.

The Natural Environment

Sensitive Species and Habitats
pp. 4-5 through 4-7

"CSC" or California Species of Concern are special status species. For consistency with the Sonoma County General Plan language, and for up to date and accurate reporting of sensitive species and habitats in the general Petaluma area, please include California Species of Concern or Species of Concern in definitions, along with "threatened" or "endangered."

The listing on pages 4-5 through 7 is also incomplete. Special status avian species, as well as the special status mammal species, American Badger, provided to your department in prior correspondence should be listed therein. If you would like an additional copy of the special status species in the Paula Lane area, please advise and we will be happy to produce another copy for you. The documentation of wildlife in our area is based on over five years of observation and reporting by our nonprofit, as well as the assistance of qualified biologists. Some of the species have made it into the CNDDB, but, as you know, the CNDDB database is not up to date and cannot be relied upon solely as a resource for listing species.

(The Natural Environment - Cont'd)

Goal 4-P-3: "Conserve wildlife ecosystems and sensitive habitat areas in the following order of protection preference: 1) avoidance, 2) mitigation, 3) off site mitigation."

Comment: With all due respect, this statement exemplifies what continues to concern us about the overall tone of the revised General Plan. In the Planning Commission workshops, there was often discussion about the desire to present a vision and to understand broad concepts as they related to the evolution of Petaluma over the next twenty years. We recommend revising wording of this policy to reflect the importance of consideration of wildlife habitat and wildlife connectivity areas (similar to the Sonoma County General Plan wording, although there is continued discussion about how to achieve the goals.)

This section really should be written for the community at large and for the very special natural resources that exist and have significantly diminished in the Petaluma area, not necessarily for the development community. If the development community can factually identify and mitigate for impacts, they would be functioning under CEQA and also within the policy guidelines of the General Plan. Our suggestion for rewording follows:

"Conserve wildlife ecosystems and sensitive habitat areas, as well as identify and conserve areas of connectivity for wildlife. Protection preference for such identified areas is avoidance."

> -*Note:* We recognize on-site mitigation and off-site mitigation provisions. We do not have a copy of the Technical Memorandum 3 and are unable to comment, but assume such measures are addressed within as the method by which a developer would propose to mitigate. We believe the City's policy of stated avoidance of impact on identified wildlife ecosystems and sensitive habitat areas should be clearly stated, as suggested.

Goal 4-P-4: Request amendment also to include "species of concern" as your table 4.1-1 is amended.

4-P-4 A: Because development has displaced so many wildlife species and connectivity areas, movement areas, and access to water resources and habitat is more critical in the next 20 years than previously - as indicated in public discussions at the Planning Commission workshops - the statement of "If development is located outside these ecologically sensitive regions, no site-specific assessment of biological resources may be necessary..." is a very misleading statement and we request it be deleted from this policy. Biological resource identification continues to be a CEQA requirement and this policy statement in the General Plan could be misinterpreted. In this revised General Plan, attention to accurate identification of biological resources, in our view, will be of greater import, given what we perceive as a critical situation, at least in our area.

Final comment in Natural Resources: The Petaluma River and river corridor are truly jewels in Petaluma's crown, both historically and for the future. At the same time, we would like to see an equal emphasis on the critical wildlife habitat and natural resources, including water resources to be addressed below, in the "West Hills" area and specifically the Paula Lane area and Bodega avenue outreaches. There really does need to be an expansion of communication in this section with regard to the richness of natural resources - water and wildlife in conjunction with the depth of history in our area of Petaluma.

(The Natural Environment - Cont'd)

Goal 4-G-2: Biology and Natural Resources
p. 4-10

4-P-5 - Subheading B: Request amendment to read:
"Work with County, State and federal agencies to ensure that **proposed** development within the ...affected State or **federally listed special status species** or their habitats..."

4-P-6: "Support wetland mitigation and oak woodlands restoration in the unincorporated areas outside the UGB."

Request amending and expanding this policy to read:
"Support groundwater recharge identification and preservation, wetlands preservation, native grasslands in uplands area, and oak woodlands preservation and restoration in the unincorporated areas **at or outside** the UGB."

A. The transitional areas of West Petaluma often include ecosystems that include groundwater recharge, water resources, wildlife habitat and connectivity areas, and mature trees that all serve to support multiple wildlife species."

Chapter 5: Mobility

Street Classifications, Figure 5-2:
The map reflects Paula Lane in West Petaluma as a defining "Connector Street." We request the map reflect actual circumstances as they relate to mobility in Petaluma. Paula Lane is a two-lane county road, except for 200 feet of city street at the intersection of Paula Lane/Sunset Drive and West Street. A more accurate representation would be to designate for the revised General Plan the reality of mobility in this area - that would be Bantam Way on the north side of Bodega Avenue as a "Connector Street, "with the designated and approved Bantam Way extension to be completed in the life of this revised General Plan. Bantam Way designates the approximate end of the Petaluma City limits, as well.

Chapter 6, Recreation, Music, Park and the Arts

1. "Community and Urban Separators" - p. 6-10

Prior comments in this correspondence refer to the concept of "urban path separator." In the Paula Lane area of Petaluma, the urban path separator is incompatible with the nature of the remaining land and open space, where critical wildlife habitat exist, along with seasonal winter wetlands on one property, and no human encroachment currently exists, and would be detrimental. A small dedication of a strip of land along an urban growth boundary is not compatible with the level of natural resources that merit preservation and protection in the Paula Lane area. An Urban Separator designation would be more appropriate, There are some lands in the

Paula Lane area that merit preservation as open space preserves with some limited public access and educational opportunities.

2. "Sonoma County Agricultural Preservation District" pp. 6-12

The title would aptly be "Sonoma County Agricultural Preservation and Open Space District." Descriptions of areas within Acquisition Plan 2000 will be outdated for the Petaluma Revised General Plan. We respectfully request the Petaluma General Plan document incorporate and reflect the updated categories and definitions of "Connecting Communities and the Land," the long range strategic plan and update of acquisition plan for the Sonoma County Ag. Preservation and OSD.

In addition, for the benefit of Petaluma for the next 20 years, we recommend including comments regarding the Open Space District's "open space preserve" category and the matching grants program that allows cities and nonprofit agencies to partner with the District in creative ways to preserve deserving areas of open space and add to both the Open Space District's portfolio and cities' intelligent and creative approaches to preservation of open space lands that can incorporate multiple areas of natural resources beyond recreation - groundwater recharge areas, wetlands, critical wildlife habitat and corridors, and perimeter areas that contribute to protecting urban fringes and transitional areas from urban to rural life.

Chapter 8 - Water Resources

Capital Improvement Program/Restoration - p. 8-17

We wish to reserve comments or helpful suggestions with regard to West Petaluma and how water resources in this area may relate to greater Petaluma until the modeling underway is completed and the EIR for the General Plan is complete.

At this time, however, we wish to note for the benefit of the General Plan process that residential development in the West Hills are of Petaluma has materially altered the flow and velocity of storm waters into rural creeks that ultimately flow into the channel at Stony Point Road (KOA campgrounds). This has caused flooding in rural areas that affects water quality due to contamination with septic and other chemicals. Removal of brush and other growth in the channels is restricted by environmental law and regulatory agencies. This process leads to the rural low northwestern lands becoming a holding pond for city discharges. Currently, the Zone 2A advisory committee with the Sonoma County Water Agency, to our knowledge, is working on solutions, but any final outcome could be years away.

Recognition of the water resources and the additional runoff and discharges from new residential development in the hills of West Petaluma is critical to understanding the additional contribution to runoff and potential flooding. We believe there has been inadequate attention and documentation in this area and, for the future, this situation cannot be ignored. Creeks such as Marin Creek in our area of West Petaluma are both significant natural resources, a water resource for wildlife, and a contributor to the overall runoff that reaches the channel at Ston, Point Road.

(Water Resources - Cont'd)

We also request coordination with the Sonoma County General Plan process for the Western portion of Petaluma in the unincorporated area, including at the UGB, for consistency of policy and understanding of water resources, preservation of groundwater recharge areas, and impacts of urban residential development runoff into the creeks in the West Petaluma area.

Glossary

P. G-6 Open Space - Rather than state this definition in terms of, basically, a piece of land that is not developed, we believe a more descriptive definition that will be congruent with the Petaluma General Plan for the next 20 years would be appropriate. We would like to suggest:

> "Open Space - An area of land and/or water devoted to preservation of the land itself, significant natural resources and for public enjoyment for scenic value and where appropriate recreation to enhance quality of life, as defined in the General Plan and/or designated in local, state or regional plans and policies, to include the Sonoma County Agricultural Preservation and Open Space District's "Connecting Communities and the Land," along with the District's additional programs and policies for open space preserves and matching grants plans."

P. G-8 Please update definitions to reflect Species of Concern as well as Special Status Species in *general.*

P. G-9 Wildlife Corridors: Please amend this to be more descriptive. For Petaluma wildlife and wildlife in rural areas accommodating the wildlife displaced by development, a suggested definition would be:

> "Wildlife Corridors: A natural corridor or area of movement through which wildlife species move for foraging, access to water supplies, safety from perceived harm and to sustain breeding viability."

* * * *

Thank you for the opportunity to make comments on this draft of the General Plan. We would be pleased to provide further information or documentation of resources if this will be helpful for your process. Please refer to prior correspondence, as well, from the Paula Lane Action Network in this regard.

We look forward to reviewing the EIR as well as the water resources information for the General Plan. Congratulations to you and your staff for the valiant effort in helping to chart the documentation that will be the future plan for greater Petaluma. Your efforts are appreciated and to be commended.

Sincerely yours,

Susan Kirks

Susan Kirks, for the
Paula Lane Action Network

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PAULA LANE ACTION NETWORK (P.L.A.N.)

a 501(c)3 nonprofit public benefit org.
P.O. Box 2903
Petaluma, CA 94953
Phone (707) 773-3215/763-2009

October 2, 2006

For: Pamela Tuft, AICP, Director
Scott Duiven, Senior Planner
Department of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952

Subject: City of Petaluma Draft General Plan 2025: Draft Environmental Impact Report and Technical Appendices

Dear Ms. Tuft,

Our neighborhood organization, P.L.A.N., has reviewed the above-referenced draft. Thank you for the opportunity to provide additional comments.

We wish to provide input for your further planning process. For your records, this letter contains comments on:

- Chap. 3, Settings, Impacts & Mitigation Measures, 3.8 Biological Resources
- Figure 3.8-1 Habitat Areas and Special Status Species
- Technical Appendices: Volume 1, Appendix A-2 (reference to)
- Glossary

- Evolving Chapter on Historic Resources and Preservation of General Plan

Chapter 3, Settings, Impacts & Mitigation Measures, 3.8 Biological Resources

Environmental Setting...Habitats
We request a change in definition of #3. Grassland/Oak savannah C
..."Grasslands/Oak savannah. Native and non-native grassland vegetation occurs in the western and southern portions of the planning area while oak savannah occurs in the western portions. The western rural grassland vegetation serves as habitat and foraging area for multiple wildlife species. In some areas, grazing has reduced plant coverings to the extent that bare ground is visible."

Table 3.8-1 and Figure 3.8-1.
We noted a difference in species listed, where we believe Figure 3.8-1, the Habitat Areas and Special Status Species was intended to reflect the species listed in Table 3.8-1, Special Status Species Known to Occur or Potentially Occurring within the Petaluma Planning Area. D

For example, the American Badger is shown in Figure 3.8-1, but not listed under Mammals in Table 3.8-1. On the other hand, the White-Tailed Kite is listed in Table 3.8-1, but is not shown in our Western Petaluma area on Figure 3.8-1, although is noted in the Figure as occurring throughout the Planning Area. The Western Hills area, particularly in our vicinity on Paula Lane, is a representative location of the White-Tailed Kite.

In Technical Appendix Volume 1, A-2, we note and appreciate inclusion of the wildlife species identified in the Paula Lane area, as well as biologist Dan Nelson's avian study reflecting the abundance and variety of avian species, migratory and resident, that rely on our area in West Petaluma for habitat and migratory stopovers. We note the following documented avian species in the Paula Lane area of Petaluma have not yet been included in your listed Special Status Species in Figure 3.8-1 or Table 3.8-1:

Allen's Hummingbird
Rufous Hummingbird
Sharp-Shinned Hawk
Oak Titmouse
Redbreasted Sapsucker
Long-billed Curlew

We would appreciate consideration of inclusion of these documented special status avian species in your Figure 3.8-1 and Table 3.8-1 in the Paula Lane area, same vicinity as the American Badger.

If this is not possible, please amend the title of Table 3.8-1 to read "Partial List of Special Status Species Know. to Occur or Potentially Occurring within the Petaluma Planning Area."

E

Glossary

We respectfully request a rewriting of the following definition:
From: Wildlife Corridors: "A natural corridor, such as an undeveloped ravine, that is frequently used by wildlife to travel from one area to another."

To: Wildlife Corridor: A primary means for linking fragmented wildlife habitat areas, allowing species to move between otherwise isolated areas. Especially important for migratory animals and animals with large home ranges. Contributes to maintaining biodiversity, population interbreeding and continuation of species, and accessing other habitats.

We surveyed definitions from ecology organizations in the United Kingdom, Montana and British Columbia to compile the above definition.

We believe the requested definition change accurately reflects the level of significance of identifying and preserving wildlife corridors.

F

Evolving Chapter on Historic Resources for General Plan

Based on the recent SPARC public hearing and input from historians and interested parties in a separate chapter in the General Plan for Historic Resources, Identification and Preservation policies, we wish to request inclusion in the form of a sentence or paragraph in that chapter of the rich agricultural historical heritage in the Paula Lane area of West Petaluma, contributing to both Sonoma County and Petaluma early history.

Our nonprofit has recently located a grant writer who will assist with grant applications to obtain a grant for documentation of the history of the Paula Lane area. As you know, our neighborhood in the Western Hills planning area is one of Sonoma County's and Petaluma's oldest, with deep roots in immigrant agricultural history. It is also our hope to interface with the Sonoma County Landmarks Commission for consideration of an Historic District designation for the Paula Lane area between Bodega Avenue and Schuman Lane. While this would be a county designation, the history of our area also relates to Petaluma's early agricultural history.

A general statement of support via policy for identification and preservation where possible of West Petaluma properties of the late 1800's to late 1950's would be appreciated.

* * * *

Thank you again for your staff's diligence in creating the revised General Plan and for the opportunity to provide further comment.

Sincerely yours,

Susan Kirks

Susan Kirks, for the
Paula Lane Action Network

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NEXUS
REALTY GROUP, INC.

1241 North McDowell Boulevard • P.O. Box C • Petaluma • CA 94953
Fax: (707) 769-5282 • Phone: (707) 769-5280

October 16, 2006

Via Email & Mail

Ms. Pamela Tuft, Director
Department of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952

76

A

Dear Ms. Tuft:

I received the notification of the public hearing on the City of Petaluma Draft General Plan 2025 and Consideration of Land Use Map Designations on Specific Parcels. I appreciate that the City is making an effort to inform the public. It is too bad that the property owners were not concurrently informed what their own parcel's designation is under the existing general plan and under the draft general plan land use map. I would imagine that you would have received many more requests to change land use designations.

I am concerned that the list of amendments is incomplete. In particular, I do not believe that all of the land use changes generated by staff are being reviewed at this public hearing as they should be. It is difficult to reconcile all of the changes between the Original Draft Land Use Map on which the Draft EIR was completed and the Revised Draft Land Use Map which now appears in the DEIR. I believe these changes need to also be considered in a public meeting.

I am also concerned that these changes to the land use map are not reflected in the text of the Draft General Plan regarding the inventory of available lands and other chapters discussing such things as the jobs/housing balance. Further, the recently announced flood plain building moratorium will impact a number of parcels that have not been identified. Without knowing the extent of the land use designation changes it is difficult to say that the General Plan has internal consistency.

I am requesting that your department post on the internet a list of all parcels in the land use map area, sorted by Assessor's Parcel Number and listing parcel size, owner, existing land use designation, draft land use plan designation, revised land use designation, proposed land use designation modification, by whom, and staff's recommendation. Such a document would be consistent with the County's approach and allow the public to better participate in the development of the general plan.

Thank you for your time and consideration.

Sincerely,
Nexus Realty Group, Inc.

Bryant R. Moynihan

Tuft, Pamela

From: Tuft, Pamela
Sent: Friday, October 20, 2006 2:16 PM
To: 'Nexusrealty@aol.com'; s.duiven@ci.petaluma.ca.us
Cc: phummel@mcn.org
Subject: RE: Tuesday's GP packet / Hummel

Bryant,

I would be glad to copy all three and distribute them to the Planning Commission, in addition to the letter you submitted by email and hand delivery today.

Regarding your letter, we have been working on a user-friendly web-site to allow people to log on to the City's web-site and the City's parcel viewer system to obtain information on a specific parcel, they would then be able to access info on the 1987 General Plan and the Draft General Plan 2025 Land Use designations. This would be in addition to the noticing that we have done through the local papers and the public workshops. The web-site is expected to be up and running in the next week and we will do a public outreach to notify people of that availability.

Thank you for your continued interest and participation.

Pamela Tuft, AICP
Director of General Plan Administration
City of Petaluma
P O Box 61
Petaluma, CA 94953
(707) 778-4552
(707) 778-4586 (fax)

From: Nexusrealty@aol.com [mailto:Nexusrealty@aol.com]
Sent: Friday, October 20, 2006 11:07 AM
To: Tuft, Pamela; s.duiven@ci.petaluma.ca.us
Cc: phummel@mcn.org
Subject: Tuesday's GP packet / Hummel

Dear Pamela & Scott:

B

In reviewing Tuesday Planning Commission packet, I noticed that the communications between the Hummels and the City were not included. The Hummels asked me to speed and facilitate by providing a copy of these documents.

Would you please provide a copy of the three attached pdf files to the Planning Commission. Thank you. - Bryant

Bryant R. Moynihan
P.O. Box C
Petaluma, CA 94953
cell 707-484-2566
office 707-769-5280
NexusRealty@aol.com

Arlo Hummel
1436 Cunningham Rd.
Sebastopol, CA 95472-5533
(707) 823-2557

March 3, 2005

Mayor & Council Members
City of Petaluma
11 English Street
Petaluma, CA 94952

Via Mail & Fax 707-778-4419
Hand delivered

RE: 415 Denman Road, Petaluma
A.P. # 007-431-004

Dear Mayor & Council Members:

For a number of years we have owned the above referenced property, which adjoins the Redwood Business Park, includes a right of way through the business park, and is within the Petaluma city limits. We have reviewed the Draft Preferred Plan land use map that, as anticipated, gives our property a land use designation of Business Park.

Unfortunately, there now appears a light green line on our property that is color-coded as Urban Separator. This designation is not on the current General Plan for our property. We are concerned that along with access, hydrology and the existing public pathway this new Urban Separator proposed designation will render our property un-developable and will be a taking of its value.

We recognize that a sensitive land use proposal will have to be created to allow the Proposed land use designation of Business Park to be realized. Additionally, we recognize there is a limited supply of land on which local businesses can grow within the city limits of Petaluma. We would like the opportunity to work with the City Staff to develop a sensible project that will properly mitigate all environmental concerns and at the same time achieve the City's economic growth goals.

Please remove the Urban Separator designation from our property, or at a minimum, allow an Urban Separator Path designation.

Sincerely,

Arlo Hummel

Arlo Hummel

Cc: Ms. Pamela Tuft

Via Fax 707-778-4586

CITY OF PETALUMA

POST OFFICE BOX 61
PETALUMA, CA 94953-0061

David Glass
Mayor

Keith Cravens
Mike Harris
Mike Healy
Karen Nair
Mike O'Brien
Pamela Torliatt
Councilmembers

12 April 2005

Mr. and Mrs. Hummel
1436 Cunningham Road
Sebastopol, CA 95472

RE: Denman Road property
General Plan 2025 – Preliminary Land Use Map

Dear Mr. Hummel:

As you and I have discussed in the past, we are recommending an amendment to the General Plan Land Use designation for your property, referenced above, from Agriculture to Business Park with an Urban Separator strip along the border of the City Urban Growth Boundary. Another aspect of the General Plan 2025 work is to evaluate and identify possible surface water detention and groundwater recharge areas. These identified areas could be encumbered by an overlay designation as well as the underlying land use designation.

The City Council during recent discussions weighed in on the recommended land use amendment to Commercial. Several of the Councilmembers expressed an interest in retaining the Agriculture designation, in part, to facilitate the continued storage of excess storm flow on the site. It is my position that the amendment, along with the overlay designation, would allow a reasonable amount of future development and/or the use of the property for agriculture and as a surface water detention site.

Enclosed is a copy of the Agenda Bill for the Council meeting of April 18th, at which the Council will continue their discussion. The City Council will be discussing the recommended land use designation of your property and the exhibit illustrating the preliminary surface water overlay designation. If you have any questions, please do not hesitate to call me (778-4514); I would be pleased to discuss this with you.

(707)

Sincerely,

Pamela A Tuft, AICP
Director of GP Administration

General Plan Administration
25 Howard Street
Petaluma, CA 94952

Phone (707) 778-4553
Fax (707) 778-4586

E-Mail
generalplan@ci.petaluma.ca.us

c: Dean Eckerson, DWR&C, Engr. Mgr.
General Plan work file; PT/cf

Mr. and Mrs. Arlo Hummel
1436 Cunningham Road
Sebastopol, CA 95472-5533
(707) 823-2557

October 17, 2006

Ms. Pamela Tuft
Department of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952

RE: 17.87-Acre Hummel Property
AP#007-431-004

Dear Ms. Tuft:

I take this opportunity to address the Land Use Designation for the above referenced property. I will not be able to attend the meeting but want to reiterate our request, as it is very important to us. Unfortunately, our request is not correctly portrayed in the staff report or on the revised Draft Land Use Map. Additionally, the Hummel property has been grouped with two other unrelated properties, one of which is not in the same sub-area.

Our land use designation in the Draft Land Use Map was "Business Park" (see attached Land Use Map). This designation was consistent with representations made by the City of Petaluma to G&W Management for their proposed Redwood Business Park Unit 4. Based on these City representations, G&W deeded and recorded to the Hummel property a 65 foot wide Access Easement directly to North McDowell Boulevard to facilitate future "Business Park" designation development. The future development of this road easement will extend the existing business park to the northern city limits.

The City of Petaluma also represented that our nearly 18 acre Incorporated City of Petaluma Parcel would be allowed to develop when we agreed to pay the special assessments for the Sewer and Corona-North McDowell Assessment District. To reverse that position now, after we have paid the assessments is unfair and wrong.

In our opinion, it is not good land use planning to retain any "agricultural" land use designations within an urban area with an Urban Growth Boundary that the community wishes to maintain. Any such ill-advised action will have a negative impact on the Draft General Plan's Economic Element, jobs/housing balance and inventory of developable property. An "Agricultural" Land Use Designation will also discourage us as property owners from cooperating in more encompassing efforts to shape collaborative mitigation solutions to the City's flooding problems. It is unreasonable to single out just a few properties for unequal land use designation treatment.

We had only asked that the urban separator not be added onto our parcel until we have an opportunity to design a project that can adequately address all of the environmental and physical constraints. Please, do not change the original land use designation of Business Park.

Please provide a copy of this letter to all members of the City Council and Planning Commission. We would be happy to answer any further questions if you wish to phone us.

Sincerely,

Arlo Hummel

Cc: Mr. William Saks

Governor's Office of Planning and Research
State Clearinghouse and Planning Unit

Arnold Schwarzenegger
Governor

Sean Walsh
Director

October 27, 2006

Pamela Tuft
City of Petaluma
11 English Street
P.O. Box 61
Petaluma, CA 94953

77

Subject: City of Petaluma Draft General Plan 2025
SCH#: 2004082065

Dear Pamela Tuft:

The State Clearinghouse submitted the above named Draft EIR to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on October 26, 2006, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Terry Roberts

Terry Roberts
Director, State Clearinghouse

Enclosures
cc: Resources Agency

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
TEL (916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

SCH# 2004082065
Project Title City of Petaluma Draft General Plan 2025
Lead Agency Petaluma, City of

Type EIR Draft EIR

Description Assessment of environmental impacts associated with the proposed adoption of a new General Plan 2025. Technical Appendices include: NOP and written responses, Community Survey, Mobility Analysis and Traffic Model Development Report, Draft Bicycle & Pedestrian Plan, Water Supply and Demand Analysis Report, Water Dist. System Master Plan, Fiscal Impacts of Preferred Plan, Biological Resources Review Report, Groundwater Feasibility Study, and XP-SWMM Surface Water Management Model Calibration & Analysis Report.

Lead Agency Contact

Name Pamela Tuft
Agency City of Petaluma
Phone (707) 778-4552 **Fax**
email
Address 11 English Street
P.O. Box 61
City Petaluma **State** CA **Zip** 94953

Project Location

County Sonoma
City Petaluma
Region
Cross Streets Highway 101/Petaluma Boulevard South north to Highway 101/Old Redwood Highway
Parcel No. All within City
Township **Range** **Section** **Base**

Proximity to:

Highways 101, 116
Airports Petaluma Municipal
Railways SMART
Waterways Petaluma River
Schools All within Petaluma
Land Use

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Cumulative Effects; Drainage/Absorption; Economics/Jobs; Flood Plain/Flooding; Geologic/Seismic; Landuse; Noise; Other Issues; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Water Quality; Water Supply; Wetland/Riparian; Wildlife

Reviewing Agencies Resources Agency; Department of Parks and Recreation; Native American Heritage Commission; Office of Historic Preservation; Department of Health Services; Department of Forestry and Fire Protection; Department of Fish and Game, Region 3; Department of Water Resources; California Highway Patrol; Caltrans, District 4; Caltrans, Division of Aeronautics; State Water Resources Control Board, Division of Water Quality; State Lands Commission; Department of Toxic Substances Control

Date Received 09/12/2006 **Start of Review** 09/12/2006 **End of Review** 10/26/2006

Note: Blanks in data fields result from insufficient information provided by lead agency.

DIVISION OF AERONAUTICS – M.S.#40
1120 N STREET
P. O. BOX 942873
SACRAMENTO, CA 94273-0001
PHONE (916) 654-4959
FAX (916) 653-9531
TTY (916) 651-6827

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September 27, 2006

Ms. Pamela Tuft
City of Petaluma
P.O. Box 61
Petaluma, CA 94953

Dear Ms. Tuft:

Re: City of Petaluma's Draft Environmental Impact Report for the Draft General Plan 2025; SCH# 2004082065

The California Department of Transportation (Caltrans), Division of Aeronautics (Division), reviewed the above-referenced document with respect to airport-related noise and safety impacts and regional aviation land use planning issues pursuant to the California Environmental Quality Act (CEQA). The Division has technical expertise in the areas of airport operations safety and airport land use compatibility. We are a funding agency for airport projects and we have permit authority for public and special use airports and heliports. The following comments are offered for your consideration.

The proposal is for the Petaluma General Plan 2025 intended to replace the existing General Plan, adopted in 1987. Petaluma Municipal Airport is located within the City of Petaluma.

In accordance with Public Utilities Code (PUC) Section 21676, local General Plans and any amendments must be consistent with the adopted airport land use compatibility plans developed by the appropriate county Airport Land Use Commission (ALUC). The City of Petaluma General Plan must be consistent with the Comprehensive Airport Land Use Plan for Sonoma County prepared by the Sonoma County ALUC.

The Draft Environmental Impact Report (EIR), Section 1.6 "Documents Incorporated by Reference" does not include the consistency criteria between the General Plan and the Comprehensive Airport Land Use Plan. This should be corrected. A

General plans and elements must clearly demonstrate intent to adhere to ALUC policies to ensure compliance with compatibility criteria. Direct conflicts between mapped land use designations in a General Plan and the ALUC criteria must be eliminated. A General Plan needs to include (at the very least) policies committing the county to adopt compatibility criteria essential to ensuring that such conflicts will be avoided. The criteria do not necessarily need to be spelled out in the General Plan. There are a number of ways for a city or county to address the airport consistency issue, including:

- Incorporating airport compatibility policies into the update
- Adopting an airport combining zoning ordinance
- Adopting an 'Airport Element' into the General Plan
- Adopting the Airport Compatibility Plan as a 'stand alone' document or as a specific plan

The General Plan must acknowledge that until ALUC compatibility criteria are incorporated into the General Plan, proposals within the airport influence area must be submitted to the ALUC for review. These provisions must be included in the General Plan at a minimum for it to be considered consistent with the airport compatibility land use plan.

In addition the proposed General Plan update must be submitted to the Sonoma County ALUC for a consistency review to ensure that general plan policies and recommendations for noise impact assessment and land use densities are appropriate, given the nature of airport operations. The proposal should also be coordinated with airport staff to ensure its compatibility with future as well as existing airport operations.

In accordance with CEQA, Public Resources Code 21096, the Caltrans Airport Land Use Planning Handbook (Handbook) must be utilized as a resource in the preparation of environmental documents for projects within airport land use compatibility plan boundaries or if such a plan has not been adopted, within two nautical miles of an airport. The Handbook provides a "General Plan Consistency Checklist" in Table 5A and a "Possible Airport Combining Zone Components" in Table 5B. The Handbook is published on-line at http://www.dot.ca.gov/hq/planning/aeronaut/htmlfile/landuse.php.

Allowing new residential within a "noise problem" airport's 65 decibel (dB) Community Noise Equivalent Level (CNEL) contour is inconsistent with Pubic Utilities Code (PUC) 21670 (a)(1) and the Airport Noise Standards (California Code of Regulations, Title 21, Chapter 6, Section 5000 et seq.). PUC 21670 (a)(1) states that is in the public interest "to promote the overall goals and objectives of the California airport noise standards...and to prevent the creation of a new noise...problems." The Noise Standards, in part, state that the "standard for the acceptable level of aircraft noise for persons living in the vicinity of airports is hereby established to be a community noise equivalent level of 65 decibels." B

Federal and State regulations regarding aircraft noise do not establish mandatory criteria for evaluating the compatibility of proposed land use development around airports (with the exception of the 65 dB CNEL "worst case" threshold established in the State Noise Standards for the designated "noise problem" airports). For most airports in California, 65 dB CNEL is considered too high a noise level to be appropriate as a standard for land use compatibility planning. This is particularly the case for evaluating new development in the vicinity of the airport. The 60 dB CNEL, or even 55 dB CNEL, may be more suitable for new development around most airports. For a further discussion of how to establish an appropriate noise level for a particular community, please refer to Chapter 7 of the Department's Airport Land Use Planning Handbook, available on-line at http://www.dot.ca.gov/hq/planning/aeronaut/htmlfile/landuse.php.

Sound insulation, buyer notification and avigation easements are typical noise mitigation measures. These measures, however, do not change exterior aircraft noise levels. It is likely that some future homeowners and tenants will be annoyed by aircraft noise in this area. Noise mitigation measures are not a substitute for good land use compatibility planning for new development

The planned height of buildings, antennas, and other objects should be checked with respect to Federal Aviation Regulation (FAR) Part 77 criteria if development is close to the airport, particularly if situated within the runway approach corridors. General Plans must include policies restricting the heights of structures to protect airport airspace. To ensure compliance with FAR Part 77, "Objects Affecting Navigable Airspace," submission of a Notice of Proposed Construction or Alteration (Form 7460-1) to the Federal Aviation Administration (FAA) may be required. For further technical information, please refer to the FAA's web site at https://oeaaa.faa.gov/oeaaaEXT/portal.jsp C

Education Code, Section 17215 requires a school site investigation by the Division prior to acquisition of land for a proposed school site located within two miles of an airport runway. The Division's recommendations are submitted to the State Department of Education for use in determining acceptability of the site. This should be a consideration prior to designating residential uses in the vicinity of an airport. D

Section 11010 of the Business and Professions Code and Sections 1102.6, 1103.4, and 1353 of the Civil Code (http://www.leginfo.ca.gov/calaw.html) address buyer notification requirements for lands around airports. Any person who intends to offer land for sale or lease within an *airport influence area* is required to disclose that fact to the person buying the property.

Land use practices that attract or sustain hazardous wildlife populations on or near airports can significantly increase the potential for wildlife-aircraft collisions. The Federal Aviation Administration (FAA) recommends that landfills, wastewater treatment facilities, surface mining, wetlands and other uses that have the potential to attract wildlife, be restricted in the vicinity of an airport. For further technical information, please refer to the FAA's web site at http://wildlife-mitigation.tc.faa.gov/public_html/index.html. E

California Public Utilities Code (PUC) 21676 et seq., requires that Caltrans review and comment on the specific findings a local government intends to use when proposing to overrule an ALUC. Caltrans specifically looks at the proposed findings to gauge their relationship to their overrule. Also, pursuant to the PUC 21670 et seq., findings should show evidence that the city is minimizing "...the public's exposure to excessive noise and safety hazards within areas around public airports to the extent that these areas are not already devoted to incompatible uses." F

Aviation plays a significant role in California's transportation system including the movement of people and goods within and beyond our State's network of over 250 airports. Aviation contributes nearly 9% of both total State employment (1.7 million jobs) and total State output ($110.7 billion) annually. These benefits are discussed in "Aviation in California: Benefits to Our Economy and Way of Life," available at http://www.dot.ca.gov/hq/planning/aeronaut/. Aviation improves mobility, generates tax revenue, saves lives through emergency response, medical and fire fighting services, annually transports air cargo valued at over $170 billion and generates over $14 billion in tourist dollars, which in turn improves our economy and quality-of-life.

The protection of airports from incompatible land use encroachment is vital to California's economic future. Petaluma Municipal Airport is an economic asset that should be protected through effective

airport land use compatibility planning and awareness. Although the need for compatible and safe land uses near airports in California is both a local and a state issue, airport land use commissions and airport land use compatibility plans are key to protecting an airport and the people residing and working in the vicinity of an airport. Consideration given to the issue of compatible land uses in the vicinity of an airport should help to relieve future conflicts between airports and their neighbors.

These comments reflect the areas of concern to the Division with respect to airport-related noise and safety impacts and regional airport land use planning issues. We advise you to contact our District 4 Office in Oakland at (510) 286-4444 concerning surface transportation issues.

Thank you for the opportunity to review and comment on this proposal. If you have any questions, please call me at (916) 654-5314.

Sincerely,

Original Signed by

SANDY HESNARD
Aviation Environmental Specialist

c: State Clearinghouse, Sonoma County ALUC, Petaluma Municipal Airport

Department of Toxic Substances Control

Maureen F. Gorsen, Director
700 Heinz Avenue
Berkeley, California 94710-2721

Linda S. Adams
Secretary for
Environmental Protection

Arnold Schwarzenegger
Governor

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October 17, 2006

Ms. Pamela Tuft
City of Petaluma
11 English Street
P.O. Box 61
Petaluma, California 94953

PETALUMA GENERAL PLAN 2025, PETALUMA, SONOMA COUNTY – DRAFT ENVIRONMENTAL IMPACT REPORT, SCH #2004082065

Dear Ms. Tuft:

Thank you for the opportunity to comment on the Draft Environmental Impact Report (EIR) for the City of Petaluma Draft General Plan 2025, Sonoma County, California. As you may be aware, the California Department of Toxic Substances Control (DTSC) oversees the cleanup of sites where hazardous substances have been released pursuant to the California Health and Safety Code, Division 20, Chapter 6.8. As a potential Responsible Agency, DTSC is submitting comments to ensure that the environmental documentation prepared for this project pursuant to the California Environmental Quality Act (CEQA) adequately addresses any remediation of hazardous substance releases that may be necessary. G

The proposed project consists of the adoption of new General Plan for the entire City of Petaluma. The General Plan includes an increase of 6,005 housing units and 6,126,000 square feet of non-residential development at build out. The project does not include specific plans for development project(s) in the redevelopment area and does not discuss whether separate environmental reviews will be performed for future development projects and the approval process that will be followed.

The Draft EIR states on page 3.13-2 that reuse and intensified use of former industrial and commercial areas has the potential to expose hazardous materials during demolition or excavation and that remediation of these hazards is necessary before rehabilitation or construction can begin. However, the Draft EIR concludes on Page 3.13-12 that there are no Cortese sites within the Planning Area. Thus, build out under the proposed General Plan would not result in new development being located on

hazardous materials sites and implementation of the proposed General Plan would result in no impact. DTSC's Site Mitigation and Brownfields Reuse Program EnviroStor database provides DTSC's component of Cortese List data. There are currently four sites in Petaluma that are currently listed on DTSC's EnviroStor database. The database can be accessed through DTSC's Website at the following address:

http://www.envirostor.dtsc.ca.gov/public/default.asp

The EnviroStor database includes sites where there are potential or documented hazardous substances releases. However, properties that have historically been used for industrial or agricultural purposes and where hazardous substances releases have occurred may not be listed on the EnviroStor or other regulatory agency databases if no actions have occurred which have lead to a regulatory agency or agencies becoming aware of contamination or involved at a property.

The Draft EIR or separate future CEQA documents for specific redevelopment projects should include a description of the property's past uses. This information is necessary to determine whether hazardous substances may have been released at the property. We believe this is particularly important in industrial or agricultural areas that may be converted to residential use. A historical assessment of past uses should be conducted for each property that would be redeveloped. Based on that information, sampling may need to be conducted to determine whether release of hazardous substances has occurred. This sampling should be conducted prior to or in conjunction with the preparation of the CEQA document and the results should be discussed in the CEQA document. If hazardous substances have been released and remediation is required, the impacts associated with remediation will need to be addressed as part of the CEQA evaluation for the individual development projects.

For example, if remediation activities include the need for soil excavation, the CEQA document should include: (1) an assessment of air impacts and health impacts associated with the excavation activities; (2) identification of any applicable local standards which may be exceeded by the excavation activities, including dust levels and noise; (3) transportation impacts from the removal or remedial activities; and (4) risk of upset should be there an accident at the Site during remediation.

DTSC can assist your agency in overseeing characterization and cleanup activities through our Voluntary Cleanup Program. A fact sheet describing this program is enclosed. In an effort to use the available review time efficiently, we request that DTSC be included in any meetings where issues relevant to our statutory authority are discussed.

If you have any questions or would like to schedule a meeting, please contact Remedios Sunga at (510) 540-3840 or by e-mail at rsunga@dtsc.ca.gov. Thank you in advance for your cooperation in this matter.

Sincerely,

Mark E. Piros

Mark E. Piros, P.E.
Unit Chief
Northern California
Coastal Cleanup Operations Branch

Enclosure

cc: See next page

cc: without enclosure

Governor's Office of Planning and Research
State Clearinghouse
1400 Tenth Street
Sacramento, California 95814

Guenther Moskat
CEQA Tracking Center
Department of Toxic Substances Control
P.O. Box 806
Sacramento, California 95812-0806

California Environmental Protection Agency

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

The Voluntary Cleanup Program

In 1993, the California Environmental Protection Agency's Department of Toxic Substances Control (DTSC) introduced this streamlined program to protect human health and the environment, ensure investigation and cleanup is conducted in an environmentally sound manner and facilitate the reuse and redevelopment of these same properties. Using this program, corporations, real estate developers, other private parties, and local and state agencies entering into Voluntary Cleanup Program agreements will be able to restore properties quickly and efficiently, rather than having their projects compete for DTSC's limited resources with other lower-priority hazardous waste sites. This fact sheet describes how the Voluntary Cleanup Program works.

Prior to initiation of the Voluntary Cleanup Program, project proponents had few options for DTSC involvement in cleaning up low-priority sites. DTSC's statutory mandate is to identify, prioritize, investigate and cleanup sites where releases of hazardous substances have occurred. For years, the mandate meant that, if the site presented grave threat to public health or the environment, then it was listed on the State Superfund list and the parties responsible conducted the cleanup under an enforcement order, or DTSC used state funds to do so. Because of staff resource limitations, DTSC was unable to provide oversight at sites which posed lesser risk or had lower priority.

DTSC long ago recognized that no one's interests are served by leaving sites contaminated and unusable. The Voluntary Cleanup Program allows motivated parties who are able to fund the cleanup – and DTSC's oversight – to move ahead at their own speed to investigate and remediate their sites. DTSC has found that working cooperatively with willing and able project proponents is a more efficient and cost-effective approach to site investigation and cleanup. There are four steps to this process:

- √ **Eligibility and Application**
- √ **Negotiating the Agreement**
- √ **Site Activities**
- √ **Certification and Property Restoration**

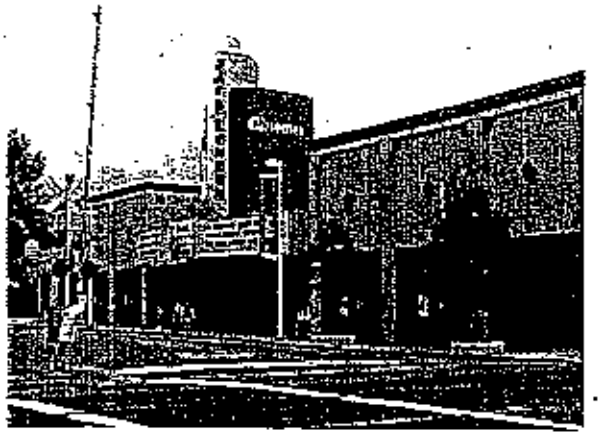
The rest of this fact sheet describes those steps and gives DTSC contacts.

August 1999

The Voluntary Cleanup Program

Step 1: Eligibility and Application

Most sites are eligible. The main exclusions are if the site is listed as a Federal or State Superfund site, is a military facility, or if it falls outside of DTSC's jurisdiction, as in the case where a site contains only leaking underground fuel tanks. Another possible limitation is if another agency currently has oversight, e.g. a county (for underground storage tanks). The current oversight agency must consent to transfer the cleanup responsibilities to DTSC before the proponent can enter into a Voluntary Cleanup Program agreement. Additionally, DTSC can enter into an agreement to work on a specified element of a cleanup (risk assessment or public participation, for example), if the primary oversight agency gives its consent. The standard application is attached to this fact sheet.



Jack London Square Theater, Oakland: Under the Voluntary Cleanup Program, a nine-screen theater was built atop a former Pacific Gas & Electric town gas site, creating a regional entertainment hub.

If neither of these exclusions apply, the proponent submits an application to DTSC, providing details about site conditions, proposed land use and potential community concerns. No fee is required to apply for the Voluntary Cleanup Program.



Romero Ranch, Santa Nella: A Voluntary Cleanup Agreement enabled the Nature Conservancy to use the land to preserve natural habitat and promote wildlife development rights.

Step 2: Negotiating the Agreement

Once DTSC accepts the application, the proponent meets with experienced DTSC professionals to negotiate the agreement. The agreement can range from services for an initial site assessment, to oversight and certification of a full site cleanup, based on the proponent's financial and scheduling objectives.

The Voluntary Cleanup Program agreement specifies the estimated DTSC costs, project scheduling, and DTSC services provided. Because every project must meet the same legal and technical cleanup requirements as State Superfund sites, and because DTSC staff provide oversight, the proponent is assured that the project will be completed in an environmentally sound manner.

August 1999

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SITE MITIGATION STATEWIDE CLEANUP OPERATIONS

VOLUNTARY CLEANUP PROGRAM APPLICATION

The purpose of this application is to obtain information necessary to determine the eligibility of the site for acceptance into the Voluntary Cleanup Program. Please use additional pages, as necessary, to complete your responses.

SECTION 1 PROPONENT INFORMATION

Proponent Name _____

Principal Contact Name

Phone ( )

Address _____

_____

Proponent's relationship to site

_____

_____

Brief statement of why the proponent is interested in DTSC services related to site

SECTION 2 SITE INFORMATION

Is this site listed on Calsites? ☐ Yes ☐ No
If Yes, provide specific name and number as listed

Name of Site _____

Address _____ City _____ County _____ ZIP _____

(Please attach a copy of an appropriate map page)

Current Owner

Name _____

Address _____

Phone ( )

Background: Previous Business Operations

Name _____

Type _____

Years of Operation _____

If known, list all previous businesses operating on this property

_____

_____

_____

What hazardous substances/wastes have been associated with the site?

_____

_____

_____

What environmental media is/was/may be contaminated?

☐ Soil ☐ Air ☐ Groundwater ☐ Surface water

Has sampling or other investigation been conducted? ☐ Yes ☐ No

Specify

_____

_____

If Yes, what hazardous substances have been detected and what were their maximum concentrations?

_____

_____

_____

SECTION 2 SITE INFORMATION (continued)

Are any Federal, State or Local regulatory agencies currently involved with the site? ☐ Yes ☐ No
If Yes, state the involvement, and give contact names and telephone numbers

Agency	Involvement	Contact Name	Phone

What is the future proposed use of the site?

What oversight service is being requested of the Department?

☐ PEA ☐ RI/FS ☐ Removal Action ☐ Remedial Action ☐ RAP ☐ Certification
☐ Other (describe the proposed project)

Is there currently a potential of exposure of the community or workers to hazardous substances at the site?
☐ Yes ☐ No If Yes, explain

SECTION 3 COMMUNITY PROFILE INFORMATION

Describe the site property (include approximate size)

Describe the surrounding land use (including proximity to residential housing, schools, churches, etc.)

Describe the visibility of activities on the site to neighbors

SECTION 3 COMMUNITY PROFILE INFORMATION (continued)

What are the demographics of the community (e.g., socioeconomic level, ethnic composition, specific language considerations, etc.)?

Local Interest
Has there been any media coverage?

Past Public Involvement
Has there been any past public interest in the site as reflected by community meetings, ad hoc committees, workshops, fact sheets, newsletters, etc.?

Key Issues and Concerns
Have any specific concerns/issues been raised by the community regarding past operations or present activities at the site?

Are there any concerns/issues anticipated regarding site activities?

Are there any general environmental concerns/issues in the community relative to neighboring sites?

Key Contacts
Please attach a list of key contacts for this site, including: city manager; city planning department; county environmental health department, local elected officials; and any other community members interested in the site. (Please include addresses and phone numbers.)

SECTION 4 CERTIFICATION

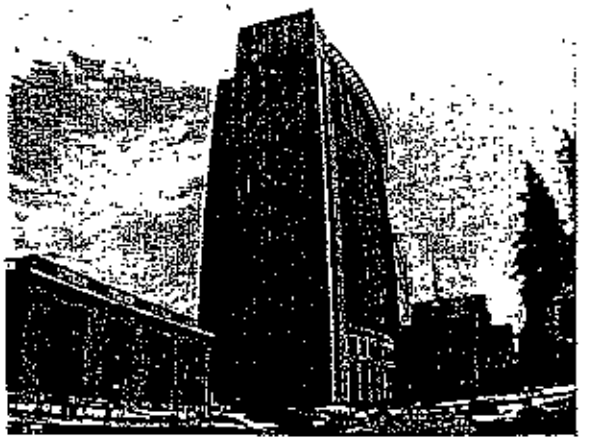
The signatories below are authorized representatives of the Project Proponent and certify that the preceding information is true to the best of their knowledge.

Proponent Representative Date Title

In the agreement, DTSC retains its authority to take enforcement action, if, during the investigation or cleanup, it determines that the site presents a serious health threat, and proper and timely action is not otherwise being taken. The agreement also allows the project proponent to terminate the Voluntary Cleanup Program agreement with 30 days written notice if they are not satisfied that it is meeting their needs.

Step 3: Site Activities

Prior to beginning any work, the proponent must have: signed the Voluntary Cleanup Program agreement; made the advance payment; and committed to paying all project costs, including those associated with DTSC's oversight. The project manager will track the project to make sure that DTSC is on schedule and within budget. DTSC will bill its costs quarterly so that large, unexpected balances should not occur.



The new Federal Courthouse, Sacramento: The largest construction project in the city's history benefited from the Voluntary Cleanup Program when cleaning up a railyard site.

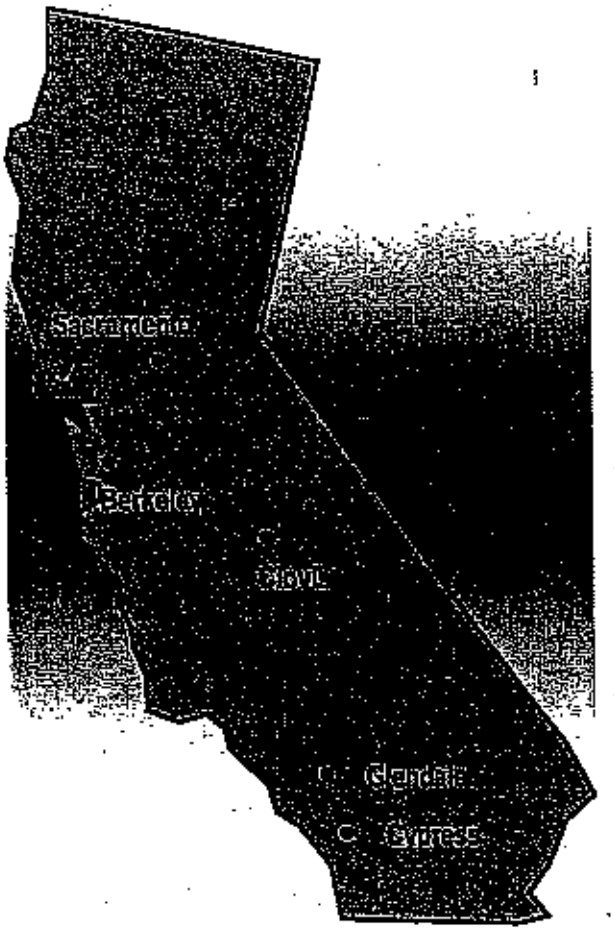
Once the proponent and DTSC have entered into a Voluntary Cleanup Program agreement, initial site assessment, site investigation or cleanup activities may begin. The proponent will find that DTSC's staff includes experts in every vital area. The assigned project manager is either a highly qualified Hazardous Substances Scientist or Hazardous Substances Engineer. That project manager has the support of well-trained DTSC toxicologists, geologists, engineers, industrial hygienists, specialists in public participation, and other technical experts.

The project manager may call on any of these specialists to join the team, providing guidance, review, comment and, as necessary, approval of individual documents and other work products. That team will also coordinate with other agencies, as appropriate, and will offer assistance in complying with other laws as needed to complete the project.

Step 4: Certification and Property Restoration

When remediation is complete, DTSC will issue either a site certification of completion or a "No Further Action" letter, depending on the project circumstances. Either means that what was, "The Site," is now property that is ready for redevelopment or other reuse.

To learn more about the Voluntary Cleanup Program, contact the DTSC representative in the Regional office nearest you:



DTSC office locations

North Coast California
Lynn Nakashima / Janet Naito
700 Heinz Avenue, Suite 200
Berkeley, California 94710-2721
(510) 540-3839 / (510) 540-3833

Central California
Megan Cambridge
10151 Croydon Way, Suite 3
Sacramento, California 95827
(916) 255-3727

Central California – Fresno Satellite
Tom Kovac
1515 Tollhouse Road
Clovis, California 93611
(209) 297-3939

Southern California (Glendale and Cypress)
Rick Jones
1011 Grandview Avenue
Glendale, California 91201
(818) 551-2862

Additional information on the Voluntary Cleanup Program and other DTSC Brownfields initiatives is available on DTSC's internet web page:

http://www.dtsc.ca.gov

DEPARTMENT OF FORESTRY AND FIRE PROTECTION
1199 Big Tree Road
St Helena, CA 94574
Email:frank.ketcham@fire.ca.gov
(707) 967-1408

RECEIVED
OCT 24 2006
STATE CLEARING HOUSE

Clear 10-26-06 e

October 23, 2006

City of Petaluma
ATTN: Pamela Tuft, AICP
P.O. Box 61
11 English Street
Petaluma, CA 94953

RE: City of Petaluma Draft General Plan
SCH# 2004082065

Thank you for the opportunity to comment on the City of Petaluma Draft General Plan. The area surrounding the City of Petaluma is all classified as State Responsibility Area (SRA).

SRA lands are an important consideration for long range planning. By statute and code, the California Department of Forestry and Fire Protection (CDF) is empowered with the legal and financial responsibility for the prevention and suppression of all wildland fires, which occur in such classified areas. When SRA lands are incorporated into a city, they no longer are classified as SRA areas and the city assumes full financial responsibility for the prevention and suppression of all wildland fires occuring in this newly incorporated areas.

The City of Petaluma currently has two areas in the south end of the city that have been designated as "Very High Fire Hazard Severity Zone" (VHFHSZ) as defined in Government Code 51177 and 51178 (refer to Government Code 51176 for a full description of the process and benefits). Designating areas as very high fire hazard zones is a great tool to help address the wildland urban interface issues within the city. The general plan should include planned regular intervals to re-evaluate city lands that have been designated as VHFHSZ areas and update accordingly.

Government Code 65302.5.1 states that the draft element of or draft amendment to the safety element of a county or city general plan shall be submitted to the State Board of Forestry and Fire Protection and to every local agency that provides fire protection to territory in the city or county at least 90 days prior to either of the following:

CONSERVATION IS WISE-KEEP CALIFORNIA GREEN AND GOLDEN.
PLEASE REMEMBER TO CONSERVE ENERGY. FOR TIPS AND INFORMATION, VISIT "FLEX YOUR POWER" AT WWW.CA.GOV.

DEPARTMENT OF FORESTRY AND FIRE PROTECTION
1199 Big Tree Road
ST Helena, CA 94574
Email:frank.kemper@fire.ca.gov
(707) 967-1408

(A) The adoption or amendment to the safety element of its general plan for each county that contains state responsibility areas.

(B) The adoption or amendment to the safety element of its general plan for each city or county that contains a very high fire hazard severity zone as defined pursuant to subdivision (b) of Section 51177.

Sincerely,

By: Frank Kemper
Assistant Chief
Pre-Fire Division

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5505
FAX (510) 286-5559
TTY (800) 735-2929

Clear 10-26-06

Flex your power!
Be energy efficient!

October 26, 2006

RECEIVED
OCT 26 2006
STATE CLEARING HOUSE

SON-GEN
SON000136
SCH#2004082055

Ms. Pamela Tuft
City of Petaluma
P O Box 61
Petaluma, CA 94953

Dear Ms. Tuft:

City of Petaluma General Plan 2025 – Draft Environment Impact Report (DEIR)

Thank you for continuing to include the California Department of Transportation (Department) in the environmental review process for the General Plan 2025. We have reviewed the document and have the following comments:

1. Table 3.2-5 on Page 3.2-9 (Intersection Level of Service, Existing Condition): The table shows that the McDowell Blvd/East Washington Street intersection operates at Level of Service (LOS) D during the PM peak hour under existing conditions. Based on our studies, the intersection is currently operating at LOS F and heavily influences operation of the northbound and southbound ramps intersections. In 2020, this impact can be expected to be more severe. The only planned projects for Washington Street are the East Washington Street interchange improvements, as shown in Figure 3.2-4 and listed on Page 3.2-22. The McDowell Blvd/East Washington Street intersection would continue to operate poorly without providing mitigation measures on McDowell Blvd and East Washington Street east of this intersection. The impacts would also adversely affect operations of adjacent intersections. I

2. The DEIR should also include AM peak hour analyses of US 101. J

3. Table 3.2-6 on Page 3.2-11 (Freeway Peak-Hour V/C Ratio and Existing LOS) and Table 3.2-8 on Page 3.2-30 (Freeway Peak-Hour V/C Ratio and LOS Summary):
   - The LOSs and V/C ratios shown are not reflecting realistic freeway operations. The Department's general practice for freeway operational analyses is to identify bottleneck locations and their associated delays, and use constrained volumes to determine LOSs or V/C ratios. Under this practice, a V/C ratio on a roadway segment will not exceed 1 (which indicates that a roadway segment operates at LOS E, or there is a bottleneck when V/C =1). V/C ratios greater than 1, as indicated on the tables, will never occur in reality. K
   - Using the theoretical capacity of 2,200 vehicles per hour per lane (vphpl) is too high in the study area. Our study shows existing capacities are much lower than 2200 vphpl.

- Table 3.2-8 uses volumes/theoretical capacity as V/C ratios. For mixed flow traffic on any roadway segment, this ratio should be higher because there would be less traffic in an HOV lane than in a mixed flow lane.
- Table 3.2-8: The numbers in the columns 'Theoretical Capacity' and 'Volumes' under Existing Conditions should be reversed.

Should you require further information or have any questions regarding this letter, please call or email Ina Gerhard of my staff at (510) 286-5737 or ina_gerhard@dot.ca.gov .

Sincerely,

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

c: State Clearinghouse

To members of:
Petaluma City Counsel 2006
Petaluma City Counsel 2007
Petaluma Planning Commission
SPARK
Petaluma General Plan 2025 and the Draft Environmental Impact Report

We are writing to bring to the attention of the City of Petaluma a severe problem. We have lived at 307 Sunnyslope Avenue since July of 1980 and Kelly Creek runs through our back yard and through the yards of many other citizens from Sunnyslope Avenue to 8th Street. It continues under ground where it joins with the conduit from Thompson Creek and on to Petaluma River. The FEMA map of February 15th,1980 shows no flooding at our address but a problem at 8th Street. Work was done to alleviate the problem but looking at the FEMA map from September 29th,1989, we see the problem was simply pushed upstream to our property. We've enclosed copies of these maps for your consideration.

In the early 1990's the water agency did some work to take away and reroute water from Kelly Creek to Thompson Creek but added additional surface water emanating from West of us including the then new Victorian Subdivision. At this time Kelly Creek went from being a natural seasonal creek; dry in the summer and filled with frogs to a year round Street drain clogged with pesticides from lawn watering, street sludge and as a result: no more frogs. ... Now it is "Kelly Ditch"

There is a 48" x 48" x 30 foot tunnel under our neighbors driveway at 304 12th Street, that constricts the flow of the creek just as it leaves our property. Beyond that constriction,the infrastructure is collapsing and we presume, all done without permits or engineering for the last 100 years and now; "grandfathered in". All the conduit upstream from us is huge allowing for massive flows. We talked to the Planning Commission on October 24th, 2006 and presented some recent photos of the system which are available and enclosed.

The street work and drainage (which we were assessed for) was done on Sunnyslope Avenue in circa 1991-92 just prior to our annexation into the city (though the creek area part of our property was already in city limits). This new drainage system has since proved inadequate to handle the amount of upstream surface runoff during heavy rainfall resulting in the flooding of Sunnyslope Avenue in front of our house and most of our yard. There is not an updated FEMA map yet but we are sure our property will be even more in the flood plain. Flood insurance is now cost prohibitive.

At the October meeting, Pamela Tuft pointed out that Kelly Creek, as it runs through our yard is private property; it belongs to us. We alone have been responsible for its up keep and maintenance as are the other creek neighbors. Yet the city of Petaluma in conjunction with Sonoma County Water Agency have opted to dump the problem of up stream development onto us and other creek dwellers. Many of our creek neighbors and the creek dwellers on other "private" creeks are unaware of their rights and responsibilities.

Over the past 26 years, we have all learned about the "el Niño" effect and micro weather cells: We have had the 10 year, the 25 year, the 100 year and etc. floods during this time. Petaluma has had much of its Down Town and the Auto Mall area under water. Yet when asked at the October planning commission meeting if another planned development expansion was to be approved, their only question was: "will the new development be above the flood level so it will be safe from flooding ?". Then it was approved. Nothing, absolutely nothing was said in consideration for the properties down stream from the expansion. Only that the new subdivision would be safe. In addition to this, our area, even the addition of small groups of houses eventually adds up

We direct your attention to this section of the Municipal Code:
20.40.040 Modification not to be detrimental to public welfare.
Granting of the modification will not be detrimental to the public welfare or safety; or injurious to other property in the territory in which said property is situated. (Ord. 1046 NCS §1 (part); 1972: prior code §22.9.103.)

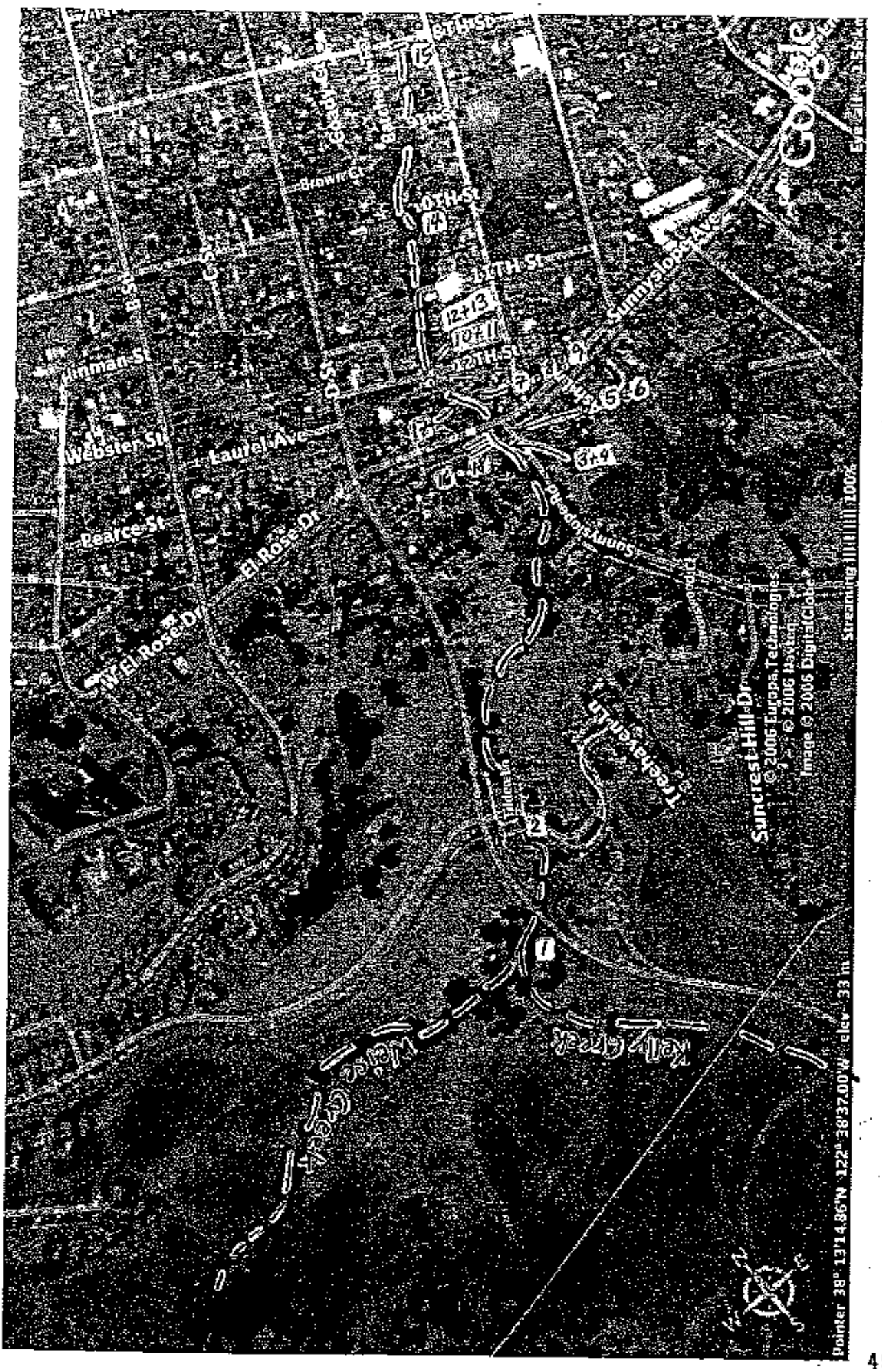
It has become apparent that every thing the City of Petaluma, the Sonoma County Water Agency, and all the development the City has allowed and encouraged up stream from us has impacted our property in a negative way. The addition of small groups of houses are approved without the requirement of an EIR though rather quickly this "infill" adds up to the area of a subdivision with nothing being said or done about the additional drainage needed.

At this time we are asking the Petaluma City Counsel (both present and future), the Planning Commission and SPARK to have this letter read into their meetings and discussed. We also request a legal and timely written response from all.

November 27th, 2006

Joseph Grubaugh & Sigrun Seifert

307 Sunnyslope Avenue
Petaluma, CA 94952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Webster St
Laurel Ave
Pearce St
El Rose Dr
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Sunnyslope Rd
Treehaven Ln
Suncrest Hill Dr
Kelly Creek
Weiss Creek
Google
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Streaming 100%



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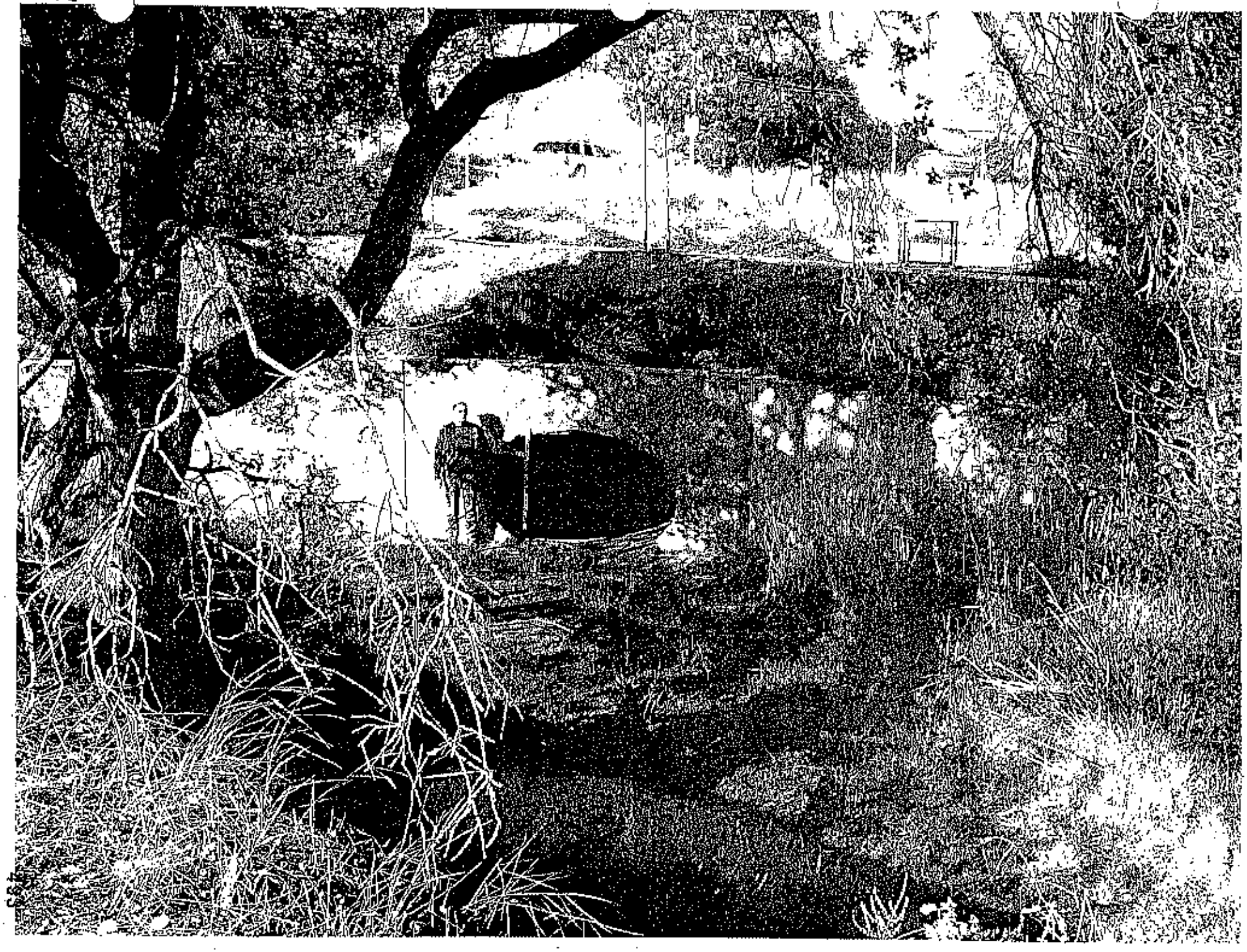



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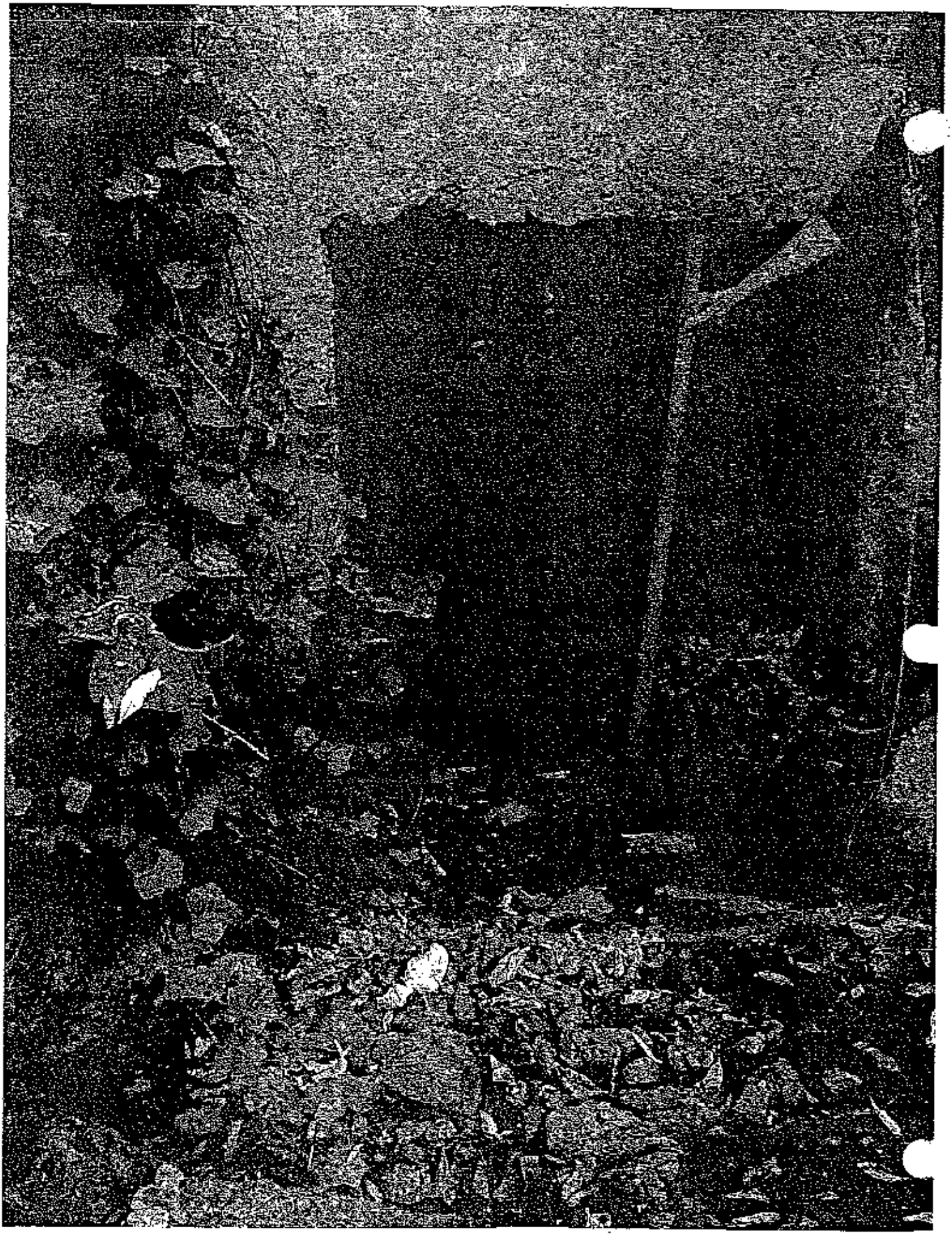



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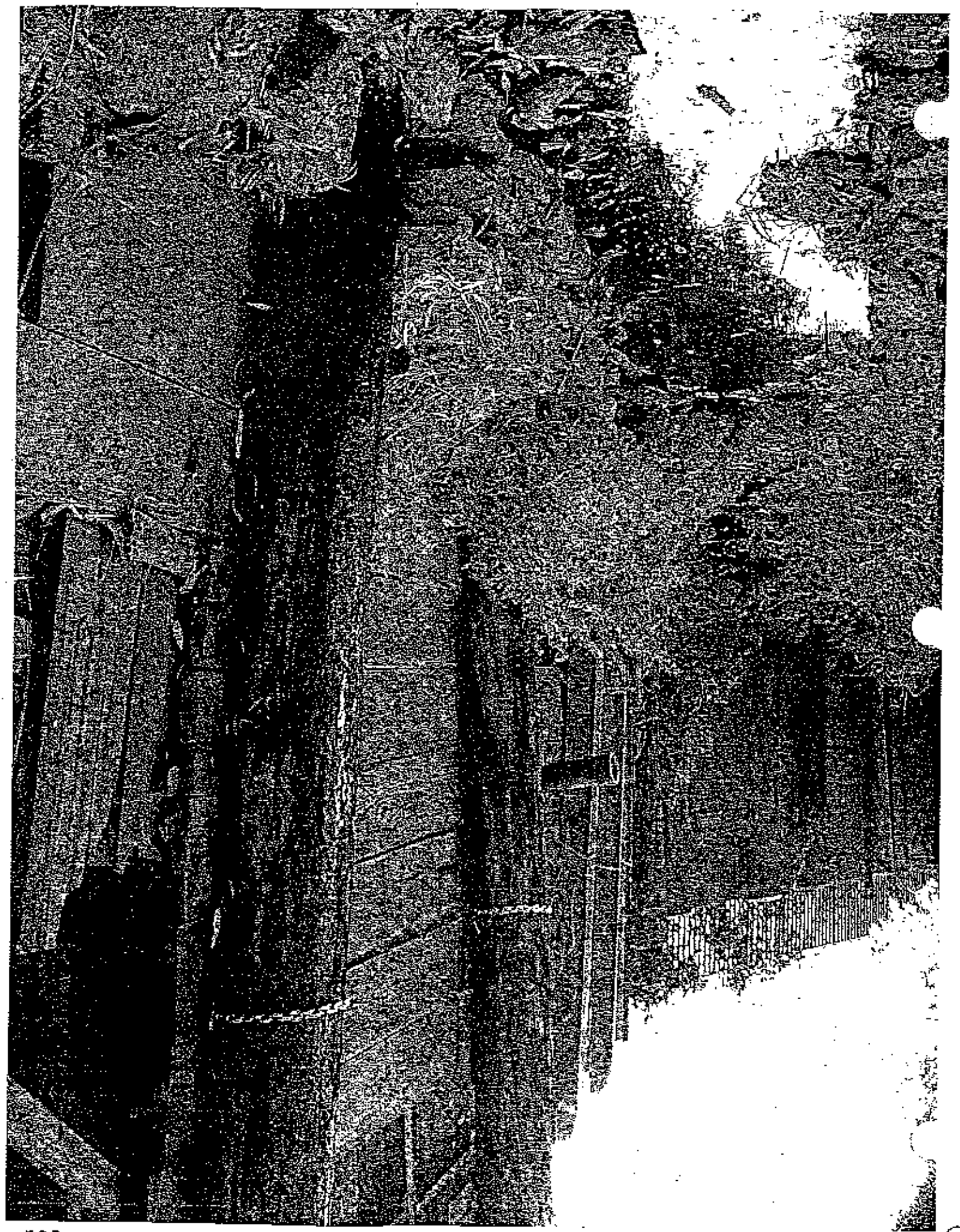

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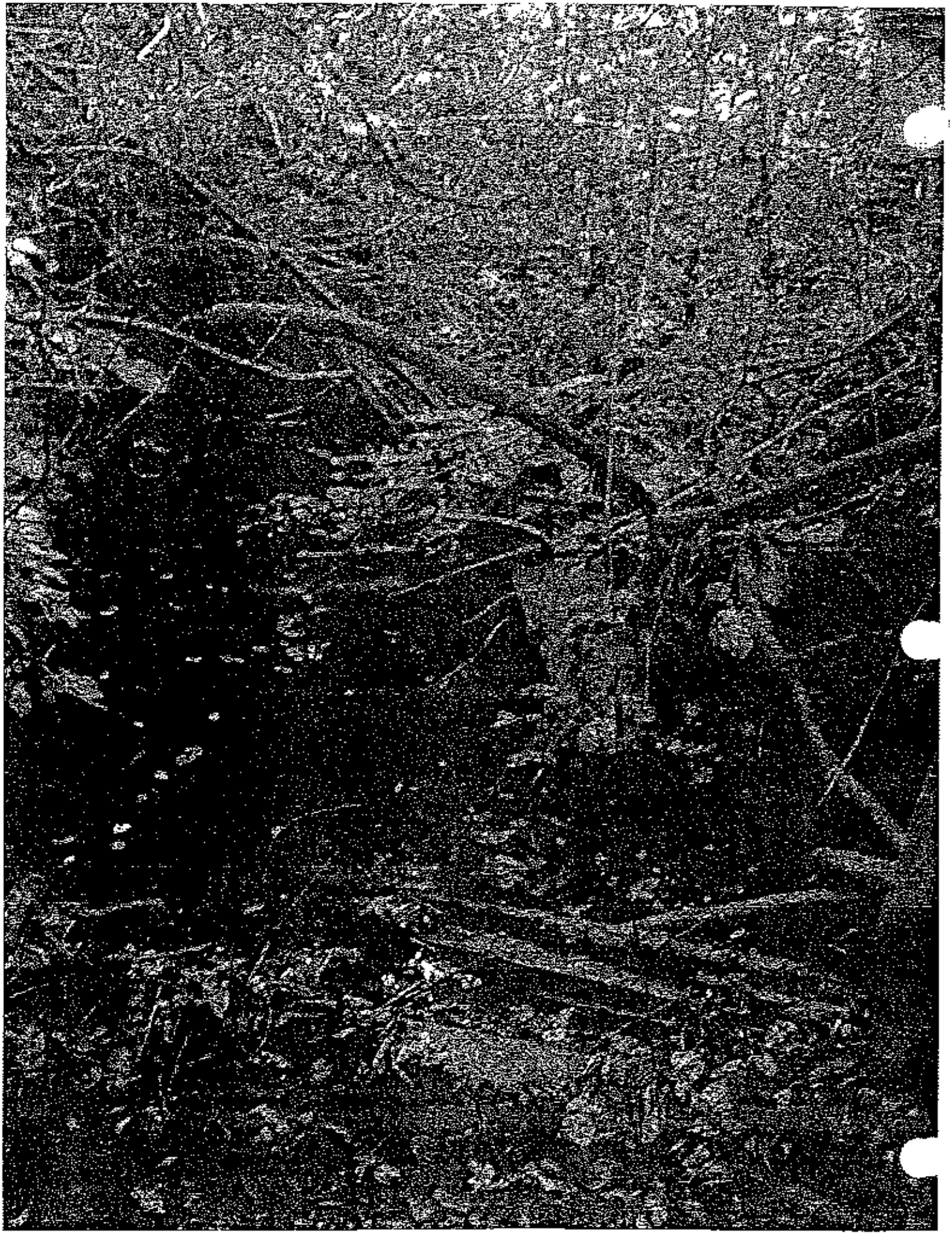

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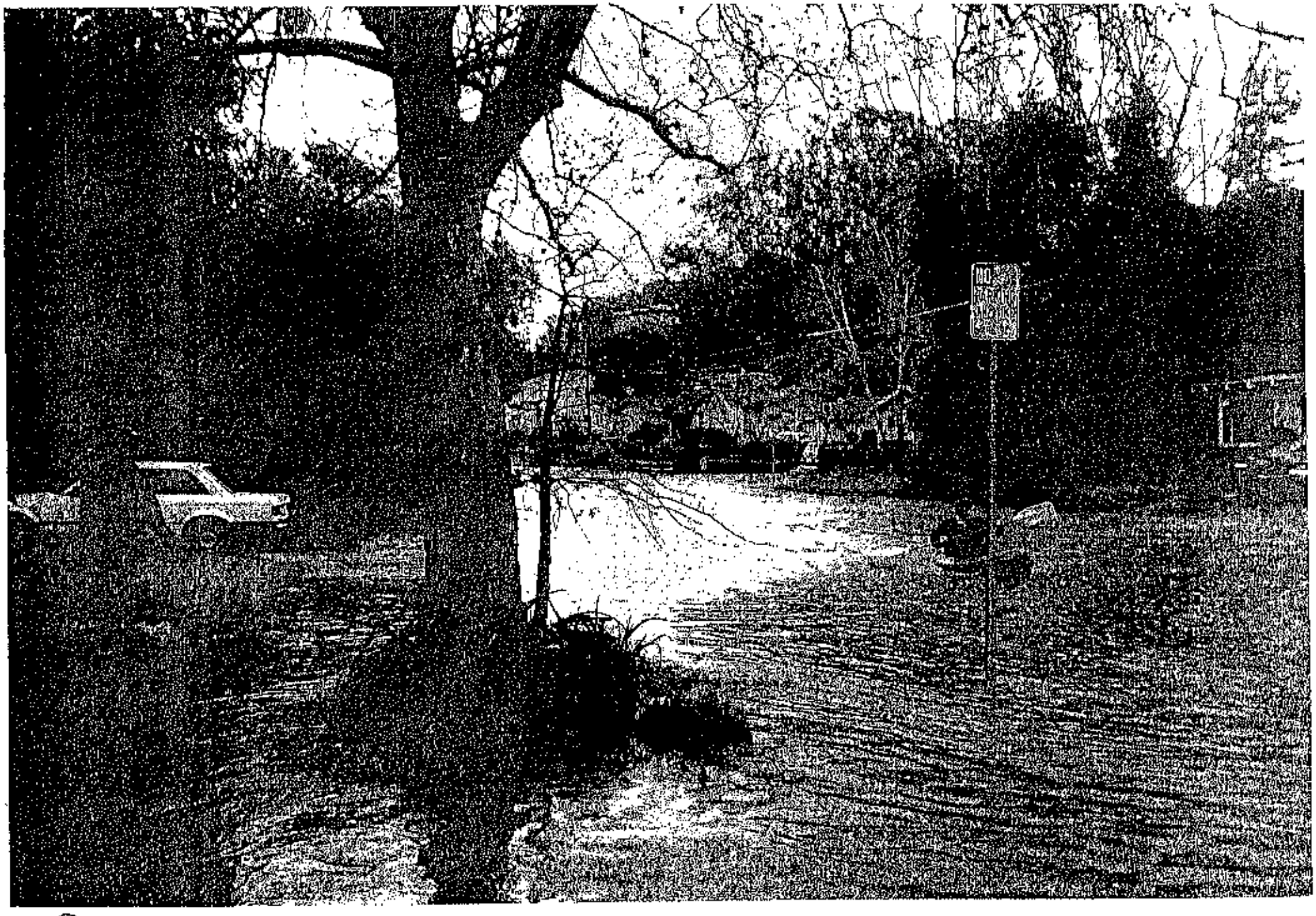

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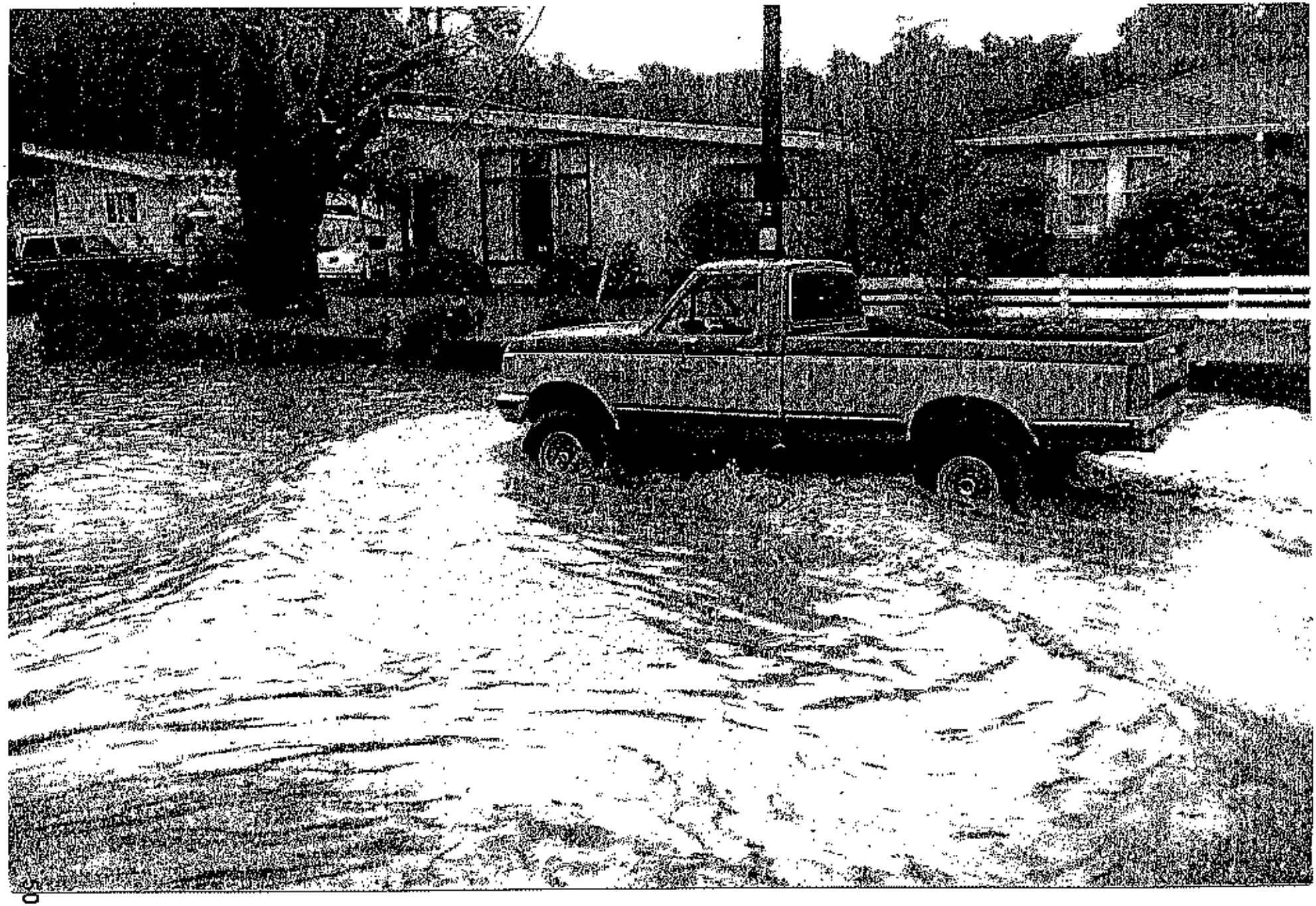

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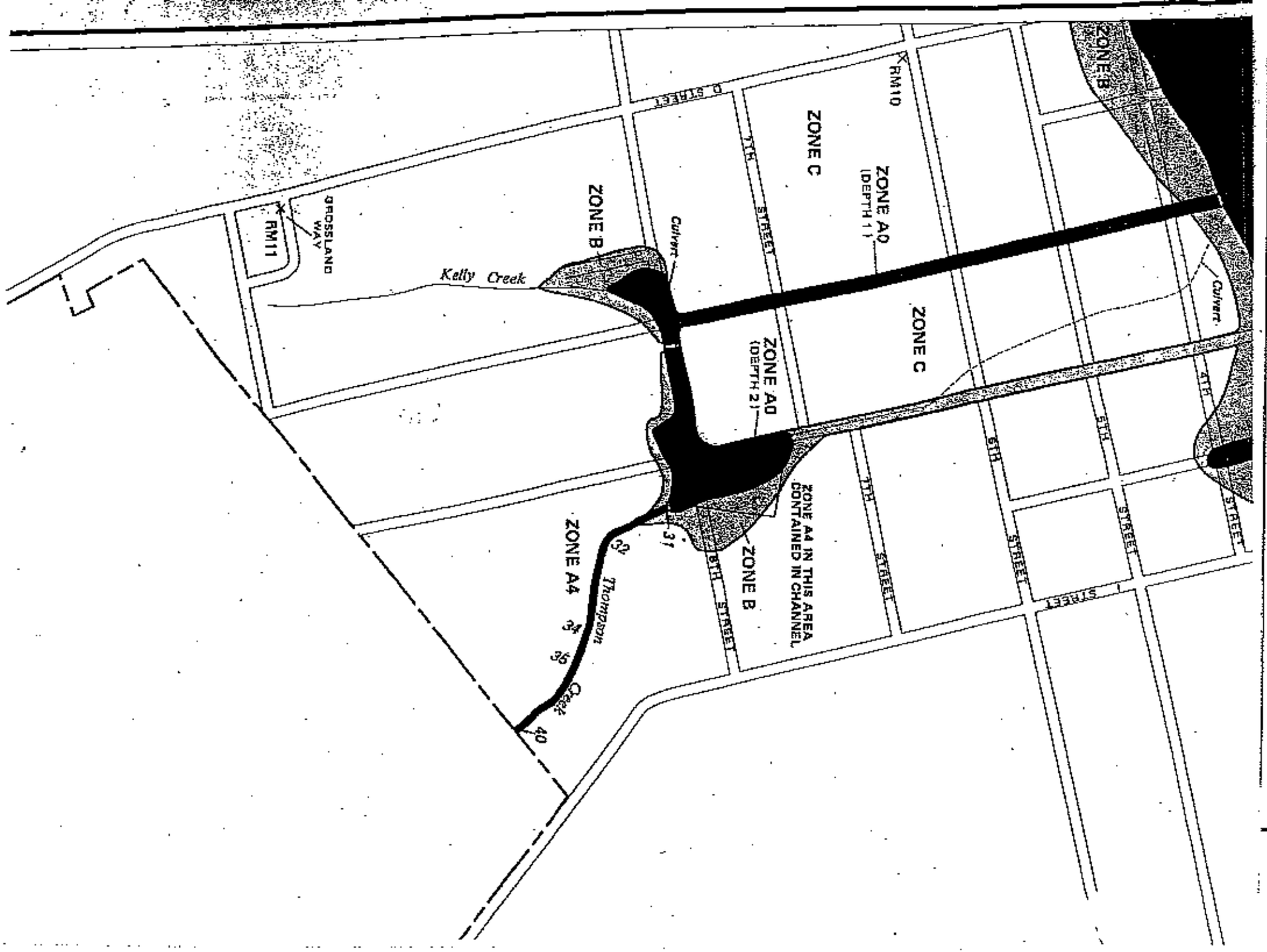

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SONOMA COUNTY

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AND URBAN DEVELOPMENT
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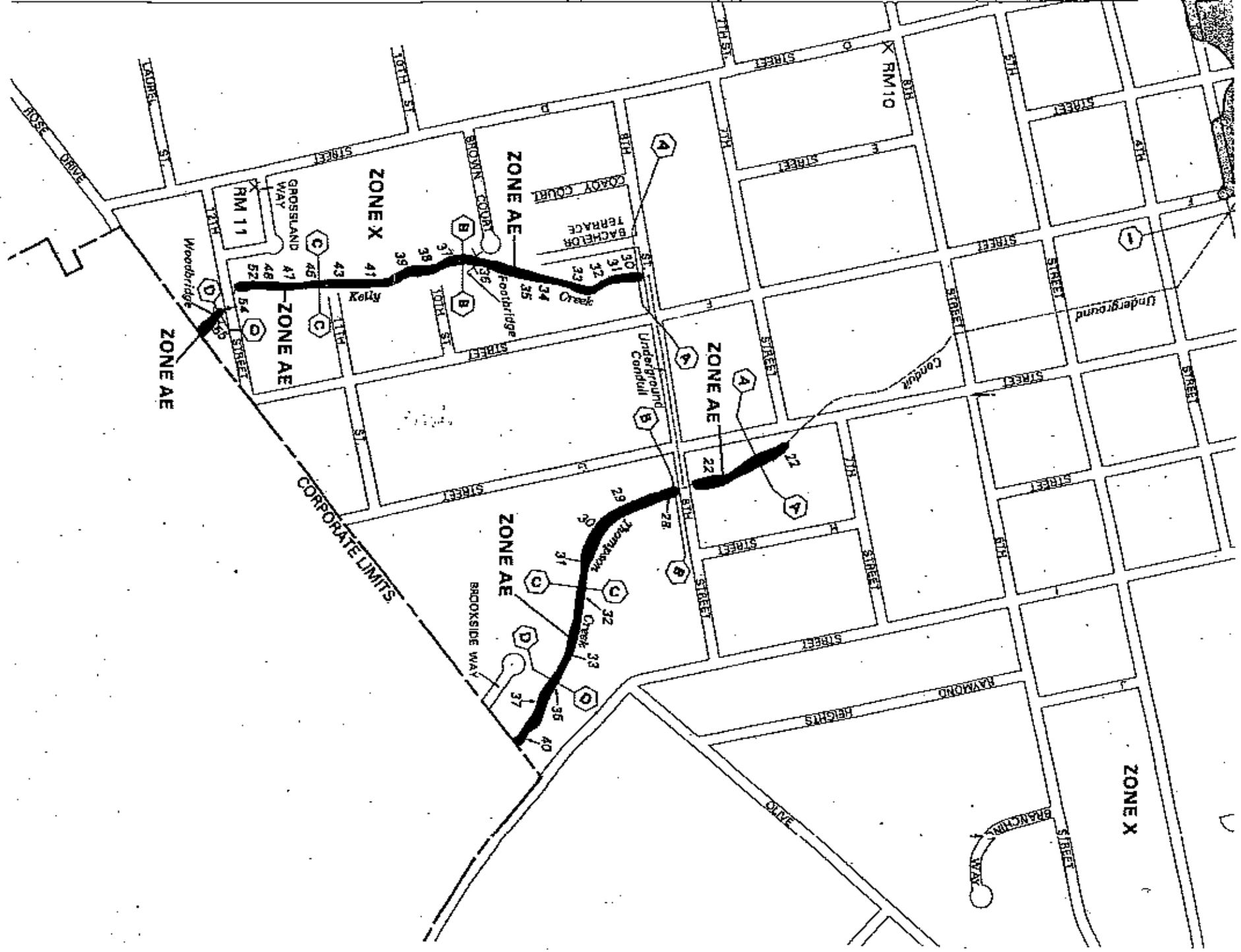

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SONOMA COUNTY

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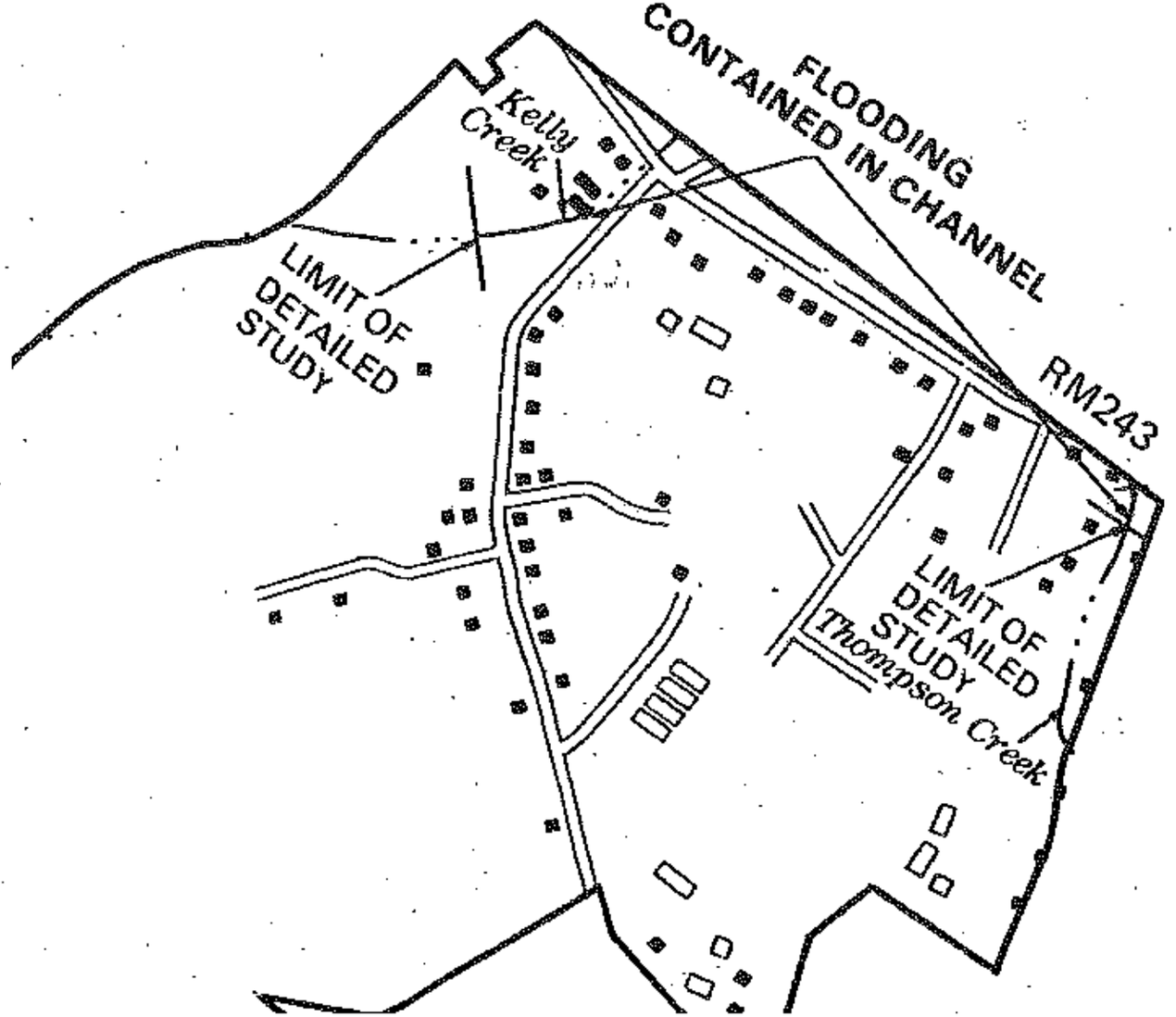

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City Council

Tim Smith
Mayor

Vicki Vidak-Martinez
Vice-Mayor

Arnie L. Breeze
Armando F. Flores
Jake Mackenzie
Council Members

Stephen R. Donley
City Manager

Daniel Schwarz
Assistant City Manager

Judy Hauff
City Clerk

Michelle Marchetta Kenyon
City Attorney

Gabrielle P. Whelan
Assistant City Attorney

Thomas R. Bullard
Director of Public Safety

Ron Bendorff
Director of Community Development

Darrin W. Jenkins
Director of Public Works / City Engineer

Sandra M. Lipitz
Director of Administrative Services

September 11, 2006

Ms. Pamela A. Tuft, AICP
Director of GP Administration
City of Petaluma
27 Howard Street
Petaluma, California 94952

Subject: Draft General Plan 2025

Dear Ms. Tuft,

Thank you for allowing the City of Rohnert Park the opportunity to review the City of Petaluma's Draft General Plan 2025 ("Draft"), which appears to be a very comprehensive document that should serve your community well as it continues to develop. We also applaud the inclusion of Goal 5-G-3 in the Draft, which recognizes the City of Petaluma's role in the regional mobility system (Page 5-13 of the Draft).

Policy 5-P-12 under Goal 5-G-3 states that the City of Petaluma will "[c]onsider participating through a proportionate fair share, as deemed appropriate and feasible by the City, *in mobility network improvements transitioning into and out of the City.*" The City of Rohnert Park's 2020 General Plan includes a similar policy (Policy TR-21) that specifically speaks to participation in a "Regional Mitigation Plan" that would help fund regional traffic congestion mitigation projects beyond the immediate vicinity of Rohnert Park. A copy of TR-21 is attached for your reference. We respectfully request that Policy 5-P-12 be expanded to include regional traffic mitigation beyond "mobility network improvements transitioning into and out of the City."

Should you have any questions, please do not hesitate to contact me at (707) 588-2231.

Sincerely,

Ron Bendorff
Director of Community Development

Attachment

Cc: Mayor Tim Smith and City Councilmembers
Steve Donley, City Manager
Dan Schwarz, Assistant City Manager
Darrin Jenkins, City Engineer/Director of Public Works

TR-20 Work with Sonoma County and the Sonoma County Transportation Authority (SCTA) to plan improvements to Petaluma Hill Road.

Petaluma Hill Road serves as a bypass to US 101 and experiences peak-hour congestion. Table 4.1-4 calls for new turn lanes and intersection improvements to Petaluma Hill Road.

TR-21 A. Work with Sonoma County, the City of Santa Rosa, the City of Cotati, and the City of Petaluma ("Contributing Jurisdictions") and the Sonoma County Transportation Authority (SCTA) to plan and implement selected improvements necessary to mitigate impacts of increased traffic congestion on major roads and intersections in Penngrove ("Regional Mitigation Plan"). The Regional Mitigation Plan shall include those roadway and other improvements necessary to mitigate the impacts of increased traffic congestion on major roads and intersections in Penngrove ("Regional Mitigation Projects"), and a financing plan that explains how those improvements will be funded and that determines each Contributing Jurisdiction's fair share. The City shall contribute its fair share of the total cost of the Regional Mitigation Plan provided that the City's participation is roughly proportional to the traffic impacts from new development in Rohnert Park.

The City's payment or other contribution of its fair share shall be provided when all of the following occur: (1) A Regional Mitigation Project is approved by the Sonoma County Board of Supervisors, and each of the Contributing Jurisdictions; (2) a financing plan for the Regional Mitigation Project has been approved by the Sonoma County Board of Supervisors, and each of the Contributing Jurisdictions; (3) new development that contributes to the traffic impacts to be mitigated by the project receives final approval by the City; and (4) each of the Contributing Jurisdictions has appropriated its fair share to the Regional Mitigation Project. In the event that other jurisdictions do not contribute their fair share to the Regional Mitigation Project, and funding for their fair share is provided by some other means to ensure implementation of the Regional Mitigation Project, the City will contribute and be limited to its fair share.

Traffic congestion presently exists in Penngrove at the Petaluma Hill Road and Old Adobe Road intersection during commute times. Traffic congestion is a result from growth and commute patterns in Sonoma County, SSU, and the Cities of Santa Rosa, Rohnert Park, Cotati, and Petaluma. Implementation of this General Plan will result in additional traffic in this area. Long-term solutions to traffic congestion on Petaluma Hill Road require a cooperative, regional approach by Sonoma County, the Penngrove area, Sonoma State University, and the cities of Cotati, Petaluma, Santa Rosa, and Rohnert Park. The City of Rohnert Park commits to being a responsible participant in formulating measures to minimize traffic congestion on Petaluma Hill Road. The City of Rohnert Park encourages the cities of Cotati, Petaluma and Santa Rosa, Sonoma County, and SSU to adopt policies demonstrating their commitment to participating in long-term solutions to these problems.

During the period in which this General Plan was being drafted, the City worked with the County and other interested parties to identify potential improvements to mitigate regional traffic impacts. Because of the regional nature of issues and solutions, it is anticipated that the process of studying and approving the selected improvements will take several years to complete. Therefore, specific projects to mitigate existing and future traffic congestion on Petaluma Hill Road had not been identified at the time this General Plan was adopted. However, the City of Rohnert Park is committed to continuing its participation in this regional effort.

TR-21 B. Work with the City of Cotati and Sonoma State University to determine feasible measures to mitigate impacts of increased traffic on East Cotati Avenue (within the City of Cotati, beginning with the La Plaza intersection) associated with the proposed growth assumed in the 2000 General Plan. These measures shall be based on detailed (intersection-level) traffic studies that will be prepared with each specific plan. The Canon Manor Specific Plan, University Specific Plan, and Southeast Specific Plan shall include a detailed analysis of intersections within and outside of the city that are projected to be impacted by the specific plan project area; an analysis of the traffic impacts of the specific plan project area on East Cotati Avenue; a cumulative impact analysis; and feasible mitigation measures for lessening the potential traffic impacts.

Contribute the City's fair share to the feasible mitigation measures identified in each Specific Plan (Canon Manor Specific Plan, University Specific Plan, and the Southeast Specific Plan); provided that (1) the City's fair share is roughly proportional to the traffic impacts of development beyond the 1999 incorporated limits of the City of Rohnert Park; and (2) other jurisdictions that approve development that impacts traffic congestion at the impacted intersections on East Cotati Avenue contribute their fair share. In the event that the City of Cotati and/or SSU approve development that impacts East Cotati Avenue traffic congestion but do not contribute their fair share to fund the feasible mitigation measures, the City and City of Cotati will evaluate alternative feasible mitigation measures that can be implemented. The City's financial commitment is also contingent upon legal authority to collect payments through specific plans, development agreements, assessment districts, and/or ordinances to raise funds for needed improvements on East Cotati Avenue.

Because of the location of the City of Cotati adjacent to U.S. 101, a portion of the traffic passing through Cotati to reach the U.S. 101 corridor is generated from jurisdictions outside the City of Cotati. Implementation of this General Plan may generate additional vehicle trips on City of Cotati roadways, particularly East Cotati Avenue. Long-term solutions to traffic congestion on East Cotati Avenue require a cooperative regional approach. Policies in this General Plan commit the city of Rohnert Park to being a responsible participant in developing and funding these solutions. Development within the Specific Plan areas may occur without implementation of the identified mitigation measures in the event that funding is not available from other jurisdictions to construct the improvements.

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Tuft, Pamela

From: General Plan Administration
Sent: Monday, September 25, 2006 12:40 PM
To: Tuft, Pamela
Cc: Dulvon, Scott
Subject: FW: New General Plan comment - retail

More comments to pass on to you from the General Plan email address..

From: k88ro@comcast.net [mailto:k88ro@comcast.net]
Sent: Thursday, September 21, 2006 9:26 PM
To: General Plan Administration
Subject: New General Plan comment - retail

80

Dear Ms. Tuft,
My understanding is comments regarding new gen plan will not be taken after tomorrow. Here are mine:
My concern is with retail planning. I think your plugging retail leakage is off base. I think it alot of spin. Is Rohnert Park oh so in the black because they brought all these crummy stores in. Can one employed at Target really afford an apartment on the river in Petaluma? I don't think so
In my brief review of the draft, the intention to balance big box with other types of shopping is commendable, but I think Petaluma is missing the boat. Bringing in Target, Lowes etc.... the exact copy that is 7 or so miles away in both directions of 101 is redundant. And TJ Maxx is a totally junky store. I believe the city should be looking to take a larger risk with both upscale and alternative shopping oppportunities. If you are going to duplicate then duplicate more reasons for people not only to remain in Petaluma to shop but bring people to Petaluma to shop. Downtown just goes so far. How about Nordstroms? There are million dollar homes being built, I would guess one can afford the shoes to match. I believe Petalumans are driving to Corte Madera or the city and so are people in Sonoma, Healdsburg and areas like Fountain Grove in Santa Rosa, so bring them here. Build your sho pping complex with some class and quality. If you build it they will come.
I don't think their are any creative juices flowing certainly not from developers when all you can get is the same old same old that is down the road.
ie Circuit Citics are a dime a dozen, why not Fry's. I was reading an editorial in the Argus bragging about bringing these stores, I was so disappointed and unimpressed then I look down the page and see that Pharmacia an alternative speciality pharmacy is opening in Novato. With a fair size add in the Argus, Why do you think? Novato of all places and not addtional alternative shopping here in Petaluma? If you have to go with corporate retail as some sort of economic answer then shoot for better that is not down the highway or in Santa Rosa, At least go for Pottery Barn, Virgin Records, Restoration hardware, the Discovery Stores just something different. Do we have to look like every hiway and biway in the US,
I could not read the whole plan but I would like to know if the infrastructure issues include reworking all of the entries and exits into Petaluma from 101 their awful and more traffic is just going to cause potential accidents. I also hope that who ever currently does street planning learns more about how to design for more car, bike and pedestrian traffic and that should be part of the new plan.
Thank you for your time and work, Good Luck,
Kate Brolan
1073 Warren Drive
Petaluma, CA. 94952

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October 11, 2006

My dear Pamela Tuft
of the Planning Commission

I live on the corner of 4th and G., across from Wickersham Park. It is a lovely spot in Petaluma. We've been here since 1962 when I got a position to teach at Petaluma High School.

Of course I've seen a lot of changes: - hayfields changed into a city. Our end of town, on the South Blvd., (which was 3rd St. at one time) has seen some changes too: - many homes squeezed onto the old McNear estate — homes on the Golf Course/Gravel Pit hill — Condos lined up along the river.

Now I hear that there are objections to the appearance of the small businesses along the "entrance to town". Those small businesses provide jobs. We don't need any more dwellings for commuters

General

if there are no local jobs. And we don't need more retail-type malls so close to our down town businesses.

Please leave our present approach into town on the South-Free way exit alone. We need it as it is with the few businesses and the remaining old charming small dwellings on the Boulevard.

Very Sincerely,

Emma Webber

I would appreciate your sharing my letter with other city officials.

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(Presented to PC, by author, in Sept.)

See Petaluma From The Water
Petaluma Small Craft Center Coalition
P.O. Box 192
Petaluma, CA 94953

September 30, 2006

Pamela Tuft
Director - General Plan Administration
City of Petaluma
27 Howard St
Petaluma, Ca. 94952

82

RE: City of Petaluma Draft General Plan 2025 (July 2006)

Dear Ms. Tuft and the City of Petaluma Planning Commission;

We address these comments to you as members of the Petaluma Small Craft Center Coalition (PSC3) a group of non-profits and individuals dedicated to the use of small craft on the Petaluma River. Our studies have estimated that as many as 300 individuals regularly use the river for recreational boating, and our coalition, through its member clubs, represents the majority of these.

We are very pleased to see so many references to river access in the Draft General Plan 2025, starting with the historical background in section 1.1. The river that formed the heart of the city is still, to the many members of PSC3, one of its primary aesthetic, recreation, commercial, and community assets.

Several of our members participated in development of the Petaluma River Access and Enhancement Plan and we are encouraged to see many of its elements embedded in the new general plan. And, with increasing pressure for housing and other non-river dependent uses on the riverbanks, we encourage the city to reinforce its commitments to river access in the general plan. Please accept our comments in this spirit.

It is stated in sec 6.1 under Creek Fronts and Riverfront that "the river in particular offers numerous recreational amenities and holds the possibility of

offering more". We would like to offer some specific points and general suggestions for increasing river access, appreciation and recreational amenities to be included in the text, maps, and goals of this section to encourage river access for users of small boats, and develop a public Small Craft Center to benefit the entire city.

Goal 2-G-5 (p. 2-22)/2-P-36-37:
Extend the River Plan Corridor south to include the CPSP zone and the tidelands south of the Marina. Map the River Plan Corridor to show both existing and proposed river and creek trails and access points for hand-launched small craft. Coordinate this map with access points as indicated in the San Francisco Bay Water Trail (creation of such a trail on the Petaluma River was authorized by the 2005 San Francisco Bay Water Trail Act) and plans for a River Parkway. Require development along the river to build and maintain public access sites that meet the following description: Access sites can include locations with developed amenities (ramps, steps, roads, docks, or other construction) or sites that provide natural features (e.g., beaches, riverbanks, rock outcrops, banks adjacent to bridges, etc.) to reach the water or hand-launch a small boat. Any of these can suffice as long as: people can walk a reasonably short distance to the water, the vertical space between the shore and surface of the water is not excessive, water depth allows for launching without damage to shallow-draft craft, and there is enough space for boaters to step in and out of watercraft.

Goal 2-G-5 (p. 2-22)/2-P-38:
Strengthen the wording of this policy to incorporate water access (see definition above) in addition to orienting buildings toward the river as a focal point.

Goal 2-G-5 (p. 2-22):
Add a policy establishing that access be a priority in future riverfront development, because of the rapidly diminishing number of buildable parcels along the waterfront.

Goal 3-G-3 (p. 3-11)/3-P-12:
Require linkages that will require a contiguous Downtown-Schollenberger riverfront footpath and access points in any future development along the river.

Goal 5-G-8 (p. 5-30):
Continuing commercial and industrial use is important to recreational river users as well; it protects the river's status as a key commercial asset of the community as well as a recreational asset. We urge the city to take measures to assure continuing economic viability of the operations currently dependent on river transportation.

Dredging should continue and be expanded to include McNear Channel, thus opening the channel for development of small-craft launch sites and connecting Steamer Landing Park and the proposed Agricultural and River Heritage center to be developed there to river access.

Goal 5-G-8 (p. 5-30)/5-P-49 B:
This policy should make explicit an action item emerging from any investigation. A multi-use public aquatic center, increased river access for hand-launching of small boats, and a contiguous footpath connecting Schollenberger Park with downtown would all contribute substantially to the health of Petaluma's tourism economy. We urge the policy to include collaboration with the city Parks and Recreation Department and private non-profits offering small-craft recreation to determine optimal installations or services to meet tourism interests.

Goal 6-G-1 (p. 6-15)/ 6-P-2 A:
Specific access points (existing and potential) should be identified and mapped in the General Plan. These should include both formal and informal access points, including pocket parks along the river at regular intervals throughout the city; especially at street ends and creek entrances, bridges, and along the walking trail.

Goal 6-G-1 (p. 6-15):
Development of a public multi-sport small-craft center should be included in this goal. A small craft and maritime heritage center would support the many recreational and competitive small boaters who are using rowing shells, outrigger canoes, kayaks, traditional wooden boats, and other human and sail powered watercraft on the Petaluma River. The vision should include a strong educational component for youth and adults, with a focus on the River's maritime heritage and its natural and wildlife heritage.

Goal 7-G-1 (p. 7-6)/ 7-P-3:
We encourage the City to assist private non-profits and/or its parks and recreation department in offering increased small-craft programming at the Marina. Collaborators should include PSC3 members representing the outrigger, kayak, rowing, and traditional small craft communities. These groups should be consulted on features and services that would make the Marina more "friendly" to users of small craft, and assure compatibility with existing powerboat users.
The Marina is one of several sites that would be natural for development of a small craft center, although space is too limited in its current design to accommodate all of the community's recreational small craft interests. Creation of a Small Craft Center will facilitate learning and enjoying the use of rowing, paddling and sailing boats. If possible, it could be combined with a Maritime Heritage Center highlight the city's nautical past

The river is our most prominent and available open space yet only a small percentage of the population have actually been on its waters. We strongly suggest including river oriented programs and facilities to house and accommodate them in the General Plan.

Thank you for allowing us to comment on the draft general plan. We look forward to the growth and flowering of a vibrant, diverse, and user friendly community based on the final edition of this plan.

Participants in the PSC³, including:

Friends of the Petaluma River
He'e Nalu Outrigger Canoe Club
Lokahi Outrigger Canoe Club
NorthBay Rowing Club
Ohana Wa'a Outrigger Canoe Club
Petaluma Paddlers
Petaluma River Works
Petaluma Yacht Club
Sequoia Paddling Club
Sonoma State University Crew
Traditional Small Craft Association/Sacramento Chapter

For further information please contact:

Greg Sabourin
(707) 293-3685
gjjsabourin@aol.com

Susan Starbird
(707) 778-7277
paddler@starbirdcreative.com

Payette Caldwell
Petaluma Paddlers

Kathleen Garvey
Paddle Up Petaluma

Phil Hervé
Ohana Wa'a and Lokahi Outrigger Clubs

From: Skypasture@aol.com
Sent: Tuesday, November 14, 2006 9:07 PM
To: wildargieppc@comcast.net
Cc: White, George; Tuft, Pamela; Duiven, Scott
ubject: Planning Commission mtg. comments, Tuesday, 11/14/06

83

11/14 8:45 p.m.
Dear Mr. Dargie,
I am listening to the Planning Commission meeting while in the midst of evening chores.

A specific parcel density was discussed this evening - if I understood correctly, as I came in on the discussion later than the beginning - the parcel is in the proximity of Western Avenue, Bodega Avenue and Bantam Way. The discussion involved residential density and evolved to include a discussion of an urban separator.

In the midst of the discussion, the concept of "urban separator of 100 feet" came up, and the conversation expanded to the western area in general, the "urban separator path" concept as represented on Paula Lane, and eventually the Rural Residential density designation - and the desire to discuss these issues further at your next meeting.

I would appreciate it if you could communicate to the Planning Commissioners, especially those commissioners who were not present during the actual planning process for this draft General Plan in our area of Paula Lane - the depth of input by the majority of the community in our area, the extensive input, and the diligent participation in community workshops to reach the density designations in the Paula Lane area in particular.

This is not an area we wish to have revisited by the new Planning Commission in the final stages of approval now.

We support your comment regarding the parcel in question - which is to leave the density as it is for the larger picture. The larger picture of our area of West Petaluma - and it ppears the parcel discussed is in our area - focuses around transitioning to rural life and retaining the unique historic community character in our area, as well as protecting critical wildlife habitat - much of which exists now because no provision was made for open space or wildlife movement areas as development moved west from central Petaluma.

I would be pleased to take as much time as is required to meet with any or all of the new sitting Planning Commissioners to describe the history, process and outcome of the residential densities on Paula Lane - I would welcome this opportunity actually.

If you would be so kind as to forward this email to the commissioners and provide my name and number: Susan Kirks 773-3215, as Chair of the Paula Lane Action Network, a 501(c)3 nonprofit organization dedicated to preservation of historic resources, wildlife habitat, rural land and open space in our west Petaluma area, I believe I could fill in some blanks and provide what may be helpful information to new Commissioners who are not familiar with the details of the process in our area for the past six years.

With regard to "urban separator," as you are probably aware, in community workshops, we requested a minimum 100 foot urban separator along all properties on Paula Lane with the Rural Residential density designation. The General Plan Administration staff and consultants created the "urban separator path" as a general compromise, we believe, between the true urban separator as represented on the East side of Petaluma and the unique characteristics and topography of the west Petaluma properties.

Ironically, and we have provided this information in extensive documentation that is on file with the General Plan Administration Department - the "urban separator path," which implies human encroachment or a bicycle path - at least in the Paula Lane area - would be completely inappropriate - as the path as shown in the General Plan traverses critical and sensitive wildlife habitat where there is no human encroachment, nor should there be. This is another reason we advocated for an urban separator.

In our opinion, the General Plan as has evolved for our area of West Petaluma is the

result of many hours of consideration and discussion by Planning [illegible] were both experienced in reviewing proposed projects and familiar with unique characteristics, history and community character in our area of Petaluma. With all due respect to both the intellect and creativity of the sitting Planning Commission, we do not believe revisiting Paula Lane residential densities or suggesting an increase in densities is appropriate at this time.

Perhaps a policy statement that defines urban separator or urban separator path as an a[illegible] of separation that is a minimum of 100 feet from a property line would suffice for the general policy nature of the General Plan. We would support a change, however, to urban separator from urban separator path on the properties along Paula Lane - if an urban separator designation is created in our general area.

Again, I would be most pleased to meet with any Planning Commissioner and provide detailed information as to the history, process and outcome of the Draft General Plan for the Paula Lane neighborhood as it currently exists.

If we are now required to again come before the Planning Commission, after having participated in all community workshops in the last several years and all Planning Commission meetings - except for tonight - to revisit the area, we shall be pleased to do so and will advise our legal counsel of this new development in the Planning Commission's review process.

Please also kindly remind the sitting Planning Commissioners that the City Council recently unanimously approved a Resolution for an open space project on the 11.22 acres at Paula Lane and Sunset Drive, and we are hopeful applications for that project will be filed according to the Open Space District's schedule of accepting new applications in early January 2007.

As you may recall, there have been significant identified environmental constraints to development in the area of Paula Lane. The Paula Lane neighborhood is one of Sonoma County's oldest agricultural neighborhoods, steeped in history, with a unique community character the majority of residents wish to preserve.

We look forward to working with the property owners and the City of Petaluma to create t[illegible] open space project on Paula Lane at Sunset Drive and appreciate the City Council's direction in this regard. We also deeply appreciate the level of attention and understanding given to our community in the past by the Petaluma Planning Commission. Best wishes with your continuing review and final recommendations.

Sincerely,
Susan Kirks, 773-3215

Duiven, Scott

From:	Skypasture@aol.com
Sent:	Thursday, November 16, 2006 11:51 PM
To:	wildargieppc@comcast.net
Cc:	White, George; Duiven, Scott; Tuft, Pamela
Subject:	Re: Planning Commission mtg. comments, Tuesday, 11/14/06

84

11/16/06 p.m.

Dear Will,
I appreciate your prompt response to the email I submitted regarding this past Tuesday evening's Planning Commission discussion relative to the West Hills.

I shall pass the word on to neighbors that we should attend the next Planning Commission meeting. As always, we wish to be available to provide input from the community's viewpoint, should this be both helpful and necessary.

We never desire to take up more time than necessary or to provide comments that are not helpful and, as you are likely aware, a representative of our neighborhood has attended all Planning Commission hearings, community workshops and past Planning Commission workshops related to the General Plan update - except for this past Tuesday evening.

The Paula Lane residential density issue has been discussed and settled, and we do not feel it is appropriate to revisit it. It is based on, as described, extensive input in writing to the General Plan Administrator, as well as the evolutionary process as it related to both the Planning Commission workshops, community workshops, and City Council review of the proposed land use plan to date.

There has been no request, to my knowledge, to revisit this issue.

However, I do believe it would be helpful - especially for new planning commissioners who have not had the opportunity to review any project proposals - to have a clear understanding of the historic character of our neighborhood, the potential significant environmental impacts related to development proposals, the critical wildlife habitat, and the location of the Paula Lane area in the most outlying of areas - rural.

In addition, the RR density of 1 house per 2 acres or 0.5 unit per acre on some parcels is consistent with the update of the Sonoma County General Plan.

With regard to the Urban Separator concept in our area, I believe it would be helpful for Planning Commissioners to understand such a concept would apply if properties were annexed to the City of Petaluma. Based on the continuing sentiment of the majority of property owners and residents in our area, it is highly unlikely that the Paula Lane area will ever request annexation. The City of Petaluma could always form a Benefits Assessment District to determine this officially. Piecemeal annexation is not desired nor do we feel it would represent good policy and, as reflected in the draft GP update, is not considered preferred policy. This is also consistent with Sonoma County General Plan policy.

This is why our nonprofit organization of homeowners and residents has not pressed the issue of changing the Urban Separator Path. We are satisfied with the current representation of our area in the Petaluma General Plan update/ Land Use Plan.

Having said this, if an Urban Separator is designated on other properties in our area of 100 feet, then it would undoubtedly be appropriate to change the Urban Separator Path to Urban Separator on the Paula Lane properties. We had requested this originally, as noted. Pamela indicated in one Planning Commission discussion (on the recent evening when I had to leave prior to your discussion of community workshop comments) that placing an Urban Separator of 100 feet would be considered "taking" of land.

It is our opinion, if properties on Paula Lane were ever annexed - and as indicated, we do not believe this will be the case, based on strong sentiments of property owners in the majority in the area, an Urban Separator of 100 feet as a condition would seem appropriate on those properties which have received the Urban Separator Path..

Finally, we appreciate the many hours devoted to crafting the Land Use Plan by you and former Planning Commissioners who have an appreciation for the West Petaluma area - its unique character - and the desire of most to preserve that while honoring the rights of property owners. We agree that the parcel in question in the last meeting, bordered by Bantam, Western and Bodega, would best remain as was designated through the Planning Commission workshops that led to the draft Land Use Plan. The County Planning Commissio also has stringent requirements, should development of that parcel occur in the county.

Again, thank you for your response and for requesting forwarding of information to the other Planning Commissioners.

Sincerely, Susan Kirks, Paula Lane Action Network, 773-3215

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DEC 19 2006

GP Administration

Geoffrey H. Cartwright
56 Rocca Drive
Petaluma, Ca. 94952
(707) 763 2883

General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, Ca. 94952

December 18, 2006

Dear Ms. Tuft,

RE: PETALUMA GENERAL PLAN 2025 DRAFT ENVIRONMENTAL IMPACT REPORT. 85

The city council meeting and discussion on Dec. 4, 2006 has raised a couple more issues pertaining to hydrology. Specifically the comments pertaining to the terracing of the river in it's upper reaches. The comments that the bridges on Corona Road and the two bridges on Petaluma Blvd. North near Stony Point Road would act as weirs preventing the waters from rushing down stream into town may be flawed in the assumption.

The reality of the circumstances is evidenced by the removal and larger replacement of the Willow Brook Bridge on Old Redwood Hwy. (I believe in 1998) between Redwood Business Park III and the Adobe Lumber site. We must remember that the primary purpose of roads and their bridges is to facilitate the flow of traffic and are not intended as chanelization weirs to prevent down stream flooding. It would be far more prudent to assume with the development proposed by this new general plan that these roads will be improved and those bridges replaced with larger spans as development interest will insist be done and as was done at the Willow Brook bridge in 1998. The impacts and mitigations of which need to be identified in this new General Plan EIR, and if the impacts and mitigations are not feasible, policy must be in place within the new General Plan.

Another area of concern is the forward movement of this General Plan EIR prior to the remaping of the flood plain by FEMA, which cannot occur until the removal of the railroad bridge between Lakeville Hwy. and the down town area which will complete the US ARMY Corps of Engineers flood control project.

It should be noted that the design assumptions for the Corps of Engineers channelization project was based on hard scaping of the valley but did not include the rerouting or displacement of flood waters by dirt fill building pads or the channelization of Denman Flats, our water sheds natural holding pond. The design assumptions were intended to provide the 100 year protection level upon completion of the project and 40 year protection levels upon build out of the valley.

Last new years eve we experienced a storm over this water shed that was identified as an approximate 40 year storm event by the Petaluma Dept. of Water Resources and Conservation and yet it was only two feet from flooding Jess Ave. in the area of the Corps of Engineers weir. These flood waters were only one foot from flooding down town at First Street.

I believe it is necessary to identify the impacts and mitigations for the displacement of flood waters by dirt fill building pads, including the fill now being applied at the Redwood Gate Way Center (previously known by it`s EIR as the Redwood Tech. Center). I further believe this EIR should identify the impacts and mitigations for the displacement of flood waters by future dirt fill building pads west of Hwy. 101 from Stony Point Road to the Payran Neighborhood considering the development projections in this new General Plan as the city does not appear to have the ability to govern it`s own zero net fill policy, or at least that policy appears to have failed.

Sincerely

Geoffrey B Carlington Jr

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MAR 1 9 2007

GP Administration

From: Brock Dolman <brock@oaec.org>
Date: Sun Feb 11, 2007 5:07:52 PM US/Pacific
To: Sonomawildlife <SonomaWildlife@yahoogroups.com>
Cc: <SCWaterCoalition@yahoogroups.com>, <ncwaternet@lists.mcn.org>, APC <Apc@openpermaculture.org>, <DutchBillCreekWatershed@yahoogroups.com>, <salmoncreekwatershedcouncil@yahoogroups.com>
Subject: [SonomaWildlife] Harvesting rain for a dry day article by Rick Polito in the Marin Independent Journal
Reply-To: SonomaWildlife@yahoogroups.com

86

Harvesting rain for a dry day

Rick Polito Marin Independent Journal
Article Launched: 02/09/2007 04:32:50 PM PST

Paola Bouley unscrews the lid on the fifth in a line of bulging plastic barrels behind the storage shed and leans forward, peering into its murky depth.
"This is last year's water," she says.

More accurately, it's last year's rain. Bouley, a biologist for the Salmon Protection and Watershed Network, is one of a small - and she hopes growing - number of homeowners who are harvesting rain from roof gutters and using it to water plants, prevent erosion and spread a new water consciousness tied to natural cycles.

The barrels positioned behind the shed and just past the rain-grabbing permeable driveway catch a modest 450 gallons of water, a fraction of the 5,500 gallons that flows off the 264-square-foot roof in an average year. But it is enough water to irrigate her fruit trees and help establish an array of native plants she is cultivating in the yard of her Fairfax home.

"We catch way more water than we can use," says Bouley, who cites claims that one-third of Marin residential water use will go to landscaping in the summer months.
The system is simple. The rain runs off the roof and into the rain gutter. It then pours through a window screen filter into the first of the barrels. When that barrel fills, it siphons into the next. The process goes on until all five barrels are filled, and Bouley has enough water to keep her plants and trees thriving.
Bouley assembled the system with her husband. There is no hydraulic sophistication. "I'm not a tinkerer person," she admits.

That's the beauty of "rainfall harvesting," says Brock Dolman, a sustainable design instructor at the Occidental Arts and Ecology Center. Nobody has to be an expert on anything.

And they have most of the equipment already. They're just not using it. "They already have a roof," Dolman says. "They already have downspouts. Getting water into a tank and pre-filtering it can be a pretty simple process."

But few people are taking advantage of that simplicity. Bouley and Dolman were part of the team that built a rainwater harvesting system at Lagunitas School. The system catches 30,000 gallons off the school's playground structure and saves it for use in an organic garden.

That idea can easily be scaled down. Bouley estimates that rooftops catch 85 million gallons in the San Geronimo

Valley alone.
The technology is certainly nothing new. Rainwater has been stored in cisterns since ancient times. But it's older than that, Bouley says.
It's how nature works, given the chance.

The water caught in the barrels and tanks would be stored in the aquifer if the roofs and concrete or asphalt surfaces weren't funneling it into storm drains and shooting it into fragile creekbeds. The result is erosion and creeks that go dry for months, disrupting habitats and leaving salmon and other species to die in dwindling pools. "These are all predictable effects of what we are doing," Bouley says.

Putting barrels under the gutters of every home is not going to fix that problem entirely. It's not even going to save people any money. Water is artificially cheap, Bouley says, and the barrels and hoses cost money. But plugging into the natural rhythms of rain and drought might raise people's water consciousness, she says. "It will enlighten you to the cycle of water."

Dolman tells people to think of their rainfall harvesting systems as a kind of "savings account. "Every winter the planet gives you an allowance," he says.

People have to think about how much allowance they need. With 100 square feet of roof surface "for every one inch of water, you'll get about 55 gallons," Dolman says.
Gardeners can tie in an efficient drip-water system and plant low-water-use vegetation, making the water last acros. the dry months. Dolman calls it "balancing the water budget."

"There's nothing here that's new, except you're filling your tank off the roof instead of pumping it out of the ground."
Why more people aren't taking advantage of their runoff isn't so much a mystery as a source of frustration for Dolman and Bouley. Many people don't think beyond the faucet, ignoring the effect of habitat destruction, erosion and pollution. Rain and water only enter the consciousness when there's too much or too little. Floods and severe droughts get attention. Drying creeks escape notice.
Catching water is catching on in other areas, Dolman says. He points to New Mexico, Texas and Hawaii as sources of innovation. With water in varying stages of crisis across the state, he can't understand why it isn't happening here. "California is kind of behind the curve on this."
"We're a little bit in denial," observes Bouley, who lives across the street from a home where a mudslide caused extensive damage. Artificially altered landscapes can have disastrous consequences.
People shouldn't wait for a drought or a flood to start thinking of their place in the watershed, Bouley points out. She tries to look at the landscape "from ridge to creekbed, including the people in between."
The driveways, roofs and roads are major alterations. The barrels behind her shed, and the driveway that lets water soak in instead of sheeting off, are a small kind of mitigation. If more people had more barrels, and took the ethic they learned into their homes, the effect could be big.
"We could have a cumulative effect for the best," she says. "Or for the worst."
IF YOU DRIP
Find out more information on setting up your own rainwater harvesting systems and where to find books on the subject at these sites:

– http://rainwater.org
– www.arcsa-usa.org
– www.harvestingrainwater.com
– www.rain-barrel.net
Rick Polito can be reached at polito@marinij.com.

Messages in this topic (1) Reply (via web post) | Start a new topic
Messages | Files | Photos | Links | Database | Polls | Members | Calendar
***
Links to Member Organizations of the Sonoma County Conservation Council:
http://envirocentersoco.org/groups.htm

Environmental Events Calendar:
http://www.envirocentersoco.org/eventcalendar

Sonoma County Water Coalition
http://www.scwatercoalition.org

Northern California River Watch - Action Calendar
http://www.google.com/calendar/embed?src=ncriverwatch%40gmail.com

Russian River Interactive Information System
http://www.russianriverwatershed.net
Yahoo! Groups

Change settings via the Web (Yahoo! ID required)
Change settings via email: Switch delivery to Daily Digest | Switch format to Traditional
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Start a group

in 3 easy steps.

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From: "Paul Palmer" <paulp@sonic.net>
Date: Fri Feb 23, 2007 11:27:53 AM US/Pacific
To: "Bruce Baum" <b-baum@comcast.net>, "Edward A. Mainland" <emainland@comcast.net>, "David Haskell\(New Zeal\)" <david@gardenkids.net>, "Andre Angelantoni-Marin" <aangel@inspiringgreenleadership.com>, "Ellen Hopkins" <ellen_hopkins@yahoo.com>, "Sam Doctors\(Marin ZW\)" <samdoctors@comcast.net>, "Stuart Moody" <stuartfieldmoody@hotmail.com>, "Sue Brown-Marin" <Suubrown@comcast.net>, "Ellen Bicheler\(ZW Group\)" <ellenb@sonic.net>
Subject: Redesign for zero waste

87

Folks:
Here is a great example for the redesign of water resource usage as a zero waste project (though they don't identify it that way).
Paul

Setting a precedent in water conservation and keeping water local, California's first permitted residential graywater system with a constructed wetland passed inspection on January 24. The residents of the EcoHouse in Berkeley will save between 18,000 to 27,000 gallons of water each year by using wastewater instead of city-supplied drinking water to irrigate their garden.

Home graywater systems and municipal treatment wetlands already exist in California, but this design combines both systems in a dense residential area. With the help and design work of John Russell and DIG Cooperative, an Oakland-based design-build collective, the hybrid EcoHouse graywater system was granted a permit by Berkeley Public Works on October 24, 2006. The East Bay Municipal Utilities District has also been supportive throughout the 18-month permit process. The EcoHouse began construction of the graywater system at an October 29th workshop where more than 50 attendees helped construct it.

Of all the water on Earth only 0.007% is readily accessible for direct human use.
Fresh water is only becoming more precious due to over-extraction, climate change, and pollution. Here in the Golden State of California, a "drought state" seeing rain only five months out of the year, these vital statistics are leading hundreds of organizations to promote water efficiency and recycling such as graywatering.
According to Appendix G of the California Plumbing Code, "graywater" refers to water drained from sinks, showers, tubs and washing machines. The EcoHouse design features an EPA approved constructed wetland that uses gravel and wetland plants with deep root systems to treat the graywater before it irrigates the garden. The system does not invite mosquitoes because water always remains below the surface. During the rainy months a flip of a switch directs graywater back to the city sewer.

"Meeting state and city codes can make it intimidating for the average homeowner to use graywater safely," says EcoHouse co-founder and board member Babak Jacinto Tondre.
"We have created a template that can save a lot of money and consulting time," he says. "This provides a whole new opportunity for green entrepreneurs to start drafting, constructing and maintaining these systems safely in high density urban areas."
The EcoHouse plans to help guide the public through the permit process through presentations and tours of the system. It's part of the project's mission of "making ecological ways of living accessible and affordable to people of all ages, ethnicities, and income levels."
Graywater systems can be low cost, save money and turn otherwise wasted water into a beautiful garden.

There will be a tour of the EcoHouse graywater system on Sunday Feb.25th from 10am to 2pm at 1305 Hopkins st. in Berkeley.

The EcoHouse models ecologically oriented self-sufficiency solutions, such as solar PV panels, natural building materials, nontoxic cleaning products, energy- and water-saving appliances and fixtures, and much more. It is a

project of the Ecology Center (www.ecologycenter.org), which promotes environmental awareness of topics from plastics toxicity and recycling to biodiesel and farmers' markets. To learn more about the EcoHouse graywater system or to schedule an EcoHouse tour, contact ecohouse@ecologycenter or call 510-548-2220 ext. 224

March 8, 2007

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MAR 19 2007
GP Administration

Pamela Tuft
General Plan Manager
City of Petaluma
27 Howard St.
Petaluma, CA 94952

RE; Comments on Petaluma General Plan 2025 Draft Environmental Impact Report State Clearinghouse No. 2004082065

Dear Ms. Tuft,

With regard to water: 88

1. 3.5-2 – How many days water supply would Petaluma have if Petaluma were cut off from SCWA sources? Please explain and talk about such possible impacts as drought, earthquake and peak oil. A

Water Conservation comments (3.5-20)

The current and proposed water conservation measures proposed in the D.E.I.R. could go much further and save both the city and citizens of Petaluma water and money. Here are some proposals that could save a considerable amount of water and money. I would like a response that lets me know if these proposals will be considered and if so how. B

1. Retrofitting with new toilets, clothes washers (the most water-efficient machine regularly available in stores), showerheads, facet aerator, addressing leaks remaining after toilets are replaced, and installation of an on-demand hot water recirculation system. Use a market based system called Pay As You Save (PAYS) to pay for it. Customers pay nothing up front and assume no debt obligation, independent credible analysis assures products will function well and savings will exceed costs. Customers only pay while they personally save. If a measure fails and is not repaired or if the customer leaves the home, the customer's payment obligation ends. Since customers only pay while they save, split incentives are not an issue (this occurs when resource saving equipment must be purchased by someone other than the end user – for example, a developer or landlord who is unlikely to benefit directly from the investment). There is a more equitable distribution of costs and benefits that with normal rebate-based efficiency program because capital is not limited, practically anyone may participate, and non-participants do not have to pay for benefits provided to someone else. PAYS system is being successfully piloted by two New Hampshire electric utilities, and is moving toward implementation with utilities in Hawaii and Kansas C
2. Rainwater Harvesting – Please review document, *Saving Rain for a Sunny Day*, by Laura Tuttle. (Submitted with this document). Rainwater Harvesting is "the D

principal of collecting and using precipitation from a catchments service."[1] Rainwater harvesting is used to conserve water, prevent flooding and recharge our groundwater.

Best Practice Examples

- Cisterns in Santa Cruz – page 4, *Saving Rain for a Sunny Day* – from 4,000 square foot roof, the Markowitz's collect and use 150,000 gallons of water per year.
- Cisterns in Hawaii – *Guidelines on Rainwater Catchment Systems for Hawaii* by Patricia S.H. Macomber estimates that 30,000 to 60,000 people in Hawaii depend upon rainwater catchment systems to meet all of their water needs.[2]
- Arizona: Cisterns and Land/Water Management Systems – The City of Tucson receives an average of 12.77 inches of water per year. Brad Lancaster states Tucson's projected population growth and increased water use is predicted to outstrip Tucson's "renewable" water supplies by 2025.[3]It is estimated that the average rainfall exceeds current municipal use. If rainwater is harvested as the principal source of water, greywater used as a secondary source, and municipal and private wells are used only to supplement in times of need, a positive effect can take place. The City of Tucson Water Department has a webpage containing a water harvesting guidelines.
- Marin County, California – SPAWN, Laguinitas School and the Regional Water Quality Control Board installed a 30,000 gallon tank to catch water off a 1,600 square foot roof at the school. "The project will serve as a replicable model of a simple and effective approach to reduce the impacts of storm water runoff on local creeks."[4]
- India – See Appendix C of *Saving Rain for a Sunny Day, Ran Water Harvesting and Artificial Recharge to Ground Water*.

I would like to see rainwater-harvesting guidelines for Petaluma. I've included a copy of a recent article in *Marin Independent Journal*, "Harvesting rain for a dry day," by Rick Polito. I could provide you with a video, "The Global Gardner," after I use it on Friday, March 16th, which details rainwater harvesting and greywater systems.

3. Greywater systems – Implement a pilot program in Petaluma for both residential and commercial applications. "The typical American family uses 100 to 200 E

[1] http://www.tn.gov.in/stp/rainwater.htm

[2] Macomber, P.S. H., *Guidelines on Rainwater Catchment Systems for Hawaii* (2004). Download a copy at http//www.ctahr.Hawaii.edu or call 808-956-7046

[3] Lancaster, Brad, *Rainwater Harvesting for Drylands*, Volume 1, 2006, www.harvestingrainwater.com

[4] SPAWNUSA.org/pages/page-134

gallons of water a day in their home (not including irrigation water). Thought some of that household water goes down the toilet as blackwater, most of it leaves via sink, shower and laundry drain, contaminated only be a few drops of soap, the odd flake of dead skin, and a smattering of the bacteria that coexist peacefully with us. This is greywater, nearly pure but just dirty enough to be unfit for direct human reuse. However, plants and soil organisms will gratefully accept the watery part of greywater, and eagerly consume the solid and dissolved contents as food.

Reusing greater reduces pollution and the strain on sewage and septic systems. Just as we now separate our compostable garbage and recyclables from landfill-bound trash, it makes sense not to combine easily reusable, almost-clean greywater with toilet wastes."[5]

Best Practice Example

Eco-House – Berkeley – See Diagrams – residents will save between 18,000 to 27,000 gallons of water per year with their greywater system.

I have included an additional reference of some additional websites that can be of use with your considerations.

I look forward to receiving the City's written responses to my comments that are consistent with the principles under CEQA, the Guidelines and applicable case law.

Sincerely,

Ellen Bicheler

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[5] Hemenway, Toby, *Gaia's Garden: A Guide to Home-Scale Permaculture*, Chelsea Green Publishing Company, Vermont, 200

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Additional Resources – Greywater, rooftop gardens

www.owue.water.ca.gov/docs/Revised_Graywater_Standards.pdf -
These are California's greywater standards
http://www.el-cerrito.org/public_works/c3.html
This is the city of El Cerrito blueprint for a clean bay
http://www.redding.com/news/2007/feb/25/green-features-make-new-building-energy-efficient/
This is Redding, Ca. roof garden
http://www.ciwmb.ca.gov/GreenBuilding/CaseStudies/Educational/DonaldBren.htm
This is UCSB environmental building with recycled roof water
www.twdb.state.tx.us/publications/reports/RainwaterHarvestingManual_3rdedition.pdf - Similar pages
</search?hl=en&rls=GGLD,GGLD:2004-39,GGLD:en&q=related:www.twdb.state.tx.us/publications/reports/RainwaterHarvestingManual_3rdedition.pdf
This is Texas' rainwater standards

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water tank in my own yard, sunk in the ground and camouflaged with a deck and grape arbor, only lasts through six weeks of drought. By the time you read this, we should have a large pond to provide water through the summer.

Ponds are a pleasing way to store water. Beyond the practical benefits, on a hot day the sight of sparkling water edged by lush greenery seems to drop the temperature by ten degrees.

The secret of storing water in a pond is depth. By digging a 12-by-12-foot garden pond 4 feet deep instead of the usual 2, you can store over 4,000 gallons of water. Obviously, if you're pulling water from the pond for irrigation, you will have to develop some strategies for protecting plants and fish when the water level drops toward the bottom. One possibility is to have one pond strictly for irrigation, and a second, smaller one for finny and leafy inhabitants.

To see how a pond can be both a landscape focal point and a practical water source for the garden, let's look at what forestry consultant and permaculturist Tom Ward did in his Ashland, Oregon, yard. Tom has built a 3,000-gallon pond on the uphill side of his vegetable garden. "After we dug the hole for the pond," Tom told me, "we lined it with three coats of a product called plastic cement, troweled onto bird netting for reinforcement." He could have used a rubber or plastic liner, but chose a less-expensive but more labor-intensive method. The pond is fed by downspouts from the house next door and from a shed in the lot behind Tom's. Both neighbors responded readily to his request for their runoff water.

The pond was new when I visited, but Tom intended to stock it with edible fish and a variety of useful and attractive plants. However, the pond's benefits extend beyond its boundaries. A swale runs alongside the pond. Overflow dribbles out of the pond, down a rock waterfall, and into the swale. The water is captured by the level swale and sinks into the soil. Tom's vegetable garden is just downhill from the swale, and the expanding lens of subterranean wetness from the swale moves down the slope toward the crops like a slow underground tide. The pond and swale thus form a subsurface irrigation system for the nearby garden. Once again, placing the pieces in the right relationship lets nature do the work, and substantially cuts Tom's reliance on municipal water.

At the outlet end of the swale, about twenty feet from the waterfall inlet, Tom has planted blueberry bushes. Any water that flows the entire length of the swale and spills out the far end is captured by these shrubs.

This is a fine example of ecological design. The pond harvests rainfall from his neighbors' roofs, the swale collects any surplus from the pond, and the garden and blueberries benefit from moisture taken in by the swale. Tom has integrated a pond into his garden that is attractive, practical, and connects once-separate elements—even from beyond his own property—into a healthy, smoothly functioning whole.

Closing the Cycle with Greywater

The typical American family uses 100 to 200 gallons of water a day in their home (not including irrigation water). Though some of that household water goes down the toilet as "blackwater," most of it leaves via sink, shower, and laundry drain, contaminated only by a few drops of soap, the odd flake of dead skin, and a smattering of the bacteria that coexist peacefully with us. This is greywater, nearly pure but just dirty enough to be unfit for direct human reuse. However, plants and soil organisms will gratefully accept the watery part of greywater, and eagerly consume the solid and dissolved contents as food.

Reusing greywater reduces pollution and the strain on sewage and septic systems. Just as we now separate our compostable garbage and recyclables from landfill-bound trash, it makes sense not to combine easily reusable, almost-clean greywater with toilet wastes.

Does the idea of using wastewater in the yard

seem, well, a bit unsavory? Don't worry. By following a few simple guidelines, you can easily reuse greywater with no health risk, odor, or any other unpleasantness. Far from it. Greywater can be an important resource, helping to build yet another resilient, life-enhancing cycle into the ecological garden. Let me describe greywater's benefits; then we'll see how to add this new resource to the garden's living structure.

In earlier chapters, I described the crucial role of the decomposers that make up the detritus cycle. In a healthy ecosystem, the decomposers play as large a part, both physically and energetically, as the producers (such as plants) and the consumers (animals). The decomposers transform the wastes and corpses cast off by the living into the raw feedstocks of life, ready to be cycled once more as the breath and bodies of animate beings. Yet in most human ecosystems, including our yards, the detritus cycle is sadly lacking. Without decomposers and their products, organic matter becomes as rare as precious gems. (I've known gardeners who, when they move, take their compost pile with them.) Ecological gardening attempts to restore the detritus cycle to its rightful, central role by using deep mulches and composting, and by avoiding pesticides. Incorporating greywater is one more method to do this.

Greywater closes a loop. The usual linear flow of water through a household goes like this: We import and use clean water and items such as soap and food in the home ecosystem, mix them together to create dirty water, and send this very dilute waste out of our house (and our awareness) through the sewer. This greywater is often piped through a massive sewage system, processed in an expensive treatment plant, and eventually dumped into a river, lake, or ocean. In this way, valuable resources are speedily converted to garbage, yielding along the way only a fraction of the energy and value they contain, and costing lots of money to clean up.

In contrast, reusing greywater creates a tight cycle and uses far less energy. In such a system, water, food, and biodegradable soaps are imported into the household ecology, mixed with a little dirt and skin effluvia in shower and laundry, and sent into the soil or a backyard wetland. There, the whole melange is processed by the microbes and plants in the yard. The result is not "waste," but clean water and fertilizer, ready for recycling. The soaps and food bits are transformed into soil, trees, and flowers in the garden. These nutrients have now been absorbed into the home ecosystem to be whirled into the eternal dance from leaf to litter and back again. With a greywater system, instead of burdening a sewage treatment plant, most of the water used in the household grows our plants and is lofted into the air by transpiration, cooling us on a hot day, and wafting high into the sky to return soon as rain. Each time greywater flows into the garden, new fertility is added, captured, used, and reused by the plants and animals that live there. With every shower or load of laundry, this circle's connections grow thicker and stronger, and the garden grows greener.

Although the amount of soaps, food, and other material in greywater may seem trivial, it adds up over time, building biomass, becoming plants and wildlife and food. And obviously, the water involved, at about 100 gallons a day, is by no means trivial. I've seen greywater systems that have quickly and dramatically boosted the fertility and lushness of a yard. There's something magical in creating these simple cycles, as if nature recognizes the service and showers us with her gifts in return.

If we think of a garden as a living being, then a greywater system acts as one of its organs, a sort of liver and kidneys that process waste and liquid. These "organs" are missing from most gardens. No one can function without kidneys; the only substitute is the elaborate machinery of life support. Our gardens are the same. Given a full complement of "organs," a garden comes to life. Then we can withdraw resource-gobbling life-support systems such as automated sprinklers and doses of

TIPS FOR USING GREYWATER

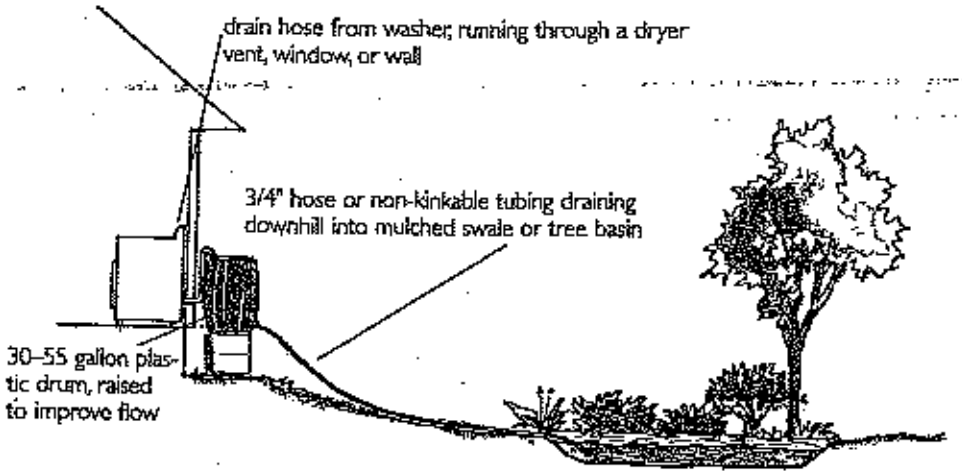
- Greywater is a legal gray area. The southwestern states are the most greywater-friendly, but even their building codes mandate systems that are more complex than necessary. Many greywater systems have been built without code approval, yet function safely. I'd advise becoming aware of the codes in your area before building a greywater system.
- Avoid watering food plants directly with untreated graywater. Greywater should be applied to the base of nonfood plants or fruit trees and shrubs. It can also be delivered by subsurface irrigation using perforated leach lines, like a septic system. The risk of disease or toxicity from greywater is slight, but putting greywater directly on food is asking for trouble. Once greywater has been processed by passing through microbes and plants in an artificial wetland or other system, its contaminants will have been removed or detoxified. It can then be collected if desired, and used for food-plant irrigation.
- Be careful of what you put in a greywater system. Chlorine bleach, detergents containing boron (borax), and some household chemicals and solvents are toxic to plants and should never go in a greywater system. Hydrogen peroxide–based bleaches are safe to use. If you must use chlorine or boron, install a diverter valve so that your laundry outlet can be temporarily sent to the septic tank or sewer (that is, treated as blackwater).
- Most common detergents will make greywater quite alkaline, which is hard on most plants. Many stores now sell detergents that are greywater compatible and are labeled as such.
- In climates where the ground freezes more than a few inches deep, greywater systems may not work in the winter. Here it's a good idea to be able to divert greywater back into the sewer or septic system until spring thaws.
- Don't store greywater for more than a day or two. The normally low numbers of bacteria can multiply quickly in the nutrient-rich water, and create unpleasant smells at best, and health hazards at worst. Get greywater on the ground quickly.
- Greywater is too "lumpy" for drip irrigation systems unless filtered by sand or some other fine filtration system. Lint, hair, and other debris will quickly clog pumps and pipes or openings less than ½-inch across. Use large-diameter hose and pipes to deliver greywater, or invest in an appropriate filter system.

fertilizer. A greywater system helps a garden be more self-sustaining.

A thorough guide to greywater systems is beyond the scope of this chapter. Good books and articles have been written on the subject. My favorite resource is *Create an Oasis with Greywater* by Art Ludwig (see bibliography). This easy-to-read booklet describes how to choose and install a range of greywater systems. For now, the present chapter will look at a few simple greywater setups, to show how easy and sensible it is to incorporate greywater into the ecological garden.

The simplest possible greywater system—maybe too simple for most people—is a basin in the sink. When it's full, just empty the basin into a well-mulched garden bed. The mulch will absorb the greywater instead of letting it run off, and mulch contains ample soil life to quickly and hungrily process the greywater's contents. Avoid pouring greywater directly on vegetation, as soaps or oils could clog leaf pores or otherwise harm the plant.

For those who would like to recycle their greywater but don't want to be sloshing outdoors with a full soapy basin every few hours, the next level is what greywater guru Art Ludwig calls a "drain to mulch basin" system. This involves a little do-it-yourselfing or hiring a plumber to tap into the outlet of a washing machine, tub, or shower, and to isolate it from the drain lines that carry toilet wastes. Rigid plastic drain pipe (ABS) is then connected to the drain to carry the greywater out of the house. Outside the house, more ABS pipe or flexible, *nonkinkable* 1-inch hose (such as spa-flex PVC) directs the greywater downhill into a mulched swale or to mulched basins around trees. The outlet hose *must* be unkinkable—not just a garden hose or irrigation polypipe. A kinked hose can cause a drain to back up or burn out a washing-machine pump. See the illustration on page 94 for details of this setup. This system can be varied to include a 30- to 55-gallon drum outside the house to temporarily hold the greywater. The



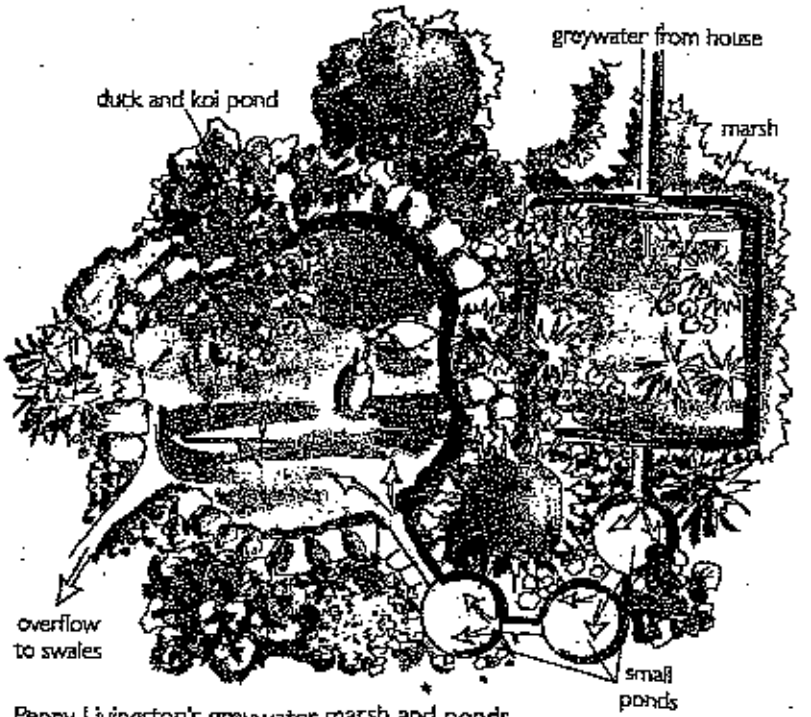
A washing machine set up to pump greywater into a drum that will then drain to a planted, mulched swale or tree.
Redrawn with permission from Create an Oasis with Greywater, by Art Ludwig (Oasis Design 2000).

drum will cool water that's too hot for plants, and briefly store large volumes of water, such as a tub's contents, that flow too fast for a narrow-diameter outlet hose.

This arrangement, which provides regular doses of 10 to 30 gallons from a shower or laundry load, is ideal for trees, shrubs, and large mulched beds. The flexible hose outflow can be moved from bed to bed every day or two, so that no single area will get too soggy. Ludwig's booklet also describes systems that drain to multiple beds, so you won't have to move a hose around.

Some very complex greywater systems exist, full of automatic backflush pumps, multistage filters, and leach-field distribution lines. However, for me, the next step in greywater technology beyond the "drain to mulch basin" system is no more mechanically complicated, but far more biologically rich. An ideal example is one created by Penny Livingston, at her home north of San Francisco.

Penny's greywater system is a set of four shimmering ponds, complete with water plants, fish, and ducks. Greywater from bath and laundry first flows through a small marsh that brims with bog plants and ornamental grasses. This artificial wetland, just a few feet across, removes most of the greywater's contaminants and converts them into vegetation. The mostly clean water then trickles over rocks through three small ponds, where it is joined by rainwater from the roof of Penny's backyard office, home of the Permaculture Institute of Northern California. The



Penny Livingston's greywater marsh and ponds.



Ducks bob happily in clean, treated greywater that has been purified by a backyard wetland.

final destination is the duck pond, a deep 10-by-10-foot affair that glimmers with golden koi and ripples with the splashes of mallards. The ducks serve as water-quality monitors. In the system's early days, before the marsh was installed, the ducks wouldn't swim in the not-clean-enough water. That was because the residual soap in the ponds washed the oil from their feathers, resulting in sinking ducks. Now, the marsh-cleaned water suits them perfectly.

The pond network is strategically located just south of the office so that winter sun is reflected through the windows, brightening the building's interior. A patio and arbor lie beside the pond, where Penny and the rest of the staff sit on pleasant days or on any other excuse to enjoy this soothing spot.

Penny's backyard was my introduction to the dynamic nature of greywater. During a visit, I quickly learned that when I showered, the pond network came alive, so some mornings I would dash, half-dressed and dripping, from the shower to the ponds to watch the show my bathing had triggered. As my shower's water surged into the tiny wetland, plant-filtered water flowed out, over the rocks, past the meditating Buddha and under the dwarf peach tree, filling the first pond to overflowing. The second pond topped up, then the third, and water soon cascaded into the final pond. The gentle surge of water set the ducks bobbing, and their soft quacks sounded like laughter.

Here was living, dancing water that needed no pump to force its liquid motion. With greywater, every yard, no matter how landlocked or desert-bound, can gurgle and splash with the lively rhythms of moving water, without pumps or huge utility bills. And these simple systems give a tremendous boost to the diversity of plants and wildlife that a yard will support while decreasing water consumption. Adding water to a yard creates a whole series of new edges, and new flows of both energy and living beings, as any pond owner knows. Treated and cleaned in a backyard wetland, greywater not only provides this bounty guilt-free, it eases the burden on overtaxed sewer systems.

Water Brings the Garden to Life

If I were designing a landscape from scratch, I'd try to incorporate nearly every idea in this chapter. That way, the garden would be nearly self-watering, sparing the gardener from most of the work and expense of irrigation. But the reasons go much deeper. Catching water from rooftops spares our overtaxed municipal supplies and groundwater aquifers. Thinking of the soil as the best place to store water encourages deep mulching and other practices that also create fertility and abundant soil life. This, in turn, keeps plants healthier. Using greywater allows us to

CREATING A BACKYARD WETLAND

Wetlands are nature's way of purifying and recycling water. As dirty water wends sluggishly through a marsh or bog, the resident plants, microbes, and animals dine leisurely on the water's contents, converting pollutants to biomass and purifying the water. Cities from Shelburne Falls, Massachusetts, to Arcata, California, have copied nature, building "artificial" wetlands to process municipal wastewater. Many of these projects are beautiful, threaded with paths for nature-lovers who gather to watch the waterfowl, otters, and other creatures that thrive in the restored habitat. The know-how for building these wetlands has trickled down to homeowners, coincidentally at a time when growing bog and water plants is very popular. By creating a backyard wetland for greywater, we can meld the beauty of water gardens with ecological responsibility.

Building a backyard wetland is relatively straightforward. It's really just a shallow pond, filled with gravel, covered with mulch or soil, and planted with bog and water plants. The water level is kept below the top of the gravel to thwart mosquitoes. Greywater enters the wetland, passes through the gravel, is purified by the plants and attendant microbes, and exits to a pond, swale, or irrigation system (running greywater through irrigation pumps and sprinklers may require additional filtering). Table 5-3 suggests some plants for this wetland. The plants in the first section of the table—cattail, bulrush, reed canary grass, and canna lily—are essential for treating greywater, and all greywater wetlands should contain a majority of one or more of these species. They are special water-cleaning plants, able to supply oxygen to their roots and to the soil nearby. This creates an aerobic zone around each root, resulting in countless aerobic and anaerobic microsites in the wetland and plenty of edge between them. These diverse micro-niches support many different kinds of pollution-eating microbes. A wetland lacking these special plants might not clean water effectively.

Once a preponderance of the essential plants are in place, other plants, such as those in the second section of table 5-3, can be added to increase diversity.

Greywater wetlands only function effectively when the plants are growing. Gardeners in very cold climates should install a diverter valve to direct water to the sewer or septic system when the plants die back in winter. This also will keep the outdoor greywater plumbing from freezing.

To build a backyard greywater wetland, select a site that is downhill from your home's greywater outlet so the wetland can be gravity-fed (otherwise you'll need a sump pump or other power-using system). As a rule of thumb for sizing the wetland, it takes about 1.25 square feet of wetland to process 1 gallon of greywater per day, thus a family that produces 100 gallons of greywater daily would need a wetland roughly 10 by 12 feet. This can be any shape: a long trench, a circle, a wavy-edged pattern that maximizes the edge effect, or even more than one wetland in series or parallel.

The wetland should be 12 to 18 inches deep, and lined with a plastic pond liner. If your soils are relatively impervious clay you may not need a liner. Local building codes may offer guidelines for size and materials, although home greywater wetlands are a little avant-garde for most codes to even consider. Many of the systems I know of are of the guerrilla variety, or have required special code variances.

Once the wetland is dug and lined, install plumbing as per the diagram. Then fill the liner with ½- to 1-inch round gravel. The wetland can be covered with mulch or an inch or two of topsoil to help get plants established. Then add the plants. Now greywater can begin to fill the wetland.

The water depth is controlled by a water-level box such as that shown in the diagram on page 98. By changing the height of the pipe, the water level can be adjusted to the optimal height, about 2 inches below the top of the gravel (this will prevent mosquito growth). If you want to be extra nice to the plants, once a month or so pull the level control pipe all the way off to drain the wetland. Once it's drained, reinsert the pipe. Periodic draining aerates the bottom of the wetland, helping roots get deeply established.

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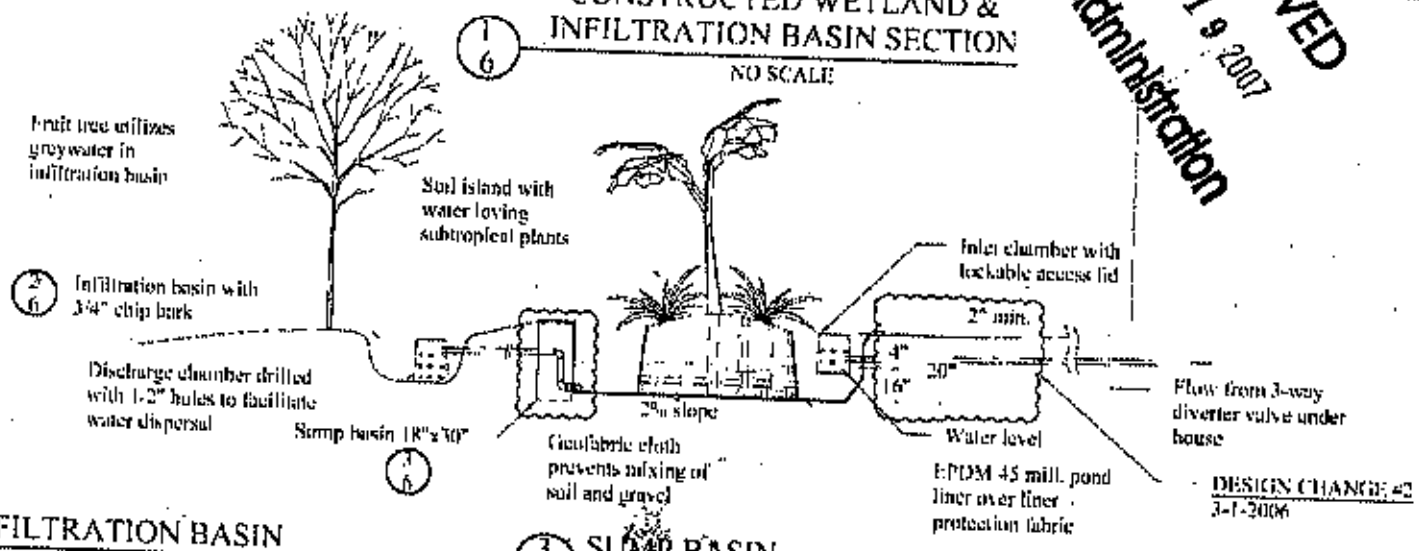
1/6 CONSTRUCTED WETLAND & INFILTRATION BASIN SECTION

NO SCALE



2/6 INFILTRATION BASIN

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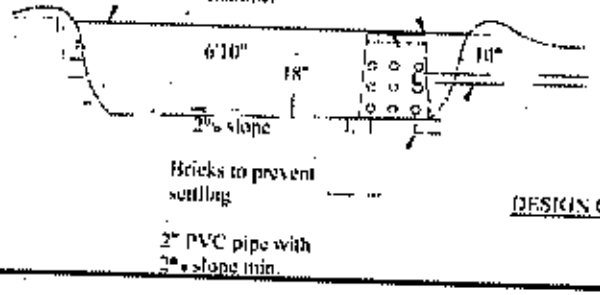
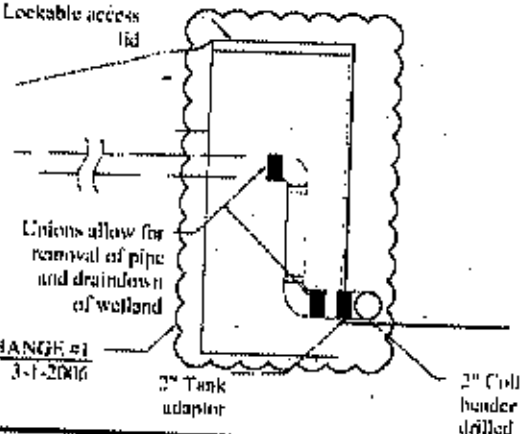


3/6 SUMP BASIN

NO SCALE



CONSTRUCTED WETLAND SPECIFICATIONS

The constructed wetland is constructed of 45 mill. EPDM pond liner to prevent loss of water into surrounding soil. The constructed wetland cleans the greywater to secondary effluent standards. The constructed wetland has a 3-way diverter valve and backwater valve on inlet pipe, overflows to infiltration basins, vents through gravel surfaces, has lockable access covers, and tank adapter connections to piping.

Wetland capacity:	183 Gallons
Water retention time:	2.0 days @ 75 GPD

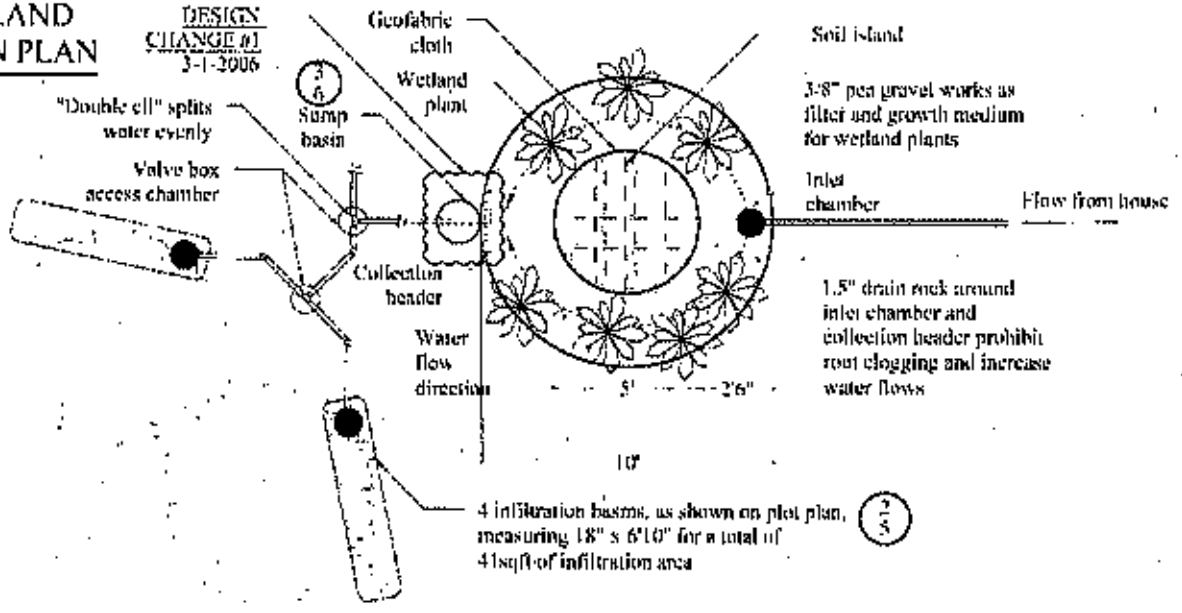
Lindy Construct
DIG CITY
Ecological De Cooperativ
Greywate System Section
BERKELEY ECOHOUSE
1385 Hopkins St. Berkeley, Californ
Greywater Syst Permit Set

CONSTRUCTED WETLAND & INFILTRATION BASIN PLAN

1/5

SCALE 1/4" = 1'

DESIGN CHANGE #1 3-1-2006



NOTES:

- Collection header to be 2" pipe, 3' long, with holes drilled on bottom every 9"
- 2" "Double ell" with inspection-cleanout port to be used to split water equally between infiltration basins. Double ells to be installed level on base of gravel under access chamber for inspection of port.

Greywater flow from house is deposited into the constructed wetland in the inlet chamber. This chamber has a lockable access lid for cleanout purposes. 1.5" gravel around inlet chamber and collection header help to evenly distribute and collect flow without clogging while discouraging plant growth. 3/8" pea gravel encourages favorable rooting conditions for wetland plants.

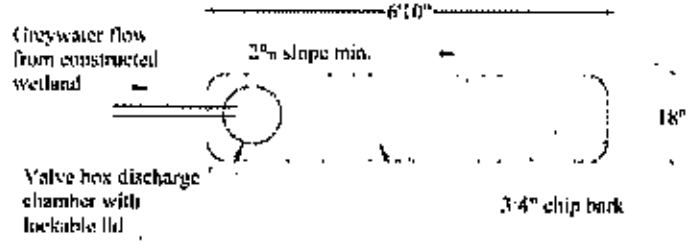
The water flows through the pea gravel where flocculation, sedimentation and filtration act as the primary mechanisms for BOD (Biochemical oxygen demand) and TSS (Total suspended solids) reduction. In addition bacterial mats on plant roots help to further reduce BOD and nitrogen levels. The soil island increases nitrogen removal from greywater by providing increased habitat for bacterial mats and provides asthetic benefits. Constructed wetland design is based on EPA manual for Constructed Wetlands Treatment of Municipal Wastewaters.

Water flows into the collection header, through the sump basin, and flows to the infiltration basins for sanitary disposal of the greywater. Union pipe fittings in the sump basin allow for wetland draindown and access to the collection header for cleanout. Fruit trees planted at infiltration basin edge utilize greywater for growth.

INFILTRATION BASIN

2/5

SCALE 1/2" = 1'



Lindy Construction

DIG CITY INC.

Ecological Design Cooperative

BERKELEY ECOHOUSE
1305 Hopkins St.
Berkeley, California

Greywater System Plan

Greywater System Permit Set

Gray Water Policy Center

ummary: A compilation of grey water ıws, suggested improvements to gray ıater regulations, legality & greywater olicy considerations, sample permits, ublic health considerations, studies, etc.

or regulators, inspectors, elected fficials, building departments, health epartments, builders, and homeowners.

)n this page:

'olicy resources

- Grey water policy packet
- ıidance for regulators
- reatment effectiveness references
- General references, studies

Policy examples

- Arizona grey water law - the model to emulate
- Uniform Plumbing Code
- International Plumbing Code
- California
- Malibu, California
- Connecticut
- Colorado
- New Jersey
- New Mexico
- New York
- Massachusetts
- Oregon
- Texas
- Utah
- Washington
- Vermont
- Australia
- Jordan

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rey water policy packet

lis packet contains all the information in the greywater policy center in PDF format. It was a ry popular item in the Vote for new books & articles, but when we generated it, it seemed eless to us without live links. Please Contact us and let us know if it is useless to you, too, if it is so much nicer to read in hard copy that you prefer it to reading the greywater policy nter online:Greywater policy packet (pdf, 4.3MB).

uidance for regulators

advice to regulators is simple: Copy Arizona. Don't copy California, the Uniform Plumbing ıde, or anyone else. The Arizona law could use a tune up, the other laws need overhaul or rapping.

w Mexico has copied Arizona, and Texas is considering it.

stimony to the New Mexico state legislature Water and Environment Committee on desirability and characteristics of good grey water laws
- Material for a meeting of the New Mexico Department of Environment Grey Water

U.S. Department of Energy
Energy Efficiency and Renewable Energy

GREYWATER

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☐		Audubon Center at Debs Park	The National Audubon Society	Los Angeles, CA	Recreation; Interpretive Center; Park	5,020	
☐		C. K. Choi Building	University of British Columbia	Vancouver, BC, Canada	Commercial office; Higher education	34,400	
☐		CBF Merrill Environmental Center	The Chesapeake Bay Foundation Inc.	Annapolis, MD	Commercial office; Interpretive Center	32,00	
☐		Cusano Center at Tinicum	U.S. Fish and Wildlife Service	Philadelphia, PA	Retail; Interpretive Center; Assembly; Park	18,000	
☐		Dunes Country	Dunes Country Partners, LLC	Chesterton, IN	Commercial office; Restaurant; Retail; Financial & communications; Multi-unit residential; Special needs housing; Hotel/resort; Daycare; Recreation; Health care; Interpretive Center; Assembly; Public order & safety; Transportation; Park; Community		
☐		Florida House Learning Center	Florida House Institute for Sustainable Development	Sarasota, FL	Single-family residential	1,960	
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☐		Navy Building 850	U.S. Navy	Port Hueneme, CA	Commercial office; Industrial; Military base	17,000	2
☐		Oberlin College Lewis Center	Oberlin College	Oberlin, OH	Higher education; Library; Assembly; Campus	13,600	1
☐		People's Food Co-op	People's Food Co-op	Portland, OR	Retail	6,400	7
☐		Rinker Hall at the University of Florida	University of Florida	Gainesville, FL	Higher education	47,300	3
☐		Roberts Hall at Lewis & Clark College	Lewis & Clark College	Portland, OR	Multi-unit residential	24,700	7
☐		SPNHF–French Wing	Society for the Protection of New Hampshire Forests	Concord, NH	Commercial office	11,600	3
☐		Steinhude Sea Recreation Facility	City of Steinhude	Steinhude, Germany	Recreation	3,190	
☐		Wampanoag Headquarters	Wampanoag Tribe of Gay Head (Aquinnah)	Gay Head, MA	Commercial office; Interpretive Center; Assembly	8,700	2

17 project(s)

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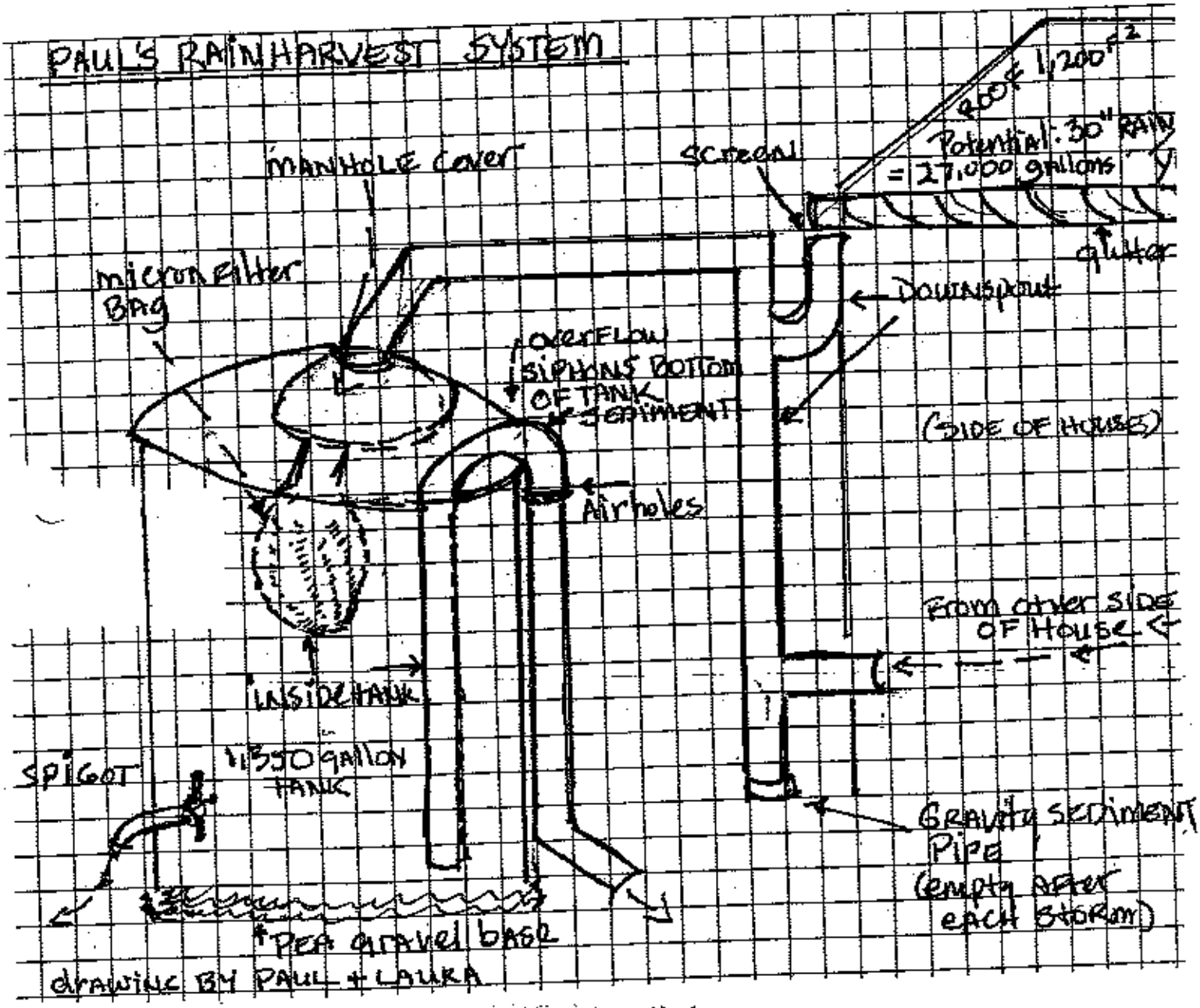
SAVING RAIN FOR A SUNNY DAY

Reference Guide of Water Catchments, Management, and Reuse Systems
(Rainwater Harvesting)



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OVERVIEW

Mission Statement:

To inform and inspire all governmental representatives and citizens to (1) learn about and embrace the principles of rainwater harvesting and water catchment systems for utilization of outdoor/indoor use, (2) in managing water run-off, and (3) for the re-use of water within a property's boundary.

Acknowledgments:

Gratitude to the Environmental Forum of Marin (EFM)[1]. Due to the forum I have learned cutting edge factors involving environmental issues in our society today, and am inspired to labor on this conservation project. Thanks to all the contributor speakers of the EFM XXXIV Class, the list too long to enumerate, but among a few of the many notable: Phyllis Faber, Nona Dennis, Cathy Cuneo, all of whom helped to save countless miles of open space in Marin County, CA, along with L. Martin Griffin, MD[2]; J. Dietrich Stroeh (who spent 20 years at the Marin Municipal Water District)[3] ; William J. McDonough (a visionary "green" architect in community designs) [4]. Their talks and written matierals all contributed by inspiration and theories of living in an environmentally sustainable way.

Special thanks to Debra Jones, our EFM facilitator of the Class of XXXIV for pointing me in the right direction regarding this project, and Barbara Thornton, Mayor of San Anselmo, CA, for coordinating this XXXIV Class of EFM with their countless volunteer hours.

Thanks to Sandy Wollenberg, for research and an introduction to her dear friend, Bobby Markowitz. Mr. Markowitz[5] was kind enough to talk/walk me through blueprint designs of water catchment works accomplished by him, of a water catchment plumbing supply with working prototypes at Scotts Valley Sprinkler & Pipe Supply in Scotts Valley, CA, and tour of J. and C. Bowen's property (a 1.5 acre garden paradise in Soquel, CA roof catchment system designed by Markowitz saves over 150,000 gallons/per year).

Also, thanks to husband, Doug Tuttle, for his encouragement of this project.

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[1] Environmental Forum of Marin teaches basic environmental impact issues facing our society. They can be reached at: www.marinefm.org or (415)479-7814.

[2] "Saving the Marin-Sonoma Coast," by L. Martin Griffin, M.D. is available at Sweetwater Springs Press, P.O. Box 66, Healsburg, CA 95448 or at the Audubon Canyon Ranch Bookstore in Stinson Beach, Ca.

[3] J. Dietrich Stroeh, The Man Who Made It Rain (2006) available at the manwhomadeitrain@sbcglobal.net

[4] W. McDonough & M. Braungart, Cradle to Cradle - Remaking the Way We Make Things, (2002) available through The North Point Press, www.fsgbooks.com . (Green architects located in Charlottesville, Virginia as McDonough Braungart Design Chemistry, website: www.mbdc.com)

[5] Bobby Markowitz is a California Licensed Landscape Architect, #3309, and can be reached at www.earthcraftdesign.com or (831) 475-9355.

I. WATER

It's that wonderful substance that makes up 78% of our bodies when we are born, that drops to about 65% by age one, in adult men makes about 60% of their bodies, and in adult women about 55% of their bodies, the fatter you are the less water your body contains.[6] Actually water is designated as H20 (or 2 atoms of the element Hydrogen and one atom of the element Oxygen per each molecule of water).[7]

Okay, enough already with the complicated stuff. Water is that swift flow of liquid that slides across and delights your fingers and toes when you cross a stream and dabble your fingers in it. Or if you were a child of the 50's like me, you would have been quickly informed about properties of water and other substances it might contain when caught in the act of conducting a tea party with neighbor kids and your tea set at the edge of the gutter filled with flowing water.

"As seen from space, one of the most unique features of our home planet is the water, in both liquid and frozen forms, that covers approximately 75% of the Earth's surface...about 96.5%, is in the global oceans."[8] That leaves only about 3.5% for potable water. Because of the decreasing supply of potable water, Dietrich Stroeh describes it as, "...the new oil."[9] According to Stroeh, "most of the world's fresh water is preserved in frozen form, either in glaciers or in the polar ice caps. Many of the glaciers in the world are rapidly melting due to climate change ... Several glacier-fed rivers have dried up completely in recent droughts, eliminating drinking supplies to cities."

II. WATER, WHO NEEDS IT?

As already shown above, water constitutes a significant amount of our body mass, however, just about every living organism here on earth needs water to live. Humans, animals, fish, and plants live as a result of the availability of quality water to support them in their habitat.

At age 15, after having dinner at a neighbor's house, the impact of the precious need of water came home to roost. The dinner hostess was the owner of a Chinese restaurant. She was actually American-Japanese, masquerading as Chinese after she and her husband had been interned in Japanese internment camps during World War II. I dried dishes as she washed them. She was meticulous in her use of water, filling one quart pot with water and a little detergent, then washing each dish and setting it aside in a stack to rinse, then carefully rinsing each dish with as little as possible water. Me, the gutter-tea-party-queen, was astonished by these careful maneuvers in dishwashing and asked why she was so careful with water; something that was so plentiful and free. She explained that water was necessary to life: to live, to grow food, to clean yourselves and your possessions, and that it was precious, and not as free-flowing as I thought but, in fact, to be conserved, appreciated and measured for it's fullest use. At the internment camps each family was only allowed a small allotment of water for all of their uses per day.

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[6] http://www.madsci.org/posts/archives/wooo-05/958588306.Anr.html

[7] http://biology.clc.uc.edu/courses/bio104/atom-h2o.htm

[8] http://earthobservatory.nasa.gov/Library/Water

[9] "The Man Who Made It Rain." by J. Dietrich Stroeh is available at the manwhomadeitrain@sbcglobal.net

Which do we need more than the other to live on earth, water or gold? The question then, if water is more important to our living than gold, why don't we catch and retain every possible drop of it? If gold was raining down on us, we would be out picking it up and devising plans of catching it as it landed on our property (and probably also on the property of others). We wouldn't just let it run off our roofs and into sewage storm drains if it was gold.

III. WHAT IS RAIN WATER HARVESTING?

The principle of collecting and using precipitation from a catchments surface.[10] We can implement this use to conserve water, prevent flooding, and recharge our ground water. Some frequently asked questions/basic answers from HarvestH2O.com[11] are, in part: 1) *How do you harvest rainwater?* Answer: Harvest means to gather or accumulate a store of water; 2) *What is best method of harvesting rain?* Answer: Catch it from a surface (usually a rooftop) in anything that holds water. Barrels with a faucet attachment where you can attach a hose is good. The web page offers a tutorial on "How to Build a Rain Barrel." 3) *Do I need pumps to harvest water?* Answer: If your tank is at ground level and you need to move the water up any slope, then you may need a pump. If you have a small rain barrel with attached hose or soaker line, no pump is likely required. Also, if you elevate your tank, gravity can work for you. *How big a yard can I water?* Answer: The Austin Wildflower Center (in TX) has 2 - 25,000 gallon tanks and 3 cisterns. They can capture up to 300,000 gallons a year and the system meets 10 - 15% of annual needs for the Austin Wildflower Center that covers 279 acres and displays over 500 species of native plants. 4) *How big are rain barrels?* Answer: Barrels vary in size from about 100 gallons, though most barrels are around 50 - 60 gallons. Rain water tanks run from several hundred gallons to thousands gallons. For a complete list of questions and answers, along with the rain barrel tutorial, visit the webpage noted in footnote 11.

IV. WHY RAIN WATER HARVESTING?

We are running out of our snow-fed supplies of water. With a behemoth footprint indicating the earthly needs of our ever rapidly increasing populations for our ever decreasing resources, global warming is upon us, and picking up speed in the formula of need versus supply, with a huge deficit looming ahead on our earth's horizon. The best place to observe this phenomena from one's couch is the film by Al Gore, "An Inconvenient Truth." However, in the news we hear about global warming more and more with headlines reading "Hottest Year on Record in U.S. Raises Fears,"[12] where we are informed that last year was the warmest of the past 112 years, capping a nine-year warming streak unprecedented in the historical record, resulting in unusual weather patterns. If you are on the east coast this winter, say Washington DC, step out your door this January 2007 and notice cherry blossoms blooming, something that normally occurs in March.

In an article entitled "The Great Thirst," [13] Glen Martin posits: "Global warming likely will result in somewhat drier winters and less snowpack for the Sierra; strong El Niños, also predicted in most current global warming projects, mean wetter, warmer winters for the North

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[10] Http://www.tn.gov.in/dtp/rainwater.htm

[11] Doug Pushard, Rainwater Harvesting: Frequently Asked Questions (2005) Http://www.harvesth2.0.com/faq/shtml

[12] Press Democrat, Jan 10, 2007, at pp. A1 & A10

[13] San Francisco Chronicle Magazine, Jan 7, 2007, pp. 9 - 15

States." These statements seem disparate, however, they make total sense when logically reconciled with the theory that warmer weather brings less snow and more rain. We used to derive 30 million acre-feet of runoff annually from the Sierra Nevada, however, during the past 50 years our average has been about 25 million acre-feet of water a year, with the prediction from California Climate Action Team reports "From 2035 to 2064, Sierra snowpack is expected to decrease 12 to 47 percent from historic levels. By the end of the century, annual snowpack could decline by 90 percent."

As California Licensed Landscape Architect Bobby Markowitz says, "Start looking up for water instead of down." Markowitz' plan evolved for clients in the Santa Cruz mountains that had spent thousands of dollars drilling fruitless water wells and thousands more trucking in water to keep irrigating their 1.5 garden paradise that surrounds their home. Markowitz planned the water catchment systems in place, and this particular customer now harvests about 150,000 gallons of water per year from their rooftop.

We must realize change to effect positive consequences, better said by the wise words of Albert Einstein: "The world will not evolve past its current state of crisis by using the same thinking that created the situation."

To illustrate the necessity to change the way we think about water management, Tucson, Arizona has an average annual precipitation recorded during the years 1971-2000 of 12.77 inches[14]. During the same period Billings, Montana had a annual precipitation of 14.76 inches.[15] "Annual precipitation totals for Marin County vary from about 30 to 50 inches."[16] If places like Tucson, Arizona and Billings, Montana have found it within their governmental and citizen labors to create water catchment systems, then it makes sense that Sonoma County, Marin County and other counties in the State of California have enough rainwater to consider water catchment systems as a serious alternative water resource.

Marin County is wrapping up their most recent General Plan while Sonoma County is also creating a new General Plan. This is a time when discussion is underway to revamp existing infrastructures such as water and sewage systems, to replace old crumbling pipelines and systems. Wouldn't it make sense at the same time of replacing old systems to also install water catchment systems to capture water during our heavy rain periods that could later be used to water lawns and gardens, to fill swimming pools and ponds, to maybe even "recharge" our rivers and creeks by allowing a slow in-fill of water back into creeks during low-flow drought periods.

What if there were water catchment tanks (or cisterns) placed along Corte Madera Creek that would automatically begin to fill when the creek flow reached a certain height, then as the water began to recede the tanks could slowly empty back into the Creek during low water flow months. What if the homes in the areas along the creek all had water catchment systems installed to capture rainwater into holding tanks to help divert run-off into the creek? That would require manpower and that requires money, however, every time towns flood along the creek, the repair requires a lot of manpower and a lot of money, plus the loss in damage to property. A similar system could be installed along the Russian River to avoid or minimize flooding, using the stored water to later "recharge" the aquifers on the River by releasing the stored waters into the aquifer areas. On December 12, 2006 Marin County Supervisor Charles McGlashan shared the thought

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[14] Http://www.rssweather.com/climate/Arizona/Tucson

[15] Http://www.rssweather.com/climate/Billings/Montana

[16] Marin Countywide Plan - Air Quality Technical Background Report, at p.2 (April, 2002)

of water catchment systems up in the Marin County watersheds that would have warning systems installed so that when water depths reached a certain height, the County would be put on notice of possible flooding.

While installing such systems and maintaining them would require employment of many individuals, the creation of jobs is not a bad thing. It is a good thing to have people employed in areas of labor that enhance our community and our environment, while supporting individuals economically. Micro-management of several, smaller systems may work to our advantage.

V. TYPES OF RAINWATER CATCHMENT SYSTEMS (SANTA CRUZ - INDIA)

A. Cisterns in Santa Cruz. On a clear crisp December morning I recently drove to Santa Cruz, California with friend Sandy Wollenberg, where we met up with her long-time friend Bobby Markowitz. Bobby is a California licensed landscape architect[17] who became interested in sustainable gardening about 30 years ago. His studies have taken him to far parts of the world, as he initially studied Asian influenced style gardening. Bobby also took a permaculture course from Bill Mollison to learn sustainability methods, and then began to design more native plant and drought resistant garden plans. As the focus switched more to designing landscapes to prevent erosion and landslides, water catchment systems began to find their way into his landscape designs. He recently returned from a Rainwater Harvesters Conference in Arizona and will soon be in Hawaii to attend yet another Rainwater Harvest Seminar. Bobby will be giving rainwater forums on in Scotts Valley, CA on February 11, 2007 and March 11, 2007, and anyone wanting to attend can contact him via his webpage, www.earthcraftdesign.com.

A paradise of Mediterranean type planted gardens with an Asian influence greeted us as we walked the path to and around Bobby's home. In his office, Bobby showed us three different landscape designs he has implemented with rainwater harvesting catchment systems. One project we actually visited was the home and 1.5 acres gardens of the Bowens in the Santa Cruz mountains. They had dug several wells that eventually proved useless. Bobby had designed the landscaping around their home about 13 years ago, and two and a half years ago designed and installed a rainwater harvesting system that captures rain as it runs down the roof of their home. From their approximate 4,000 square foot roof the Bowens have collected about 150,000 gallons of water per year. From the pictures on the following page, you can see their roof is ceramic tile roof, the water from the gutters flow to a pipe and pump/filter system under a deck, down to one holding tank, that in turns distributes the water to five other tanks, each with a holding capacity of 5,000 gallons of water. The following pages p.i and p.ii contains photographs of the roof, tanks, and filter/pump system.

The next design Bobby showed us involved a large plot of land with a sloping hillside up from the house. A couple bought the property and were so environmentally conscious that they had the Scotch Broom completely stripped from the hillside. Staring at the denuded hillside, they realized that soon the rains would come and with it the possibility of a sliding slope. Bobby was able to design a system and get it put in place within approximately six weeks. The blueprints of the plan included swales along the hillside dug toward a drycreek, so that the water was channeled from swales in the hillside down to the dry creek, with an arched walking bridge crossing the creek bed. Next, he directed the flow of water to plant beds located around the property, as well as to a formal water catchment system off to the corner of the property, where the tanks were then camoflaged by plants around them. He had rocks hauled in and strategically placed upon the hillside to minimize sliding, paths installed with permeable crushed rock material, and plants in place.

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[17] www.earthcraftdesign.com

Another project Bobby designed allowed for the property owners to donate one of their three water tanks for emergency firefighting purposes. The other two tanks of water were used for their garden, which they stated tasted a lot better now that they watered it with rainwater they had stored.

Rainwater harvesting systems are best accomplished by an experienced eye that can integrate all components, be they earthen land catchment systems and/or rooftop catchment systems. Landscaping for efficient use of patterns of water flow design that also offset erosion are essential, as well as water flow design using gravity, placement of the tanks for most efficient flow into and out of the tanks, and placing the tanks where their temperature may be best influenced and where they can be accessible while at the same time be aesthetically pleasing are all important elements to be considered.

Scotts Valley Sprinkler and Pipe Supply in Scotts Valley, California is an excellent source of catchment system information and supplies, with all size and types of water tanks, pipes, filters, pumps, and buffering materials for in-ground tanks. Prototypes of catchment systems are on working display. Prices are as variable as the products, so that the most simple and affordable system can be equipped, as well as the most complicated and expensive. Attached as Appendix A is a price list of various holding tanks, along with a 2-page flyer of a simple downspout filter that caught my eye for it's simplicity (and an explanation of how it works).

B. Cisterns - Facts From Hawai`i

In Hawai`i at the College of Tropical Agriculture and Human Resources (University of Hawai`i at Manoa) Patricia S. H. Macomber wrote the bible on rainwater catchment systems.[18] An estimated 30,000 to 60,000 people in Hawai`i depend upon rainwater catchment systems to meet all of their water needs. Since this includes potable water for all indoor uses by people, valuable information on how to best capture, store and treat water for human use is addressed thoroughly in Ms. Macomber's book.

To pick the proper storage tank(s), figure out (1) number of people using water; (2) the rainfall; (3) dimensions of the system's catchment. Macomber points out that it's important to check your area to see if you have enough rainfall for a system, and that in cases where there is not enough rain, some people have systems they utilize for use with trucked in water.

Though average use of water per person per day is thought to be about 120 gallons, Macomber finds families living on rainwater catchment systems are more frugal with a use of 30 - 50 gallons per day. Another resource she consulted showed a family of four would use about 200 gallons per day (cooking/dishwashing=20 gallons; laundry = 35 gallons; bathing = 65 gallons; flushing = 80 gallons).

To ascertain *how much water you can save from a roof surface* calculate the size of your roof by measuring the "footprint" area under the roof of your house by measuring the sides of your house from eave to eave. Next, multiply the length times the width to get square footage of the catchment surface. Multiply that amount times 0.625 to find total gallons the roof can catch per inch of rain, a rough estimate can be made by the below example.

Example: 36' x 36' = 1296 square feet of roof area

1296 ft² x 0.625 gallons of water per inch of rain = 810 gallons per inch of rain

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[18] P.S.H. Macomber, Guidelines on Rainwater Catchment Systems for Hawai`i (2004) Download a copy at http://www.ctahr.hawaii.edu or order by calling 808-956-7046

Next, take a *look at your rainfall chart* (find rainfall charts at NOAA or rssweather.com or similar webpages). Macomber gives the following example for the roof above with 3.44 inches of rainfall:

Example: 810 gal x 3.44 inches of rain = 2786.4 gallons

The *size of holding tanks* should be decided upon your water needs. Attached hereto as Appendix B is Ms. Macomber's table to assist in calculating dimensions of tanks to their holding capacity. The *tanks should be made of non-toxic materials.* Tank materials and their approximate prices range includes redwood, corrugated steel, concrete, ferroconcrete, polyethelene and fiberglass tanks. Materials of polyethylene and fiberglass are too new to the tank market to reflect their longevity. Prices vary according to materials (see Appendix A for varying size/prices of tanks at Scotts Valley Sprinkler & Pipe Supply). Ferroconcrete and cement reduce acidity of acid rain, while providing the best structural integrity for the longest time period.

Solid material is preferable for the tank's cover; it should keep out sunlight to reduce growth of algae, etc.; it should be tight enough to keep out debris and rodents; and there should be an overflow device fashioned in a way that will direct the overflow from your tank to another holding tank or to an area of your property (not on your neighbor's property) where the earth is permeable enough to absorb the water before a three-day period (it takes three days for mosquitoes to gestate).

In a simple water catchment system, *tank placement* should be close enough to the house to be able to run a down-sloping pipe from the roof to the tank, with the overflow and drainage runoff directed in such a manner that it doesn't adversely impact your house foundation or the property of your neighbor. In a more sophisticated system (see pictures at p.i and p.ii herein of the Santa Cruz system) the water can be directed from the down spout to a ground pipe with a filter/pump connection that will then direct the water to the holding tanks.

Building materials for the roof, gutters, downspouts and holding tanks must not leach toxins into the water. The more acid your rain, the likelihood increases of chemical leaching from building materials in contact with the rainwater. Fungicides should not be used on any of the building materials. Galvanized metal painted or enameled with a nontoxic paint is a favorite roofing material used in Hawai`i, although other roofing materials that can be used are concrete, terracotta, tiles, slate, polycarbonate, and fiberglass.

In the initial construction of your system washing off the roof, cleaning out the gutters of the roof, flushing out your tanks, providing a tight system to keep debris and rodents out of your water tank is imperative for quality water and longevity of your system. With systems intended for drinking water, the materials, cleanliness, tight construction, and maintenance can mean the difference between life and death. Macomber suggests the best information on filter systems intended for drinking water can be found at the National Sanitation Foundation's Web site, http://www.nsf.org., as NSF certifies drinking water systems. A synopsis on rainwater catchment systems that includes a risk assessment table of the systems for potable water can be found at http://www2/ctahr.hawaii.edu.

C. Arizona: Cisterns and Land/Water Management Systems

With Tucson, Arizona's annual precipitation gauged at 12.77 inches, it's still enough rainfall for serious consideration by governmental authorities and citizens alike. Brad Lancaster states Tucson's projected population growth and increased water use is predicted to outstrip

Tucson's "renewable" water supplies by 2025.[19] It is estimated that the average rainfall exceeds current municipal use. If rain water is harvested as the principal source of water, grey water used as a secondary source, and municipal and private wells are used only to supplement in times of need, a positive effect can take place. The consumption of groundwater sucked from aquifers beneath Tucson and surrounding valleys for municipal, agricultural and industrial uses has caused the groundwater table to lower more than 200 feet in the past 100 years, and it continues to lower 3 to 4 feet each year, causing a dearth of vast stretches of dead trees and vegetation. Landcaster proposes that a 1/4 acre lot in Tucson receives about 67,000 gallons of salt-free rain water in an average year; the average family of 3 uses about 120,000 gallons of water a year.

Some basic cistern system principles[20] are:

1. Ensure adequate inflow. Size your gutters, downspout, and inflow pipe for maximum rainfall capacity;

2. Ensure adequate outflow and use it as a resource. Diameter of cistern overflow pipe must be equal to or larger than diameter of cistern's inflow pipe so your system doesn't back up. Direct overflow resource to another tank or mulched and vegetated infiltration basins.

3. Design your system to collect high quality water. Don't use toxic materials for building materials of your system and use materials rated for contact with potable water yield the highest quality water.

4. Design a closed system that passively filters itself. Screen it off from sunlight, and make sure bugs and rodents can't access it. An outflow pipe from the cistern should be a minimum of 4 inches above the bottom of the cistern to keep sludge of sediments from being pulled into the supply pipe.

5. Maintain access to your tank and its interior. Leave access around tank to check water levels, make tank repairs and to enable you to clean out the tank

6. Vent your tank. Prevent a vacuum from forming within the tank when large quantities of water are drawn from the tank. Be sure the vent mouth has a covering that will keep out bugs and rodents.

7. Use gravity to your advantage. Place tank to utilize elevation of the catchment surface and the power of gravity to collect rainwater and distribute it around your landscaping.

Some rainwater harvesting systems can become quite original. Lancaster writes about one couple in the Sierrita Mountains of southwest Arizona (14 inches of annual rainfall per year) poured a 2,500 gallon ferrocement 3-foot high lagoon shape in the middle of their living room, the center of which has a pipe that feeds water from their 1,500 square foot roof. A 10 gallon RV pump pressurizes the water and delivers it to all sinks, bathrooms and washing machine. The water supplies all of their needs except for drinking water (or a dip on a real hot day).

Lancaster supplies a very concise water-harvesting calculations for every conceivable type of catchment system (whether it be landscaping catchment or cisterns) as well as for the

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[19] B. Lancaster, Rainwater Harvesting for Drylands, Vol. I(2006) available to order through www.HarvestingRainwater.com

[20] B. Lancaster, Rainwater Harvesting for Drylands, Vol. I, at pp.70 (2006)

catchment component's.[21] A book worth waiting for on water catchment cisterns and systems by Lancaster is due for release in 2008.

The City of Tucson Water Department also has a webpage containing a water harvesting guideline that can be accessed at 222.ci.tucson.az.us/water/harvesting.htm.

D. Billings, Montana: Cisterns and Land/Water Management Systems

What to do when you buy land without any water? If you are Dave Grimland and Kathleen Ralph, you hire an architect and explain your theory of a roof water catchment system so that a design can be drawn up and then you meet the contractors who don't think the system is practical.[22] The Grimlands were able to capture about 500 gallons of water from one-quarter inch precipitation on a 3,200 square foot roof. They started with a 2,200 gallon concrete cistern and added another 4,000 gallon cistern. Because those cisterns were filled halfway through Spring, they next built a "water barn" under their house with 13,000 more gallons of storage. It's important to keep in mind that annual precipitation in this area is recorded at 14.76 inches per year.

The Grimlands have a filtration system of a carbon filter for taste, and a sub-micron filter that screens out giardia, then an ultraviolet light system that kills bacteria. This system has provided all the water the family of three needs for the past nine years (six of the years were drought years), with the exception of having to haul water twice due to a fire prevention measure and the second time for maintenance cleaning. An estimated $8,000 was the cost of their system nine years ago.

E. Sonoma County, California: Cisterns and Land/Water Management Systems

With an annual average precipitation in 2005 of 25.85 inches in Petaluma[23], California, my neighbor Paul decided that a water catchment system would definitely fulfill their family's gardening needs. This past winter of 2006 he installed a roof catchment system (see pictures on pp.iii and iv) for under $1,000 (the 1,350 gallon tank cost about $700 and pipes cost about $200.). A hand-drawn sketch of his system is on the cover of this reference guide. The footprint of Paul's home is only 1,200 square feet.

Completion of his system in November 2006, allowed water harvesting in one rainfall incident the past month up to the tank's 1,250 gallons water mark With some possible sprinkles due this week, Santa Rosa, California is headed for driest January since 1889 (average annual rainfall fr January is usually 4.82 inches, however this January of 2007 has only measured 0.12 to date).[24] We could all do with a catchment system.

Paul's system is comprised of gutters on either side of the length of his house roof that feed down from the roof to a pipe that then feeds into a gravity sediment trap before flowing back up the pipe and across his driveway in another pipe over to the 1,350 gallon tank. The gravity

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[21] B. Lancaster, Rainwater Harvesting for Drylands, Vol. 1, at p.124 - 135 (2006)

[22] U.S. Water News Online, September 2004, at uswaternews.com/archives/arcconserv/4billcoup9.html

[23] Article, Money Magazine: Best places to retire 2005: Petaluma, CA snapshot at http://money.cnn.com/magazines/moneymag/bpretire/2005/snapshots/35478.html

[24] The Press Democrat, Jan, 24, 2007, at p.1

sediment trap must be emptied after every storm cycle. At the roof gutter to pipe connections there are filter screens to keep out debris, bugs and rodents. At the end of the pipe extending across driveway and into top of the tank, there is a 75 micron bag filter to keep any debris that escaped the first screens. This bag filter must be taken out and cleaned. There is an overflow pipe to the right inside of the tank just an inch or so above the floor of the tank that siphons out sediment and then flushes it out the overflow pipe to the outside. Small air holes that are impregnated into the "U' joint (see red circled pictures) around the pipe cause the suction to occur while keeping the overflow from emptying out the tank any farther than right at the line of the air holes. A spigot at the bottom of the tank on the left side allows for use of water from the tank. The tank itself is made of "light proof" material, and rests on a level bed of pea gravel.

Paul read Brad Lancaster's book mentioned herein at footnotes 20 and 21 and was able to e-mail Brad Lancaster with questions when he hit system construction glitches and was thankful for the informative responses he received back. Paul did all the labor on constructing this system by himself.

A local Sonoma County resource suggested by Paul is: OAEC Water Institute, CEO Brock Dolman, 15290 Coleman Valley Rd., Occidental, CA 95465 707-874-1557, www.oaec.org. They are holding a rainwater harvesting workshop on April 7, 2007; check their website for information.

From a very informative article[25] I found out about one Bodega, California couple that have built a rainwater harvesting system where water is collected from the metal roofs of their house and outbuildings (all painted with nontoxic paint). The filtered water is stored into a 27,000 gallon tank. The first year they were able to supply all domestic water needs from rainwater. Obtaining permits for the project was the biggest hurdle in the project.

F. Marin County, California: Cisterns and Land/Water Management Systems

As previously stated, Marin County's annual average precipitation is 30 to 50 inches per year, depending on where you are in Marin County given it's variety of micro-climate ecosystems. So it only makes sense that someone would get the idea and implement it in regard to rainwater harvesting. Just a few days ago inspiration and hope prevailed when I spoke with Paola Bouley of Salmon Protection and Watershed Network (SPAWN). SPAWN, Lagunitas School and the Regional Water Quality Control Board installed a 30,000 gallon tank to catch water off a 1,600 square foot roof at the school just completed this past September 2006. "The project will serve as a replicable model of a simple, and effective approach to reduce the impacts of storm water runoff (erosion and sedimentation) on local creeks."[26] (Tours of the system can be arranged by telephone 415-488-0370 x 102 and a landowner's guide to watershed friendly living can be found on the SPAWN web page in footnote 27 below). The water from the cistern will water a school garden during the summer months.

The dual achievement of rainwater harvesting systems is: (1) harvest rainwater for use in summer; and (2) reduce the impacts of storm water runoff. Imagine then if every home surrounding creeks had such a system installed. The water would be saved instead of flowing out to streets and sidewalks to pick up pollutants while on the way to the water tributaries. Not only would this cut back on the amount of water at storm times going into the creeks and thereby offset flooding, but it would keep pollutants out of the streams at the same time. That saved rain

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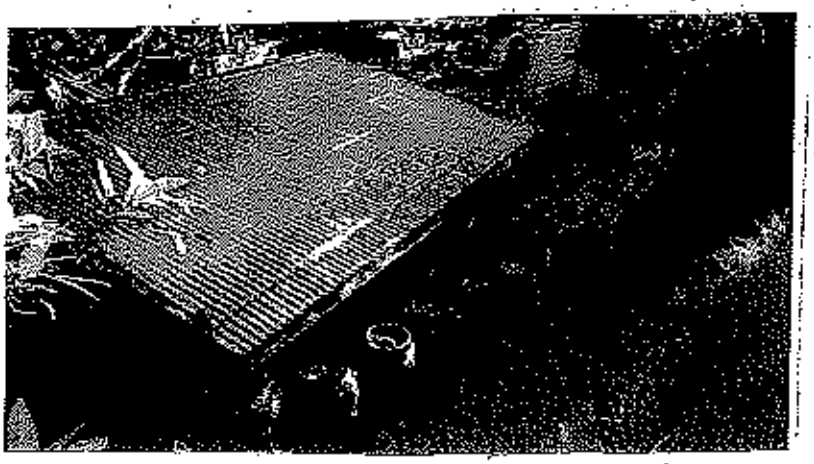
[25] Jenny Blaker, *Local consequences: Policy Recommendations WATER CRISIS IN SONOMA COUNTY TOWARDS A WATERSHED PARAGIDGM*, O.W.L. Foundation, Dec. 10, 2004

[26] SPAWNUSA.org/pages/page-134

could then be used in summer time.

The picture directly below is of a water shed system that Ms. Bouley installed in Fairfax, CA on a 264 square foot roof that drains into 8 rain barrels she can store 850 gallons of water!



G. India: Cisterns and Land/Water Management Systems

Appendix C is a 5-page webpage from the government of India.[27] Rain Water Harvesting and Artificial Recharge to Ground Water (care for ground water before it becomes rare) is a hefty statement in itself and an idea that could be used so beneficially to replenish our under-mined and over-mined[28] and tired aquifers in the Russian River, as well as other aquifer sources. Appendix C says it all, as well as it's system picture that so tells the story. Let our engineers in the state, counties, cities and towns take a look at this age-old technology for our future's sake.

Instead of the adage, "If it ain't broke, don't fix it," more apt in this instance is: "Our water sources are going broke, let's fix them." Our modern technology does not meet up with our needs when it comes to having enough water to go around, or to avoid flooding. Since the outlook in our weather appears to be less snow, larger downpours of rains at lesser lengths of time (that will strain our dam systems and force the drainage of their water to avoid them from bursting [see, article in footnote 13]) perhaps the answer is micro-management with a multitude of rainwater harvesting systems.

VI. WATER MANAGEMENT PERMACULTURE

A video, "Global Gardener - Permaculture with Bill Mollison,"[29] describes sustainable agriculture methods throughout tropical climates of Australia and Zimbabwe; in arid lands (reversing desertification) in Arizona, Botswana and Australia; cool climates of Europe, Tasmania, and the San Juan Islands in Washington State, as well as urban environments in New

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[27] Source: http://www.tn.gov.in/dtp/rainwater.htm

[28] See, Russian Riverkeeper, River Currents, (Spring 2006); contact Donald McEnhill at rrkeeper@sonic.net

[29] Global Gardener, Permaculture with Bill Mollison is available to order from Bullfrog Films, P.O. Box 149, Oley, PA 19547 (800)543-3764, www.bullfrogfilms.com

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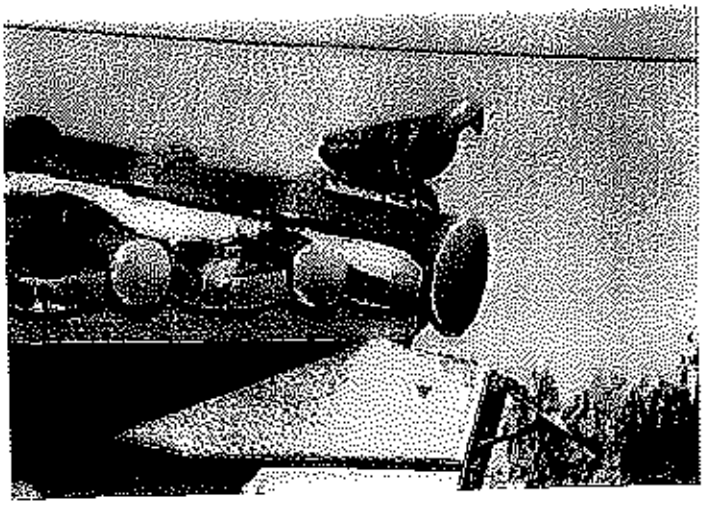




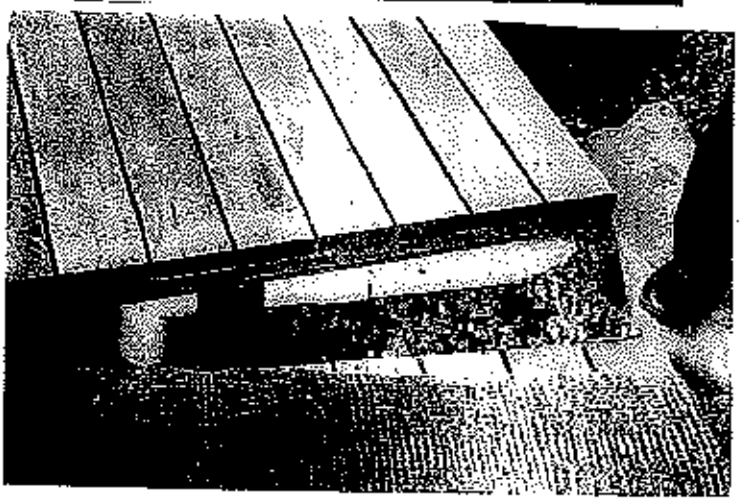
roof ↑



↑

gutters/drain pipe





← FILTER/pump from house.
drain pipes (from gutters)
← that then sends water
to holding tanks

Santa Cruz Cistern System
Photos p.i





Holding tanks from front view and accessible back view (with Bobby + Sandy)

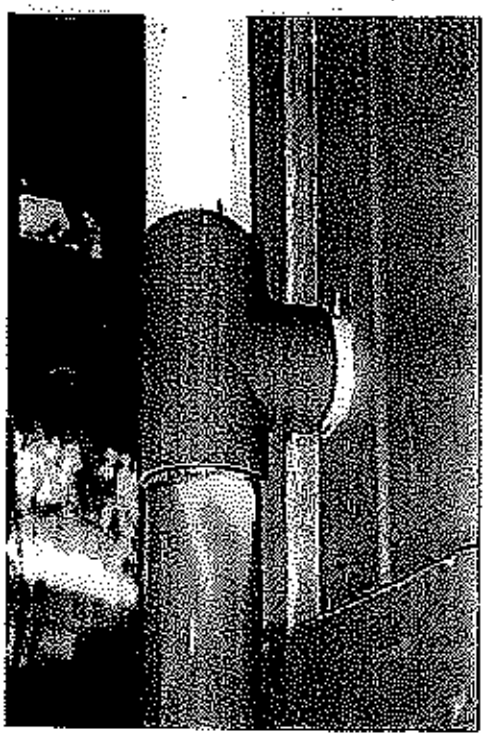


part of 1.5 acreage watered from rain catchment system



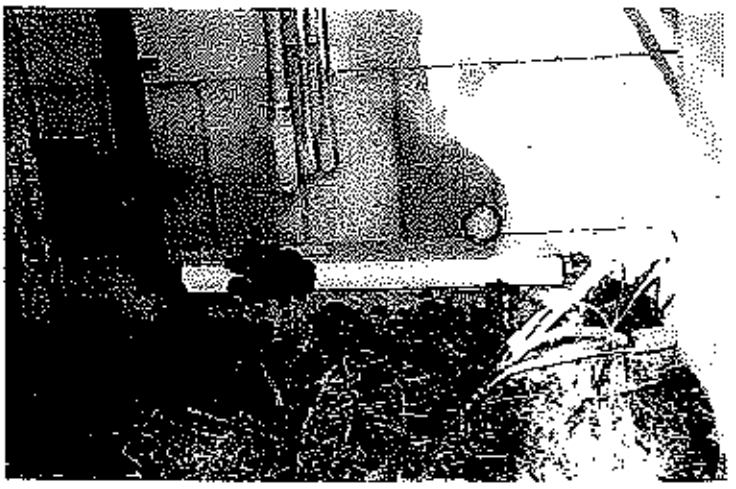
gutters to drain (note screen to keep out debris)





pipe travels to "t" and then crosses under house to other side

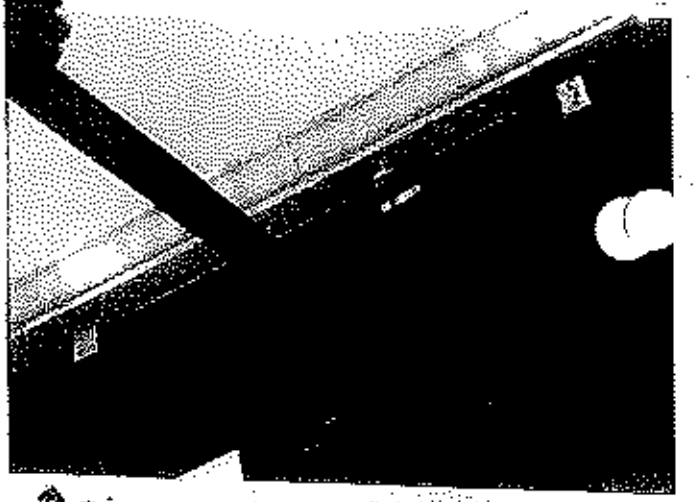
Filter screen bag to collect sediment/debris ... located inside top of tank. This must be checked/cleaned periodically.



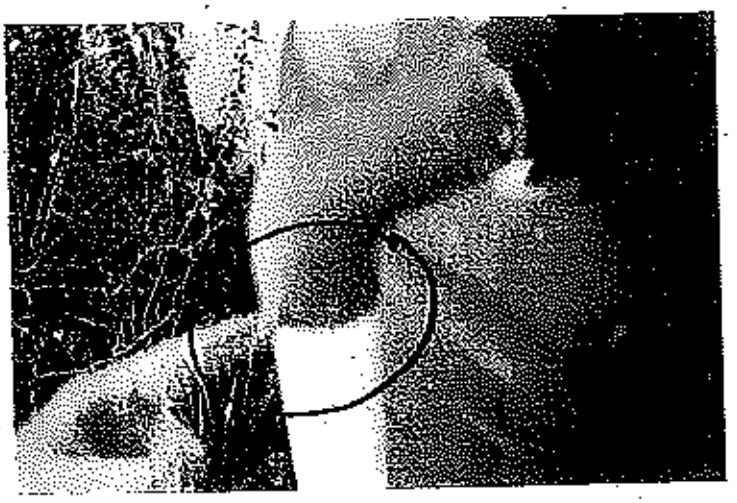
overflow for sediment release + overflow water



Overflow + sediment collection from bottom of tank

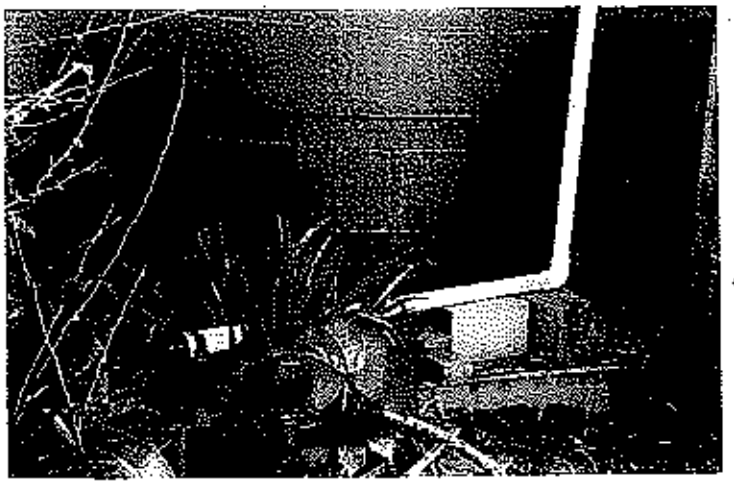


↑ pipe from gutter, as well as cross-over from house-to tank



Close view of over-flow from bottom of tank (to suction out sediment from tank bottom) pinholes impregnate pipe to cause suction and to stop outflow level in tank





↑ overflow from inside tank (note screen at pipe end)



York, India and Zimbabwe. These methods show in each climate how to best design the land for the most efficient water use and retention, along with productive gardening.

For the most efficient water use, integration of systems throughout the home and landscape should be incorporated. Landscaping utilizing swales, permeable paths, drought resistant plants where water can be directed or funneled by the type of digging and layering of earth are important in design to retain water on your property (and to reduce erosion or flooding).

Though Mollison is very adept at incorporating resources at hand into the land to effect the most efficient water absorption and retention, there are also french drain systems that can be installed in the ground that will cause the ground to absorb water more rapidly and direct the water's flow to the area where it is most needed. Scott's Valley Sprinkler and Pipe Supply in Scotts Valley, CA had the synthetic systems on display, or for more information contact Ezflow at (800) 649-0253 or wwww.ringindustrial.com. Landscape architects are excellent consultants to call in when contemplating such a landscape design

In Tucson, Arizona a water catchment systems shown in the video is as simple as an 8-edged star-shaped wheel on a plow that leaves imprints in the ground to catch the seeds and then when the rains come, the imprint captures enough rainwater to help establish the seedling. In India a roof top garden is lush with plants in pots that an Indian lady has also "planted"a porous pottery vessel into each pot that she then pours water into. The porous pottery vessel hides the water source from the sun and directs the water to the roots of the plants in the pots. Closer to home in Davis, California a suburb called Village Homes shows homeowners Michael Colville and David Katz at home where their homes have been built on small "hills" across from the other homes with swale depressions in between the rows of homes. The swales catch the rainwater runoff and are productive, lush gardens. Rocks have been placed in soil spaces to maintain drainage, wooden walkways are placed over the swales for ease in traversing them in wet months.

VII. WATER REUSE/CONSERVATION SYSTEMS

Grey water re-use is shown in the Mollison video as water from inside the home that has been used once and then is directed to outside the home for grey water reuse. Grey water re-use filtration using nature has been brought to high level as used by Paul Stamets on his farm. A small herd of his cows were causing fecal coliform bacteria to threaten the water quality. His extensive knowledge of fungi led him to establish two King Stropharia fungi beds at the heads of the ravines that drained onto a saltwater beach where his neighbor cultivated oysters and clams. "Once the mycelium fully permeated the sawdust/chip beds, downstream fecal bacteria was largely eliminated. The mycelium in effect became a micro-filtration membrane...'gray water' run-off could be cleaned of bacteria and nitrogen rich effluent."[30] Mr. Stamets notes that Government agencies were resistant to his fungi theory of gray water cleaning, however, with test plots in place currently being monitored for effects on water quality, he envisions a widespread application of this method, if proved successful, into basins leading into river, lakes, and bodies of saltwater.

Rain catchment systems can supply water to the more than 50% of average water use that does not need to be potable water, such as toilets (usage 26.7%) , clothes washer (21.7%), faucets (15.7%), dishwasher (1.4%), showers (16.8%) and baths (1.7%)[31]. Greywater systems for indoor

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[30] Paul Stamets, Permaculture with a Mycological Twist" reprinted from Growing Fourmet & Medicinal Mushrooms (by Paul Stamets 1994) source: 222.fungi.com/mycotech/permaculture.html

[31] Www.wonderwater.net/residential.html

use can be installed inside the home to capture greywater from showers and tubs and the washing machine, in a system holding tank where the water is filtered and reday for delivery to toilets or used for irrigation.[32] Kitchen sink water is not recommended for re-use due to the oils and fats it may contain that could clog systems.

A waterless alternative is the composting toilet. "This is a simple, waterless, odorless toilet linked to a small compost facility. Table waste can also be incorporated into the composter. The dry composting converts human fecal material into a soil-like humus, which is essentially odorless and is scarcely 10% of the original volume. The compost facilities need to be emptied every year or so...The U.S. Environmental Protection Agency now lists several brands of dry toilets approved for use."[33] A USEPA water efficiency Technology Fact Sheet, composting toilets can be accessed at 222.3pa.gov/OW-OWM.html/mtb/comp.pdf.

VIII. CODES AND REGULATIONS

First off, a disclaimer is due here. I am not advocating any legal position one way or another, nor is this a complete guide to govern any project you may take. What is included below is a drop in the bucket of what's out there regarding any regulations surrounding your rainwater harvesting or water re-use system. The following, as with the rest of this reference guide, is just that, a reference guide.

As with any homeowner builder project you undertake on your property, you don't want to run afowl of your local planning department. If you think you need to check out a system before you install it to make sure you're in sync with building codes, or to see if you need a permit, contact your local planning department agency.

To see what governs water quality, look to your United States Environmental Protection Agency webpages[34] for information on what is and isn't potable water. If you want to have the water in your system checked by a California State Certification Officer for Drinking Water, contact Laboratory Certification Office, 2151 Berkeley way, Annex 2, Berkeley, CA 94704 at (510)540-2800. In addition, most counties have their own water quality boards.

The Regional Centre for low cost water and sanitation (CREPA) was set up in 1988 as part of the World Health Organization (WHO), to promote appropriate technologies in water and sanitation; they have developed or adapted many technologies in that sector. CREPA is organized under the International Water and Sanitation Centre (IRC) founded in 1968. Their webpage for more information regarding water systems, quality, and water information summits is www.irc.nl.

If you are interested in Leadership in Energy and Environmental Design (LEED) Green building Rating System (nationally accepted benchmark for design, construction, and operation of high performance green buildings), visit their webpage at www.usgbc.org., or contact them at LEED Customer Service (202) 742-3780 or leedinfo@usgbc.org. They offer training courses for green building practices, operations site management and materials procurement at www.buildings.com/usgbc.

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[32] 222.greywater-systems.com/works.htm

[33] Lester R. Brown, Plan B 2.0 - Rescuing a Planet Under Stress and a Civization in Trouble"(2006), at p.217

[34] Www.epa.gov/safwater/standards.html

IX. CONCLUSION

We cannot continue to waste our natural resources, in this instance water, as if it is a disposable resource that will forever continue to replicate itself merely as a result of our necessity. Depletion of groundwater sources has land sinking and salt infiltration into wells occurring. Gravel mining in the very prime aquifer areas that create high quality drinking water (i.e. the Russian River) cannot continue without death of our aquifers being the only logical consequence of this practice. Unhealthy rivers are dying rivers, that lead to unhealthy bays they empty into and, ultimately, unhealthy oceans.

Rainwater harvesting on government buildings and private residences, green buildings that include water re-use systems, and water catchment systems such as India uses (see Appendix C) to recharge their aquifers, are some natural answers to our dilemma of the loss of and quality of our water sources. Implementation of these systems by our government officials into general plans, and building codes of new buildings, as well as changing existing building codes to permit such systems in existing buildings, would be a positive step toward serious water conservation and the restoration of rivers.

Quoting William McDonough: "If humans are truly going to prosper, we will have to learn to imitate nature's highly effective cradle-to-cradle system of nutrient flow and metabolism, in which the very concept of waste does not exist. To eliminate the concept of waste means to design things - - products, packaging, and systems - - from the very beginning on the understanding that waste does not exist."[35] The systems we design for water conservation and use must begin to include designs that eliminate waste.

Before the traditional Iroquois convened their consul meetings, they invoked this declaration: In our every deliberation we must consider the impact of our decisions on the next seven generations.[36] I ask our governmental officials that control our water quality and usage to turn their outlooks from the "old" ways of engineered fetes that prove failure (i.e. straight paved canals that flood, mining of aquifer areas) in a direction of environmental responsibility and accountability. With that accountability the necessity of flexing the boundaries of possibilities becomes paramount: the stewardship of the land and it's resources is more important than the mighty buck. We need to prioritize restoration of resources to preserve them for our use and that of our grandchildren and their grandchildren.

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[35] W. McDonough & M. Braungart, Cradle to Cradle - Remaking the Way We Make Things, (2002), at pp.103-104, available through The North Point Press, www.fsgbooks.com . (Green architects located in Charlottesville, Virginia as McDonough Braungart Design Chemistry, website: www.mbdc.com)

[36] Jim Nollman, "For the Seventh generation," from the Interspecies Newsletter (2000)

PHOTOGRAPHS
p.i - p.iv

APPENDIX A - Scotts Valley
Sprinkler & Pipe Supply
Cost Sheet & Filter System



A Division of Schriver Corporation

SCOTTS VALLEY SPRINKLER & PIPE SUPPLY

Irrigation, Drainage and Erosion Control

Scotts Valley Branch:
5010 Scotts Valley Drive
Scotts Valley, CA 95066
Tel. (831) 438-6450
Fax (831) 438-8373

Watsonville Branch:
131 Walker Street
Watsonville, CA 95076
Tel. (831) 728-0446
Fax (831) 728-4149

Accounting Office:
P.O. Box 66837
Scotts Valley, CA 95067
Tel. (831) 438-0210
Fax (831) 438-3954

WATER TANK PRICES — October 25, 2006

POLY PROCESSING					NORWESCO				
SKU/SIZE	DIAM X HT	COLOR	LID SIZE	PRICE	SKU/SIZE	DIAM X HT	COLOR	LID SIZE	PRICE
*LT55	23" X 37"	GREEN	12"	$399.95	*LT65N	23" X 42"	WHITE	8"	$165.95
*LT115	30" X 42"	GREEN	12"	$499.95	*LT105N	23" X 63"	WHITE	8"	$249.95
*LT230	38" X 4' 11"	GREEN	17"	$679.95	*LT210N	32" X 60"	WHITE	18"	$369.95
*LT325	4' X 4' 8"	GREEN	17"	$849.95	*LT305N	46" X 45"	GREEN	18"	$399.95
*LT475	4' X 6' 3"	GREEN	17"	$899.95	*LT550N	87" X 42"	GREEN	18"	$499.95
*LT685	5' 1" X 5' 4"	GREEN	17"	$799.95					
**LT1080	7' 8" X 5'	GREEN	17"	$999.00	*LT1100N	7' 3" X 4 '3"	GREEN	18"	$899.95
**LT1400	7' 5" X 6'	GREEN	12"	$1,195.00	**LT1350N	5'11" X 7' 3"	GREEN	18"	$995.00
**LT2500	8' X 8' 2"	GREEN	24"	$984.50	**LT2500N	7' 11" X 7' 5"	GREEN	18"	$1249.95
**LT3650	10 '2" X 8' 5"	GREEN	24"	$2,049.00	**LT3000N	7' 11" X 8" 11"	GREEN	18"	$1,69
**LT4900	12' X 8' 1"	GREEN	24"	$2,239.00	**LT4900N	11' 9" X 7' 2"	GREEN	18"	$2,139.A
**LT4925	9' X 11' 11"	GREEN	24"	$2,699.00	**LT4925N	8' 8" X 12' 8"	GREEN	18"	$2,599.0
***LT6100	10' X 12' 6"	GREEN	24"	$3,795.00					
***LT7100	12' X 10' 11"	GREEN	24"	$3,995.00	***LT6500N	10' X 11' 7"	GREEN	18"	$3,695.0
***LT7900	12" X 11' 4"	GREEN	24"	$4,395.00					
***LT9100	12' X 12' 11"	GREEN	24"	$4,795.00					
***CLT10300	12' X 14' 4"	BLACK	24"	$5,495.00	***LT10000N	11' 9" X 13' 4"	GREEN	18"	$4,995.0
***CLT12150	12' X 16' 6"	BLACK	24"	$9,450.00					
***CLT14950	14' X 16' 10"	BLACK	24"	$9,995.00					

**BRUISER1600	BELOW GROUND TANK	6'8" X 6' X 4'10"	$1,895.00	BELOW GROUND SPHERICAL TANKS	
**BRUISER1800	BELOW GROUND TANK	11'4" X 4'7" X 5'8"	$2,495.00	*ET300	BELOW GROUND TANK $699.00
**BGT1700	BELOW GROUND TANK	11'4 X 4'7" X 5'8"	$1,995.00	*ET500	BELOW GROUND TANK $895.00

SPHERICAL AND BRUISER TANKS MAY BE LEFT EMPTY AFTER PUMPING.

PRICES SHOWN DO NOT INCLUDE FREIGHT ON SPECIAL ORDER TANKS. FREIGHT AMOUNT TO BE DETERMINED BY DELIVERY LOCATION.
PLEASE CHOOSE CAREFULLY, WATER TANKS ARE NOT RETURNABLE.
PRICES ARE SUBJECT TO CHANGE

* Plus Delivery Charge per chart
**Free Local Delivery within 50 miles
*** Plus Freight Charge (factory delivery only)

GR13D 13' DIAMETER STEEL GRAVEL RING $299.95
GR10D 10' DIAMETER STEEL GRAVEL RING $279.95

To protect manufacturers' 3 year warranty, flexible tank connection are required (ask)
Scotts Valley Sprinkler proudly sells both Poly Processing and Norwesco water tanks.
Scotts Valley sprinkler believes that these manufacturers are the two highest quality tank builders in the USA.
If you are considering an Ozone System, we recommend a Poly Processing Tank, due to the 24" lid size.

Sku # indicates gallons

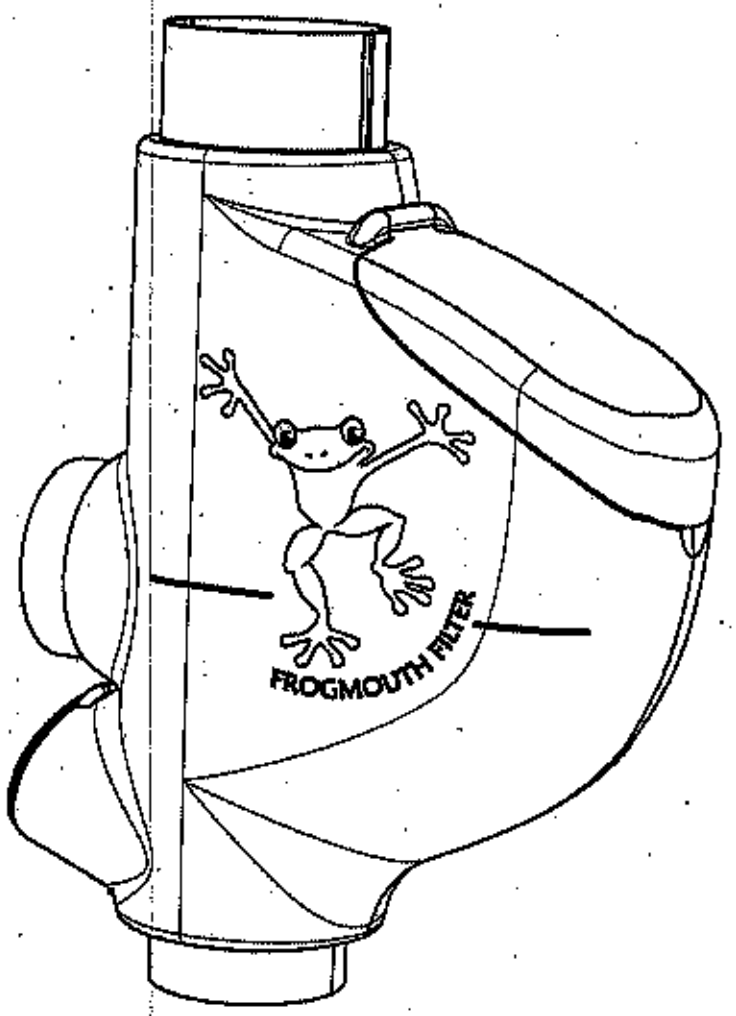
Appendix A - Scotts Valley Sprinkler & Pipe Supply (SVSPS) Cost list

p.v



Frogmouth Filter™
By the people at
Silvan H_2O
405 South Gippsland Hwy
Dandenong
Victoria

Tel. (03) 9791 9933
www.silvanh2o.com.au



Installation Instructions

Silvan H_2O
Smarter rainwater systems

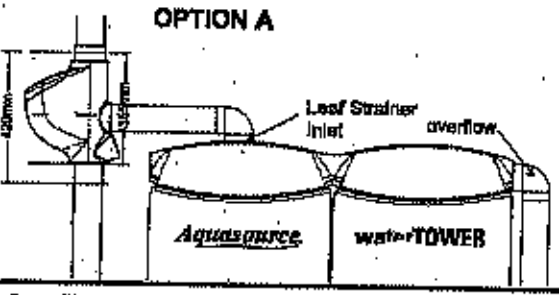
If water tank does not have an overflow pipe fitte

- Mark a line on the downpipe 420mm above the invert of the overflow
- Mark a second line 355mm below the first line

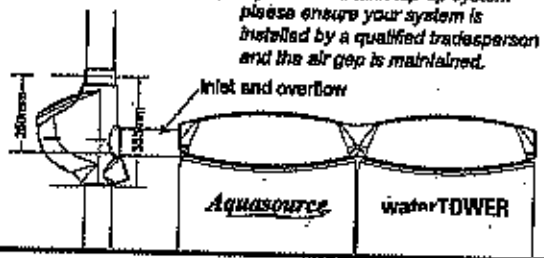
- Mark a line on the downpipe 250mm above the invert of the inlet pipe
- Mark a second line 355mm below the first line

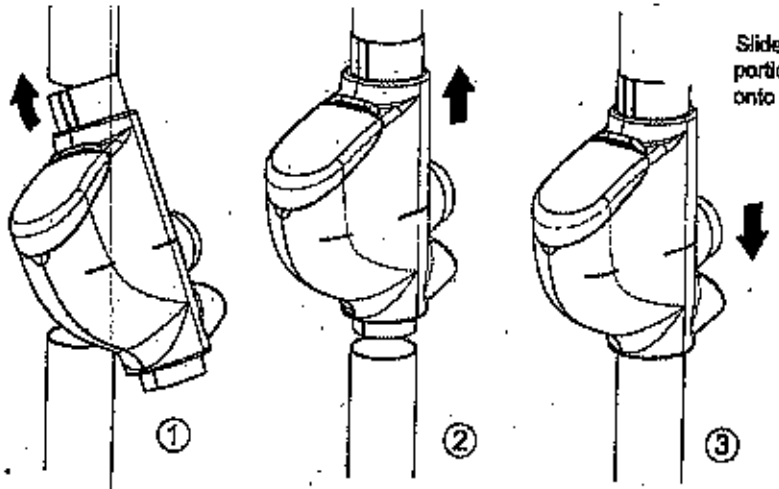
- If using a rectangular downpipe, instead mark a line 350mm above the invert of the inlet pipe, or 520mm if an overflow is already installed: Mark the second line 555mm below the first line.

OPTION A



OPTION B *If you have a tank top-up system please ensure your system is installed by a qualified tradesperson and the air gap is maintained.*

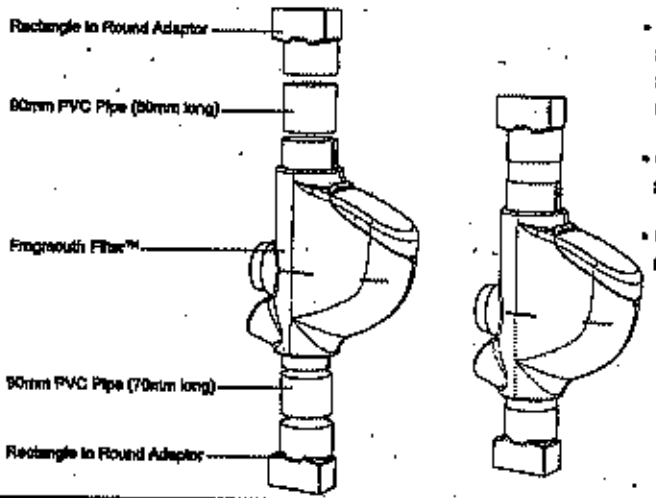




Slide Frogmouth I
portion of downpi
onto lower portion

Appendix A - (from SVSPS) Filter System instruction Sheet p.vii

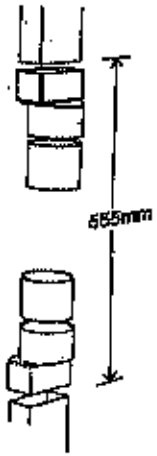
2. Prepare Frogmouth Filter™ for Installation

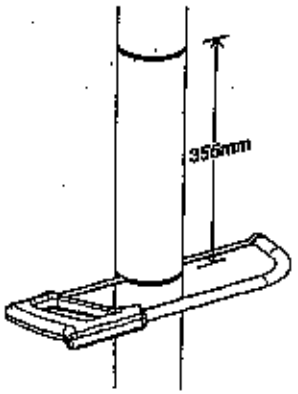


- If required, attach rectangle-to-round adaptors to the Frogmouth Filter™ at the top and bottom. An 80mm and a 70mm length of 90mm PVC will be required. (not supplied)
- Glue upper PVC pipe to adaptor, and glue adaptor to downpipe
- Glue lower PVC pipe to adaptor and glue adaptor to downpipe

3. Prepare Downpipe

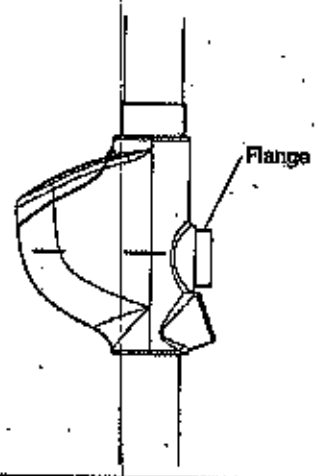
- Cut downpipe on previously marked lines and file rough edges
- Paint edges with rust prevention paint

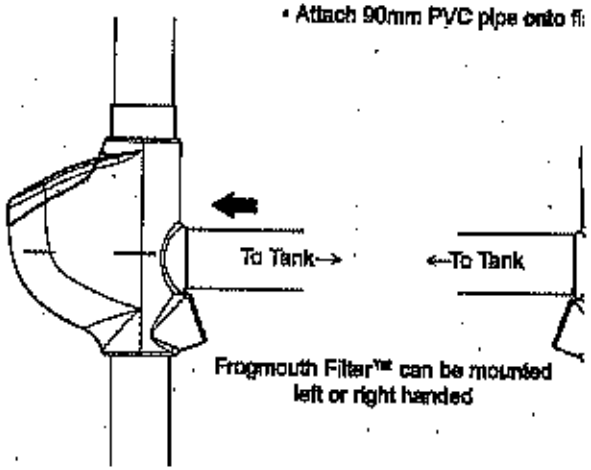




5. Mount Pipe on to Flange

- Apply blue glue to flange on Fr
- Attach 90mm PVC pipe onto fl

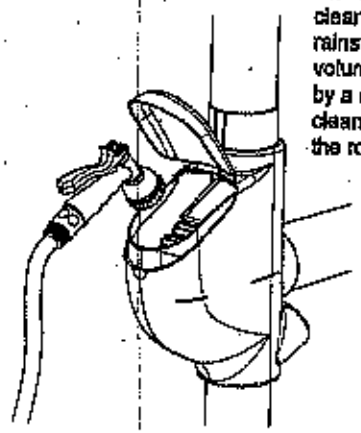




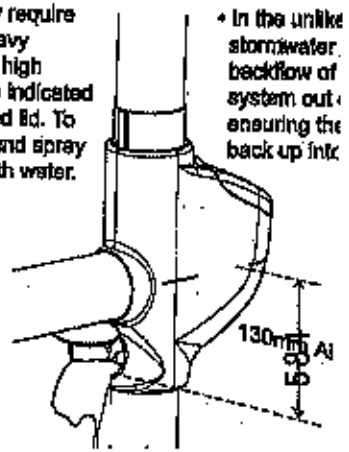
Frogmouth Filter™ can be mounted left or right handed

6. Extreme Weather Events

- The Frogmouth Filter™ may require cleaning following a very heavy rainstorm. This is due to the high volume of debris, and will be indicated by a slight lifting of the hinged lid. To clean the filter, open the lid and spray the rollers and filter mesh with water.



- In the unlike stormwater backflow of system out ensuring the back up into



Calculating the capacity (gallons) of a rectangular water tank

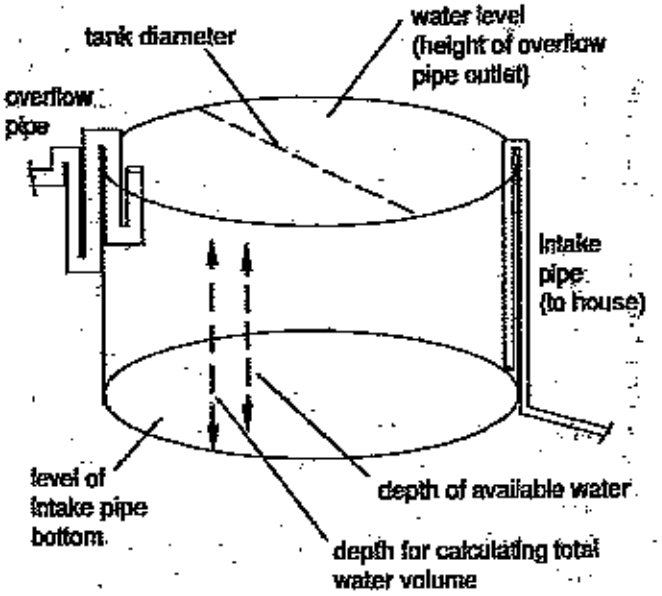
Floor area (length x width = square feet)	Depth (feet)												
	3	4	5	6	7	8	9	10	11	12	13	14	15
16	360	480	600	720	840	960	1080	1200	1320	1440	1560	1680	1800
25	563	750	938	1125	1313	1500	1688	1875	2063	2250	2438	2625	2813
36	810	1080	1350	1620	1890	2160	2430	2700	2970	3240	3510	3780	4050
49	1103	1470	1838	2205	2573	2940	3308	3675	4043	4410	4778	5145	5513
64	1440	1920	2400	2880	3360	3840	4320	4800	5280	5760	6240	6720	7200
81	1823	2430	3038	3645	4253	4860	5468	6075	6683	7290	7898	8505	9113
100	2250	3000	3750	4500	5250	6000	6750	7500	8250	9000	9750	10500	11250
144	3240	4320	5400	6480	7560	8640	9720	10800	11880	12960	14040	15120	16200
169	3803	5070	6338	7605	8873	10140	11408	12675	13943	15210	16478	17745	19013
196	4410	5880	7350	8820	10290	11760	13230	14700	16170	17640	19110	20580	22050
225	5063	6750	8438	10125	11813	13500	15188	16875	18563	20250	21938	23625	25313
256	5760	7680	9600	11520	13440	15360	17280	19200	21120	23040	24960	26880	28800
289	6503	8670	10838	13005	15173	17340	19508	21675	23843	26010	28178	30345	32513
324	7290	9720	12150	14580	17010	19440	21870	24300	26730	29160	31590	34020	36450
361	8123	10830	13538	16245	18953	21660	24368	27075	29783	32490	35198	37905	40613
400	9000	12000	15000	18000	21000	24000	27000	30000	33000	36000	39000	42000	45000

Calculating the capacity (gallons) of a circular water tank

Diameter (feet)	Depth (feet)												
	3	4	5	6	7	8	9	10	11	12	13	14	15
4	283	378	472	566	661	755	835	944	1038	1133	1227	1322	1416
5	443	590	738	885	1033	1180	1305	1475	1623	1770	1918	2065	2213
6	637	850	1062	1274	1487	1699	1879	2124	2336	2549	2761	2974	3186
7	867	1156	1446	1735	2024	2313	2559	2891	3180	3469	3758	4047	4337
8	1133	1510	1888	2266	2643	3021	3341	3776	4154	4531	4909	5286	5664
9	1434	1912	2390	2867	3345	3823	4228	4779	5257	5735	6213	6691	7169
10	1770	2360	2950	3540	4130	4720	5220	5900	6490	7080	7670	8260	8850
11	2142	2856	3570	4283	4997	5711	6316	7139	7853	8567	9281	9995	10709
12	2549	3398	4248	5098	5947	6797	7517	8496	9346	10195	11045	11894	12744
13	2991	3988	4986	5983	6980	7977	8822	9971	10968	11965	12962	13959	14957
14	3469	4626	5782	6938	8095	9251	10231	11564	12720	13877	15033	16190	17346
15	3983	5310	6638	7965	9293	10620	11745	13275	14603	15930	17258	18585	19913
16	4531	6042	7552	9062	10573	12083	13363	15104	16614	18125	19635	21146	22656
17	5115	6820	8526	10231	11936	13641	15086	17051	18756	20461	22166	23871	25577
18	5735	7646	9558	11470	13381	15293	16913	19116	21028	22939	24851	26762	28674
19	6390	8520	10650	12779	14909	17039	18844	21299	23429	25559	27689	29819	31949
20	7080	9440	11800	14160	16520	18880	20980	23600	25960	28320	30680	33040	35400

APPENDIX B - Calculations
From: Guidelines on Rainwater Catchment Systems for Hawai'i

To calculate the volume of available water, measure from the water surface to the opening of the intake pipe. To calculate the total volume of water in the tank, measure to the bottom of the tank.



Water collection highlights

- Use non-toxic building materials.
- Wash all surfaces before using them to catch or hold water.
- Make sure there are no low spots or puddles in the gutter system and that there is a continuous downward slope to the catchment tank.
- First-flush systems improve water quality and should be installed.
- Install a by-pass valve so you can paint or clean your roof and gutters without the rinse water going into the tank.
- Make sure your system will catch and hold enough water for your family's needs
- Calculate the amount of water in your tank—a full 5000-gallon tank does not mean you have 5000 gallons of accessible water.
- When building your home, consider the water catchment as a whole system rather than a series of parts.

APPENDIX C - India's
Water Harvest System to
Recharge Aquifers

பேரூராட்சிகள் இயக்ககம்

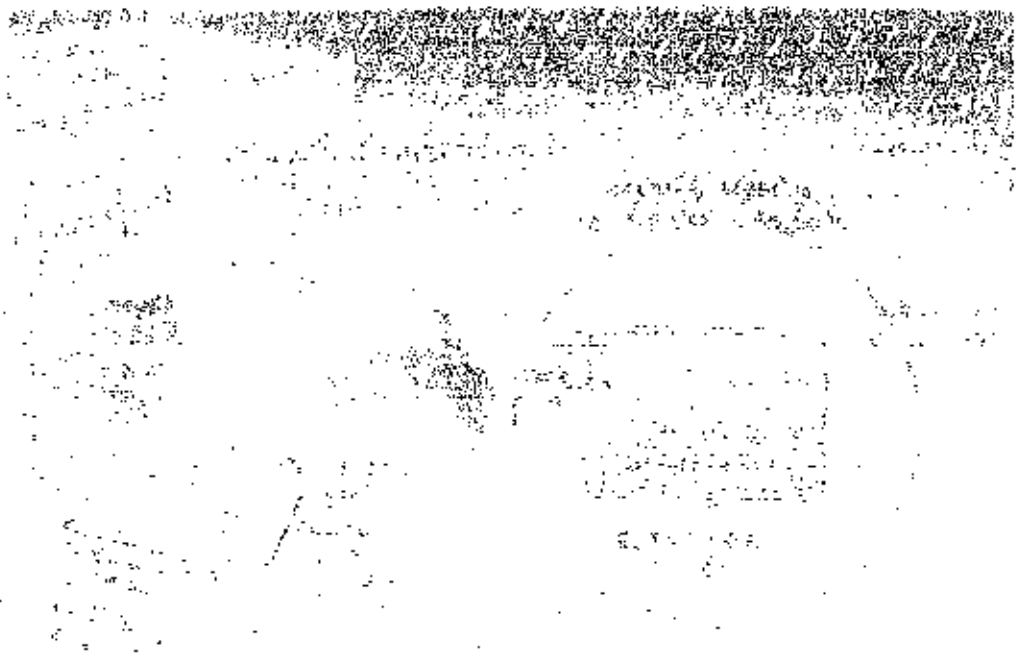
Directorate of Town Panchayats

[illegible]

[illegible]

[illegible]

Rain Water Harvesting



Care for ground water before it becomes rare

RAIN WATER HARVESTING AND ARTIFICIAL RECHARGE TO GROUND WATER

WHAT IS RAIN WATER HARVESTING :

The principle of collecting and using precipitation from a catchment surface

An old technology is gaining popularity in a new way. Rain water harvesting is enjoying a renaissance of sorts in the world, but it traces its history to biblical times. Extensive rain water harvesting apparatus existed [illegible] years ago in the Palestine and Greece. In ancient Rome, residences were built with individual cisterns and paved courtyards to capture rain water to augment water from [illegible] aqueducts. As early as the third millennium BC, farming communities in Baluchistan and Kutch impounded rain water and used it

http://www.tn.gov.in/dtp/rainwater.htm

Appendix C - rainwater harvest
To recharge aquifers

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for irrigation dams.

ARTIFICAL RECHARGE TO GROUND WATER :

Artificial recharge to ground water is a process by which the ground water reservoir is augmented at a rate exceeding that obtaining under natural conditions or replenishment. Any man-made scheme or facility that adds water to an aquifer may be considered to be an artificial recharge system.

WHY RAIN WATER HARVESTING :

Rain water harvesting is essential because :-

Surface water is inadequate to meet our demand and we have to depend on ground water.

Due to rapid urbanization, infiltration of rain water into the sub-soil has decreased drastically and recharging of ground water has diminished.

As you read this guide, seriously consider conserving water by harvesting and managing this natural resource by artificially recharging the system. The examples covering several dozen installations successfully operating in India constructed and maintained by CGWB, provide an excellent snapshot of current systems.

RAIN WATER HARVESTING TECHNIQUES :

There are two main techniques of rain water harvestings.

Storage of rainwater on surface for future use.

Recharge to ground water.

The storage of rain water on surface is a traditional techniques and structures used were underground tanks, ponds, check dams, weirs etc. Recharge to ground water is a new concept of rain water harvesting and the structures generally used are :-

Pits :- Recharge pits are constructed for recharging the shallow aqulfer. These are constructed 1 to 2 m, wide and to 3 m. deep which are back filled with boulders, gravels, coarse sand.

Trenches:- These are constructed when the permeable stram is available at shallow depth. Trench may be 0.5 to 1 m. wide, 1 to 1.5m. deep and 10 to 20 m. long depending up availability of water. These are back filled with filter. materials.

Dug wells:- Existing dug wells may be utilised as recharge structure and water should pass through filter media before putting into dug well.

Hand pumps :- The existing hand pumps may be used for recharging the shallow/deep aquifers, if the availability of water is limited. Water should pass through filter media before diverting it into hand pumps.

Recharge wells :- Recharge wells of 100 to 300 mm. diameter are generally constructed for recharging the deeper aquifers and water is passed through filter media to avoid choking of recharge wells.

Recharge Shafts :- For recharging the shallow aquifer which are located below clayey surface, recharge shafts of 0.5 to 3 m. diameter and 10 to 15 m. deep are constructed and back filled with boulders, gravels & coarse sand.

Lateral shafts with bore wells :- For recharging the upper as well as deeper aquifers lateral shafts of 1.5 to 2 m. wide & 10 to 30 m. long depending upon availability of water with one or two bore wells are constructed. The lateral shafts is back filled with boulders, gravels & coarse sand.

Spreading techniques :- When permeable strata starts from top then this technique is used. Spread the water in streams/Nalas by making check dams, nala bunds, cement plugs, gabion structures or a percolation pond may be constructed.

DIVERSION OF RUN OFF INTO EXISTING SURFACE WATER BODIES

Construction activity in and around the city is resulting in the drying up of water bodies and reclamation of these tanks for conversion into plots for houses.

Free flow of storm run off into these tanks and water bodies must be ensured. The storm run off may be diverted into the nearest tanks or depression, which will create additional recharge.

Urbanisation effects on Groundwater Hydrology :

Increase in water demand

More dependence on ground water use

Over exploitation of ground water

Increase in run-off, decline in well yields and fall in water levels

Reduction in open soil surface area

Reduction in infiltration and deterioration in water quality

Methods of artificial recharge in urban areas :

Water spreading

Recharge through pits, trenches, wells, shafts

Rooftop collection of rainwater

Roadtop collection of rainwater

Induced recharge from surface water bodies.

Computation of artificial recharge from Roof top rainwater collection :

Factors taken for computation :

Roof top area 100 sq.m. for individual house and 500 sq.m. for multi-storied building.

Average annual monsoon rainfall - 780 mm.

Effective annual rainfall contributing to recharge 70% - 550 mm.

	Individual Houses	Multistoried building
Roof top area	100 sq. m.	500 sq. m.
Total quantity available forrecharge per annum	55 cu. m	275 cu. m.
Water available for 5 member Family	100 days	500 days

Benefits of Artificial Recharge in Urban Areas :

- Improvement in infiltration and reduction in run-off.
- Improvement in groundwater levels and yields.
- Reduces strain on Special Village Panchayats/ Municipal / Municipal Corporation water supply
- Improvement in groundwater quality
- Estimated quantity of additional recharge from 100 sq. m. roof top area is 55,000 liters.

HARVESTING RAINWATER HARNESSING LIFE :

A NOBLE GOAL - A COMMON RESPONSIBILITY

Ground water exploitation is inevitable is Urban areas. But the groundwater potential is getting reduced due to urbanisation resulting in over exploitation. Hence, a strategy to implement the groundwater recharge, in a major way need to be launched with concerted efforts by various Governmental and Non-Governmental Agencies and Public at large to build up the water table and make the groundwater resource, a reliable and sustainable source for supplementing water supply needs of the urban dwellers.

Recharge of groundwater through storm run off and roof top water collection, diversion and collection of run off into dry tanks, play grounds, parks and other vacant places are to be implemented by Special Village Panchayats/ Municipalities /Municipal Corporations and other Government Establishments with special efforts.

The Special Village Panchayats /Municipalities/Municipal Corporations will help the citizens and builders to adopt suitable recharge method in one's own house or building through demonstration and offering subsidies for materials and incentives, if possible.

ATTRIBUTES OF GROUNDWATER :

- There is more ground water than surface water
- Ground water is less expensive and economic resource.
- Ground water is sustainable and reliable source of water supply.
- Ground water is relatively less vulnerable to pollution
- Ground water is usually of high bacteriological purity.
- Ground water is free of pathogenic organisms.
- Ground water needs little treatment before use.
- Ground water has no turbidity and colour.

http://www.tn.gov.in/dtp/rainwater.htm

Appendix C - rainwater harvest
To recharge aquifers
(www.tn.gov.in/dtp/rainwater.htm)

- Ground water has distinct health advantage as art alternative for lower sanitary quality surf water.
- Ground water is usually universally available.
- Ground water resource can be instantly developed and used.
- There is no conveyance losses in ground water based supplies.
- Ground water has low vulnerability to drought.
- Ground water is key to life in arid and semi-arid regions.
- Ground water is source of dry weather flow in rivers and streams.

Click here for photographs of instances of rain water harvesting



Last updated on Tuesday, September 05, 2006

Tuft, Pamela

From: David Keller [dkeller@eelriver.org]
Sent: Wednesday, March 14, 2007 2:21 PM
To: CityCouncil; Tuft, Pamela
Subject: 2 Casinos Impacts on Petaluma: General Plan/DEIR Impacts not addressed

From: David Keller
Bay Area Director
Friends of the Eel River
1327 I St.
Petaluma, CA 94952

To: Petaluma City Council
Pamela Tuft, General Plan Manager
11 English Street
Petaluma, CA 94952

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Comments for the Public Record, draft General Plan and DEIR:

Dear Council members and Ms. Tuft:

The current draft General Plan and DEIR do not address the cumulative impacts from two reasonably foreseeable regional casino projects which, if built, will have profound impacts on the City, and to our ability to fulfill our goals, objectives, policies and programs for the next twenty years in a manner consistent with CEQA's requirements.

The Petaluma General Plan and EIR must address the cumulative worst-case adverse impacts of the projected maximum City build out combined with the impacts from the casino complex proposed by the Federated Indians of Graton Rancheria in Rohnert Park, and the possible casino complex (or other intensified usage) located just south of Petaluma by the Dry Creek Band of Pomo Indians.

I am enclosing a series of articles from the Argus Courier and Press Democrat since last September 2006 describing the potential problems associated with these proposals, as well as noting the campaign for Petaluma's Measure H on last November 2006 ballot opposing a casino operation south of Petaluma.

These direct and indirect impacts, most all capable of being identified (and as reported in the DEIS for the Rohnert Park location), include increased local and regional traffic congestion, severe impacts to demands for water supplies from SCWA sources (including the Eel River, Russian River and regional groundwater), increased wastewater discharges, increased groundwater pumping, demands for regional Hwy. 101 capacity that would conflict with retail, commercial, job and residential growth predicted by Petaluma, increased emergency room and health care needs, creased crime, accidents and injuries and concurrent police and fire/EMS calls (including mutual aid Petaluma calls), increased low-income housing demands, sales tax shifts to Indian casino owned or leased businesses, sales tax losses from Petaluma retailers on alcohol, tobacco, gasoline and anything else that the tribe sells without sales or excise taxes, increased regional and local air/water pollution, increases in local and regional Green House Gas emissions, increased wear and tear on local roads and public facilities, etc.

A B C D E F G H I J K

Under CEQA, it is mandated that the General Plan DEIR and FEIR include an assessment of those cumulative impacts for Petaluma and the region.

For instance, if Hwy 101 capacity (current and with future expansions including the Novato Narrows) is used up to serve the casino businesses, employees and visitors, then there'd be little or no capacity left for future Petaluma regional serving businesses (like, Target, Lowes etc); those cumulative impacts would put a big crimp in Petaluma's plans for expansion, and would require a coherent alternative plan and impact avoidance or mitigations within the final General Plan and FEIR. This is also true for Petaluma's other utility and public infrastructures.

It is unfortunate, given the public and agency awareness of these proposals for quite some time, that the DEIR did not include this discussion of impacts and alternatives. We believe that the impacts are severe enough and suffuse throughout the wide range of issues considered in the DEIR, that the DEIR should be recirculated as a revised focused draft.

Please see the *Graton Rancheria Casino and Hotel Environmental Impact Statement*
http://www.gratoneis.com/

Thank you for helping to make this a better General Plan and DEIR for our region's and Petaluma's future.

David Keller

Editorial: Argus Courier - Mar 7, 2007

Will Petaluma become a casino sandwich?

Despite Petaluma elected officials and residents having made it perfectly clear they do not want a casino built on property at the southern edge of town, the Indian tribe that owns the 277-acre site met recently with local officials and had the chutzpah to inquire as to whether the city would extend sewer and water lines in order to develop the property.

Oddly, the tribe apparently had not heard (or chose to ignore) the results of a November advisory vote in Petaluma in which nearly 80 percent of voters made it clear that a casino was not welcome in Petaluma.

So what's up with the Dry Creek Rancheria Band of Pomo Indians? Why is the tribe, the same one that owns and operates River Rock Casino in Geyserville, so hell bent on building another casino in Petaluma?

Although the tribe continues to be coy about its intentions, officially saying it has no plans to construct a casino on the site, it passed a resolution last year declaring its intention to develop "a class III gaming facility and related amenities in Petaluma."

Clearly, they want to build a big casino on Petaluma's doorstep and aren't the least interested in whether Petaluma residents like it or not.
The reason for their persistence is simple economics: With a competing Indian tribe, the Federated Indian of Graton Rancheria, poised to build a gigantic half-billion-dollar casino in Rohnert Park, the Dry Creek Pomos are trying to leapfrog that development and build their own massive casino in Petaluma right alongside Highway 101 and within a 30-minute drive of the populous Bay Area.

If both tribes are successful, Petaluma would find itself sandwiched between two of the largest casinos in California. *The resulting impacts would forever change this community for the worse with massive traffic jams; increased crime and pollution; severe water shortages in an already*

water-scarce region; wastewater disposal problems impacting the nearby Petaluma River; and impaired fire protection and law enforcement services, among the more obvious.

Around the same time the Dry Creek Pomo tribe was testing the political backbone of local officials, which included Petaluma Mayor Pam Torliatt and south county Supervisor Mike Kerns, the finishing touches were being put on an environmental impact report for the Graton Rancheria's colossal casino development in Rohnert Park. *Among the stated impacts: significant traffic congestion, air pollution and crime in nearby communities, including Petaluma.*

Left unclear in the report was how to address the housing needs of an estimated 2,400 low-wage, full-time casino employees. Since Petaluma is a mere eight-minute drive to Rohnert Park, you can be sure that many of these folks will be housed in Petaluma, thus soaking up every drop of this community's limited affordable housing supply.

In case there was any doubt in the minds of Dry Creek Pomo tribal leaders about how city and county officials feel about a casino in Petaluma, Torliatt and Kerns made it clear that they do not support it, residents oppose it and they will vehemently fight any efforts to build such a facility here.

That fight includes proposed federal legislation that would crack down on so-called "reservation shopping," which is exactly what the Dry Creek Pomos are doing. The bill would roll back the deadline for Indian gaming applications to March 29, 2006 — two weeks before the Dry Creek Pomos filed their application to have the Petaluma land taken into federal trust. Unfortunately, the measure has stalled in the Senate where as many as a dozen senators have placed a hold on it — presumably under pressure from lobbyists with the powerful Indian gaming industry.

At this point, efforts to prevent the Dry Creek Pomos from building a casino in Petaluma are virtually a battle to preserve the community of Petaluma as we know it. Rohnert Park has a well-organized community group battling the casino in that community, but Petaluma has no similar organization.

Given the intensity of the Dry Creek Pomos' efforts to stick a casino in Petaluma, it may be time for Petalumans concerned about such a development to consider organizing beyond the relatively passive political efforts undertaken to date.

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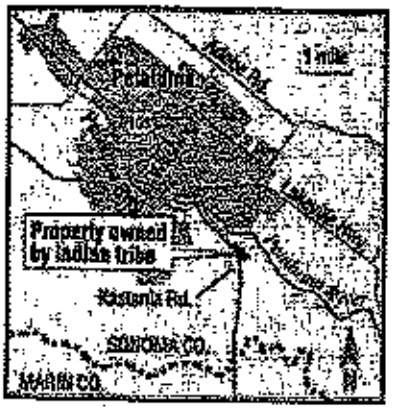
Tribe seeks to develop Petaluma land

Leaders of Pomo tribe meet with local officials to discuss future of 277-acre site of possible casino project

Published: Wednesday, Mar 7, 2007

By COREY YOUNG
ARGUS-COURIER STAFF

Meeting face to face for the first time since Petalumans voted their displeasure at the thought of a casino south of town, elected officials and leaders of the Dry Creek Band of Pomo Indians sat down at City Hall in February to talk about what might be built at the tribe's 277-acre south county property.



Petaluma Mayor Pamela Torliatt, who attended the meeting with Supervisor Mike Kerns, City Manager Mike Bierman and other city and county staff, described the discussion as a "meet and greet" initiated by the tribe to begin talking about the future use of the land.

"They just wanted to meet us — their neighbors — and see what the potential opportunities are," said Torliatt, who announced that she had attended the meeting during the Feb. 26 City Council session.

The tribe has no development plans at this point, a spokesman said, and Kerns and Torliatt said new tribal chairman Harvey Hopkins repeated the tribe's assertion that it does not plan to construct a casino on the site.

"It was kind of a cordial, get-acquainted opportunity to meet government-to-government," tribal spokesman Dave Hyams said. "This was a very preliminary discussion."

Kerns said county staff described the current state of the land — stretching between Highway 101 and the Petaluma River east of Kastania Road — and what uses would be allowed under the two zoning designations for the site.

Most of the land is zoned for agriculture, but about 25 acres in the central portion of the site is slated for "limited commercial" use, Kerns said.

Under county regulations, permitted uses for "limited commercial" include offices, restaurants, gas stations, car dealerships and a variety of other businesses.

Though the tribe — which currently operates River Rock Casino in Geyserville — doesn't have a specific development in mind, Hopkins said that the Pomos wanted whatever they might build there to have community support.

"One of the things they're looking for is housing for the tribe, as well as trying to increase their revenues," Torliatt said.

"I really don't think they know at this point what they want to do there," Kerns said. "They're trying to determine what kind of a project would be economically feasible and generate some revenue."

Tribal leaders brought along some "very rough schematics" of a hotel and golf course that had been prepared in past years but said those ideas hadn't gotten off the drawing boards, Kerns said.

Torliatt said the tribe also inquired as to whether the city would extend water and sewer service to the property, which is outside of the urban growth boundary.

She told tribal leaders "it is heavily frowned upon in this community to provide those services outside of the urban growth boundary."

As to possible development on the site, "more than the majority is in agriculture and I think this community would like to see it remain that way," she said.

She asked the tribe to consider holding community meetings to hear public comment if any development

moves forward.

"I think our community would be very interested in commenting and being part of that process," she said.

Though the tribe says it isn't planning a casino, last year it applied for the federal government to grant "trust" status to the land, which is a first step in planning future development — and which critics said opens the door to a possible casino if approved.

In November, Petaluma voters passed Measure H — urging city leaders to take "all lawful steps" to oppose a casino on the site — with 80 percent approval.

Torliatt said she told the tribe of the anti-casino vote and informed it that a letter highlighting the results would be sent to Gov. Arnold Schwarz-enegger, who must approve gaming compacts with tribes.

Kerns said Petaluma's opposition to a casino was "made very clear" at the meeting.

"We all said we don't want a casino there," he said.

"I was very upfront with Harvey (Hopkins). I said, 'I know that if a casino gets up and running in Rohnert Park, there's going to be tremendous pressure from your tribal members to open a casino on this site — and that's what we fear.'"

Kerns said he was encouraged by the tribe's willingness to talk with local leaders about the future use of the site.

(Contact Corey Young at corey.young@arguscourier.com)

CASINO IMPACTS AREN'T JUST ENVIRONMENTAL

Published on March 12, 2007
The Press Democrat

BYLINE: CHRIS COURSEY

For the most part, the draft environmental report for the proposed Indian **casino** in Rohnert Park is a good cure for insomnia. But there are a few eye-opening paragraphs buried in the thing.

First, of course, is its sheer size. The Federated Indians of Graton Rancheria and their Las Vegas partners, Station **Casinos**, propose a **casino**-hotel-spa complex of more than three-quarters of a million square feet that will employ 2,400 people. It will cost $450 million to build and will rake in an estimated $500 million in annual receipts.

Significant **impacts**? Let me count the ways: Air, water, traffic, plants and animals, police and fire services.

Not to mention turning central Sonoma County into the Bay Area's gambling hub. How do you measure the **impact** of that?

In its dry, bureaucratic language, the report assesses each of the meas- urable **impacts** and either dismisses them as less than significant or lists mitigation measures meant to ease their pain. For example, **casino** operators will keep down the dust during construction, keep down the noise during operation and police the grounds to ensure litter doesn't migrate off the property.

But how will they mitigate the estimated 18,000 daily vehicle trips in and out of the **casino**, most of which will wind up on Highway 101?

Well, 101 can handle it, the report says -- or at least 101 will be able to handle it with the millions of dollars in freeway work expected over the next several years. As for the busy intersections of northern Rohnert Park and the country roads in the vicinity of the proposed **casino**, the Graton tribe says it will pay to improve them (or at least help local governments pay for the job).

It all sounds tidy and simple -- until you start thinking about all that isn't included in this voluminous report.

How, for example, will a Rohnert Park **casino** affect the county's only existing tribal gambling hall -- River Rock **Casino** in Alexander Valley? That question became important to citizens of Petaluma last week when they learned that the Dry Creek Band of Pomo Indians, which operates River Rock, has asked city and county leaders to extend sewer and water services to 277 acres that tribe owns south of Petaluma.

The general suspicion is that if the Graton tribe can open a **casino** in Rohnert Park, then the Dry Creek tribe might decide to ``leapfrog" their competition with a Petaluma **casino**.

Leaders of the Dry Creek Band told Mayor Pamela Torliatt and county Supervisor Mike Kerns that they don't plan to build a **casino** on that land, according to a story about the meeting in the Petaluma Argus Courier. But the tribe also at one point said it wasn't building a parking garage at River Rock, and now that seven-story structure can be seen from miles away.

Torliatt and Kerns said they told the tribe that municipal services are unlikely to be extended beyond Petaluma's urban boundaries, the newspaper said. They also reminded tribal leaders that Petaluma voters have made their opposition to a **casino** loud and clear at the polls.

But the Dry Creek Pomos have shown time and again they aren't swayed by public opposition, and the Graton tribe indicates in its environ- mental report that it doesn't need municipal services for a megacasino outside of Rohnert Park. The tribe will drill wells for its water and will build an on-site plant to treat its sewage, if necessary.

These are sovereign governments, after all, and they're backed up by multibillion-dollar gambling corpor- ations. They don't need Petaluma's permission -- or Rohnert Park's, or Sonoma County's -- for anything.

They do, however, need clearance from the federal government. The National Indian Gaming Commission will hold hearings on the Graton tribe's environmental report on April 4 and 5. The report is at www.gratoneis.com.

Contact Chris Coursey at 521-5223 or chris.coursey@pressdemocrat.com.

PETALUMA VOTERS URGED TO OPPOSE CASINO: OFFICIALS, ACTIVISTS SAY MEASURE H APPROVAL WOULD SEND STRONG MESSAGE

Published on November 4, 2006

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BYLINE: JOSE L. SANCHEZ Jr. THE PRESS DEMOCRAT PAGE: B3

Elected officials and activists who suspect an Indian tribe is planning a **casino** south of Petaluma gathered one last time before Tuesday's election to urge voters to adopt an anti-**casino** advisory measure. ``I'm lined up to ask the voters to do the right thing,'' Mayor David Glass said. ``A yes vote means you do not want the **casino**.''

Glass joined others at a news conference Thursday at the Petaluma Sheraton hotel.

Measure H would authorize the city of Petaluma to ``take all lawful steps'' to oppose a **casino** on land purchased last year by the Dry Creek Rancheria Band of **Pomo** Indians, which operates River Rock **Casino**

The tribe has applied to the federal government to take the 227 acres near Highway 101 south of Petaluma into trust for purposes of gambling. near Geyserville.

The prospects of the tribe's gaining the necessary approvals for a second **casino** are uncertain, and a spokesman said the tribe's current plans for the property are agricultural.

The tribe is willing to talk with the community and elected officials about any potential use of the property and paying for infrastructure, law enforcement and other services made necessary by any project, said Dave Hyams, the tribe's spokesman.

This year, he said, the Dry Creek tribe gave grants totaling $450,000 to police, fire and hospital districts near the River Rock **Casino**, which employs 600 people. Petaluma Councilman Mike Healy, who proposed Measure H and is running for mayor, said he expects it to pass overwhelmingly.

``This will send a very strong message that the community does not want a **casino** on its edge,'' he said. Pamela Torliatt, the other mayoral candidate, also supports the measure.

Chip Worthington, a Rohnert Park minister who has led opposition to a **casino** proposed in his city by the **Graton** Rancheria tribe, said approval of Measure H would send a ``clear message to the governor not to even begin discussions for a compact.''

Last year, Gov. Arnold Schwarzenegger issued a proclamation saying he would approve compacts for **casinos** on land acquired for gambling only if ``the tribe and the local jurisdiction demonstrate that the affected local community supports the project, such as by a local advisory vote.''

You can reach Staff Writer Jose L. Sanchez Jr. at 762-7297 or jsanchez@pressdemocrat.com.

CASINO MEASURE WILL GIVE CITY LEVERAGE

Published on September 29, 2006

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PAGE: P2

Other communities have learned the limits of their ability to resist American Indian tribes that want to build and operate **casinos**. In Alexander Valley, the Dry Creek Rancheria Band of **Pomo** Indians ignored local opposition and now operates the River Rock **Casino**.

In Rohnert Park, the **Graton** Rancheria tribe, disregarding neighbors' protests, is pursuing plans to build its own Las Vegas-style **casino** and resort.

Now, the Dry Creek tribe has purchased 277 acres of land between the Petaluma River and Highway 101 on the city's south side -- and the tribe has applied for trust status that would permit construction of a resort, hotel and **casino**.

In Petaluma, Measure H on the Nov. 7 ballot is the City Council's response. The advisory measure asks city voters to decide if the city should mount a campaign in opposition.

In stopping a **casino** But the measure does make clear to state and federal officials that Petalumans don't like the idea. proposal, the measure does not have the force of law. The sovereignty of Indian tribes limits the authority of local government.

Such a declaration could influence a decision to permit the **casino** -- or it could give the city leverage to influence the size and design of the project. The current mayor, David Glass, and the two candidates for mayor, Mike Healy and Pam Torliatt, all support Measure H. In the ballot argument, they say: ``This ballot measure is your chance to tell local, state and federal officials that you want them to fight against this **casino**.''

Judging by the results of past opinion surveys -- which showed overwhelming opposition to **casino** projects -- Petaluma voters will approve Measure H.

Passage of the measure won't guarantee that Petaluma still won't have to deal with the traffic congestion and other environmental impacts associated with a major development.

But it would position the city to argue that when it comes to a **casino** project, public opinion is clear and unequivocal. The Press Democrat recommends a yes vote on Measure H.

LAWMAKERS SHOULD CALCULATE THE REAL COSTS OF GAMBLING

Published on January 29, 2007
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BYLINE: MARILEE MONTGOMERY

COLUMN: CLOSE TO HOME

In 2006, Gov. Arnold Schwarzenegger negotiated new gambling compacts that would add between 3,000 and 5,500 new slot machines each for five Southern California tribes: The Agua Caliente Band of Cahuilla Indians, the San Manuel Band of Mission Indians, the Pechanga Band of Luiseno Indians, the Morongo Band of Mission Indians and the Sycuan Band of the Kumeyaay Nation.

According to a recent news article, these compacts, which have not yet been ratified by the state Legislature, are expected to generate $509 million annually for the state. In reality, the increase in **casino** gambling would result in a net loss for California that would most likely be in the billions of dollars.

Earl Grinols is a professor of economics at the University of Illinois at Urbana-Champaign and a former senior economic adviser to President Ronald Reagan. He is considered to be a worldwide expert in the economics of gambling. In his book, ``Gambling in America: Costs and Benefits," Grinols examines the economic **impact** of **casino** gambling.

He concluded that **casino** gambling causes up to $289 in social costs for every $46 of economic benefit. If one considers only the $509 million in anticipated revenue for the state, the cost for these new gambling compacts could be in excess of $3 billion.

The social costs of gambling such as increased crime including embezzlement, domestic violence, lost work time, suicide, bankruptcies and financial hardships faced by the families of gambling addicts, and increased cost in the criminal justice system have already reached epidemic proportions.Experts have determined that most of the social costs associated with gambling are the result of problem and pathological gamblers.

Grinols concluded that nationwide, the costs from gambling addiction are now the equivalent of one-half of the total cost of drug addiction in this country.

According to former California Attorney General Bill Lockyer's May 31, 2006, report, ``Gambling in the Golden State 1998 Forward," there are now almost one million problem and pathological gamblers in the state.

This report puts the current annual cost of adult pathological and problem gamblers to the state at nearly $1 billion. The huge increase in **casino** expansion as would be allowed by the governor's 2006 compacts would only exacerbate the problem.

Furthermore, as indicated in the attorney general's report, tribal **casinos** are ``the predominant venue for problem gamblers in California." California's problem and pathological gamblers generate over 80 percent of tribal **casino** gambling revenue.

In real numbers, this means that more than $404 million of the anticipated $506 million increase in revenue would be made on the backs of some of the most unfortunate members of our society -- the gambling addicts.

Aside from the suffering of the families of those addicted to gambling, these sobering figures only underscores the need for a thorough analysis of the costs and benefits of new compacts before they are ratified. Anything else would be reckless, having the potential to destroy the lives of hundreds of thousands of Californians, including innocent children.

In North America, we are in a period of widespread gambling expansion. The costs to society have already begun to make themselves known. In Canada, gambling debt-related suicides are rising sharply, as are missed work and lower productivity from Canadian employees. Here in America, gambling debt is on the rise as a cause of bankruptcy, and gambling addiction is up by double-digits among our youth.

Three and a half years ago, I did a Yahoo search for "anti-**casino** organizations" that produced virtually no results. Today that same search produces thousands of results from all over the country.

Casino expansion is being driven only by special interests. There is no groundswell movement to expand gambling in this country, but there is certainly a growing groundswell movement to end gambling expansion. We can only hope that Sacramento will listen and lead.

Marilee Montgomery is a Santa Rosa resident and a founding member of Stop the **Casino** 101 Coalition, a group founded in 2003 to combat the proposed **Rohnert Park casino**.

Friends of Lafferty Park

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707-778-0629

March 15, 2007

RECEIVED
MAR 19 2007
GP Administration

Director, Pamela Tuft, AICP
27 Howard St.
Petaluma, CA 94952

Subject: Comment for the Public Record on the General Plan and DEIR

90

Dear Ms. Tuft:

Friends of Lafferty Park would like to propose a few changes to Petaluma's General Plan 2025 and its associated Draft Environmental Impact Report. The purpose of these changes is not to propose new city policy with respect to Lafferty Ranch, but merely to bring the General Plan in line with current city policy, and to restore Lafferty to the Petaluma's Plan where omitted.

Lafferty is mentioned several times in the Recreation, Music, Parks, and the Arts section of the Draft General Plan 2025 as a proposed (County) Regional Park site. Friends of Lafferty Park does not oppose the idea of Lafferty as a Regional Park, but current city policies allows for a broader range of possible outcomes that should be reflected, we believe, in the Plan.

Current City policy with respect to Lafferty Ranch is encapsulated in Ordinance 2022, passed by the City Council in 1996. Ordinance 2022 specifies that, "Lafferty Ranch shall be made available for passive recreational use by the public...pursuant to a public use management plan to be prepared and implemented by the City...based on best management practices for public open space and recreational lands in the San Francisco Bay Area." This Lafferty Ranch Management Plan was completed by Petaluma in the 1997, and formed the basis of the Lafferty Ranch EIR certified by the City Council on October 16, 2001.

All these policy documents are (deliberately) ambiguous as to whether Lafferty Park would ultimately by administered by the City, County, or State. On the one hand, the current, 1989, county General Plan calls for Lafferty to become a Regional Park, as did earlier county park planning documents dating from 1964. But it is also the case that many Lafferty Park supporters have assumed since the 1990s that Lafferty would eventually be a park administered by the city, and the above policy documents allow for that possibility, as well.

The current passages in the Draft GP referring to Lafferty group it with Tolay as two proposed Regional Parks supported by the city. This is strangely passive wording for a property owned by the City, as Lafferty is, and with clear City policy on the books as to its future disposition.

We recommend the following specific changes to the General Plan 2025:

1 Give Lafferty its own paragraph on page 6-8 as follows:

> "While located at the east edge of the Planning Referral Area, Lafferty Ranch is a City-owned facility that will provide access to hiking trails on Sonoma Mountain for the greater Sonoma County area, once development of minimal facilities is achieved to allow public access, as called for by City policies, reiterated in this plan."

2. Table 6.1-5 should have a footnote next to Lafferty: The proposed park might be administered by the City, County, or State. For purposes of estimating acreage totals, County Regional Park is assumed.

3. Policy 6-P-13 needs to treat Lafferty and Tolay separately, as their status and process are completely different. We'll leave any Tolay wording up to you, but the Lafferty policy should be as follows, in order to agree with current City policy:

> **6-P-13 Open Lafferty Ranch to the public as an open space park for the residents of Petaluma and southern Sonoma County, working in conjunction with county and state agencies as appropriate.**

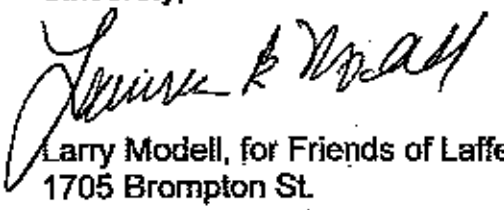
4. The Parks and Open Space map, 6-1, really must make reference to Lafferty, even if only in a text box or footnote (given that Lafferty is outside the area depicted).

5. In the DEIR, there are similar references to Lafferty as a proposed (County) Regional Park, specifically, on pages E-17, table ES-5, 3.3-12, 3.3-14, and 5-9. These should be aligned with the change to 6-P-13 suggested above. A

6. The DEIR also has a map, Figure 3.3-1 that excludes Lafferty. See point #4, above. B

7. It should be noted in the EIR, probably in Chapter 3, that the environmental impacts of Lafferty Park itself have been exhaustively studied, documented, and certified by the City of Petaluma in the Lafferty Ranch EIR of October, 2001, and thus no further impact analysis is required either in this document or any separate document. C

Sincerely,



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cc: Friends of Lafferty Park email list and website

PETALUMA TOMORROW

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March 16, 2007

RECEIVED

MAR 19 2007

GP Administration

Director, Pamela Tuft, AICP
27 Howard St,
Petaluma, CA 94952

Subject: Comment for the Public Record on the General Plan and DEIR

91

Dear Ms. Tuft:

Our general plan has a twenty-year planning horizon, but the built infrastructure resulting from it should last a century or more beyond that. As such, we need to approach it as a truly long-range plan.

Petaluma Tomorrow is concerned that the Draft General Plan, as written, is based the unstated assumption that key "macro" external factors will remain unchanged over this long-term planning horizon. We believe the plan must, at a minimum, surface and document this assumption. Ideally, it will go beyond that and include contingency planning, should certain key factors change in ways that are looking increasingly likely.

A

The macro external factors I refer to are related to global climate change and fossil fuel scarcity. In modest but commendable ways, the Draft General Plan does suggest a few steps to minimize our city's impacts on global climate change. Petaluma Tomorrow supports these efforts, and would support much stronger ones as well. But our concern in this letter is for the predictable effects of the twin global crises, not so much the cause. In addition to minimizing our contribution to the problem (quite tiny, in the global scheme of things), prudence demands that we prepare for the most predictable effects, at least, of climate change and energy scarcity on our city and watershed.

B

Macro Factor #1: Sea level rise

While the science is now overwhelming that the earth's atmosphere and oceans are warming at an alarming rate, it can be difficult to predict the impacts on any given geographical region. Will the Petaluma area receive more or less rainfall in the future? I don't know that anyone is making such predictions with any degree of confidence at this time.

However, some local impacts can reliably be predicted. Overall global warming will result in worldwide sea level rise, likely measured in feet (as opposed to a

few millimeters or inches) in coming decades. As a city with considerable land at or near sea level, we cannot ignore this prediction.

I'll offer two citations documenting the mainstreaming of recent predictions of significant sea level rise. One is the Argus-Courier article of February 19, 2007, appended below, entitled, "Sea Level Will Rise In Petaluma, Too." The prediction cited there, from the Bay Conservation and Development Commission, is for a three foot rise within a century.

The other citation is among the most mainstream of publications, Sports Illustrated. SI's March 12, 2007 issue features an attention-grabbing (photoshopped) cover image of a Florida Marlins baseball player hip deep in sea water in their drowned stadium. The article also predicts a one-meter sea level rise by 2100, based on data from the Natural Resources Defense Council (NRDC), with disastrous ramifications for many built and proposed professional sports facilities in the San Francisco Bay Area and in Florida.

If the Argus and Sports Illustrated are reporting on dramatic sea level rise, it is not a secret anymore, and our general plan needs to address it.

At a bare minimum, the plan should include an "Assumptions" section in the introduction, surfacing the plan's now problematic assumption that sea level will not change significantly during its planning horizon, or during the projected lifespan of buildings and infrastructure built under the plan.

Far preferable would be some level of contingency planning. I'm not an expert in the hydrology, but it seems to me any sea level rise of more than one or two feet within the next century or so would dramatically change how we develop the town, particularly when combined with the increasing severe storm events that are also widely predicted. Not only would any building on existing mapped floodplain become (even more) irresponsible, but many areas not currently considered flood prone would have to become off limits for building. In addition, I would think we would have to begin a systematic retreat from low elevation areas that are already built upon.

Macro Factor #2: Energy scarcity

B

Following sea level rise, the next in the order of high percentage predictions is that the scarcity and relative cost of energy will increase significantly in coming years and decades.

Energy scarcity will come about in one of two ways, not mutually exclusive. The first scenario is fossil fuel depletion. A great many experts are now saying that the world is at or very close to the point where it has burned half its usable oil and natural gas. What remains will be increasingly hard to extract, located in politically unstable parts of the world, and expensive. For an excellent synopsis of the peak oil argument and its ramifications for a western U.S. city, see the report just adopted by the City of Portland,

OR, entitled "Descending the Oil Peak: Navigation the Transition from Oil and Natural Gas" (http://www.portlandonline.com/shared/cfm/image.cfm?id=145732).

The other road to energy scarcity is through severe restrictions on fossil fuel usage, perhaps through steep carbon taxes, in an effort to curb greenhouse gas emissions, as the effects of global warming become increasingly obvious and dire.

What about replacing oil and gas with energy from other sources, such as renewables, "clean coal" with carbon sequestration, or even nuclear? The is a complex question, but there is certainly no expert consensus that any other source can provide anything like the level of cheap energy oil and gas have provided for the past century. For extensive expert discussion of this question, refer to www.theoildrum.com

Here too, the prudent approach for our General Plan is to surface and document assumptions, and to include contingency planning should those assumptions prove wrong.

What would need to change in Petaluma if gasoline prices rise to, say, $10/gallon (in constant dollars), due to either oil scarcity or carbon taxation? Off the top of my head, I think traffic congestion would no longer be one of our top concerns. Instead, it would be replaced by the need for mobility options, and goods and services delivery, that did not require the use of private automobiles.

In sum, we are asking for a few changes in the General Plan that could keep it from becoming an irrelevant dead letter within a few short years, due to readily predictable, and amply documented, macro changes. Document major assumptions, and include a bit of contingency planning should the assumptions change. Let's not be remembered as the planners of a new Atlantis.

Sincerely,

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Sea level will rise in Petaluma, too

The Petaluma River, roughly at sea level, could rise three feet along with other Bay Area shorelines

Published: Wednesday, Feb 21, 2007

By DANE GOLDEN
ARGUS-COURIER STAFF

A predicted three-foot rise in sea level in the Bay Area during the next century will also affect Petaluma, according to Will Travis, executive director of the Bay Conservation and Development Commission. The group issued the recent report showing similar predicted changes to Bay Area shorelines.

If the prediction is correct, Travis said, "the tide will be three feet higher over there [in Petaluma]."

The Petaluma River is actually a tidal slough situated roughly at sea level, and rises and falls with Bay tides. Travis said that because of this, the river and its adjacent areas would be susceptible to a corresponding rise in sea level in the Bay Area and worldwide. Furthermore, he said, the Petaluma River and the surrounding area would likely flood at a significantly higher level than it does today.

The commission based its statements on last year's Climate Change Report issued by the California Climate Change Center, which said that in the last 100 years, sea levels along California's coast have risen about seven inches.

The report also said "If heat-trapping emissions continue unabated and temperatures rise into the higher warming range, sea level is expected to rise an additional 22 to 35 inches by the end of the century. Elevations of this magnitude would inundate coastal areas with salt water, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats."

And the warnings continue to pile up. The Climate Change Center's estimates are backed up by a report by the U.N. Intergovernmental Panel on Climate Change, which said in its Feb. 2 report that sea levels are expected to rise up 7 to 23 inches worldwide by 2100. And on Sunday in San Francisco, the American Association for the Advancement of Science issued a similar dire warning about climate change.

Additionally, the U.S. Nation-al Climatic Data Center reported a few days ago that last month's average worldwide temperature was the warmest January ever recorded.

Travis pointed out that the California Climate Change Center study said that areas that are currently considered 100-year floodplain (meaning they have a 1 percent chance each year of flooding) will be more accurately considered a 10-year floodplain (meaning a 10 percent chance of flooding in any given year).

Petaluma is no stranger to flooding, the most recent major incident being the Dec. 31, 2005 storms, which caused millions of dollars in damage.

The areas that flooded in the storm a year ago, and those of similar elevation nearby would have a much greater likelihood of having more significant flood damage. Additionally, any area between one and three feet above the Petaluma River would be expected to be permanently under water by 2100.

That, of course, would be unless other action is not taken. The Petaluma River already has some levees south of town, and more could potentially be built as water rises.

Petaluma's draft 2025 General Plan calls for the creation of a "river corridor" of open space and widened banks north of the Payran flood control project, both for public riverside access and increased flood capacity in the rivel channel.

And then there are local steps being taken to help prevent further worsening climate change.

Sonoma County has taken steps to fight the greenhouse gases that cause global warming. In 2005, all nine cities and the county committed to reducing greenhouse gas emissions 25 percent below 1990 levels by 2015.

And Petaluma is currently under a yearlong building moratorium that prevents building in the 100-year floodplain north of Payran.

David Yearsley, executive director of Friends of the Petaluma River and a man who probably knows the Petaluma River as well as anyone, said that such a rise in sea level would "have potential negative influence for all the good work we've done trying to restore the wetlands."

He said that several areas would be significantly impacted, including Haystack Landing, the McNear Channel and the property owned by the Dry Creek band of Pomo Indians adjacent to the river south of town, an area that some believe might one day have a casino.

"The Pomo lands are definitely going under," Yearsley said. "They would be captured by wetlands."

He said another area at risk would be the Redwood Landfill, unless levees are built or other action is taken.

"It would create an island of trash out in the Petaluma marsh," Yearsley said. "It would be hard to contain those toxins."

As far as the depletion of wetland species, he said that would depend on the rate of change in their habitat, but he particularly worries about the California Clapper Rail, an endangered species which has been making a remarkable recovery of late.

"Birds that feed on or near the wetlands would lose their habitat," including the Clapper Rail, he said.

The bay commission's Travis is encouraged by the attention his agency's report has received. With the recent increase in discussions about the effects of global warming, people are seriously considering which actions to take to plan for the future, he said.

And, he said, as opposed to earthquakes, which are unpredictable, "Climate change is one of those things that we can do something about."

(Contact Dane Golden at dane.golden@arguscourier.com)

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Terry Hankins
A predicted three-foot rise in the sea level would also affect Petaluma. The Petaluma River Turning Basin is shown here.
Zoom Photo

RESOURCES

San Francisco Bay Conservation and Development Commission: www.bcdc.ca.gov

American Association for the Advancement of Science: www.aaas.org

Intergovernmental Panel on Climate Change: www.ipcc.ch

California Climate Change Center: www.climatechange.ca.gov

Climate Protection Campaign: www.climateprotectioncampaign.org

U.S. National Climatic Data Center: www.ncdc.noaa.gov

RECEIVED

MAR 19 2007

GP Administration

Geoffrey H. Cartwright
56 Rocca Drive
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(707) 763 2883

General Plan Administration
City Of Petaluma
27 Howard Street
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March 18, 2007

Dear Ms. Tuft,

Please have the consultants address the following concerns pertaining to the PETALUMA GENERAL PLAN 2025 DRAFT ENVIRONMENTAL IMPACT REPORT (SECTION 3.6 HYDROLOGY AND WATER QUALITY). 92

I know that your office has been made aware of the San Francisco Bay Conservation and Development Commissions recent release of information pertaining to the Intergovernmental Panel on Climate Change and the 2006 California Climate Action Team Report. The information reported shows a seven inch rise of the sea level in the San Francisco Bay over the past 150 years and further indicates a twelve (12) to thirty six (36) inch rise in mean sea level over the next one hundred (100) years.

Being aware that the scope of the new General Plan only covers the next twenty (20) years it is possible that the consultants for the Petaluma General Plan 2025 may at first glance consider such projections pertaining to the next one hundred (100) years as outside of the scope of the new General Plan. Therefore I believe it is necessary to point out that provided there is no increase in the rate of the mean sea level rise and one follows the predictions as reported by the San Francisco Bay Conservation and Development Commission (BCDC) It is safe to assume, over the next twenty (20) years we will most likely see an increase in the mean sea level between two point four (2.4) and seven point two (7.2) inches.

It is stated in the (BCDC) report pertaining to sea level rise and I quote "Sea level rise models indicate that a 30 cm (11.8 inch) rise in sea level would shift the 100-year storm surge-induced flood event to once every 10 years. With each flood event, the Bay Area stands to lose valuable real estate, critical public infrastructure, and natural resources."

Considering the Petaluma River, the altitude of much of Petaluma relative to sea level, the flood plain and the already severe flooding that Petaluma has experienced I believe any rise in sea level over the next twenty (20) years approaching between 2.4 and 7.2 inches would be significant. It is my firm desire to see these issues thorough addressed in the Petaluma General Plan and Draft EIR.

Sincerely,
Geoffrey H. Cartwright

From: Geoffrey Cartwright [ghcart@yahoo.com]
Sent: Sunday, March 18, 2007 10:47 PM
To: General Plan Administration
Subject: General Plan & Sea Rise
Attachments: 2139335701-Sea Rise General Plan.doc

Dear Pamela Tuft,

How are you this morning? I hope this finds you well. Please see attachment, thank you.

Geoff

We won't tell. Get more on shows you hate to love
(and love to hate): Yahoo! TV's Guilty Pleasures list.

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SONOMA COUNTY
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT
2550 Ventura Avenue, Santa Rosa, CA 95403-2829
(707) 565-1900 Fax (707) 565-3767

March 19, 2007

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City of Petaluma
General Plan Administration
27 Howard Street
Petaluma, CA 94952

Att: Pamela Tuft, Director
Re: Comments on Draft General Plan 2025 and General Plan 2025 DEIR 93

Dear Ms. Tuft:

Thank you for this opportunity to comment on General Plan 2025 and the General Plan 2025 DEIR. The comments which follow focus on potential impacts and policy issues with regard to traffic, flooding and drainage, and groundwater protection. Please note these comments replace earlier comments dated March 14, 2007.

Traffic:

The Draft General Plan 2025 DEIR does not adequately address the traffic impacts on the County road network that will result from General Plan 2025 goals, objectives and policies. A

First, the Petaluma GP 2025 DEIR assumes that level of service standards established by the Sonoma County General Plan are not relevant because Sonoma County did not participate in an update of the 1995 Sonoma County Transportation Authority Congestion Management Plan. Sonoma County General Plan Policy CT-2a and Figures CT-2c and CT-2d establish level of service standards for the County road network. The Petaluma GP 2025 DEIR should use these standards when determining whether or not LOS standards are currently being met, and if future development under General Plan 2025 will meet these standards for traffic in the unincorporated County. In addition, even if the County LOS standards are already being met, the future City development will increase traffic in the unincorporated area. This impact should be identified and addressed through appropriate mitigation.

Secondly, the Petaluma GP 2025 DEIR assumes that Sonoma County's GP 2020 DEIR traffic analysis adequately considered impacts created by implementation of Petaluma GP 2025 policies and that additional study is not required. While the Sonoma County GP 2020 DEIR considered regional impacts resulting from existing General Plan policies of the County and all nine Cities, it does not consider the distinct impacts from each jurisdiction. The GP2020 DEIR specifically warns that "Without additional study, it is not possible to determine the extent to which the future congestion of city and county roadways would be the result of future land use and development within one jurisdiction or another". Additional studies are needed to assist in determining Petaluma's contribution to regional congestion, and policies should be added to GP 2025 that mitigate this impact through fair share funding by future development within the City. B

Fair Share Funding of Regional Transportation Improvements:
Implementation of policies in the Economic Health and Sustainability Element will strengthen the retail sector in Petaluma, encourage mixed-use development, and promote Petaluma's economic vitality. However, despite an assumed balance between jobs and housing in Petaluma, development within Petaluma will result in additional peak hour traffic since workers and residents will continue to travel into and out of the City and the surrounding area. The 2000 Census Transportation Planning Package shows 27,509 working residents and 28,430 jobs in Petaluma during 2000. Of these 28,430 jobs, 10,400 jobs were held by residents, and 18,030 held by in-commuters, with the remaining 17,109 residents traveling outside Petaluma for employment. This results in almost 13 commuters for every 10 employed residents, creating a significant burden on the County road system. Sonoma County General Plan Policies CT-1c and CT-1e recognize the need for development of regional revenue sharing agreements to ensure that development within the Cities pays its fair share toward mitigating traffic impacts in the unincorporated portion of the County. Therefore, GP 2025 should include goals, objectives, and policies that commit the City to require that future development contribute its fair share of regional improvements to the County transportation system. C

The following changes to Policy 5-P-12 are suggested to help develop and implement fair share funding of regional transportation improvements:

> Cooperate with local jurisdictions, County, State and Federal agencies toward identifying and implementing regional improvements to the network.
>
> A. Work with CalTrans and the Sonoma County Transportation Authority(SCTA) to achieve timely implementation of programmed freeway and interchange improvements.
>
> **B. Designate SCTA as the agency with the overall responsibility for regional circulation and transit coordination between the City and County.**
>
> **C. Work with the County and SCTA to develop and adopt regional/subregional fees and/or require a fair share contribution toward major subregional highway and/or transit improvements required to accommodate transportation demand created by new development in the City.**
>
> ~~B. Consider participating through a proportionate fair share, as deemed appropriate and feasible by the City, in mobility network improvements transitioning into and out of the City~~.

Road Diets: D
Figure CT-6h of the Sonoma County General Plan shows capacity improvements on Stony Point Road, Lakeville Road, and Old Redwood Highway, which are identified as primary arterials. Petaluma GP 2025 calls for capacity reduction on Ely Boulevard, McDowell Boulevard, and Petaluma Boulevard. We support capacity reductions that help "calm" city traffic as long as east-west routes such as Frates, Ely, Washington, McDowell are improved and made available to accommodate future cross town traffic. In addition, the City should include policies to work with the County to assure that efficient traffic flow is maintained between arterials and reduced capacity roadways.

Bicycle Circulation:
Policy 5-P-38 should be expanded to encourage coordination between the Petaluma Bicycle Advisory Committee and the SCTA Bicycle and Pedestrian Advisory Committee. Additionally, Policy 5-P-36 should require that updates to the Petaluma Bicycle Plan are coordinated with the SCTA Countywide Bicycle Plan. E

Flooding and Drainage:

The Petaluma GP 2025 should clarify its surface water management policies regarding how the City intends to work with the County and other responsible agencies to reduce flooding in the City. F

Policies 8-P-29, 8-P-30, 8-P-32, and 8-P-34 are proposed as mitigation for impacts to existing drainage patterns resulting from Petaluma GP 2025 buildout. These policies call for additional land use restrictions in unincorporated areas upstream from Petaluma in order to protect downstream development from flooding within the City. Restrictions include increased setbacks from creeks, removal of existing housing in flood-prone areas, limiting improvements to county maintained bridges and culverts, limits on restoration of channel capacity, and preserving land in the unincorporated county for detention basins. The DEIR does not analyze impacts to public safety, natural resources, road maintenance, and housing in unincorporated areas created by implementation of these policies.

The following changes are recommended to 8-P-29, 8-P-30, and 8-P-34 to be consistent with flood hazard policies in the Public Safety Element of the County's Draft GP 2020 (Policies PS-2a -PS-2v):

> Policy 8-P-29/30/34:
> "**The City of Petaluma,** ~~working with~~ SWCA, **Sonoma County**, and **other responsible agencies** ~~the Sonoma County Board of Supervisors, the City~~ shall **be encouraged to work together in order to create and adopt a flood management plan for the Petaluma River watershed** implementing **the following** regional surface water solutions: ~~identify the necessary~~
>
> ~~A. Setbacks for the Willowbrook, Marin, and Liberty Creek corridors within the Petaluma Planning Referral Area to include~~
>
> **A. Establish** a Creek Corridor **setback** ~~aside~~ for the design and construction of a flood terrace system ~~to~~ allowing ~~the Creeks~~ **Willowbrook, Marin, and Liberty Creeks** to accommodate a 100 year storm event within **the a** modified creek channel.
>
> **B.** Within a 200' setback from centerline of the River and **Willowbrook, Marin, and Liberty** ~~creeks referenced in Policies 8-P-28 and 2-P-29, stated above,~~ **the City of Petaluma shall work with Sonoma County to create interim development standards for** ~~no development shall be permitted on~~ lands within that 400' wide corridor until such time as the study is concluded and approved by **Sonoma County,** ~~the~~ SCWA, ~~and~~ City of Petaluma **and other responsible agencies.** Thereafter all lands affected shall set aside the necessary river and/or creek corridor areas and, as development occurs, shall undertake the identified surface water containment enhancement improvements.

C. A. The City will work with the County ~~Working with Sonoma County, the City will continue~~ to ensure that zero net fill policies are enforced within the unincorporated area for areas within ~~encumbered by~~ the regulatory floodplain of the Petaluma River and its tributaries.

D. B. Working with Sonoma County, the City shall develop a plan and identify funding opportunities ~~shall pursue State and Federal funding opportunities~~ to acquire and remove ~~demolish~~ existing structures ~~housing~~ within the regulatory floodway of the Petaluma River and its tributaries. The plan shall be updated as needed to maintain consistency with changes in regulatory mapping of the floodway. ~~, which remains located within the regulatory floodway, once remapping occurs.~~

E. Participate with the County in implementation of the regional components of the Petaluma River Watershed Master Drainage Plan (SCWA, June 2003), Petaluma River Floodplain Management Plan (City of Petaluma, October 2001), Petaluma River Access and Enhancement Plan (City of Petaluma, May 1996), and Sonoma County General Plan 2020 (Public Safety Element)

Policy 8-P-32 appears to be inconsistent with Sonoma County General Plan Policy PS-2m, which assigns responsibility for planning, managing and prioritizing flood hazard mitigation to the Sonoma County Water Agency (SCWA). In order to be consistent with this policy, it is suggested that Policy 8-P-32 be replaced with the following language:

8-P-32 Work with Sonoma County, SCWA, and other responsible agencies to preserve detention basin capacity within the Petaluma River watershed and maintain or reduce peak discharge volumes from Willowbrook, Marin, and Liberty Creeks.

A. The City shall work with the County of Sonoma to establish a zero net fill policy for detention basins within the Petaluma River watershed in order to preserve and enhance basin capacity. ~~prohibit~~ placement of fill materials within those areas identified as having historic storage capacity, which have a detrimental impact on downstream flows, including the increase in peak discharge volumes in the downstream areas.

It is also suggested that a regional map delineating the flood detention basins within the Petaluma River watershed be included as a policy document in GP 2025.

Groundwater Protection:

G

Policy 8-P-20 urges the County to examine the combined impacts of new septic tanks placed in proximity to wells. County Onsite Sewage Disposal Regulations establish septic system setbacks from wells, and it is unclear if Policy 8-P-20 intended to support existing County regulations, or increase restrictions beyond existing County standards. "Proximity to wells" should be replaced with a proscriptive standard specifying the desired setback distance between wells and septic systems in order to clarify this policy.

Thank you for the opportunity to comment on these documents and for your willingness to meet with us regarding these important issues. We also appreciate your willingness to commit to joining with the County and other jurisdictions in addressing these important regional issues. We look forward to working with the City in the development of Petaluma GP 2025. If you have any questions about this letter or County policies, please feel free to call me at 565-8340.

Sincerely,

Gary Helfrich
Planner I

Copies: SCPRMD: Pete Parkinson, Jennifer Barrett, Greg Carr
SCTPW: Dave Knight, John Maitland
SCTA: Suzanne Wilford

F:\Petaluma GP2025 and DEIR\Petaluma Draft General Plan Comments GH_rev3.wpd

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STC101

Stop the Casino 101 Coalition

Representing the People of Marin County & Sonoma County, California

www.stopthecasino101.com

URGENT FAX: PLEASE ROUTE TO RECIPIENT IMMEDIATELY

If you have problems with this fax, please call 707-588-9926

DATE: March 19, 2007

TO: Ms. Pamela Tuft
General Plan Manager, City of Petaluma

FROM: Marilee Montgomery, Press Liaison
Stop the Casino 101 Coalition
Telephone: 707-588-9926
Email: marilee@stopthecasino101.com

re: Petaluma General Plan Update and DEIR

Page One of 7

Attached please find our comments for inclusion in the Petaluma General Plan Update and DEIR.

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STC101

Stop the Casino 101 Coalition

Representing the People of Marin County & Sonoma County, California

www.stopthecasino101.com

March 19, 2007

Pamela Tuft
General Plan Manager
City of Petaluma
27 Howard Street
Petaluma, CA 94952

94

RE: Petaluma General Plan Update and DEIR

Dear Ms. Tuft,

This letter requests that the City of Petaluma incorporate within current General Plan and DEIR activities, an analysis of foreseeable future Class III tribal casinos to be located within close proximity to the City, and sufficient to significantly impact the affected municipality. It is fundamental that planners fully understand that a tribal casino is not just another public facility; it is the arrival of a separate government with rapid land and land use expansion capability, at odds with and not accountable to local or state land use and planning principles.

Listed below are elements of the Petaluma General Plan most likely lacking sufficient tribal casino analysis to fully protect the city's managed growth needs in the coming decade, with associated but cursory comments included:

Land Use, Growth Management and Built Environment. Land use laundering is a phrase circulating among communities and planners struggling with "reservation shopping" and off-reservation casinos, a phrase associated with a basic scheme whereby under tribal federal exemptions from local land use, zoning and other regulatory processes, a massive amount of development takes place without being accommodated and planned for within the framework of the local and state land use planning guidelines and requirements. Petaluma should position itself to verify its ability or inability to cope with the potential of two major public facilities near its built environment that will cumulatively impact the municipality while remaining exempt from any accountability to the City of Petaluma.

A

Community Design, Character and Sustainable Building. The draft General Plan and DEIR must address the impact upon the city's identity, character and sustainable building as a direct result of the proposed casinos of the Federated Indians of the Graton Rancheria (FIGR) and Dry Creek Band of Pomo Indians (DCBP). The potential of Petaluma being wedged between two major tax-exempt gambling facilities will significantly impact the region's identity and character, including an escalating corrosion of the socio-economic strength of its households and citizens.

B

The Natural Environment. The resounding voice of citizens in the recent passage of Measure H can be reflected within the General Plan with language that deters over-development of land zoned agricultural, and with supportive data that justifies best practices for preserving the

C

remaining natural environment within and surrounding the municipality. The Measure H voice is harmonious with efforts to deter global warming and over-development of land with facilities that generate impacts that exacerbate global warming.

Mobility. The Draft EIS of the proposed FIGR casino seriously fails to adequately analyze projected traffic impacts and required mitigations. Traffic projections of a foreseeable casino operated by the DCBP located in even closer proximity to Petaluma will dramatically impact traffic carrying capacity for other area resources, including retail, manufacturing, education and recreational traffic patterns projected for the area's future. D

Recreation, Music, Parks and the Arts. An anticipated shift in recreational activities of Petaluma citizens will have a social and economic impact upon existing recreational facilities. Patronage of recreational, park and art venues may be diminished by behavioral changes of area residents, drawn to the illusive hope of instant "wins" at tribal casinos. Revenue presently available to such facilities and quality of life for the community at large need close scrutiny. E

Community Facilities, Services and Education. Related to the subject above, the ability of existing community facilities to generate self-sustaining revenue, whether public or private will likely be affected by a redirection of a significant percentage of consumer disposable income. Area school districts, using the example of municipalities adjacent to the Foxwood and Mohegan casinos in Connecticut, are impacted by an unanticipated increase in non-English speaking students requiring multiple language instructors (Hispanic, Vietnamese, Korean, Chinese, etc.) to accommodate children of large workforces imported into the area for workforce needs of tribal casinos where an area's demographics lack an existing adequate workforce. Additional personnel costs, overcrowded classrooms, and facilities maintenance burdens are but a few quantifiable cost impacts that affect local school districts. F

Water Resources. It is a given that the region is in a major water crisis that need not be described at length herein. Suffice is to say that two major facilities of high consumer occupancy, on a 7-day, near 24-hour basis will require inordinate water and wastewater systems, further exacerbating the region's water crisis. Water usage currently identified within the General Plan must be analyzed in light of the foreseeability of two proposed tribal casinos within the City's resource supply. G

Economic Health and Sustainability. The proliferation of serious gambling is well documented with a general principle that every $1 dollar gambled creates $3 in local community negative impacts. John Warren Kindt, professor of economics at the University of Illinois specializes in economic analysis of gambling impacts upon communities and society at large. Dr. Kindt has been published in numerous law journals, among which is an article entitled *Diminishing or negating the multiplier effect: the transfer of consumer dollars to legalized gambling: should a negative socio-economic "crime multiplier" be included in gambling cost/benefit analysis?* published in Michigan State Law Review Journal, Volume 2003, Summer, Issue 2. Dr. Kindt can be contacted at: John W. Kindt, University of Illinois, 350 Wohlers Hall, Champaign, IL 61820; Phone: 217-333-6018. Regional disposable income redirected from taxable retail and commercial facilities into non-taxable private tribal revenue streams will have an immediate, continuous and increasing negative impact upon the revenue stream of the City of Petaluma. This same disposable income formerly used for consumer and household necessities becomes unavailable to meet basic needs of area households when funds are expended into tribal casino slot machines, impacting the quality of life of area households on an increasing and continuous scale as well. H

Health and Safety. An emerging field of study indicates that tribal casinos, like any other major public facilities or gathering places are high risk targets for terrorism, but differ in the following I

regard: 1) inadequate security and law enforcement jurisdiction exists on tribal "trust" lands, limiting federal, state and local law enforcement and emergency response authority; 2) money laundering for terrorism potentials exist within tribal casinos; 3) consumer population per square foot is more dense and higher in casinos with dense rows of slot machines, than big-box retail, or restaurant facilities.

For information related to terrorism risks associated with Indian lands and casinos, contact: Dr. Lloyd W. Mitchell, Ph.D, Department of Geological, Environmental and Marine Science, Public Health and Sanitation Program Director, Elizabeth City State University, Elizabeth City, North Carolina 27909; [Phone: 252-335-3693]. Dr. Mitchell served as project manager for a program under the auspices of the University of Southern California's Center For Economic and Risk Analysis of Terrorism Events (CREATE), and the U.S. Department of Homeland Security, in developing 10 Terrorism Risk Indicators for Indian Reservations. Dr. Isaac Maya serves as Director for the CREATE research center at USC. Terrorism indicators include tribe's having more than $1 million dollars in unaccountable funds, high-density customer facilities, and unaudited (money laundering) potentials of casinos.

Housing. One facility alone, the FIGR casino, projects 2,400 low-wage workers with housing needs near their work site. The communities adjacent to the Foxwood and Mohegan Sun casinos in Connecticut have seen substantial housing over-crowding, inadequate housing availability, and substantial neighborhood deteriorations. Results have burdened city officials with deteriorating housing stock conditions, code enforcement, and additional public health and safety personnel workloads. Similar impacts will be present in the City of Petaluma.

Conclusion. As mentioned at the beginning of this request, tribal casinos are far more than mere commercial facilities. They operate on land taken into federal trust that becomes a de facto "reservation" of a separate government unaccountable to local and state planning principles or regulatory authority. The pattern of what occurs when a tribal casino opens is best described in the attached article, *The Great Casino Camouflage*, by Elaine Willman, city council member of Toppenish, Washington, national chair of Citizens Equal Rights Alliance and author of *Going to Pieces...the dismantling of the United States*. [See article attached]. The insertion and expansion of a separate government, supported by federal policy, soon politically and economically overwhelms host and adjacent communities.

The City of Petaluma, through its draft General Plan and DEIR process, is in a position to either quantify precise impacts upon finite resources of two enormous and foreseeable gambling facilities and justify a deterrence for such projects; or in the alternative, to specifically identify required future mitigations that sustain the quality of life, character, natural environment and socio-economic landscape for the future of the City of Petaluma. In the former, a well thought out General Plan update can be a useful legal tool for elected officials to oppose or defend against such future facilities. In the latter, specifically identified mitigations within a General Plan can be verifiable requirements submitted to state and federal decision-makers respecting future Class III tribal casinos that will impact the City.

I would like to add that both Dr. Kindt and Dr. Mitchell are available as consultants. They have extensive knowledge of tribal casino impacts as indicated above. I encourage your office to contact them.

I reserve the right to expand upon these topic for the April 2, 2007, City Council meeting.

Thank you for taking this information under consideration respecting the City's General Plan needs. If you have any questions, please don't hesitte to contact me. My home phone number is 588-9926.

Sincerely,

M. Taylor Montgomery

Maritee Taylor Montgomery
Public Information Liaison, Stop the Casino 101 Coalition
Reply to: 152 Wilfred Avenue
Santa Rosa, CA 95407
Email: marilee@stopthecasino101.com

/mtm
cc: The Honorable Pamela Torliatt, Mayor, City of Petaluma
Bcc
enclosures

The Great Casino Camouflage

By Elaine Willman, MFA

A national pattern is emerging in areas far distant from Indian reservations. Several rural and urban regions whose longtime population is entirely unfamiliar with federal Indian policy are awakening to a systematic process that

installs "Indian Country" or a constructive "reservation" as a next-door neighbor to communities. Local elected officials are ill equipped, unprepared and loath to ever disagree or interfere with "economic development" desires of an Indian tribe.

Community residents tend to walk around shell-shocked wondering what happened. Where did this tribal government come from? Folks wake up to a tribal reservation and fully equipped tribal government where only a tribal casino was contemplated.

It begins with the off-reservation casino. When a community receives notice that an off-reservation casino is approaching, the tendency is to see only the business-venture, and to attempt to treat the tribal business-venture as any other project applicant. How will the project impact the site and adjacent environment? What infrastructure and municipal services will be affected? What about social and law-enforcement impacts? At this point in the process, no one sees the actual tribal government coming to town.

If the proposed casino is targeted for a land space already placed into federal trust for the tribal applicant, adjacent local governments and residents have minimal, if any, voice in the process. The casino literally just opens its doors once it has complied with federal law and secured a state-tribal gaming compact.

In accordance with the Indian Gaming Regulatory Act of 1988 (IGRA), proposed off-reservation casinos to be located on land not yet placed into federal trust, must factor in community detriment and environmental impacts. IGRA permits a greater input from affected local governments, and requires an environmental assessment and review process. But still, no one sees the actual tribal government moving in just yet. Here is the pattern replicating itself in states from East to West, from New York to California:

1. Revenue from a tribal casino is used to acquire land areas adjacent to the operating casino. Casino revenue is also used to acquire lobbyists and litigators who then form a triumvirate of tribal council leaders, lobbyists and litigators to quickly influence, overwhelm or overpower county commissioners, local city council members and other community leaders. Lynwood, Illinois and Rhonert Park, California are at the front end of this process. Then...

2. Land adjacent to the class III casino is acquired to establish a larger land base under tribal control. The Santa Ynez Valley is maturing through this stage. Additional land is needed for either expanded gambling enterprises or other tribal, tax-exempt businesses that operate at a significant advantage over neighboring non-tribal businesses. Then...

3. This process of expanding the tribal land base is repeated annually, with annual gambling revenue generated by the primary casino. As the land base increases, a tribal government headquarters appears within the land base, and the need for a tribal court, and subsequent tribal law enforcement emerges. A "satellite" reservation has then been effectively constructed. Then...

4. A very serious presence of a tribal government with governing authority over "Indian Country" or a "reservation" asserts its voice in all projects adjacent to the tribal land base. The tribal government voice is amplified substantially by supportive federal resources, fully intimidating state and local elected officials. Then...

5. Large areas of a county or region have morphed into a separate tribal government, a separate "nation," operating under its own rules and not those of the host state or county. Then...

6. With hefty supportive resources of federal subsidies, gambling revenues, special preferences and tax-exemptions, tribal enterprises thrive and non-tribal enterprises within the region wither and die. Then...

7. Failed businesses and additional properties are generally acquired by a tribe, and adjacent land values are impacted negatively, while adjacent property taxes are increased to offset the loss of state and county property and sales tax revenue that has either flushed down slot machines or disappears with each tribal parcel acquisition.

The most stunning examples of the above pattern are present in Madison and Oneida Counties, NY (Oneida Indian Tribe) and Snohomish County, WA (Tulalip Tribe). The pattern is in full motion in the quiet hills of the Santa Ynez Valley, CA.

Is governmental co-existence, balance and preservation of community values possible? Can state sovereignty hold its own with tribal sovereignty? The answer depends upon two critical components: 1) the education, courage and tenacity of local government officials in their allegiance to represent the best interest of their citizens; and 2) citizen education, engagement and full support of elected officials who support them, and removal of elected officials who fold to tribal government pressure at the direct expense and harm to local governments and those they serve.

The pathway to action is for each citizen to clearly understand that ongoing respect for all cultures, including American Indian culture, is a very separate matter from government and business decision-making. It is appropriate, even necessary to exercise citizen voice in matters affecting your local government, and especially in matters that

involve tribal government decisions that affect your community, your businesses, your property and the local tax base.

Citizen silence is absolutely golden for the accomplishment of tribal government goals.

Elaine Willman, MPA, is Chair of Citizens Equal Rights Alliance (CERA) a national organization of community education groups and citizens in 28 states who reside within or near federally recognized Indian reservations. Ms. Willman is author of "Going To Pieces...The Dismantling of the United States of America," a non-fiction reflection of the voices on and near 17 Indian reservations in the United States. Contact: Phone: 509-865-6225; Email: toppin@aol.com

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RE: DRAFT
& DEIR

KRISTIN SCHENONE
(925) 979-3325
kschenone@mmblaw.com

March 19, 2007

VIA FACSIMILE and U.S. MAIL

Pamela Tuft
City of Petaluma
General Plan Administration
27 Howard Street
Petaluma, CA 94952

RECEIVED
MAR 2 0 2007
GP Administration

Re: Comments on Draft EIR for Petaluma General Plan
Our File No. 10079-001

95

Dear Ms. Tuft:

This office represents Syers Properties in matters related to the City of Petaluma's General Plan 2025 ("General Plan") and draft Environmental Impact Report ("DEIR"). This letter is intended to provide comments on the DEIR for the General Plan.

As detailed below, the DEIR fails to provide adequate mitigation measures for the identified transportation impacts and does not contain sufficient information about the feasibility of the proposed mitigation measures. Also, the DEIR needs to include the appropriate analyses to reflect the changes on land use designations for certain properties that were the subject of straw votes of the City Council. The DEIR must be revised and recirculated to incorporate this critical information before any action may be taken on the General Plan. Furthermore, as part of any such revision and recirculation, the mitigation measures for the identified traffic impacts should be made more specific and require that the necessary traffic improvements be constructed or funded as a condition of approving any proposed new development creating the need for such traffic improvements.

A

B

1. Transportation Comments.

The California Environmental Quality Act ("CEQA") requires that for each significant impact identified in the EIR, the EIR must discuss feasible measures to avoid or substantially reduce the significant environmental effects. *CEQA Guidelines section* 15126.4(a). To be considered adequate, mitigation measures must be specific, feasible actions that will actually improve adverse environmental effects. Mitigation measures must be fully enforceable through permit conditions, agreements, or other legally binding instruments. *CEQA Guidelines section* 15126.4(a)(2). In addition, the EIR should identify a capital outlay or capital improvement program, or other scheduling or implementing device, that governs the submission and approval of subsequent projects, or a discussion of why it is impractical to identify such a program.

The DEIR does not adequately identify or address the mitigation measures necessary to reduce the traffic impacts. Impact 3.2-1 states that "increased motor vehicle traffic would result in unacceptable level of service at study intersections." The proposed policies to reduce this impact to a less than significant level at most study intersections are general, non-specific mitigation measures that fail to adequately show that such measures will be feasible.

Specifically, measure 5-P-2 provides that the City will:

> "Ensure the identified mobility system is provided in a timely manner to meet the needs of the community. A. Ensure that new developments pay a fair share of mobility improvements and that those improvements are undertaken in context with that development." B. Review City transportation impact fees to insure that necessary citywide improvements are funded. C. Allocation of mitigation funds shall be designated to the specific capital improvement project for which it was executed."

Similarly, measure 5-P-11 "Requires proposed development to assist, in addition to seeking other funding sources, in the funding and construction of [certain identified traffic improvements]."

These mitigation measures fail to provide sufficient certainty that new development will pay its fair share toward the necessary traffic improvements. These measures fail to identify how the City will collect additional funding for the necessary traffic improvements, the need for which is created by new development. The DEIR should address how the City will ensure that sufficient transportation infrastructure will be available to serve new development, including the financing mechanisms that could be used to obtain the funding for such traffic improvements, as well as the availability of funding. Further, there is no discussion in the DEIR of the capital outlay or capital improvement program, or other scheduling or implementing device that will govern the necessary traffic improvements. The DEIR should also describe the plan or program for allocating any funds collected.

Merely requiring the City to "review" the City transportation impact fees, and requiring proposed development to "assist" in funding traffic improvements are vague, generalized statements that do not provide adequate assurance that the necessary funding for the traffic improvements will be collected from new development and available to fund the identified traffic improvements, prior to new development taking place. These general, non-specific mitigation measures do not provide the required specific, feasible actions that will actually mitigate adverse traffic impacts resulting from the proposed new development.

Since the City's current traffic impact fees do not appear adequate to fund the necessary traffic improvements, the DEIR should specifically require adoption of updated, increased traffic impact fees, or other fees, in order to adequately mitigate the traffic impacts from new development and should identify the capital improvement plan, or other program, that will cause the necessary traffic improvements to be funded and constructed prior to new development

occurring. The mitigation measures should also require a capital improvement program to be adopted or updated, as the case may be, specifying the road improvements to be completed within the next 10 years to ensure compliance with the applicable level of service and other standards. Requiring proposed development to "assist" should be revised to requiring new development to either construct, or pay their fair share of traffic improvement costs, resulting from the impacts of their proposed project. As an example, a mitigation measure could provide that developer paid traffic impact fees shall fully pay for all necessary traffic infrastructure improvements to mitigate all direct and cumulative traffic impacts from new development.

We respectfully request that the mitigation measures for the traffic impacts be revised to contain specific, feasible mitigation measures.

2. Analysis Regarding Changes In Land Use Designations

C

The City Council has taken straw votes to change proposed land use designations identified in the draft General Plan for certain properties. The City Council is also expected to take additional straw votes at its meeting this evening. The DEIR will need to be revised to include the appropriate analyses for these changes. We believe one of the most significant changes may be made to the DSL site. The City Council's first straw vote on this site changed the land use designation from "mixed use" to "community commercial." The City Council will reconsider this vote at its meeting this evening. Different impacts and the extent of such impacts will differ with these new designations. For example, on the DSL site, less traffic will occur under a "mixed use" designation then a "community commercial" designation. Also, a more extensive retail impact/market saturation/urban decay analysis would need to be conducted under a "community commercial" designation since that designation would allow big box and other retailers that will compete with other similar uses in the City, including the Plaza North Shopping Center owned and operated by our client.

We thank you for your consideration of our comments and look forward to participating in the environmental review and decision making process for this project. If you have any questions about any of the foregoing, please do not hesitate to discuss them with me at any time.

Very truly yours,

MORGAN MILLER BLAIR

KRISTIN SCHENONE

KS:klm

cc: Dr. Charles S. Syers
Craig Woolmington-Smith
Charlie Abrams

MMB:10079-001:746237.1

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COUNTY WATER AGENCY

File: zn/0-2-1 Petaluma General Plan & Draft EIR
(Agency Comments & Responses)

March 19, 2007

RECEIVED
MAR 20 2007
GP Administration

Ms. Pamela Tuft, AICP
Director
Department of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952-6320

Re: Petaluma General Plan 2025 Draft Environmental Impact Report 96

Dear Ms. Tuft:

Sonoma County Water Agency (Agency) staff has reviewed the City of Petaluma (City) General Plan 2025 Draft Environmental Impact Report (DEIR). In response, Agency staff submits the following comments.

GENERAL COMMENTS

The Agency adopted its 2005 Urban Water Management Plan (UWMP) on December 12, 2006. The UWMP contains information about the amount of water expected to be available to the City from the Agency through 2030. The City's General Plan 2025 DEIR should reflect the UWMP analysis, as discussed in more detail below. The DEIR should also reflect the analysis contained in the City's most recently adopted Urban Water Management Plan if completed.

1. The DEIR should state that there is some uncertainty about the Agency's ability to provide a water supply to its water contractors, including the City, for the reasons described in the Agency's UWMP. The Agency's UMWP analysis was premised on certain reasonable assumptions, including (1) that the listing of three salmonid species as threatened or endangered under the federal Endangered Species Act (ESA) will not reduce the amount of water the Agency can supply; (2) that PG&E's existing Federal Energy Regulatory Commission (FERC) license for the Potter Valley Project (PVP) will not be modified, or that any license modifications (and the terms of any new license) will not reduce the amount of water available for diversion by the Agency; (3) that the Agency will construct and operate the facilities described in its Notice of Preparation of the environmental impact report (EIR) for the Water Supply, Transmission, and Reliability Project (Water Project), and will obtain the approval of the State Water Resources Control Board to increase the amount of water the Agency can divert from the Russian River beyond the current limit of 75,000 acre-feet per year. Changes in these assumptions could affect the ability of the Agency to divert water from the Russian River or to construct and operate the Water Project. If construction and operation of the Water Project or an alternative project to meet the demands of water contractors is delayed, or if there is a delay in the expected date by which the Agency obtains water rights allowing the Agency to divert additional water from the Russian River, then deliveries by the Agency to its water contractors will be limited by any then-existing constraints on the capacity A

P.O. Box 11628 - Santa Rosa, CA 95406 - 404 Aviation Boulevard - Santa Rosa, CA 95403 - (707) 526-5370 - Fax (707) 544-6123

of the transmission system and by the Agency's current Russian River diversion limit of 75,000 acre-feet per year.

2. The DEIR should not assume that the Agency will be able to deliver to the City the current allocation of 13,400 acre-feet per year as set forth in the Restructured Agreement for Water Supply, for two reasons. First, that allocation was premised upon the assumption that the Agency would construct the Water Supply and Transmission System Project (WSTSP). As noted in the Agency's UWMP, the Agency no longer intends to construct the WSTSP. Second, that allocation was premised on an outdated analysis of the amount of water reasonably needed by the City from the Agency to meet the City's future demands. The analysis by the Agency and the City of the reasonable future demands of the City and the maximum amounts of water the City can expect to receive from the Agency over time are set forth in the Agency's UWMP and the City's UWMP. The DEIR should use the UWMP allocation rather than the allocation set forth in the Restructured Agreement for Water Supply. B

3. As reflected in the Agency's UWMP and the City's UWMP, a portion of the City's future water demands is expected to be met by local supply and recycled water projects developed and implemented by the City. To the extent that such local supply and recycled water projects will be necessitated in part by increases in future demands, the local supply and recycled water projects should be identified and any environmental impacts of developing and implementing those projects should be analyzed. If any local supply project relies on groundwater, the analysis should include an evaluation of the project's impacts on the long-term sustainability of any affected groundwater basin. C

4. The Agency's UWMP and the City's UWMP assume that the City will continue to implement existing water conservation programs and institute aggressive new water conservation programs in the future. These programs include: (1) continued implementation of the California Urban Water Conservation Council Best Management Practices; (2) implementation of additional "Tier 2" Best Management Practices (listed as Table 6-2 in the Agency's UWMP); (3) implementation of future plumbing retrofits as required by the plumbing code; and (4) implementation of water-efficient design standards for future developments. The DEIR should evaluate the status of the City's implementation of these programs and standards, and should ensure that all elements of these conservation programs are incorporated into the project either as project components or as mitigation measures to reduce the project's impact. D

5. The reliable capacity of the Agency's transmission system is currently limited to 92 million gallons per day. Summertime demands on the Agency's transmission system may exceed this capacity. To the extent that the project could increase peak summertime demands, the DEIR should discuss ways in which peak summertime demands (both of the project specifically and in City's service area can be reduced). E

In addition, summertime demands on the Agency's water transmission system may exceed the reliable capacity of the transmission system. All water customers have been requested to implement water conservation measures, recycled water projects and/or increase the use of local ground water supplies immediately to reduce demand on the Agency's transmission system throughout the summer. F

The Agency recognizes that some cities and local water suppliers may rely on local groundwater as either a primary or supplemental source of water. Given the uncertainty regarding the status of existing groundwater supplies, the Agency requests that entities using groundwater do so in a manner that promotes the long-term sustainability of groundwater basins in the County. In addition, when ongoing groundwater basin studies are complete, the Agency will provide copies to the appropriate cities and local water suppliers for managing their use of local groundwater supplies. C

SPECIFIC DOCUMENT COMMENTS

TABLE ES-5 SUMMARY OF IMPACTS AND PROPOSED GENERAL PLAN POLICIES THAT REDUCE THE IMPACT

- **Section 3.6-1, 3.6-3 and 3.6-4. [Pages E-31 through E-33]**

The DEIR refers to the "SWCA" when referencing the Agency. The correct acronym for the Agency is SCWA. Please correct where applicable.

CHAPTER 3: SETTING, IMPACTS, AND MITIGATION MEASURES

- **Impact 3.6-3 Buildout of the proposed General Plan may increase drainage flows as a result of impervious surfaces, thereby altering the existing drainage patterns. [Pages 3.6-7 through 3.6-10]**

The DEIR refers to the "SWCA" when referencing the Agency. The correct acronym for the Agency is SCWA. Please correct where applicable.

The DEIR refers to General Plan policies **8-P-28** though **8-P-32** as policies that would reduce **Impact 3.6-3** to a less than significant level. **Policy 8-P-30** references **Policies 3-P-28** and **3-P-29**. The intent of these references is unclear in the context of **Policy 8-P-30**. Staff requests clarification in regards to the connection of **Policy 8-P-30** with **Policies 3-P-28** and **3-P-29.** G

Staff requests clarification in determining how the 400-ft wide corridor was established and the criteria for determining that the corridor is adequate. Based on the graphic depictions of the 100-year flood for existing and buildout conditions, the City's XP-SWMM model results appear to suggest that it is inadequate under either the existing or future buildout conditions.

Policy 8-P-30

Policy 8-P-30 references a study that will be approved by the Agency and the City. Staff requests clarification within the text to identify which particular study the City is referring to when describing Policy 8-P-30. H

Policy 8-P-30-A

Policy 8-P-30-A includes a reference to cooperative maintenance of the City's XP-SWMM model. Further coordination between Agency staff and the City is needed to determine the feasibility of such mutual maintenance of the City's XP-SWMM Model. I

Policy 8-P-31 and Policy 8-P-32
Both policies make reference to "existing areas subject to periodic surface water inundation and containment". For both policies, Agency staff request the City delineate the areas inside and outside the city that are reported to be subject to periodic surface water inundation and containment. J

Policy 8-P-31-A
Policy 8-P-31-A states: K

> The Department of Water Resources and Conservation shall work with the SCWA and the Community Development Department to insure that reduction for the projection afforded by the Payran Corps Flood Protection Project is not compromised or reduced by proposed development

It is understood by the Agency that the Corps Flood Project also assumed that the Denman Flat area is an inundation area that will continue to flood. The City however should be aware that two current projects may ultimately affect flood detention in that area. One project is the Southern Sonoma County Resource Conservation District's project (budgeted for Zone 2A funding in fiscal year 05-06), which is the Marin, Wilson, and Wiggins Creek Channel Maintenance and Revegetation Project. This project includes removal of sediment and re-establishment of the channel to relieve flooding along Marin, Wilson, and Wiggins Creeks between Skillman Lane and Rainsville Road.

The second project is the Marin Creek/Denman Flats Drainage Study (budgeted for Zone 2A funding in fiscal year 04-05), which will investigate possible solutions to alleviating flooding along Marin Creek between Skillman Lane and the confluence with the Petaluma River.

Agency staff request clarification of Policy 8-P-31 to include discussion of the above-mentioned projects. Agency staff also requests that the City consider the above-mentioned projects as well as future projects proposed by the Agency and other groups when conducting watershed modeling and surface water planning.

CHAPTER 3: SETTING, IMPACTS, AND MITIGATION MEASURES

- **Impact 3.6-4, page 3.6-10 New Development may overload storm drain system capacity or require expansion of existing or construction of new facilities. (Significant)**

The DEIR states on page 3.6-10:

> ...allowing the 25-year storm to utilize the curb-to-curb capacity of the streets to handle the short-term storm flows. Grading within the flood prone areas, at time of development, may result in the 50-year elevation exceeding the top of the curb but it must be managed within the public right-of-way.

Agency staff has not reviewed the City's surface water management standards. Agency staff recommends that the drainage design described in Impact 3.6-4 be in compliance with the Agency's Flood Control Design Criteria. However, compliance with this Design Criteria does not provide assurance that flooding will not occur and will not, by itself, mitigate all flooding risks.

The DEIR refers to General Plan policies **8-P-33** though **8-P-36** as policies that would reduce **Impact 3.6-4** to a less than significant level. Agency staff request clarification in regards to Policy 8-P-33. L

Policy 8-P-33
The Agency maintains maintenance responsibility for engineered channels which are owned in fee by the Agency or engineered channels where the Agency holds a drainage easement. Natural waterways are only maintained for natural waterways in which the Agency holds permissive clearing easements. Policy 8-P-33 may lead the reader to imply that the Agency maintains all engineered channels, natural creeks and enclosed surface water systems within the Petaluma Watershed.

CHAPTER 3: SETTING, IMPACTS, AND MITIGATION MEASURES

- **Impact 3.6-5 Buildout of proposed General Plan 2025 may expose people or structures to risk of existing flooding hazards, or may place structures which could impede or redirect flood flows. (Significant)**

Mitigation measures associated with Impact 3.6-5 reference the City's XP-SWMM watershed modeling program. In reviewing the XP-SWMM model calibration and analysis report, Agency staff recommends that additional analysis may be necessary to further evaluate the possible flooding impacts to the watershed associated with policies within the General Plan. The City's XP-SWMM Watershed model appears to assume antecedent soil moisture conditions are saturated or nearly saturated for the 100 year storm for both existing and buildout conditions. However, the assumption of saturated or nearly saturated soil moisture conditions, while likely reasonable to model "worst case" (highest magnitude) flood events, may be misrepresentative of lesser (lower magnitude) and more frequent flood events. By modeling only a saturated soil condition for existing conditions, the XP-SWMM model presents similar results to assuming a highly impervious surface for much of the watershed. Therefore, when adding actual additional impervious surfaces for buildout conditions, it effectively shows little impact. Again, for the worst case condition, it may be representative, however, for more frequent flood events the effect of the additional impervious surfaces i.e. buildout conditions, may not be representative under the City's current XP-SWMM model. The analysis may not accurately assess how buildout conditions may affect flood frequency in the watershed. M

The XP-SWMM model calibration and analysis report should also clarify what assumptions have been made concerning the level of stream maintenance that will be provided for channels throughout the watershed, both inside and outside the city limits. The XP-SWMM model should be reflective of current and reasonably foreseeable regulatory limitations imposed upon the Agency's stream maintenance activities. Similarly, Agency staff request that the City clarify and identify what stream projects outside of the city have been assumed as part of the XP-SWMM buildout model. Policy 8-P-29 of the General Plan references terracing projects on Marin, Liberty, and Willowbrook Creeks. Does the buildout model assume those projects occur, and does it assume any others conducted by other agencies/organizations? The Agency anticipates that environmental and regulatory limitations may delay implementation of these projects. In addition, please indicate how the city will pay for these projects and identify the sources of funding (e.g. development fees, taxes, assessments, etc)." N

Thank you for the opportunity to comment. For surface water issues or questions regarding the City's XPSWMM model, please contact Kent Gylfe at 547-1977. For questions regarding water supply, please contact Jay Jasperse at 547-1959

Sincerely,

Randy D. Poole
General Manager/Chief Engineer

c Jay Jasperse, Pam Jeane, Mike Thompson, Renee Webber, Kent Gylfe, Erica Phelps, David Cuneo, Marc Bautista

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From: Barry Albert Bussewitz [barry.bussewitz@solano.edu]

Sent: Monday, March 19, 2007 3:39 PM

To: General Plan Administration

Subject: Fwd: Comments for the public record for the Petaluma General Plan and Draft EIR

From: Barry Albert Bussewitz <barry.bussewitz@solano.edu>
Date: March 19, 2007 2:28:43 PM PST
To: citycouncil@ci.petaluma.ca.us
Subject: Comments for the public record for the Petaluma General Plan and Draft EIR

97

Comments for the public record for the Petaluma General Plan and Draft EIR
March 19, 2007

Dear City Council & Staff:

I submit these comments for the General Plan.

1) I believe the General Plan must meet the council goals of reducing greenhouse gas emissions 25% of 1990 levels by 2015 for the entire community.

A

2) Any new or remodeled buildings must meet Green Design Principles; this must be made clear in the General Plan.

B

3) The General Plan should require that no store exceed 90,000 square feet. The General Plan should require a Community and Fiscal Impact Reporting requirement on all retail occupancies greater than 25,000 square feet.

C

4) I believe that the General Plan and its Environmental Impact Report should be reevaluated to consider the possible impacts of future nearby casinos on our local roads, city police and fire services, water availability, wastewater disposal, garbage services, crime, and other services.

D

5) I believe developments in all parts of the city must also account for and maintain historical animal corridors so that fencing or other barriers do not prohibit the migration of small mammals and other animals whose survival relies on season population dispersal.

E

6) Finally, please, please, please put into the General Plan a prohibition against any further loss of ridgetop and hilltop access in our community. It is a tremendous loss to our capacity to know and love our own geography and natural history when we lose access to the significant features of our environment!

F

Thank you very much,

Barry

Barry Albert Bussewitz
Instructor in Early Childhood Education and Human Development
Solano Community College
Fairfield, California

Home/Contact Address
315 Sixth Street
Petaluma, California 94952
707.763-9635
<barry.bussewitz@solano.edu>
Solano College Voicemail: 707.864-7000, ext. 5127

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From: Ûalabio? [walabio@macosx.com]
Sent: Monday, March 19, 2007 3:53 PM
To: Jones, Chris; Hudson, Jo; - Information Technology; King, Fran; - City Clerk; citymgr; Tavares, Nancee; Blanquie, Ron; CDD; CDD; Cooper, Trae; Gaebler, Bonne; Smith, Patricia; Ginn, Michael; General Plan Administration; Wray, Rebecca; publicworks; Simmons, Steve; CONSERVATION
Subject: Development on the street Washington

98

¡Hello!

¿How fare you?

The counsel points to the taxes and jobs big boxes will bring to Petaluma. Unfortunately, This is very one-dimensional, as about 85% of the money going to a typical big box comes from local businesses. Indeed, One would not be surprised is opening one big box with an hundred thousand square feet might kill one hundred businesses with a thousand square feet. One might ask: A

¿Do big boxes really hurt the towns where they reside?

Most local business are locally owned and spend locally. One cannot same the same thing about big boxes. Approval of big boxes probably will not bring any net taxrevenue and will bring definite costs:

* Traffic
* Pollution:
  - Sound
  - Air
  - Light
  - Water
* Blight
* Tourism (Tourists come to Petaluma for the Historic DownTown — not the big boxes.)
* Movies (No big boxes are in "Peggy Sue Got Married".)
* Watermain (The city will need a new main for the big boxes.)
* Adverse impact on public amenities:
  - The Library
  - The SwimCenter
  - The Skating Park
  - The FairGrounds
* Watersupply (¿Do we even have sufficient water for big boxes?) B

Craig Lee Chrisco
1283 Saint Francis Drive
Petaluma
California
94954-5331
The United States of America

1 (707) 763 - 7834

¡Peace!

"Ŭalabio?" <Walabio@MacOSX.Com>

The first Intactivistic wiki on Earth devoted to Peaceful Beginnings:

* - <HTTP://PeaceFulBeginnings.Org/> <HTTP://IntactWiki.Org/>

Thoreson, Karen

From: Tuft, Pamela
Sent: Monday, March 19, 2007 5:31 PM
To: Thoreson, Karen
Cc: Duiven, Scott
Subject: FW: DSL DEIR comments

Attachments: 2007 DSL final comments .doc



2007 DSL final comments .doc (

Karen,

Please replace Janice's letter in the DEIR packet for PC, per her request below. Thanks,

Pamela

-----Original Message-----
From: Janice Cader-Thompson [mailto:janicecader@comcast.net]
Sent: Monday, March 19, 2007 5:26 PM
To: Tuft, Pamela
Subject: DSL DEIR comments

Pamela, attached is my final copy of the letter I sent you this morning. Sorry for the inconvenience. Please discard the earlier letter.

Sincerely,

Janice Cader-Thompson

March 19, 2007

Ms. Pamela Tuft
City of Petaluma
27 Howard Street
Petaluma, California 94952

99

Re: Draft Environmental Impact Report for Proposed General Plan

Dear Ms. Tuft:

The following are comments on the draft environmental impact report (DEIR) prepared on the proposed draft general plan. This letter supplements the oral comments I presented at the various Planning Commission and City Council hearings on the DEIR. The DEIR did not adequately analyze several significant impacts including water supply and land use. Also, the DEIR did not analyze the impacts that will result from the new commercial/retail development contemplated under the general plan.

A

Water Supply

The water supply section of the DEIR does not include the necessary information to determine if there is an adequate water supply for development proposed under the general plan. As required by *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova*, 40 Cal. 4th 412 (2007), the DEIR must include the following:

- Sufficient facts to evaluate the pros and cons of supplying the water development under the general plan will need. This analysis is not included.

- An adequate environmental impact analysis for the general plan cannot be limited to the water supply for a part of the development anticipated under the general plan. Impact 3.5-1 states that water supplies may be exceeded by the projected development and the measure to mitigate this impact is to develop a comprehensive water supply plan. This deferral of information and thus, the inability to determine the effectiveness of the mitigation measure, violates CEQA. CEQA's demand for meaningful information is not satisfied by stating information will be provided in the future.

- Future water supplies identified and analyzed in the DEIR must be reasonably likely to prove available; speculative sources and unrealistic allocations or

possibilities do not provide an adequate basis for decision making under CEQA. The reliance on the South Transmission Project is a speculative source of water.

- Where a full analysis leaves some uncertainty regarding the availability of anticipated future water sources, CEQA requires some discussion of possible replacement or alternative supply sources, and of the environmental consequences of resorting to those sources. This analysis is not contained in the DEIR.

- CEQA's informational requirements may not be met by providing that future development will not proceed if the anticipated water supply for a project fails to materialize. It seems that program/policy 8-P-7 contemplates such an approach. Also, the DEIR acknowledges that there is a projected shortfall of water (an annual demand of 773 million gallons and an ADMM shortfall of 5 mgd) (p. 3.5-16). The DEIR then concludes that this shortfall can be met through water conservation and groundwater. There is no evidence that this amount of shortfall can be found in the groundwater or through water conservation measures.

B

Without this information, it is not possible to understand the extent of the water supply impacts and whether or not they can be mitigated.

Land Use

During the hearings on the DEIR, the Planning Commission and City Council took straw votes to change the proposed land use designations on certain lands. For example, the DEIR analyzed a "mixed use" designation for the DSL site, but the City Council took a straw vote to change the land use designation to "community commercial." If the DSL site is changed to "community commercial," the DEIR must be revised to analyze all the potential impacts that will result from this change. Similarly, all the land uses that were changed by a straw vote from those contemplated in the draft general plan and analyzed in the DEIR, must be re-analyzed under the newly proposed land use designation.

Retail Impact Analysis

The draft general plan contemplates additional retail development in the City. For example, the DSL and East Washington Place sites are identified for commercial development. The DEIR does not include a retail impact analysis for these additional commercial uses or for the other retail uses contemplated under the general plan. How will these new retail uses impact the existing retail? Will traffic patterns change? Will the potential new retail development cause existing retail development to go out of business and leave us with an empty unused shell of a store? Will the City have too much retail? Can the City support the number of superstores or "big box" stores that are likely to occur on the DSL and East Washington Place sites and the other commercially designated sites?

C

D

C

Thank you.

Very truly yours,

Janice Cader-Thompson
732 Carlsbad Court
Petaluma, CA 94954

From:	Ken Burgess [kburgess@yahoo.com]
Sent:	Monday, March 19, 2007 5:54 PM
To:	General Plan Administration
Subject:	General Plan 2025 Comments for Water Conservation and Greenhouse Gasses
Attachments:	Home Economics - 2007-01-17.doc; EEI_Pays_1st_paper.pdf; EEI_Pays_2nd_paper.pdf; MissouriAnalysis07_5_04.pdf

Dear Pamela,

I have been a Petaluma resident for over 10 years and been involved with several water and energy conservations measures over that time.

Recently I attended a workshop put on by Sustainable Petaluma with presentations from both Ned Orrett and HR Downs.

100

My comments are focussed with the Water Conservation BMP's and their effective relation to Petaluma reduction of Greenhouse gasses as resolved in 2005-118.

The PAYS® plan, Pay As You Save®, founded and adopted by the Energy Efficiency Institute of Colchester, VT (www.eeivt.com) is designed to overcome the key barriers to customer purchase of resource efficiency measures and to ensure long term financial and natural resource savings. The PAYS® system (it may be renamed however its host utility desires) appears ideal for use by water utilities to deliver efficiency services.

PAYS® products are resource efficiency products that, in the determination of a third-party service, will save more money each year than they cost. They are purchased with no up-front payment and no customer debt obligation. The customer at a location where PAYS® products are installed pays a tariffed charge on the utility bill as long as the customer (or successor customer at that location) realizes savings and only until all measure costs, including financing costs, are paid.

The attached document is his writeup for PAYS® , and the founding website is:

http://www.eeivt.com/index.html

My request is to have this writeup included in the plan as a model or prototype program that can be implimented on a trail basis with citizens committee review to establish an effective measure of performance to then be reviewed and possibly implimented on a larger scale.

The benefit of this program is that it is a self motivating program for conservation measures that require no (or minimal) up front municipal funding costs, and allow the city and community to benefit with reduced water usage to provide greater long term community sustainability and associated greenhouse gas emissions.

I see that PAYS would be an ideal contribution to at least BMP 01, 02, 03, 06, 07, 08, 14.

It would be a contributory asset through providing financial incentives generated through conservation measures that would directly result in water and energy reductions that could be measured through program participation and aggregated water usage estimates.

Since the purpose of this plan is to provide significant savings in water usage through efficiency investment programs rather than rebate programs, there is no rebate funding supply that needs to be renewed or placed in jeprody through funding cuts.

The final goal of this plan is to reduce greenhouse gas emissions through the reductions of pumping, domestic heating, and wastewater reclamation costs. Since the 2005-118 resolution calls for significant reductions in both community wide and municipal emissions, self funding conservation programs such as PAYS® should provide an attractive benefit for the Petaluma General Plan 2025.

Since this comment is only a very general discussion of the possibilities of PAYS, and its application to the Petaluma General Plan, there may be additional need for discussion, development and review on how Petaluma will benefit from this program.

Thank you for your time and consideration,

Ken Burgess,

707-769-8027.

Bored stiff? Loosen up...
Download and play hundreds of games for free on Yahoo! Games.

Home Economics

Ned Orrett, MS, PE

Did you know... it is possible to reduce indoor water use in many Petaluma homes by almost half, while also saving hundreds of dollars annually for each household? Did you know that the efficiency products to produce these savings may be installed without upfront cost to the homeowner, and typically without need for rebates from the City? And, these products could offset all GHG emissions related to Petaluma's water and wastewater utilities? I didn't either, until sitting down to prepare a new recipe. It's all about home economics. But first, let's set the table.

Our story begins with the City of Petaluma's commitment to manage water in Petaluma as a limited resource. The City, recognizing a water supply constraint, is developing a plan to support growth described by the City's new General Plan without exceeding its existing water allotment from the Sonoma County Water Agency. To support the additional water demand projected from new growth, the City intends to supplement its existing supply with water obtained from "internal" resources: water reclaimed from treated effluent, and water saved via efficiency improvements. To keep this water picture balanced, nearly 800 million gallons per year are expected to be needed from the latter sources by the time the General Plan is fully developed.

A plan is being developed that will identify an aggressive water efficiency program and extensive use of reclaimed water for irrigation that together can achieve the savings target. While the final combination of projects and cost are not yet known, it is apparent that relative to the cost of currently supplying water, it will cost less to save water via efficiency, and more to provide reclaimed water. Given that these sources constitute Petaluma's incremental water supply, all costs are proposed to be borne by new development.

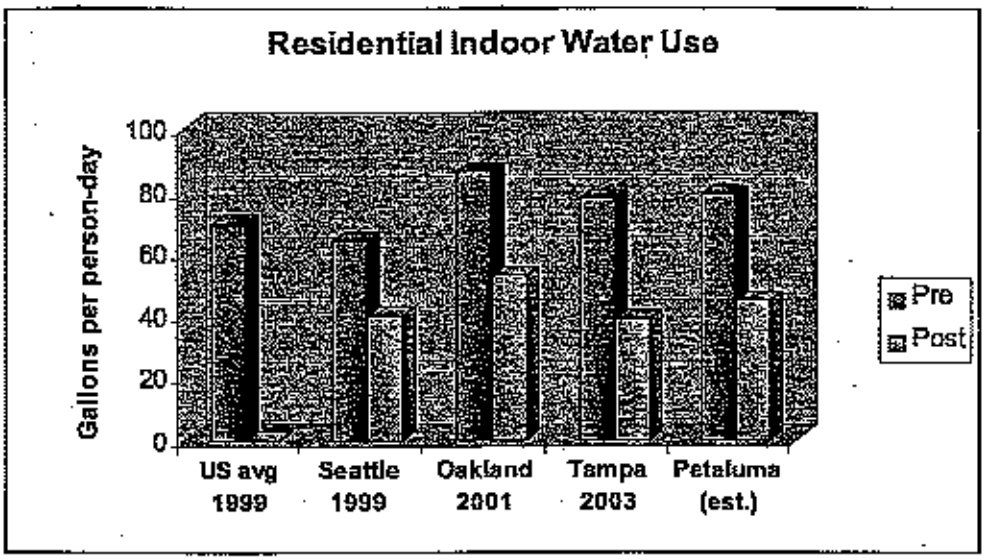
This is a remarkable proposal in the annals of municipal water planning – that is, to apply a "Zero Water Footprint" standard for future development. And yet, can we do even better? Can we save more water, money, and even reduce greenhouse gas emissions? Climate change is an emerging issue, and one that may impact the functioning of the reclamation system (itself a source of emissions) over the 80-year initial life envisioned in the planning process.

Perhaps this water supply constraint presents an opportunity to test ways to resolve this and related issues comprehensively and at less cost. Resource efficiency is the starting point, and smart implementation is the key. As an example, let us consider using water more efficiently inside existing homes. The quality of data available for this sector, and water use (28% of the total citywide demand expected in 2025), makes this a great case study for the potential of achieving high performance results.

Figure 1 summarizes the best studies about indoor residential water use efficiency and how it may be improved. Water use was closely monitored in groups of homes in three cities before and immediately after they were retrofitted with new toilets, clothes washers, showerheads, and faucet aerators. For Petaluma, the same retrofit was modeled (on a computer) with the addition of a few innovations to push the envelope, to explore what might be possible.

Innovations included upgrading to a premium clothes washer (the most water-efficient machine regularly available in stores), addressing leaks remaining after toilets are replaced, and installing an on-demand hot water recirculation system to avoid losing lukewarm water down the drain. With these extra features, indoor water use in the average Petaluma home, where it is assumed that all of these measures could be effectively employed (given the relatively high current usage), is conservatively estimated to decline by 43% from 79 to approximately 45 gallons per person-day.[1] Follow-up services could be scheduled to replace measures as they wear out and otherwise maintain performance.

Figure 1



Financial Performance

At current retail prices, this upgrade is estimated to cost approximately $2,100 to install (less with bulk pricing in a competitive environment). If financing is arranged for the package at a public rate (5%), as with publicly-funded traditional water and wastewater projects, and the financial term for each element of the package is conservatively limited to three-quarters of its useful life, the annual cost to each participating customer would begin at perhaps $250, and decline thereafter as items are paid off. Meanwhile, these devices will reduce total water, wastewater, electricity, and natural gas costs by approximately $550/yr (more for those with electric water heaters). If water or energy rates continue to rise, these savings will obviously increase over time. Furthermore, as less water needs to be pumped to the City, heated at home, and later managed as wastewater, greenhouse gas emissions will decline by approximately 1,700 pounds (equivalent carbon dioxide) per house-year. Amazingly, this is of a magnitude, when aggregated over a majority of Petaluma's homes, which is equivalent to all GHG

[1] Chief among the ways the Petaluma savings estimate is conservative is the assumption that 23% of the post-retrofit usage is in the "Other" category, for which no savings are anticipated. In contrast, the measured data for Seattle, Oakland, and Tampa assigns an average of only 1% of post retrofit usage to "Other." If Petaluma usage turns out to be similar, household savings for this package of measures will increase to 55%.

emissions associated with the electricity required to power the City's water and wastewater operations.

With the current average of 2.8 people per home, estimated water savings for the package envisioned is estimated at 34,000 gl/home-year. If 75% of Petaluma's ~17,000 homes were served (a feasible participation rate for a traditional program offering free showerheads, faucet aerators, and toilet tank devices), water savings would exceed 400 million gallons/yr. Disposable household income for Petaluma's participating residents, net of equipment cost, would increase by nearly $4 million annually. And best of all, the service could proceed city-wide with minimal need for rebates.

This example addressed just indoor water in existing homes. All other sectors, including buildings not yet designed, may also be served by this method.

An Attractive Offer

The key to efficiency efforts is to make it attractive for customers to engage services that will deliver large and durable resource savings. The ability to accomplish this has long been confounded by many obstacles. Resource costs, especially for water, are typically too low to command customer attention; the time required to become educated about steps to take and carry them out; high initial cost, especially for high-performance equipment; possibility of moving and thus not capturing paybacks; and the disconnect faced in rental situations between equipment purchases (owners) and resource costs (renters). These barriers typically require high financial incentives to overcome. Even with these, participation is typically well below the economic potential, and water savings are left uncaptured while customers pay for natural resources they don't need. This unfortunate situation gets worse because water utilities must then turn to relatively costly engineering infrastructure to achieve service commitments.

The benefits offered by resource efficiency improvements are left on the table for lack of a way to make them easy for customers to engage. The challenge is to get customers to want to buy only high quality efficiency products, and in a way that provides for customers, product vendors, and successor customers to ensure there are cost savings. A market based system called Pay As You Save® (PAYS®) was created to make this possible.[2]

PAYS® was designed by Harlan Lachman and Paul Cillo of the Energy Efficiency Institute of Colchester, VT (www.eeivt.com). PAYS® is designed to overcome the key barriers to customer purchase of resource efficiency measures and to ensure long term financial and natural resource savings. The PAYS® system (it may be renamed however its host utility desires) appears ideal for use by water utilities to deliver efficiency services.

PAYS® products are resource efficiency products that, in the determination of a third-party service, will save more money each year than they cost. They are purchased with no up-front payment and no customer debt obligation. The customer at a location where PAYS® products

[2] Although there are other models for such systems now in use by electric utilities, that created by PAYS®, in the opinion of the author, is easily the most powerful for use by a water utility in terms of ability to support all customers, simple transactions, and ratepayer equity, among other parameters.

are installed pays a tariffed charge on the utility bill as long as the customer (or successor customer at that location) realizes savings and only until all measure costs, including financing costs, are paid.

PAYS® normally does not require rebates to create customer investment in resource efficiency, although a host utility may decide to offer rebates to cover the portion of a desired item that is not sufficiently cost-effective from the customer's perspective. It is a market-based system in which customers, vendors, and capital providers acting in their own interests produce unprecedented efficiency investments that are also in a utility's interest. Like other market-based systems -- mortgages, leases, credit cards -- PAYS® makes it easier for vendors to make sales and for consumers to make purchases by putting a system in place that overcomes market barriers that have long inhibited purchase of resource efficiency products.

Customers will buy PAYS® products because:

- They pay nothing up front and assume no debt obligation;
- Independent, credible analysis assures products will function well and savings will exceed costs;
- Customers only pay while they personally save. If a measure fails and is not repaired or if the customer leaves the home, the customer's payment obligation ends.
- Since customers only pay while they save, split incentives are not an issue (this occurs when resource saving equipment must be purchased by someone other than the end user - for example, a developer or landlord who is unlikely to benefit directly from the investment); and
- There is a more equitable distribution of costs and benefits than with normal rebate-based efficiency programs because capital is not limited, practically anyone may participate, and non-participants do not have to pay for benefits provided to someone else.

The PAYS® system is being successfully piloted by two New Hampshire electric utilities, and is moving toward implementation with utilities in Hawaii and Kansas. The next step is to determine its capabilities with a water utility.

Conclusions

This paper is less about technology than it is about the power of imagination. Those who deal with emerging global resource trends share the notion that solutions adequate to the significant tasks before us, of which the Petaluma water issue is but a hint, will be extremely resource efficient, equitable, cost-effective, attractive, and highly integrated in their design.

There is now a way to bring these qualities to bear as we determine how to accommodate water and other resource responsibilities into the future. For Petaluma, this can provide uncommon service to all water customers while avoiding the cost of funding most, if not all, of the water conservation subsidies otherwise required, and possibly deferring elements of the proposed

reclamation system that have the greatest unit cost. In this view, these are ultimately matters of home economics.

Note to Readers: *Home Economics* is a title borrowed from a collection of Wendell Berry's essays (North Point Press, 1987). Nearly two decades hence, here is a new opportunity for the general course of those ideas to bear fruit. Berry, after all, is first a farmer.

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1999



NARUC

Pay-As-You-Save Energy Efficiency Products: Restructuring Energy Efficiency

The National Association of Regulatory Utility Commissioners

Paul A. Cillo
Harlan Lachman

December 1999

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Pay-As-You-Save Energy Efficiency Products

Restructuring Energy Efficiency

December 1, 1999

Prepared for the

National Association of Regulatory Utility Commissioners

Committee on Energy Resources & the Environment

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Pay-As-You-Save Energy Efficiency Products

Restructuring Energy Efficiency

Paul A. Cillo & Harlan Lachman
December 1, 1999

Purpose

This paper explains how regulators and other policymakers can promote widespread market-based investment in energy efficiency. Establishing a new market infrastructure can dramatically increase the number of customers in every sector who buy cost-effective energy efficiency products. While especially suited to states that are restructuring their electric industry, this approach can be used by any state interested in maximizing the economic and environmental benefits of energy efficiency investment while minimizing the need to rely on public funding sources. Pay-As-You-Save efficiency products offer a way to restructure the energy efficiency market and release the pent-up demand of American consumers for energy efficiency in their homes and businesses.

Energy Efficiency and Market Barriers

There are long-term public benefits from investment in energy efficiency. Lower usage means less pollution and a smaller (and therefore less costly) transmission and distribution infrastructure. Using energy efficiently extends our limited energy resources. Most important to consumers, however, eliminating energy waste lowers energy costs. Lower costs improve the competitiveness of businesses and increase customers' discretionary income, thereby raising their standard of living.

While these benefits seem sufficient to justify investment in energy efficiency, individuals typically do not use societal criteria when making personal or business decisions. Consequently, if policy makers want individuals to invest in energy efficiency so that society can realize the benefits, they have to address the obstacles that inhibit individuals from making these investments.

Lack of money (or competing demands for available funds), lack of technical expertise, and uncertainty about one's continued occupancy at a particular location all combine to prevent customers from choosing to invest in energy efficiency in

their homes and businesses. The so called split incentive, when energy using equipment is purchased by someone other than the end user, also inhibits the selection of energy efficient equipment. Builders, developers and landlords profit by purchasing the least expensive equipment, even though the end user's life cycle cost for energy inefficient equipment may be much higher. Another significant barrier is the one least understood: rational, well-informed consumers with access to capital and an understanding of the life-cycle value of efficiency investments often do not make such investments because the up-front cost is more real to them than the theoretical future savings.

Attempts to address these obstacles or market barriers have produced a myriad of programs. Information programs are designed to provide the technical expertise that customers lack. Direct-install programs address customers' lack of technical expertise by sending out trained individuals to correctly install the right products in the proper locations. Incentive programs offer to pay people to purchase products they would not otherwise buy.

Most state utility efficiency plans, whether in the context of continued regulation or of a restructured industry, rely on either of two long-used approaches to promoting energy efficiency: utility-funded incentive programs or free market sales of energy efficient products.

Limitations of Utility Funded Incentive Programs

Utility-funded programs are paid for by all ratepayers and can be implemented statewide or through local distribution companies. The justification for using incentives to encourage people to invest in energy efficiency is sound, especially for new products. These programs allow experts in energy efficient technologies and the marketplace to offer subsidies to increase the number of purchases of cost effective measures. Some experts assert that subsidizing purchases of new energy efficiency measures will help these measures to gain market acceptance and will thus facilitate market transformation. Perhaps the strongest justification for incentive programs is that without subsidies, there is little customer investment in cost effective energy efficiency.

However, the incentive approach has drawbacks. Incentive programs do not eliminate the underlying market barriers for most customers. Large segments of the potential market for such measures have not chosen efficient alternatives despite the availability of rebates or subsidies of part of the up-front costs. And among those who do participate, many do not repeat such purchasing patterns.

Utility incentive programs also use ratepayers' money to pay for participating customers' savings. Subsidizing one customer's savings with other customers' money can create resentment that undermines public support for and limits the sustainability of such programs.

However, the most significant drawback to incentive programs is that they limit customer investment in energy efficiency. Customers learn to buy only those products that someone has determined merit a subsidy. Products without subsidies or with low subsidies, even if they are more cost effective, become less desirable and less likely to be purchased. For example, when the state and federal tax credits for solar water heaters ended in the early 1980s, the solar industry collapsed, even though the technology had improved and its cost effectiveness had increased as a result of rising energy prices.

Incentive programs also limit customer investment in energy efficiency because the decision about how much funding to make available for incentives is usually based on the amount of the wires charge, not on an analysis of how much is needed to ensure all customers purchase all cost-effective energy efficiency technologies. While a public benefits fund is a necessary component of operating an electric system, raising the additional funds for incentives unnecessarily increases the cost of electricity. Since regulators, distribution companies, energy service companies, and customers want to keep costs at reasonable levels, the tendency is to limit the funds available for subsidies and thereby limit investments in energy efficiency.

In most states (e.g., California, Connecticut, Illinois, Maine, Massachusetts, New Hampshire, Ohio), the amount allocated for incentives is the result of a decision by legislators or regulators about how large a surcharge ratepayers will tolerate. Whether one considers this amount large or small, it creates a ceiling on what can be accomplished that has nothing to do with the amount needed to fund customer installation of all cost effective or desirable energy efficiency products.

Limitations of Free-Market Energy Efficiency

The free market approach leaves it to vendors to decide whether or not to offer energy efficiency products and services and how much to charge. Typically customers choose vendors that offer desired services at reasonable prices. The justification of the free market approach is that little or no government involvement ensures that customers will get the best price and can buy only the services they want. Advocates for a free market approach to energy efficiency assert that entrepreneurs will invent and market products when there is money to be made.

However, the free market approach only works if the market for efficiency is structured in such a way that customers can actually express their desire for energy efficiency through purchases. This market structure does not exist. The same market barriers that led to the creation of utility programs continue to prevent most customers from purchasing energy efficiency measures.
Customers lack the capital and expertise required to install most energy efficiency technologies. Most customers have no guarantee they will remain at a location long enough to realize a sufficient return on an investment. Split incentives inhibit investment in energy efficiency products by builders, developers and property managers. Maintaining energy efficiency equipment to ensure savings is still a hassle. Consumers are risk adverse and most will not pay an up-front cost for an

efficiency measure, even if they are aware that there are life-cycle savings and can afford the initial outlay.

Additionally, electricity distribution companies and energy providers whose earnings decrease when sales decrease are unlikely to want to offer successful, widely available services that significantly lower their sales. Other companies lack the access to customers and a billing and payment system that might make the difference between a successful or failed energy efficiency venture. Unless all these market barriers are addressed, only a small percentage of the country's efficiency potential will be realized.

Defining the Problem

Although there is no universally accepted standard for quantifying the savings potential of all currently available energy efficiency technologies, there is agreement that the potential is significant. Neither traditional incentive programs nor the free market approach will effectively capture a significant amount of this energy efficiency savings potential.

Continuing to use the incentive approach will not significantly increase investment in energy efficiency because insufficient funds will be appropriated for incentives to subsidize installation of even a fraction of all cost-effective technologies. Additionally, once incentives exist, consumers are less likely to buy the product(s) without an incentive.

At the same time, simply returning to a free-market approach will reduce investment in energy efficiency. If there were no market barriers, there would already be enthusiastic investment in cost effective energy efficient products, those technologies whose savings exceed their cost (or incremental cost). Thus, if market barriers are not addressed and current subsides are eliminated, there would be nothing to attract customer investment in energy efficiency.

The problem is not a matter of money. Customers are already spending enough money on energy to pay for all cost-effective energy efficiency technologies. If a product's lifetime savings exceed its costs and if its costs were spread over time, customers would see immediate bill reduction. All that has to occur to fund the installation of all cost effective energy efficient technologies is to redirect the amount being spent on energy in today's marketplace to the purchase of cost-effective energy efficiency technologies. Market barriers are the reason this has not already occurred.
Utilities are not going solve this problem because if they were successful their sales would be reduced. Manufacturers and retailers of energy efficient products would supply a vibrant market if it existed. However, such a market cannot exist without a new infrastructure.

Key Assumptions for Energy Efficiency

Instead of ignoring market barriers or offering programs with incentives that artificially limit energy efficiency investment, we can restructure the way energy efficiency products and services are packaged and sold. By doing this, products with a very limited market can be made into products that most customers will want. The restructuring proposed in this paper is based on three fundamental assumptions:

1. How much you ask customers to pay for something is not as important as how you ask them to pay for it.

   There is a perception that people do not want to pay money for things. Actually, people are willing to pay money for things they value if the products are packaged in a way that responds to what consumers want. Bottled water is a good example. Offering to sell a three-year supply of bottled water for a fixed price of $500 may get a few takers. Selling a bottle of water for $1.00, however, responds to a real market and exponentially increases sales. Though an individual may spend much more than the $500 over the three years by purchasing one bottle at a time, portability, ease of purchase and the small financial commitment of each purchase change an unmarketable product into a marketable one.

2. People are more likely to pay for something if they only pay while they use it.

   Many products are purchased by paying a large amount of money in small increments over the time a product is used. There is a whole set of products (e.g., homes, cars, internet access, and even cable TV) that exist because of this payment approach. Part of the reason for the large number of owners of these products is that most people finance their purchases, knowing they can stop their payments when they sell their home or car or stop using internet or cable services. In fact, many people care more about the monthly costs for these products than their total costs.

3. People value what they pay for.

   Many people assign value based on the amount something costs. If someone has to pay money for something, they are more likely to use it. If customers are required to pay their own money for an efficiency measure, an implicit message is, "This efficiency measure is worth something." Conversely, to the extent the public has to be offered an incentive to buy a product, the message is, "You would not want this if you had to pay its full cost." Thus, perversely, if public funds are used to reduce or eliminate customers' costs for energy efficiency products, these products are less likely to be used and maintained properly and the savings from their installation are likely to be lower.

Pay-As-You-Save (PAYS) Efficiency Products

Restructuring energy efficiency requires a new set of products and services so that energy efficiency investment flows from marketplace decisions. End-user Pay-As-You-Save (PAYS) products involve restructuring the sale of proven technologies. Restructuring makes current products desirable to customers by eliminating the barriers to purchasing them. With no market barriers, consumers will purchase these products without incentives.

PAYS products:

- ensure that customers pay for a product as they realize its savings;
- save more than they cost; and
- are user friendly so customers will actually use the product and realize its savings.

PAYS products do not require consumers to have cash on hand or special technical expertise or to know they will stay in their current location for the next ten years. These products are designed to work for the consumers who want them.

PAYS Product Infrastructure

PAYS products cannot now be offered by vendors or energy service companies. They require the development of a new market infrastructure. The best way to discuss this concept of a product and how product design is affected by infrastructure is to use housing as an example.

Housing is a product. Few homes were purchased when people had to pay cash for the full value of the house. The market barrier to home ownership was lack of capital. Public subsidies to homeowners might have been a solution, but home ownership, though increased, would have been limited by the amount of money available for the subsidies.

Mortgaged financing within a regulated lending infrastructure was another solution. This solution involved creating a new product, mortgaged financed homes, that exponentially increased the number of homebuyers. Mortgage financed condominiums with legislated definitions and rules of ownership is another housing product that expanded the market for housing to even more customers.

These are familiar examples of packaging that transform what used to be an unmarketable product to one that is marketable. These new products were not possible without the legislative and regulatory lending and property transfer infrastructure that did not previously exist.

The new infrastructure for PAYS products includes a similar financing mechanism, the creation of an energy services charge. The energy services charge is the financial collection mechanism that allows PAYS products to exist. The energy services charge would appear each month on the customer's utility bill and remain a customer obligation at the meter location where the energy efficiency technologies were installed until the obligation is satisfied. An important new feature of the energy services charge is that more than one customer could end up paying for the installation at a location if occupancy changes hands during the term of the obligation.

The PAYS infrastructure must assure customers that PAYS products will save more than they cost. The monthly charge for a PAYS product has to be set so that the annual costs are less than the annual savings and the term of the charge is shorter than the life of the measure.

The PAYS infrastructure must also ensure that PAYS products are those that customers can and will use so that there are in fact savings. Products not installed or improperly installed will not produce savings. Therefore, PAYS products must be designed to be useable so that customers can easily learn where and how to install them (or the savings are great enough to pay for professional installation).

Usability also includes assurances that PAYS products deliver what customers want. For example, the earliest horizontal access washers were too small for American consumers and too difficult to use. The earliest energy efficient home heating systems were too complicated for local home heating companies to service. Just because a product is affordable and the payment system is consumer friendly does not make the product usable. PAYS products must be carefully designed to be desirable consumer products. Surveys, tests, and careful review can ensure customers get user-friendly products.

These assurances require a certification infrastructure that approves the products, payment terms, and the product installers or vendors. Initially, it is likely that states or utilities will establish or contract with a state agency, non-profit or business to certify PAYS products and set (or approve) the maximum monthly payment amount. Experts without a vested interest in the sale of a specific product will be better able to evaluate the likelihood that a product's annual savings will exceed its monthly costs and that a product is sufficiently reliable that it will last longer than the duration of the payments.

There are a number of ways to assure that customers will save more than they pay each year while assuring that product and financing costs are covered. Careful selection of reliable, long-life products is the simplest method. This could be combined with negotiated extended warranties from manufacturers or vendors for assured product life and savings.

Finally, states that have public benefits funds or other energy efficiency program funds used for incentives can redirect this money to supplement manufacturers'

warranties. Public funds in this case would be used to reimburse participants' costs that were not offset by promised savings after they made an investment in the public interest by selecting a PAYS product. In essence, this would be a publicly funded insurance program in a free market using funds that would otherwise have provided direct subsidies to every participant.

Regulators and or legislatures will have to approve these essential mechanisms for the PAYS approach to work. These include the appearance of the energy services charge on the distribution utility bill, the requirement that the obligation to pay for long-life measures stays with the meter, and the right to disconnect for non-payment of the energy services charge. Because of the need for consumer confidence in measures subject to these provisions, oversight of the market is required, especially at the beginning of a PAYS approach. Mandatory disclosure and warranties may also be beneficial.

How PAYS Products Work

Once the energy services charge and the other infrastructure changes are in place, PAYS products could be offered by a variety of vendors in the marketplace. Any cost-effective energy efficiency technology can be made into a PAYS product. The upfront capital for installation could be provided by a customer's electricity distribution company, energy supplier, a loan fund or even a product vendor. Whoever supplies the capital is repaid (including financing costs) through the customer's monthly payment of the energy services charge.

The electricity distribution company collects the energy services charge payments and forwards them to the capital provider (unless the distribution company supplied the capital). This is similar to the requirement that distribution companies collect energy charges and forward them to energy suppliers in both retail competition and non-competition states. Non-payment results in disconnection like any other billing charge.

The energy services charge for long-life, permanently installed measures, such as heating and ventilation systems, is assigned to the meter location. A customer's obligation to pay an energy services charge for such a measure ends when that customer's occupancy ends. The obligation automatically transfers to the next customer at that location. The energy services charge is structured to be less than the energy savings over the course of each year, so that future customers will pay less than they would have without the installed energy saving technology.

A different approach is used for shorter-life and removable measures, such as compact fluorescent light bulbs or room air conditioners. For these measures, customers will be required to pay any remaining balance or transfer the monthly payment obligation to their new location when they move.

The energy services charge mechanism ensures that the customers who get the savings pay the bill. Without this component, energy efficient technologies are

often not installed since developers and builders can keep their project costs low by not incurring the added expense of installing energy efficient technologies. Similarly, occupants (both renters and homeowners) who are uncertain about their future tenancy tend not to install energy efficiency technologies, unsure they will be there to see the savings.

For cost effective products, consumer assurance mechanisms can address consumer uncertainty. Certification of vendors and products, extended warranty requirements for product reliability and savings, and effective disclosure requirements combine to eliminate customer doubts. PAYS is not applicable to unproven technologies or technologies that are known not to be cost effective since there is no assurance the savings required to offset the monthly charges will be realized.

A PAYS Example

The Burlington Electric Department of Burlington, Vermont (BED) recently commissioned a study of PAYS products. As part of its design effort, BED staff and consultants developed the following example from a real-life project that illustrates how PAYS addresses the split-incentive problem.

A developer proposed a six-story project for downtown Burlington, Vermont with 16 tenants. To reduce costs and ensure that tenants paid for their own energy usage, the developer specified individual heating and cooling units for each tenant. BED proposed to upgrade each heat pump system with a high efficiency model and to build a cooling tower (metered on the building's main account) at a cost of $24,536. A conservative estimate of the life of these measures was fifteen years.
(All values are stated in nominal dollars.)

Measure	Incremental Cost	Annual Owner Savings	Annual Tenant Savings
Heat Pumps	$ 22,040	$ 0	$ 5,931
Cooling Tower	$ 2,496	$ 873	$ 0

Under Vermont's mandated new construction program, BED's customers would pay the entire $24,536. The developer and the tenants would pay nothing.

In BED's alternative, BED would pay for 100% of the up-front incremental cost. The developer has no additional out of pocket costs for installing the energy efficiency equipment.

BED would recover its costs through monthly energy service charges placed on each tenant location. The tenants pay each month out of their savings. The energy services charge would be collected over 10 years (two thirds of the estimated 15-year life of the measures) and be less than the projected monthly savings.

Since the tenants realize the savings from more energy efficient heat pumps, they (not the building owner) pay for their incremental cost. Since the building owner realizes the savings from a more efficient cooling tower, the building owner pays the incremental cost of the more efficient cooling tower. Assuming 10 years of payments and an 8.25% cost of capital, BED will eventually recover its costs while these customers receive the savings as follows:

Party	Total Payments	10 Year Savings
Tenants	$ 32,440	$ 59,310
Building Owner	$ 3,674	$ 8,730

If the building owner sells the building, the new owner, who now receives the savings from the more efficient cooling tower, continues to make the monthly payments until BED recovers all its costs, including financing, for that portion of the project. If tenants move out, their payment obligation is transferred to the new tenants, who now realize the savings from the more efficient heat pumps and pay the energy services charge until all BED costs have been recovered for that portion of the project. The monthly payments and savings for participants during the ten-year period would be as follows:

Party	Monthly Payment	Monthly Savings	Net Monthly Benefit
Tenants	$270.33	$494.25	$223.92
Building Owner	$ 30.61	$ 72.75	$ 42.14

In this example, the developer installs measures making his building more desirable to potential customers and society at no additional cost. The customers who occupy the building pay for the measures out of their savings until all project costs are recovered. BED's customers are not required to pay for individual customers' savings.

PAYS Products Track Record

PAYS is a new concept. In many states, regulations about disconnection and the charges that can appear on customers' bills make demonstration of this approach difficult. Further, we know of no state that currently allows charges for long-term obligations to be assigned to a meter location and automatically transferred to future occupants until the obligation is satisfied. However, various components of PAYS have been used in the past and there is a large body of data that may be instructive.

For example, many utilities rented water heaters to customers, especially in the 1960s. When customers left and new customers replaced them, the water heaters

remained and the new customers assumed the rental. While this was the new customer's choice, it may illustrate customer tendency to accept sensible decisions made by previous occupants.

Utilities in Vermont, Ohio and Texas have demonstrated that customers are willing to lease energy efficient products and pay monthly as part of their electric bills. Utilities in these states have leased thousands of compact fluorescent light bulbs. In Texas, utilities have also leased hundreds of refrigerators. BED set up its own loan program to help customers switch from electric heat to gas. In fact, an energy services charge that stays with the meter was used by Pacific Power & Light for commercial and industrial customers in the early 1990's. To a large extent, the PAYS approach builds on what was learned during the design and implementation of these programs.

Why PAYS Products Make Sense

Even though customers who install PAYS products will pay the entire cost, more energy efficiency will be realized than from incentive programs that enable potential purchasers to pay less. This is because PAYS products actually eliminate market barriers.

1.) The consumer does not need capital to purchase a PAYS product. Available measures are financed and there does not need to be any up-front payment.

2.) Customers need less technical expertise because they can trust that products eligible for PAYS will work and that savings will be guaranteed.

3.) Customers' concerns about their duration of occupancy and obligation to pay for long-life measures are mitigated because the obligation stays with the property not with the customer.

4.) The split incentives barrier is solved since designers, builders and landlords will not have to pay for more efficient installations. The end user who receives the savings will pay for them. In fact, designers and builders will be able to sell more valuable buildings at the same net cost.

5.) Savings from energy efficient technologies will be more likely to continue over the life of measures. Both the original customer and any subsequent customers will be more conscious about maintaining energy saving products since they will be paying the charges each month.

6.) There is no need for costly baseline studies to ascertain which measures require subsidies and which do not (and amount of the subsidy) and no need to compute avoided costs. Since there are no subsidies paid by all ratepayers, all proven cost-effective products can be turned into PAYS products and savings will be valued by the customer at the customer's energy cost.

Conclusion

In national surveys, consumers have expressed support for energy efficiency and a healthy environment. If policy makers want to realize a significant portion of the potential public benefits of energy efficiency, including the environmental benefits, they need to restructure the energy efficiency market so that vendors can develop and offer products that respond to consumers' unmet demand.

PAYS products have the potential to significantly increase customer investment in energy efficiency. If these products are going to exist, however, policy makers must establish a new market infrastructure. In order to develop the new infrastructure in any state, additional research will be needed. Appendix A provides a list of essential infrastructure elements needed to implement the PAYS approach. Establishing this infrastructure may require changes to state statutes or regulations. A review of current statutes and regulations is necessary to determine what changes are required for each state.

Once the new infrastructure is in place, PAYS products can be developed for all proven cost-effective technologies and for all classes and sub-groups of customers. These products do not require retail competition. However, if a state is restructuring its electric industry, it makes sense at the same time to put in place the infrastructure that enables the PAYS approach to work. PAYS products can effect real market transformation by turning existing technologies into desirable products.

Appendix A

Essential Elements of Pay-As-You-Save Infrastructure
(Statutory or Regulatory Action May Be Required)

The following are some of the essential elements that may require statutory or regulatory action in order to implement the PAYS approach. The nature of the action required (or whether an action is required) will vary by state. However, it is necessary that these elements be in place for PAYS products to be offered.

1. Electric distribution companies must be required to collect energy service charges (ESCs) when authorized by the Commission's designated agent (i.e., a certified vendor, a certifying agent, or certifying agency) and forward the collected funds to the financing entity (product vendor, bank, loan fund) or this designated agent.

2. Electric distribution companies must be permitted to follow their disconnection practices for non-payment of ESCs.

3. For specified long-life measures that become part of the real property at a meter location, after the initial customer terminates his/her account, the distribution company must be responsible for collecting ESC payments from successive customers at that meter location until all payments have been collected.

4. For specified portable measures, when customers terminate service at a location, distribution companies must be required to transfer the customers' ESC payment obligation to their next location or to collect all outstanding payments -- at the customers' option.

5. Distribution companies must be required to keep records of ESC charges assigned to meters, including the amount of each charge, the payment term remaining, a description of the measure(s), and the projected monthly customer savings.

6. Distribution companies must be responsible for disclosing to potential new customers, prior to establishing service, the existence of any ESC at a location and information about it such as the measure(s), the estimated savings per month, the remaining term of the payments, and other similar information. There needs to be performance criteria to ensure the utility communication to the new customer is successful. The designated agent should be empowered to contact the distribution company to verify its procedures for supplying this information to customers and its compliance with this requirement.

7. A designated agent needs to be authorized with specific responsibilities regarding assigning ESCs. Responsibilities 1must include, but not necessarily be limited to, approving specific measures, ensuring savings exceed costs (e.g., requiring adequate warranties, establishing conditions for sale or installation, limiting measure costs, etc.), and resolving customer complaints. Additionally, the designated agent could receive funds from the collecting utility and forward the appropriate amounts to each of the financing entities.

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NARUC

More Distributed Generation With Pay-As-You-Save

The National Association of Regulatory Utility Commissioners

Paul A. Cillo
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More Distributed Generation With Pay-As-You-Save

November 1, 2001

Prepared for the

National Association of Regulatory Utility Commissioners

Committee on Energy Resources & the Environment

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More Distributed Generation With Pay-As-You-Save

Paul A. Cillo & Harlan Lachman
November 1, 2001

Introduction

The market-based Pay-As-You-Save (PAYS) approach to energy efficiency investment was first described in the authors' December 1999 paper.[1] PAYS allows customers to pay the total cost for certified cost-effective energy efficient measures over time using a portion of their expected savings. PAYS eliminates the customer's obligation to pay a large sum up front or to pay for savings that they may never receive. The first PAYS pilot program in the nation is awaiting approval from the New Hampshire Public Utilities Commission for a January 1, 2002, start up.[2]

Since PAYS was first discussed, regulators and other policy makers have suggested that a PAYS approach might also stimulate the distributed generation (DG) market. This paper provides a brief overview of PAYS, a review of the major barriers to widespread implementation of DG and discusses how PAYS could help to overcome some of these barriers.

PAYS Background: Market-Driven Energy Efficiency

PAYS offers a hassle-free way for consumers to purchase certified energy efficiency products with reduced risk and save money immediately. PAYS products:

- are hassle free because consumers can purchase them in one simple transaction with no up-front payment;
- relieve consumers of the major risks of investing in energy efficient technologies since these products are guaranteed by a consumer-trusted organization and there is no obligation for the customer to pay if for any reason the energy-saving measure stops working or the customer leaves the location where the measure was installed; and
- ensure that customers' savings are estimated to be significantly greater than their monthly payments.

PAYS products are packages of one or more cost-effective energy-efficient measures paid for over time on the monthly electric bills of the customers who receive the savings. PAYS packages energy-efficient technologies that benefit society as products that consumers want to buy and are willing to pay for. Only technologies that customers can be confident will produce savings are packaged as PAYS products.

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[1] "Pay-As-You-Save Energy Efficiency Products: Restructuring Energy Efficiency," Paul A. Cillo and Harlan Lachman, December 1999, prepared for the National Association of Regulatory Utility Commissioners (NARUC) Energy Resources and the Environment Committee.

[2] Docket Number DE 01-080, Pay-As-You-Save. If approved, as anticipated by the parties, the New Hampshire PAYS pilot program will be implemented by Public Service Company of New Hampshire (PSNH) and New Hampshire Electric Co-op (NHEC). PSNH's initial efforts will target larger municipal customers while NHEC's will primarily target residential and small commercial customers. NHEC will also allow its members to purchase PAYS products that save energy from all fuel sources and pay for them on their monthly electric bill. After eighteen months of operation, both utilities will prepare detailed process evaluations of their pilots to allow these utilities and the Commission to determine whether or not to expand the pilot.

While the benefits to society (less pollution, financial savings, and transmission and distribution system savings) may seem sufficient to justify investment in energy efficiency, individuals and businesses typically do not use societal criteria when making energy decisions. Consequently, if individuals are to purchase energy-efficient technologies so that society can realize the benefits, the obstacles that inhibit individuals from purchasing them need to be addressed. PAYS provides a vehicle to address these obstacles with significantly less public cost than most other approaches.

Unlike shared savings contracts, specific savings are not guaranteed. Instead, payments are structured so that for both the short and long term, customers' savings are estimated to exceed their payments. Additionally, PAYS does not use a traditional financing structure, which requires the purchaser to assume responsibility for making all of the payments. With PAYS, customers who purchase measures assume responsibility for making payments only while they are customers at that location. When a customer terminates occupancy at a location, the obligation to pay for measures is disclosed and transferred to the next customer at that location. The next occupant gets the savings and assumes any remaining payment obligation for the duration of occupancy.

The utility delivery service company provides billing and collection services for PAYS since it is the only entity that bills customers at every location and is capable of transferring energy charges to successive occupants. The PAYS arrangement is described by a tariff filed by the local utility distribution company and approved by regulators. Although PAYS relies on a tariff, it is a market-driven approach. The tariff only applies when customers decide to buy certified PAYS products in the marketplace.

As a tariff, PAYS is available to all customers who install PAYS-certified products. PAYS is similar to line extensions in that permanent energy-saving products for the benefit of the customer at a location are installed and then paid for by whomever the customer is at that location until the term of the tariff obligation has expired. The obligation to pay for PAYS products is not a debt assumed by an individual customer. Rather, it is simply a contractual obligation to make payments, with the tariff (which has the force of law) providing the assurances to the capital provider that would normally arise out of loan documents. Moreover, tariffs and the rules surrounding them are under the jurisdiction of state regulators, who can provide informal and expeditious consumer protections to supplement the costly and often lengthy court process. For government entities installing cost-saving measures, paying a tariff does not require voter approval since the installations do not involve customer assumption of any long-term debt.

Distributed Resources and Market Barriers

> *Distributed resources are demand- and supply-side resources that can be deployed throughout an electric distribution system (as distinguished from the transmission system) to meet the energy and reliability needs of the customers served by that system. Distributed resources can be installed on either the customer side or the utility side of the meter.*[3]

This definition of distributed resources includes two points that are important to this paper. First, distributed resources include both demand and supply-side resources. Demand-side investments

[3] "Profits and Progress Through Distributed Resources"; February, 2000; David Moskovitz, Regulatory Assistance Project.

(i.e., investments in energy efficiency and load management measures) were addressed in the 1999 PAYS paper. The possibility of using PAYS to facilitate customer investment in supply-side resources (i.e., generation) is the focus of this paper.

The second point included in this definition is that distributed resources can be installed on either side of the meter. PAYS was designed for products installed only on the customer side of the meter. PAYS is not a tool for utilities to determine whether to invest in efficiency or generation, but a system that enables customers to purchase and pay for cost-saving products. Therefore, this paper will discuss distributed generation installed only on the customer side of the meter.

Distributed generation technologies can provide benefits to the customers who install them, their utility and society. Customers can benefit from the lower costs and increased reliability from DG. Their utility can benefit from system improvements such as improved system reliability, reduction of excessive demand on the transmission and distribution system, and reduced line losses. DG can benefit society with lower emissions and reduced harmful impacts to land and water resulting from the use of more efficient technologies.[4] DG can also provide greater flexibility to meet the needs of customers, utilities and society because DG can be up and running quickly (i.e., it is generally easier to permit and install) and is readily adaptable to renewable energy sources.

If barriers did not exist, given these obvious advantages, there would be widespread customer purchase and installation of cost-effective DG throughout the country right now. The most obvious barriers are the regulatory issues that must be resolved. Many of these issues were discussed in a 1999 Arthur D. Little white paper.[5] Some of the key policy issues cited in the paper include:

- Interconnection and Interface.
  If customer-installed generation is to be interconnected to the utility grid, appropriate policies, protocols and equipment must be in place to ensure system safety and reliability and define issues such as market participation and pricing signals. This requires clear utility interconnection and interface policies that customers can readily understand and can count on and system requirements that are affordable for customers to implement.

[4] There are many types of DG. All references to DG in this paper refer to clean DG such as wind, solar, gas microturbines, combined heat and power, etc. Regulators may want to inhibit or even prohibit the installation of dirty DG. For example, some fossil-fuel fired DG is less efficient than larger-scale generation and thus produces more carbon dioxide per kWh. In addition, nitrogen oxides, carbon monoxide, and particulate matter are produced in varying amounts with these systems, depending on the characteristics of combustion, and "tailpipe" clean up is usually cost prohibitive.

[5] "Distributed Generation: a Policy Framework for Regulators," 1999, Arthur D. Little, Inc.

- Grid-side Benefits and Costs.
  Customer-installed interconnected generation can be a cost and/or a benefit to the utility system depending on where the DG installation is located and how it is operated. Ideally, customers would install DG where it benefits the system as well as the customer, but customers do not have information about whether their sites provide those system benefits. Additionally, unless the utility or the government provides financial incentives to the installing customer, that customer does not share in the system benefits of DG beyond those benefits that all customers receive.

- Siting and Permitting.
  While small, standardized DG equipment would generally not require the lengthy permitting processes that large central generation requires, there are issues associated with DG that may require siting permits and emissions approvals. While permitting may equal a small percentage of the costs for a large power plant, they represent a much higher percentage of the costs for a DG installation and depending how policymakers structure siting and permitting requirements for DG, these issues may present real obstacles to customer installation of DG.

Regulators have the authority and ability to resolve all of these issues. However, to the extent that these issues remain unresolved or are resolved in a way that is unfavorable to customers who want to install DG systems, they present barriers to the DG market. Prohibitive fees, strict interconnection policy requirements, or withholding incentives for distributed generation in transmission or distribution-constrained areas are examples of policies that may or may not be justified but prevent customers, vendors, and society from realizing the benefits of DG. Clearly, finding a way to balance the legitimate concerns of utilities and the non-DG customer with the needs of individual DG customers and society is the important job of policymakers if customer-installed DG is to become viable.

However, resolving these major issues will not be sufficient to create a vibrant market for customer-installed DG. Even if the major regulatory issues specific to DG are resolved, a number of less-obvious market barriers remain. These market barriers threaten to inhibit widespread investment in DG as they have with energy efficiency for years. Several of the key market barriers to customer investment in any DG technologies were discussed in our 1999 paper relating to energy efficiency measures:

> *Lack of money (or competing demands for available funds), lack of technical expertise, and uncertainty about one's continued occupancy at a particular location all combine to prevent customers from choosing to invest in energy efficiency in their homes and businesses. The so-called split incentive, when energy- using equipment is purchased by someone other than the end user, also inhibits the selection of energy efficient equipment. Builders, developers, and landlords profit by purchasing the least expensive equipment, even though the end user's life cycle cost for energy inefficient equipment may be much higher. Another significant barrier is the one least understood: rational, well-informed consumers with access to capital and an understanding of the life-cycle value of efficiency investments often do not make such investments because the up-front cost is more real to them than the theoretical future savings.*[6]

[6] " Pay-As-You-Save Energy Efficiency Products: Restructuring Energy Efficiency," Paul A. Cillo and Harlan Lachman, December 1999, prepared for the National Association of Regulatory Utility Commissioners (NARUC) Energy Resources and the Environment Committee.

Distributed Generation and PAYS

Customer investment in DG will encounter similar barriers to customer investment in energy-efficient technologies. Both types of investments require:

- large capital expenditures;
- informed customers who have the time to gather information, trust the information they find, and use it to evaluate their options;
- customers willing to accept the payment obligation for installations that produce savings that might be realized by subsequent customers; and
- landlords or developers who are willing to live with split incentives, i.e., invest additional money in their projects so that tenants or future owners can have lower energy costs.

PAYS was designed to address these barriers. Therefore, regulators and other policy makers can implement PAYS to help consumers interested in investment in DG to overcome them.

Large capital expenditures. PAYS does not require customers to make up front payments or even commit to assuming the costs for raising the necessary capital. Capital is provided by a third party (e.g., the vendor, manufacturer, or an investing party). A PAYS tariff is used to generate a stream of revenue to reimburse the capital provider. The purchasing customer only has to agree to make monthly payments that in combination with new fuel costs are estimated to be significantly less than the customer's current costs. The capital provider relies on the assurance and reliability of the utility billing and collection service, one of the most reliable payment streams in the nation, instead of loans, leases or other traditional financial mechanisms.

Informed customers who gather key information they can trust. PAYS makes the process easier for customers to decide whether to install DG. The same certification system that facilitates customer confidence in PAYS energy-efficient products can be used to provide confidence in PAYS DG technologies and their installation. If an independent entity verifies what a project entails (e.g., permits and interconnection equipment required), verifies the cost and savings estimates for the project, and provides the assurance that customers receive basic consumer protections (e.g., bonded contractors, contracts that clearly spell out all responsibilities, extended warranties), customers will be better positioned to confidently accept accurate vendor claims.

Customer payment obligation. Paying a PAYS tariff for a DG installation obligates customers to pay only during the time that they benefit from the installation. If the unit stops working, the charge ends. If the customer leaves the location, that customer's obligation to pay ends. The tariff binds successor customers at that location to assume the payments when they take occupancy and assume the benefits of the installation. As long as there is adequate disclosure, successor customers can decide whether to take occupancy based in part on their analysis of the cost and benefit of the DG installation at that location.

Split incentives. A PAYS tariff ensures a developer or building owner that installing a certified DG system will benefit subsequent building occupants and that the occupants who benefit will pay 100% of its cost. The PAYS tariff also enables a tenant or lessee who wants to install a certified DG system to do so with the landlord's permission. The PAYS tariff relieves tenants or lessees of any obligation to continue to pay the tariff for permanent equipment that cannot be taken with them once the period of their occupancy has ended. PAYS offers the first real opportunity to eliminate the split-incentive market barrier.

There are other benefits resulting from the use of a PAYS tariff to pay for DG. First, since a tariff is associated with a meter location and not an individual customer, there is no indebtedness created by the decision to install PAYS DG. Many customers cannot afford to borrow even for items that will lower their total annual expenses because their individual or business debt is at its maximum. Municipalities and institutions with annual budgets requiring board or voter approval also have difficulty accepting debt-encumbering purchases. However, since PAYS purchases do not require individual customers to assume new debt that will appear on the annual balance sheet, all of these difficulties may be avoided.

Secondly, even when individuals and businesses have available capital, there are usually competing demands for it (e.g., salary increases, expanded marketing, plant improvements). The capital for a PAYS purchase does not compete with these other interests. Whether supplied by a manufacturer, vendor, or third party, capital for a PAYS measure can only be used for a DG project that meets PAYS requirements. PAYS ensures that investments in DG do not have to be weighed against other competing uses for capital.

Thirdly, PAYS can target public funds to protect customers and investors who implemented desired DG projects in the event an installation fails. Public funds, when available, have been used for subsidies that lower the cost of installations. Used this way, public funds benefit participating customers whether or not they receive the expected savings. PAYS could be combined with publicly funded guarantees to protect customers and the capital providers, who fund their installations, from situations where the customer does not realize any savings and the capital provider will not be reimbursed.

For example, even if a measure is under warranty for the term of the PAYS charge, the measure could fail and the manufacturer could go out of business. In such cases, unless the manufacturer had provided the capital, someone would have to repay the money. A similar problem would exist if a business moved from a location and the location remained unoccupied. Without a customer in the location to receive the benefits from the DG investment, there would be no one to make the payments. In some cases, DG equipment could be removed and resold, but if that was not possible or did not produce sufficient funds, someone would have to repay the balance of the money owed. In these examples, societal funds could be used to guarantee the investment, transferring the risk away from customers and capital providers who invested in projects determined to have societal benefit.

Lastly, when the issue of lost revenues inhibits utility investment in DG, it could be addressed through use of a PAYS tariff. If all of the potential savings from a DG installation are sufficiently robust, the PAYS charge could be increased to allow the utility to recover the value of its lost revenues and the consumer could still be offered sufficient savings to warrant the investment. A PAYS DG tariff could offer vertically-integrated utilities (especially in those states that have not implemented restructuring), independent system operators (ISOs) responsible for overseeing T&D, and distribution utilities in restructured markets a way to help consumers

realize the benefits of DG without the negative lost revenue impacts to the system normally associated with DG.

PAYS Distributed Generation Example

In 1999, a large east coast state university faced a number of problems with its energy systems. The problems included high energy bills, an aging infrastructure requiring costly maintenance, and an electricity distribution system that was inadequate to meet anticipated expansion. The institution was paying approximately $25 million annually for energy, primarily electricity and gas. A leading developer, owner and operator of combined heat and power (CHP) equipment worked with the university to develop a solution that addressed their infrastructure needs and lowered their energy costs. The solution required the installation of $71 million worth of new equipment including two dual-fired combustion turbines with heat recovery generators, a central chilled water plant, improved high-voltage electric distribution and a new metered-steam distribution system. The savings from reduced electricity and gas costs were estimated to exceed $6 million annually.

Were this to be a PAYS measure, the CHP developer would have secured financing, installed the equipment and arranged for its operation and maintenance for a total annual cost of less than $6 million. The utility would have instituted a PAYS tariff equal to the monthly project cost. The university and the state would have taken on no additional debt obligation since their only obligation would have been to pay the tariff and only if they continued to occupy the facility and receive the benefits of the installation. The project would look like this:

Project Cost	$71,000,000
Monthly Payment @ 5% for 20 Years	$ 468,568
Annual Payment	$5,622,822
Estimated Annual Savings[7]	$6,000,000
Net Annual Savings	$ 377,177

This project is currently being implemented without PAYS. The project capital for this state university was raised by the state using state bonds (at a rate of 4.5 to 5%) despite the opposition of the State Treasurer. This is an approach, however, that is not guaranteed to be successful in every state. If the State Treasurer, concerned about the implications of long term debt, had succeeded in denying approval for state bonding for the project, PAYS would have been the only way for the vendor to assure a third-party capital provider that the capital would be repaid by converting the project savings into a reliable payment stream. Additionally, if the client had been a business or institution other than a university with at least implicit ties to a specific location, PAYS would have been the only way to address concerns about occupancy by the client at that location.

[7] The estimated annual savings reflect the incremental savings from reduced operational and maintenance costs.

Market-Driven Distributed Resource Planning

The benefits of distributed resources have been well documented. But the best approach to incorporating distributed resources into the electricity supply and delivery system remains a subject of debate.

Some regulators have initiated distributed utility planning as a way to address some of these issues and move DR forward as a viable part of the utility-customer relationship. Distributed utility planning requires that utilities invest or encourage customers to invest in DR that is less expensive, based on the utility's avoided costs, than alternative utility investments in generation, transmission and distribution. Using a distributed utility planning approach modeled on integrated resource planning provides an orderly way to identify and target DR with sufficient quantifiable system benefits to justify the expenditure of utility funds to ensure that the DR is installed. While this is a worthwhile effort, it is likely to run into the same major problem that integrated utility planning and demand-side management programs have faced – the strong disincentive to reduce load inherent in traditional ratemaking.

The results of energy-efficiency efforts over the past two decades provides a glimpse of what might be ahead for DG if distributed utility planning is the only approach used. While utility demand-side management as part of integrated utility planning has stimulated energy efficiency investment, progress has been slow. Most of the cost-effective energy efficiency measures in the country that could have been installed over this period are still cost effective and waiting to be installed.

While a market-based approach to distributed resource planning on its face appears to be chaotic and riddled with obstacles, using open and fair markets provides one big advantage: the efficient use of public resources. DG vendors' desire to make their businesses grow requires that they develop projects that produce sufficient benefits at low enough costs that customers are willing to buy them. In a free and fair market, the level of investment is limited only by the number of good projects in which to invest.

In the absence of barriers, customers and vendors hoping to benefit from a money-making opportunity will actively seek each other out. The desire for and benefits of a more market-based approach to DG is summed up in the Arthur D. Little white paper's warning that "policymakers will be challenged by stakeholders" to establish fair policies for DG. Failure to do so could result in a failure to provide a level playing field for DG in a competitive market.[8] The challenge for regulators is to structure markets in a way that avoids chaos yet allows vendors, customers and society to benefit from DG.

There is a substantial difference between distributed utility planning and the market-driven PAYS approach. Distributed utility planning attempts to induce utilities to invest in or encourage their customers to invest in cost-effective distributed resources that are in all ratepayers' interest. This approach relies on establishing responsibilities, setting goals, carefully monitoring performance, determining whether or not goals have been met and, if not, identifying the reasons for non-performance, and instituting rewards or penalties. A market approach tends to invite all comers who think they can make money and requires regulators and other policy makers to establish the rules for a fair and open market to ensure that participants and society at large are not hurt as market forces are allowed to function.

[8] "Distributed Generation: a Policy Framework for Regulators," 1999, Arthur D. Little, Inc., p.v.

An approach that combines the focus and commitment to societal goals of distributed utility planning with the marketplace interactions of vendors and customers may have the best chance of realizing the full potential of DG for society. Regulators and planners could determine where DG offers society the most value, the amount of DG required to realize that value, and the implications to the utility system of incorporating DG. However, the goal of this regulatory effort would not be to mandate utility investment or subsidy of DG or to establish performance goals for utilities. The goal would be for states to:

- establish clear regulatory policies for DG installation where necessary (e.g., interconnection and stand-by policies for DG)[9],
- determine the amount of DG appropriate to specific T&D constrained areas,
- pre-approve installations up to that amount, and,
- allow vendors and their customers every opportunity to determine the best ways to provide the desired amount of DG in those locations using the PAYS approach.

Conclusion

While PAYS is still in the early stages of its development, in preparation for the pilot program to be launched in New Hampshire in 2002, many of the structural issues have been resolved. The PAYS strategy is to establish a structure that reduces risk for consumers and capital providers who are interested in working together to install cost-effective energy-efficient technologies. If successful in stimulating customers to invest in these technologies, it should be applicable to small-scale, customer-installed DG technologies as well.

Regulators in most states still have significant work to do in establishing the rules for customer installation of DG equipment. Issues such as interconnection, interface, siting, permits, and allocation of system costs and benefits need to be resolved before DG is cost-effective for customers to install. However, even if all of the major regulatory issues specific to DG are resolved in a way that gives customer-installed DG a fair chance, the same more-subtle market barriers that have inhibited widespread customer investment in energy-efficient technologies will dampen DG investment as well. PAYS can help address these market barriers.

Many states have not yet implemented restructuring. Regulators in these states may or may not be interested in allowing market forces to determine, at least in part, how their resource needs are met. However, in states that want to pursue market-driven DG, whether they have implemented restructuring or not, PAYS should be part of their overall solution. Regulators can improve the prospects for successfully incorporating DG into power systems nationwide by establishing not only the regulatory framework for distributed generation (e.g., methods for determining cost-effectiveness, interconnection policy, permitting and siting issues), but a PAYS market framework as well (e.g., tariffs, guarantees, certification).

Next Steps

Based on our efforts to implement PAYS for energy efficiency, we recommend that regulators interested in using the PAYS approach for DG:

[9] On February 4, 1999, the Public Utility Commission of Texas adopted clear interconnection guidelines for distributed generation (Project No. 20363, "Investigation into Distributed Resources in Texas, 1999 Interconnection Guidelines for Distributed Generation").

1. Consider opening a docket (or expanding an open docket) to address market-driven DG, perhaps on a pilot basis. Parties could provide information regarding the location(s) where DG would provide T&D benefits and the potential value to the system of such benefits. Parties could also evaluate the amount of DG that would be necessary to realize potential T&D relief in each area. Testimony could be sought regarding the environmental impacts of generation in these areas (including any corresponding offset in other areas). This analysis could be tempered by revenue and growth projections to calculate distribution company revenue impacts as well as system impacts and costs.

2. Use this information to pre-approve generic DG installations in the locations, in the amounts (i.e., energy and demand), and with the environmental impacts determined to be, on balance, beneficial to society. Since all pre-approved DG would be assured of having societal benefit(s), regulators might be able to justify more market friendly interconnection standards for pre-approved DG installations to ensure they are viable. Pre-approval would create a limited but open market for DG.

3. To further stimulate DG markets, approve the use of PAYS on a pilot basis limited to a specific portion of the pilot utility's system by establishing a tariff, and a certification and disclosure process. Certified DG vendors could offer their products to customers regardless of whether those customers owned or rented their premises or whether their capital or debt levels were limited. Vendors and customers could compete to access the limited pre-approved DG capacity and market forces would determine what specific customers, vendors and applications would satisfy this market.

4. Once the pilot results are evaluated, if successful, the PAYS approach could be expanded to other parts of the pilot utility's territory and in other utilities' territories.

A Preliminary Analysis of the Cost Effectiveness of Potential PAYS® Products In Missouri

Prepared by

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for
PAYS America, Inc.
July 5, 2004

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Executive Summary

PAYS® can be used to promote customer purchase of resource efficiency products in Missouri more effectively and at less cost than any other proven program or system. Despite electric and gas rates that are low relative to much of the country, there are a number of cost-effective resource efficiency products that will qualify as PAYS® products.

This analysis of potential PAYS® products in Missouri is a feasibility study designed to help AmerenUE and the Missouri Residential & Commercial Energy Efficiency Collaborative (Collaborative) to determine whether or not to pursue implementing the PAYS® system in Missouri. Although specific markets and delivery systems have been considered, this report does not contain complete program designs or consider all possible resource efficiency products. PAYS America, Inc.'s preliminary analysis of the cost effectiveness of potential PAYS® products in Missouri reveals that, if implemented as suggested in this report, robust markets for customer purchase of cost effective resource efficiency products can be developed for:

- Catalog sales of resource efficiency measures (for example compact fluorescent lights and water savers) targeted to residential and small commercial customers supplemented by the participation of local retailers;
- Installation of resource efficiency measures (for example lighting retrofits and water saving devices) in public housing projects and master metered multi-unit residential housing units;
- Installation of resource efficiency measures (for example lighting, HVAC improvements, water saving devices) in state office buildings and colleges; and
- Custom comprehensive resource efficiency projects for large (e.g., industrial) customers.

Data used to evaluate packaging weatherization measures as PAYS® products from Missouri low income weatherization providers indicates cost effectiveness from weatherization measures is less robust than for the PAYS® products noted above. Although some measures qualify as PAYS® products assuming a cost of capital as high as 8%, this is an effort that would benefit significantly from low cost capital (e.g., a bond fund). However, the data does support moving forward at this stage in conjunction with the aforementioned efforts.

PAYS America did not obtain data from local vendors to evaluate the appliance program. However, in light of the current energy rates in Missouri, as indicated in Appendix 6, and reasonable assumptions for usage and costs (based on PAYS America's experience), the incremental costs for efficient appliances under any reasonable scenario are likely to be too high to qualify them as PAYS® products at this time.

The recommended efforts are the ones certain to produce significant cost-effective opportunities for customers and vendors of resource efficiency products if implemented correctly. However, PAYS America has provided descriptions and analyses of all the possible markets and products that were the subject of this analysis as outlined in the contract. We know of no basis for anticipating any short-term significant increases in electricity costs. However, reductions in product prices or unexpected increases in utility rates could make the resource efficiency measures that are not now viable as PAYS® products become viable at some future date. The descriptions of these options and worksheets in the Appendices could be used in such cases to reevaluate these options.

The descriptions and analyses in this report include reasonable estimates of the costs for operating each of the PAYS® markets including selected consumer assurance follow-up by AmerenUE or a designated Certification Agent, and costs associated with monthly billing of PAYS® Delivery Charges (PDC). As noted in the contract for this study, the costs for the design of a PAYS® system in Missouri or for set up of the PAYS® billing and collection system by the utility have not been considered in this study. If Missouri decides to implement a PAYS® system, these infrastructure costs can be amortized over many years and the sale of many products. Once the infrastructure is in place, there should be little cost to the utilities inasmuch as they already provide billing and collection services for all customers. While it would be reasonable for these costs to be recovered through rates (like the costs of all regulated utility infrastructure), if Missouri implements a PAYS® effort, this is a policy decision to be resolved by the parties and the Commission.

The descriptions of all of the efforts contained in this analysis are not program designs. If AmerenUE, the Collaborative, or the Missouri Public Service Commission (Commission) decides to implement a PAYS® system in Missouri, interested parties should work together with expert assistance to develop detailed program designs. A program design provides a complete road map for those entrusted with implementing a PAYS® system or any resource efficiency program. Such a design should clearly prescribe what offers can be made to which customers, how they may be made, who should be permitted to make them, and how consumer assurance is to be provided. All program forms and contracts, product certification criteria, vendor certification protocols, warranty procedures, and utility billing system changes (including how information about PAYS® should be depicted on monthly bills) should be clearly specified before any customer contacts are made. Taking the time to ensure that operating details have been thought through eliminates the problem of program decisions being made in crises by field staff, who often make different decisions than policy makers or those expert in PAYS® and resource efficiency efforts.

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Introduction to Pay-As-You-Save™ (PAYS®)

The PAYS® system breaks through the barriers to widespread resource efficiency by making installation of efficiency measures attractive to consumers, vendors, and investors.

PAYS® enables building owners or tenants to purchase and install money-saving resource efficiency products with no up-front payment and no debt obligation. Those who benefit from the savings pay for these products through a tariffed charge on their utility bill, but only for as long as they occupy the location where the products were installed. The monthly charge is always lower than the product's estimated savings and it remains on the bill for that location until all costs are recovered. Like a loan, PAYS® allows for payment over time, but unlike a loan a customer's PAYS® obligation ends when occupancy ends or the product fails.

PAYS® is the first market-based system to successfully promote the purchase and installation of resource efficiency measures. A two-year pilot program with two New Hampshire utilities has proven that:

- customers want PAYS® products (Public Service Company of New Hampshire's pilot was fully subscribed in the first quarter of both pilot program years);
- customers who have not previously purchased resource efficiency products will buy PAYS® products;
- customers will pay their PAYS® charges (nearly 100% of customers are current on payment of their PAYS®' charges, which means that, unlike subsidy programs, funds expended for measures will be returned and be available to help other customers);
- vendors will market and sell PAYS® products independent of utility program staff;
- the PAYS® legal structure involving a tariff and contract documents functions well; and
- utilities can manage PAYS® billing and collection without major difficulty.

The system can be tailored to individual states regardless of whether a state has initiated retail competition for electricity or gas. PAYS® can be used to create vibrant markets for any cost-effective, resource-efficiency product.

States may implement PAYS® systems whether or not they have funds for incentives to make more measures cost effective. States may wish to include financial incentives in a PAYS® system to make more measures qualify. This is especially useful in states where avoidable costs for transmission, distribution, future supply, or even environmental clean up have been identified but are not currently impacting rates.

PAYS® Products

PAYS® is not a traditional resource efficiency program in which staff from a utility, government agency, or state or locally funded nonprofit use public or ratepayer funding to facilitate installation of resource efficiency measures. Instead, PAYS® is a market-based system that creates an infrastructure for customers to buy and pay for cost-effective resource-efficiency products because they are packaged as desirable products that customers want and can afford. These products are not burdened with the market barriers that have previously inhibited customer investment in resource efficiency (see "Pay-As-You-Save Energy Efficiency Products:

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Restructuring Energy Efficiency" available at www.paysamerica.org). These resource efficiency measure packages are called PAYS® products. PAYS® products are only available in states that have instituted a PAYS® tariff and infrastructure.

Instead of paying customers financial incentives to do something that they would not otherwise do, PAYS® creates a market infrastructure where vendors sell and consumers buy products. PAYS® assures customers, especially successor customers who accept PAYS® obligations when they accept service at a location where PAYS® measures have been installed, that the estimated savings from the measure(s) are greater than the PAYS® Delivery Charges (PDC). A well-designed PAYS® system should not limit the number of PAYS® products that customers can purchase due to limited funds for financial incentives, program staff or budgets. The only limit should be customer demand and product availability.

There are two types of PAYS® products discussed in this report: permanent (or stationary) measures and portable measures. Permanent measures are those that become part of the real estate where they are installed (e.g., insulation or lighting fixtures) and the monthly charge is paid by the succession of customers at the location where it was installed until the term of the charge has expired. Portable measures are those that customers take with them when they leave a location such as CFLs, refrigerators, or clothes washers (in some jurisdictions, some of these items might need to be treated as permanent measures). Charges for portable measures are also paid monthly on the utility bill, but the balance is due at the time the customer leaves the system and can no longer be billed for them.

Cost Effectiveness

Twenty years ago, energy efficiency measures were typically evaluated for cost effectiveness based on the cost and savings to the end user. A simple payback calculation was based on the amount the customer would pay for the measure and the annual savings the customer could expect. Savings were calculated based on:

- the customer's reported building usage and current retail utility rates;
- the actual building conditions or energy systems in place; and
- the anticipated performance of the actual replacement or upgrade products being installed at that location.

This method of determining whether a measure was worth purchasing was typical for residences and public buildings (primarily schools and hospitals). Few building owners, however, felt that an investment that paid for itself in longer than two or three years was worth the risk. Therefore, many cost-effective measures were not installed.

In the late 1980s, with the advent of integrated resource planning in the regulated energy industry, the concept of cost effectiveness shifted focus. The focus was no longer on the individual but on the system and society since efforts to improve energy efficiency had substantial system and societal benefits in addition to benefits to individual energy users. New methods for determining cost effectiveness were developed using assumptions about such factors as system costs for energy (e.g., marginal wholesale energy costs), projected increases in energy and demand costs, the energy performance of equipment, typical conditions in customers' homes

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and businesses, inflation and discount rates, environmental benefits, average installation costs, take back, and free ridership.

Most of these analyses were used to determine the amount of financial incentive to be offered to customers to induce them to install resource efficiency products that were cost effective to the system or to society. While some customers would be expected to save more than the estimated savings and some customers less, states that used this approach based their incentives and use of public funds on estimated system and societal benefits assuming the average installation.

PAYS® is a market-based system, so it shifts the focus of cost effectiveness back to individual customers, who make the decisions about purchasing the products. PAYS® cost effectiveness is calculated using customers' usage and costs (e.g., retail rather than wholesale costs for energy). PAYS® cost effectiveness does not include system and environmental benefits that are not included in retail rates. Because projected increases in energy costs are uncertain, they are also excluded from PAYS® cost effectiveness calculations. However, since system cost analyses consider the wholesale cost of energy and usually include only modest adders for externalities, in most cases, retail rates will be higher than wholesale rates, so more measures tend to qualify as cost effective using the PAYS® system.

Customers receiving savings from PAYS® products are required to pay 100% of the cost or incremental cost for installation of these products. Since individuals' savings are not being subsidized by other electric customers, all savings can be included in the cost effectiveness calculation (i.e., gas, water and avoided purchases or maintenance savings). Our analyses include all such documented savings.

Since PAYS® customers pay for installation of the products that produce those savings, the PAYS® system must assure them that they will end up with some money in their pocket. To ensure customers get savings immediately, PAYS America recommends that resource efficiency products and services qualify as PAYS® products only if three-quarters of the estimated savings will cover all costs for an installation over three-quarters of its estimated useful life (3/4 - 3/4 Rule).

Because actual savings depend on each customer's current usage and rates, not all customers will qualify to buy the same PAYS® products. For example, while a lighting retrofit (e.g., replacing T-12 fixtures with T-8 fixtures) might be cost effective for a warehouse in which lights are on 24 hours each day, the same retrofit might not be cost effective for a school in which the lights are used for only 6 hours per day.

Data and Methodology

The analysis of potential PAYS® products in Missouri is a feasibility study designed to help AmerenUE and the Collaborative to determine whether or not to pursue implementing the PAYS® system in Missouri. Although specific markets and delivery systems have been considered, this report does not contain complete program designs or consider all possible resource-efficiency products.

After detailing the assumptions used in the course of completing this feasibility study, this report

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includes descriptions of six possible PAYS® markets for different customer types (e.g., residential, small commercial, etc.). Each description notes whether we have determined that this PAYS® effort is likely to result in viable markets with current rates, costs, vendors, and interest rates. Any calculations used to make these determinations appear in the appendices.

Vendors

PAYS America contacted a number of vendors of potential PAYS® products in Missouri by telephone and email. A list of individuals who provided information for this effort and their contact information appears as Appendix 12. The contract envisioned PAYS America making calls to vendors selected from telephone directories for the target cities. In consultation with Ms. Brenda Wilbers of the Missouri Energy Center (Energy Center), the primary contact for this project, PAYS America agreed that the most efficient and accurate route was to contact appropriate vendors recommended to us by Ms. Wilbers. PAYS America appreciates the fact that not only did Ms. Wilbers provide contact information for potentially helpful vendors, she contacted them and sought their cooperation on behalf of AmerenUE and the Collaborative.

Contacts with vendors involved explaining the PAYS® concept and answering their questions. Follow-up to initial calls was by email and telephone. PAYS America copied Ms. Wilbers almost all of the written correspondence to keep her informed of our progress. These vendors were asked to provide cost and savings data that constitute the bulk of this analysis. When feasible, cost and savings data have been verified by PAYS America. With the exception of the CFL (compact fluorescent lighting) Catalog Option and the Public Building/Multi-Family/Hotel Option, PAYS America limited its research to the cost and savings estimates provided by recommended local vendors and associates recommended by them. These vendors are expert in resource-efficiency measures that are cost effective and attractive to Missouri customers since the success of their businesses depends on this knowledge. PAYS America has worked with Niagara Conservation and Water & Energy Savings Corporation in the past and used their information to develop the cost and savings data for the CFL Catalog Option and the Public Building/Multi-Family/Hotel Option. Both of these vendors have indicated that they would provide the services described below in Missouri if local vendors were unwilling or unable to provide these same services at the same or lower prices.

PAYS America developed preliminary concepts for markets that would enable these vendors to sell their services and products to customers as PAYS® products. These concepts are described in two to three page summaries later in this report.

Consumer Assurance

The PAYS® system requires an independent Certification Agent who can assure customers that PAYS® products are estimated to save more money than they cost.

PAYS America developed reasonable estimates of the costs for providing consumer assurance, which would be accomplished primarily through telephone contacts with customers to verify data inputs, and supplemented with selected verification of calculations and even scattered inspections of selected projects. These estimates are based on PAYS America staff experience in operating resource-efficiency programs. (NOTE: PAYS America has found that by requiring vendors to pay for the costs of failed inspections, only a very small budget allocation is required

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to provide consumer assurance. If additional inspections are warranted, they are paid for by the vendors whose inadequate work necessitated them rather than participants or non-participants).

Spreadsheets were developed for each PAYS® option to determine which of these markets would be viable if implemented as described (c.f. Appendices 4 – 10). Additionally, Appendix 11 is the PAYS® Analysis Tool which can be used by the parties to screen additional measures.

Target Cities

Initially, Ms. Brenda Wilbers of the Energy Center advised PAYS America to use St. Louis and Jefferson City as the two cities to be included in our analysis. She stated (March 16th email) that they are sufficiently different populations yet each would be large enough to potentially develop a PAYS® market. On March 31st, PAYS America was notified that the Collaborative would like to add Cape Girardeau as a third city in this analysis.

PAYS America requested that vendors consider actual projects in these cities when providing their estimates for this analysis. However, since they were not reimbursed for their time, vendors were unable or unwilling to provide such data for all cities. Consequently, some analyses for this report are not based on cost and savings data for all three cities.

Notwithstanding this limitation on data, PAYS America is confident that the data used for this report is sufficient for a preliminary analysis for all three areas. Inasmuch as electric rates are the same for these cities and gas rates have been comparable, resource savings from measures are very likely to be similar in all three cities.

Secondly, vendors who could not provide information for these cities indicated that they knew no reason why their costs for services (or their competitors' costs) in these cities would vary from one area to another. Appendix 10, showing the viability of PAYS® products based on actual projects for Missouri manufacturers, tends to support the conclusion that cost effectiveness of measures does not vary significantly among the three cities at least for larger projects. However, for projects that depend heavily on labor costs, for example weatherization, different labor costs may impact overall cost effectiveness.

Since the savings and costs for measures installed in these three cities should be comparable, except as noted above, the analyses should not be significantly different. Given the limited scope of this preliminary analysis, PAYS America determined the information as presented was sufficient.

Interest Rates

In the absence of guidance from the Collaborative, PAYS America used the default interest rates (5%, 7%, and 8%) noted in our original proposal. For vendor-financed options (e.g., the CFL Catalog Option), vendors were allowed to choose their own interest rate.

If one of the PAYS® options described below is viable at the highest interest rate, it will be viable regardless of the source of capital. When a PAYS® option did not screen cost effective at the highest interest rate (e.g., Piggyback Weatherization), it was screened at the one or both of the two lower rates to determine if the availability of less expensive capital (e.g., bond funds or

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utility funding) would enable resource efficiency products sold through this option to qualify as PAYS® products. Any option that would be viable only if lower cost capital were available is identified as such.

Electric Rates

Ms. Lena Mantle of the Missouri Public Service Commission (via Ms. Wilbers) provided the current marginal retail rates for electricity from AmerenUE's tariffs. PAYS America calculated a weighted average of winter and summer rates for residential customers of $0.04987 per kWh and $0.04607 for small general service customers (see Appendix 2). Weighted average rates were used to determine potential savings for measures used equally year round such as lighting. For measures such as heating or cooling, the appropriate winter or summer marginal rate would be used.

In a telephone conversation, Ms. Mantle also informed PAYS America that for the next few years, for customers of AmerenUE, significant increases in electricity costs were not anticipated. This analysis assumes, therefore, that efficiency measures that are not cost effective now are not likely to be cost effective when Missouri is ready to implement a full-scale PAYS® effort. The decision whether to proceed with developing a PAYS® market should be based on whether Missouri policy makers want to implement the recommended efforts that have been determined to be cost effective.

Gas Rates

Ms. Mantle also provided information regarding gas rates (see Appendix 3). In Jefferson City, gas rates were $1.0032 per ccf for residential customers and $0.8811 per ccf for general service customers. In St. Louis, gas rates were between $0.90748 (summer) and $1.17419 (winter) per ccf for residential customers and between $0.88284 (summer) and $1.18577 (winter) per ccf for general service customers. Assuming a combustion efficiency of 80%, the cost for heating one's premises with gas in the winter per 100,000 btu's delivered is significantly higher than it would be for heating the same premises with electricity for both residential and general service customers in Jefferson City and St. Louis.

Validity of Data

PAYS America is confident that the data used for this analysis is valid (i.e., cost data represents realistic costs for measures and savings estimates approximate the savings customers will realize if they purchase PAYS® products through the markets described below).

Data for the analyses of the CFL Catalog Option and Large Commercial & Industrial Options is the most reliable. The actual costs to implement the CFL Catalog Option will very likely be equal to or less than the vendor's estimate (i.e., other vendors may actually bid less to provide these services). The savings data for this effort are simple computations (i.e., existing watts and new watts) so the savings estimates are equally reliable.

The cost and savings data for the Custom Retrofit Option for Commercial and Industrial customers is also very reliable The Industrial Assessment Center (IAC) at the University of

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Missouri-Rolla not only has the credibility of the University of Missouri behind it, IAC has extensive experience with retrofits for these types of customers. This experience ensures that their savings and cost estimates are accurate. This market alone provides sufficient resource efficiency opportunities to justify AmerenUE implementing PAYS® in its service territory.

The Lighting Option will result in numerous cost-effective PAYS® products. The fact that both Lighting Services, Inc. and Energy Systems Group were both able to provide examples of cost-effective measures makes the representations of each more credible. Additional data to support this conclusion (and more data to identify weatherization measures that qualify as PAYS® products) will surface during the design and implementation of Missouri's PAYS® system.

Capital to Pay PAYS® Upfront Costs

While Niagara Corporation has agreed to finance the sale of measures it sells (c.f., CFL Catalog Option), other vendors were unable (e.g., Water & Energy Savings could not afford to add debt to its books) or unwilling (Lighting Service, Inc. was unwilling to absorb risk of financing) to finance the installation of measures. The recommendations in the last section of this report regarding treatment of PAYS® bad debt should, if implemented, adequately address the concerns of these or other vendors so that market benefits of increased sales will outweigh the risk of their financing of their products or services.

Nevertheless, PAYS America believes that if the parties wish to implement a PAYS® effort, early on in the process, capital providers should be invited to help design the Missouri PAYS® effort. While both financial institutions contacted for this study, M Corporation and United Missouri Bank in St. Louis, believed they would be willing and able to make some funds available (see letter in Appendix 1), making the PAYS® cash stream reliable will translate into the lowest cost financing possible. With Missouri's low energy rates, high cost financing would result in some potentially cost-effective measures not qualifying as PAYS® products. Managers of pension funds, tax deferral funds, small mutual funds and banks should be contacted about their interest in providing capital for PAYS® products.

PAYS America did not contact AmerenUE to ascertain its interest in providing capital for a PAYS® effort. However, it should be allowed to bid to provide funds for PAYS® products since the profit it would make from financing might alleviate some of the lost revenues associated with any program that reduces customer use of electricity (or any resource). Additionally, since we are recommending use of the AmerenUE billing and information infrastructure, there is justification for them to profit from that use if they are interested in providing capital.

Based on interest expressed by capital providers to date, PAYS America assumes that if the recommended treatment of bad debt is implemented as noted below, the cash stream created by a PAYS® effort will be sufficiently reliable to attract sufficient funds for installation of PAYS® products when needed.

Risk Mitigation & Bad Debt

One of the reasons that PAYS® products are attractive to customers is that PAYS® reduces risk for customers. While some of the risk that is removed is perceived risk, there is real risk that is

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transferred to other parties. Properly assessing this risk is critical to the operation of the PAYS® system. A risk assessment that is too conservative unnecessarily reduces investment in resource efficiency. Too reckless an assessment will result in the financial failure of the program. The goal should be to assess risk at a cautious and prudent level.

For utilities across the country, the bad debt for municipal, large nonprofit, federal, state and select large power customers (those not likely to go out of business or whose location is so desirable as to make relocation unlikely) is less than the already low rate of bad debt for utility customers overall. These are the most stable, reliable customers that any utility has. In the New Hampshire pilot PAYS® program, 100% of Public Service Company of New Hampshire's (PSNH) participating large customers paid their PDCs to date. The bad debt rate for these customers is not likely to increase significantly in the few remaining years that PDC payments are due.

The New Hampshire Electric Cooperative's (NHEC) PAYS® pilot is also instructive on this point. Nearly 100% of customer payments that were due in 2002 and 2003 were received by NHEC. This was true despite a diverse, though small, base of participating customers. Just as they do with the other components of the utility bill, customers will continue to make their payments rather than face disconnection. Additionally, since more investment in cost-effective resource efficiency means that customers that might otherwise default on their utility bills are in a better position to pay them, PAYS® should have the positive effect of decreasing the utility's overall customer default rate.

The only way that risk to the utilities would become significant would be if the utilities stopped insisting on payment or if many of the locations at which they installed measures remained vacant for long periods of time. The first would only happen if the utility behaved imprudently. The second is unlikely and should be easily mitigated by the judicious selection of large customers as noted above.

There are two recommended ways to deal with the risk that does exist from even a well-implemented PAYS® effort. Missouri policy makers will have to decide which is most appropriate for Missouri.

The solution PAYS America is recommending in New Hampshire Docket DE 04-052 is the most conservative and will limit many of the benefits of a PAYS® effort. However, its conservativeness may make it more attractive, especially for an initial effort.

This approach involves establishing a guarantee fund to cover bad debt and basing the amount of the guarantee fund on the amount assumed for a reasonable worst-case default rate. For large customers and portable measures, where repayments in the New Hampshire pilots have exceeded 99.9% of the amount spent on measures, using a 10% payment default rate, which is one hundred times greater than the actual default rate in the pilot, should be many times the amount needed to ensure bad debt would never exceed the guarantee fund.

For other customers, where repayment or continued occupancy is less certain, a default rate as high as 20% would still allow for leveraging five times the rate of the guarantee fund for the capital to pay the up-front cost for measures without any real risk that bad debt would exceed the

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guarantee fund. These extremely conservative rate assumptions can be lowered as Missouri develops its own experience with PAYS® bad debt. While in New Hampshire, money used to capitalize the guarantee fund is supplied by ratepayers, PAYS America does not recommend any particular source for a guarantee fund.

The other approach acknowledges, especially for select measures and customers (e.g., short term measures and measures for municipalities and large permanent non-profits such as hospitals), that the risk of bad debt is minimal or non-existent. The second approach is for the Commission to guarantee the utility that if it prudently operates it billing and collection function, it is guaranteed cost recovery. Since the risk to date for select customers is less than a few hundredths of a percent, this approach offers the greatest potential for leveraging capital to pay the up-front cost for measures. Since bad debt will most likely result from a location where PAYS® products were installed remaining vacant, a Commission may determine that this is an appropriate use of the utility's existing bad debt system and a reasonable system expense to be shared by all rate payers who hope to receive the societal benefits of their fellow customers paying for resource efficiency.

With this approach, the parties would likely agree to begin with the most proven options (those noted above) and gradually expand the scope of measures and customers eligible to receive PAYS® products (or use the more conservative guarantee fund approach for these customers until sufficient data is available to ascertain whether the bad debt will be low enough to use this approach for other customer groups, too).

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PAY® Options

CFL Catalog Option (Cost Effective)

PURPOSE: A low cost vendor-driven CFL catalog program (other items, such as low flow showerheads, flapperless toilets, programmable thermostats can be added as desired).

REQUIREMENTS:

- Program advertised by utility bill stuffers, school presentations, press releases, advertisements paid by utility or advocacy groups, public service announcements, etc.
- Utility adds charge to customer's bill; the charge is not removed unless the customer leaves system (i.e., once purchased, customer's only recourse is free product replacement under warranty program.)
- Charge per CFL is $0.20 per month for 27 months. Costs for other items to be computed as added.
- Other utility involvement minimized (no returns or billing changes and all complaints directed to Vendor).

SUPPLIER: Niagara Conservation (Vendor) has promised to bid to supply up to five CFL models. Each will be sold with direct shipment to customers at a cost of $5.40 per CFL spread over twenty-seven (27) payments (the 30 Watt Circle which is an appropriate replacement for a 150 watt reading lamp will cost twice that amount -- $0.40 per month). The actual cost for CFLs sold through this effort will be determined by competitive bid and therefore be equal to this price or less. Vendor will send customers their CFLs upon receipt of a signed customer agreement that also serves as a mailing label and billing form. Either it will be sent to customers as a bill stuffer or, if possible, downloaded and printed off the web. Vendor has promised to pack CFLs, send them directly to customers, and replace any CFLs damaged in shipping. All CFLs will be warranted for the full 27-month payment term. Vendor will offer free replacement shipped to any customer returning unbroken but non-working CFLs during the payment period. The only requirement other than being a customer is that the customer order at least 6 CFLs per order.

OFFER: Residential customers can purchase between 6 and 18 CFLs (11, 15, 20, 24 and 30 watts) and pay 20¢ per CFL for 27 months for all but the 30 watt Circle. Small commercial accounts will have a different ordering form and will not be limited to 18 CFLs. As Appendix 4 shows, four hours of use ensures a net monthly electricity savings of approximately 5¢ per CFL during the payment term, even if only 45 watts are displaced. After the 27-month payment term, customers will receive all the savings (assuming 8,000 hour life, residential customers will receive net electricity savings of $12.55 per CFL plus the avoided cost of purchasing 10 replacement incandescent bulbs – at least $2.50 per CFL – c.f., Appendix 4). Once PAYS® charges are on their account, customers must pay their PAYS® charges for all 27 months. If they leave the utility service territory, they must pay off the balance at that time. The utility forwards payments to the Vendor for the CFLs over the 27 month payment term deducting a $2 fee per order that is also collected over the payment period. $1.50 goes to the utility to cover the cost of adding the charges once and $0.50 to the Certification Agent to pay for selected follow-up phone calls to verify usage. The utility is responsible for non-payments.

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CONCEPT: Customer fills out an order form that has been sent to him/her as a bill stuffer or, if possible, is downloaded from a website. The order form serves as a PAYS® Agreement form, mailing label, and billing form. The form has the following information:

- The customer only saves more than the payment amount if the bulbs they are replacing are used at least an average of four hours per day and the CFL reduces their wattage by at least 45 watts.
- The customer's signature certifies usage of at least four hours per day and reduction of the wattage by at least 45 watts.
- The minimum order size is 6 CFLs. The maximum is 18 (residential customers only).
- If they do not return the CFLs in good condition and in their original packaging within two weeks of receipt, the charge will be added to their monthly bills for the next 27 months.
- Should the bulb fail during the 27-month payment period, they must contact the Vendor for their free replacements by calling the provided toll free number. They will receive replacement CFLs upon returning the unbroken, non-working CFL to the Vendor.

The customer fills in the number of CFLs (s)he wants, signs the form and sends it to their utility which verifies that the form is from an eligible customer before sending it to the Vendor. The order form has bar code information including each customer's name and address and account information. The Vendor uses a bar code scanner to process the order, ships the CFLs to the customer and supplies the utility with a list of orders shipped and order forms.

The customer has 2 weeks from date of receipt of CFLs to return undamaged CFLs in the original packaging to the Vendor (at customer's expense) or charges will go on their account. Returned CFLs will be used for other shipments. After 2 weeks, the Vendor sends the list of shipped orders to the utility, which starts billing and makes the initial payment to the Vendor within 30 days of receipt of the list.

If the bulb stops working during the warranty period, the customer calls the toll free number, arranges for bulb's return, and is shipped a brand new replacement CFL (The utility/Vendor reserves the right to inspect CFLs prior to return – broken CFLs will not be replaced).

Any local retailer willing to comply with program rules (i.e., types and quality of products, warranty, vendor financing cost, data collection, etc.) will be allowed to sell PAYS® CFLs directly from their stores. For the first time, more efficient lighting will have lower out-of-pocket costs than incandescent bulbs.

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Piggyback Weatherization Option (Cost Effective*)

PURPOSE: By piggybacking the sale and installation of measures sold as PAYS® products onto existing low income provider networks, the ability of local providers to serve low income customers who do not qualify for their grant services and other residential customers in their service area is increased.

REQUIREMENTS:

- Utility adds PAYS® charge to customer's monthly bill and assigns obligation to the meter.
- Individual PAYS® charges are calculated by the local weatherization provider using an adjusted National Energy Audit Tool, NEAT, audit (reducing inflation factors and compensating for higher or lower indoor temperatures) and then the PAYS® Analysis Tool.
- The Certification Agent verifies selected analyses and assumptions (by phone).
- The utility makes capital available for measures or a fund is created by the state (e.g., funds or annual appropriation), or a capital provider will need to be identified.

SUPPLIER: Staff of local weatherization programs throughout Missouri already provide energy efficiency services to income-eligible clients. Their programs are heavily monitored by both federal and state agencies. Typically, they do not install all cost-effective water and electricity-saving measures and a cost-effective opportunity is lost. Additionally, providers are restricted in the services they can perform by budget constraints and by income guidelines (limiting which low income customers qualify for their services). Furthermore, it is often difficult to install measures in rental housing because of concerns that landlords will increase rents if homes are weatherized (this is less likely with PAYS® since the customer will be paying the PAYS® charge and the landlord will have to disclose the charge to prospective tenants). Finally, although they have extensive capabilities, they do not provide fee-based services to non-low income residents in their service territories.

OFFER: Customers currently receiving services from weatherization providers will be able to buy cost-effective measures currently not included in the program at catalog rates from their local provider if these are not already approved program measures. Residential customers not receiving services from local providers may buy cost-effective weatherization services as PAYS® products through a two-step process.

In order to receive Step One measures, customers will be asked to answer a number of questions (to make sure there is sufficient opportunity for savings) and sign a Customer Agreement to purchase installation of a limited number of low cost measures (i.e., air sealing, CFLs, and water savers) for a fixed monthly charge on the customer's electric bill. Signing the agreement before staff are sent to customers' homes will ensure providers are paid for all services. If appropriate (i.e., based on existing conditions in the residence), the customer will receive an analysis based on the NEAT audit. The analysis will identify if there are any Step Two efficiency measures (e.g., attic, wall or floor insulation and furnace upgrades) that qualify in their home. If this option is developed as a PAYS product, the customer-specific eligibility evaluation form must examine the potential health and human safety consequences of any measures that reduce air infiltration due to the risk of carbon monoxide exposure or indoor air pollutants.

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If there are Step Two measures that qualify as PAYS® products and if the customer signs another Customer Agreement, these measures will also be installed in the customer's home. The agencies' regular contractors can install all measures customers purchase in Step Two. The local provider or its contractor will install them and be paid upon completion of the work.

CFLs and water saving devices will be treated as portable measures and air sealing and other Step Two measures will be treated as permanent measures. The monthly payments will be set so that savings from these measures will exceed their monthly cost. As illustrated in Appendix 5, it is likely that customers will have multiple PAYS® charges at one location with different terms (because measure lives vary) and some customers will also have PAYS® charges for portable measures. For permanent measures, the customer's payment obligation is only for as long as (s)he is a customer at that location. The balance owed on portable measures must be paid off at the time a customer leaves the utility's service territory.

CONCEPT: The homes of low income customers, especially those who do not qualify for low income weatherization assistance programs, are often most in need of weatherization services. However, because these customers lack resources and debt capacity (and are more likely to be renters) they are less likely than any other customer to purchase resource efficiency measures that will lower their bills. Reducing their utility bills benefits all customers by reducing bad debt, the costs for fuel assistance programs and the societal costs associated with substandard living conditions (i.e., unnecessary illness, poor achievement in schools, unpaid bills, etc.).

By piggybacking this option onto the existing low-income provider network, the percent of total costs spent on administrative and start-up costs (which are typically a substantial percentage of program costs) can be greatly reduced. Low-income customers who would be otherwise ineligible to receive services (due to income guidelines or budgetary restraints) would be able to be served (i.e., they could realize these benefits too). Non-low income customers in their service territories would also have access to affordable weatherization measures.

When this option is established, the tariff should be written so that it is an energy service charge that can be paid with fuel assistance funds. That will ensure that eligible customers are not "penalized" (i.e., their financial situation is not worsened) because they agreed to pay for improvements that may eventually (i.e., when the PAYS® charges are paid in full) reduce the burden of fuel assistance programs for all customers.

Providing capital for these measures for these customers may be more acceptable to utilities since unlike other low-income programs, the money will be repaid by the customers who benefit from the measures. If utilities are not interested in capitalizing a fund to pay for measures, the state may be interested in creating a fund with bonds or an appropriation (for the same reason). If neither of these options are viable, a low cost third party capital provider will be needed.

Local weatherization providers, at their option, would offer PAYS® products to eligible customers. This effort needs to be optional because some providers may lack the staffing to offer PAYS® products at any given time. This effort would be available to any residential customer, fully taking advantage of the service capabilities of the providers and their contractors.

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For this option to work, careful adjustments will need to be developed for the NEAT audit to adjust savings results to account for different usage patterns in individual homes and to eliminate fuel inflation factors. (NOTE: This was accomplished in Texas in the mid 1990s by the Energy Efficiency Institute, a corporation operated by the Co-Executive Directors of PAYS America.)

Appendix 5 is the analysis tool used to ascertain the viability of this option. It or the PAYS® Analysis Tool can be used to screen measures. As indicated in Appendix 5, most measures can be packaged to qualify as PAYS® products with a cost of capital of 5% (although some also qualify if capital is as high as 8%). However, the program charge amount used in Appendix 5 (i.e., funds used to cover consumer assurance and utility billing costs) was only 5 dollars. PAYS® Piggyback Weatherization is the recommended PAYS® effort that would most benefit from low cost capital (e.g., a bond fund).

*These measures narrowly qualify as PAYS® products. Carefully resolving program design details, including cost of capital, issues will be essential for a successful effort.

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Residential Appliance Option (No Data/Not likely Cost Effective)

PURPOSE: Customers seeking to buy new appliances will, for the first time, find it costs less to buy the most efficient appliance at participating retailers.

REQUIREMENTS:

- Program advertised by bill stuffers, school presentations, press releases, advertisements paid by utility or advocacy groups, public service announcements, etc.
- Utility adds charge to customer's bill; the charge is not removed unless the customer leaves system (i.e., once purchased, only recourse is free product replacement under warranty program. For permanent appliances (e.g., hot water heaters, central air conditioners, etc.) the tariff is assigned to the meter.
- The PAYS® charge covers the incremental cost for the more efficient appliance and, if possible, a little more than that. The charge is set annually by the Collaborative based on market conditions.

SUPPLIER: Local retailers will be invited to participate. They must agree to sell selected Energy Star appliances as follows:

- Customers seeking new or replacement appliances will be informed about the PAYS® option. The conditions necessary for them to save money will be explained (e.g., paying a water/sewer bill, minimum usage, gas heat dryer, etc.).
- Participants pay an up-front charge for new appliances as they do now (i.e., cash or financing).
- The out-of-pocket expense for PAYS® products is set to be less than traditional, non-efficient models.
- The customer signs an agreement to pay the balance of the payments on the utility bill. The payment amount is set to be only a portion of their estimated savings (c.f., the 3/4 - 3/4 rule).

The retailer must also agree to process the paperwork and send it to the utility. The retailer receives the full PAYS® amount from the capital provider (e.g., utility or third party fund). Retailers can agree to self-finance and may wish to advertise their participation in the PAYS® option.

OFFER: Residential customers can purchase the most efficient new or replacement appliances in participating stores for less out-of-pocket money than non-efficient appliances. When purchasing a new or replacement appliance, they go to a participating retailer and select the desired appliance. Their usage and situation is evaluated to ensure they will have net savings even with the PAYS® charge. For example, customers who use the appliance infrequently or who do not pay for water or sewer may not have sufficient savings to warrant purchasing the more efficient appliance based on a personal cost effectiveness criteria. The participating retailer will have a chart to guide the customer and retailer in assessing the viability of the appliance as a PAYS® product. When appropriate, the customer signs a Customer Agreement, agreeing to pay for the incremental cost for the more expensive appliance on their monthly utility bill over time. This payment will not impact their personal debt rating. Customers will have lower total ownership

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costs (i.e., life cycle costs for owning the appliance) compared to the life cycle costs for less efficient appliances.

For permanent measures (e.g., central air or hot water heaters, etc.) the charge will be assigned to the meter so that a customer's only obligation is to pay the charge while a customer at the location where the appliance is installed. The obligation to pay also ends if the appliance fails and is not repaired. For portable measures (e.g., horizontal access washers), if the customer leaves the utility's service territory, (s)he must pay the balance of any unpaid charges with the last bill.

CONCEPT: For the first time, customers pay less for more efficient products.

Customers should be informed of the PAYS® option so they can select participating retailers. They compare models with the features they want. If available, an Energy Star model that is usually more expensive is offered to them for less out-of-pocket expense than less efficient models.

They answer some questions to make sure their savings are likely to exceed their monthly charge. Questions may include hours of use, type of energy or other resource supplier, etc. A table will be prepared for the retailer to assist them in determining if the customer should proceed with the PAYS® option.

The customer signs a Customer Agreement form. Customers buy the more efficient appliance using whatever means they normally use for these types of purchases (cash, credit card, store financing). The retailer sells a more efficient and more costly appliance to more customers (increasing profits). The retailer receives some of the payment from the customer and the balance from the capital provider (a third party or the retailer willing to self-finance the incremental cost).

The utility bills the customer (or for permanent measures the customer at that location) until all payments have been collected. The utility forwards the payments to the capital provider (which could be the utility). The utility is responsible for non-collectibles.

If the appliance stops working during the warranty period, the customer follows the warranty instructions. For permanent measures, it may be necessary to negotiate warranties that extend at least as long as the payment period. Doing so may require allowing the retailer to recover post warranty expenses by extending the term of the PAYS® charge.

Appendix 6 is an analysis tool that can be used to ascertain the viability of this option if and when gas, water or electric prices increase significantly or the price premium for more efficient units declines.

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Public Building/Multi-Family/Hotel Option (Cost Effective)

PURPOSE: A low cost, multi-resource, vendor-driven PAYS® option to reduce utility costs in multi-family structures, especially public housing projects.

REQUIREMENTS:

- Utility adds PAYS® charge to customer's monthly bill and assigns obligation to the meter.
- Individual PAYS® charges are calculated by the vendor using PAYS® Analysis Tool.
- The Certification Agent verifies analyses and assumptions (primarily by phone).
- A capital provider is located.

SUPPLIER: Water & Energy Services Corporation (Vendor) has already completed six audits of public housing projects in or near the St. Louis area. As shown in Appendix 7, recommended measures in five of those projects can be packaged as qualifying PAYS® products. Vendor installs water saving devices (e.g., toilets), controls, boiler repairs and replacements when cost effective. All five projects qualified as PAYS® products even if the interest rate was 8%. Vendor will warranty the measures for the duration of the payment term (but the cost for repairs and replacement will either be embedded in the project cost or added to the term when necessary). Any vendor willing to comply with program regulations can be certified to sell its services and products as PAYS® products.

OFFER: Public Housing Authorities, single-metered multi-family building managers, and hotels can buy resource-efficiency products from certified vendors. There will be no upfront cost for the project. Payments estimated to be equal to or less than 75% of the monthly savings will be added to the monthly electric utility bill for a term not longer than 75% of the estimated measure life. Since the payment obligation is a tariffed charge and not a loan, there is no individual debt (i.e., the project should not show up on the books except as a reduction in utility bills). The customer's payment obligation is only for as long it is a customer at that location and only as long as the measure(s) function.

CONCEPT: Water & Energy Services, or other certified vendor, contacts customers it ascertains are interested in buying resource efficiency as PAYS® products and develops a project and analysis. $500 is added to the cost of all measures to cover the costs for adding charges to the bill ($200) and consumer assurance ($300). The customer signs a Customer Agreement form. The Certification Agent reviews the project and verifies customer-provided inputs by telephone. Vendors and the Certification Agent each have access to the PAYS® Analysis Tool so they can establish payment amounts and terms for projects that qualify. Upon Certification Agent approval, the vendor installs measures (e.g., toilets, showerheads, boiler replacements or repairs, controls, lighting, etc.) at its cost or using the capital fund established for measures. When completed, it sends an invoice to the Certification Agent who may inspect the project or contact the customer to verify completion. The invoice is sent to the utility, which adds the charge to the monthly bills for the duration of the payment stream, and to the capital provider who pays the vendor for the completed work.

If a measure stops working, the customer contacts the vendor which must fix the measure within a reasonable period of time or the payment amount for that measure stops. Vendors must be

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bonded or post an irrevocable letter of credit of sufficient size to ensure compliance. If the non-working measure is fixed and if the repair and replacement costs are not included in the contract, the cost for the repair or replacement can be collected by extending the term (but not the amount) of the payments.

NOTE: Water & Energy Services have located a supplier of capital to pay for the up-front cost of qualifying projects at a rate of approximately 5% at the time of this research, providing a "borrower" could be located. PAYS® does not technically involve a borrower since the obligation to pay for permanent measures runs with the meter, and is not assigned to an individual. However, an entity, for example the Certification Agent, might be able to borrow the money to be used to pay the upfront costs for measures, providing it had a contract with the utility assuring repayment of measure costs as recommended in this study.

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Lighting Retrofit Option (Cost Effective)

NOTE: Originally PAYS America envisioned separating out data for public and commercial buildings into two options. After review of the data, combining these two options into one makes more sense. Additionally, although this option was initially to be limited to lighting, requests from Ms. Wilbers and data provided by Mr. George Sterling of Energy Systems Group have allowed for a broadening of this option to include non-lighting measures.

PURPOSE: A low cost vendor driven lighting retrofit program targeted to municipal, state, federal and other commercial buildings in which delamping and fixture replacement are used to lower annual operating expenses and all ratepayers' tax burden. As this effort gains exposure, it can be expanded to other buildings receiving significant public funding (e.g., public hospitals, colleges, etc.). As noted below, other measures that qualify may be included as PAYS® products.

REQUIREMENTS:

- Utility adds PAYS® charge to customer's monthly bill and assigns obligation to the meter.
- Individual PAYS® charges are calculated by the vendor using PAYS® Analysis Tool.
- The Certification Agent verifies analyses and assumptions (by phone).

SUPPLIER: Lighting Service, Inc. and Energy Systems Group (Vendor) have identified several lighting retrofit projects in or near the St. Louis area. As shown in Appendices 8 and 9, measures recommended in all three submitted projects qualify as PAYS® products assuming capital at 8%. Both companies will warranty the measures for the duration of the payment term (but the cost for any repairs and replacement will be recovered by increasing the payment term). A $500 fee to pay for customer assurance ($300) and utility billing ($200) has been included in Lighting Service, Inc.'s total cost and would be included for any basic lighting project. A $1,000 fee to pay for customer assurance ($700) and utility billing ($300) has been included in Energy Systems Group's total cost to reflect the added cost of more custom projects (which will have more analysis to verify and may have multiple terms PDCs on each utility bill).

OFFER: Managers of publicly financed buildings can purchase lighting retrofits (and other cost effective resource efficiency measures) as PAYS® products. These purchases will be tariffed charges designed to lower the customers' (state, municipality or federal agency) utility bills, the obligation is assigned to a meter, and the project does not involve a loan or lease. Since the customer is not obligated to do anything other than continuing to pay its electric bill as long as it remains a customer at that location, there should be no need for budgetary adjustments or approvals, voter or Board approvals and perhaps no need to meet traditional "purchase" requirements (e.g., public notice requirements).

CONCEPT: For basic lighting projects, Vendor contacts the customer, proposes a project that qualifies based on reasonable assumptions provided by the customer, standard savings calculations (watts replaced and cost thereof), and project approval determined by the PAYS® Analysis Tool. The customer signs a Customer Agreement Form that stipulates all program obligations including disclosure of the charge to future owners of or bill payers at that location by the building's owner. The signed proposal is sent to the Certification Agent for review

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(contacts with the customer to verify inputs and a cursory review of lighting savings estimates – watts in and out -- and other inputs to check on custom project analyses). When approved, Vendor implements the project at no up-front cost to the customer.

Custom projects involving other measures may require additional consumer assurance. The higher fee should cover the costs for additional analysis when required.

When the work is completed, an invoice is sent to the utility and copied to the Certification Agent. The Certification Agent will either inspect the project or complete a telephone survey to verify completion and acceptance of the work.

The customer is obligated to pay PAYS® charges for as long as the measures function and it remains a customer at that location, regardless of changes in use of the building. If the customer sells, leases, or quits occupancy of the building, the next customer at that location assumes the payment obligation. For those projects that are not vendor-financed, the contractor (which must be bonded or post an irrevocable letter of credit) is paid upon completion of the work and Certification Agent verification and the monthly payments are directed to the capital provider (e.g., the utility or third party capital provider).

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Large Commercial/Industrial (Manufacturer) Option (Cost Effective)

PURPOSE: A customer/vendor/IAC driven program targeted to larger customers and larger buildings.

REQUIREMENTS:

- Utility adds PAYS® charge to customer's monthly bill and assigns obligation to the meter.
- Individual PAYS® charges are calculated by the IAC using the PAYS® Analysis Tool.
- The IAC verifies analyses and assumptions.

SUPPLIER: IAC of the University of Missouri-Rolla currently offers a fee-based program designed to help its industry partners collaboratively plan, develop, and adopt cleaner and more energy-efficient technologies and practices. (IAC also provides its services to schools and hospitals and could also provide them to municipalities). IAC has identified 45 retrofit projects in St. Louis, Jefferson City and Cape Giradeau for 45 businesses that together have gross sales of more than $1.2 billion dollars and more than 8,000 employees. These projects include retrofits to motors and drives, lighting, HVAC and compressed air systems. 44 of these projects have paybacks of less than 2.5 years yet most of them have not been implemented. Even assuming interest rates of 8%, each of these 44 projects qualify as PAYS® products (see Appendix 10). PAYS® is designed to overcome the implementation barriers that have prevented these companies from addressing this economic and energy inefficiency.

Given the reliability of bill payment by these customers and the importance of economic development in these times, a capital pool targeted to these customers could be easily created by a bond fund, AmerenUE, energy service companies (ESCOs), or other third-party capital providers. The total budget for the identified 45 projects is less than two million dollars, well within the range of funds discussed with Ms. Jeannine Lamm of the United Missouri Bank in St. Louis (one of the two financial institutions contacted). Contractors would be required to warranty measures for the duration of the payment term (but the cost for any repairs and replacement can be recovered by increasing the payment term or by embedding the costs for extended warranties and maintenance in a project's cost). A $1,500 fee included in each project's total cost is divided between the utility ($200) and the IAC ($1,300) and is used to pay for costs associated with utility billing and customer assurance.

OFFER: Large customers or vendors can use PAYS® to arrange the purchase of cost-effective projects recommended to them by IAC, vendors, or their staff energy managers. Since these purchases will be tariffed charges designed to lower the customers' utility bills and the obligation is assigned to a meter, the project does not involve a loan or lease which obligates the customer to anything other than continuing to pay their electric bill as long as they remain a customer at that location. There is no up-front payment and the monthly payments are designed to be lower than the estimated savings. Offering these customers lower bills without any long-term commitment or impact to their books (i.e., debt to equity ratings) should eliminate most customers' reluctance to purchase resource efficiency.

CONCEPT: IAC or a vendor contacts the customer and proposes a project that qualifies based on reasonable assumptions provided by the customer. IAC completes its standard analysis (either on

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a fee basis as it has to date, with the cost rolled into the project's cost, or, if possible, with a revolving fund established for this purpose which would be replenished by the aforementioned charges to each project). The IAC reviews each project's actual cost and estimated savings using the PAYS® Analysis Tool. The customer signs an IAC prepared Customer Agreement Form that stipulates all program obligations including building owner disclosure of the charge to future owners of or bill payers at that location. When approved, the contractor implements the project at no up-front cost to the customer.

When the work is completed, an invoice is sent to the utility and copied to the IAC. The IAC will either inspect the project or complete a telephone survey to verify completion and acceptance of the work.

The customer is obligated to pay PAYS® charges for as long as the measures function and it remains a customer at that location, regardless of changes to use of the building. If the customer sells, leases, or quits occupancy of the building, the next customer at that location assumes the payment obligation. For those projects that are not vendor (i.e., ESCO) financed, the contractor (which must be bonded or post an irrevocable letter of credit) is paid upon completion of the work and IAC verification and the monthly payments are directed to the capital provider (e.g., the utility or third party capital provider).

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Recommendations

PAYS America believes there is sufficient justification (i.e., cost effective opportunities, customer interest, and interested vendors) to warrant setting up the PAYS® infrastructure and implementing the recommended PAYS® efforts in Missouri.

If AmerenUE and the Collaborative agree that, in spite of low energy rates, the PAYS® system can be used to make possible customer purchase of resource efficiency products more effectively and at less cost than any other proven system, the real work in designing a PAYS® effort for Missouri will begin.

If AmerenUE, the Missouri Residential & Commercial Energy Efficiency Collaborative (Collaborative), or the Missouri Public Service Commission (Commission) decides to implement a PAYS® system in Missouri, interested parties should work together with expert assistance to develop detailed program designs. A program design provides a complete road map for those entrusted with implementing a PAYS® system or any resource efficiency program. Such a design should clearly prescribe what offers can be made to which customers, how they may be made, who should be permitted to make them, and how consumer assurance is to be provided. All program forms and contracts, product certification criteria, vendor certification protocols, warranty procedures, and utility billing system changes (including how information about PAYS® should be depicted on monthly bills) should be clearly specified before any customer contacts are made. Taking the time to ensure that operating details have been thought through eliminates the problem of program decisions being made in crises by field staff, who often make different decisions than policy makers or those expert in PAYS® and resource efficiency efforts. Public Service Company of New Hampshire's and New Hampshire Electric Cooperative's April 12, 2001 filing to the New Hampshire Public Utilities Commission, "Pay-As-You-Save Energy Efficiency Products Pilot Program Design" is an example of such a program design.

However, the first step would be for the Collaborative or one of the parties to request that the Commission appoint an Independent Expert to work with the parties and expert consultants to develop the program designs. Given the myriad details and different interests of the parties (e.g., utilities may be concerned about lost revenues, vendors may want unbridled access to the PAYS® system, consumer advocates may want both reasonable and unreasonable consumer protections, etc.), it is unlikely consensus will be reached. A trusted expert answerable only to the Commission could make unbiased recommendations when consensus was not possible.

If the parties decide to set up the PAYS® infrastructure, the set-up costs (e.g., changes to the utilities' billing and collection system and the cost to develop program designs) should be borne by all customers through rates (much as they share the costs of all regulated utility infrastructure). If Missouri decides to implement a PAYS® system, the infrastructure costs can be amortized over many years and the sale of many products. Once the infrastructure is in place, there should be little cost to the utilities inasmuch as they already provide billing and collection services for all customers. Since, for the first time, all customers (i.e., tenants, building owners, those with and without capital or debt capacity, etc.) would effectively be able to participate in a resource efficiency market, there is ample justification to share the costs for building the PAYS® infrastructure among all customers who will be effectively eligible to participate. However, PAYS America realizes that this is a policy decision that must be resolved by all the parties.

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For planning purposes, in testimony before the Connecticut Department of Public Utility Control, Connecticut Light and Power (testimony from Kathleen Culligan, CL&P Late File Exhibit HD-04, Q-LF-024. Docket No. 03-01-01, March 2003) claimed billing system changes required to accommodate a PAYS® effort might cost $104,600. While this amount is probably excessive, even if this were the real cost, it is inconsequential compared to the environmental, economic and system benefits realized by all Missourians from the millions of dollars that a PAYS® marketplace could cause to be invested by customers in cost effective resource efficiency.

In New Hampshire, utilities' external costs for development of testimony and development of program designs (i.e., the April 12, 2001 submission to the New Hampshire Public Utilities Commission and subsequent consulting) was approximately $100,000. This appears to have been a good investment based on the more than 360 customers buying energy efficiency measures (including eligible projects in process or awaiting utility or town approval) totaling more than $1.38 million dollars invested by customers in resource efficiency projects (almost all of this total is money that will be paid by the customers who receive the savings). This preliminary feasibility study identified cost effective opportunities for Missouri customers that greatly exceed the scope of the New Hampshire pilots.

PAYS America is available and interested in helping the parties to implement a PAYS® effort in Missouri should they choose to do so.

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Appendices

Appendix	
1	UMB Bank Letter (Jeannine Larm)
2	St. Louis & Jefferson City Electric Rates
3	St. Louis & Jefferson City Natural Gas Rates
4	CFL Savings Calculation
5	PAYS® Analysis of Weatherization Data
6	Efficient Clothes Washer Savings Calculation
7	Water & Energy Savings Data Corporation Data
8	Public Building (School) Lighting Retrofit
9	PAYS® Analysis of Energy Systems Group Data
10	PAYS® Analysis of IAC Data
11	PAYS Analysis Tool
12	List of Resources

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From: Ken Burgess [kburgess@yahoo.com]

Sent: Monday, March 19, 2007 6:06 PM

To: General Plan Administration

Subject: Comments for Petaluma Draft EIR

Concerning Petaluma Resolution 2005-118 for greenhouse gas emissions, I do not see any mention in the EIR for addressing how either the water conservation measures or energy reduction measures are going to apply.

Since these guidelines have already been established as city achievements, I welcome the cities suggestions on how we will achieve them, and to what level this can be an open discussion to support and encourage community participation.

Ken Burgess,
Sustainable Petaluma,
707-769-8027.

No need to miss a message. Get email on-the-go
with Yahoo! Mail for Mobile. Get started.

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RE: GP/DEIR

Tuft, Pamela

From: David Keller [dkeller1@sonic.net]
Sent: Wednesday, March 28, 2007 12:44 AM
To: CityCouncil; CDD; Tuft, Pamela; Moore, Mike
Subject: Brownstones and compact development; Green Roofs. Petaluma General Plan and DEIR comments

101

Comments for the draft Petaluma General Plan and DEIR
RE: Housing, economic development, transportation, neighborhoods, land use, energy efficiency, green building.

Dear City Council, Planning Commissioners, and SPARC members:

A

Here are yet more options for denser, infill housing to create neighborhoods within Petaluma. These can also be used to our advantage as mixed use housing infill and incorporated within major retailers, as well as upper story residential over retail and commercial occupancies. Our policies should not just allow these types of developments, but mandate their use. The CPSP had asked that the Washington corridor also be designed as an extension of the CPSP SMART Code and land use, including the Kenilworth school site (Regency mall project); the DSL site on McDowell must also consider these alternatives. The General Plan and DEIR has ignored that opportunity, to the detriment of our existing neighborhoods and cross-town traffic congestion, and with a likely creation of blighted neighborhoods, both in competing retail downtown and in other shopping centers, as well as in adjacent neighborhoods of the "Old East Petaluma" area. (see Bakersfield Citizens for Local Control v. Bakersfield et al, for CEQA considerations of these impacts, currently not addressed in the DEIR.)

B

The second article describes successful uses of Green Roofs and Roof Gardens, working very successfully to reduce Greenhouse Gas emissions, reduce Petaluma's carbon loads, and save energy. Our current draft General Plan and DEIR do not address any measurable programs and policies to get to our city's adopted policy of reduction of overall GHG emissions to 25% below 1990 levels by 2015. These roofing programs offer another tool for us to get there, and should be evaluated and included as an overall, integrated, well-supported program for building design.

We need a General Plan and DEIR with a specific series of programs and policies to ensure that Petaluma leads the way in a measurable decrease in our GHG emissions to meet our target goals and environmental needs. We need a systems approach, not piecemeal efforts.

Petaluma should never have another 'traditional' big box, strip mall or standard commercial structure. We deserve better than that. We must pay attention to energy and water efficiencies, GHG reductions, and creation of successful pedestrian oriented neighborhoods.

Thank you,
David Keller
Petaluma River Council
1327 I St.
Petaluma, CA 94952

The brownstones are coming

East Coast icon offers urban chic on compact lots

By Jim Wasserman - Bee Staff Writer

Published Tuesday, March 27, 2007 Sacramento Bee
Story appeared in BUSINESS section, Page D1
http://www.sacbee.com/142/story/144389.html



Fifty-eight town houses are being built on 3 acres at 21st and U streets. Prices for the three-story, brownstone-style homes are projected from the mid-$400,000s to the $800,000s. Neighborhood amenities include a new Safeway and several restaurants. Sacramento Bee/Anne Chadwick Williams

Sacramento home builders are tapping that venerable icon of East Coast architecture -- the brownstone -- to stir sales for nearly 100 new three-story town houses coming to midtown.

They don't look like much now as construction begins. But as the new homes begin to sprout on vacant land in one of the city's oldest neighborhoods, builders say they'll evoke a classic brownstone ambience with their sturdy stone exteriors, second-story kitchens and living rooms and third-floor bedrooms.

The vertical, narrow homes are a key in the push for higher density housing in the region -- with up to 43 units per acre compared to the five or 10 per acre common in the area's suburbs -- and new examples of how in-fill projects are being used to turn the concept into reality.

"We were looking for something with urban cachet and it evolved very quickly into the brownstone concept," said Kevin Noell, partner in Metro Nova Communities.

Noell, a San Diego builder, and his development partners Tony Giannoni and Eleni Tsakopoulos-Kounalakis plan 58 brownstone-style homes on 3 acres at 21st and U streets in a project dubbed Tapestri Square. Three models are under construction.

None of the new Sacramento homes will be exact replicas of the brownstones that populate the streets in eastern cities like New York and, increasingly, some Western cities such as Portland, Ore. Neither do they share common walls, a standard feature of the homes that originated as multistory European row houses.

But they do mimic the narrow widths common to homes built in urban areas: The buildings at Tapestri Square range from 16 1/2 feet wide to 24 feet wide.

Tapestri Square is being built in an area with increasing shopping amenities. A Safeway grocery store and numerous restaurants are just blocks away; the Capitol is about a 15-minute walk from the project.

John Packowski, marketing principal of PHA Architects, said the idea for the buildings' look evolved as he walked past brownstones on the Upper West Side of New York City and later in Chicago.

"It's a modern adaptation of a traditional style," Noell said. "The verticality, the relatively narrow unit, is actually part of the ambience."

Most of the homes include the traditional walk-up to the main second-floor living area and the sitting stoops that give residents of brownstones a sense of neighborhood life.

Prices at Tapestri Square will range from the mid-$400,000s to the $800,000s for three-story homes ranging from 1,200 square feet to 2,600 square feet. The plan is to snag people downsizing from bigger single-family homes after their children are grown.

"That was the idea, to appeal to a somewhat older buyer who typically has an older, bigger home and furniture they don't want to part with. It can travel down with them," said Packowski, the architect.

About a mile away behind Trinity Cathedral at 27th and N streets, Sacramento-based Loftworks also is clearing ground to begin 32 three-story residences called Sutter Brownstones. The plan is to attract employees of nearby Sutter Hospital and others who "want to live more closely to the amenities the city is beginning to offer," said Mark Friedman, a Loftworks partner with Michael Heller.

Friedman hired the architectural firm LPA Sacramento Inc. and a Portland architect to blend older brownstone features and a more contemporary look for the town houses.

Tentative prices for the town houses, which range from 1,150 square feet to 1,700 square feet, are $415,000 to $650,000. The first units likely will be available at the end of November, Friedman said.

Both partnerships say the appeal of brownstone-style features will compete with proposed high-rise condo developments to the west in downtown Sacramento, including the Towers, Third Street and Capitol Mall, and Aura Condominiums at 601 Capitol Mall.

Analysts say the new housing is part of downtown Sacramento's long transition to an urban center with more for-sale homes, office buildings and entertainment offerings. Densities that range from about 20 per acre at Tapestri to 43 homes per acre at Sutter Brownstones also win praise -- and predictions of quick sales.

"The thing we're seeing is that 30 to 40 percent of the population seem to want what I refer to as walkable urbanism," said Christopher Leinberger, a fellow with the Brookings Institution in Washington, D.C., and director of the University of Michigan's graduate real estate program.

Leinberger, who recently addressed the Downtown Sacramento Partnership about revitalizing the city's urban core, said there is always pent-up demand for such housing because too little has been built. That also makes it more expensive.

In Rancho Cordova, Atlanta-based Beazer Homes is giving the brownstone concept a slightly more suburban twist for its Capital Village development. The builder plans 248 brownstone-themed homes in a community of 800 houses. Some are three stories and others two stories, said Sacramento division President Brendan O'Neill.

He said the brownstone theme fits for the homes' vertical architectural features and tiny lots that place the homes three feet apart. That's to help comply with the region's push toward putting more of its newcomers onto less space, he said.

The models are nearly finished with grand opening scheduled in mid-April. Prices range from $304,000 to $382,000 for 1,365 square feet to 2,200 square feet.

As the brownstone theme is unveiled downtown and in Rancho Cordova, three-story residential units of all kinds are springing up across the metro area -- with plenty more to come, analysts say, as expensive land prices also push housing ever more vertical.

In West Sacramento, builders are marketing at least three new triple-story projects that bear some resemblance to those in midtown. Those include Sacramento-based Leonard Development's 25-home River's Side at Washington Square and Fairfield-based SBB Associates' 34-unit Harriet Lane town house development. Regis Homes of Sacramento also is building 104 three-story houses at its Lofts at Ironworks.

The three-story concept is spreading far beyond the Sacramento's urban core, as well. Chicago-based Kimball Hill Homes plans an unspecified number of three-story single-family houses at its 168-home Somesert infill project on Franklin Boulevard in south Sacramento.

"A lot of this is going back to the higher density to get better efficiency out of your land use," said Mike Paris, the builder's Sacramento division president. "We have to go vertical in order to do that."

About the writer:

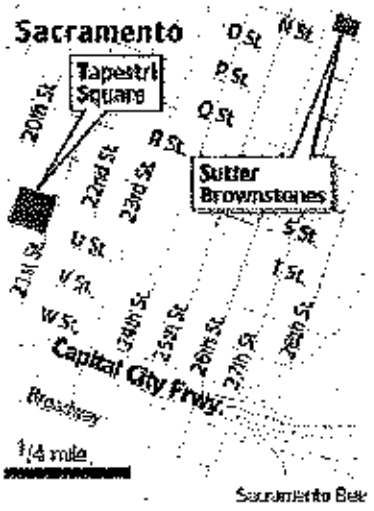
- The Bee's Jim Wasserman can be reached at (916) 321-1102 or jwasserman@sacbee.com.

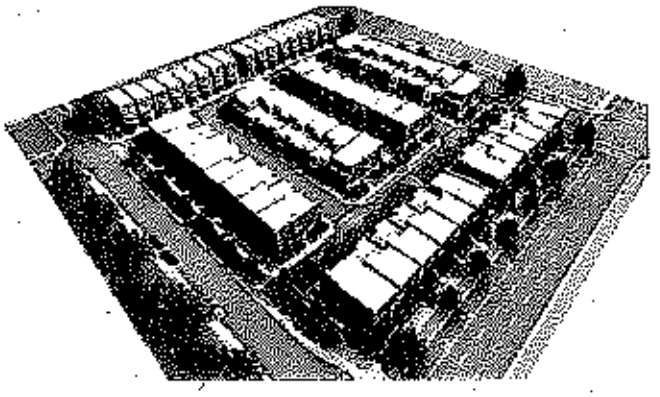


Models are under construction at Tapestri Square. Developers hope an update of the traditional brownstone appeals to empty nesters looking for a more urban lifestyle without the pain of extreme downsizing. Sacramento Bee/Anne Chadwick Williams



An architectural rendering of Tapestri Square shows vertical, narrow homes that are key to infill development and fulfilling the desire for higher-density housing in the capital region. /Metro Nova Communities





The tightly packed homes and front stoops of Tapestri Square are designed to enhance street life. But unlike the brownstones that inspired them, the homes do not share a common wall. /Metro Nova Communities

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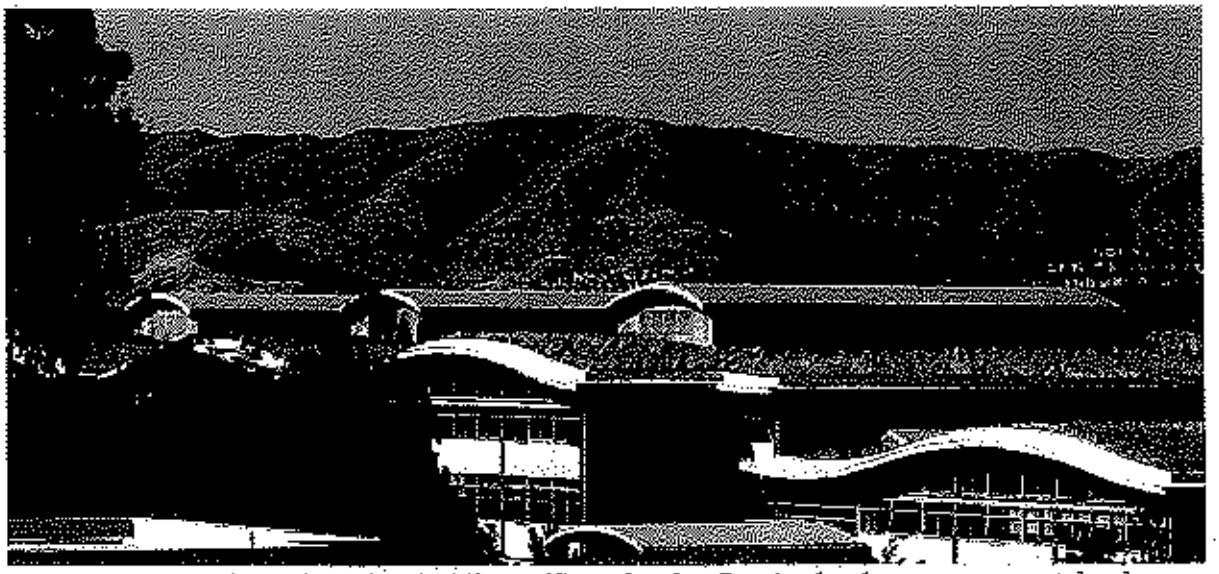
Roof gardens and Green Roofs: energy conservation and GreenHouse Gas reduction strategies being implemented.

The Window Box Gets Some Tough Competition

By PATRICIA LEIGH BROWN



In San Bruno, Calif., a building holding offices for the Gap is also home to a coastal oak savannah landscape. More Photos >

CARMEL VALLEY, Calif. — It is the green season, when the rains give way to a landscape of renewal, and gardeners clutching copies of Sunset magazine's Western Garden Book emerge exultantly from their winter dens.

In this place where the political climate, too, is green, it is perhaps not surprising to encounter a hardy new perennial in the world of horticulture — the green roof gardener.

While others nearby toil over grapes and artichokes, Cooper Scollan spends his days hunched over some 1.7 million baby sedum and other native plants destined for hillocks atop *the green roof at the new California Academy of Sciences building*, nearing completion in Golden Gate Park.

Mr. Scollan, 30, is a green collar worker, responsible for the safety and well-being of what soon will be the largest continuous swatch of vegetation in San Francisco. The academy, designed by the architect Renzo Piano, whom Mr. Scollan has seen only on television, will feature the country's most technically ambitious eco-roof, the latest example of what is known in highbrow circles as "regenerative" or "living" architecture.

It is a growing movement that originated in Germany and now includes, to name a few, bottlebrush grasses and wild rye atop Chicago City Hall, succulents on the 10-acre roof of Ford's River Rouge truck plant in Dearborn, Mich., flowering chives and dianthus on the Bronx County building in New York, and, at an office building for the Gap in San Bruno, Calif., a coastal oak savannah landscape.

Though green roofs are hardly new — think of the fabled hanging gardens of Babylon — eco-roofs may represent gardening's next frontier, as cities from Los Angeles to Chicago offer incentives, including fast-tracking development, to builders who forgo drab stretches of concrete in favor of a living roof. The reasons are pure Al Gore: the new California Academy of Sciences roof is expected to reduce storm water run-off by half. That water will then be used, instead of potable water, to flush toilets.

The design is also calculated to prevent the release of more than 405,000 pounds of greenhouse gases and substantially reduce the urban "heat island" generated by roads, sidewalks and parking lots.

More poetically for Mr. Scollan, who is fond of comparing his favorite plant, the towering blue "Pride

of Tenerife," to Marge Simpson's hair, the poppies, strawberries, sedum and other California native plants on the roof will provide a wildlife park in the sky protected from windblown weeds and the vagaries of man. Should all go well, it will also attract the endangered San Bruno elfin butterfly, a coppery brown temptress.

Like meditation, he said, gardening is repetitive yet constantly changing. "Plants, like insects, metamorphize," he philosophized, "transforming from a tangled mass of cells into a fig hanging in midair."

As nursery manager for Rana Creek Habitat Restoration, an ecological design firm, Mr. Scollan is one of a growing number of green roof gardeners. According to a survey last year by Green Roofs for Healthy Cities, a nonprofit industry association based in Toronto, over 3 million square feet of green roofs were planted in North America in 2005, worth about $60 to $80 million. This year growth is expected to rise 125 percent, between 6 and 7 million square feet, said Steven Peck, the group's founder.

Gardeners like Mr. Scollan are tackling challenges at once similar and distinct from "terrestrial" gardening, in the words of Ed Snodgrass, a pioneering green roof nurseryman in Maryland who writes an "Ask Ed" column for green roofs.com and is the author of the definitive "Green Roof Plants: A Resource and Planting Guide" (Timber Press, 2006).

Mr. Scollan checks his brood each morning, when this stunningly pristine valley is still swaddled in mist. The plants' environmental pedigree does not fend off nature's whims: Mr. Scollan buys copious amounts of chunky peanut butter to put in mousetraps — 20 traps a week — to discourage mice from dining on mosses or on the prunella, a plant with tubular purple flowers beloved by hummingbirds.

Mr. Scollan personally raised the prunella from seed, hand-collected in Point Reyes, starting with a couple of hundred that, in less than a year, have generated more than 200,000 plants.

Although his enemies are typical — mites and aphids are high on the hit list — the unusual configuration of the roof has required horticultural derring-do. Mr. Piano's third-story design resembles the downhill ski run at the Winter Olympics: it includes seven steep undulating hills. (Mr. Piano, who designed the new building for The New York Times, created his first green roof for a project in Berlin.)

Plants will adhere to the daunting slopes by way of 50,000 "bio trays," biodegradable planters made from coconut fibers that allow roots to attach the trays to one another and also to the soil. (A waterproof membrane and fabric mats protect the roof from water.). As on all large green roofs, the soil is not dirt exactly but a gravel-like growing medium of granulated pumice, shales, clays and other minerals.

Paul Kephart, the founder of Rana Creek, calls the roof "the most challenging vegetative structure in the world." The need for gardening ingenuity is likely to increase as green architecture gets ever more sophisticated, Mr. Kephart said. "The cultural idea of a beautiful place now includes ecology, aligning nature's life cycles to ours," he said.

Although less prone to weeds than earthbound gardens, green roofs tend to be drier and windier, said Mr. Snodgrass, a fifth-generation alfalfa farmer who saw a market niche and established one of the country's first green roof nurseries. The logistics of roof gardening — in the case of the California Academy of Sciences, 2.6 million pounds of plants and soil — require immense forethought, especially the issue of weed-hauling.

"You do need to think about how you will get everything on and off the roof," said Mr. Snodgrass. "It's

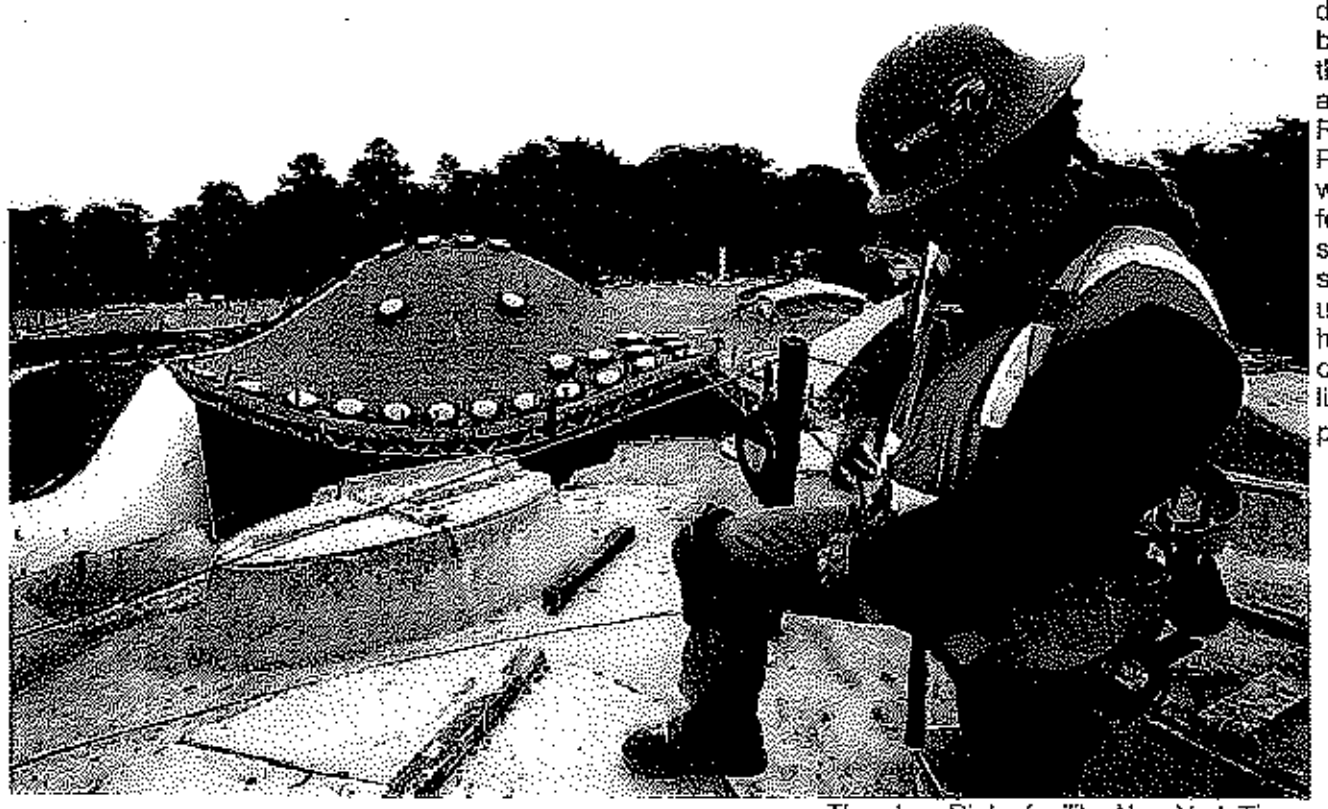
a whole different world than pulling up to the sidewalk in a pickup truck."

Daydreaming while gardening is not a good strategy. "You have to be mindful that there's an edge," he said.

If drought-tolerant green roof grasses and other plants are a new American crop, pioneers like Mr. Scollan, who carries a pruner, assorted plastic frogs and a beat-up copy of Scientific American in his Honda, are brave new harvesters. His passion for plants started early: his mother has a green thumb. He first studied ornithology, including a stint in Central and South America with Roger Tory Peterson, who, he recalled, "could hear an Eastern meadowlark a quarter mile away with the radio on."

Green architecture may one day be the equivalent of medieval cathedrals, but with living things the architectural inspiration, rather than soaring stone and glass.

For Mr. Scollan, creating life for the tops of buildings is "Jack and the Beanstalk" redux, but with an eco-twist. "Plants are the true magicians," he said. "With just a few seeds sown, a whole new world is grown in the sky."



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Theodore Rigby for The New York Times

RE: DEIR

Tuft, Pamela

From: Diane Reilly Torres [dreillytorres@sbcglobal.net]

Sent: Tuesday, March 27, 2007 5:14 PM

To: Tuft, Pamela; CDD; willdargieppc@comcast.net

Cc: kmillerhome@comcast.net; tanyasullivan@comcast.net; Pam Torliatt; Spence F. Burton; Teresa Barrett; David Keller; ghcart@netzero.net; janicecader@comcast.net; johnc85393@aol.com; mgfashionart@comcast.net; notice@owlfoundation.net; penngrove@sonic.net

Subject: Fwd: Re: FWCommissioner Sullivan asked that these streets be mapped but they are not- "Comments for the Public Record for the General Plan DEIR".

"Comments for the Public Record for the General Plan DEIR",
Hi Pamela,

I glanced through the GP and DEIR comments provided to the Planning Commission and I did not see the comment on the DEIR I emailed to you on Thu, 1 Feb 2007. I might of missed it, but just in case I am resending for **tonight's Planning Commission Meeting**. I am leaving out the no on street parking issue as that was resolved but am including

- **The City of Petaluma Municipal Code Chapter 11.90**

TRIP REDUCTION ORDINANCE PROGRAM

102

11.90.010 Purpose.

The purpose of this chapter is to promote the development of trip reduction ordinance programs at employer work sites with one hundred or more employees during the afternoon peak traffic period, four p.m. to six p.m., in order to reduce traffic impacts within the city.

The passage of Senate Bill 437 in February 1996, prohibits any public agency from requiring employers to implement an employee trip reduction program unless required by the federal government. Participation in this program is voluntary. **(Ord. 2015 NCS §l, 1996: Ord. 1886 NCS §l (part), 1992.)**

- ***How does this effect the Impacts and Proposed General Plan Policies that Reduce the Impact of 3.2-1 Increased motor vehicle traffic would result in unacceptable level of service (LOS) at study intersections. , mirigations that include Transportation Demand Management programs to reduce peak-period trip generation., trip reduction credits, etc.*** A
- ***How does this effect the Impacts and Proposed General Plan Policies that Reduce the Impact of 3.5-5 The proposed General Plan could cause a substantial increase in transportation energy consumption due to the projected increases in trips associated with future population and employment growth IE*** B
- ***How does this effect the Impacts and Proposed General Plan Policies that Reduce the Impact of 3.10-1 Buildout of the proposed General Plan would result in population levels that could conflict with the Bay Area 2005 Ozone Strategy.*** C

4-P-8 Reduce motor vehicle related air pollution. Significant

This appears to make the following Mitigations/Proposed General Plan Policies that Reduce the Impact

of Air Quality, Energy and Traffic not feasible.

5-P-13 Encourage existing major employers to develop and implement Transportation Demand Management programs to reduce peak-period trip generation.
a. Study the feasibility of a citywide TDM program that would be funded by annual fees or assessments on new development.
B. Assign a proportion of TDM fees to Petaluma Transit for expansion of service and future fare reductions or fare elimination.
C. As part of the development code, require TDM measures for all new non-residential development.
D. Assign trip reduction credits and reduced transportation impact fees for demonstrated commitment to TDM strategies.
E. Reduce parking requirements for mixed-use developments and for developments providing shared parking or a TDM program.
F. Establish a TDM program for City of Petaluma employees.

D

5-P-2 Ensure the identified mobility system is provided in a timely manner to meet the needs of the community.

What is the definition of timely?

Comment Draft Environmental Impact Report (DEIR)
page 3.2-22
Planned Roadway Improvements
Several new roadways and "cross-town connectors" are incorporated in the proposed General Plan to help reduce traffic congestion at freeway interchanges and crossings of the Petaluma River. The analysis of future conditions assumes these improvements identified in the proposed General Plan will be in place by the Year 2025
(see Figure 3.2-4):

There are nine (9) listed two are
Rainier Avenue Extension and Interchange. Rainier Avenue will be extended to connect with a new freeway interchange on U.S. 101 between Washington Street and Corona Road and provide another cross-town travel route and access to U.S. 101.

North Petaluma Boulevard Grid. A grid of streets will be developed near North Petaluma Boulevard adjacent to the Rainier Avenue extension and a planned southward extension of Industrial Avenue.

but Figure 3.2-4 Planned Transportation Improvements identifies eleven (11)
Industrial Avenue: Extension of Industrial Ave. and new river crossing and Shasta Avenue: Improve and extend to Rainier Avenue

E

Commissioner Sullivan asked that these streets be mapped but they are not.

Are these the North Petaluma Boulevard Grid ?
A "grid of streets" is inadequate Where are the streets going to be? Where does it identify the number of vehicle trips used to forecast future traffic conditions? Where is the traffic analysis for the future traffic volumes?

F

Under CEQA, a lead agency (City of Petaluma) is required to consider public opinion and the existence of public controversy in determining the significance of a project's environmental impacts (California Public Resources Code Sections 21082.2[b] and CEQA Guidelines Section 15064[c]).

The Draft General Plan 2025 and Draft EIR as written will have significant and

unavoidable enviormental effects to all of the residents near the Rainier Av and DSL site. In addition to adverse economic effects and I believe we all have a right to know how significant

G

Did the City of Petaluma consider public opinion and the existence of public controversy in determining the significance of a project's environmental impacts?

Impacts and Mitigation Measures
Impact 3.2-1 Increased motor vehicle traffic would result in unacceptable level of service (LOS) at study intersections. (Significant and Unavoidable)

Significant impacts would remain at six study intersections. Installing additional lanes or expanding capacity at these locations would conflict with proposed General Plan goals and policies related to improving multi-modal circulation and **preserving the pedestrian environment of Central Petaluma.** Therefore, no mitigation are identified. Intersection impacts at these locations are significant and unavoidable:

H

McDowell Boulevard N. / Corona Road
Lakeville Street / Caulfield Lane
Lakeville Street / East D Street
Petaluma Boulevard S. / D Street
Sonoma Mountain Parkway / E. Washington Street
McDowell Boulevard N. / Rainier Avenue

Mitigation Measures None identified

Are the General Plan goals and policies related to improving multi-modal circulation for the entire City or only to **preserve the pedestrian environment of Central Petaluma?**

I

Will increased motor vehicle traffic result in unacceptable level of service at six study intersections. (Significant and Unavoidable) in order to **preserve the pedestrian environment of Central Petaluma?**

J

Diane Reilly Torres <dreillytorres@sbcglobal.net> wrote:

> Date: Thu, 1 Feb 2007 16:08:37 -0800 (PST)
> From: Diane Reilly Torres <dreillytorres@sbcglobal.net>
> Subject: Re: FW: Mobility Petaluma General Plan
> To: "Tuft, Pamela" <PTUFT@ci.petaluma.ca.us>
> CC: Matthew Ridgway <M.Ridgway@fehrandpeers.com>,
> "Duiven, Scott" <sduiven@ci.petaluma.ca.us>
>
> Hi Pamela,
>
> My neighbors homes including mine are located in the 11 driveways along Rainier Avenue that was identified in the Rainier EIR as automobiles not being able to back out of the driveway because of the increase in traffic.
>
> I appreciate Mathew Ridgeway's response and all the work you have done but it is still unclear to my neighbors and myself how the new General Plan will effect us as far as

traffic, air quality, noise, safety, visual, etc. It is not just my neighbors, Mary Glarden's neighbors (Park Place) South of Rainier and Janice Cader-Thompson's neighbors North of Rainier have been coming to the meetings asking the same questions and raising the same concerns.

The Draft General Plan 2025 and Draft EIR as written will have significant and unavoidable enviormental effects to all of us, in addition to adverse economic effects and I believe we all have a right to know how significant. (see below)

Under CEQA, a lead agency (City of Petaluma) is required to consider public opinion and the existence of public controversy in determining the significance of a project's environmental impacts (California Public Resources Code Sections 21082.2[b] and CEQA Guidelines Section 15064 [c]).

The City of Petaluma has encouraged public participation, has heard public opinion and is aware of public controversy, but has failed to **consider public opinion and the existence of public controversy in determining the significance of a project's environmental impacts**. If I am wrong please tell me.

Impacts and Mitigation Measures
Impact 3.2-1 Increased motor vehicle traffic would result in unacceptable level of service (LOS) at study intersections. (Significant and Unavoidable)

Significant impacts would remain at six study intersections. Installing additional lanes or expanding capacity at these locations would conflict with proposed General Plan goals and policies related to improving multi-modal circulation and **preserving the pedestrian environment of Central Petaluma.** Therefore, no mitigations are identified. Intersection impacts at these locations are significant and unavoidable:

McDowell Boulevard N. / Corona Road
Lakeville Street / Caulfield Lane
Lakeville Street / East D Street
Petaluma Boulevard S. / D Street
Sonoma Mountain Parkway / E. Washington Street
McDowell Boulevard N. / Rainier Avenue

Mitigation Measures None identified.

•

Chapter 3: Settings, Impacts, and Mitigation Measures

- **The City of Petaluma Municipal Code Chapter 11.90**

TRIP REDUCTION ORDINANCE PROGRAM

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5-P-13 Encourage existing major employers to develop and implement Transportation Demand Management programs to reduce peak-period trip generation.
a. Study the feasibility of a citywide TDM program that would be funded by annual fees or assessments on new development.
B. Assign a proportion of TDM fees to Petaluma Transit for expansion of service and future fare reductions or fare elimination.
C. As part of the development code, require TDM measures for all new non-residential development.
D. Assign trip reduction credits and reduced transportation impact fees for demonstrated commitment to TDM strategies.
E. Reduce parking requirements for mixed-use developments and for developments providing shared parking or a TDM program.
F. Establish a TDM program for City of Petaluma employees.

Less than Significant
Significant and Unavoidable
Significant and Unavoidable

Diane Reilly Torres

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Re: GP/DEIR

Tiffany Renée

843 B Street Petaluma, CA 94952

To: City Council, City of Petaluma
Pamela Tuft, General Plan Administrator
11 English St.
Petaluma, CA 94952

RECEIVED
MAR 2 8 2007
GP Administration

Public comments on the draft General Plan and General Plan DEIR:

Please find additional comments to the General Plan 2025 and DEIR.

103

1. **8-P-4 A & 8-P-4 B** are insufficient mitigations for balancing development with demand. Proposed development and subsequent water demand can be almost guaranteed based on the Proposed Plan, however the water supply is based on paper and a high level of resident participation in conservation. It's paper water. An annual water budget must be balanced against Best Management Practices for proposed water conservation and recycled water programs. Should the proposed Water Conservation Plan not be met, development plans must be placed on hold until conservation can meet demand for future growth. A B
2. With the amount of water coming through the Petaluma watershed and the vast areas of open and agricultural space, is there an Urban Water Management Plan that includes plans to store water? C
3. **Impact 3.10-1.** Particulate matter is life-threatening to asthma sufferers and is known to cause cancer. Winter particulate matter from wood-burning fireplaces can be so pervasive that those susceptible to poor air quality have a significant reduction in their quality of life, making pedestrian activity difficult and causing further automobile dependence. The American Lung Association "recommends that individuals avoid burning wood in homes where less polluting heating alternatives are available. The use of the least-polluting alternative heating methods and cleaner technologies should be promoted to provide useful heat, while minimizing any adverse health effects."[1]

> There are also a variety of environmental factors in Sonoma County that can make asthma worse, including high pollen counts, mold and fungus, **use of wood-burning stoves and fireplaces** [*emphasis ours*], agricultural burning, and high pesticide use.
>
> While ozone air pollution declined 11 percent in the rest of the country between 1982 and 2001, ozone levels in Sonoma County do not show a decreasing trend. In fact, current ozone and particulate matter levels are already near the maximum allowable standards to protect the health of sensitive members of the population, including those with asthma. The growing number of cars, buses and trucks in Sonoma County will continue to add to the air pollution problem.
>
> "Even small amounts of air pollution can irritate the lungs," said Dr. Martin. "Studies have linked premature death as well as increased hospital admissions, emergency room visits and asthma episodes with

---

1 http://www.lungusa.org/site/pp.asp?c=dvLUK9O0E&b=23354#solutions

> **exposure to particulate matter air pollution and diesel exhaust.** [*emphasis ours*] We must look at the connection between the environment and lung health here in Sonoma County."[2]

Given the significant impact to air quality in the form of high particulate matter in the proposed General Plan, the City should include a stronger ordinance or policy that bans all new fireplaces that produce polluting air particulates and implement Best Management Practices that pay residents to close up existing fireplaces and/or remove wood stoves and inserts that burn materials that produce particulate matter. All existing home sales should be encouraged to remove non-compliant wood-burning stoves and/or retrofit to new least-polluting stoves and/or close fireplaces. As well rebates for converting to manual push or electric lawn mowers should be offered to residents and landscape businesses.

Automobile pollution from HWY 101 and local traffic congestion should also be addressed. User fees for gross and high polluting vehicles should be considered, with money going to an asthma inhaler rebate for children. As well, land use next to freeways (500 meters) should be restricted from new housing and youth-oriented outdoor activities until such time as highway emissions can be deemed safe for children. D

> Children who live near a major highway are not only more likely to develop asthma or other respiratory diseases, but their lung development may also be stunted.
>
> According to a study that will appear in the February 17 issue of The Lancet and now available online, researchers at the Keck School of Medicine of the University of Southern California (USC) found that children who lived within 500 meters of a freeway, or approximately a third of a mile, since age 10 had substantial deficits in lung function by the age of 18 years, compared to children living at least 1500 meters, or approximately one mile, away.
>
> "Someone suffering a pollution-related deficit in lung function as a child will probably have less than healthy lungs all of his or her life," says lead author W. James Gauderman, Ph.D., associate professor of preventive medicine at the Keck School of Medicine of USC. "And poor lung function in later adult life is known to be a major risk factor for respiratory and cardiovascular diseases."
>
> The study draws upon data from the Children's Health Study (CHS), a longitudinal study of respiratory health among children in 12 southern California communities. More than 3,600 children around the age of 10 years were evaluated over a period of eight years, through high-school graduation. Lung function tests were taken during annual school visits, and the study team determined how far each child lived from freeways and other major roads.
>
> "Otherwise-healthy children who were non-asthmatic and non-smokers also experienced a significant decrease in lung function from traffic pollution," continues Gauderman. "This suggests that all children, not just susceptible subgroups, are potentially affected by traffic exposure".

---

[2] http://www.lungusa2.org/redwoodempire/news_110103a.html

Lung function is a measure of lung health based on how much air a person can exhale after taking a deep breath, and how quickly that air can be exhaled. Children's lung function develops rapidly during adolescence until they reach their late teens or early 20s. A deficit in lung development during childhood is likely to translate into reduced function for the remainder of life.

"This study shows there are health effects from childhood exposure to traffic exhaust that can last a lifetime," says David A. Schwartz, M.D., Director of the National Institute of Environmental Health Sciences (NIEHS). "The NIEHS is committed to supporting research to understand the relationship between environmental exposures and diseases, and to identify ways to reduce harmful exposures to all populations, especially children so they can realize their full potential for healthy and productive lives."

Previous studies have demonstrated links between lung function growth and regional air quality. The findings in this study add to that result, demonstrating that both regional air pollution and local exposure to traffic pollution affect lung development.

"This study provides further proof that regional air quality regulations may need to be adjusted based on local factors, including traffic volume," says Gauderman. "This is important because in areas where the population continues to grow, more and more children are living or attending school near busy roadways. This may be harmful in the long run." Gauderman adds that community leaders, school districts, and developers should consider these results when developing new schools or homes. [3]

4. With the increased use of energy from residential and commercial build out why hasn't a larger plan to deal with renewable sources of energy been adopted in the General Plan? If Petaluma is to reach its commitment to the County on Climate Protection and green house gas reductions we must increase our energy mix. A plan to convert to a Consumer Choice Aggregate for the city or a stronger policy on renewable energy production should be implemented by residential and commercial builders, 5% is not enough to offset our GHG emissions. We need to consider 100% renewable energy production for Petaluma, all of Petaluma if we plan to live here in the century. E

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3 http://www.sciencedaily.com/releases/2007/01/070125185843.htm

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FACSIMILE TRANSMITTAL SHEET

To: PAMELA TUFT, DIRECTOR

From: R. Nadon, Paleontologist

Company: PETALUMA GEN-PLAN ADMIN

Company:

Phone Number:

Phone Number: (707) 937-2412

Fax Number: (707) 778-4586

Sender's Reference Number:

Regarding: PUBLIC HEARING 3-13 REZONE

Recipient's Reference Number:

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- ☐ Urgent
- ☐ Please Reply ☐ ASAP
- ☐ For your records

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March 12, 2007

R. B. G.-Naidu, Paleontologist
PO Box 1593
Fort Bragg, CA 95437
(707) 937-2412
rbgn@earthlink.net

Ms. Pamela Tuft, Director
Department of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952

104

RE: Rezoning of parcels, Petaluma Blvd. No. and Cinnabar Road: Public Hearing Mar. 13.

Dear Ms. Tuft,

Rezoning of these parcels should require a CEQA update. Paleontologic assessment (fossils) needs to be addressed. If this was covered in earlier EIR's, there is New Information (G.-Naidu, 1999).

All projects involving grading or rezoning need to assess paleontologic sensitivity (a separate category of the CEQA guidelines). Professional standards require a qualified vertebrate paleontologist assess potentially fossil-bearing strata for paleo remains. Standard assessment includes analysis of bulk matrix samples to ascertain whether or not there are microvertebrates (small bones) present.

The proposed rezoning involves parcels that may be partly or wholly situated on the Wilson Grove Formation, a paleontologically significant stratum (see G.-Naidu, 1999). I was unable to down-load site specifics from your website. The Wilson Grove is present on upper Cinnabar Road - lower Cinnabar Road may include undifferentiated Pleistocene sediments. These are also known to be fossiliferous.

The Paleontologic Assessment should be included in the rezoning of these parcels, and should be added specifically to the new Petaluma General Plan.

Thank you for your attention to this matter.

Sincerely,

R. B. G. Naidu

Reference: G.-Naidu, R. B. 1999. Ecology and paleontology of the Wilson Grove Formation, Sonoma-Marin counties, California (abs.). Paleo Bios 19 (1), supp. 6.

Duplication - Removed

Pages 743 - 748

CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM

ALAMEDA
COLUSA
CONTRA COSTA
LAKE
MARIN
MENDOCINO
MONTEREY
NAPA
SAN BENITO
SAN FRANCISCO
SAN MATEO
SANTA CLARA
SANTA CRUZ
SOLANO
SONOMA
YOLO

Northwest Information Center
Sonoma State University
1303 Maurice Avenue
Rohnert Park, California 94928-3609
Tel: 707.664.0880 • Fax: 707.664.0890
E-mail: leigh.jordan@sonoma.edu

October 26, 2006

06-EIR-02

Pamela A Tuft, AICP
Director of GP Administration
City of Petaluma
PO Box 61
Petaluma, CA 94953-0061

RECEIVED
OCT 3 1 2006
GP Administration

RE: Draft Environmental Impact Report and Draft General Plan 2025

Dear Ms. Tuft:

105

Thank you for the opportunity to comment on the Draft Environmental Impact Report and Draft General Plan 2025. On the whole, we found them to be excellent documents that clearly articulate the need for preservation of cultural resources and the proper processes for addressing adverse effects that projects may have on our shared cultural environment. Please see our comments below which are divided between the two documents and referenced by your page numbers.

DEIR comments:

Page 3.12-2

DEIR: First paragraph in *Prehistoric Resource Sites* states, "A review of the Petaluma UGB conducted by the Northwest Information Center found 21 recorded Native American archaeological resources and historic cultural resources…"

NWIC: The letter sent by this office dated 17 December 2001 (NWIC file #01-1124), stated that "the proposed planning area contains 14 recorded Native American and 19 historic cultural resources". Please change to reflect this and change historic to **historic-era**.

A

Page 3.12-8

DEIR: Second paragraph states, "…the Information Center may recommend a survey for historical, archaeological and paleontological sites."

NWIC: This office only makes recommendations for historical resources (archaeological and architectural), not for paleontological sites.

B

Page 3.12-9

DEIR: First paragraph under Impact 3.12-1 again states that "21 recorded Native American archaeological resources and historic cultural resources are currently located within the UGB". A

NWIC: Again please note that our correspondence stated that "the proposed planning area contains 14 recorded Native American and 19 historic cultural resources". Please change to reflect this and change historic to **historic-era**.

In addition, please note that this record search is now five years old and additional resources may have been recorded within the UGB. Therefore, please remove the word "currently" and adjust wording to show that as of 17 December 2001 the proposed planning area contains…

Under the *Proposed General Plan Policies that Reduce the Impact* (page 3.12-10)

3-P-7 (F) C

DEIR: "Ensure the protection of known archaeological resources in the city by requiring…for Native American and/or historic remains."

NWIC: Please change to, "Ensure the protection of known **and unrecorded** archaeological resources… for Native American and/or **historic-era** remains".

Under the *Proposed General Plan Policies that Reduce the Impact* (page 3.12-11)

3-P-7 (F)

DEIR: "Ensure the protection of known archaeological resources in the city by requiring…for Native American and/or historic remains." D

NWIC: Please change to, "Ensure the protection of known **and unrecorded** archaeological resources… for Native American and/or **historic-era** remains".

Draft General Plan (DGP) 2025 comments:

Page 2-7

Park and Open Space

DGP: *Open Space*. This designation includes unimproved sites devoted to the preservation of natural resources, … E

NWIC: …preservation of natural and cultural resources, …

Page 2-7
3-P-7
Add H: In accordance with Senate Bill 18, after March 1, 2005, if land designated, or proposed to be designated as open space contains a cultural place, and if an affected tribe has requested notice of public hearing under Government Code §65092, then local governments must consult with the tribe.

Page 3-3
DGP: First paragraph in *Historical and Archaeological Resource* states, "The California Historical Resources Information System records 21 Native American and historic cultural resource sites within Petaluma's UGB.

NWIC: The letter sent by this office dated 17 December 2001 (NWIC file #01-1124), states that "the proposed planning area contains 14 recorded Native American and 19 historic cultural resources". Please change to reflect this and change historic to **historic-era**.

In addition, please note that this record search is now five years old and additional resources may have been recorded within the UGB. Therefore, please adjust wording to show that as of 17 December 2001, the California Historical Resources Information System records …

Page 3-7
3-P-7 (F)
DGP: "Ensure the protection of known archaeological resources in the city by requiring…for Native American and/or historic remains."

NWIC: Please change to, "Ensure the protection of known **and unrecorded** archaeological resources… for Native American and/or **historic-era** remains".

Again, thank you for including us in this process and if you have any further questions or comments, please do not hesitate to contact our office at 707.664.0880.

Sincerely,

Bryan Much
Researcher I

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Pages 753 to 766

STATE OF CALIFORNIA
PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

ARNOLD SCHWARZENEGGER, *Governor*

September 21, 2006

Pamela Tuft
City of Petaluma
11 English Street
Petaluma, CA 94952

106

Dear Ms. Tuft:

Re: SCH #2004082065; Draft General Plan 2025

As the state agency responsible for rail safety within California, we recommend that any development projects planned adjacent to or near the rail corridor in the County be planned with the safety of the rail corridor in mind. New developments may increase traffic volumes not only on streets and at intersections, but also at at-grade highway-rail crossings. This includes considering pedestrian circulation patterns/destinations with respect to railroad right-of-way.

Safety factors to consider include, but are not limited to, the planning for grade separations for major thoroughfares, improvements to existing at-grade highway-rail crossings due to increase in traffic volumes and appropriate fencing to limit the access of trespassers onto the railroad right-of-way.

The above-mentioned safety improvements should be considered when approval is sought for the new development. Working with Commission staff early in the conceptual design phase will help improve the safety to motorists and pedestrians in the County.

If you have any questions in this matter, please call me at (415) 703-2795.

Very truly yours,

Kevin Boles
Utilities Engineer
Rail Crossings Engineering Section
Consumer Protection and Safety Division

cc: Lillian Hames, SMART

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California Regional Water Quality Control Board
San Francisco Bay Region

Linda Adams
Secretary for
Environmental
Protection

1515 Clay Street, Suite 1400, Oakland, California 94612
(510) 622-2300 • Fax (510) 622-2460
http://www.waterboards.ca.gov/sanfranciscobay

Arnold Schwarzenegger
Governor

Date: OCT 3 0 2006
File No. 2148.02 (AHS)

Ms. Pamela Tuft
Director of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952

107

SUBJECT: **Comments on Draft Environmental Impact Report for the City of Petaluma General Plan Update**

Dear Ms. Tuft:

We have reviewed the City of Petaluma's Draft Environmental Impact Report (DEIR) for the City's General Plan Update. The DEIR evaluates whether the Draft General Plan 2025 mitigates for a variety of land use and environmental impacts from future development and growth within the City of Petaluma. Water Board staff's (staff) comments address development along the Petaluma River (river) corridor and the need to preserve the last remaining open space area along the developed portion of the river.

The staff initially commented on the Notice of Preparation (NOP) for the City's General Plan Update in a letter dated September 16, 2004 and provided public comment at the September 28, 2004 Planning Commission Meeting. In both instances staff recommended that the City consider the cumulative environmental impacts of current and future development along the river corridor and consider preserving the remaining open space in the area of the potential Rainer extension. This area is the last remaining intact riparian habitat complex along the entire river and could be used for a variety of uses that would be compatible with preserving the area's environmental resources and ecological importance. For example, this area could be used to provide additional recreational opportunities and improve floodplain capacity in this reach of the river that often floods just upstream of the open space area. It could also be utilized to mitigate for future wetland and riparian corridor development within the City. Additionally, this area contains a significant amount of wetland habitat complemented by the riparian areas, oak savannah habitat, and its proximity to the river. Because our Board and State Policy mandates the avoidance of wetland impacts to the extent feasible, the development of this area for medium density residential development, which includes the building of approximately 8.1 to 18.0 units per acre as designated in Figure 2-1 of the Draft General Plan 2025, may not be compatible with Board policy. This type of development would require grading a majority of the area and potentially filling the on-site wetlands. Consequently any medium density development as proposed may

A

not receive the necessary permits to fill or otherwise impact the wetlands which are considered waters of the State.

As of the date of this letter, the Water Board has not received a response from the City addressing the staff's concerns discussed in the September letter and reiterated during the testimony during the public comment period at the Planning Commission meeting. Staff encourages the City to consider our recommendations that were strongly supported by the Planning Commissioners at the September meeting. At this meeting a number of Commissioners commented on the need for more recreational space and flood attenuation, and overall were in support of staff's recommendations to consider an alternative that would address preserving this area. Staff strongly encourages the City to evaluate the use of this open space area and work to reduce future water quality impacts and the loss of important riparian and wildlife corridors that could result from development of this site as proposed in the DEIR.

Both the September 16, 2004 letter and a transcript of the September 28, 2004 testimony are enclosed for your review.

If you have any questions, please contact Abigail Smith at (510) 622-2413, or email her at asmith@waterboards.ca.gov.

Sincerely,

for Bruce Wolfe
Executive Officer

Encl:

1). Comments on Notice of Preparation of Draft Environmental Impact Report for the City of Petaluma General Plan Update (Letter Dated September 16, 2004)
2) Transcript of Testimony by Abigail Smith at the September 28, 2004 Planning Commission

Cc:

Jenny Chen, SWRCB-DWQ
Philip Shannin, U.S. Army Corps of Engineers
Tim Vendlinski, U.S. EPA, WTR-8
Bill Cox, CDFG, Yountville

San Francisco Bay Region

Terry Tamminen
Secretary for Environmental Protection

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http://www.swrcb.ca.gov/rwqcb2

Arnold Schwarzenegger
Governor

Date: SEP 16 2004
File No. 2148.02(AHS)
Certified Mail No.7003 0500 0003 7752 4087

Ms. Pamela Tuft
Director of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952

SUBJECT: **Comments on Notice of Preparation of Draft Environmental Impact Report for the City of Petaluma General Plan Update**

Dear Ms. Tuft:

We have reviewed the three alternatives for the City of Petaluma General Plan update which focuses on three land use and mobility alternatives. While this alternatives review does not specifically address water quality impacts from the update of the General Plan, the type and density of the land use adjacent to the Petaluma River and its tributaries could result in significant adverse impacts to the river and its beneficial uses. The Petaluma River is classified as a Federally listed impaired water body due to exceedences of several water quality standards. As such, the City must make certain that its land use planning decisions do not contribute to the violation of water quality standards. The Water Board staff is particularly concerned about development of the parcels along the Petaluma River that are currently designated as agricultural lands that are located in the vicinity of the proposed Rainer Extension. These land use issues are discussed below.

Water Board staff also needs to review the specific water quality related documents that are referenced in the alternatives analysis before we can determine if the General Plan update is protective of the beneficial uses of the Petaluma River and its tributaries. These documents include the Water Resources Element, the Surface Water Management Plan, and the FEMA Map Amendment. If these documents have already been prepared please send us copies to review. If they are not ready, please notify us when the draft copies will be ready to review.

Land Use

Alternative C is the less environmentally damaging alternative as compared to the other two alternatives. As discussed below, a fourth alternative that would leave the area around the proposed Rainer Extension as open space, should be considered. Alternative C provides for a maximum open space buffers and plans for the lowest density development along the river corridor among the three proposed alternatives. We would

need more specific information on the size and location of the open space buffers to evaluate the effectiveness and adequacy of the proposed buffers to minimize environmental impacts. And while this is one of the City's less environmentally damaging alternatives as compared to the other two alternatives, none of the alternatives address the water quality and riparian habitat and beneficial use impacts of developing the agricultural parcels in the vicinity of the Rainer Extension located on both sides of the Petaluma River. Will these issues be addressed in the Water Resources Element? Cumulative water quality and beneficial use impacts of the various land use alternatives must be evaluated so that the City can reasonably identify preferred alternatives in accordance with the California Environmental Quality Act (CEQA) requirements.

Existing Agricultural Lands

The agricultural parcels located in the vicinity of the Rainer Extension are the last remaining open space habitat along this section of the Petaluma River. The Water Board staff is particularly interested in the impact to these parcels because of the high habitat value of this complex of riparian habitats. This riparian habitat corridor is unique among the remaining undeveloped parcels in the City supporting a variety of aquatic, riparian and upland habitat and species. It also serves as an important wildlife corridor and provides shade and refuge habitat for Federally protected species such as steelhead. Development of these parcels will further fragment and degrade the habitat along this section of the river and generate additional urban stormwater runoff pollutant discharges. The Water Board staff strongly recommends that the City of Petaluma consider conserving this area as open space. B

Development within the City of Petaluma will increase significantly in all three alternatives and this area could serve as a mitigation bank for future impacts to wetlands and riparian corridors. We request that the City evaluate utilizing this area as a mitigation bank. The State Wetlands Conservation Policy and the Water Board's Basin Plan require compensatory habitat mitigation for impacts to wetlands and waters of the State. Developers with projects in Petaluma have had a difficult time finding suitable sites to mitigate for wetland fill in recent years. The General Plan update is the ideal planning tool to identify high value habitats that could serve as mitigation for future development projects. C

Pollutants

Development within the Petaluma River watershed and especially parcels adjacent to the river could increase pollutant loads into the Petaluma River. The Petaluma River is currently listed on the 303(d) list for a number of pollutants whose concentrations could increase if the river corridor is further developed. The staff is currently working to identify sources of pollutants and determine cumulative impacts to the Petaluma River as part of the Federally mandated Total D

Maximum Daily Load Program (TMDL). The Petaluma River is currently listed under Section 303(d) of the CWA as impaired for the following pollutants: sediment, pathogens, nutrients, nickel and diazinon. These are all recognized as urban pollutants. Development of the existing agricultural parcels could increase both sediment loads and urban runoff pollution both during and after development.

Sediments loads to the river would increase if appropriate setbacks are not designed into development projects. Setbacks that allow for the natural movement of the river and include appropriate buffers between the river and any development project would reduce the need for future bank stabilization intervention and loss of riparian habitat. E

Increasing the percentage of impervious surfaces changes the overall hydrology of a site and increases the amount and velocity of site runoff. Storm runoff from residential development would also increase the load of urban pollutants into the river including increased loads of nutrients and pesticides from site landscaping and household gardening activities. F

While many individual impacts can be minimized through appropriate site design, the Water Board staff strongly recommends that the City of Petaluma consider the cumulative impacts of all of the development projects along the Petaluma River. Of particular concern is the habitat loss and water quality impacts to the riparian and wildlife habitat corridor near the proposed Rainer Extension which will occur if any of the three General Plan update alternatives are implemented. Again, we strongly encourage the City to evaluate the feasibility of designating this area as open space or to utilize it as a mitigation bank for future wetland and riparian corridor development. Accordingly, the Water Board staff asks that the City consider a fourth alternative that would limit development along the Petaluma River corridor and protect the unique riparian habitat in the vicinity of the proposed Rainer Extension. G

If you have any questions, please contact Abigail Smith at (510) 622-2413, or email her at ahs@rb2.swrcb.ca.gov.

Sincerely,

for Bruce H. Wolfe
Executive Officer

California Regional Water Quality Control Board
San Francisco Bay Region

Linda S. Adams
Secretary for
Environmental Protection

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Arnold Schwarzenegger
Governor

Testimony Given During the Public Comment Period
at the City of Petaluma Planning Commission on 9/28/2004

My Name is Abigail Smith, I work for the San Francisco Regional Water Quality Control Board. I am the Board's Watershed Coordinator for Sonoma County.

On Sept 16th, we a sent a letter to the City of Petaluma commenting on the Notice Of Preparation of the Draft EIR for the General Plan Update.

We are here to answer any questions you might have. I would like to take this opportunity to briefly present our two major concerns.

1) Our first concern is that the General Plan Update doesn't contain an alternative which considers the feasibility of preserving the parcels in the vicinity of the proposed Rainier Extension in their current state.

These parcels contain a unique complex of high quality wetland, riparian and upland habitats.

National and State Policy identify the preservation and enhancement of existing wetlands and their associated habitats as a highest priority.

We were surprised that the General Plan Update didn't include the preservation of this last remaining high quality open space along the Petaluma River within the downtown area.

2) Our second concern is that the alternatives as presented in the General Plan Update might not be permitable.

The State's Wetlands Conservation Policy requires that not only is there no overall net loss of wetlands but rather an overall net gain in the quantity and quality of wetlands.

The Water Board's Basin Plan implements this conservation policy and requires that development avoid existing wetlands to the extent feasible which includes considering other sites to accommodate development needs.

The development of these parcels might not be able to be permitted by our Board because this area contains a significant amount of wetlands, riparian areas, creeks and other waters of the State.

Our letter also reminds the City that the Petaluma River is an impaired waterbody and discussed how development of these parcels might contribute to violations of State water quality standards in this already impaired waterbody.

J

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MORRISON | FOERSTER

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October 31, 2006

Writer's Direct Contact
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Telefacsimile: 415.276.7286
MZischke@mofo.com

Via Electronic Mail and
Overnight UPS Delivery

Pamela Tuft
Director of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952

108

Re: Petaluma General Plan Update and EIR – Comments of Basin Street Properties and Petaluma Riverfront LLC

Dear Ms. Tuft:

On behalf of Basin Street Properties and Petaluma Riverfront LLC, this letter submits comments on the environmental impact report for the proposed City of Petaluma General Plan 2025. We appreciate the opportunity to comment upon this EIR, and we are including in this letter both our own comments as well as comments from technical experts who have reviewed the EIR and related documents.

I. SUMMARY OF COMMENTS

Unfortunately, the EIR is fatally and fundamentally flawed in several critical respects and must be substantially revised before the City may certify it as being adopted in compliance with CEQA. As explained further in the detailed comments below, the following are some of major deficiencies in the EIR.

A

A. The analysis of alternatives in the EIR is defective on its face. The EIR does not evaluate alternatives which reduce or avoid the impacts of development pursuant to the General Plan; instead, the EIR evaluates alternatives that in various respects intensify the proposed development. Significantly, that the EIR identifies the proposed General Plan as the environmentally superior alternative. This establishes that the EIR has failed to comply with CEQA's requirement to evaluate a range of reasonable alternatives that "would avoid or substantially lessen" the significant effects of the project. CEQA Guideline 15126.6(a). Rather than complying with CEQA's requirements to evaluate alternatives that reduce impacts, it appears the alternatives were selected from past planning studies that considered

various planning options, but did not specifically evaluate ways to reduce environmental impacts.

B. The EIR includes no analysis of the substantial infrastructure improvements that are proposed as part of the water supply provisions of the General Plan. Under the CEQA cases holding that infrastructure required to serve a project must be described and evaluated in the EIR, this analysis needs to be included in the EIR. Also, the City should re-evaluate its water supply projections, and in particular consider more realistic projections of future demand, and alternatives or mitigation measures that includes more water conservation measures and less construction of facilities. B

C. The EIR fails to describe or analyze a fundamental change in the location of the proposed "southern crossing". In the Central Petaluma Specific Plan, the Riverfront parcel was designated for mixed use with neighborhood streets, and the southern crossing was aligned on the edge of the parcel, consistent with the mixed use that was proposed in the Specific Plan. The proposal for development of the Riverfront parcel was developed in reliance on that Specific Plan, and included mixed use development, neighborhood streets and a neighborhood park. The proposed General Plan, however, moves the crossing to the center of the parcel and designates it as an arterial, resulting in the very type of fragmentation that the Specific Plan was intended to resolve and avoid. This is inconsistent with the type of mixed use development envisioned by the Specific Plan, and inconsistent with the city's plans for a neighborhood park in the middle of the property. The City should retain the approach of the Central Petaluma Specific Plan, rather than changing it just a few years after that Plan was adopted. Should the City proceed with this ill-advised change, the EIR must both describe the change and evaluate its land use consistency and other impacts. C

D. As pointed out in one of the attached technical letter, the EIR repeatedly relies on ineffective, vague and uncertain General Plan Policies as mitigation for potentially significant impacts of development pursuant to the General Plan. The EIR does not provide or summarize any evidence that those policies will actually assure that mitigation takes place, and many of the mitigation measures and policies on their face do not mitigate the identified impacts. D

E. Similarly, the EIR repeatedly relies on future plans and studies as mitigation for potentially significant impacts, without establishing required performance standards to be achieved through the application of those future study and permitting requirements. E

In sum, the EIR does not currently serve as a legally adequate basis for the City to approve the proposed General Plan 2025, and many of the determinations of impact mitigation are not supported by either the required substantial evidence or by adequate mitigation measures. Further, the City continues to propose water capacity fees based on a

dramatic overstatement of the amount of water that will be needed for new development, and a water supply plan that fails to include credits or other incentives for conservation. Until the City cures the defects in the EIR and proposes a more realistic water analysis and capacity fee, Basin Street Properties and Petaluma Riverfront LLC object to the proposed certification of the EIR and the approval of the proposed new General Plan 2025 based on that EIR. F

II. SPECIFIC COMMENTS

A. *Summary and Introduction*

1. On Page E-1, the EIR states that future development projects will be subject to site-specific environmental review. Given the possibility that the application of CEQA to future projects may be limited pursuant to Public Resources Code § 21083.3, this EIR needs to specify in more detail how it may be used in the context of future site-specific projects. Absent such a description, the public cannot be meaningfully informed about the scope of this EIR and the subsequent review of particular projects. This is particularly critical given that the general plan anticipates construction of substantial water supply and wastewater improvements, but the EIR does not offer even any general analysis of the impacts of those improvements. G

2. The EIR on page 1-5 purports to incorporate by reference several documents, including the Land Use and Mobility Alternatives Report that was used in preparing the analysis of project alternatives that is in the EIR. Contrary to the requirements and Guideline 15150, however, the EIR does not "briefly summarize" this report; instead, the EIR only labels it. There is no showing that that data and information in the Report cannot be summarized, and the EIR does not describe the relationship between the Report (or the other incorporated documents) and the analysis in the EIR. H

3. The EIR discusses the March 2003 Central Petaluma Specific Plan EIR, but does not indicate whether or not this document is incorporated by reference. Similarly, the proposed General Plan states that it incorporates the provisions of the Central Petaluma Specific Plan "with a few amendments," but the proposed General Plan does not specify those amendments, or specify whether provisions of the Specific Plan are incorporated into the proposed General Plan. The relation between the Specific Plan and the General Plan needs to be clarified in general, and both the EIR and the Plan should incorporate relevant provisions of the Specific Plan by reference. Also, as pointed out below, the EIR and the General Plan both need to clarify the relationship between the proposed General Plan and the Central Petaluma Specific Plan with respect to the alignment of the Southern Crossing. I

B. *Project Description.*

J

1. The Draft EIR impermissibly segments the project, and fails to fully describe the proposed project, because it fails to describe the City's extensive water supply construction project.

a. Under CEQA, an EIR must contain a clear and comprehensive project description The DEIR project description is critical to meaningful public review. *City of Redlands v. County of San Bernardino* (2002) 96 Cal.App.4th 398, 406. "An accurate, stable and finite project description is the *sine qua non* of an informative and legally sufficient EIR. *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 192-93. The "project" that must be analyzed by an EIR is "the whole of an action." CEQA Guidelines § 15378(a). An EIR must consider all of the constituent parts of a project. Deferring analysis of some aspects of a project risks "improperly submerg[ing] the aggregate environmental consideration of the total project." *Citizens Association for Sensible Development of Bishop Area v. County of Inyo* (1985) 172 Cal.App.3d 151, 165-67. Thus, "[a] public agency is not permitted to subdivide a single project into smaller individual subprojects in order to avoid the responsibility of considering the environmental impacts of the project as a whole." *Orinda Ass'n v. Bd. of Supervisors* (1986) 182 Cal.App.3d 1145, 1171-72; *see also Bozung v. Local Agency Formation Comm'n* (1975) 13 Cal.3d 263-283-84. [CBQA mandates that "environmental considerations do not become submerged by chopping a large project into many little ones"].

b. In particular, when a general plan is amended to allow development, the project description for that general plan amendment must include the infrastructure necessary to serve that development. *San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 729-734. Here, the Draft EIR acknowledges that a $44 million program of construction projects including new pipelines and two new reservoirs will be required to serve development anticipated by the proposed general plan (Draft EIR, pages 3.5-16 to 3.5-17, 3.5-18 to 3.5-19 and Appendix C). The Water Demand and Supply Analysis Report at Table 1-22 appears to put the figure for this construction program at $55 million, so that discrepancy needs to be clarified. Whatever the correct amount of the total construction program, the Draft EIR does not include any analysis of the projects that constitute this substantial construction program. In *San Joaquin Raptor*, an EIR for a proposed general plan amendment and related approvals was set aside for precisely the same reason. This Draft EIR must be revised to include the required water supply improvements as a reasonably foreseeable component of the project.

2. The project description does not include any of the mandatory information required by Guideline 15124(d). That guideline requires an EIR to include the following information in its project description:

a. A list of the agencies expected to use the EIR in their decision-making;

b. A list of the permits and other approvals required to implement the project; and

c. A list of related environmental review and consultation requirements required by federal, state and local laws, regulations and policies.

This information must be added to the EIR's project description before the EIR can be certified as complying with CEQA.

3. In adding the information required by Guideline 15124(d), the EIR must in particular explain how the EIR will be used in connection with permits and approvals for the City's proposed water supply capital improvement program, and the fee that is proposed to fund this program. The public, and the development community that is being expected to fund these water supply programs, must be able to determine from the text of this EIR the extent to which it may be used as part of the approvals for the water supply program and the associated fee. K

4. The Draft EIR states on page 2-24 that that Development Code and the Zoning Map shall be amended to implement and be consistent with the proposed General Plan. The Draft EIR also states that the Subdivision Ordinance may require amendment to be consistent with the proposed General Plan. The specific nature of the required changes, and whether or not the Subdivision Ordinance will require amendment, should be specifically described. The timing of such amendments should also be specified, as no such amendments were enacted following adoption of the City's last General Plan 2000, even though that Plan called for such amendments. L

C. *Land Use*

1. On Page 3.1-20, the EIR describes its analytical methodology for evaluating land use impacts as a comparison between the different land use designations between the existing City of Petaluma General Plan and the proposed General Plan. This "plan to plan" type of analysis has been expressly rejected by the courts, which require EIRs for general plans to evaluate the impacts of the proposed general plan compared to existing physical conditions rather than existing planning designations. *Envt'l Planning and Information Council v. County of El Dorado* (1982) 131 Cal.App.3d 350. As noted in the accompanying letter from Smith Engineering and Management commenting on M

transportation and circulation issues in the EIR, there is a similar defect in the Draft EIR's evaluation of the "no project" alternative.

2. The Draft EIR contains inconsistent statements regarding farmland within the Urban Growth Boundary, and the analysis of farmland loss impacts is inadequate. On page 3.1-2 of the EIR the EIR states that agricultural lands comprise 77 acres in the northern part of the city, yet on page 3.1-13 the EIR states that approximately 316 acres of Farmland of Local Importance are located within the UGB. It appears from the impact discussion at page 3.1-22 that the 316 acres will all be designated in the new plan for non-agricultural use, and the northern parcels only would retain their agricultural designation. Thus it appears that the General Plan will result in conversion of at least eighty percent (80%) of the land within the Urban Growth Boundary that is either currently used or designated as farmland. (The proposed Plan itself states on page 2-9 that there will be 42 acres of agricultural land at buildout, so the figure of 80% may be low.) There is no mitigation proposed in the Plan or in the EIR that does anything to reduce or avoid this impact, and there is no analysis in the EIR to justify the conclusion that this impact is less than significant. In order to provide a legally adequate analysis of this impact, the EIR's analysis of farmland impacts should be revised as follows: N

(a) The EIR should indicate, on a map, the specific location of the land that is currently used or designated as farmland, and the EIR should also indicate the specific location of the lands that will instead be designated for non-agricultural use under the proposed plan.

(b) At a general level of detail, the EIR must evaluate the impact of this conversion of land to non-agricultural use. Although this is a program EIR for a general plan, there must still be some descriptive analysis of this impact and whether it is significant.

(c) The EIR must also evaluate mitigation measures for the loss of farmland. The type of mitigation measures that should be considered by the EIR include mitigation that avoids the impact (by limiting the redesignation of farmland) or mitigation that reduces the scope of the impact or compensates for the impact (such as preservation of other farmland or conservation easements and/or the like).

3. The statement that the conversion of farmland "would not constitute a significant loss of farmland" is conclusory and not supported by any facts or analysis. This finding is accordingly not supported by substantial evidence, contrary to CEQA's requirements.

4. There is also no basis for the EIR's statement that CEQA does not "consider the conversion of Farmland of Local Importance to be a significant impact." The EIR authors appear to be relying on the checklist questions in Appendix G of the CEQA Guidelines, but relying on those questions to "define out" of CEQA a particular impact ignores the fact that those questions are not binding thresholds of significance. Appendix G itself notes that the questions are "only a suggested form" and the Guidelines state that "ironclad" definitions of significance do not take account of variations in the regional setting. CEQA Guideline 15064(b). Here, where the plan will designate 80% of the land now designated or used for farming for non-farming use, the EIR must evaluate whether that impact is significant.

5. None of the General Plan policies cited on page 3.1-22 as reducing the impact of farmland conversion actually achieves this result. The impact in question is the conversion of farmland within the Urban Growth Boundary, and there is no policy listed on the EIR or the plan that either avoids or reduces the identified impact. Most of the policies in question, in fact, apply to lands outside the Urban Growth Boundary.

D. *Transportation/Traffic*

1. There is a fundamental change in circulation planning that is not disclosed or evaluated in the EIR, and that change is the new location proposed for the so-called "southern crossing". In the Central Petaluma Specific Plan, the Riverfront parcel was designated for mixed use with neighborhood streets, and the southern crossing is aligned on the edge of the parcel, consistent with the mixed use development that is described in the Specific Plan for the Riverfront Parcel. Central Petaluma Specific Plan, SmartCode Section 5.10 (Thoroughfare Standards Key Map). In addition, the Specific Plan showed a network of neighborhood streets on the property, with a neighborhood park in the center of the property. *Id., see also* SmartCode Section 2.10 (Zoning Map). The proposed General Plan Update, however, moves the southern crossing through the middle of this property, through the area for the park, and designates that crossing as an arterial roadway. Draft EIR, Figure 3.2-4. – This is a fundamental change in the proposed development planning for the lower reach of the Petaluma River, yet the impacts of this fundamental change are not disclosed in either the General Plan or the EIR. In addition, the EIR for the Central Petaluma Specific Plan concluded that the southern crossing was an alternative that was not required, as it had virtually no significant benefit on traffic circulation. The EIR for the General Plan now requires the southern crossing – in a different alignment – without any traffic analysis of a "no southern crossing" alternative. O

2. The proposed General Plan notes on page 1-14 that the Central Petaluma Specific Plan is one of the planning documents that "should be consulted together" with the General Plan. Also, the proposed General Plan states obliquely that, "with a few I

amendments" the proposed General Plan incorporates the land use and planning concepts from the Central Petaluma Specific Plan. The relationship between the General Plan and the Central Petaluma Specific Plan needs to be described with more specificity. In particular, the decision to shift the location of the proposed southern crossing needs to be explained.

3. On the substance of the plan, Basin Street and Petaluma Riverfront LLC object to the decision to relocate the southern crossing from what was proposed in the Central Petaluma Specific Plan. The conceptual approach to the Specific Plan was to complete a fragmented urban pattern and create stronger neighborhood linkages. One of the fundamental means of doing this was by planning for mixed use development, and this was specifically applied to the Riverfront parcel. Yet the southern crossing as set forth in the proposed General Plan would fragment the mixed use development of the Riverfront parcel, and it conflicts directly with the neighborhood park that was proposed in the Specific Plan as a unifying aspect of new mixed use development there. Also, the designations in the Specific Plan were the basis of a proposal that has been developed at substantial cost, and that has already been reviewed multiple times by the City's Site Plan and Architectural Review Committee. Basin Street and Petaluma Riverfront, LLC relied on the designations in the Specific Plan in formulating and designing their proposed project. Yet only three years after all the work that went into the Specific Plan, the City proposes a new southern crossing that is fundamentally inconsistent with the goals and designations in that Specific Plan. C

4. With respect to the EIR, should the City proceed with this ill-advised change, the EIR must both describe the change and evaluate its land use consistency and other impacts. There is currently no analysis in this EIR of the consistency of this proposed new transportation corridor with the promotion of mixed use development pursuant to the Central Petaluma Specific Plan and the goals and policies of this new General Plan. The EIR should evaluate that issue, and should evaluate whether alternative alignments may be more consistent with the development and redevelopment of the lower reach area. One alternative alignment that should be evaluated is the alignment connecting the Caulfield extension to Mountain View, which was the alignment analyzed in the EIR for the Central Petaluma Specific Plan. An additional alternative that should be analyzed is the alignment shown in the project submitted for the Riverfront parcel by Basin Street Properties, which incorporates the southern crossing and its connector into the project while maintaining the mixed use nature and central park contemplated in the Central Petaluma Specific Plan. This is not only important to the planning process for the Riverfront parcel; the City has now expressed at least two different planning proposals for the southern crossing, and the EIR needs to evaluate which of those crossings will have the least environmental impacts, and which will be most consistent with the General Plan and Central Petaluma Specific Plan policies for this area.

5. On Page 3.2-35, the EIR purports to reject as infeasible mitigation measures for significant and unavoidable impacts at six study intersections. If the City intends to reject such mitigation measures as infeasible, it must make specific findings supporting that infeasibility determination. Public Resources Code § 21081(a)(3). There is no basis in these conclusory statements for the required findings and the EIR must be revised to either evaluate the proposed mitigation measures or to explain in detail why they are infeasible. In addition, given that the City is proposing to adopt a new General Plan, it is inappropriate to rely simply on General Plan Policy conflicts as a basis for a finding of infeasibility, because the City is in the process of changing the very planning document that is cited as the basis for infeasibility. Given that the City could adopt new General Plan policies relating to traffic as part of the update, it must evaluate particular mitigation measures to avoid or reduce these identified significant impacts. P

6. On Page 3.2-34, the EIR relies on Transportation Demand Management (TDM) programs as part of the mitigation to reduce a number of intersection impacts. Cities and other lead agencies are specifically restricted, however, from imposing TDM requirements on employers. California Health and Safety Code § 40717.9. It is inconsistent with state law, and thus impermissible, for the City to either require TDM measurers, as set forth in the EIR, or to indirectly seek to impose such measures through trip reduction credits or reduce transportation impact fees. Such provisions are inconsistent with state law and legally impermissible. Q

7. On Page 3.2-37, the EIR finds that parking impacts would be less than significant, based upon a General Plan policy which purports to support the construction of additional parking and to maximize shared parking opportunities "to the extent deemed feasible and appropriate by the City." This is the epitome of ineffective and vague mitigation and cannot legally serve as the basis for a finding that parking impacts will be less than significant. The EIR acknowledges that there is high parking demand and that measures such as increased parking enforcement are necessary to avoid parking impacts. The purported mitigation, however, is not legally binding because it can freely be discarded by the City based on a finding that it is no longer "feasible" or "appropriate". This violates CEQA's requirement that mitigation measures "must be fully enforceable". CEQA Guideline 15126.4(a)(2). R

8. According to Chapter 4 of the EIR, the analysis of traffic impacts in Section 3.2 serves as an analysis both of the project specific impacts of development pursuant to the General Plan, as well as the cumulative analysis. However, the EIR does not provide the required cumulative impacts analysis. Under CEQA Guideline 15130, the analysis of cumulative impacts of the Petaluma General Plan must evaluate the combination of the General Plan's impacts with the related impacts of other projects. The EIR must indicate whether or not the cumulative impact is significant, and this analysis must be based S

either on a list of past, present and probable future projects, or on a summary of projections contained in an adopted General Plan or related planning document or in a prior certified CEQA document. CEQA Guideline 15130(a), (b). Section 3.2 of the EIR does not contain this analysis. Instead, on page 3.2-21, there is a brief reference to the County's General Plan EIR, an EIR which has not been adopted or certified (*see* CEQA Guideline 15130(b)(1)(B)). Also, there is no summary of projections from that EIR, and there is no determination whether the cumulative impacts are either significant or cumulatively considerable. In other words, although the EIR evaluates conditions within Petaluma up to the year 2025, there is no analysis of cumulative impacts extending beyond Petaluma's boundaries, and that analysis needs to be added to the Draft EIR.

9. The EIR also adopts significance thresholds for traffic which are inappropriate under CEQA, particularly with respect to cumulative impacts. For signalized intersections that are operating at Level of Service (LOS) D or E, which violate the City's current level of service standard of LOS C, the EIR states that impacts are significant only if the Level of Service will deteriorate to the next lowest level. This violates the principle set forth in *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, where the court held that it is not proper for an EIR to find that cumulative impacts are insignificant when they make only a small contribution to an existing significant problem. Here, intersections that are already operating at Level of Service D or E violate the City's current Level of Service C standard. This establishes that traffic congestion is the type of background significant problem that was at issue in the *Kings County Farm Bureau* case. The EIR concludes, however, that the impact of development pursuant to the General Plan must be so significant as to cause the Level of Service to move from LOS D or E to the next lowest level in order to be significant. By requiring an impact to be so large as to shift the level of service, this has the same "trivializing" effect that the court rejected in the *Kings County Farm Bureau* decision.

10. The analysis of future freeway operations assumes that a high occupancy vehicle lane will be added to US-101 through Petaluma. Neither the EIR nor the Traffic Model Development Report cite the basis for this assumption, however, and the EIR needs to explain why it is appropriate to assume that such HOV lanes will be built. Some of the HOV lanes proposed for the City of Petaluma are proposed as part of the Marin Sonoma Narrows project, a project which has not even completed the required CEQA review. Based on the Caltrans District 4 website, the draft environmental impact report for this project has not yet been circulated, and until Caltrans has evaluated whether and how to approve and fund the project based on the EIR, the City should not assume that the project will go forward. A copy of the construction schedule for this project and other relevant pages from the Caltrans District 4 website (http://www.dot.ca.gov/dist4/msn/pschcd.html) is attached to this letter as Exhibit "C". To the extent the EIR assumption is based on the construction of HOV lanes that are not yet approved or fully funded, the EIR must evaluate future conditions

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and without the HOV lane in order to provide an adequate analysis of reasonably foreseeable future conditions.

E. *Parks and Recreation.*

1. The General Plan Policies regarding parks and recreation set forth a specific numerical standard, whereby the City will maintain a park standard of five acres per 1,000 residents. This is an example of the type of performance standard, which when combined with more generalized policies, can support a finding that impacts will be reduced to a less than significant level. This illustrates the type of standard that should be set forth elsewhere in the EIR, where supposedly mitigating policies do not include any standards at all. U

2. In other respects, however, both the plan policies and provisions regarding parks and recreation, and the analysis in this EIR of those policies and designations, present critical problems. First, Basin Street and Petaluma Riverfront LLC object to the proposal in Policy 6-P-6 on page 6-15 of the proposed General Plan to revise the City's Municipal Code to require dedication of park land in addition to the payment of park impact fees, eliminating the reimbursement component for neighborhood parks. First, with respect to subdivisions, this change is inconsistent with the provisions of the Quimby Act requiring credits against the payment of fees for the value of any improvement. Government Code § 66477(a)(9); see also 73 Ops. Cal. General 152 (1990) (specifying that the grant of this credit is mandatory). The courts have not yet addressed the issue of whether this provision applies to all land use changes, so this may apply outside of the subdivision map context as well. In addition, under CEQA, eliminating the reimbursement component would result in mitigation being imposed on private projects that violates the constitutional requirement that mitigation must be roughly proportional to the impacts of a particular development project. CEQA Guideline § 15126.4(a)(4). V

3. The General Plan also proposes to place a seven-acre neighborhood or community park on the Pomeroy /Riverfront site designated as Map Code P-3 on page 6-14 of the General Plan and Figure 3.3-1 of the EIR. As shown in the General Plan and Figure 2.4-1 of the EIR, this park is located on land that is proposed to be designated in the new General Plan as "river dependent industrial" and "mixed use". The EIR fails to evaluate a number of issues that are raised by this proposed designation. W

a. The river dependent industrial designation is for heavy industrial manufacturing, raw material processing and related uses that require river access. Placing a neighborhood or community park in and/or immediately adjacent to heavy industrial manufacturing or raw material processing uses is precisely the type of action that

creates land use compatibility problems, yet the EIR does not evaluate any potential significant impacts relating to land use compatibility.

b. The EIR also fails to evaluate the consistency of this proposed park designation with the Central Petaluma Specific Plan and the City's River Access Enhancement Plan.

c. The EIR also fails to evaluate, either in the parks and recreation section or in other sections, noise and air quality impacts that result from locating a park next to heavy industrial uses. Based on these compatibility and impact concerns, and also to achieve consistency with the Central Petaluma Specific Plan, this park designation should be deleted from the proposed General Plan. If it is not deleted, however, the potentially significant impacts of placing a park in this area need to be evaluated.

F. *Public Services.*

1. On Page 3.4-16, the EIR relies on ineffective mitigation with respect to police officer staffing. Having found that there will be a need for 21 new police officers, the mitigation set forth in EIR is to "consider" funding additional staff. Contrary to CEQA's requirement that mitigation measures must be fully enforceable, this measure does not require the City to maintain the specified standard of 1.3 police officers per 1,000 population, but instead only requires the City to consider the necessary funding. The EIR must be revised to either set forth enforceable mitigation, or to evaluate whether, absent enforceable mitigation, the impacts are significant. X

G. *Public Utilities and Energy (including water supply).*

1. Overall, the EIR's failure to evaluate water supply issues in more detail, and its failure to describe in detail the measures that are proposed to avoid water supply problems, are some of the most fundamental and critical defects in the EIR. The Water Demand & Supply Analysis report includes a $55 million capital improvement program, with a variety of facilities to be constructed to meet demand pursuant to the proposed General Plan. Under CEQA cases holding that EIRs must describe and evaluate the infrastructure that is required to serve a project, this capital improvement program needs to be included in the EIR and its impacts need to be evaluated. *San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal. App. 4th 713; *Santiago County Water Dist. v. County of Orange* (1981) 110 Cal. App. 3d 818. Y

2. In providing this required disclosure and analysis, the City should also re-evaluate its overall water supply analysis. For example, projected annual demand for water was developed using historical unit demand factors that dramatically overestimate

water use. The unit demand factor for single family residential demand (418 gallons per day per residential unit) is 30% higher than the historical water usage by single family residential units in Petaluma (317 gallons per day per residential unit), even though new construction is typically far more efficient in water use. This results in a substantial overestimate of the water supply demand. With more realistic projections of additional water demand, the scope of the capital improvement program might be reduced. This is important to the development community because of the substantial fees that are proposed to fund the capital improvement program, but reducing that program may also reduce the impacts of the substantial construction that is included in the program.

3. As part of the evaluation of water supply and water infrastructure impacts, the City should consider as an alternative or mitigation measure a revised water supply plan that includes more water conservation and less construction of facilities. Conservation can reduce water demand with fewer environmental impacts and at a lower cost to businesses. For example, the City should evaluate an alternative which allows a credit against the proposed water capacity fee for conservation efforts and for projects which can achieve no net increase in water demand. The absence of such a credit acts as a disincentive against conservation by businesses, and for projects which propose substantial conservation measures, violates the constitutional requirement that mitigation must be roughly proportional to the impacts of a particular development project. CEQA Guideline § 15126.4(a)(4)..

4. One of the CEQA requirements implicated by the City's overestimation of water demand is the requirement that mitigation measures imposed on third parties must be consistent with all applicable constitutional requirements, including the requirement that the mitigation must be "roughly proportional" to the impacts of a project. CEQA Guideline 15126.4(a)(4); *Erlich v. City of Culver* (1996) 12 Cal.4th 854. It would be inappropriate for the City to impose fees on private development that are based on a substantial overestimation of the impact of such new development.

5. In addition, the EIR for the General Plan fails to include an analysis of City programs likely to decrease future water demand, including but not limited to Petaluma's plans to increase water fees by approximately fifty percent over the next five years (currently noticed for public hearing on December 4, 2006), and to impose new restrictive landscape requirements for both new construction and retrofits, both of which will reduce City-wide water demand.

6. The Draft EIR does not impose enforceable mitigation measures to address a shortfall on water supply that is identified as an impact of the General Plan. In particular, Policies 8-P-1 through 8-P-7 do not contain sufficiently specific implementation measures to ensure that water supply problems are addressed and to justify the conclusion

that the impact of water supply shortfalls will be reduced to a less than significant level. Policies that require the City to "work with" other agencies lack the specificity and enforceability that is required by CEQA.

7. With respect to Policy 8-P-5, to develop alternative sources of water, the Draft EIR does not evaluate any of the secondary environmental impacts of the facilities that will be required in order to address the purported shortfall. In order to provide meaningful disclosure of the water supply issues, the EIR must both justify the projection of water demand, and evaluate the impacts of the substantial construction projects that the City proposes to address water supply issues. There is no sufficient analysis either included in, or incorporated by reference into, the EIR that provides this information.

H. *Hydrology and Water Quality.* Z

1. Policy 8-P-X requires a study of the 100 year flood zone and prohibits entitlements in that zone until the study is complete, but does not include any performance standard to be in place following the completion of the study. Absent such a performance standard, the potential impact of construction should be considered significant and not mitigated.

2. Overall, the analysis of flooding impacts and the provisions in the General Plan deferring this issue until further studies are completed defers both analysis and mitigation of environmental impacts that should be included in the General Plan and in this EIR, rather than being deferred. The City has kept projects on hold for some time already pending the completion of this analysis and it should not be deferred further.

I. *Biological Resource Impacts.* AA

1. Most of the information regarding the environmental setting and impacts on biological resources is set forth within the December 2003 Technical Memorandum. Even though the EIR indicates that proposed development adjacent to the Petaluma River and Adobe Creek could result in impacts on several species, the information regarding those impacts is inappropriately included in an Appendix rather than being presented in more detail in the body of the EIR.

2. The mitigation measure for impacts and special status fish species and their habitat is entirely vague and unenforceable. The policy purporting to mitigate the impact contains such "future study" requirements as working with other agencies, conducting site-specific development review, and reviewing development proposals. No performance standard or other provision to ensure that the mitigation is actually carried out is included

and these mitigated policies are thus inadequate to support a finding that impacts are mitigated.

3. The same problem of ineffective mitigation also applies to the EIR's analysis of potential impacts in the California Brackishwater Snails, impacts on the salt marsh harvest mouse, impact on special status bat species, impacts on the American badger, impacts on amphibians, impacts on nesting raptor species, other birds and oak woodland and special status plant species. BB

J. *Noise.*

1. The analysis of noise impacts in the EIR does not evaluate the noise impacts that will result from placing a neighborhood park on the Pomeroy/Riverfront properties adjacent to a heavy industrial development. If that proposed neighborhood park is not deleted from the plan, this noise impact must be evaluated. The EIR states that General Plan impacts would be significant if they exceed 70 CNEL at neighborhood parks. Uses such as raw material processing, specifically designated for the river dependent industrial site, can be expected to result in noise impacts and excessive of the standard. CC

K. *Hazardous Material.*

1. One of the areas of analysis set forth within the Appendix G checklist is whether a project would expose people or structures to a significant risk of loss, injury or death involving wildland fires, including fires that may result because wildlands are adjacent to urbanized areas. Although this EIR includes a brief discussion of fire services in Section 3.4, there is no discussion either in Section 3.4 or in Section 3.13 on hazards regarding this issue. The EIR should be revised to evaluate whether there is an increase in risk due to wild land fires relating to the increased development that will be allowed by the General Plan.

L. *Impact Overview.* DD

1. The listing of significant and unavoidable impacts is under-inclusive and needs to be revised to include all of the impacts determined in the EIR to be significant and unavoidable. For example, traffic impacts that at least six intersections are already determined by the Draft EIR to be significant and unavoidable. Further, when appropriate thresholds of significance for cumulative impacts are required, the number of significant and unavoidable traffic impacts should increase, and those additional impacts should be listed here as well.

2. The analysis of growth inducing impacts does not comply with the standard set forth in CEQA Guideline 15126.2(d). Rather than discussing the characteristics of the plan which may encourage and facilitate growth, either individually or cumulatively, EE

this analysis attempts to sidestep CEQA's requirement to evaluate growth rather than inducing growth, inducing impacts by dismissively stating that the General Plan accommodates growth and by stating that growth inducing impacts are difficult to assess with precision. While the brief description of increases in housing demand and the jobs housing balance is part of the analysis, the EIR needs to evaluate whether particular characteristics of the proposed General Plan will induce growth. In particular, the EIR should compare designations under the proposed plan to existing conditions in determining where additional growth is most likely to occur. The EIR should also indicate whether growth inducing impacts will be significant.

3. In particular, the EIR should evaluate whether the proposed program of constructing water supply facilities will further induce growth, given that the need for such facilities is predicated upon levels of water usage not typically sustained by new development. In other words, the City is proposing to build a water supply system which may be bigger than is needed; this may be desirable from some perspectives but may also act as an inducement to growth that must be evaluated in this EIR.

4. The EIR indicates on Page 4.3 that revisions to the City's housing element may be needed to continue to provide a fair share of reasonable housing. The EIR needs to evaluate now whether such revisions will be required as a result of the policies and designations proposed in the new General Plan.

5. The discussion of growth inducing impacts is particularly deficient with respect to analysis of housing impacts. The City in revising and expanding the EIR may wish to look to the decision in *Napa Citizens for Honest Government v. Napa County Board of Supervisors*, 91 Cal.App.4th 342 (2001). There a market and job/housing analysis prepared in connection with adoption of a specific plan detailed the types of businesses that would be expected to locate within the plan area, the number of employees that would be generated, the number of additional housing units that would be generated, and the number of affordable units that would be required. This case provides some helpful guidance to the City in revising and expanding the growth inducing impact analysis.

6. The analysis of cumulative impacts does not meet the requirements of CEQA. To take one example, the very general discussion of cumulative biological impacts is not based either on a comparison of General Plan impact with a list of projects generating biological impacts, or upon regional plans relating to biological impacts.

7. The biological discussion also concludes without analysis that the various policies included in Section 3.8 of the EIR will ensure that cumulative impacts on biological resources are less than significant. As stated above, however, most of these policies do not include performance standards and they rely on unspecified permitting

AA

processes and requirements to conclude that impacts will be less than significant. There is no binding and effective mitigation set forth for biological impacts, either specific to this General Plan or with relation to overall cumulative impacts. FF

M. *Alternatives Analysis.*

1. The EIR's analysis of alternatives violates the fundamental purpose of an alternatives analysis in an EIR. The purpose of evaluating alternatives is to identify ways that significant environmental effects can be reduced or avoided. *Laurel Heights Improvement Ass'n v. Regents* (1988) 47 Cal.3d 376. Under both the statute and the Guidelines, an EIR must focus on alternatives that reduce or substantially lessen a project's significant environmental effects. Public Resources Code § 21002; CEQA Guideline § 15126.6. Here, it is apparent from the EIR as well as the Land Use and Mobility Alternatives Report that the City evaluated various planning issues in determining the range of alternatives to be included in the EIR, but failed to consider whether those alternatives will reduce environmental impacts.

2. The discussion of the alternatives demonstrates why the analysis is inadequate under CEQA. Rather than providing for reduced impacts alternatives 2 and 3 both would add more residents to the City of Petaluma than the existing General Plan. Similarly, alternatives 2 and 3 as shown on Table 5.3-2 would generate more traffic volume. This is particularly significant given that traffic is one of the unavoidable and significant impacts identified by the EIR, but there is no alternative evaluated which reduces those traffic impacts.

3. A comparison to other EIRs prepared in the region confirms that it is common practice and appropriate to evaluate impact-reducing alternatives. For example, the Santa Rosa 2020 General Plan Draft EIR included a neighborhood centers alternative, which contained less population and employment growth than the City's proposed General Plan, resulting in less traffic congestion, public services and infrastructure demand and reduced exposure to natural hazards. City of Santa Rosa, 2020 General Plan Draft Environmental Impact Report, page 6-1. This impact-reducing alternative was designated in the EIR as the environmentally superior alternative. Id., page 6-33. Similarly, the Sonoma County GP 2020 Draft EIR includes a mitigated alternative that results in fewer significant impacts that the County's proposed General Plan and is also designated as the environmentally superior alternative. Sonoma County, Draft General Plan 2020 EIR, page 5.0-80. Copies of relevant pages of these EIRs are attached to this letter as Exhibit "D".

4. When the City adds the alternative or alternatives that will be necessary to prepare a legally adequate EIR, the City should also consider whether the addition of those alternatives will require recirculation of the EIR pursuant to Guideline

15088.5(a). That Guideline specifies that, when a feasible alternative which is considerably different from those previously evaluated in the EIR is added to the EIR, and that alternative would lessen the environmental impacts of a project, then the EIR must be recirculated. This suggests that the City should give serious consideration to expanding the EIR, alternatives analysis, and then recirculating the Draft EIR.

N. *Closing Comments and Attached Letters.*

1. We appreciate the opportunity to comment upon the Draft EIR. We are attaching comment letters on behalf of Basin Street Properties and Petaluma Riverfront, LLC from the following expert consultants, and these detailed comments should be considered by the City as well:

- Daniel T. Smith, Jr., a Civil and Traffic Engineer with 39 years of experience as a traffic and transportation engineering consultant in California, and the Principal at Smith Engineering and Management, prepared a comment letter focusing on the traffic and transportation issues in the EIR, including its assessment of issues relating to alternatives and mitigation measures in the EIR. A copy of Mr. Smith's letter and resume are attached to this letter as Exhibit "A".

- Richard Grassetti, the Principal of Grassetti Consulting, who has over 20 years of experience in preparing and reviewing CEQA documents, prepared an overall assessment of the Environmental Impact Report, including the adequacy of its mitigation measures, cumulative impacts analyses, and alternatives analyses. A copy of Mr. Grassetti's letter and resume are attached to this letter as Exhibit "B".

These expert consultant letters are hereby incorporated in this letter and are submitted to the City by Basin Street Properties and Petaluma Riverfront LLC as additional comments on its behalf on the Environmental Impact Report for GP 2025. Please prepare written responses to these consultants, as well as the comments in this letter.

2. As a final point, we recognize that the City will need to consider whether the Draft EIR must recirculated for additional public comment, particularly when the proper evaluation of impacts such as cumulative impacts and intersections is considered pursuant to these comments. We do not wish to prejudge the issue of EIR recirculation at this time pending the City's responses to these comments. At least on a preliminary basis, however, it appears the EIR will need to disclose additional significant impacts and substantially more severe impacts in order to comply with CEQA, and impact-reducing

alternatives will need to be added to the EIR. The City is thus likely to be required to recirculate the EIR for additional public review and comment. GG

We appreciate the City's attention to all of these comments.

Very truly yours,

Michael H. Zischke

MHZ/jd

Attachments

cc: Eric Danly, City Attorney

LIST OF EXHIBITS

A	Comment Letter of Daniel T. Smith, Jr., Smith Engineering and Management, and Resume
B	Comment Letter of Richard Grassetti, Grassetti Environmental Consulting, and Resume
C	Schedule for the Marin Sonoma Project, including proposed HOV lanes in Petaluma, from the Caltrans District 4 website
D	Copies of selected pages from the Santa Rosa 2020 General Plan Draft EIR and the Sonoma County GP 2020 Draft EIR

Exhibit A

Exhibit A

SMITH ENGINEERING & MANAGEMENT

October 26, 2006

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Mr. Mike Zischke
Morrison and Foerster
425 Market Street
San Francisco, CA 94105

Subject: Petaluma General Plan DEIR

Dear Mr. Zischke:

Per your request, I have reviewed the transportation and circulation component of the draft environmental impact report (hereinafter "the DEIR") for the Petaluma General Plan Project ("the project") . My qualifications to perform this review include registration as a Civil and Traffic Engineer in California and thirty-nine years experience as a traffic and transportation engineering consultant in the State. I have both prepared and reviewed the transportation and circulation components of numerous environmental documents as well as the circulation elements of General Plans and am familiar with the Petaluma area. My professional resume is attached. My comments on the subject DEIR follow.

A

A. General Lack of Good Faith Effort to Disclose Impact

CEQA requires that an EIR reflect a good faith effort to disclose impacts. The DEIR on the Petaluma General Plan was prepared by the same consultants that prepared the Plan itself. When this occurs, there is a natural tendency on the part of the analysts to favor the plan they created. Nonetheless, if the EIR investigation is thorough, facts stand for themselves and CEQA's requirement of a good faith effort to disclose impact is fulfilled. However, in this case, particularly in regard to matters of traffic and transportation related issues, the DEIR analysis is extremely superficial and the content and tone of the document is merely one of assertion of the rectitude of the planners vision in proposing the recommended Plan. This does not fulfill CEQA's requirement of a good faith effort to disclose impact.

B. Analysis of Alternatives to Proposed Project Deficient

B

Although the DEIR gives the superficial appearance of CEQA's requirement to consider alternatives to the proposed project, inspection of the alternatives analysis in Chapter 5 of the DEIR makes evident that the purported alternatives analysis is a pro forma exercise for the purpose of creating the appearance of compliance with the CEQA requirement.

- The analysis includes no meaningful variation in land use alternatives. Development alternatives considered, as quantified in terms of population and employment, are not meaningfully different from the proposed plan. The alternatives range from 5 percent below the proposed plan's total population (the "no-build alternative" which is comprised of presumed build-out of the current General Plan) to 7.2 percent above the proposed plan's population total. C

  All of the alternatives have only slightly less employment than the proposed plan with the "no-build" alternative the most different from the proposed plan at only 6.2 percent less employment.

  All of the plans tend to concentrate future growth in roughly the same areas of the community. There is no testing of a rigorous growth-control alternative, of alternatives that test variations of the urban limit line or concentrations of development to the east or west. Although an earlier report produced in the planning process, the 2004 *Land Use And Mobility Alternatives* report, a document incorporated by reference in the DEIR but not included in the DEIR appendices where the public could readily inspect it, identifies the possibility of a few small, site-specific variations in the urban growth boundary, neither that report nor the DEIR explicitly evaluates the impacts, consequences and potential benefits of broad strategic variation in the urban growth boundary (UGB) as a land use plan alternative. Because both the DEIR and the *Land Use And Mobility Alternatives* report are unspecific on this topic and because the *Land Use And Mobility Alternatives* report is not appended as part of the DEIR, the public has no means of judging whether variations in the UGB might be beneficial or not.

- The "no project" alternative in the DEIR's evaluation of alternatives is based on a strained interpretation of build-out of Petaluma's existing General Plan. According to the *Land Use And Mobility Alternatives* report, the existing Petaluma General Plan was developed with the intent of providing a holding capacity for a population of 67,500 residents. However, in the DEIR analysis of alternatives to the project, the "no project" alternative considered is an interpretation of the existing General Plan that assumes all flexibility within that plan will be taken advantage of to result in a "no build" alternative with a population of 69,094 residents.

The DEIR's consideration of an inflated "no project" alternative tends to blur the distinctions in impacts that might emerge in the analysis of alternatives between it and the proposed project (projected to have a population of 72,707) and hence the analysis is not consistent with the good faith effort to disclose impact required by CEQA.

- The population totals for all of the alternatives considered in the DEIR analysis of alternatives make no sense in light of regional projections. According to t he *Land Use And Mobility Alternatives* report, the Association of Bay Area Governments projection of year 2025 population for Petaluma is 65,600 residents. The "no project" alternative as considered in the DEIR analysis, is 5.3 percent higher that the ABAG 2025 population projection. The proposed project is 10.8 percent higher than the ABAG 2025 population projection. The other "build" alternatives considered in the DEIR analysis are 15.4 and 18.7 percent higher than the ABAG 2025 population projection. The gap between the population totals of all of the alternatives considered in the DEIR analysis and the ABAG projections for Petaluma reinforces our prior comments concerning the DEIR's deficiency in failing to include an alternative with considerably lower development than the proposed plan (perhaps reflecting a plan alternative with a strong growth control policy) and our comments regarding the unreasonableness of the DEIR inflating the intended population of the existing General Plan in its definition of the CEQA required "no project" alternative. D

- The proposed plan and the alternatives considered include several major transportation improvement projects. The projects involve several new bridge crossings of the Petaluma River, a new freeway interchange and reconstruction of existing freeway interchanges. The analysis of alternatives in the DEIR and its supporting appendix documentation does not include any coherent testing of variations on the major transportation improvements that would support logical conclusions about whether these major projects are all necessary or effective. There is no testing of variations of the major transportation improvement package in combination of a fixed land use alternative. The only variation of the major transportation alternatives in the alternatives analysis merely confounds the analysis because even this limited variation is carried out in combination with variation in the land use alternative. Consequently, it cannot be determined whether differences in transportation system performance are the result of variations in the transportation improvements included in a particular alternative or the result of differences in the land use alternative. E

  Similarly, although the DEIR attempts to draw distinctions about transportation system performance among the land use alternatives it considers, there is no basis for the distinctions drawn because the land

use alternatives are tested with variations of the major transportation improvement program components.

- The assessment of transportation performance among the alternatives in the DEIR is needlessly limited to superficial measures, instead of the peak hour level-of-service quantifications prepared for the proposed plan. The DEIR presents only comparisons of aggregate daily traffic generation for the study area and projected daily traffic volumes on major routes. There is no justifiable reason for this limited transportation analysis of the alternatives since, once the computerized transportation analysis model process stream has been set up, as it was for the proposed plan, there is no meaningful extra effort in providing an equivalent level of analysis information with respect to the alternatives. In layman's terms, it is as if the analysts turned off the computer before it could execute the programmed last step, the level-of-service analysis, in the case of the alternatives to the proposed plan.

  The consequence of this is that, instead of looking at discrete quantified and defined performance indicators on the transportation system that relate to clearly established criteria, in trying to understand the DEIR's evaluation of alternatives the public is left with superficial information that, although quantified, does not relate to any established performance criteria. There is no way of knowing whether the differences in projected daily trips in the study area or differences in daily traffic on a particular street are meaningful or not.

- The substance of the transportation evaluation in the DEIR's analysis of alternatives is illogical. The variations in daily trip generation (and consequently projected daily traffic volumes on major streets) do not reasonably correspond to the differences in the land use alternatives for which they are projected.

  Consider the total of population and employment among the alternatives as documented in DEIR Table 5.2-1 and the projection of total daily vehicle trips in Table 5.3-1. The proposed plan, that has a combined total of some 122.4 thousand population and jobs in the study area is projected to generate 566,000 vehicle trips per day in the study area.

  Alternative 1, the "no project" alternative that involves build-out of the current General Plan, is projected to have a combined total of 115.7 thousand population and jobs, 6700 fewer than the proposed plan. Under consistent assumptions about trip generation and mode choice, this alternative should generate about 29,000 *fewer* trips than the proposed plan. However, Table 5.3-1 shows it generating *1000 trips more* than the proposed plan.

Alternative 2 involves a combined total of some 1500 population and jobs than the proposed plan. Under consistent assumptions about trip generation and mode choice, it should generate about 6900 more vehicle trips per day than the proposed plan. However, Table 5.3-1 shows it generating *34,000 more trips* than the proposed plan, nearly 5 times the reasonable differential that would be explained by the land use difference.

Alternative 3 has a combined total of 3100 more population and jobs than the proposed plan. Under consistent assumptions about trip generation and mode choice, it should generate about 14,300 more vehicle trips per day than the proposed plan. However, Table 5.3-1 shows it generating *30,000 more trips* than the proposed plan, more than double the reasonable differential that would be explained by the land use difference.

The only possible explanation for these differences is that the analysts have assumed undescribed and unsubstantiated differences in the trip generation rates among the alternatives, differential rates that heavily favor the proposed project. There is no reasonable basis for assuming that the travel characteristics of Petaluma's population, workforce and other travelers would be substantially different in the case of the proposed project from the other alternatives considered. Hence, slanting the analysis in favor of the proposed project through such assumptions of major differences in travel behavior is completely inconsistent with the good faith effort required by CEQA.

C. Failure to Identify Significant Traffic Impacts

The project traffic analysis indicates (though only in table footnotes) that in the case of at least 15 intersection locations in either the am or pm peaks or both, traffic operational conditions (generally, excessive traffic queues that block other flows due to insufficient length of turning lanes or too closely spaced intersections) cause the intersections to operate at a worse level of service (LOS) than indicated in the theoretical LOS calculations. When this circumstance occurs, the normal procedure in traffic analysis is to substitute the field-observed LOS reflecting the operational constraints for the theoretical computation and to identify significant impacts accordingly. However, in this DEIR, perhaps reflective of the Plan and DEIR's general tenor of unconcern for traffic impacts, the DEIR takes refuge in the fact that Petaluma's thresholds of significance provide no explicit guidance relative to substituting observed LOS for theoretically computed LOS when operational factors intervene, and does not disclose impacts based on actual field LOS observances.

As a consequence of this, significant traffic impacts at key intersections are undisclosed as such, and members of the public, particularly those who do not have in-depth technical knowledge about traffic matters or who rely on the DEIR document's summaries of impacts and mitigations, will be led to believe that

traffic conditions will be led to believe that traffic conditions will be better, less impacted, than will actually be the case.

The entire analysis should be redone, substituting observed LOS where appropriate due to operational conditions, and impacts and mitigations should be identified accordingly.

D. Failure to Identify Feasible Mitigation Measures

CEQA Guidelines Article 15126.4 states (in part) that:

> (1) An EIR shall describe feasible mitigation measures which could minimize significant adverse impacts, including where relevant, inefficient and unnecessary consumption of energy.
>
> (A) The discussion of mitigation measures shall distinguish between the measures which are proposed by project proponents to be included in the project and other measures proposed by the lead, responsible or trustee agency or other persons which are not included byt the lead agency determines could reasonably be expected to reduce adverse impacts if required as conditions of approving the project. This discussion shall identify mitigation measures for each significant environmental effect identified in the EIR.
>
> (B) Where several measures are available to mitigate an impact, each should be discussed and the basis for selecting a particular measure should be identified.

Where this DEIR does identify significant traffic impacts, its principal response is to characterize them as "unavoidable". Virtually no effort is devoted to defining substantive traffic mitigations. While the distain of the consultants who prepared the proposed plan and DEIR for mitigation measures such as adding lanes at impacted intersections is made amply evident in the text of the Plan and the DEIR documents, this does not relieve the Lead Agency or its consultants of the obligation under CEQA of informing the public of conventional traffic mitigation measures such as lane additions or widenings at explicit locations where those measures may be reasonably feasible. While a community may ultimately choose not to implement particular measures, the measures themselves cannot be summarily dismissed without specific definition and discussion in the DEIR. It is also noteworthy that there may be other traffic mitigation measures that

a) there may be significantly impacted locations where conventional traffic mitigations like lane additions can be implemented without significant adverse consequences to such considerations as pedestrian and bicyclist circulation or community appearances, but this is unknown because the DEIR did not consider such explicit mitigations at most impacted locations.

b) there area other potential traffic mitigations such as, for instance, improved traffic signal timing and coordination, that might successfully address traffic impacts while avoiding the alleged adverse consequences of street widening projects to bicyclist and pedestrian circulation and community appearance. However, no consideration has been devoted to such measures.

Because of its current failure to define and discuss all feasible traffic mitigations, the DEIR is fatally deficient.

E. Failure to Consider Potential Impacts of Major Circulation System Improvements

The proposed project includes as components a number of explicit major circulation system improvements. These include three new crossings of the Petaluma River and a new freeway interchange. Comparison of the information in the Transportation section of the DEIR (section 3.2) with that of the Biological Resources section (section 3.8) makes obvious that several of these components will constitute new urban development intrusions into the habitats of numerous protected species. The analysis of potential conflicts with biological resources is limited to a generalized overview of potential impacts of the plan as a whole and those potential impacts are dismissed by the unsubstantiated assumption that conformance to certain laws and ordinances and plan policies will render the potential impacts less than significant. We acknowledge that the major transportation improvement components of the plan are of a scale and nature such that each will require its own EIR that should define specific impact and mitigation measures for those improvement projects. However, the DEIR on this proposed plan is deficient in failing to include a focused screening of the evident environmental challenges to each major transportation improvement component of the plan.

F. The DEIR Fails to Evaluate Impacts of the Bike/Pedestrian Component of the General Plan

The DEIR contains no critical impact evaluation of the bike/pedestrian facilities component of the proposed project. The DEIR treats the bike/pedestrian facilities component, which emerges as the "wish list" of bike-pedestrian advocates, as something that is inherently good and environmentally impact-free. Such is not necessarily the case. To be adequate, the DEIR must define the impacts or potential impacts of each individual facility component of the bike-pedestrian facilities plan.

For instance, depending on their location, off street trails may pose nuisances and privacy and security concerns for neighborhoods and businesses because they often offer the possibility of side-lot and rear-lot visual and physical access

to private property and particularly because they are difficult to police. The plan includes specific desire-line locations for off-street trails. It is reasonable to expect that, in addition to identifying the generalized potential for privacy and security impacts, the DEIR would have screened these proposed off-street corridors to identify locations where the potential for such impacts may be obvious.

Another example concerns on-street bike lanes. If, in order to implement the bike lanes, it is necessary to eliminate parking, the residences and/or businesses that depend on that parking will be significantly impacted. It is reasonable to expect that the DEIR would have screened the streets where the plan proposes on-street bike lanes to determine whether, and where, implementation of the plan would have parking impacts.

G. The DEIR Fails to Evaluate Impacts of the Proposed Degradation of the City's LOS Policy

The proposed plan proposes to degrade the City's traffic level of service policy from the current one which considers conditions worse than LOS C unacceptable and significantly impactful to one that only considers conditions worse than LOS D to be unacceptable and significantly impactful. The DEIR is deficient in that it contains no evaluation of the consequences of this change in policy. In fact, the change in policy is highly consequential.

As documented in the DEIR, under *2000 Highway Capacity Manual* procedures, LOS C conditions prevail when average 'control delay' per vehicle ranges between 20 and 35 seconds and LOS D conditions prevail when average 'control delay' per vehicle ranges between 35 and 55 seconds. The difference, the 20 second increment between 35 and 55 seconds superficially does not seem very consequential when phrased in terms of individual vehicle delay. However, when the cumulative delay to people is considered, the implications of the policy change are significantly consequential.

For example, at the intersection of Petaluma Boulevard North and Washington Street, the DEIR projects that in the PM peak hour, 1830 vehicles will pass through the intersection with the proposed general plan project. At this traffic level, the implication of the proposed LOS policy is that up to in excess of 11 hours of person-delay[1] in each weekday PM peak period that would be generally be classified as unacceptable under current General Plan policy would be rendered acceptable by the proposed project policy. Taken on an annual basis, the proposed LOS policy would classify acceptable some 2796 hours of weekday PM peak hour person-delay *at this one intersection* that would ordinarily be regarded as unacceptable under current policy. Clearly, this kind of policy change is highly significant.

[1] This computation reflects typical average vehicle occupancy during commute peak periods.

To give the public a fair indication of the implications of the proposed policy, the DEIR should have identified the potential cumulative incremental person-delay in the AM and PM peak periods City-wide that would be reclassified acceptable by the proposed policy. The tabulation should indicate both daily peak period incremental person-delay City wide and cumulative annual values for total daily peak period person-delay. The analysis should consider the traffic volume at each of the 19 intersections the DEIR acknowledges as operating at LOS D in the future project condition plus the 7 additional intersections where operational factors that lead to LOS performance worse than that indicated by theoretical LOS computations make likely that these intersections would operate in the LOS D range under proposed plan conditions.

It is clear that the plan proposal to degrade the City's Level Of Service policy is driven by a desire to avoid the compunction to make traffic improvements in downtown Petaluma where the plan desires to maintain and enhance a pedestrian-friendly environment. However, the DEIR fails to note that the change in the LOS standards could have the effect of making it more difficult to require mitigation of, or to justify denial of site development projects regarded as detrimental to the community.

H. Illogical Juxtaposition of Major Transportation Improvements and Unmitigated Impacted Locations

The plan proposes major investments in new transportation facilities including three new crossings of the Petaluma River. Yet, in failing to mitigate undesirable traffic conditions on the approaches to these intersections and in adopting policies that make such intersection improvements more difficult, the plan negates the desired effects of its proposed major investments in new crossings.

The plan proposal for a new "southern crossing" extending from Caulfield Lane to Petaluma Boulevard South, though logical in intent, would have its usefulness limited by three intersections on its north end that would be heavily congested and unmitigated under the proposed plan. The intersection of Lakeville Street and Caulfield Lane – the north terminus of the new crossing, would operate at LOS D in the AM peak and LOS E in the PM peak, with no traffic mitigation for this location proposed in the DEIR. A block farther north, the intersection of Caulfield with Payran would operate at LOS D during both AM and PM peaks, with no traffic mitigation proposed for this location in the DEIR. At both these locations, a tabular footnote in the DEIR acknowledges that due to operational conditions not reflected in the theoretical LOS/delay calculations the actual LOS would likely be worse than indicated. Furthermore, a block to the west from the north terminus of the new crossing, the DEIR shows that the intersection of Lakeville Street with Lindberg Lane would operate at LOS F. Once again, no mitigation is proposed. Given the deficient conditions of three intersections on the immediate north approach and departure paths of the new planned crossing,

conditions we believe the DEIR has too hastily characterized as "unavoidable" without sufficient effort to identify mitigations, the DEIR is deficient in failing to question whether the investment in the costly new crossing is justifiable unless the approach intersections' traffic congestion problems can be mitigated. The public should also be asking this question of the proposed plan's authors.

A similar situation exists with respect to the proposed river crossing that involves extending Copeland Street to Petaluma Boulevard North at Oak. On the immediate north approaches to this proposed new crossing are the intersections of E. Washington Street with Lakeville Street and Lakeville Street with E. D Street. The DEIR indicates that the E. Washington Street - Lakeville Street intersection would operate at LOS D in the PM peak and that the intersection of Lakeville Street with E. D would operate at LOS D in the AM peak and LOS E in the PM peak. The DEIR characterizes traffic impact conditions at both intersections as "unavoidable". It also acknowledges by footnote that conditions at both locations, conditions will likely be worse than computed due to operational considerations. Again, the DEIR is deficient in failing to raise and answer the question of whether investment in the new central area river crossing makes sense given the conditions at intersections on its north approach and departure routes or in failing to make more effort in defining mitigations for those intersections. Also, in the case of this crossing, the DEIR seems deficient in failing to have addressed the question of whether this crossing would introduce undesired levels of traffic onto Oak Street.

All too similar is the situation with respect to the proposed Ranier Avenue crossings of the freeway, rail line and river and new interchange with Highway 101. To the east, the primary approach intersection of McDowell Boulevard N. with Ranier will operate at LOS D in the AM peak and LOS E in the PM peak according to the DEIR. This is another intersection where the DEIR characterizes the traffic impact as "unavoidable" and also one that the DEIR acknowledges as having operational considerations that make actual conditions worse than the theoretical calculations of LOS/delay. The west end of the proposed crossing splits into two legs, one connecting to the intersection of Shasta Avenue with Petaluma Boulevard N. The DEIR discloses this intersection as operating at LOS D with the proposed plan in the PM peak period and as in the other cases, characterizes this impacted condition as "unavoidable". Again the DEIR appears deficient for failing to question the wisdom of investment in this major component of the plan given the conditions of critical intersections at the ends of the new major link and/or in failing to make a more thorough effort to mitigate the traffic conditions at those intersections.

I. Conclusion

Based on all of the foregoing, I believe the transportation component of the DEIR on the Petaluma General Plan is deficient, requires further analysis and should

be recirculated in draft status. This concludes my current comments on the Petaluma General Plan DEIR.

Sincerely,

Smith Engineering & Management
A California Corporation



Daniel T. Smith Jr., P.E.
President

DANIEL T. SMITH, Jr.
President

EDUCATION

Bachelor of Science, Engineering and Applied Science, Yale University, 1967
Master of Science, Transportation Planning, University of California, Berkeley, 1968

PROFESSIONAL REGISTRATION

California No. 21913 (Civil)
California No. 938 (Traffic)
Nevada No. 7969 (Civil)
Washington No. 29337 (Civil)
Arizona No. 22131 (Civil)

PROFESSIONAL EXPERIENCE

Smith Engineering & Management, 1993 to present. President.
DKS Associates, 1979 to 1993. Founder, Vice President, Principal Transportation Engineer.
De Leuw, Cather & Company, 1968 to 1979. Senior Transportation Planner.
Personal specialties and project experience include:

Litigation Consulting. Provides consultation, investigations and expert witness testimony in highway design, transit design and traffic engineering matters including condemnations involving transportation access issues; traffic accidents involving highway design or traffic engineering factors; land use and development matters involving access and transportation impacts; parking and other traffic and transportation matters.

Urban Corridor Studies/Alternatives Analysis. Principal-in-charge for State Route (SR) 102 Feasibility Study, a 35-mile freeway alignment study north of Sacramento. Consultant on I-280 Interstate Transfer Concept Program, San Francisco, an AA/EIS for completion of I-280, demolition of Embarcadero freeway, substitute light rail and commuter rail projects. Principal-in-charge, SR 238 corridor freeway/expressway design/environmental study, Hayward (Calif.) Project manager, Sacramento Northeast Area multi-modal transportation corridor study. Transportation planner for I-80N West Terminal Study, and Harbor Drive Traffic Study, Portland, Oregon. Project manager for design of surface segment of Woodward Corridor LRT, Detroit, Michigan. Directed staff on I-80 National Strategic Corridor Study (Sacramento-San Francisco), US 101-Sonoma freeway operations study, SR 92 freeway operations study, I-880 freeway operations study, SR 152 alignment studies, Sacramento RTD light rail systems study, Tasman Corridor LRT AA/EIS, Fremont-Warm Springs BART extension plan/EIR, SRs 70/99 freeway alternatives study, and Richmond Parkway (SR 93) design study.

Area Transportation Plans. Principal-in charge for transportation element of City of Los Angeles General Plan Framework, shaping nations largest city two decades into 21'st century. Project manager for the transportation element of 300-acre Mission Bay development in downtown San Francisco. Mission Bay involves 7 million gsf office/commercial space, 8,500 dwelling units, and community facilities. Transportation features include relocation of commuter rail station; extension of MUNI-Metro LRT; a multi-modal terminal for LRT, commuter rail and local bus; removal of a quarter mile elevated freeway; replacement by new ramps and a boulevard; an internal roadway network overcoming constraints imposed by an internal tidal basin; freeway structures and rail facilities; and concept plans for 20,000 structured parking spaces. Principal-in-charge for circulation plan to accommodate 9 million gsf of office/commercial growth in downtown Bellevue (Wash.). Principal-in-charge for 64 acre, 2 million gsf multi-use complex for FMC adjacent to San Jose International Airport. Project manager for transportation element of Sacramento Capitol Area Plan for the state governmental complex, and for Downtown Sacramento Redevelopment Plan. Project manager for Napa (Calif.) General Plan Circulation Element and Downtown Riverfront Redevelopment Plan, on parking program for downtown Walnut Creek, on downtown transportation plan for San Mateo and redevelopment plan for downtown Mountain View (Calif.), for traffic circulation and safety plans for California cities of Davis, Pleasant Hill and Hayward, and for Salem, Oregon.

Transportation Centers. Project manager for Daly City Intermodal Study which developed a $7 million surface bus terminal, traffic access, parking and pedestrian circulation improvements at the Daly City BART station plus development of functional plans for a new BART station at Colma. Project manager for design of multi-modal terminal (commuter rail, light rail, bus) at Mission Bay, San Francisco. In Santa Clarita Long Range Transit Development Program, responsible for plan to relocate system's existing timed-transfer hub and development of three satellite transfer hubs. Performed airport ground transportation system evaluations for San Francisco International, Oakland International, Sea-Tac International, Oakland International, Los Angeles International, and San Diego Lindberg.

Campus Transportation. Campus transportation planning assignments for UC Davis, UC Berkeley, UC Santa Cruz and UC San Francisco Medical Center campuses; San Francisco State University; University of San Francisco; and the University of Alaska and others. Also developed master plans for institutional campuses including medical centers, headquarters complexes and research & development facilities.

Special Event Facilities. Evaluations and design studies for football/baseball stadiums, indoor sports arenas, horse and motor racing facilities, theme parks, fairgrounds and convention centers, ski complexes and destination resorts throughout western United States.

Parking. Parking programs and facilities for large area plans and individual sites including downtowns, special event facilities, university and institutial campuses and other large site developments; numerous parking feasibility and operations studies for parking structures and surface facilities; also, resident preferential parking .

Transportation System Management & Traffic Restraint. Project manager on FHWA program to develop techniques and guidelines for neighborhood street traffic limitation. Project manager for Berkeley, (Calif.), Neighborhood Traffic Study, pioneered application of traffic restraint techniques in the U.S. Developed residential traffic plans for Menlo Park, Santa Monica, Santa Cruz, Mill Valley, Oakland, Palo Alto, Piedmont, San Mateo County, Pasadena, Santa Ana and others. Participated in development of photo/radar speed enforcement device and experimented with speed humps. Co-author of Institute of Transportation Engineers reference publication on neighborhood traffic control.

Bicycle Facilities. Project manager to develop an FHWA manual for bicycle facility design and planning, on bikeway plans for Del Mar, (Calif.), the UC Davis and the City of Davis. Consultant to bikeway plans for Eugene, Oregon, Washington, D.C., Buffalo, New York, and Skokie, Illinois. Consultant to U.S. Bureau of Reclamation for development of hydraulically efficient, bicycle safe drainage inlets. Consultant on FHWA research on effective retrofits of undercrossing and overcrossing structures for bicyclists, pedestrians, and handicapped.

MEMBERSHIPS

Institute of Transportation Engineers Transportation Research Board

PUBLICATIONS AND AWARDS

Residential Street Design and Traffic Control, with W. Homburger *et al*. Prentice Hall, 1989.

Co-recipient, Progressive Architecture Citation, *Mission Bay Master Plan*, with I.M. Pei WRT Associated, 1984.

Residential Traffic Management, State of the Art Report, U.S. Department of Transportation, 1979.

Improving The Residential Street Environment, with Donald Appleyard et al., U.S. Department of Transportation, 1979.

Strategic Concepts in Residential Neighborhood Traffic Control, International Symposium on Traffic Control Systems, Berkeley, California, 1979.

Planning and Design of Bicycle Facilities: Pitfalls and New Directions, Transportation Research Board, Research Record 570, 1976.

Co-recipient, Progressive Architecture Award, *Livable Urban Streets, San Francisco Bay Area and London*, with Donald Appleyard, 1979.

Exhibit B

Exhibit B

Grassetti Environmental Consulting

Environmental Assessment
NEPA/CEQA Compliance
Project Management
Planning and Permitting
Regulatory Process Consulting

Mr. Michael H. Zischke
Morrison & Foerster LLP
425 Market Street
San Francisco, CA 94105-2482

October 22, 2006

Subject: Peer Review of Draft Environmental Impact Report on Petaluma General Plan 2025 110

Dear Mr. Zischke;

Per your request, Grassetti Environmental Consulting (GEC) has conducted a peer review of the Draft Environmental Impact Report on Petaluma General Plan 2025 for compliance with California Environmental Quality Act (CEQA) requirements. This review was conducted by Mr. Richard Grassetti, the firm's Principal, and is based on his 20+ years of experience preparing and reviewing CEQA documents. This review does not contain any revised quantitative technical analyses, but does include reviews of certain methodological issues.

Our review indicates that the document has a fairly comprehensive setting section, but contains a number of flaws in the impacts, mitigations, and alternatives, including:

- Failure to include any alternatives that have been designed to reduce or eliminate the project's significant environmental impacts. Instead, alternatives appear to have been selected from past planning studies instead of developed to reduce the project's impacts. This results in the EIR evaluating an inadequate range of alternatives. A
- Repeated reliance on general, vaguely worded policies as mitigation when there is no evidence that those policies would be implemented in a manner that would actually assure mitigation. As detailed in Attachment A, below, actions such as "encourage implementation", "consider funding" and implement mitigation "to the extent feasible" all are considered to assure mitigation when, in fact, they do not.
- Repeated reliance on future plans, studies, and permits as mitigation for the Plan's potentially significant impacts in the absence of any assurance that those future actions would mitigate impacts to less-than-significant levels. As detailed in Attachment A, this approach is applied to mitigation of nearly all of Plan's significant impacts on the biological resources B
- Failure to identify an environmentally superior alternative to the proposed Plan. Instead, the plan is identified as its own environmentally superior alternative, followed by the no-project alternative, and then the other alternatives. C
- Certain topics are missing from the cumulative impacts analyses. D E

2008 Bristol Drive Berkeley, CA 94705 Phone/Fax: 510.849.2354

A detailed table of comments is included in Attachment A to this letter. Please feel free to contact me at (510) 849-2354 if you have any questions or comments on our review.

Sincerely,

Richard Grassetti
Principal

Attachment A: Specific Comments

Page	Para	Comment
3.2-32-35; 4-1	all	The project impact on 6 intersections is determined in the statement of impact to be Significant and Unavoidable, but this significant unavoidable impact also was omitted from the Section 4.1 (p. 4-1) discussion of Significant Unavoidable Impacts.
3.2-34	5-P.13	"Encourage....implement[ation]" of a TDM program and studying its feasibility does not assure mitigation. Further, it should be noted that the EIR is relying on mitigation that is not permitted to be required under California Health and Safety Code section 40717.9, which prohibits public agencies from imposing employee trip reduction programs unless required by Federal law. The significance of this impact should be revisited absent this infeasible mitigation measure.
3.2-36	5-5.40	The policy to "Identify increased funding sources for local transit service" does not in any way assure that such funding sources will be identified, and, if identified, that funds will be secured. Absent these funding sources, the policy of expanding the transit system would not be implementable. Funding sources should be identified in the Plan if this is to be considered a mitigation for project impacts.
3.2-37	5-P-14	The Policy to reduce parking impacts that is qualified by "To the extent deemed feasible and appropriate by the City...." is so vague and unenforceable as to be meaningless in terms of mitigation. Similarly, the above referenced legally impermissible TDM program is relied upon as mitigation despite no assurance that it would actually occur. Therefore, parking should be considered, or at least assessed, as a possible significant impact.
3.4-13	Table 4 and following discussion	The EIR claims that, due to demographic changes, the addition of 15,600 new residents would actually reduce student enrolment by 15%. These estimates/calculations and their underlying assumptions differ from my experience in preparing EIRs in other California municipalities, and should be reviewed in detail. For example, I recently have worked on EIRs on large-scale residential projects in Dublin, Modesto, and Hollister where the project and cumulative school demand required construction of several new schools. It is unclear why similar development in Petaluma would not require additional schools. The DEIR did not contain the

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		calculations to permit verification of its conclusions.
3.4-14, 15	all	The EIR identifies the need for 21 new police officers and states that this impact is less than significant because the Plan mitigates it, however plan policy 7-P-31, states only that the City should "consider funding additional staff..." Consideration of funding in no way assures funding for police services, and therefore fails to mitigate the Plan's impacts on police services.
3.5-2; 3.5-14 16, 17	all	Needs discussion of safe yield of the system, and available water supplies, in drought years or a series of dry years. This "analysis" appears to apply to maximum storage capacity and legally allocated water supplies, not actual physical water supplies. The EIR text does not provide enough analysis for the reader to determine if the presumed water supplies would exist in dry or drought-year or period scenarios. The Plan itself (Chapter 8) includes no analysis the adequacy of minimum or drought-year/period water supplies to serve Plan buildout.
3.6-11, 12	Impact 3.6-5	Policy 8-P-X requires studying the 100-year flood zone and prohibits entitlements in that zone until the study is complete, but does not include any post-study mitigation. Therefore this impact (construction of housing in the 100-year flood zone) appears to remain significant.
3.7-24-, 25, 26	Impact 3.7-1	The impacts of widespread very-high liquefaction potential in downtown Petaluma appear to be understated in this analysis. Impacts and mitigations are focused on structures, however this widespread failure will likely destroy much of the underground infrastructure. Also, mitigations of studying and designing each new structure to withstand widespread liquefaction fails to address the severity of the impact. As seen in the Ptarmigan Heights area of Anchorage in the 1964 earthquake, widespread liquefaction and lateral spreading in a major earthquake can be of a scale that destroys entire neighborhoods, therefore individual structure design and engineering cannot mitigate for hazards of this magnitude.
3.8-20	Impact 3.8-1	Mitigation for loss of habitat and special status species resulting from Plan buildout relies primarily on permit compliance. There is no evidence that site-by-site permit compliance would, in fact, reduce this overall impact on habitats and species to a less-than-significant level. In addition, this is an impermissible deferral of mitigation. The

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		Plan should be revised to preserve the habitat in a cohesive manner rather than rely on future project-specific permitting by other agencies.
pp.3.8-22-28	Impacts 3.8-3, 4, 5, 6, 7, 8, 9, 10	Each of these impact assessments for special status species relies on future studies and permitting for individual projects to assure future "appropriate" mitigation. As described above, these permits may or may not actually mitigate the impacts to a less-than-significant level. These species should be planned for in the Plan and all critical areas protected as part of the plan, and not deferred to future site-specific studies. If this is not done, based on the information provided in the EIR, the City is required to find this impact significant and unavoidable.
3.9-5 through 15	Aircraft Noise discussion	The discussion of both setting and impact of aircraft noise relies entirely on time-averaged (CNEL) noise metrics. This entirely disregards the disruptive effects of single-event noise from increased aircraft overflights. This impact should be assessed per the Berkeley Keep Jets Over the Bay v. Board of Port Commissioners case, which clearly stated that use of only averaged noise levels does not fully or adequately characterize the noise impact from that source. Single-event noise also should be added to the Significance criteria for noise.
3.11-5, 6	Impact 3.11-1	The discussion states that impacts of development on hills would be minimal because the Plan's policies call for protecting ridgelines and hillsides. However, Policy 2-P-14 is written such that it offers no such protection. It starts "allow development in hillside areas that preserve ridgelines and are site sensitive." This is the opposite of prohibiting such development, therefore this impact should be considered significant and unmitigated by the Plan.
4-1	Section 4.1	As noted above, the EIR's identified significant unavoidable impact on intersection operations has been omitted from this section. In addition, the other impacts identified in the above comments that are not actually mitigated by the Plan or other measures identified in this EIR (i.e. noise, visual quality, liquefaction, and biological resources) should be added to this section.
4-2	Section 4.3	The Growth Inducing Impacts discussion should be expanded to address the possible growth inducing effects of tapping into groundwater supplies and expanded wastewater recycling.

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4-4	Section 4.4	The Cumulative Impacts discussion is missing any discussion of flooding, water quality, and geologic impacts. It also states that public services would not be affected by cumulative development, but does not explain why.
4-5	First paragraph	The analysis seems to state that the project would contribute to cumulative biological impacts, but the conclusion sentence says that it would not; there is no logical connection from the analysis to the conclusion. Further, the cumulative analysis relies on the same deferred/vague mitigation applied to the Plan. In so doing, the EIR's stated "cumulatively considerable impacts" on biological resources are simply not mitigated, and this impact remains significant.
5-2-5-20	5.2 and 5.3	As noted under General Comments above, the EIR does not include any alternatives that have been designed to reduce or eliminate the project's significant environmental impacts. Alternatives appear to have been selected from past planning studies instead of developed to reduce the project's impacts. As described in Section 5.3, the alternatives do not "Substantially avoid or lessen one or more of the significant effects" of the project, as mandated under CEQA Guidelines section 15126(d)(2). This results in the EIR's range of alternatives being inadequate to meet CEQA requirements. As indicated in the analyses on pp 5.5 – 5.20, the alternative not only fail to mitigate the project's significant impacts, in most cases their impacts are greater than those of the project (due to increased population, flood hazards, services demands, and traffic-related impacts). Additional alternatives that mitigate project impacts on Traffic, Noise, Air Quality, or the other potentially significant impacts identified in this memo should be considered in the EIR.
5-16	Table 5.3-3	The traffic assessment for the alternatives fails to include an assessment of the intersections that would be significantly and unavoidably affected by the project, so it is not possible to see if the alternatives would, in fact, mitigate any of these impacts.
5-20	Section 5.4	The Environmentally Superior Alternative discussion to identify an environmentally superior alternative to the proposed Plan; instead, the plan is identified as its own environmentally superior alternative, followed by the no-project alternative, and then the other alternatives.

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A. INTRODUCTION TO THE FIRM

Grassetti Environmental Consulting (GECo) is a specialty environmental planning firm with expertise in environmental assessment, CEQA/NEPA compliance analyses, third party review, CEQA project management, and preparation of geologic and water resource studies. The firm focuses on working with clients towards full disclosure of environmental impacts and development of practical mitigation measures for those impacts. Our working ethic is to efficiently ensure full compliance with CEQA/NEPA regulations and guidelines while minimizing duplicative studies and regulatory confusion. We are proficient in preparing responsive environmental documentation for technically complex projects, and can provide our clients with a working understanding of the appropriate level of effort needed to comply with applicable environmental regulations. We strive to provide our clients with a level of personal service not generally found in larger firms.

The firm's Principal, Mr. Richard Grassetti, has over 20 years of experience preparing and reviewing environmental documents throughout California. Mr. Grassetti has worked on over 200 environmental impact reports, initial studies, environmental assessments, and environmental impact statements. He has substantial expertise reviewing environmental assessments for regulatory compliance and technical adequacy, has conducted over 30 peer reviews of NEPA and CEQA documents, and has testified as an expert witness regarding CEQA adequacy issues. He also has prepared various other environmental analyses including Wild and Scenic River studies, environmental constraint assessments, and feasibility studies. Mr. Grassetti has experience in both technical analysis and project management for environmental impact assessments of many types of projects including industrial development, power generation projects, airports, waste management and pollution control projects, mixed use urban development, residential projects, recreation/resort developments, planning studies, transportation improvements, and other infrastructure development.

GECo works with a group of affiliated environmental professionals on a regular basis. This collaboration provides our clients with a broad range of expertise, without the overhead burden of a large consulting firm. Our goal is to provide our clients with personalized service tailored to their specific needs. Each individual included on a GECo project team is a highly experienced, senior-level professional with extensive experience working for both public- and private-sector clients. Our services range from initial project scoping through project implementation and monitoring. Our staff and affiliates are highly qualified to assist clients in negotiating the maze of environmental compliance regulations. Through these reciprocal working arrangements, we offer technical experts of the highest caliber at modest cost. Our combined skills and experience offer a complete range of environmental assessment services.

GECo provides a variety of services in preparation and review of environmental documents and issues. A sampling of our services is provided below. References are available on request.

- *Expert Review and Critique of CEQA and NEPA Documents*: GECo provides thorough objective review and critique services for all types of documents prepared pursuant to the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Our review capabilities include both technical analyses and regulatory conformance analyses.

- *Consultant and Project Management Services*: GECo can assist your legal efforts in providing and managing teams of technical consultants for review or preparation of CEQA, NEPA, and other environmental documents. Our experience with local experts and in consultant management can assure quality, cost, and schedule control.

- *Expert Review of Technical Studies*: GECo provides detailed reviews of all types of technical environmental studies for planning and land use permitting issues. In addition to our in-house capabilities, we have established long-term affiliations with a broad range of technical subcontractors for preparation of specific technical reviews including toxics, air quality, water quality, biological resources, hydrology and geology.

- *Permitting and Processing*: GECo provides assistance in environmental and land use permitting. We can assist attorneys in understanding and completing the permit process in compliance with CEQA, NEPA, Corps of Engineers, BCDC, and other state, local, and regional agency requirements.

- *Expert Witness Services*: GECo's Principal, Mr. Richard Grassetti has been accepted as an expert witness in the California Courts, and provides expert witness services in CEQA and NEPA compliance cases. In addition, through our network of subconsultants, we can provide appropriate expert witnesses on a variety of other technical issues.

- *Land Use Planning*: GECo provides assistance with land use planning issues. We have a thorough understanding of California planning law and the practical aspects of its implementation. This allows us to assist our clients in the land use planning process. We typically assist attorneys in the "hands-on" aspects of implementing California planning law.

- *Mitigation Monitoring and Reporting*: GECo has extensive experience reviewing and preparing Mitigation Monitoring and Reporting Programs pursuant to CEQA requirements. We can work with you to develop a format and content that satisfies both your client's needs and CEQA requirements.

- ***Environmental Assessment of Waste Management Projects:*** GECo has extensive experience preparing environmental studies for waste management projects including recycling, landfills, and AB 939 documents/facilities. We can assist your staff in preparing and/or reviewing these studies.

B. REPRESENTATIVE PROJECT EXPERIENCE

PREPARATION OF CEQA/NEPA TECHNICAL ANALYSES/DOCUMENTS

Dutch Slough Restoration Project/Oakley Community Park EIR. Geco is preparing the EIR for a 1400-acre wetland restoration and 80-acre community park on former diked lands in Oakley. Major issues include fisheries, water quality, historic architectural resources, and wetlands. Client: California State Coastal Conservancy.

Pinole Creek Restoration Project Initial Study. GECo prepared the CEQA Initial Study for a 2.5 mile long creek restoration project in the City of Pinole. Major issues included biological resources, flooding, and water quality. Client: City of Pinole.

Baxter Creek Restoration Project CEQA Consulting. GECo assisted City of El Cerrito staff in the preparation of an Initial Study for the proposed Baxter Creek Restoration Project. Client: City of El Cerrito.

West of Fairview Subdivision Supplemental EIR. GECo is preparing a Supplemental EIR for a 700-unit residential development in Hollister. Major issues include traffic, biology, and utility services. Client: City of Hollister.

American Canyon Initial Studies. GECo is preparing two initial studies for commercial and warehouse projects in the City of American Canyon. Major issues include traffic, biological resources, and geology. Client: City of American Canyon.

Hampton Road Subdivision EIR. GECo is preparing a focused EIR for a 10-unit subdivision in the San Lorenzo area of Alameda County. Major issues include historic resources. Client: Philip Chen.

Fallon Villages CEQA Consulting. GECo prepared draft EIR sections end provided CEQA guidance for an 1100-acre planned development in Dublin. Major issues included land use, traffic, traffic, and biological resources. Client: Braddock and Logan Services

Pelandale-McHenry Specific Plan. GECo prepared the Specific Plan for an 80-acre residential/commercial development in Modesto. Major issues included land use, traffic, and provision of adequate infrastructure. Client: Meritage Homes

Monte Cresta Roadway Extension Initial Study. GECo prepared an Initial Study/Negative declaration for a roadway extension in San Juan Hills area of the City of Belmont. Major issues included slope stability and growth inducement. Client: City of Belmont

Bethel Island Water Supply Project. GECo prepared and Initial Study for a proposed new water supply system for the community of Bethel Island in Contra Costa County.

Major issues included growth inducement, archaeological resources, and biological resources. Client: Bethel Island Municipal Improvement District.

Invasive Spartina Control Project EIR/EIS and Addendum. GECo prepared the programmatic EIR/EIS on a plan to control invasive cordgrasses throughout the San Francisco Bay. Major issues included endangered species, visual resources, water quality, and human health and safety. GECo subsequently prepared an addendum for the addition of a new herbicide to the Spartina Control Program. Client: California State Coastal Commission.

Aptos Sanitary Sewer Replacement Project Initial Study. GECo prepared an Initial Study for the replacement of a storm-damaged sanitary sewer pipeline in Santa Cruz County. Major issues included cultural resources and biological resources. Client: Harris and Associates.

Eastern Dublin Specific Plan Supplemental EIR. GECo prepared a Supplemental EIR for an 1100-acre mixed-use project in the City of Dublin. Major issues included traffic, biological resources, public services, noise, and air quality. Clients: Shea Homes and Braddock and Logan Services.

Consolidated Forward Landfill Project EIR Update. GECo prepared an EIR for the expansion and consolidation of the Forward Landfill and the Austin Road Landfill near Stockton, CA. Major issues include toxics, water quality, traffic, biological resources, and air quality. Client: San Joaquin County Community Development Department.

Pleasanton IKEA Initial Study. GECo prepared a Draft Initial Study for a proposed new 300,000 sq. ft. IKEA store in Pleasanton. Major issues included biology, traffic, and visual resources. Client: IKEA Corporation.

Central Contra Costa Household Hazardous Waste Facility Studies: GECo assisted Central Contra Costa Sanitary District staff in the preparation of a Planning Study and subsequent CEQA Initial Study on feasibility, siting, and environmental issues associated with the development of a Household Hazardous Waste collection program and facility in Central Contra Costa County. Client: Central Contra Costa Sanitary District.

Southwest Richmond Flood Control Project IS. GECo prepared the Initial Study and Mitigated Negative Declaration for a proposed flood control project in the City of Richmond. Client: City of Richmond.

Wickland Oil Martinez Tank Farm Expansion Project EIR Management. GECo served as an extension of City of Martinez Planning Department staff to manage all aspects of the preparation of the CEQA review for a 2,000,000 barrel expansion at Wickland's Martinez oil storage terminal. We prepared the NOP, RFP, assisted in consultant selection, and managed the consultant preparing the EIR on this project. Client: City of Martinez.

Austin Road Landfill Expansion Project EIR Update. GECo prepared an Initial Study and Supplemental EIR updating a 1994 EIR for the expansion of the Austin Road Landfill near Stockton, CA. Major issues include water quality, traffic, biological resources, and air quality. Client: San Joaquin County Community Development Department.

Wayside Road Sewer Expansion Initial Study. GECo prepared an Initial Study and Mitigated Negative Declaration for a proposed new sewer system in the Wayside Road area of Portola Valley. Client: West Bay Sanitary District

Los Trancos Woods Sewer Expansion Initial Study. GECo prepared an Initial Study and Mitigated Negative Declaration for a proposed new sewer system in the Los Trancos Woods area of Portola Valley. Client: West Bay Sanitary District

Arastradero Road Sewer Expansion Initial Study. GECo prepared an Initial Study and Mitigated Negative Declaration for a proposed new sewer system in the Arastradero Road area of Portola Valley. Client: West Bay Sanitary District

Lower Orinda Pumping Station Initial Study/Negative Declaration. GECo prepared an Initial Study/Negative Declaration for renovating or relocating a wastewater pumping plant in Orinda, CA. Client: Central Contra Costa Sanitary District.

Shell Martinez Breakout Tanks Project Initial Study. GECo prepared an Initial Study for two proposed new waste water storage tanks at Shell's Martinez Manufacturing Complex. Major issues included air quality, odors, and visual impacts. Client: City of Martinez.

Shell Martinez Biotreater Facility Initial Study. GECo prepared the Initial Study/Negative Declaration for a proposed new biotreater facility for Shell's Martinez Manufacturing Complex waste water treatment plant. Major issues included water quality, wetlands, growth-inducement, and cumulative impacts. Client: City of Martinez.

Vallejo Solar Power Plant Initial Study. GECo prepared a CEQA Initial Study/Negative declaration for a proposed photovoltaic array intended to power a water pumping plant in the City of Vallejo. Major issues included land use compatibility and visual quality. Client: City of Vallejo.

Ranch on Silver Creek CEQA Consulting. GECo prepared the Mitigation Monitoring and Reporting Program and other CEQA compliance tasks for a large residential/golf course project in San Jose. Client: Sycamore Associates.

Morgan Hill Ranch Initial Study Analyses. GECo prepared the Hydrology, Geology, and Hazardous Materials analyses for the Morgan Hill Ranch Mixed Use Project Initial Study. Client: Wagstaff and Associates.

East Bay MUD Water Conservation Study. GECo conducted the field portion of a major water conservation survey for the East Bay MUD service area. Client: Water Resource Engineering.

East Bay MUD Pipeline CEQA Analyses. GECo prepared technical analyses for two EIRs regarding proposed new East Bay MUD pipeline in Sacramento, San Joaquin, and Calaveras Counties. Client: Uribe & Associates.

Sunnyvale Landfill Power Plant CEQA Initial Study. GECo prepared an Initial Study for a proposed landfill gas-fueled power plant at the Sunnyvale Landfill in Santa Clara County. Recommendations for mitigation and further environmental review were prepared. Client: 3E Engineering.

Fremont Redevelopment Project Hydrologic Analysis. GECo prepared the hydrology section for an environmental impact report for four redevelopment projects in Fremont. Client: Wagstaff and Associates.

Ostrom Road Landfill Hydrologic Analysis. GECo prepared the hydrology section for an environmental impact report on the proposed vertical expansion of an existing Class II landfill in Yuba County. Client: ESA Associates.

Pinole Portion of the Bay Trail Hydrologic, Geologic, and CEQA QA/QC Analyses. GECo prepared the hydrologic and geologic analyses for a CEQA Initial Study on a half-mile segment of the Bay Trail in the City of Pinole. GECo also provided CEQA process consulting services on this project. Client: Placemakers.

Kennedy Park Master Plan Hydrologic and CEQA QA/QC Analyses. GECo prepared the hydrologic analyses for an environmental impact report on a proposed park master plan in the City of Napa. Client: Placemakers.

U.S. Navy Bay Area Base Closure and Re-Use Environmental Studies. GECo assisted in the NEPA/CEQA review process for US Navy Base Closures and Re-Use for the San Francisco Bay Area. Work tasks include CEQA compliance overview, internal peer review, quality control reviews, and preparation of technical analyses. Specific projects are summarized below:

Mare Island Naval Shipyard EIR/EIS Studies. GECo prepared the hydrology section of the EIR/EIS on the shipyard closure and reuse program, conducted a peer review of the geology section, and conducted QA/QC review of the entire EIR/EIS. Client: Tetra Tech, Inc.

Oak Knoll Naval Medical Center EIR/EIS Studies. GECo conducted a CEQA/NEPA quality control and peer review of the EIS/EIR prepared for disposal and reuse of the Oak Knoll Naval Medical Center EIS/EIR in the City of Oakland. Client: Tetra Tech, Inc.

NAS Alameda EIR/EIS Studies. GECo prepared the hydrology section of EIR/EIS on reuse of the Naval Air Station, conducted a peer review of the geology section, and conducted QA/QC review of the entire EIR/EIS. Client: Tetra Tech, Inc.

Naval Station Treasure Island EIR/EIS Studies. GECo prepared the hydrology section of the EIR/EIS on reuse of Naval Station Treasure Island, conducted a peer review of the geology section, and conducted QA/QC review of the entire EIR/EIS. Client: Tetra Tech, Inc.

Hunters Point Naval Shipyard EIR/EIS. GECo assisted in the responses to comments and peer review of the EIR/EIS for the Hunters Point Naval Shipyard in San Francisco. Client: Uribe and Associates.

Naval Fuel Depot Point Molate. GECo conducted overall internal peer reviews of several drafts of the EIR/EIS for reuse of the former Naval Fuel Depot Point Molate in Richmond, CA. In addition, we prepared the Noise, Socioeconomics, and Cultural Resources sections of the EIS/EIR. Client: Uribe and Associates.

CEQA/NEPA COMPLIANCE SEMINARS

Mr. Grassetti has conducted CEQA and NEPA compliance seminars for entities including:

- West Bay Sanitary District
- North Coast Resource Management, Inc.
- Tetra Tech Inc.
- Impact Sciences Inc.
- Northwest Environmental Training Center

PEER REVIEW CEQA/NEPA COMPLIANCE, AND EXPERT WITNESS CONSULTING

Jackson State Forest CEQA Review. GECo prepared a detailed analysis of the CEQA adequacy of the California Department of Forestry's EIR on a new management plan for the 40,000 acre Jackson State Forest. Major issues included forestry practices, water quality , and biological resources. Client: Dharma Cloud Foundation

Los Angeles Airport Arrival Enhancement Project Environmental Assessment NEPA Peer Review. GECo prepared a peer review and expert declarations regarding the adequacy of the NEPA Environmental Assessment for rerouting of flight paths for aircraft arriving at Los Angeles International Airport. Major issues included adequacy of assessment of noise effects on traditional cultural practices of the Morongo Band of Mission Indians. Client: Law Offices of Alexander & Karshmer.

Metropolitan Oakland International Airport Development Plan Environmental Impact Report CEQA Review. GECo performed a critical review and assisted in the preparation of comments and ultimately successful litigation regarding the proposed expansion of Metropolitan Oakland International Airport. Major issues included noise, cumulative impacts, and alternatives selection/analyses. Client: Law Office of John Shordike.

Oakland Creek Protection Ordinance Litigation. GECo is providing ongoing expert CEQA and Creek Protection Ordinance consulting for litigation regarding failure to enforce the City of Oakland's Creek Protection Ordinance. Client: North Hills Phoenix Association.

San Francisco International Airport Environmental Liaison Office Consulting. GECO conducted various internal peer review tasks associated with environmental studies being prepared for SFIA's proposed runway expansion. Client: LSA Associates, Inc.

El Cerrito Lumber Yard CEQA Peer Review. GECo conducted an internal peer review for an Initial Study on a controversial parcel in the City of El Cerrito. Client: City of El Cerrito.

Sausalito Marina CEQA Critique. GECo prepared a peer review and critique of an EIR for a proposed new marina in Sausalito. Client: Confidential

Sausalito Police and Fire Station CEQA Critique. GECo prepared a peer review and critique of an EIR for a proposed new public safety building in Sausalito. Client: Confidential

Napa Verison Tower CEQA Critique. GECo conducted a peer review and critique for a cellular telephone tower in the City of Napa. Client: Confidential.

West Bay Sanitary District CEQA Assistance. GECo presented a short-course on successful CEQA compliance for staff of the West Bay Sanitary District in Menlo Park, CA. Client: West Bay Sanitary District.

Morongo Mining Projects Environmental Reviews. GECo provided CEQA, NEPA, and technical consulting to the Morongo Band of Mission Indians regarding two aggregate mines adjacent to their reservation in Riverside County, CA. Client: Law Office of Alexander & Karshmer.

Napa Skateboard Park Peer Review. GECo conducted a peer review and critique for a neighborhood association on a proposed skateboard park in the City of Napa. Client: Confidential.

Headwaters Forest Project EIR/EIS Review. GECo conducted an expert review of the CEQA and NEPA adequacy and technical validity of EIR/EIS on the Headwaters Forest Habitat Conservation Plan, Sustained Yield Plan, and land purchase. Clients: Environmental Law Foundation; Environmental Protection and Information Center, and Sierra Club.

Global Photon Fiber-Optic Cable EIR Peer Review. GECo assisted in a third-party peer review of an EIR on a proposed offshore fiber-optics cable. Client: Tetra Tech, Inc., and California State Lands Commission.

Coachella Valley Water Management Plan CEQA Peer Review. GECo assisted a consortium of Coachella Valley Indian Tribes in reviewing CEQA documents on the Coachella Valley Water Management Plan. Client: Consortium of Coachella Valley Tribes.

Salton Sea Enhanced Evaporation System Initial Study/Environmental Assessment Peer Review. GECo reviewed the draft IS/EA for a spray project to evaporate excess return flow water from the Salton Sea. Client: Morongo Band of Mission Indians.

Santa Rosa Home Depot CEQA Peer Review: GECo conducted a peer review and provided expert testimony regarding the adequacy of the Environmental Impact Report and associated technical studies for a proposed Home Depot shopping center in Santa Rosa. Client: Redwood Empire Merchants Association.

Mitsubishi Mine CEQA Litigation Review. GECo conducted a review of legal briefs regarding the adequacy of CEQA analyses for a proposed mine expansion in San Bernardino County. Client: Law Offices of Thomas Mauriello.

Alamo Gate Permitting Review. GECo performed a critical review and prepared expert testimony and correspondence regarding the adequacy of CEQA and land use permitting and studies for a proposed gate on Las Trampas Road which would preclude vehicular access to a regional park staging area. Client: Las Trampas Trails Advocates.

Cambria Condominiums Environmental and Planning Review. GECo prepared expert reviews of the potential environmental effects and Local Coastal Plan compliance of a proposed condominium development in Cambria, San Luis Obispo County. Client: Law Office of Vern Kalshan.

Mariposa County Planning Policy Reviews. GECo conducted a review of proposed alterations to the Mariposa County General Plan for CEQA compliance.. Client: Dr. Barton Brown.

Gregory Canyon Landfill Environmental Processing Review. GECo was retained to review the environmental permitting and CEQA analyses for the proposed Gregory Canyon Landfill in northern San Diego County. Procedural issues include landfill siting requirements and CEQA process compliance. Technical issues include cultural resources, hydrology, endangered species, traffic, and health and safety. Client: Law Offices of Alexander & Karshmer and Pala Band of Mission Indians.

Otay Ranch Development CEQA Review. GECo prepared an expert review of the Environmental Impact Report for the 23,000-acre Otay Ranch project in San Diego County in connection with ongoing litigation. Major issues were CEQA compliance, compliance with the California planning process, biological impacts, cumulative impacts, and alternatives. Client: Law Offices of Charles Stevens Crandall.

Punta Estrella Chip Mill Environmental Report Compliance Review. GECo prepared a review of a proponents environmental report for a proposed wood chip mill in Costa Rica to determine compliance of documentation with U.S. environmental standards and policies. Major compliance issues included US Clean Air Act and Clean Water Act standards, NEPA standards, and adequacy of overall impacts analysis. Client: Scientific Certification Systems.

Carroll Canyon Burn Facility CEQA Compliance Review. GECo prepared a CEQA process review for a proposed Negative Declaration on a planned contaminated-earth burning facility in the City of San Diego. Client: Law Offices of William Mackersie.

Monterey Bay Marine Lab CEQA Compliance Review: GECo assisted attorneys in review of a CEQA Negative Declaration, NEPA Environmental Assessment, and associated documents for the relocation of the Monterey Bay Marine Laboratory. Issues included the effectiveness of mitigation to cultural and biological resources, the appropriateness of the Negative Declaration versus an EIR, and other CEQA issues. Client: Law Offices of Alexander & Karshmer.

Monterey Ground Water Ordinances CEQA Compliance Review. GECo provided expert CEQA consulting services to attorneys regarding the appropriateness of Monterey County's CEQA processing of proposed ground water ordinances. Client: Salinas Valley Water Coalition.

Jamestown Whistlestop CEQA Adequacy Review. GECo performed an expert review and assisted in successful litigation regarding an Initial Study for a proposed mini mall in Jamestown, Tuolumne County. Client: Law Offices of Thomas Mauriello.

Sunrise Hills Environmental Impact Report Peer Review. GECo performed a critical review of the applicability of the EIR for a proposed 200-unit residential development in Sonora, Tuolumne County. Major issues include grading, erosion, water quality, biological impacts, and visual quality. Client: Sylva Corporation.

Sonora Crossroads Shopping Center Environmental Impact Report Review. GECo performed a review of an EIR for a major new shopping center in Sonora, Tuolumne County. Major issues included geologic and hydrologic impacts. Findings were presented to the Sonora City Council, and pre-litigation assistance was provided. Client: Citizens for Well Planned Development.

Blue Oaks Residential Development CEQA Studies Review and Critique. GECo performed several tasks related to a proposed residential development in western Tuolumne County. Tasks included review of County CEQA procedure, review of Initial Study, review of Draft EIR, and coordination with attorneys. Client: Western Tuolumne County Citizens Action Group.

Yosemite Junction Project CEQA Review. GECo prepared a review and critique of a proposed Negative Declaration for a 40-unit outlet mall in Tuolumne County, California. The Negative Declaration was subsequently denied and the project application rescinded. Client: Sylva Corporation.

Sonora Mining Corporation CEQA Review/Expert Witness Services. GECo conducted a review and critique of CEQA compliance for the proposed expansion of Sonora Mining Corporation's Jamestown Gold Mine in Tuolumne County, California. Client: Law Office of Alexander Henson.

Save Our Forests and Rangelands Expert Review and Witness Services. GECo provided expert review, consulting services, and expert witness testimony on CEQA issues for a successful legal challenge to an EIR and Area Plan for 200,000 acres in the Central Mountain Sub-region of San Diego County. Client: Law Offices of Milberg, Weiss, Bershad, Specthrie, & Lerach.

San Diego County Land Use Planning, Consulting and Expert Witness Services. GECo provided an expert declaration and several comment letters and background analyses on the proposed amendments the San Diego County General Plan regarding agricultural preserve and water management policies. Clients: Law Offices of Charles Stevens Crandall; Save Our Forests and Rangelands.

C. JURISDICTIONAL EXPERIENCE

GECo Staff have Prepared Environmental Documents in the Following Jurisdictions:

INTERNATIONAL

Costa Rica

STATES (OTHER THAN CALIFORNIA)

Alabama
Nevada (3)
New York
Oregon
Utah

CALIFORNIA COUNTIES AND CITIES

Alameda (2)
- *Alameda*
- *Berkeley (2)*
- *Fremont (3)*
- *Hayward (2)*
- *Livermore (2)*
- *Milpitas*
- *Oakland (5)*

Colusa
Contra Costa (5)
- *Antioch (2)*
- *Concord*
- *Danville*
- *Lafayette*
- *Martinez (4)*
- *Moraga (3)*
- *Oakley*
- *Orinda*
- *Pinole (2)*
- *Pittsburg (2)*
- *Richmond (9)*
- *San Ramon*

El Dorado
- *South Lake Tahoe (3)*

Fresno (2)
Humboldt
- *Eureka*

Imperial (3)
Kern
Lake
Los Angeles
- *Hollywood*
- *Long Beach*

Madera
Marin (2)
- *Larkspur*
- *Novato (2)*
- *Sausalito*

Mono
Monterey (5)
- *Carmel Valley (4)*
- *Moss Landing*
- *Salinas (2)*
- *Watsonville (2)*

Napa (2)
Orange
- *Irvine (2)*
- *Newport Beach*

Placer (2)
Riverside
Sacramento
- *Sacramento*

San Benito (2)
San Bernardino
San Diego (4)
- *San Diego*

San Francisco (11)
San Joaquin (2)
San Luis Obispo
- Cambria

San Mateo
- *Burlingame (4)*
- *City of San Mateo*
- *Daly City (3)*
- *Half Moon Bay*
- *Hillsborough (2)*
- *Mountain View*
- *Redwood City (2)*
- *South San Francisco*
- *Woodside*

Santa Barbara (6)
Santa Clara
- *Los Gatos*
- *San Jose*
- *Saratoga (3)*
- *Sunnyvale (3)*

Santa Cruz (2)
- *Santa Cruz*

Shasta
Solano (5)
- *Vallejo (3)*

Sonoma (7)
- *Santa Rosa (5)*

Stanislaus (3)
- *Empire*
- *Modesto (4)*
- *Oakdale*

Tehema
Tuolumne (3)
- *Jamestown*
- *Sonora (2)*

Ventura
Yuba

(x) indicates the number of projects completed by GECo staff in the jurisdiction

E. CLIENT REFERENCES

Please feel free to contact the following client references with respect to GECo qualifications and experience:

John Shordike
Law Offices of Alexander & Karshmer
2150 Shattuck Ave. Suite 725
Berkeley, CA 94709
(510) 841-5056

Tom Mauriello
Law Office of Thomas Mauriello
707 Broadway, Suite 1700
San Diego, CA 92101
(619) 515-1144

Russell Leavitt
Planner
Central Contra Costa Sanitary District
5019 Imhoff Place
Martinez, CA 94553-4392
(925) 229-7255

Patricia Jeffery, AICP
Principal
Placemakers
814 Solano Ave.
Albany, CA 94706
(510) 524-7980

Richard Grassetti

PRINCIPAL

Expertise

- CEQA/NEPA Environmental Assessment
- Project Management
- Geologic and Hydrologic Analysis

Principal Professional Responsibilities

Mr. Grassetti is an environmental planner with over 19 years of experience in environmental impact analysis, hydrologic and geologic assessment, project management, and regulatory compliance. He is a recognized expert on California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) processes, and has served as an expert witness on CEQA and planning issues. Mr. Grassetti regularly conducts peer review and QC/QA for all types of environmental impact analyses, and works frequently with public agencies, citizens groups, and applicants. He has managed the preparation of over 50 CEQA and NEPA documents, as well as numerous local agency planning and permitting documents. Mr. Grassetti has prepared over 200 hydrologic, geologic, and other technical analyses for CEQA and NEPA documents. He has analyzed the environmental impacts of a wide range of projects including residential developments, waste management projects, mixed-use developments, infrastructure improvements, energy development, military base reuse projects, and recreational facilities throughout the western U.S. In addition to his consulting practice, Mr. Grassetti is an adjunct professor at California State University, Hayward, where he teaches courses on environmental impact assessment, among others.

Professional Services

- Management and preparation of all types of environmental impact assessment and documentation for public agencies, applicants, citizens groups, and attorneys
- Peer review of environmental documents for technical adequacy and regulatory compliance
- Expert witness services
- Assisting clients in CEQA and NEPA process compliance

- Preparation of hydrologic and geologic analyses for EIRs and EISs
- Preparation of project feasibility, opportunities, and constraints analyses, and mitigation monitoring and reporting plans

Education

University of Oregon, Eugene, Department of Geography, M.A., Geography (Emphasis on Fluvial Geomorphology and Water Resources Planning), 1981.

University of California, Berkeley, Department of Geography, B.A., Physical Geography, 1978.

Professional Experience

1992-Present	Principal, GECo Environmental Consulting, Berkeley, CA
1994-Present	Adjunct Professor, Department of Geography and Environmental Studies, California State University, Hayward, CA
1988-1992	Environmental Group Co-Manager/ Senior Project Manager, LSA Associates, Inc. Richmond, CA
1987-1988	Independent Environmental Consultant, Berkeley, CA
1986-1987	Environmental/Urban Planner, City of Richmond, CA
1982-1986	Senior Technical Associate - Hydrology and Geology - Environmental Science Associates, Inc. San Francisco, CA
1979-1981	Graduate Teaching Fellow, Department of Geography, University of Oregon, Eugene, OR
1978	Intern, California Division of Mines and Geology, San Francisco, CA

Professional Affiliations and

Member and Past Chapter Director, Association of Environmental Professionals, San Francisco Bay Chapter

Certifications

Member, International Association for Impact Assessment

Publications and Presentations

Grassetti, R. *Round Up The Usual Suspects: Common Deficiencies in US and California Environmental Impact assessments.* Paper Presented at International Association for Impact Assessment Conference, Vancouver, Canada. May 2004.

Grassetti, R. *Understanding Environmental Impact Assessment – A Layperson's Guide to Environmental Impact Documents and Processes.* (in press).

Grassetti, R. *Developing a Citizens Handbook for Impact Assessment.* Paper Presented at International Association for Impact Assessment Conference, Marrakech, Morocco. June 2003

Grassetti, R. *CEQA and Sustainability.* Paper Presented at Association of Environmental Professionals Conference, Palm Springs, California. April 2002.

Grassetti, R. and M. Kent. *Certifying Green Development, an Incentive-Based Application of Environmental Impact Assessment.* Paper Presented at International Association for Impact Assessment Conference, Cartagena, Colombia. May 2001

Grassetti, Richard. *Report from the Headwaters: Promises and Failures of Strategic Environmental Assessment in Preserving California's Ancient Redwoods.* Paper Presented at International Association for Impact Assessment Conference, Glasgow, Scotland. June 1999.

Grassetti, R. A., N. Dennis, and R. Odland. *An Analytical Framework for Sustainable Development in EIA in the USA.* Paper Presented at International Association for Impact Assessment Conference, Christchurch, New Zealand. April 1998.

Grassetti, R. A. *Ethics, Public Policy, and the Environmental Professional.* Presentation at the Association of Environmental Professionals Annual Conference, San Diego. May 1992.

Grassetti, R. A. *Regulation and Development of Urban Area Wetlands in the United States: The San Francisco Bay Area Case Study.* Water Quality Bulletin, United Nations/World Health Organization Collaborating Centre on Surface and Ground Water Quality. April 1989.

Grassetti, R. A. *Cumulative Impacts Analysis, An Overview.* Journal of Pesticide Reform. Fall 1986.

1986, 1987. Guest Lecturer, Environmental Studies Program, University of California, Berkeley.

Exhibit C

Exhibit C





PROJECT SCHEDULE

Conduct Environmental Studies and Prepare Draft EIS/EIR – SPRING 2001 to 2007

Circulate Draft EIS/EIR and receive Formal Public Comment – EARLY 2007

Identify Preferred Alternative and Approve Final EIS/EIR – SUMMER 2006 to S 2008

Design – START SUMMER 2007 to SUMMER 2011

Construction of First Phase (assuming funding is available) - START 2010

All schedules are based on assumed availability of funds.



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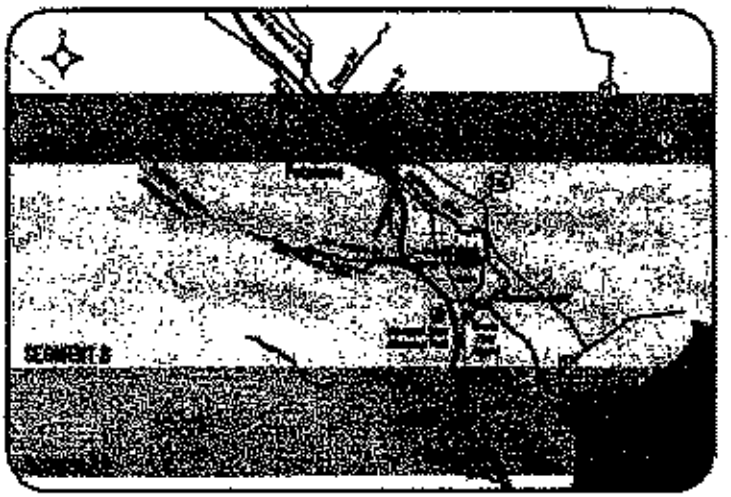
PROJECT MAP

The MSN project consists of three segments:
- Segment A – Route 37 to Atherton Avenue
- Segment B – Atherton Avenue to north of Route 116 (East)
- Segment C - Route 116 (East) to Old Redwood Highway.



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ALTERNATIVES

As part of the environmental review for the project, Caltrans will evaluate alterna each project segment. For Segments A and C, there are only two alternatives: "Bu Build". (These segments are already built to freeway standards, so the needed im aren't as extensive as in Segment B, which is currently built to expressway stand needs much more work).
For Segment B, under the "Build" alternative, four freeway access alternatives ar under consideration, subject to the review of several resource agencies and envir review.

HOV IMPROVEMENTS

Segment A - Route 37 to Atherton Avenue in Novato (approximately 4 miles)

"No Build" Alternative:
No changes or upgrades to the existing roadway

"Build" Alternative:
Proposes to add contiguous HOV lanes to the existing six-lane freeway with all of widening in the existing median. The addition of these lanes will also require that following improvements be made:

- Upgrade median drainages
- Add concrete median barrier
- HOV-bypass and ramp metering to all on-ramps
- Add soundwalls and retaining walls
- Widen Novato Creek Bridge
- Widen Franklin Overhead Bridge
- Widen Olive Uncrossing Bridge
- Widen North Novato Overhead Bridge

Segment C - Route 116 (East) to Old Redwood Highway in Petaluma (approx. 4 m

"No Build" Alternative:
No changes or upgrades to the existing roadway

"Build" Alternative:
Proposes to add contiguous HOV lanes to the existing six-lane freeway with all of widening in the existing median. The addition of these lanes will also require that following improvements be made:

- Upgrade median drainages
- Add concrete median barrier
- HOV-bypass and ramp metering to all on-ramps
- Add soundwalls and retaining walls
- Replace Northbound 101/116 Separation and Overhead, widen Southbound
- Widen Washington Creek Bridge
- Widen Lynch Creek Bridge
- Replace North Petaluma Overhead Bridge

EXPRESSWAY UPGRADE

Segment B – "The Narrows" - Atherton Avenue to north of Route 116 (East) – No

Exhibit D

Exhibit D

6 Alternatives

CEQA mandates consideration and analysis of alternatives to the proposed project. CEQA Guidelines §15126(d)(2) states that the range of alternatives "shall include those that could feasibly accomplish most of the basic purposes of the project and could avoid or substantially lessen one or more of the significant impacts." The alternatives may result in new impacts that do not result from the proposed project. The analysis must explain why the alternatives and related mitigation measures would not be preferable to the proposed project.

Case law suggests that the discussion of alternatives need not be exhaustive, and that alternatives be subject to a construction of reasonableness. CEQA Guidelines § 15126(d)(3) states that the impacts of the alternatives may be discussed "in less detail than the significant effects of the project as proposed." Also, the Guidelines permit analysis of alternatives at a less detailed level for general plan and other program EIRs, compared to project EIRs. Quantified information on the alternatives is presented where available; only partial quantification is available for some impacts.

In addition to the proposed project, three land use and transportation alternatives were considered during the General Plan process and are fully analyzed in this Draft EIR. The alternatives provide a range of options for growth and conservation, and would have varying amounts of development capacity. Each of the alternatives offers a different land use pattern and intensity that responds to the Guiding Principles developed by the General Plan Program Management Team (see Chapter 3: Project Description).

- *No Project Alternative.* The No Project Alternative assumes continuation of land use development under the approved 1996 General Plan. This alternative provides a realistic projection of future development for comparison with the Proposed General Plan.
- *Neighborhood Centers Alternative.* The Neighborhood Centers Alternative focuses all new growth into mixed use centers accessible from each neighborhood within Santa Rosa. This alternative contains less population and employment growth than the Proposed General Plan, which also results in less traffic congestion, public services and infrastructure demand, and exposure to natural hazards.
- *Downtown and Corridors Alternative.* The Downtown and Corridors Alternative focuses on reuse and intensification of the Downtown area and arterial corridors radiating outward. This alternative contains less urbanized land area within the UGB, and therefore less open space conversion, wildlife habitat loss, and stormwater runoff than the Proposed General Plan.

Table 6.4-10: Comparison of Alternatives

Impact of Proposed General Plan		Proposed General Plan*	Relative Impact Compared to Proposed General Plan		
			No Project	Neighborhood Centers	Downtown and Corridors
4.16-C	New development patterns may increase use of energy sources for transportation between activity centers.	LTS	More	Less	More
4.17-A	Development on land impacted by underground storage tanks may expose residents or workers to hazardous materials or wastes.	LTS	N/a	Less	More
4.17-B	Business and industrial expansion may increase the volume of hazardous materials and wastes used and generated in Santa Rosa, potentially adjacent to sensitive uses.	LTS	More	Less	More

* S = Significant, PS = Potentially Significant, LTS = Less than Significant, N/a = No Impact

6.5 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

CEQA requires identification of an environmentally superior alternative. The Neighborhood Centers Alternative is the environmentally superior alternative because lower population and employment growth, coupled with implementation of mitigation measures, would lessen a majority of the potential adverse impacts, as shown in Table 6.4-10. A total of 30 of the environmental impacts applicable to the Proposed General Plan can be reduced through the Neighborhood Centers Alternative. However, the magnitude of difference between the environmental impacts of the Proposed General Plan and the environmentally superior alternative (Neighborhood Centers Alternative) is negligible within the context of a program EIR.

The Proposed General Plan was selected because it meets a majority of the Guiding Principles developed by the General Plan PMT. These principles were developed to focus policy development, and guide distribution of land uses. The Proposed General Plan would have the following benefits that the other alternatives lack:

- Employment growth balanced with housing availability;
- Improved pedestrian, bicycle, and transit linkages;
- Reuse and intensification of Downtown;
- Protection of natural assets along creeks and scenic roads;
- Development of high density residential and mixed uses;
- Expansion of youth programs and facilities;
- Increased neighborhood park facilities;
- Economic development; and
- Expansion of art and culture.

population, housing, and job growth that cannot be accommodated by the existing land use maps would not meet basic project objectives. Any such alternatives are not considered in this EIR.

In addition, alternatives that would accommodate population, housing, and job growth that were greater than the No Project Alternative, but less than the proposed project were considered. These alternatives, however, were also eliminated from further consideration in the EIR for several reasons. First, they would not meet the project objectives as noted above. Second they would not provide any meaningful impact analysis that would distinguish them from the No Project Alternative, since both the No Project Alternative and the proposed project would allow essentially the same level of land use and development. The third reason has to do with the fact that Sonoma County policies favor city-centered growth. Since most future growth is planned within the cities where the County has no jurisdiction, the relatively limited unincorporated area growth would not provide the opportunity to evaluate meaningful differences in the level of development.

The project objectives and alternatives include changes to policies that are within the scope of the issues listed in the General Plan Update work plan. This work plan identified those issues that were identified by the Board of Supervisors for updating and reconsideration in the General Plan Update following extensive community meetings and public input. Issues not included in this work plan were determined to be satisfactorily addressed in the existing *General Plan*. Therefore, any alternatives that would be based upon policy issues that are outside of the scope of the General Plan Update are not considered in this EIR.

An alternative was initially considered that would analyze the impacts of no new development within the unincorporated portion of the county. A "no development" alternative is commonly included in EIRs for proposed development projects because it facilitates a comparison between the project impacts and the impacts if no project is constructed. In the case of a General Plan EIR, however, the project encompasses the sum of all land use and development that may occur in the entire county (and to some extent, the cities within the county). An alternative that assumes no future development in the county, cities, and neighboring counties is extremely unlikely and unrealistic. Moreover it would not provide any meaningful impact comparison for decision-makers. In any case, the environmental setting section of the EIR describes the same environmental conditions as a "no development" alternative would describe. Therefore, this alternative is not analyzed separately in this EIR.

5.6 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The State CEQA Guidelines require that an EIR's analysis of alternatives identify the "environmentally superior alternative" among all of those considered. Based on a comparison of impacts discussed above and in **Exhibit 5.0-2**, the No Project Alternative and the Buildout Alternatives would result in more severe impacts than the *Draft GP 2020*. The No Project Alternative does not have the benefit of the goals, policies, and programs contained in the *Draft GP 2020*. The increased level of development that would occur under the Buildout Alternative would result in more significant impacts compared to the *Draft GP 2020*. The Mitigated Alternative would include additional policies and programs that would result in fewer significant impacts than the *Draft GP 2020* and therefore would be the environmentally superior alternative. The Mitigated Alternative would have significantly more highway improvements than the *Draft GP 2020*, resulting in less congestion than the other alternatives. However, these improvements may result in additional secondary impacts. The Mitigated Alternative would result in less agricultural cultivation and associated facilities such as agricultural processing and support and agricultural tourism uses than would the *Draft GP 2020*. The reduced agricultural cultivation would result in fewer significant impacts compared to the *Draft GP 2020*.

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Ryder Companies
1425 Treat Boulevard
Walnut Creek, CA 94597
(925) 937-4373
(925) 935-9195-Fax
www.ryderhomes.com

31 October 2006

Ms. Pamela Tuft
City of Petaluma
27 Howard Street
Petaluma, CA 94952-2610

SUBJECT: Brody Ranch
360 Corona Road
APN 137-061-042

111

Dear Ms. Tuft,

This letter is in response to the City's Draft Environmental Impact Report dated September 2006 that has been issued for the Petaluma General Plan 2025. More specifically, we are objecting to the inclusion of parcel 137-061-042 (" the Brody Ranch") within the 100-year Flood Boundary as defined in Figure 3.6-3 of the Draft EIR.

On a historical note, the Brody Ranch is part of the Corona-Ely Specific Plan. The planning for the Corona Ely Specific Plan area incorporated a hydrology study for the entire specific area. Based on this hydrology study, Corona Creek was channelized as part of the improvements that were constructed. This channelization of Corona Creek included the installation of three 72-inch pipes under the Northwest Pacific Railroad crossing at the southwest corner of the subject property to improve the flow through this area.

These improvements to Corona Creek increased its capacity to hold not only a 100-year event, but also hold a 500-year event within its banks. A Letter of Map Revision was filed by the City and approved by FEMA. A copy of this LOMR has been supplied to the City on numerous occasions.

After discussions with City staff involving the assumptions made for the XP-SWMM model used for the General Plan, it appears that the model is based on a peak 100-year water flow of 600 cubic feet per second in Corona Creek. This peak water flow assumption is drastically different from the ones used to calculate the original hydrology study and the LOMR approved by FEMA. The peak 100-year flow approved by FEMA was 468 cfs and the 500-year flow was 560 cfs. The City's assumption of 600 cfs is almost 30% higher than those previously used and is even higher than the 500-year peak flow with no real significant changes made to the land use for the Specific Plan area.

Apparently, the assumption of 600 cfs used by the City was generated from updated hydrology information developed by the USACOE for the Petaluma River flood control project. However, we are unaware any detail studies performed specifically for Corona Creek and how this conclusion of 600 cfs was determined.

I have spoken with Alan Brody whose family has owned the Brody Ranch for over 50 years. Mr. Brody states that there has not been any flooding on the subject property since the improvements were made to the creek. He did note that if the three 72-inch pipes are allowed to fill with debris, there has been some water that has backed up during heavy rain falls.

This inclusion of the subject property within the Flood Boundary has a significant impact to any potential entitlement and development of the subject property. We feel strongly that the inclusion of the Brody Ranch within the Flood Boundary is based an erroneous assumptions. I want to thank you in advance for your attention to this matter and look forward to working with you on a solution to this problem. If you have any further questions, please do not hesitate to call me at (925) 274-3003.

Sincerely,

J. David Bradley
Vice President

Cc: Dean Eckerson

PWA
PHILIP WILLIAMS & Associates, Ltd
ENVIRONMENTAL HYDROLOGY
720 California St., Suite 600
San Francisco, California 94108-2404
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www.pwa-ltd.com

October 31, 2006

Pamela Tuft, Director
General Plan 2025
City of Petaluma
27 Howard Street
Petaluma, CA 94952

112

Dear Ms. Tuft:

I am deeply disturbed by the flood management direction outlined in the City of Petaluma's Draft General Plan for which this DEIR has been prepared. The City is poised to embark on a flood management strategy for the Upper Petaluma River that is directly counter to what we believe is the City's greatest flood management asset: the continued function of Denman Flat as a flood detention area. What the City's consultants do not appear to appreciate is the critical role played by the existing channel configuration in the function of this detention area.

Nearly 15 years ago, I took over a project for my engineering firm that had been well underway for more than two years. We were charged with developing a flood management concept for the Upper Petaluma River and Willow Brook. The most promising of the alternatives we had developed, and the alternative that we and the City had identified for further development, was a terraced channel option. Does this sound familiar? It was an approach that we had implemented successfully elsewhere, and it offered great potential for restoring a riparian corridor and enhancing public access, as well as taking much of the City out of the 100-year floodplain. The concept had been outlined in a report to the City.

However, following up on a question posed by a community member at a public meeting, I went back and took a look at the basis for our understanding of the hydrologic function of the Denman Flats storage area. When I reviewed the Sonoma County Water Agency files containing this information, I found that storage in Denman Flat was understood to be a function of downstream stage, or water level, in the Petaluma River. In other words, actions to reduce flood hazards in the Petaluma downstream of Denman Flat by reducing river stage would reduce or eliminate the detention effect and therefore could be expected, paradoxically, to worsen flood hazards. I was dismayed by this revelation, as the flood project we had developed for the City of Petaluma proposed to do exactly that -- reduce flood hazards by excavating terraces in the river channel, thereby lowering the stage. We had already ruled out the possibility of putting a weir or dam at the downstream end of Denman Flat, due to environmental concerns, leaving no opportunity to salvage the project approach by "maintaining" flood stages with a dam across the Petaluma River at the upstream end of the project reach, and downstream of Denman Flat.

I informed the City of the disturbing information that had come to light, and our initial concept for flood management on the Petaluma River was shelved.

But not.

Now reading the City's General Plan DEIR, I see that this terraced channel concept is again being presented as a solution to the flooding problems in the Upper Petaluma watershed. I have not had an opportunity to read the background documents on the flood analysis or flood proposal, but it appears on the basis of the text in the main document that the terraced channel proposal is presented without consideration of effects on Denman Flat storage function. If so, I emphatically urge the City to immediately put the terraced Petaluma River component of the General Plan on hold until this facet of its operation can be thoroughly explored. At risk is the City's future. Reduction in detention may cause flood flows that overwhelm flood protection provided by the City's new flood project downstream. Loss of flood detention at Denman Flat would also aggravate existing flood hazards in the reach upstream of Lynch Creek, upstream of the federal flood protection project. Petaluma cannot afford to be so cavalier in planning its flood management future, and this DEIR cannot be considered adequate without a full exploration and consideration of this issue.

Thank you for your attention to this critical issue.

Sincerely,

Elizabeth S. Andrews

Elizabeth S. Andrews, PE
Principal

also requested revisions to two figures in the Draft General Plan 2025. While it appears that one of the figures is no longer included in the current Draft General Plan 2025 (dated July 2006), the document continues to include figures incorrectly showing a river or creek on the site. The biological report determined there is no river or creek on the site; therefore, all figures, as appropriate, should be revised to not depict a river or creek on the site.[2]

The revisions requested in those letters were also presented to the Planning Commission by Mr. Steve Arago of Kimley-Horn & Associates, our client's representative, at the September 26, 2006 hearing on the Draft General Plan 2025 Draft Environmental Impact Report ("EIR").

We are extremely concerned that despite the numerous requests, to date the requested revisions discussed above have not been made. As we understood that City staff does not object to the revisions, we are uncertain why the Draft General Plan 2025 has not been revised as requested. In addition, we feel there are significant issues raised by moving forward with the Draft General Plan 2025 that does not incorporated the requested revisions. First and foremost, there are potential issues with satisfying the California Environmental Quality Act ("CEQA"). The Draft EIR for the Draft General Plan 2025 has been circulated to the public for review and comment. Because the above revisions have not been made, the Draft EIR analyzes a Draft General Plan 2025 that includes incorrect figures, and itself includes some of the unrevised figures, resulting in incorrect information having been provided to the public for review and comment. Such dissemination of incorrect information is clearly contrary to the intent and purpose of the public review requirements of CEQA. Given the hard work City staff has dedicated towards the General Plan 2025, including the preparation of the Draft EIR, we are sure that the City and staff do not want to proceed with finalizing an EIR that fails to present the public with accurate information.

A

Moreover, the Draft EIR analyzes the inaccurate land use designation of "mixed use" for the proposed Project site, which continues to be reflected in both the Draft General Plan 2025 and Draft EIR "Land Use Map" figures. Such a designation is inconsistent with the pending Project application, which designates the site as "community commercial." In addition, we understand that a "community commercial" land use designation for the site is consistent with the City's vision for future development at this location. (As noted in the March 18, 2005 letter, the Project's development plans were prepared in response to the City-sponsored "Retail Leakage and Strategy Study," which concluded the City is experiencing significant leakage of "comparative" shopping and entertainment dollars.)

Given that the City is still in the Draft EIR stage, revising the Draft General Plan

[2] Specifically, Figures 1-3, 1-4, 2-1, 3-2, 5-2, 5-3, 5-5, 6-1, 7-1, and 10-1 in the Draft General Plan 2025 should be revised, as well as their corresponding figures in the Draft EIR, if included.

STEEFEL, LEVITT & WEISS
A Professional Corporation

October 12, 2006

18826

VIA EMAIL

Mike Bierman
City Manager

Pamela Tuft
Director, General Plan Administration

City of Petaluma
27 Howard Street
Petaluma, CA 94952

113

Re: **Draft General Plan 2025 Revisions Related To Deer Creek Plaza Project Site**

Dear Mr. Bierman and Ms. Tuft:

We are submitting this letter on behalf of our client, DSL Service Company, the owner of the proposed Deer Creek Plaza Project ("Project"), to express our concerns regarding requested revisions to the City of Petaluma General Plan 2025 currently being prepared. As detailed below, our client's representatives have discussed limited revisions to the Draft General Plan 2025 with City of Petaluma ("City") staff on numerous occasions, and have also testified at public hearings on the Draft General Plan 2025 regarding these necessary revisions. It is our understanding that City staff has not expressed any issues with making the revisions, yet to date the revisions have not been made. We therefore submit this letter to again request that the revisions be made at the earliest possible time, certainly before issuance of the Final Environmental Impact Report for the Draft General Plan 2025.

As you are aware, an application for the proposed Project was filed with the City in March 2004. On March 18, 2005 and January 25, 2006, CSW/Stuber-Stroeh Engineering Group, Inc., submitted letters to you on behalf of our client requesting that the land use designation of "mixed-use" shown on the "Draft Preferred Plan" of Draft General Plan 2025 be revised to "community commercial" to reflect the pending application.[1] The January 2006 letter

[1] The land use map is currently included in the Draft General Plan 2025 (dated July 2006) as Figure 2-1, and in the Draft Environmental Impact Report for the Draft General Plan 2025 as Figure 2.4-1. Both figures need to be revised.

2025 at this time is critical. There is ample opportunity to make the revisions to the Draft General Plan 2025, and ensure that all underlying analyses in the Draft EIR are consistent with the revised document. Failing to revise the Draft General Plan 2025 at this time would result in a Final EIR being presented to the City Council for certification which, as with the Draft EIR, would be inaccurate. In addition to the concerns stated above regarding dissemination of incorrect information to the public, moving forward with certification of the Final EIR without revising the Draft General Plan 2025 first could result in delays down the road.

In light of the above, we again request that per our prior multiple requests, the appropriate revisions be made to the Draft General Plan 2025 and incorporated into the Final EIR at the earliest possible time.

Please feel free to contact me at (415) 403-3344 if you would like to discuss further.

Sincerely,

Judy Davidoff /mm

Judy V. Davidoff

cc: Mayor and Members of the City Council
Chair and Members of the Planning Commission
Mike Moore, Director of Community Development
George White, Planning Manager
Eric W. Danly, City Attorney
David Casty, DSL Service Company
Steve Arago, Kimley-Horn & Associates

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Steefel
STEEFEL, LEVITT & WEISS
A Professional Corporation

October 30, 2006

18826

Via Email and Regular Mail

Chair Will Dargie
And Members of the Planning Commission
City of Petaluma
27 Howard Street
Petaluma, CA 94952

Re: **November 14, 2006 Planning Commission hearing regarding Draft General Plan 2025**

Dear Chair Dargie and Members of the Planning Commission:

We are submitting this letter on behalf of our client, DSL Service Company, the applicant for the proposed Deer Creek Plaza Project ("Project"), regarding the revisions to the City of Petaluma ("City") Draft General Plan 2025. The Planning Commission hearing regarding the Draft General Plan 2025 was continued on October 24, 2006, to November 14, 2006. It is our understanding that on November 14th, the Planning Commission will consider requests for specific land use designations amendments for various sites, including the Project site.

Our client has requested multiple times that the land use designation of "Mixed Use" shown for the Project site on the "Draft Preferred Plan" of Draft General Plan 2025 be revised to "Community Commercial" to reflect the application submitted for the Project in March 2004 and the appropriate use of the site. (See our prior letter dated October 12, 2006.) In light of our requests, and our many discussions with the City regarding the appropriateness of the "Community Commercial" designation for this site, we are very concerned about the recommendation in the Planning Commission staff report that the Project site be designated as "Regional Commercial," a designation that does not exist in the current General Plan or the Draft General Plan 2025 (and therefore has not been analyzed in the Draft General Plan 2025 Draft Environmental Impact Report). We again request that the Project site's land use designation be revised to "Community Commercial."

As discussed previously with City staff, the "Community Commercial" designation for the Project is clearly the most appropriate existing land use designation for the proposed Project. Both the existing General Plan and the Draft General Plan 2025 already include a "Community Commercial" land use designation. Per the current City General Plan, "Community Commercial" is the designation for larger shopping centers and the City's central

shopping district that have a variety and depth of goods and services usually not available in neighborhood shopping areas. (Current General Plan, Revised 9/91, p. 35.) Under the Draft General Plan 2025, the "Community Commercial" designation allows for uses such as shopping centers and commercial districts, including regionally-oriented centers. The designation permits up to a 1.2 floor area ratio ("FAR"). (Draft General Plan 2025, p. 2-4.)

The Project is exactly the type of use and intensity envisioned for the "Community Commercial" designation under both the existing General Plan and the Draft General Plan 2025. The "Community Commercial" designation therefore remains the appropriate designation for the Project site. B

That the Project squarely fits within the "Community Commercial" designation is demonstrated by references to industry standards. For example, the International Council of Shopping Centers ("ICSC"), the global trade association of the shopping center industry, describes a "Community Center" (different nomenclature for "Community Commercial") as having 100,000 to 350,000 square feet of space on 10-40 acres, with 2 or more anchors, which is consistent with the Project proposal. Further, "Community Centers" typically offer a wider range of apparel and other soft goods than neighborhood centers. The more common anchors include supermarkets, super drugstores, and discount department stores, and tenants may contain value-oriented big-box retailers such as home improvement stores – the types of anchors/tenants envisioned for the Project.[1]

The City has indicated that it will consider designating the Project site as "Regional Commercial" in the Draft General Plan 2025. The Draft General Plan 2025 does not include such a land use designation, however. The existing General Plan also does not include a "Regional Commercial" land use designation. The City therefore would have to create a new land use designation in order to designate the Project site as "Regional Commercial." We strongly question the appropriateness of creating a new designation at this time given the Draft General Plan 2025 and its related Draft Environmental Impact Report have already been circulated for public review and comment.

Further, the Project would not be truly consistent with a "Regional Commercial" land use designation. Typically, the purpose of a "Regional Commercial" designation is to provide for commercial developments dominated by several large anchors stores with a minimum amount of small specialty tenants, and total development of up to 600,000 square feet. The proposed Project clearly does not fit this definition.

[1] ICSC classifies shopping centers by categories such as size, number of anchors, merchandise orientation, and trade area. It notes that as a general rule, however, the main determinants in classifying a center are its merchandise orientation (types of goods/services sold) and its size. ("ICSC Shopping Center Definitions: Basic Configurations and Types for the United States," www.icsc.org)

Finally, the "Regional Commercial" land use designation does not appear necessary given the "Community Commercial" designation under the Draft General Plan 2025 includes "regionally-oriented centers." The types of uses that would fall within a "Regional Commercial" designation therefore are already covered by the "Community Commercial" designation.

Per our letter dated October 12, 2006, because the City is still in the Draft EIR stage, revising the Draft General Plan 2025 at this time to reflect a "Community Commercial" designation for the site is critical.

We therefore respectfully request that on November 14th, the Planning Commission approve revising the Draft General Plan 2025 to reflect the "Community Commercial" land use designation for the Project site, as well as the other changes requested in our October 12, 2006, letter to Ms. Tuft and Mr. Bierman. Thank you for your consideration.

Sincerely,

Judy V. Davidoff

cc: (Via Email)

Mayor and Members of the City Council
Mike Bierman, City Manager
Mike Moore, Director of Community Development
Pamela Tuft, Director, General Plan Administration
George White, Planning Manager
Eric W. Danly, City Attorney
David Casty, DSL Service Company
Steve Arago, Kimley-Horn & Associates

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October 29, 2006

Pamela Tuft
Director, General Plan
City of Petaluma

Re: Environmental Impact and Policy Comments to "City of Petaluma, Draft General Plan 2025" July 2006

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Dear Pamela:

The Draft General Plan is the detailed result of an extraordinary effort and that is appreciated. Many aspects of it are particularly progressive, innovative and comprehensive in providing laudable goals for the Petaluma community, of which we consider ourselves and our proposed project as an important component. While nearly all of the Draft General Plan document is well presented, there are a few critical elements that require our comment and input. We respectfully request revising elements of these few provisions based on this input. Otherwise, keeping these provisions as currently drafted would potentially undermine both our proposed project and the ability of the City to reach its goals. As you are aware, our project is proposed for the former Kenilworth Junior High School site.

We have had an application in to the City since December 2004 after revisions in response to a SPARC review in August of 2004. It has been 2 ½ years since we purchased the land at the City's request. Using the financial proceeds of the sale, the new desperately needed replacement of Kenilworth Junior High School was completed and has been open for over a year. It is fair and important to remember the relocation and highly efficient, state of the art replacement of that school could not have happened without Regency's timely acquisition of that property. Furthermore, the City could not have had the opportunity to achieve its goal to incorporate these formerly public lands into its overall plans to relocate the school, resolve retail leakage, and create a strong addition to the redevelopment tax base, all critical to the City's goals, without Regency's good faith acquisition of the property. This critical financial leap was done at the express request of the City to meet this pressing need. Our acquisition of the property was done with the best intentions with the objective of creating a project that both meets the needs of the community as well as provides our publicly held company an acceptable economic return on this investment.

For the record, throughout the protracted land use approval process for our project, we have provided extensions to use of the school facility, we have allowed and encouraged use of our private lands by local youth sports under license agreements, all free of charge. We have endeavored to meet the requests of the City at every turn.

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Walnut Creek, California 94597
Office: 925.279.1800 • Toll Free: 800.797.7348 • Fax: 925.935.5902
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While several elements of the Draft General Plan will have economic impacts to our project, we have pared our comments to just a few key areas recognizing and balancing the community goals with our economic realities. We submit the following and request you amend the referenced sections:

Section 2, Land Use, Growth Management, & the Built Environment

Comment 1: A

Page 2-7: Mixed-Use designation/Washington Core.
The designation of mixed-use in the Washington corridor area has merit and our application to the City includes both housing and retail. However, the GP designation should allow, but not require, the potential for an all retail development along the portion of the former Kenilworth Jr. High School site with Highway 101 frontage. This flexibility may prove important if it is determined that City planning standards, City economic goals, or demand for regional retail indicate that an all retail development along the highway frontage would be the best use of that land as a regionally serving location. To achieve the City's mixed-use goal for the Washington core in this context, the GP should provide for a mixture of uses created within the broader overall mixed-use zone extending beyond the former Kenilworth school parcel. This could include, for example, the development of housing and/or office and civic uses farther to the west, and prospective redevelopment of the Fairgrounds.

Section 3, Community Design, Character, and Sustainable Building

Comment 2: B

Page 3-27. 3.3 Sustainable Building: 3-P-103.
The GP states: "Require development on sites greater than ¼ acre in size to demonstrate no not increase in peak-day storm water run-off." "Peak-day" is not defined in the Glossary. This is a laudable goal and needs to be encouraged but needs to be set to a reasonable standard balanced to an economically practical and sustainable level. "No net increase" is a standard that is impossible to meet. This provision should be similar to the proposed standards cited in 3-P-105 for green building principles, "to the extent practical and financially feasible."

Section 4, The Natural Environment

Comment 3: C

Page 4-12 Air Quality 4-P-7.
The GP states: "Require planting of trees at a ratio of five (24" box or larger) for every significant tree removed at a project site". This arbitrary standard may prove excessive depending upon the particular site and the presence of existing trees. There is no standard for the condition or desirability of the existing trees. As drafted, the proposed requirement does not provide SPARC and other City decision-makers the discretion needed to evaluate an individual setting or project and make appropriate site-specific determinations. The requirement of 24" or larger box trees again could be over- or under-

inclusive, and the City should have the flexibility to more narrowly tailor its decisions. (This same standard and objection applies to 6-P-19 page 6-17)

Section 6, Recreation, Music, Parks, & the Arts

Comment 4: D
Page 6-5 Table 6.1-2: Community Parks (Existing and Proposed).
Existing Parks: Map Code 7 "Kenilworth" at 3 acres. Presumably this is a reference to the City-owned public pool parcel. Please clarify, if this is a reference to the turf fields that are located on the former Kenilworth Jr. High School site, that such lands are private lands being utilized by local organized youth groups with permission, free of charge, under revocable license from the property owner. These Kenilworth fields are not public parks.

Comment 5:
Page 6-7, Table 6.1-3 (and Table 6.1-8) Neighborhood Parks (Existing and Proposed).
P-11 suggests creating 2 acres of Park at the former Kenilworth Site. This would not be appropriate or consistent with City goals. The optimal use for this property for the owner and to reconcile the City retail leakage is for regional commercial at this site as identified by the Thomas Study. It is not the best use of this land to create parks on this property. The property is proposed for retail uses better suited to its location and the City's needs E
and goals. It is not in the best interest of this potential development, the City's stated goal of achieving no less than 300,000 square feet of retail at this community and regional serving location, and already identified superior alternatives for community parks. This proposed policy would be in violation of the Quimby Act, and no nexus has been established to require the development of two parks for a commercial retail project, or to explain how such a requirement would be roughly proportional to the proposed development.

Section 8, Water Resources

Comment 6:
Goal 8-G-5: Water Conservation Policies and Programs:
An additional policy and program should be added that will be of tremendous value to the City water conservation program. It would provide instant quantifiable reductions in water use, reduction in related public costs for maintenance of facilities currently using water and increase the effective use of public recreational facilities. This policy would facilitate replacing public turf fields with synthetic fields where appropriate.
Development could sponsor these programs, water would be conserved, costs would be F
reduced, and the public would have the benefit of more usable facilities. Costs for these changes could be off-set from additional fees otherwise paid for other water conservation methods. We recognize Water Resources has stated that they need a method to determine which project would be allowed which opportunity for water conservation. Nevertheless, the positive results would be immediately effective and the benefits would serve the community with particular emphasis on extending playing time for already limited youth

sports facilities. This may be particularly appropriate and effective for the City's west side, where the recycled water program is not as yet available.

After you have reviewed these comments, please do not hesitate to contact me if you would like more information about our recommendations or would like to discuss them further.

Sincerely,

Bruce Qualls
Regency Centers
Vice President, Investments

Duiven, Scott

From: Spaulding, Craig
Sent: Tuesday, November 14, 2006 8:30 AM
To: Duiven, Scott
Subject: FW: Flooding concerns: comments for Petaluma General Plan and DEIR

From: Jensen, Deanna **On Behalf Of** CDD
Sent: Tuesday, November 14, 2006 7:45 AM
To: - Community Development
Subject: FW: Flooding concerns: comments for Petaluma General Plan and DEIR

From: David Keller [mailto:dkeller1@sonic.net]
Sent: Monday, November 13, 2006 11:23 AM
To: Tuft, Pamela; CityCouncil; CDD; Bierman, Mike
Cc: Moore, Mike; Eric Danly
Subject: Flooding concerns: comments for Petaluma General Plan and DEIR

From: David Keller
Petaluma River Council
1327 I St.
Petaluma, CA 94952

To: Pamela Tuft
General Plan Administrator
City of Petaluma
11 English St.
Petaluma, CA 94952

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Re: Draft General Plan and General Plan DEIR

Dear Pamela Tuft:

The comments submitted earlier by email on Nov. 12 addressed to Chris Samson (Argus Courier) and Pete Golis (Press Democrat) cc: City Council, Planning Commission, and your office, about flood management are hereby submitted, as modified below, as comments on the DEIR and the General Plan.

I am very concerned that the DEIR and the General Plan have gotten a significant part of flood management and protection for life and property dead wrong.
The plans to channelize and terrace Willow Brook and the upper Petaluma River (Corona and Willow Brook reaches) will cause tremendous future losses to residents, businesses and property.

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The proposed terracing and channelization of tributary streams and the Willow Brook and Corona reach

of the upper Petaluma River basin (above the flood project weir) will dangerously reduce floodwater storage by draining the Denman Flats and Willow Brook floodplain overflow areas. This will increase the amount and height of water flowing downstream, leading to an extremely high risk of increased flooding downstream. It will increase the risk of overtopping the weir and flood walls in the Payran Reach, and increase flooding risks downtown. There is only so much water that can be carried within the river's banks and the flood project; the rest will always and repeatedly overflow its banks. Our responsibility as a community is to reduce flooding risks, not increase it. B

The Corps of Engineers and FEMA have warned explicitly against building the proposed terracing and channelization, as has Phil Williams Associates. They warned us of the downstream impacts. The proposal for terracing and channelization is a huge mistake, and must be removed from the new draft General Plan and flood management planning strategies. Upstream channelization is not accomodated in the flood project's design, nor is upstream basin development beyond what was anticipated in the 1987 General Plan. Questions? The City has copies of the relevant letters sent to you, to Mayor Hilligoss and the City Council from FEMA, as well as the 10/31/06 letter from Elizabeth Andrews at PWA, and the conclusions and design assumptions of the Corps of Engineers Final EIS for the Petaluma Flood Control Project. C

It's time to be smart, reduce unnecessary risks to residents and businesses, and stop all building in the floodplain, unless we agree that we are willing to have these buildings flood .

According to modeling by Phil Williams Associates in the FEIR for the Chelsea Outlet Village expansion project, and which was accepted by both the city engineering staff and the project proponent, the floodplain "1% storm" Base Flood Elevations in Petaluma have increased 1-4 feet in the past 20 years, and the areal extent of the floodplain has also increased dramatically. Yet this is not represented in the modeling and mapping presented in the DEIR. D

All the upper River basin floodplain storage must be increased and protected - not drained as proposed in the General Plan and its DEIR - and existing buildings removed or floodproofed. New development in the floodplain is a disaster that WILL happen again and again, unless we chose to stop this self-destructive behavior. E

Every engineering prediction for flood levels in Petaluma since 1965 has been understated and wrong. The modeling for the General Plan and DEIR apparently continues in that sad tradition. The only exception was the peer reviewed hydrology modeling done by PWA for the Outlet Mall expansion (included in the Final EIR for the Chelsea project), which showed that the upper Petaluma River flood levels have increased 3-4 feet. The Outlet Mall flooded as predicted in 2005 as well as in 1998, yet the city has still not changed any requirements for building in flood-prone areas other than a temporary moratorium, while letting projects already in the permitting process to proceed to completion, including the Redwood Tech Center. F

The General Plan and DEIR do not indicate whether the current modeling includes data from the Feb. 1998 storm events in its calibration, and how the model would account for and predict the flooding levels of that storm. It is not stated in the DEIR what the December 2005 storm recurrance levels were assumed to be. If there was a modeling run and mapping done to comport with the storm data, it should be presented to the public for review. G

For these and other reasons explained below, the validity and accuracy of the modeling presented in the DEIR is not assured.

Apparently, the City and its consultants have failed to include in its storm water modeling runs the H

imminent reality of additional channel and drainage work for Marin Creek and other tributary streams, as currently planned by Zone 2A, SCWA. The Zone 2A Marin-Wilson-Wiggin Creeks Restoration Project, with SSCRCD as contractor to perform the work, was approved by Zone 2A in July 2004. Yet the changes in flows, peaks and water storage in Denman Flats have not been accounted for in the City's modeling, even though apparently staff has known of this project for some time. The DEIR has neglected to include this for the modeling runs used to determine buildout impacts in the DEIR and General Plan. This expected reduction of Denman Flats and tributary streams' storm water storage and change of flows is critical to determining the validity and consistency of the General Plan and the impacts of buildout as predicted in the DEIR. In part, the Zone 2A Restoration Project is designed to alleviate increased flooding, sedimentation and creek flows due to construction in recent years (including Victoria subdivision) within the City's jurisdiction, where predicted runoff and downstream impacts were understated by the City and project engineers, and the promised limitations on downstream flows and sedimentation have not been complied with: the project mitigations have not worked, as is commonly the case.

The consequence of this planned and soon-to-be-implemented creek maintenance, designed to reduce localized flooding in those creeks as a result of city-authorized projects upstream, will be to shift flood waters downstream. It is exactly this kind of sub-basin by sub-basin work not being included in the overall modeling, as well as failure for project mitigations to achieve their promised objectives, which is the hallmark of a failed integrated flood management program, yet which the DEIR claims to have achieved for the buildout period of the General Plan. This again undercuts the validity of the storm water modeling and the DEIR.

We must also implement a basin-wide (city and county) requirement for zero-net increment in stormwater runoff: if you develop a property, you may not discharge any more storm water runoff from the site than existed in pre-development conditions, both in volume and timing. All development should be modeled for this as part of project applications in GIS and parcel-specific based modeling as many other cities do. The proposed detention and retention basins are not sufficient to make up for floodplain storage already lost, no less for new development. I

While clearing obstructions from streams to allow passage of flood flows, the City and SCWA must also allow for stream-side growth and habitat improvements which will provide shade needed to keep streams cool, clean and abundent, and provide necessary riparian corridors for our recovering steelhead, salmon and wildlife. There are well proven techniques for doing this to serve both flood management and habitat needs, rather than stripping creeks of their trees, as has been done several times in error to Adobe Creek and other streams. Let's also not assume that there is a practical way to clean out sediment, debris and rocks that flow downstream during significant storms when maintenance crews are already overtaxed, and allow for some local flooding. We must keep development back from streams and floodplains with well enforced buffer zones. J

The DEIR and the General Plan must indicate what programs and policies will be used to bring tributaries and the Petaluma River into equilibrium conditions over the next 20 years, in order to reduce future unexpected flood losses and physical and economic damages, as well as reduce future maintenance operations, damages to the environment (water quality, riparian corridors, spawning and rearing habitat) and costs. Currently, this is ignored in the General Plan and DEIR, yet represent significant adverse, current and cumulative impacts if not accomplished. K

The county has still NOT required or implemented even the minimal zero-net fill requirements in designated floodplains under their jurisdition, despite explicit repeated requests to Supervisor Kerns and the county since the 1998 floods. This must change now, not wait for the new county General Plan, along with requiring the removal of massive unpermitted fill at the old Adobe Lumber site, the Auction L

Yard, and along Stony Point Road.

The XP-SWMM model must be re-run to include this information, and the DEIR re-written, re-released and recirculated to allow the public and interested agencies to provide meaningful comments on this data and predicted flood levels and floodplain extent and the alternatives. The modeling runs must also show alternative scenarios, such as continued losses or increases of Denman Flats storage capacity (as well as the programs to ensure that would happen), with or without channelization and terracing, as well as the results of a policy of Zero-net increment in stormwater runoff on a parcel-by-parcel basis, implementation of Zero-net fill in county jurisdictions, and the use of existing floodplains for storage and overflows, with or without future development upstream and/or in the Corona Reach. The impacts of the fill required for the proposed Rainier Interchange and Crosstown Connector must also be shown in a model run as well as any future development that is induced or facilitated by such a massive roadway project. M

The mapping for the model runs should also demonstrate the difference between current conditions and those expected at the end of the General Plan's lifespan. This was done in the Corps of Engineers Petaluma Flood Control Project FEIR, and has proven to be a very valuable tool as the city, the county and the public chose how best to preserve the protective capacity of the flood project through informed choices about preventing upstream development. Unfortunately, that information and lesson is ignored in the current General Plan and DEIR. N

Awaiting the FEIR for any such corrections of erroneous data of this magnitude would deprive the interested public and property owners and agencies of a chance to provide meaningful comments on such critical information. The extent of predicted flood levels and flood plain coverate goes to the heart of the nature of a General Plan, and failure to have accurate and valid information within the Plan and DEIR at this stage makes the entire General Plan and DEIR's assumptions about future land use invalid. O

A Corps of Engineers flood project manager warned the City Council in 1998 that the city and county have to make up for past mistakes in floodplain management, no less keep from making new mistakes. We are not yet doing this, and the new draft General Plan gets this direction dead wrong. A permanent moratorium for new construction in the floodplains is a start, as is preserving the existing flood storage capacity of Denman Flats and the Willow Brook overflow areas. Failure to implement an aggressive, long term integrated floodplain management strategy will lead to the inevitable: many more millions of dollars in future losses, and eventual loss of life. Petaluma can and must do better. P

- David Keller

From:
David Keller
Bay Area Director
Friends of the Eel River
1327 I St.
Petaluma, CA 94952

To:
Mike Bierman, Petaluma City Manager
Pamela Tuft, General Plan Director
Eric Danley, Petaluma City Attorney
City of Petaluma
11 English St.
Petaluma, CA 94952

116

November 15, 2006
by email

Re: Conjoint public hearings for the draft Petaluma General Plan 2025 and the Draft EIR for the General Plan 2025.

Dear Mr. Bierman, Ms. Tuft, and Mr. Danley:

I am troubled by the format and agendas set up for the requisite public hearings on the draft General Plan 2025 ("Plan") and the General Plan 2025 DEIR ("DEIR").

These conjoint hearings are being held now concurrently at both the City Council and the Planning Commission, as well as at the other commissions and committees of the city (SPARC, Parks Commission, Pedestrian and Bicycle Advisory Committee, Airport Commission, Public Arts Commission, etc). The current format and conduct of the public hearings calls for public comment and agency discussion on both documents. As a result, the comments, discussions and recommendations on the Plan and the DEIR are intermingled so as to be completely unclear to the public and to the council, commission and committee members which document is being commented on or discussed. This is a violation of both CEQA and City of Petaluma Environmental Review Guidelines for public hearings on the DEIR.

A

<u>Current hearing process and agendas frustrate public involvement that is required by CEQA and CEQA Guidelines</u>

As currently being conducted, the nature and format of these DEIR hearings frustrate the underlying purpose of an environmental impact report: informed public participation and decision-making.

The purpose of an EIR, in meeting the objectives of CEQA, is "to identify the significant

1

effects on the environment of a project, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided." Public Resources Code s. 21001.1(a). The use of EIRs by each "public agency shall mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so." Pub. Res. Code s. 21002.1(b). Further, the "purpose of an environmental impact report is to provide public agencies and the public in general with detailed information about the effect which a proposed project is likely to have on the environment." Pub. Res. Code s.21061.

The commingling of public review and comments for the Plan and the DEIR, the vagueness of the agendas and minutes, and the inability of the public and decisionmakers to decipher just which document is being commented on, violates one of CEQA's core mandates, such that recirculation and reopening of the properly noticed, agendized and conducted hearings is required. Under the current scheme, it is impossible to know if there is any addition of new information to an EIR, whether it changes the EIR in a "way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect." *Laurel Heights Improvement Association v. Regents of the University of California (1993 - "Laurel Heights II")* and CEQA Guidelines s.15087 and s.15088.

The CEQA Guidelines are very clear about the relationship between hearings and comments received, and the obligations of the Lead Agency to respond:
s.15088 (a) The Lead Agency *shall evaluate comments on environmental issues received from persons* who reviewed the draft EIR and shall prepare a written response.
(b) The written response shall describe the disposition of significant environmental issues raised (e.g., revision to the proposed project to mitigate anticipated impacts or objections). In particular, the major environmental issues raised when the Lead Agency's position is at variance with recommendations and objections raised in the comments must be addressed in detail *giving reasons why specific comments and suggestions were not accepted.* There must be good faith, reasoned analysis in response. Conclusory statements unsupported by factual information will not suffice. [emphasis added]

<u>Process violates Petaluma Environmental Review Guidelines, and fails to identify comments on the DEIR for requisite responses.</u> B

If testimony, comments and alternatives are offered by the public or council and commission members during a conjoint hearing on the Plan and DEIR, where no distinctions have been made clear for the public and members, how are staff and consultants to know which comments are to be responded to in the FEIR according to CEQA standards? Without the commenter knowing which document is under consideration, comments may or may not have been offered to the appropriate document. The staff and EIR consultants would then have to divine within which document and legal process the responses and relevant information should be reside. This involves guess work not anticipated nor allowed under CEQA and under the City's Environmental Review Guidelines. Since responses are not required for consideration of the Plan, but

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B

are required under law for consideration of the DEIR and preparation of the FEIR, there is no guarantee that an effective and predictable response and process will be achieved.

The Petaluma Environmental Review Guidelines states:

12.7.1 Public Hearings.

(c) *all relevant comments received during the public review period on environmental issues shall be addressed in the final EIR*, certified in accordance with Section 13.3.0, prior to taking action on the project.

12.8.0 Consideration of the Draft EIR.

Based on a review of the draft EIR, consideration of related City staff reports, and *any comments received during the public review period*, the decision-making body shall:

(a) consider the adequacy of the draft EIR in disclosing the potential impacts of a project and identifying mitigation measures;

(b) identify any changes, clarifications, or additional information which should be incorporated in the final EIR for certification; and

(c) authorize the Director to initiate and supervise preparation of a final EIR which incorporates these revisions, and *responds to all significant environmental points raised during the public review period.*

13.0.0 FINAL EIR

A final EIR shall be prepared by the Director to be in compliance with local and State requirements and the following provisions:

13.1.0 Response to Comments

The Director or its consultant *shall evaluate all written comments and oral testimony received during the draft EIR public review period and shall prepare a written response to these comments.* The written response shall *describe the deposition of any significant environmental issues raised by the comment.* The written response shall address in detail any EIR finding or recommendation which remains at variance in the final EIR with the objectives or recommendations of the particular comment. *The response to comments must reflect a good faith, reasoned analysis* supported by factual data.

13.2.0 Final EIR Format

The form of the final EIR shall be determined by the Director. The final EIR may take the form of an attachment, text amendment, or addendum to the draft EIR and shall include:

(a) the draft EIR as amended (can be incorporated by reference), along with any errata deemed necessary by the city *in response to comments received* on the draft EIR;

(b) *a list of persons, organizations, and public agencies commenting* on the draft EIR;

(c) *comments, recommendations and other responses received* on the draft EIR, in verbatim and/or summary form;

(d) *response to comments; i.e., the responses of the City or its consultant to significant environmental points raised in the draft EIR review and consultations process;*

If extensive revisions to the draft EIR are necessary *to adequately respond to review period comments*, the final EIR may also take the form of a revised draft EIR, plus

components (b) through (e) listed above, under one final EIR cover.
[emphasis added]

C

Agendas and public notices vague, agenda items commingled and confusing

I made this complaint verbally at the City Council meeting of Oct. 2, 2006, during a meeting that agendized a public hearing on both the General Plan and its DEIR. I expressly noted that there was no clear demarcation for the public to offer testimony on one or the other items (or both); rather, all testimony was lumped together with no focus or clarity about which document was being discussed. I requested that this be clarified and corrected. However, the Council, as well as the Planning Commission and other bodies, have continued to make no distinction in either their discussions or when inviting comments from the public. To date, no correction has been offered in response to my complaint.

Please see the public notice, at
http://www.cityofpetaluma.net/genplan/pdf/workshops0806.pdf and as published as well, which is copied below.
The notice calls for:

DRAFT GENERAL PLAN 2025 – DRAFT EIR
PUBLIC WORKSHOP/HEARING SCHEDULE (updated 11-1-06)
You are invited to attend the following Public Hearings and/or meetings
on the Draft General Plan and Draft Environmental Impact Report (EIR):
Oct 31st End of 45-day comment period on Draft EIR
Nov. 6th Hearing* City Council City Hall 7 PM
Nov. 14th Hearing Planning Commission City Hall 7 PM
Nov. 20th Hearing* City Council City Hall 7 PM
Nov 28th Hearing Planning Commission City Hall 7 PM
Dec. 4th Hearing* City Council City Hall 7 PM
Dec 12th **Hearing Planning Commission City Hall 7 PM
Dec 18th **Hearing* City Council City Hall 7 PM
*City Council scheduled hearings are tentative until confirmed by the City Council.
**These hearings/meetings will be held if needed.
The purpose of these hearings is to discuss and receive public comment on the Draft General Plan 2025 and Draft EIR.
The City's General Plan is a collection of goals, policies, and programs that will guide the development of Petaluma for the next 20 years and beyond. These workshops and hearings are integral in the General Plan adoption process and will give you the opportunity to understand the community's input into the drafting of the documents and participate in the plan that will guide development and ensure the quality of our community for generations to come.
If you would like to purchase or borrow a copy of the Draft General Plan, Draft Environmental Impact Report or the Technical Appendix documents, or have questions, please contact the General Plan Administration Office at 778-4552.
Additional hearings may be scheduled, watch for notices and news articles.

Following conclusion of the Public Hearing process, City staff and the consultant team will prepare the Final
General Plan and Final Environmental Impact Report documents. Public hearings will be held by the
Planning Commission and City Council on these documents before the EIR is certified and the General
Plan is adopted by the City Council.
S:\tuft\newsletters\flyers\Workshop Schedule 1101 updated.doc
City of Petaluma, California
General Plan Administration
27 Howard Street
Petaluma, CA 94952
STAY INVOLVED!
[emphasis added]

The published agendas for subsequent public hearings are equally vague.

See agendas and minutes, for example:
City Council, Nov. 20, 2006,
http://www.cityofpetaluma.net/cclerk/pdf/agenda/councilagenda20061120.pdf
City Council, Nov. 6, 2006,
http://petaluma.granicus.com/AgendaViewer.php?view_id=3&clip_id=316
City Council, Oct. 2, 2006,
http://petaluma.granicus.com/AgendaViewer.php?view_id=3&clip_id=288
Planning Commission, Nov. 14, 2006
http://www.cityofpetaluma.net/cclerk/pdf/planning/plan-agenda2006nov14.pdf ;
Planning Commission, Oct. 24, 2006
http://petaluma.granicus.com/AgendaViewer.php?view_id=5&clip_id=308

As you can see clearly by the language of the public notice, there is no way for the general public to know and understand just what is being considered at any particular "workshop or hearing." Again, this serves to frustrate the underlying purpose of an environmental impact report: informed public participation and decision-making.

Conjoint hearings of Plan and DEIR produce unstable and unclear project definitions

Further, the conjoint hearings mean that the General Plan 2025 document itself is not a stable and clearly defined project, as is required by CEQA, as any modifications to the Plan are not addressed in the DEIR which has already been published. The DEIR is supposed to address environmental impacts of some proposed, stable and clearly defined project as represented in the Plan. Instead, both documents are moving targets, further frustrating the duty of the city of Petaluma to provide for public comments and an informed public and agency decisionmakers. The draft General Plan document should proceed through its hearings to the point where the city deems it a stable document and project, and then the DEIR should be modified as necessary to accommodate any

recommended changes. At that time, the DEIR should go through its proper public hearing process. Otherwise, we are faced with one of two unacceptable positions: either both documents are fixed in place, violating CEQA's mandate that requires hearings and comments during such time as the project and/or its EIR are flexible to respond to new information; Or, both documents are always in a state of flux during the hearings, so that the public doesn't know what the project and its environmental impacts truly are predicted to be.

Conclusion: New public review period and hearing formats required D

The public review, comment periods and public hearings at the Planning Commission and City Council must be restarted with clear notice to the public for meetings explicitly agendized as a public review of the DEIR alone. The General Plan hearings should precede the CEQA hearings, producing a revised draft General Plan as necessary.

The public DEIR meetings must give the public the clear opportunity to provide comments on the DEIR alone, and the agendized discussions must be explicitly limited to items regarding the adequacy of the DEIR, its immediate and cumulative impacts and possible alternatives, and discussions and recommendations on the DEIR. Further, to minimize confusion and maximize clarity and specificity, it is necessary for the public to know explicitly which chapters or specified issues in the DEIR will be heard and discussed at any particular meeting. The content and agenda of every such hearing on the DEIR must clearly be noted in the public notice for each meeting, so the interested public knows which meeting(s) to attend to express their particular interests.

In short, revisions to Petaluma's hearing process for the DEIR are clearly needed.

Sincerely,

David Keller
Bay Area Director,
Friends of the Eel River
1327 I St.
Petaluma, CA 94952

NOTICE OF PREPARATION (NOP)
ENVIRONMENTAL IMPACT REPORT (EIR)
CITY OF PETALUMA GENERAL PLAN UPDATE

Date: August 11, 2004

To: Responsible Agencies, and Interested Parties and Organizations

Subject: Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the City of Petaluma General Plan Update

Project Title: City of Petaluma General Plan Update

Location: City of Petaluma, California

117

The City of Petaluma is preparing a General Plan Update, and has determined that an Environmental Impact Report (EIR) will be necessary pursuant to the California Environmental Quality Act (CEQA). The City of Petaluma requests your input on how the General Plan Update may affect the environment. More specifically, input is being solicited regarding the scope and content of environmental analysis that is relevant to your respective agency's statutory/regulatory responsibilities in order to ascertain potential impacts of the proposed project.

Although specific proposals and revisions for the Petaluma General Plan Update have not yet been determined, we are soliciting your concerns now. This will allow your input to be taken into consideration during formulation of new goals, policies, and programs for the General Plan Update as well as to be addressed in the EIR. A description of the proposed action, location map, and preliminary identification of the potential environmental effects are contained in the attached materials.

If your agency is a responsible agency as defined by Section 15381 of the State CEQA Guidelines, your agency will need to use the environmental documents prepared by the City of Petaluma when considering your permit or other approval for the action.

Due to the time limits mandated by State law, your comments should be submitted by the earliest possible date, but not later than 30 days after your receipt of this notice per CEQA Guidelines Section 15082(b). Please send your written response, with the name of your agency contact person, to: Pamela Tuft, Director, Department of General Plan Administration, City of Petaluma, 27 Howard Street, Petaluma, CA 94952.

A Scoping Meeting will be conducted on Thursday, August 26th, 2004, 7:00 PM at the Petaluma Community Center, Conference Room #2, 320 North McDowell Boulevard, Petaluma 94954. If you have questions regarding this NOP or the Scoping Meeting, you can call Ms. Tuft at (707) 778-4552.

Pamela Tuft, AICP, General Plan Administration Director
City of Petaluma

8/11/04
Date

NOTICE OF PREPARATION (NOP)
ENVIRONMENTAL IMPACT REPORT (EIR)
CITY OF PETALUMA GENERAL PLAN UPDATE

PROJECT TITLE

City of Petaluma General Plan Update

LEAD AGENCY NAME AND ADDRESS

Department of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952

CONTACT PERSON AND PHONE NUMBER

Pamela Tuft, General Plan Administration Director
City of Petaluma
(707) 778-4552

PROJECT LOCATION AND BOUNDARIES

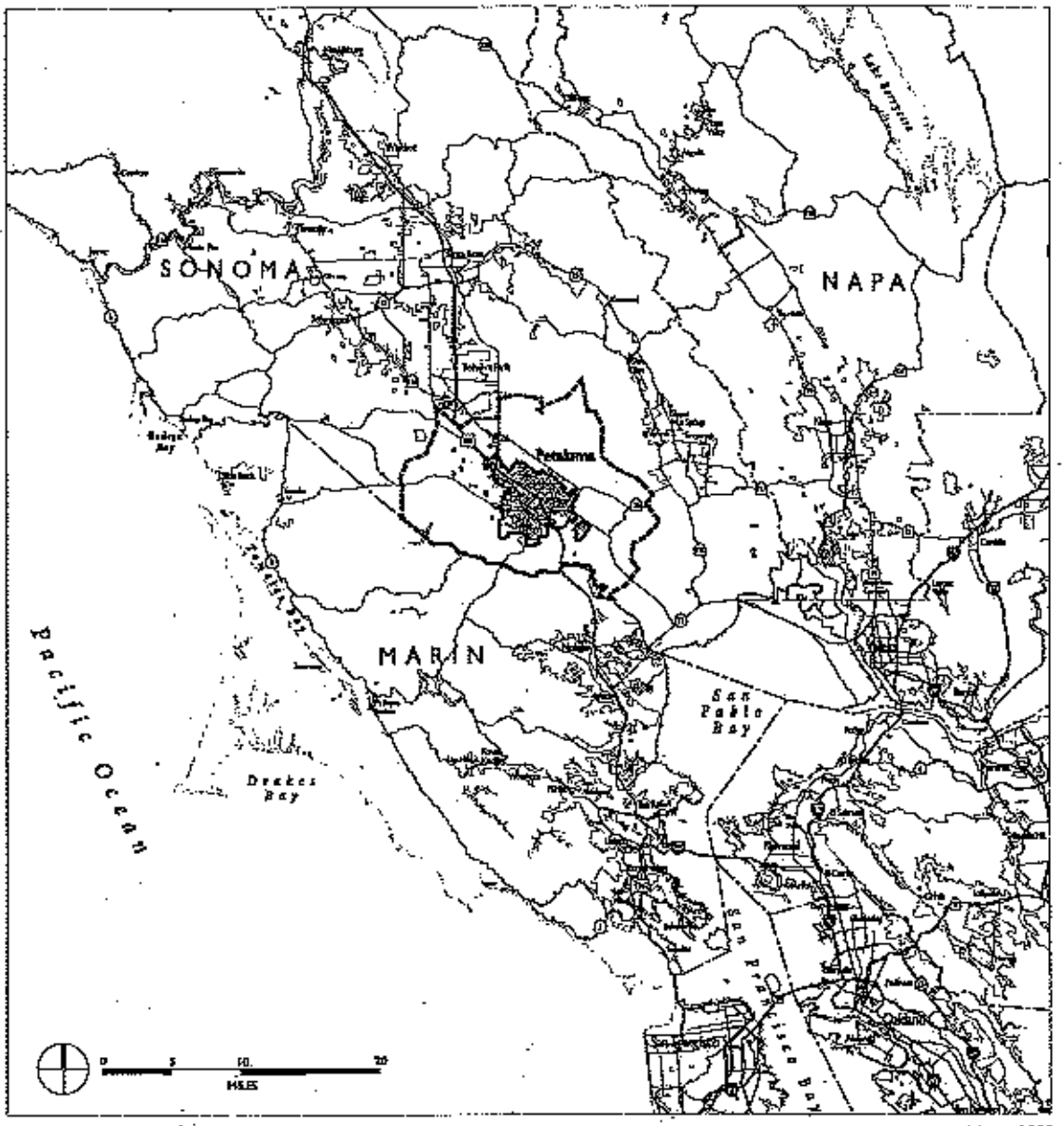
Location

Petaluma is located in southwestern Sonoma County, northeast of the Marin County border, as shown in Figure 1. The City's boundaries are defined by the surrounding landscape—from the banks of the Petaluma River to the floor of the Petaluma River Valley. The Valley itself is bordered by Sonoma Mountain on the northeast, by the hills surrounding Burdell Mountain on the west, and the Petaluma Marshlands to the south.

The Petaluma River and Highway 101 divide the City on a north/south axis. Highway 101 is an important north-south transportation route for the region, connecting the inner San Francisco Bay Area to Sonoma County, and beyond to Mendocino and Humboldt counties.

Planning Boundaries

The planning boundaries for the 2025 General Plan are illustrated in Figure 2. The Planning Referral Area—unchanged from the 1987 General Plan—covers the 117 square mile Petaluma River watershed. The 20-year Urban Growth Boundary (UGB), approved by voters in 1998, the Sphere of Influence, and the City's municipal boundary are all contained within the Planning Area. Because promoting compact growth patterns and maintaining open space around Petaluma are priorities of the General Plan, it is unlikely that there will be much, if any, outward expansion of the UGB that will be proposed as part of the General Plan Update.



Source: Dyett & Bhatia, 2002

Planning Referral Area

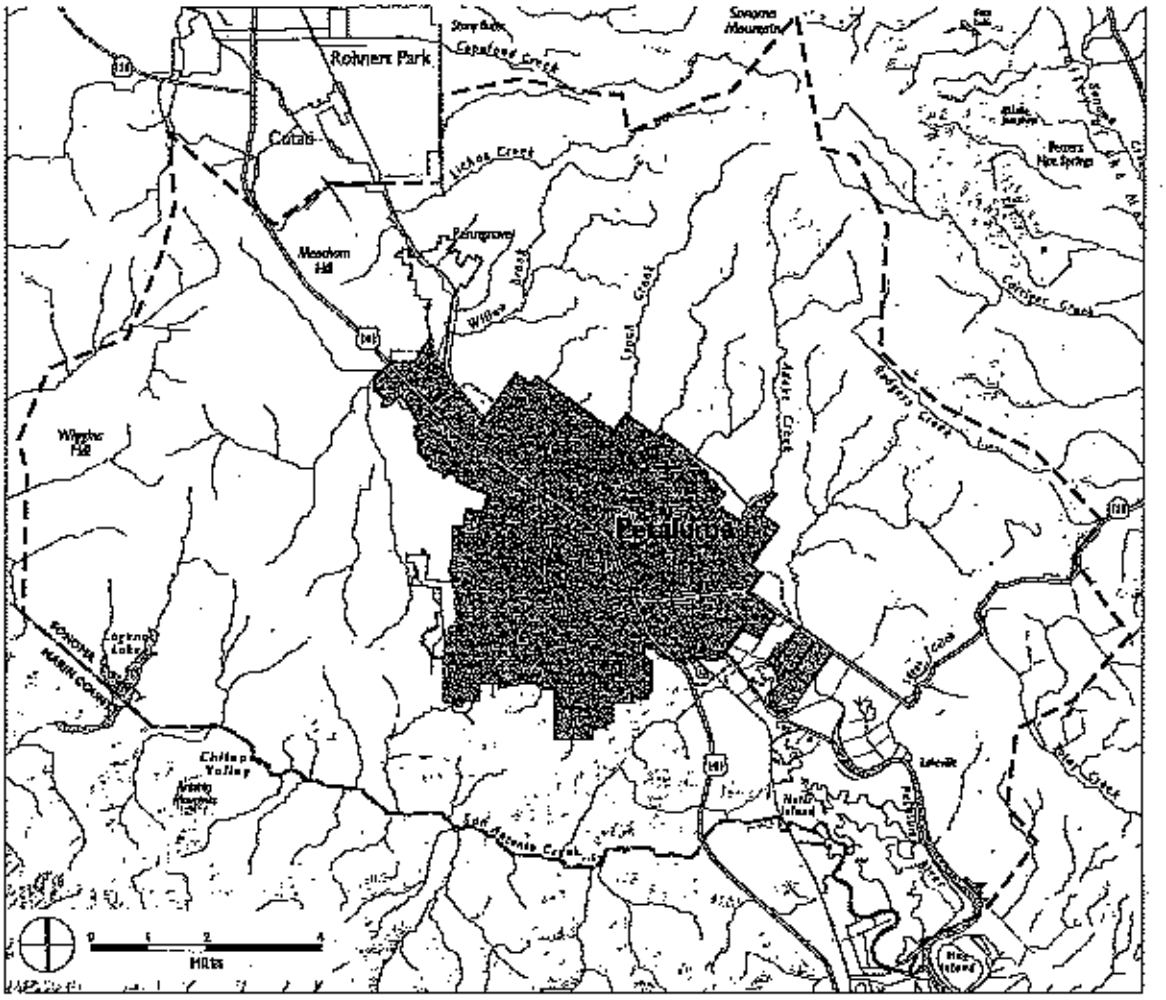
Urban Growth Boundary

Urban Areas

GENERAL PLAN 2025
City of Petaluma, California

Department of General Plan Administration
27 Howard Street
Petaluma, CA 94952
(707) 778-4552
generalplan@ci.petaluma.ca.us

Figure 1
Regional Location



Planning Referral Area
Urban Growth Boundary
Urban Growth Boundary Expansion Area
Sphere of Influence
City Limits
Other Urban Areas
County Line
River and Creeks

Source: Dyett & Bhatia, 2002
Revised: 13 September 2002

GENERAL PLAN 2025
City of Petaluma, California

Department of General Plan Administration
27 Howard Street
Petaluma, CA 94952
(707) 778-4552
[illegible]@ci.petaluma.ca.us

Figure 2
Planning Boundaries

PROJECT SPONSOR'S NAME AND ADDRESS

Department of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952

DESCRIPTION OF PROJECT

The City of Petaluma has initiated a comprehensive update of its General Plan, which is an opportunity for community members to explore long-term goals and development for the City. The State of California requires every city and county to have a comprehensive General Plan that serves as a constitution for long-term physical development. The Plan identifies current and future needs in areas such as land use, housing, transportation, public services, environmental quality, and economic viability.

The current General Plan, which has guided development in the City and its surroundings since 1987, is approaching its time horizon of 2005. While many of the Plan policies are still relevant, its context and setting have changed. Thus, Petaluma is now updating the General Plan to reflect new conditions and establish a vision for the future.

The General Plan Update will outline a comprehensive range of policies related to Petaluma's growth and conservation. The Update offers the City Council an opportunity to establish the City's priorities related to growth through development of key infill sites, cross-town connectors, neighborhoods, and activity centers. The new General Plan will serve as the framework for the City's Capital Improvements Program (CIP), any needed changes to zoning and other implementing ordinances, annual budget, and operations and maintenance activities.

The new General Plan will guide the future physical development of the City of Petaluma until the year 2025. Draft Guiding Principles (not adopted or approved by the City Council) for the General Plan Update include:

- Maintain a close-knit, neighborly, and family-friendly city;
- Preserve and enhance Petaluma's historic character;
- Preserve and enhance Petaluma's natural environment and distinct setting– a community with a discrete edge surrounded by open space—in the region.
- Enhance the River corridor while providing recreational and entertainment opportunities, including through active implementation of the Petaluma River Access and Enhancement Plan;
- Stimulate and increase public access and use of trails as alternative transportation routes by providing a safe, efficient, and interconnected trail system;
- Provide for a range of attractive and viable transportation alternatives, such as bicycle, pedestrian, rail, and transit;
- Enhance Downtown by preserving its historic character, increasing accessibility, and ensuring a broad range of businesses and activities;
- Foster and promote economic diversity and opportunities;

- Expand retail opportunities to meet residents' needs and promote the City's fiscal health, while ensuring that new development is in keeping with Petaluma's character;
- Continue efforts to achieve a jobs/housing balance, emphasizing opportunities for residents to work locally;
- Foster a sustainable community in which today's needs do not compromise the ability of the community to meet its future needs. Promote green development;
- Ensure infrastructure is strengthened and maintained;
- Integrate and connect the east and west sides of town; and
- Encourage cultural, ethnic, and social diversity.

The Draft General Plan resulting from the Update process will contain background information, goals, and policies addressing the following topics (which may be combined to be stand-alone elements):

- Land Use;
- Economic Development;
- Urban Design;
- Circulation;
- Historic Preservation;
- Noise;
- Public Safety;
- Open Space; and
- Conservation.

To meet the delivery deadlines of California's Department of Housing and Community Development (HCD), the Housing Element update was adopted ahead of the remainder of the General Plan in October 2002. Upon completion of the General Plan Update the two documents will be reviewed for internal consistency, and the Housing Element will be incorporated into the larger document.

BACKGROUND STUDIES AND PUBLIC PARTICIPATION

A critical component of the General Plan preparation process is soliciting and synthesizing public input on community concerns and possibilities. Participants in the early General Plan preparation process identified issues, opportunities, and challenges relevant to the General Plan in a variety of forums, including workshops, meetings, and a phone survey. The results of these efforts, held in the fall and winter of 2001 and 2002, are summarized in reports available on the City website: www.ci.petaluma.ca.us/genplan/reports.html.

In October 2002, the City published an *Existing Conditions, Opportunities, and Challenges Report* (ECOC), which provides extensive information on existing physical, environmental, and socioeconomic conditions in the City. Topics include community issues, land use, growth management, transportation, community facilities and services, recreation, economic health and sustainability, the natural environment, and health and safety. Each chapter concludes with a discussion of the opportunities, challenges, and preliminary planning issues that need to be considered during preparation of the General Plan. The full report as well as

an Executive Summary can be found on the City website: www.ci.petaluma.ca.us/genplan/reports.html.

The *Petaluma General Plan 2025: Land Use & Mobility Alternatives*, published in February 2004, represents a key step in the General Plan preparation process. Focusing on vacant and underutilized parcels, three Alternatives have been developed to offer a range of opportunities for future development. The Alternatives illustrate possible land use, open space, and transportation concepts. Transportation, flooding, and fiscal impacts of the Alternatives have also been prepared. No commitments to any one plan or growth-emphasis have been made at this stage. The Alternatives Report is also available on the City website: www.ci.petaluma.ca.us/genplan/reports.html.

The Alternatives are currently being reviewed in detail by the Planning Commission. Following this review, a Preferred Plan will be prepared and General Plan goals and policies formulated.

OTHER PUBLIC AGENCIES WHOSE APPROVAL IS REQUIRED

No other public agency is required to approve the Petaluma General Plan Update. Development under the Plan, however, may require approval of State, federal and responsible trustee agencies that may rely on this EIR for information relative to their area of expertise and jurisdiction.

POTENTIAL ENVIRONMENTAL IMPACTS TO BE CONSIDERED

Preliminary topics for the EIR include:

- Land Use;
- Population and Housing;
- Visual Resources;
- Parks and Recreation;
- Biological Resources;
- Cultural Resources;
- Transportation;
- Air Quality;
- Noise;
- Geology and Seismicity;
- Water Resources;
- Hydrology and Water Quality;
- Wastewater and Solid Waste;
- Energy; and
- Hazardous Materials.

In addition to the potential environmental effects listed above, the EIR will evaluate potential cumulative effects of the proposed Petaluma General Plan Update as well as alternatives to the proposed General Plan. The No Project alternative will evaluate the impacts resulting from continued implementation of existing plans, policies, and regulations which govern the City. As appropriate, other alternatives that would avoid or lessen environmental effects related to the proposed Petaluma General Plan Update will be discussed. Referring to General Plan policies, the draft EIR will also recommend measures to mitigate environmental impacts.

Responses to:
Notice of Preparation (NOP)
of Draft Environmental Impact Report
for the City of Petaluma General Plan 2025
NOP published August 11, 2004

Organizations/Individuals	Contacts
• California Regional Water Quality Control Board 1515 Clay Street, Suite 1400 Oakland, CA 94612 (510) 622-2300	Bruce H. Wolfe, Executive Officer
• City of Rohnert Park 6750 Commerce Blvd. Rohnert Park, CA 94928 (707) 588-2226	Ron Bendorff, Senior Planner
• Department of Fish and Game P. O. Box 47 Yountville, CA 94599 (707) 944-5500	Robert W. Floerke, Regional Mgr Central Coast Region
• North Marin Water District 999 Rush Creek Place Novato, CA 94942 (415) 897-4133	Chris DeGabriele, General Manager
• Petaluma City Schools 200 Douglas Street Petaluma, CA 94952-2575 (707) 778-4603	Steve Bolman, Deputy Superintendent
• Sonoma County Water Agency P O Box 11628 Santa Rosa, CA 95406 (707) 526-5370	Anne Crealock, Environmental Specialist
• Sonoma County Permit and Resource Management Department 2550 Ventura Avenue Santa Rosa, CA 95403 (707) 527-1900 Attachments: County of Sonoma Guidelines for Traffic Studies, Visual Assessment Guidelines	Robert Gaiser, Planner III

- Department of Transportation — Timothy C. Sable, Dist. Branch Mgr
  111 Grand Avenue
  Oakland, CA 94623-0660
  (800) 735-2929

- E-Mail plus Attachments — Tom McGaw
  Management & Performance
  Consulting
  [tdmcgaw@pacbell.net]
  (707) 762-3724
  Attachments: Airport Commission Minutes April 1, 2004,
  and Airport Economic Impact & Estimate August 10, 2000

- Letter — Richard Brawn
  Richard E. K. Brawn
  141 Grevillia Drive
  Petaluma, CA 94952

- Paula Lane Action Network — Paul Selinger, President
  P.L.A.N.
  P.O. Box 2903
  Petaluma, CA 94953
  (707) 773-3215 / 763-2009

- Abrams Associates — Charles Abrams
  2815 Mitchell Drive, Suite 120
  Walnut Creek, CA 94598
  (925) 945-0201

- Email and Attachment
  Diane Reilly Torres
  1657 Rainier Avenue
  Petaluma, CA 94954
  (707) 765-6696
  Attachment: Corps of Engineers Payran Flood Control Project
  Description Excerpt

California Regional Water Quality Control Board
San Francisco Bay Region

Terry Tamminen
Secretary for Environmental Protection

1515 Clay Street, Suite 1400, Oakland, California 94612
(510) 622-2300 • Fax (510) 622-2460
http://www.swrcb.ca.gov/rwqcb2

Arnold Schwarzenegger
Governor

RECEIVED
SEP 17 2004
PAMELA TUFT

Date: SEP 16 2004
File No. 2148.02(AHS)
Certified Mail No.7003 0500 0003 7752 4087

Ms. Pamela Tuft
Director of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952

SUBJECT: **Comments on Notice of Preparation of Draft Environmental Impact Report for the City of Petaluma General Plan Update**

Dear Ms. Tuft:

We have reviewed the three alternatives for the City of Petaluma General Plan update which focuses on three land use and mobility alternatives. While this alternatives review does not specifically address water quality impacts from the update of the General Plan, the type and density of the land use adjacent to the Petaluma River and its tributaries could result in significant adverse impacts to the river and its beneficial uses. The Petaluma River is classified as a Federally listed impaired water body due to exceedences of several water quality standards. As such, the City must make certain that its land use planning decisions do not contribute to the violation of water quality standards. The Water Board staff is particularly concerned about development of the parcels along the Petaluma River that are currently designated as agricultural lands that are located in the vicinity of the proposed Rainer Extension. These land use issues are discussed below.

Water Board staff also needs to review the specific water quality related documents that are referenced in the alternatives analysis before we can determine if the General Plan update is protective of the beneficial uses of the Petaluma River and its tributaries. These documents include the Water Resources Element, the Surface Water Management Plan, and the FEMA Map Amendment. If these documents have already been prepared please send us copies to review. If they are not ready, please notify us when the draft copies will be ready to review.

Land Use

Alternative C is the less environmentally damaging alternative as compared to the other two alternatives. As discussed below, a fourth alternative that would leave the area around the proposed Rainer Extension as open space, should be considered. Alternative C provides for a maximum open space buffers and plans for the lowest density development along the river corridor among the three proposed alternatives. We would

need more specific information on the size and location of the open space buffers to evaluate the effectiveness and adequacy of the proposed buffers to minimize environmental impacts. And while this is one of the City's less environmentally damaging alternatives as compared to the other two alternatives, none of the alternatives address the water quality and riparian habitat and beneficial use impacts of developing the agricultural parcels in the vicinity of the Rainer Extension located on both sides of the Petaluma River. Will these issues be addressed in the Water Resources Element? Cumulative water quality and beneficial use impacts of the various land use alternatives must be evaluated so that the City can reasonably identify preferred alternatives in accordance with the California Environmental Quality Act (CEQA) requirements.

Existing Agricultural Lands

The agricultural parcels located in the vicinity of the Rainer Extension are the last remaining open space habitat along this section of the Petaluma River. The Water Board staff is particularly interested in the impact to these parcels because of the high habitat value of this complex of riparian habitats. This riparian habitat corridor is unique among the remaining undeveloped parcels in the City supporting a variety of aquatic, riparian and upland habitat and species. It also serves as an important wildlife corridor and provides shade and refuge habitat for Federally protected species such as steelhead. Development of these parcels will further fragment and degrade the habitat along this section of the river and generate additional urban stormwater runoff pollutant discharges. The Water Board staff strongly recommends that the City of Petaluma consider conserving this area as open space.

Development within the City of Petaluma will increase significantly in all three alternatives and this area could serve as a mitigation bank for future impacts to wetlands and riparian corridors. We request that the City evaluate utilizing this area as a mitigation bank. The State Wetlands Conservation Policy and the Water Board's Basin Plan require compensatory habitat mitigation for impacts to wetlands and waters of the State. Developers with projects in Petaluma have had a difficult time finding suitable sites to mitigate for wetland fill in recent years. The General Plan update is the ideal planning tool to identify high value habitats that could serve as mitigation for future development projects.

Pollutants

Development within the Petaluma River watershed and especially parcels adjacent to the river could increase pollutant loads into the Petaluma River. The Petaluma River is currently listed on the 303(d) list for a number of pollutants whose concentrations could increase if the river corridor is further developed. The staff is currently working to identify sources of pollutants and determine cumulative impacts to the Petaluma River as part of the Federally mandated Total

Maximum Daily Load Program (TMDL). The Petaluma River is currently listed under Section 303(d) of the CWA as impaired for the following pollutants: sediment, pathogens, nutrients, nickel and diazinon. These are all recognized as urban pollutants. Development of the existing agricultural parcels could increase both sediment loads and urban runoff pollution both during and after development.

Sediments loads to the river would increase if appropriate setbacks are not designed into development projects. Setbacks that allow for the natural movement of the river and include appropriate buffers between the river and any development project would reduce the need for future bank stabilization intervention and loss of riparian habitat.

Increasing the percentage of impervious surfaces changes the overall hydrology of a site and increases the amount and velocity of site runoff. Storm runoff from residential development would also increase the load of urban pollutants into the river including increased loads of nutrients and pesticides from site landscaping and household gardening activities.

While many individual impacts can be minimized through appropriate site design, the Water Board staff strongly recommends that the City of Petaluma consider the cumulative impacts of all of the development projects along the Petaluma River. Of particular concern is the habitat loss and water quality impacts to the riparian and wildlife habitat corridor near the proposed Rainer Extension which will occur if any of the three General Plan update alternatives are implemented. Again, we strongly encourage the City to evaluate the feasibility of designating this area as open space or to utilize it as a mitigation bank for future wetland and riparian corridor development. Accordingly, the Water Board staff asks that the City consider a fourth alternative that would limit development along the Petaluma River corridor and protect the unique riparian habitat in the vicinity of the proposed Rainer Extension.

If you have any questions, please contact Abigail Smith at (510) 622-2413, or email her at ahs@rb2.swrcb.ca.gov.

Sincerely,

for Bruce H. Wolfe
Executive Officer

Cc: Oscar Balaguer, SWRCB-DWQ
U.S. Army Corps of Engineers, Attn: Philip Shannin
U.S. EPA, WTR-8
CDFG, Yountville, Attn: Bill Cox

BUILDING SERVICES

Gregory A. Nordin
Mayor

Amie L. Spradlin
Vice-Mayor

Armando F. Flores
Councilmember

Jake Mackenzie
Councilmember

Vicki Vidak-Martinez
Councilmember

Carl Eric Lelvo
City Manager

Steve Donley
Assistant City Manager

Judy Hauff
City Clerk

Michelle Kenyon
Gabrielle Whelan
Interim City Attorneys

September 10, 2004

Pamela Tuft
Director
Department of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952

Subject: Response to Notice of Preparation of Draft EIR for City of Petaluma General Plan 118

Dear Ms. Tuft:

Thank you for providing the above Notice of Preparation for our review. The following are areas that the City of Rohnert Park ("City") would like to see addressed in the Draft EIR:

- The City of Rohnert Park adopted its current General Plan in 2000, and this document governs the City's development to the year 2020. The DEIR should take into account this General Plan and its associated growth. A
- Traffic generated by new development in the City of Petaluma General Plan will impact the regional circulation system. The traffic analysis for the DEIR should include the intersection of Petaluma Hill Road/Adobe Road/Main Street in Penngrove, as well as other key intersections along Adobe Road to the east of Petaluma Hill Road and along Stony Point Road between Rohnert Park Expressway and the City of Petaluma. The traffic analysis should also factor in the potential Federated Indians of the Graton Rancheria casino, which is proposed to be developed to the west of the Rohnert Park City Limits. B
- The County of Sonoma is in the process of updating its General Plan and has completed a modeling effort for that update. To maintain consistency, the City of Rohnert Park has also updated its traffic model to reflect the County's information. The traffic analysis for the City of Petaluma General Plan DEIR should similarly use this updated County information. C
- Transportation Policy TR-21 of the Rohnert Park General Plan states that the City will work with area communities, including the City of Petaluma, "to plan and implement selected improvements necessary to mitigate impacts of increased traffic congestion on major roads and intersections in Penngrove." (Page 4-22). D

  In light of this, the City entered into an agreement with Sonoma County in 2001 that states that the City's fair share is to be determined as a part of a regional plan and shall be paid when:

6750 Commerce Boulevard . Rohnert Park CA . 94928 . (707) 588-2226 . Fax (707) 588-2263
www.rpcity.org

a. "a project is approved by each of the Interested Parties;

b. a financing plan is approved by each of the Interested Parties;

c. development that contributes to the traffic mitigated by the plan in approved by Rohnert Park; and

d. each of the Interested Parties has appropriated its fair share to the project or committed to appropriating its fair share."

Copies of the General Plan policy and the agreement are attached for your reference. We would expect the City of Petaluma General Plan DEIR to include a similar policy as a mitigation measure.

- Water and sewer capacity to serve new development is a critical concern, particularly given the limited water resources available to Sonoma County communities. A complete analysis of present and future water and sewer system needs and the availability of resources and facilities required to adequately serve the new development anticipated in the General Plan should be included in the DEIR. The water analysis should evaluate future needs against contractual agreements with water providers and users, storage capacity, and, if applicable, groundwater usage. E

- Regional air quality impacts from proposed growth under the City of Petaluma General Plan should be assessed in the DEIR and appropriate mitigation recommended. F

- The solid waste disposal needs of build out under the City of Petaluma General Plan should be assessed and the needed facilities to meet these needs should be identified in the DEIR. Increased opportunities for reuse and recycling should be considered to address any perceived impacts. G

Again, thank you for the opportunity to comment on this document. Should you have any questions, please feel free to contact me at (707) 588-2231.

Sincerely,

Ron Bendorff
Senior Planner

cc: City Council
Planning Commission
Carl Eric Leivo, City Manager
Gabrielle Whelan, Interim City Attorney
Darrin Jenkins, City Engineer

TR-20 Work with Sonoma County and the Sonoma County Transportation Authority (SCTA) to plan improvements to Petaluma Hill Road.

Petaluma Hill Road serves as a bypass to US 101 and experiences peak-hour congestion. Table 4.1-4 calls for new turn lanes and intersection improvements to Petaluma Hill Road.

TR-21 A. Work with Sonoma County, the City of Santa Rosa, the City of Cotati, and the City of Petaluma ("Contributing Jurisdictions") and the Sonoma County Transportation Authority (SCTA) to plan and implement selected improvements necessary to mitigate impacts of increased traffic congestion on major roads and intersections in Penngrove ("Regional Mitigation Plan"). The Regional Mitigation Plan shall include those roadway and other improvements necessary to mitigate the impacts of increased traffic congestion on major roads and intersections in Penngrove ("Regional Mitigation Projects"), and a financing plan that explains how those improvements will be funded and that determines each Contributing Jurisdiction's fair share. The City shall contribute its fair share of the total cost of the Regional Mitigation Plan provided that the City's participation is roughly proportional to the traffic impacts from new development in Rohnert Park.

The City's payment or other contribution of its fair share shall be provided when all of the following occur: (1) A Regional Mitigation Project is approved by the Sonoma County Board of Supervisors, and each of the Contributing Jurisdictions; (2) a financing plan for the Regional Mitigation Project has been approved by the Sonoma County Board of Supervisors, and each of the Contributing Jurisdictions; (3) new development that contributes to the traffic impacts to be mitigated by the project receives final approval by the City; and (4) each of the Contributing Jurisdictions has appropriated its fair share to the Regional Mitigation Project. In the event that other jurisdictions do not contribute their fair share to the Regional Mitigation Project, and funding for their fair share is provided by some other means to ensure implementation of the Regional Mitigation Project, the City will contribute and be limited to its fair share.

Traffic congestion presently exists in Penngrove at the Petaluma Hill Road and Old Adobe Road intersection during commute times. Traffic congestion is a result from growth and commute patterns in Sonoma County, SSU, and the Cities of Santa Rosa, Rohnert Park, Cotati, and Petaluma. Implementation of this General Plan will result in additional traffic in this area. Long-term solutions to traffic congestion on Petaluma Hill Road require a cooperative, regional approach by Sonoma County, the Penngrove area, Sonoma State University, and the cities of Cotati, Petaluma, Santa Rosa, and Rohnert Park. The City of Rohnert Park commits to being a responsible participant in formulating measures to minimize traffic congestion on Petaluma Hill Road. The City of Rohnert Park encourages the cities of Cotati, Petaluma and Santa Rosa, Sonoma County, and SSU to adopt policies demonstrating their commitment to participating in long-term solutions to these problems.

During the period in which this General Plan was being drafted, the City worked with the County and other interested parties to identify potential improvements to mitigate regional traffic impacts. Because of the regional nature of issues and solutions, it is anticipated that the process of studying and approving the selected improvements will take several years to complete. Therefore, specific projects to mitigate existing and future traffic congestion on Petaluma Hill Road had not been identified at the time this General Plan was adopted. However, the City of Rohnert Park is committed to continuing its participation in this regional effort.

TR-21 B. Work with the City of Cotati and Sonoma State University to determine feasible measures to mitigate impacts of increased traffic on East Cotati Avenue (within the City of Cotati, beginning with the La Plaza intersection) associated with the proposed growth assumed in the 2000 General Plan. These measures shall be based on detailed (intersection-level) traffic studies that will be prepared with each specific plan. The Canon Manor Specific Plan, University Specific Plan, and Southeast Specific Plan shall include a detailed analysis of intersections within and outside of the city that are projected to be impacted by the specific plan project area; an analysis of the traffic impacts of the specific plan project area on East Cotati Avenue; a cumulative impact analysis; and feasible mitigation measures for lessening the potential traffic impacts.

Contribute the City's fair share to the feasible mitigation measures identified in each Specific Plan (Canon Manor Specific Plan, University Specific Plan, and the Southeast Specific Plan); provided that (1) the City's fair share is roughly proportional to the traffic impacts of development beyond the 1999 incorporated limits of the City of Rohnert Park; and (2) other jurisdictions that approve development that impacts traffic congestion at the impacted intersections on East Cotati Avenue contribute their fair share. In the event that the City of Cotati and/or SSU approve development that impacts East Cotati Avenue traffic congestion but do not contribute their fair share to fund the feasible mitigation measures, the City and City of Cotati will evaluate alternative feasible mitigation measures that can be implemented. The City's financial commitment is also contingent upon legal authority to collect payments through specific plans, development agreements, assessment districts, and/or ordinances to raise funds for needed improvements on East Cotati Avenue.

Because of the location of the City of Cotati adjacent to U.S. 101, a portion of the traffic passing through Cotati to reach the U.S. 101 corridor is generated from jurisdictions outside the City of Cotati. Implementation of this General Plan may generate additional vehicle trips on City of Cotati roadways, particularly East Cotati Avenue. Long-term solutions to traffic congestion on East Cotati Avenue require a cooperative regional approach. Policies in this General Plan commit the city of Rohnert Park to being a responsible participant in developing and funding these solutions. Development within the Specific Plan areas may occur without implementation of the identified mitigation measures in the event that funding is not available from other jurisdictions to construct the improvements.

AGREEMENT

This is an Agreement entered into on September 25, 2001 by and between the County of Sonoma ("County)" and the City of Rohnert Park ("Rohnert Park").

RECITALS

This Agreement is entered into with reference to the following recitals of fact and intent:

1. The Sonoma County Local Agency Formation ("LAFCO") is charged with determining a sphere of influence for Rohnert Park, and with enacting policies designed to promote the logical and orderly annexation and development of areas within the sphere.

2. The Rohnert Park General Plan 2000 ("the Rohnert Park General Plan") envisions an expansion of Rohnert Park's sphere of influence. The City Council of Rohnert Park ("the Rohnert Park City Council") adopted Resolution 2001-116 authorizing its staff to submit an application to LAFCO update Rohnert Park's sphere of influence.

3. Prior to submitting an application to LAFCO to update Rohnert Park's sphere of influence, representatives of Rohnert Park are required by Government Code Section 56425 to meet with representatives of County to discuss the proposed sphere and its boundaries, and explore methods to reach agreement on the boundaries, development standards, and zoning requirements within the sphere to ensure that development within the sphere occurs in a manner that reflects the mutual concerns of Rohnert Park and County and is accomplished in a manner that promotes the logical and orderly development of areas within the sphere of influence.

4. County strives to maintain clear physical boundaries between cities and unincorporated communities in the county (collectively "communities") in order to avoid corridor-style urbanization and suburban sprawl. The Sonoma County General Plan ("the County General Plan") designates these important open space areas between communities in the county as "community separators." The County General Plan limits land uses in community separators to open space, agriculture, and rural residential development. Rohnert Park's update of its sphere of influence anticipates annexation and urban development of lands within the Rohnert Park/Santa Rosa Community Separator ("the Rohnert Park Community Separator").

5. County Resolution No. 92-1089 and LAFCO Resolution No. 2119 each enables an agreement between County and cities within the county to provide for some flexibility in changing the form and location of community separators, provided there is no net loss of separator acreage.

6. Representatives of Rohnert Park and representatives of County have met and reached agreement on certain issues relating to the update of Rohnert Park's sphere of influence.

7. The Rohnert Park Community Separator area is not subject to the greater protection provided by County Measure D. A vote of the people is not required to remove lands from the Rohnert Park Community Separator.

8. This Agreement enhances the protection of important open space lands in the county by providing the permanent preservation of open space lands in place of the interim preservation currently provided by the Rohnert Park Community Separator designation.

NOW, THEREFORE, the Parties to this Agreement agree as follows:

1. PURPOSE AND INTENT: The purpose of this Agreement is to set forth the mutual agreements of County and Rohnert Park relating to the proposed update of Rohnert Park's sphere of influence. A description of the update of Rohnert Park's sphere of influence is found in paragraph 2. The Parties intend this Agreement to satisfy the requirement of Government Code § 56425 and to comply with County Resolution No. 92-1089 and LAFCO Resolution No. 2119.

2. BOUNDARY OF THE SPHERE OF INFLUENCE: The sphere of influence that will be the subject of one or more applications to LAFCO is depicted on Figure 2.2-1 of the Rohnert Park General Plan and on Exhibit A to this Agreement ("the Rohnert Park SOI"). With the exception of a small area designated "community fields", the buffer zone along Petaluma Hill Road north of Rohnert Park Expressway (see Rohnert Park General Plan Policy OS-2), and the buffer area along Railroad Avenue and Petaluma Hill Road in the southeast, the remainder of the Rohnert Park sphere of influence is within Rohnert Park's voter-approved urban growth boundary ("the Rohnert Park UGB") (see Rohnert Park General Plan Policy GM-2).

3. COMMUNITY SEPARATOR MITIGATION: Rohnert Park shall mitigate the loss of land within the Rohnert Park Community Separator ("community separator lands") as a result of the Rohnert Park SOI and annexations in accordance therewith, by acquisition of land and/or development rights, within the Rohnert Park Planning Area as follows:

   a) First priority shall be given to lands adjacent to the Rohnert Park UGB, lands that would serve as greenbelt around the city, and view corridors along Petaluma Hill Road ("first priority lands"). Lands adjacent to the Rohnert Park UGB include the L-shaped area north of Railroad Avenue and west of Petaluma Hill Road, lands between the Rohnert Park SOI and Petaluma Hill Road north of the land designated "Community Fields" on the Rohnert Park General Plan, and the land immediately east of Petaluma Hill Road opposite the Rohnert Park SOI (excluding Canon Manor east) (see Exhibit B, First Priority Areas).

   b) Second priority shall be given to view corridors along the south side of Railroad Avenue and on Stony Point Road, prime farmland, and environmentally sensitive habitat areas and scenic landscape areas within the Rohnert Park Planning Area

(("second priority lands" - See Exhibit B, Second Priority Areas). In the event Rohnert Park amends its General Plan to allow mitigation outside its Planning Area, lands west of Stony Point Road and not within existing community separator areas may be included within the second priority lands.

c) First priority lands will require an acre of permanently preserved open space for each acre of Community Separator land included in the Rohnert Park SOI. Second priority lands will require two acres of permanently preserved open space for each acre of Community Separator land included in the Rohnert Park SOI.

d) The permanent preservation of open space shall take the form of grants in fee title or easement to the appropriate governmental body (other than Rohnert Park) such as the Sonoma County Agricultural Preservation and Open Space District, or other third party land trust Where permanent preservation of open space is provided through easement, such easement shall be of a form and nature acceptable to the appropriate governmental body or third party land trust, and sufficient to ensure permanent preservation and maintenance of the open space in perpetuity.

e) Any specific plans, area plans or other development entitlements adopted or approved by Rohnert Park for the Northwest or Wilfred-Dowdell areas within the Rohnert Park SOI shall include provisions for mitigating the loss of Community Separator land consistent with this agreement.

f) Prior to an application by property owners or Rohnert Park to LAFCO to annex land within the Northwest or Wilfred-Dowdell areas of the Rohnert Park SOI, Rohnert Park shall adopt an adequate mechanism to ensure that the required mitigation for the loss of Community Separator land will occur through acquisition of open space lands and/or development rights within the priority areas or through payment of an in lieu fee, and shall require property owners to demonstrate the ability to ensure permanent preservation of land in mitigation for the loss of Community Separator land. Payment of an in lieu fee will be permitted if the Rohnert Park City Council finds that unique circumstances warrant payment of the fee rather than provision of land and if payment of the fee will provide mitigation equivalent to the acquisition of land and/or development rights. Whether the land is acquired by the developer or through fees paid to Rohnert Park by the developer, the acquisition of the open space land must be completed prior to Rohnert Park issuance of any grading or building permit within the Rohnert Park Community Separator area, as it exists on the date of this Agreement.

4. TRAFFIC MITIGATION: County and Rohnert Park acknowledge and agree that traffic congestion on major roads and intersections in Penngrove is a regional problem that will require a regional solution. Growth anticipated in the Rohnert Park General Plan will be one of the factors contributing to this regional problem. Pursuant to Policy TR-21 in General Plan 2000, Rohnert Park shall contribute its fair

share of the total cost of a project developed with County, the City of Santa Rosa, the City of Cotati, the City of Petaluma and the Sonoma County Transportation Authority (collectively "the Interested Parties") to plan and implement improvements necessary to mitigate impacts of increased traffic congestion on major roads and intersections in Penngrove. Rohnert Park's fair share shall be determined as part of the development of the plan. Rohnert Park shall pay its fair share when (a) a project is approved by each of the Interested Parties; (b) a financing plan is approved by each of the Interested Parties; (c) development that contributes to the traffic mitigated by the plan is approved by Rohnert Park; and (d) each of the Interested Parties has appropriated its fair share to the project or committed to appropriating its fair share. In the event that other jurisdictions do not contribute their fair share to the Regional Mitigation Project, and funding for their fair share is provided by some other means that ensures implementation of the Regional Mitigation Project, the Rohnert Park will contribute and be limited to its fair share.

5. DEVELOPMENT STANDARDS: Land within the Rohnert Park SOI, as updated in accordance with this Agreement, shall be developed, to the maximum extent feasible, in accordance with the standards contained in the Rohnert Park General Plan including, but not limited to, the requirement that a specific plan be prepared for each of the specific plan areas identified on Exhibit C attached to this Agreement. County Zoning requirements shall promote the logical and orderly development of areas within the Rohnert Park SOI. County shall refer development proposals to Rohnert Park for comment and recommendation prior to taking action on a development proposal within the Rohnert Park SOI.

6. LAFCO CONSIDERATION: This Agreement shall be forwarded to LAFCO for consideration by LAFCO when LAFCO considers and adopts an updated sphere of influence for Rohnert Park consistent with LAFCO's adopted policies.

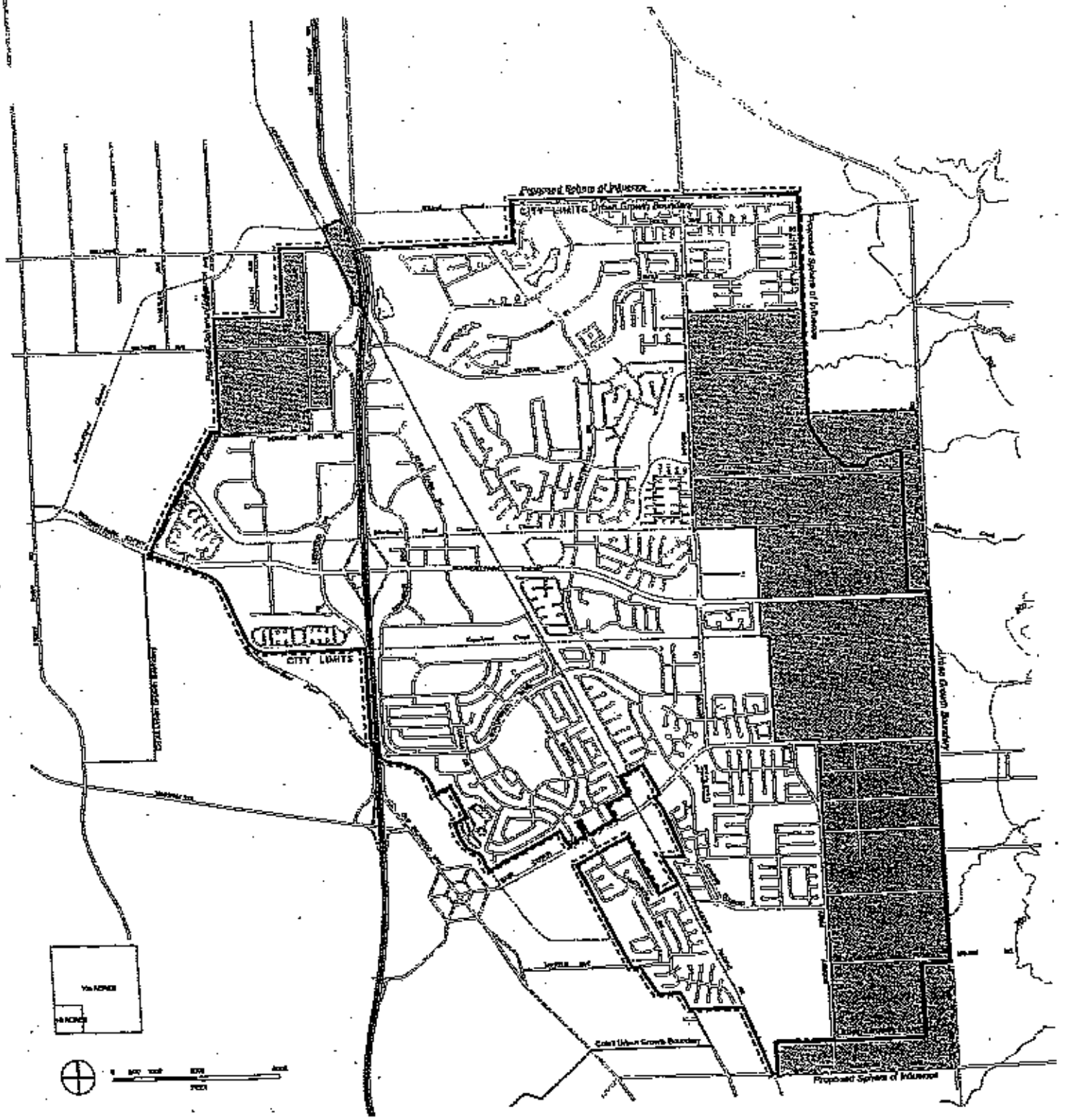
Jake Mackenzie, Mayor, City of Rohnert Park
Per Resolution No. 2001-205 adopted by the Rohnert Park City Council at its meeting of September 25, 2001

Sept 25, 2001
Date

Tim Smith, Chairman, Board of Supervisors

10/2/01
Date

THE ROHNERT PARK SOI



Annexation Areas

EXHIBIT A

Proposed Sphere of Influence

Urban Growth Boundary and Annexation Areas

DYETT & BHATIA

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FAX

Date September 10, 2004

Number of pages including cover sheet 10

TO: Pamela Tuft
City of Petaluma

Phone
Fax [707] 778-4586

FROM: Ron Bendorff
Planning Department

CITY OF ROHNERT PARK
6750 Commerce Boulevard
Rohnert Park, CA 94928

Phone *[707] 588-2231*
Fax *[707] 588-2238*

CC:

REMARKS: ☐ *Urgent* ☒ *For your review* ☐ *Please comment* ☐ *As you requested*

Hi Pamela:

Attached is a copy of the comment letter that the City prepared regarding the NOP for the Petaluma General Plan Draft EIR. The original letter was sent to you today by ground mail. If you should need anything else, please let me know. Thanks and take care.

-Ron

RECEIVED
SEP 1 0 2004
P C D C

BUILDING SERVICES

Gregory A. Nordin
Mayor

Arnie L. Spradlin
Vice-Mayor

Armando F. Flores
Councilmember

Jake Mackenzie
Councilmember

Vicki Vidak-Martinez
Councilmember

Carl Eric Leivo
City Manager

Steve Donley
Assistant City Manager

Judy Hault
City Clerk

Michelle Kenyon
Gabrielle Whelan
Interim City Attorneys

September 10, 2004

Pamela Tuft
Director
Department of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952

Subject: Response to Notice of Preparation of Draft EIR for City of Petaluma General Plan

Dear Ms. Tuft:

Thank you for providing the above Notice of Preparation for our review. The following are areas that the City of Rohnert Park ("City") would like to see addressed in the Draft EIR:

- The City of Rohnert Park adopted its current General Plan in 2000, and this document governs the City's development to the year 2020. The DEIR should take into account this General Plan and its associated growth.
- Traffic generated by new development in the City of Petaluma General Plan will impact the regional circulation system. The traffic analysis for the DEIR should include the intersection of Petaluma Hill Road/Adobe Road/Main Street in Penngrove, as well as other key intersections along Adobe Road to the east of Petaluma Hill Road and along Stony Point Road between Rohnert Park Expressway and the City of Petaluma. The traffic analysis should also factor in the potential Federated Indians of the Graton Rancheria casino, which is proposed to be developed to the west of the Rohnert Park City Limits.
- The County of Sonoma is in the process of updating its General Plan and has completed a modeling effort for that update. To maintain consistency, the City of Rohnert Park has also updated its traffic model to reflect the County's information. The traffic analysis for the City of Petaluma General Plan DEIR should similarly use this updated County information.
- Transportation Policy TR-21 of the Rohnert Park General Plan states that the City will work with area communities, including the City of Petaluma, "to plan and implement selected improvements necessary to mitigate impacts of increased traffic congestion on major roads and intersections in Penngrove." (Page 4-22).

  In light of this, the City entered into an agreement with Sonoma County in 2001 that states that the City's fair share is to be determined as a part of a regional plan and shall be paid when:

6750 Commerce Boulevard . Rohnert Park CA . 94928 . (707) 588-2226 . Fax (707) 588-2263
www.rpcity.org

a. "a project is approved by each of the Interested Parties;

b. a financing plan is approved by each of the Interested Parties;

c. development that contributes to the traffic mitigated by the plan in approved by Rohnert Park; and

d. each of the Interested Parties has appropriated its fair share to the project or committed to appropriating its fair share."

Copies of the General Plan policy and the agreement are attached for your reference. We would expect the City of Petaluma General Plan DEIR to include a similar policy as a mitigation measure.

- Water and sewer capacity to serve new development is a critical concern, particularly given the limited water resources available to Sonoma County communities. A complete analysis of present and future water and sewer system needs and the availability of resources and facilities required to adequately serve the new development anticipated in the General Plan should be included in the DEIR. The water analysis should evaluate future needs against contractual agreements with water providers and users, storage capacity, and, if applicable, groundwater usage.

- Regional air quality impacts from proposed growth under the City of Petaluma General Plan should be assessed in the DEIR and appropriate mitigation recommended.

- The solid waste disposal needs of build out under the City of Petaluma General Plan should be assessed and the needed facilities to meet these needs should be identified in the DEIR. Increased opportunities for reuse and recycling should be considered to address any perceived impacts.

Again, thank you for the opportunity to comment on this document. Should you have any questions, please feel free to contact me at (707) 588-2231.

Sincerely,

Ron Bendorff
Senior Planner

cc: City Council
Planning Commission
Carl Eric Leivo, City Manager
Gabrielle Whelan, Interim City Attorney
Darrin Jenkins, City Engineer

TR-20 Work with Sonoma County and the Sonoma County Transportation Authority (SCTA) to plan improvements to Petaluma Hill Road.

Petaluma Hill Road serves as a bypass to US 101 and experiences peak-hour congestion. Table 4.1-4 calls for new turn lanes and intersection improvements to Petaluma Hill Road.

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e) Any specific plans, area plans or other development entitlements adopted or approved by Rohnert Park for the Northwest or Wilfred-Dowdell areas within the Rohnert Park SOI shall include provisions for mitigating the loss of Community Separator land consistent with this agreement.

f) Prior to an application by property owners or Rohnert Park to LAFCO to annex land within the Northwest or Wilfred-Dowdell areas of the Rohnert Park SOI, Rohnert Park shall adopt an adequate mechanism to ensure that the required mitigation for the loss of Community Separator land will occur through acquisition of open space lands and/or development rights within the priority areas or through payment of an in lieu fee, and shall require property owners to demonstrate the ability to ensure permanent preservation of land in mitigation for the loss of Community Separator land. Payment of an in lieu fee will be permitted if the Rohnert Park City Council finds that unique circumstances warrant payment of the fee rather than provision of land and if payment of the fee will provide mitigation equivalent to the acquisition of land and/or development rights. Whether the land is acquired by the developer or through fees paid to Rohnert Park by the developer, the acquisition of the open space land must be completed prior to Rohnert Park issuance of any grading or building permit within the Rohnert Park Community Separator area, as it exists on the date of this Agreement.

4. TRAFFIC MITIGATION: County and Rohnert Park acknowledge and agree that traffic congestion on major roads and intersections in Penngrove is a regional problem that will require a regional solution. Growth anticipated in the Rohnert Park General Plan will be one of the factors contributing to this regional problem. Pursuant to Policy TR-21 in General Plan 2000, Rohnert Park shall contribute its fair

share of the total cost of a project developed with County, the City of Santa Rosa, the City of Cotati, the City of Petaluma and the Sonoma County Transportation Authority (collectively "the Interested Parties") to plan and implement improvements necessary to mitigate impacts of increased traffic congestion on major roads and intersections in Penngrove. Rohnert Park's fair share shall be determined as part of the development of the plan. Rohnert Park shall pay its fair share when (a) a project is approved by each of the Interested Parties; (b) a financing plan is approved by each of the Interested Parties; (c) development that contributes to the traffic mitigated by the plan is approved by Rohnert Park; and (d) each of the Interested Parties has appropriated its fair share to the project or committed to appropriating its fair share. In the event that other jurisdictions do not contribute their fair share to the Regional Mitigation Project, and funding for their fair share is provided by some other means that ensures implementation of the Regional Mitigation Project, the Rohnert Park will contribute and be limited to its fair share.

5. DEVELOPMENT STANDARDS: Land within the Rohnert Park SOI, as updated in accordance with this Agreement, shall be developed, to the maximum extent feasible, in accordance with the standards contained in the Rohnert Park General Plan including, but not limited to, the requirement that a specific plan be prepared for each of the specific plan areas identified on Exhibit C attached to this Agreement. County Zoning requirements shall promote the logical and orderly development of areas within the Rohnert Park SOI. County shall refer development proposals to Rohnert Park for comment and recommendation prior to taking action on a development proposal within the Rohnert Park SOI.

6. LAFCO CONSIDERATION: This Agreement shall be forwarded to LAFCO for consideration by LAFCO when LAFCO considers and adopts an updated sphere of influence for Rohnert Park consistent with LAFCO's adopted policies.

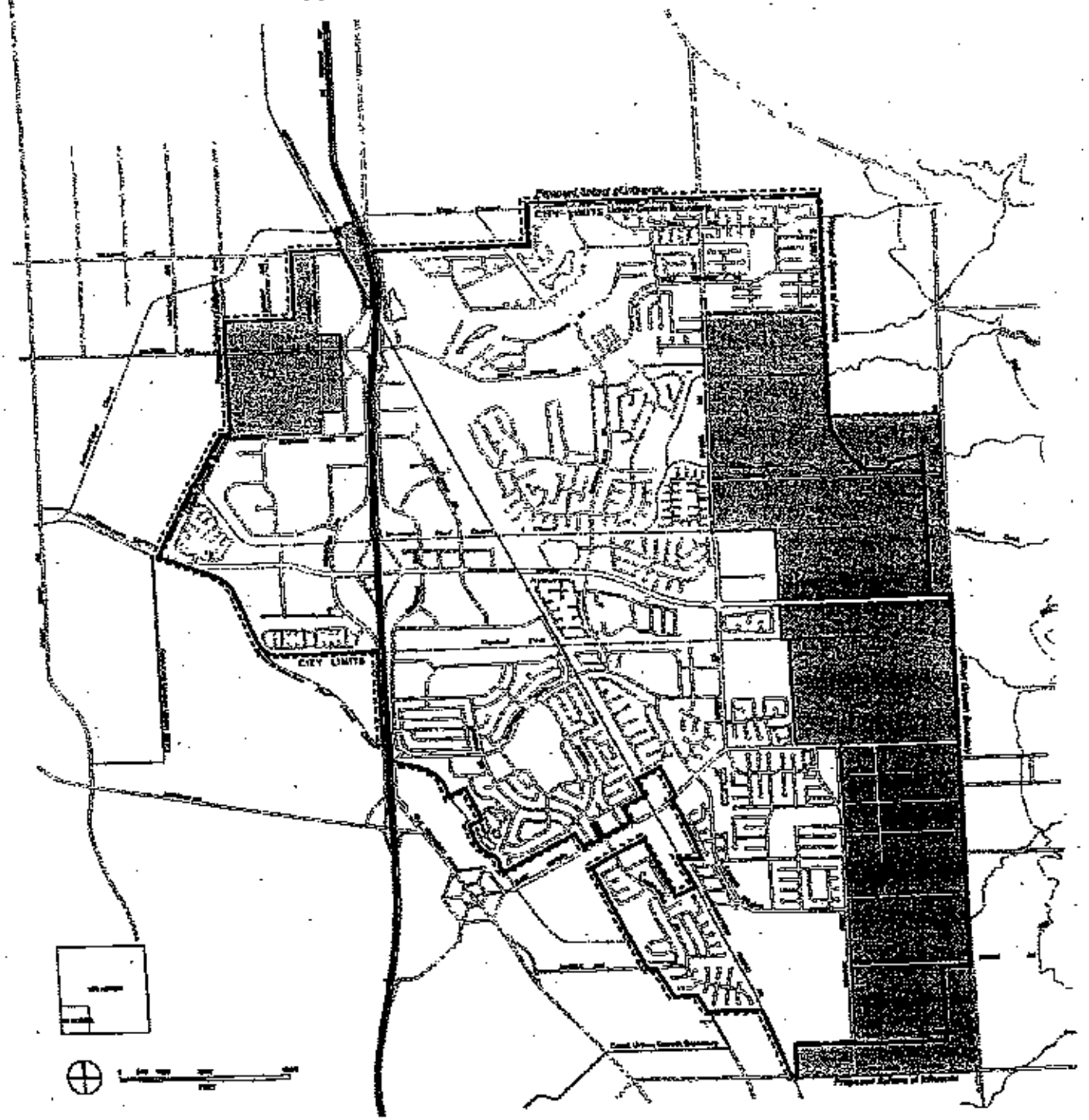
Jake Mackenzie, Mayor, City of Rohnert Park
Per Resolution No. 2001-205 adopted by the Rohnert Park City Council at its meeting of September 25, 2001

Sept 25, 2001
Date

Tim Smith, Chairman, Board of Supervisors

10/2/01
Date

THE ROHNERT PARK SOI



Annexation Areas

EXHIBIT A

Proposed Sphere of Influence

Urban Growth Boundary and Annexation Area

DYETT & BHATIA

State of California – The Resources Agency ARNOLD SCHWARZENEGGER, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
POST OFFICE BOX 47
YOUNTVILLE, CALIFORNIA 94599
(707) 944-5500

August 24, 2004

RECEIVED
AUG 26 2004
PAMELA TUFT

Ms. Pamela Tuft
City of Petaluma
27 Howard Street
Petaluma, CA 94952

119

Dear Ms. Tuft:

City of Petaluma General Plan 2025
SCH 2004082065

The Department of Fish and Game (DFG) has reviewed the document for the subject project. Please be advised this project may result in changes to fish and wildlife resources as described in the California Code of Regulations, Title 14, Section 753.5(d)(1)(A)-(G)[1]. Therefore, a de minimis determination is not appropriate, and an environmental filing fee as required under Fish and Game Code Section 711.4(d) should be paid to the Sonoma County Clerk on or before filing of the Notice of Determination for this project.

A

A complete assessment of the flora and fauna within and adjacent to the project area, with particular emphasis upon identifying endangered, threatened, and locally unique species and sensitive habitats, should be provided. Rare, threatened and endangered species to be addressed should include all those which meet the California Environmental Quality Act (CEQA) definition (see CEQA Guidelines, Section 15380). The assessment should identify any rare plants and rare natural communities, following DFG's Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities (revised May 8, 2000). The Guidelines are available at www.dfg.ca.gov/whdab/pdfs/guideplt.pdf.

B

Please be advised that a California Endangered Species Act (CESA) Permit must be obtained if the project has the potential to result in take of species of plants or animals listed under CESA, either during construction or over the life of the

[1] http://ccr.oal.ca.gov/. Find California Code of Regulations, Title 14 Natural Resources, Division 1, Section 753

project. Issuance of a CESA Permit is subject to California Environmental Quality Act (CEQA) documentation; therefore, the CEQA document must specify impacts, mitigation measures, and a mitigation monitoring and reporting program. If the project will impact CESA listed species, early consultation is encouraged, as significant modification to the project and mitigation measures may be required in order to obtain a CESA Permit.

For any activity that will divert or obstruct the natural flow, or change the bed, channel, or bank (which may include associated riparian resources) of a river or stream, or use material from a streambed, DFG may require a Streambed Alteration Agreement (SAA), pursuant to Section 1600 et seq. of the Fish and Game Code, with the applicant. Issuance of SAAs is subject to the California Environmental Quality Act)CEQA). DFG, as a responsible agency under CEQA, will consider the CEQA document for the project. The CEQA document should fully identify the potential impacts to the stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for completion of the agreement. To obtain information about the SAA notification process, please access our website at www.dfg.ca.gov/1600; or to request a notification package, contact the Streambed Alteration Program at (707) 944-5520. C

If you have any questions, please contact Mr. Liam Davis, Environmental Scientist, at (707) 944-5529; or Mr. Scott Wilson, Habitat Conservation Supervisor, at (707) 944-5584.

Sincerely,

Robert W. Floerke
Regional Manager
Central Coast Region

cc: State Clearinghouse

NORTH MARIN WATER DISTRICT
999 RUSH CREEK PLACE • POST OFFICE BOX 146 • NOVATO, CALIFORNIA 94948 • (415) 897-4133 • FAX (415) 892-8043

RECEIVED
SEP 0 2 2004
PAMELA TUFT

August 31, 2004

Ms. Pamela Tuft, Director
Department of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952

120

Subject: Notice of Preparation of Draft Environmental Impact Report for the City of Petaluma General Plan 2025

Dear Ms. Tuft:

I am in receipt of the subject Notice of Preparation and recommend that the Draft Environmental Impact Report for the Petaluma General Plan 2025 consider development in the South Petaluma Boulevard industrial area and water supply thereto. A

A draft South Petaluma Boulevard Specific Plan was prepared in December 1991. NMWD Water District (NMWD) comments on said draft plan documented current NMWD water supply provisions in the area. Those comments dated January 22, 1992 remain pertinent to this date and are attached for your ready reference. B

NMWD, on a case-by-case basis, has provided water service in the South Petaluma Boulevard industrial area from the North Portion of the NMWD Aqueduct (now known as the Kastania Pipeline). The City of Petaluma has approved said service and any water required to meet those needs are considered part of Petaluma's Russian River Aqueduct entitlement and does not diminish NMWD's Russian River Aqueduct entitlement. The parties have agreed that if and when the City of Petaluma extends water mains into the South Petaluma Boulevard industrial area, facilities constructed and the customers they serve will be transferred to the City of Petaluma.

In April 1999, NMWD transferred the Kastania pipeline to Sonoma County Water Agency (SCWA). In the Kastania pipeline agreement NMWD and SCWA reserved NMWD's right to sell water to existing customers and to new customers in this area provided that the Agreement for Use of Surplus Capacity between NMWD and the City of Petaluma remained in full force and effect. The Agreement for Use of Surplus Capacity stipulates that if surplus capacity is no longer available in the north portion of the North Main Aqueduct, NMWD shall notify Petaluma and Petaluma shall immediately undertake all actions necessary to construct its own pipeline, connecting its sixteen inch line near the City of Petaluma's river dredging disposal site directly to the aqueduct owned by the Sonoma County Water Agency.

NMWD has previously proposed to transfer water distribution facilities in the South Petaluma Boulevard industrial area to the City of Petaluma, however that proposal was never acted upon. NMWD believes that it is appropriate for the City of Petaluma to address its water

DIRECTORS: JACK BAKER • RICK FRAITES • STEPHEN PETTERLE • DENNIS RODONI • JOHN C. SCHOONOVER
OFFICERS: CHRIS DeGABRIELE, General Manager • JOYCE S. ARNOLD, Secretary • DAVID L. BENTLEY, Auditor-Controller • DREW McINTYRE, Chief Engineer

supply provision to the South Petaluma Boulevard industrial area, including the extension or acquisition of necessary infrastructure to take on water service responsibility for existing and future customers in this area, provided there is no negative effect on water delivery capacity for NMWD.

Thank you for the opportunity to comment.

Sincerely,

Chris DeGabriele
General Manager

Enclosures

cc w/o attachments:

Randy Poole, SCWA
Mike Bierman, City of Petaluma
Mike Ban, City of Petaluma

CD/jsa
@\\server\Administration\GM\2004 Misc\Petaluma Gen Plan 0804.doc

NORTH MARIN WATER DISTRICT
999 RUSH CREEK PLACE • POST OFFICE BOX 146 • NOVATO, CALIFORNIA 94948 • (415) 897-4133 • FAX (415) 892-8043

January 22, 1992

Jennifer Barrett, Project Manager
City of Petaluma Planning Department
P.O. Box 61
Petaluma, CA 94953

Subj: North Marin Water District Comments on "Draft of South Petaluma Boulevard Specific Plan, Phase I Report"

Dear Ms. Barrett:

Thank you for your notice of December 23, 1991 and the copy of the subject report prepared by Wagstaff and Associates, which you provided for our comment. The District has reviewed the draft report and offers the following suggested corrections and comments:

Page 26. Summary Chapter, Item 12 a. - Public Services and Utility Consideration - Water Supply

Comment: The second paragraph of subparagraph a. states that "An aqueduct that passes through the study area along South Petaluma Boulevard is part of the regional water supply system from which the Sonoma County Water Agency (SCWA) wholesales water." That statement is not quite accurate. The aqueduct which passes through the study area from its northernmost boundary (McNear Avenue) to its southernmost boundary is owned and operated by North Marin Water District. The District does license the Sonoma County Water Agency to convey water through this portion of North Marin's Aqueduct to Kastania Tank (Attachment A). Also, the District, by Agreement dated November 15, 1990 (Attachment B), has agreed to transport water through a portion of the North Marin Aqueduct to Petaluma's 16-inch distribution main shown on Figure 26, page 194. Both the license and agreement noted contain certain conditions. Use and conveyance of any water in North Marin's North Marin Aqueduct is fully under the control of North Marin Water District. Any additional turnouts from the North Marin Aqueduct or additional facilities connecting to North Marin's distribution mains in the area require the agreement of the District.

Chapter 6. Relevant Adopted Plans and Policies. This section provides an overview of adopted city, county and regional plans and policies that are relevant to the study area. Item d. on page 80, for instance, cites City of Petaluma Resolution 91-239 which supports the need for cooperative planning between Sonoma and Marin Counties and the Cities of Petaluma and Novato to protect and maintain agricultural open space in the Highway 101 Corridor between Petaluma and Novato.

Comment: You should add to Chapter 6 a brief paragraph describing North Marin Water

DIRECTORS: GEORGE A. AMAROLI • JACK BAKER • BARBARA B. MUNDEN • JOHN C. SCHOONOVER • WILLIAM W. WRIGHT
OFFICERS: JOHN OLAF NELSON, General Manager • JOYCE B. REED, Secretary • DAVID L. BENTLEY, Auditor-Controller • CHRIS DeGABRIELE, Chief Engineer

District Resolution No. 1230 (Attachment C) and North Marin Water District "Policy Statement - Service from North Marin Aqueduct" (Attachment D); both were originally adopted in the mid-1970's and support Marin and Sonoma Counties' and Petaluma's and Novato's goals of maintaining agricultural open space in the Novato-Petaluma Corridor.

Pages 193 through 197 discuss water supply facilities.

Comment: A number of corrections need to be made to these pages. See attached marked up copy of December 12, 1991 draft of the Phase I report covering these pages (Attachment E).

Page 14. "Constraints on Development in County Area" The last two sentences on this page state "By maintaining the urban limit line and urban separator as currently designated in the city's general plan, the extension of access and utilities to these southern lands for urban development purposes would remain inconsistent with city policy. As a result, intensive commercial development of these unincorporated lands under county general plan policies would remain constrained by the existing lack of adequate vehicle access and by existing sewage disposal limitations."

Comment: This paragraph should be amended to note that said development would further be constrained by lack of public water. Given North Marin Water District's long standing adopted policies (refer Attachment C and D) the District would not serve any new development in the study area unless the City of Petaluma approved such development.

Page 17. Last paragraph regarding the discussion on policy choice #3 "partial change to the urban limit line."

Comment: The authors talk about a "hypothetical" that might include a golf course. It should be known by all parties up front that North Marin Water District will not allow its facilities to be used to convey water to a golf course (typical demand = 250+ AF/yr) or other large irrigation use. Recycled water would be required for such a use. The District views the precious capacity of its aqueduct as too valuable to devote to this type of purpose when recycled water is available from the City of Petaluma.

General Comment: In general, North Marin Water District will be supportive of the City of Petaluma's determinations for the area. In viewing the various alternatives presented in the report, however, the District notes that any alternative including expansion of the Urban Limit Line should be weighted against the existing adopted policies concerning preservation of agriculture and open space in the Corridor separating Novato and Petaluma.

Thank you for the opportunity to comment.

Sincerely yours,

John O. Nelson

John Olaf Nelson
General Manager

P.S. Please note that some years back the District dropped the word "County" from its name.

Enclosures:
A) License Agreement between NMWD and SCWA
B) Agreement Between NMWD and City of Petaluma
C) Revised NMWD Resolution 1230
D) Revised NMWD Policy Statement re North Marin Aqueduct
E) Marked excerpts from Draft Report, Chapter 17 pages

cc:
Bob Pearson
Sonoma County Water Agency
P.O. Box 11628
Santa Rosa, CA 95406

JON\jr c:\wp51\jon\petltr.192

cc: Wagstaff & Assoc
Tom Hargis 1-23-92

LICENSE

THIS LICENSE, made this 2 day of February, 1982, by and between North Marin County Water District, a body politic and corporate, hereinafter called "Licensor", and Sonoma County Water Agency, a body politic and corporate, hereinafter called "Licensee".

WITNESSETH, that the parties hereto for the considerations hereinafter expressed covenant and agree as follows:

1. Licensor hereby licenses Licensee to use, subject to the rights hereinafter excepted and reserved and upon the terms and conditions hereinafter set forth, that portion of the pipeline, hereinafter called the "Marin Aqueduct", shown on Plans and Drawings for Job No. B239 on file in the offices of Licensor, situated between Engineer's Station 1+16.98 and Engineer's Station 76+10.71 and the right to install and maintain a water metering facility, a water pipeline and appurtenances within that certain real property described in Exhibit A attached hereto and by this reference made a part hereof.

2. Use by Licensee of said Marin Aqueduct shall be limited to transporting water in a single pipeline to and from a 12-million gallon reservoir, hereinafter called the "Kastania Reservoir", planned to be constructed by Licensee at a site situated approximately 900 feet southwesterly from the parcel described in Exhibit A. Said use shall be subject and subordinate to the prior and paramount right of the Licensor to use the Marin Aqueduct to transport water for domestic, municipal, industrial and other reasonable and beneficial uses within Licensor's service territory.

Attachment A

3. Licensor hereby reserves the right to all capacity in the Marin Aqueduct except that required by Licensee for the purposes set forth in Paragraph 2 herein, and Licensor reserves the exclusive right to provide water service from said Marin Aqueduct.

4. Licensor hereby excepts and reserves the right, to be exercised by Licensor and by any others who have obtained or may obtain permission or authority from Licensor so to do, to utilize the parcel described in Exhibit A for any purpose and in any manner as will not unreasonably interfere with the use of said parcel by Licensee for the purposes specified in Paragraph 2 hereof.

5. Licensee hereby grants to Licensor the exclusive right to provide water service from the inlet/outlet pipeline constructed by Licensee to connect the Kastania Reservoir with the Marin Aqueduct.

6. Licensee agrees to operate Kastania Reservoir and maintain the quality of water stored therein in such a manner that the quality of water delivered to Licensor from the Petaluma Aqueduct shall not be diminished.

7. Licensee shall keep and maintain the parcel described in Exhibit A in a safe, sanitary and sightly condition.

8. Licensee agrees to indemnify and save harmless Licensor against all loss, damage or expense which Licensor may sustain, incur or become liable for arising out of the use by Licensee of the Marin Aqueduct or the parcel described in Exhibit A.

9. This License shall become effective upon its execution by both parties hereto subject to review and approval by Licensor of Licensee's final designs and specifications for metering,

altitude valve control of flow to and from Kastania Reservoir, the single pipeline connection to said Reservoir, cathodic protection facilities and other appurtenant facilities. Thereafter the License shall remain in effect until terminated by mutual agreement of the parties hereto.

IN WITNESS WHEREOF, this License has been duly executed by the parties hereto as of the date first above written.

NORTH MARIN COUNTY WATER DISTRICT (Licensor)

By Barbara B. Munden

Title President, Board of Directors

SONOMA COUNTY WATER AGENCY (Licensee)

By Jack Gossett

Title Chairman

EXHIBIT A

Deed

ALFREDA HOFMANN,

the first party,

Hereby Grant *to*

NORTH MARIN COUNTY WATER DISTRICT, a public corporation.

the second party,

All that Real Property *situated in the*

County of Sonoma, *State of* California

bounded and described as follows:

BEGINNING at the Engineer's Station 816/90.00 on the "F1" line of the Department of Public Works' Survay for the State Freeway in SonomaCounty between one mile south of Petaluma and Cotati Road IV-Son. -1-F; thence S. 66° 09' 19.7" W., 135.00 feet to the point on the common boundary line of the properties now or formerly acquired by the State of Californi and Alfreda Hoffman as described in the deed recorded March 18, 1954, in Volume 1260, Page 596 of the Official Records of Sonoma County; thence along said boundary N. 30° 03' 26" W. 115.43 feet to the true point of beginning; thence along said boundary line N. 30° 03' 26" W. 80 feet; thence S. 59° 56' 34" W. 85 feet; thence S. 30° 03' 26" W. 80 feet; thence N. 59° 56' 34" E. 85 feet to the true point of beginning.

CONTAINING .156 of an acre more or less.

IN WITNESS WHEREOF the first party has executed this conveyance this

tenth *day of* August, 19 62.

Alfreda Hofmann

known to me to be the person ___ *described in and whose name* ___ *subscribed to the within instrument, and acknowledged to me that* ___ she ___ *executed the same.*

In Witness Whereof *I have hereunto set my hand and affixed my official seal in said* ___ *County of* Sonoma ___ *the day and year in this certificate first above written.*

David W. King

Notary Public in and for the ___
County of Sonoma ___, *State of California.*
My commission expires ___ DAVID W. KING
My Commission Expires March 21, 1966

H 38558

Deed

FAQED - CERESA

Alfreda Hofmann

TO

North Marin County Water District

Dated August 10, 19 62

3.63 mdec.

RETURN TO:
No. MARIN COUNTY
WATER DIST.
834 VALLEJO AVE
NOVATO, CALIF.

END OF DOCUMENT

AGREEMENT FOR USE OF SURPLUS CAPACITY

This agreement is made on November 15, 1990 by and between the City of Petaluma, hereinafter called Petaluma and the North Marin Water District, hereinafter called North Marin.

Whereas:

1. The parties hereto receive a major portion of their water supply pursuant to the agreement entitled "Agreement for Water Supply and Construction of Russian River - Cotati Intertie Project", signed by eight cities and districts and the Sonoma County Water Agency. Said agreement was initially executed on February 10, 1975 and was last amended on August 28, 1984 and is hereinafter referred to as the Master Agreement. Part 3 of the Master Agreement sets forth the delivery entitlements of the parties thereto which parties include Petaluma and North Marin. The Master Agreement terminates on June 30, 2014 but the agreement obligates Sonoma County Water Agency to enter into successive renewal agreements not to exceed 40 years each. North Marin and five other entities and districts who are parties to the Master Agreement are, as of September 1990, seeking amendment of the Master Agreement to increase their respective delivery entitlements and to provide the necessary facilities to accomplish delivery of said increases.

2. It is contemplated by the parties hereto that, from time to time, there will be capacity in the Petaluma Aqueduct and the north portion of the North Marin Aqueduct that will be in excess of the actual water requirements or delivery entitlements of the parties hereto.

3. The Sonoma County Water Agency is responsible for the installation,

maintenance, and operation of metering stations to determine the quantity of water it delivers to Petaluma and North Marin.

NOW THEREFORE THE PARTIES HERETO DO HEREBY AGREE AS FOLLOWS:

1. The terms used in this agreement shall have the same meaning as the terms used in the Master Agreement with the exception that a new term is added as follows:

"north portion of the North Marin Aqueduct" - means that portion of the 30-inch aqueduct owned by North Marin and extending from its northern terminus at the Veterans Hall near the intersection of Petaluma Boulevard South and McNear Avenue, southerly approximately 6400 feet to a point adjacent to Highway 101 lying just north of the City of Petaluma's River Dredging Disposal Site.

2. North Marin shall install a turnout facility at the southern end of the north portion of the North Marin Aqueduct. The turnout facility shall consist of a connection to the aqueduct and include a short length of 16-inch pipe fitted with an 8-inch turnout and blind flange, thence an in-line 16-inch valve with blind flange. The turnout facility shall be owned and operated by North Marin. Said turnout shall interconnect to a metering installation installed by Petaluma and which will be maintained and operated by Sonoma County Water Agency. The designs and specifications for the turnout facility shall be submitted by Petaluma to North Marin for review and approval. The designs and specifications for the metering installation, including length of pipeline between the turnout valve and the metering installation, shall be submitted by Petaluma to both North Marin and Sonoma County Water Agency for review and approval. Petaluma shall hire a contractor to install the metering

installation and to make the interconnection to North Marin's turnout facility. Said contractor shall be certified for underground construction, be fully bonded and shall provide North Marin with risk assurances and coverage as normally required by North Marin in its Standard Water Service Facilities Construction Agreement. The actual interconnection to the turnout shall be performed only in the presence of and to the satisfaction of North Marin's inspector.

3. North Marin shall bill Petaluma for the actual cost it incurs in installing the turnout facility, reviewing plans and specifications, and inspecting any work connected with Petaluma's project. Said costs shall include North Marin's normal overheads. Petaluma shall pay said bill within 30 days of receipt of an invoice. North Marin estimates these costs to be $12,000.

4. North Marin shall transport water delivered by the Sonoma County Water Agency through the north portion of the North Marin Aqueduct, thence through the turnout facility and meter installation to Petaluma. Risk of handling and loss of water shall pass to Petaluma at the 16-inch flange of the turnout facility. North Marin shall have or retain the option of having full control over the turnout valve to eliminate any operational problems that may arise for North Marin. If the situation arises that North Marin determines surplus capacity is not or shall no longer be available in the north portion of the North Marin Aqueduct, it shall notify Petaluma and Petaluma shall immediately undertake all actions necessary to construct its own pipeline connecting it's 16-inch line near the City of Petaluma's River Dredging Disposal Site directly to the aqueduct owned by the Sonoma County Water Agency. Upon such determination, North Marin shall be entitled to immediately discontinue transport of water to Petaluma under this agreement.

5. Petaluma shall not construct any turnouts from its 16-inch pipeline or render any service from its 16-inch pipeline to any customers located between North Marin's turnout facility and the Petaluma River without first obtaining North Marin's written consent.

6. North Marin makes no warranty regards the quality of water delivered to it for transport to Petaluma and shall make no charges for such transport of water to Petaluma except for prorated maintenance, repair and replacement costs actually incurred by North Marin on the north portion of the North Marin Aqueduct. North Marin shall bill Petaluma for said expenses and Petaluma shall pay same within 30 days of receipt of an invoice. The proportionate share to be paid by Petaluma shall be determined by North Marin by examining the amount of water delivered to Petaluma from the north portion of the North Marin Aqueduct for the prior twelve months in comparison to the total amount of water transported through said aqueduct section for the same period. North Marin shall retain the option of using a time period different than twelve months if it deems it is reasonable to do so.

7. Should Petaluma cause or experience an event which causes damage to any of North Marin's facilities, Petaluma shall upon receipt of an invoice, fully reimburse North Marin for any maintenance, repair or replacement costs incurred by North Marin to remedy such damage.

8. Petaluma shall defend, hold harmless and indemnify North Marin, its officers, employees and agents from and against all claims, demands, damages, costs, expenses, or liability arising out of or in connection with work performed or the delivery of water pursuant to this agreement, except for liability arising out of the sole negligence of North Marin or its

officers, employees or agents.

9. During periods when Petaluma is not using its full delivery entitlement, Petaluma consents to delivery of the unused amount of said delivery entitlement to North Marin.

10. Petaluma agrees to participate in negotiations leading to amendment of the Master Agreement and, to the extent it deems reasonable, support North Marin in its quest for an increase in delivery entitlement.

11. This agreement shall continue in full force and effect in accordance with the terms and provisions hereof until June 30, 2014. Should conditions permit, it is the intent of the parties hereto to extend this agreement such that the provisions of this agreement as may be amended shall continue and run concurrently with the term of the Master Agreement.

IN WITNESS WHEREOF THE PARTIES HAVE EXECUTED THIS AGREEMENT ON THE DATES HEREINAFTER SET FORTH, SAID AGREEMENT TO BECOME EFFECTIVE ON THE DATE THAT ALL PARTIES HAVE EXECUTED THIS AGREEMENT DATED NOVEMBER 15, 1990.

CITY OF PETALUMA

City Manager

Attest:

City Clerk

NORTH MARIN WATER DISTRICT

William W. Wright, President

Secretary

11/13/90jsr > c:\wp51\agreement\Petaluma.agr

Approved as to form:

City Attorney

Finance Director

City Engineer

Risk Manager

REVISED RESOLUTION 1230

RESOLUTION OF THE BOARD OF DIRECTORS
OF NORTH MARIN WATER DISTRICT INDICATING SUPPORT OF
COOPERATIVE PLANNING EFFORT FOR NOVATO-PETALUMA CORRIDOR
AND INTENT TO COMMUNICATE WITH ALL AFFECTED AGENCIES REGARDING ANY
PROPOSED NEW WATER SERVICE CONNECTIONS IN THE CORRIDOR

WHEREAS, it is the common goal of the Counties of Marin and Sonoma, and the Cities of Novato and Petaluma, to protect and maintain the agricultural open space nature and use of the lands located adjacent to Highway 101 on both sides of the Sonoma-Marin County line between the Cities of Novato and Petaluma and known as the Novato-Petaluma Corridor; and

WHEREAS, in 1975 the Cities of Novato and Petaluma adopted agreements in support of cooperative planning between the two cities; and

WHEREAS, the adopted general plans of the Counties of Marin and Sonoma, and the Cities of Novato and Petaluma, encourage the preservation of the agricultural open space character of the Novato-Petaluma Corridor; and

WHEREAS, the efforts of Marin and Sonoma Counties and the Cities of Novato and Petaluma to preserve and maintain the agricultural open space nature of the Petaluma-Novato corridor are of importance to and deserve the support of other public agencies also having jurisdiction, or other interest in the Novato-Petaluma Corridor; and

WHEREAS, it is in the mutual interest of all affected agencies to monitor land use activities within the Novato-Petaluma Corridor and communicate with each other relative to any proposed changes in land use, services or facilities regarding same; and,

WHEREAS, the North Marin Water District owns, operates and maintains a major water aqueduct traversing the length of the Novato-Petaluma Corridor,

NOW, THEREFORE, THE BOARD OF DIRECTORS OF NORTH MARIN WATER DISTRICT DOES HEREBY RESOLVE, DETERMINE AND FIND AS FOLLOWS:

1. This District does hereby endorse and support the joint efforts of the Counties of Marin and Sonoma and the Cities of Novato and Petaluma in developing and implementing cooperative land use policies and regulations in the Novato-Petaluma Corridor.

2. This District does hereby declare its intention to cooperate in this bi-county effort.

3. This District in recognition of its support and cooperation does hereby declare its intention to advise all affected agencies, particularly the Counties of Marin and Sonoma, their respective Local Agency Formation Commissions, and the Cities of Novato and Petaluma of any proposed new connections to the North Marin Aqueduct within said Novato-Petaluma Corridor; and will refrain from taking any action upon any such proposal until all affected agencies have been notified thereof and given the opportunity to comment thereon.

ATTACHMENT C
927

4. This District finds that the specific affected agencies referred to in this Resolution include: The County of Marin (Planning Department); the County of Sonoma (Planning Department and Fire Chief); the City of Novato; the City of Petaluma; the Sonoma County Local Agency Formation Commission; the Marin County Local Agency Formation Commission; the Sonoma County Water Agency; the Novato Sanitary District, the Marin County Open Space District; the Marin County Flood Control and Water Conservation District; and the Novato Fire Protection District.

* * * * *

Originally Adopted: July 1, 1975

Date of First Revision: January 21, 1992

I hereby certify that the foregoing is a true and complete copy of a revised resolution duly and regularly adopted by the Board of Directors of NORTH MARIN WATER DISTRICT at a regular meeting of said Board held on the 21st day of January, 1992 by the following vote:

AYES:	Directors Amaroli, Baker, Fritz, Schoonover, Wright
NOES:	None
ABSENT:	None
ABSTAINED:	None

Joyce S. Reed, Secretary
North Marin Water District

(SEAL)

NORTH MARIN WATER DISTRICT

POLICY STATEMENT

SERVICE FROM NORTH MARIN AQUEDUCT

This policy affects lands in Sonoma County which lie outside of the North Marin Water District Boundary and are located within or immediately adjacent to the Highway 101 Corridor which parallels the North Marin Aqueduct from the Petaluma Veterans Hall to the North at McNear Avenue in Petaluma (North Marin Aqueduct Station 0 Mile) to the old Sweeney Ranch near San Antonio Creek to the South (North Marin Aqueduct Station 4.5 Miles).

The nearest public water source to said lands is the North Marin Aqueduct. Historically North Marin, with the concurrence of Petaluma, has allowed connections to its aqueduct in the South Petaluma Industrial Area. North Marin, by License dated February 2, 1982, permits Sonoma County Water Agency to utilize the Northerly portion of the aqueduct from the Veterans Hall to the North end of Kastania Road (North Marin Aqueduct Station 2.0 Miles) to transport water to and from the Sonoma County Water Agency's Kastania Tank. Also, by Agreement dated November 15, 1990, North Marin transfers water from the Veterans Hall for the City of Petaluma to its 16-inch distribution main located just south of Rinehart's Truck Stop and Restaurant (North Marin Aqueduct Station 1.6 Miles). Both the license and agreement make the transfers subject to the prior needs of North Marin customers located in the Novato area.

North Marin is vitally concerned that the utility of its aqueduct, whose main function is to import water to Novato, not be diminished by the demands of corridor development along the aqueduct. The North Marin Water District Board of Directors have therefore decided that requests for connections to the North Marin Aqueduct to serve new development located in the Highway 101 Corridor and outside of the District's boundary shall be denied. Subject to hydraulics constraints as determined solely by the District and subject to the provisions of District Resolution 1230, water service exceptions to this policy that will be considered are:

(1) lands within the South Petaluma Specific Plan area which receive land use approval from the city;

(2) a few rare and isolated parcels within the corridor which have received previous commitments for service at the time that the District acquired the right-of-way for the aqueduct;

(3) dwellings preexisting May 17, 1977 (the original date of enactment of this policy) whose private source of water becomes contaminated or otherwise impaired; and,

(4) limited residential development of lands with frontage abutting Kastania Road, provided, said development is approved by Sonoma County.

Date first adopted: May 17, 1977
Date of Revision 1: January 21, 1992

ATTACHMENT D
929

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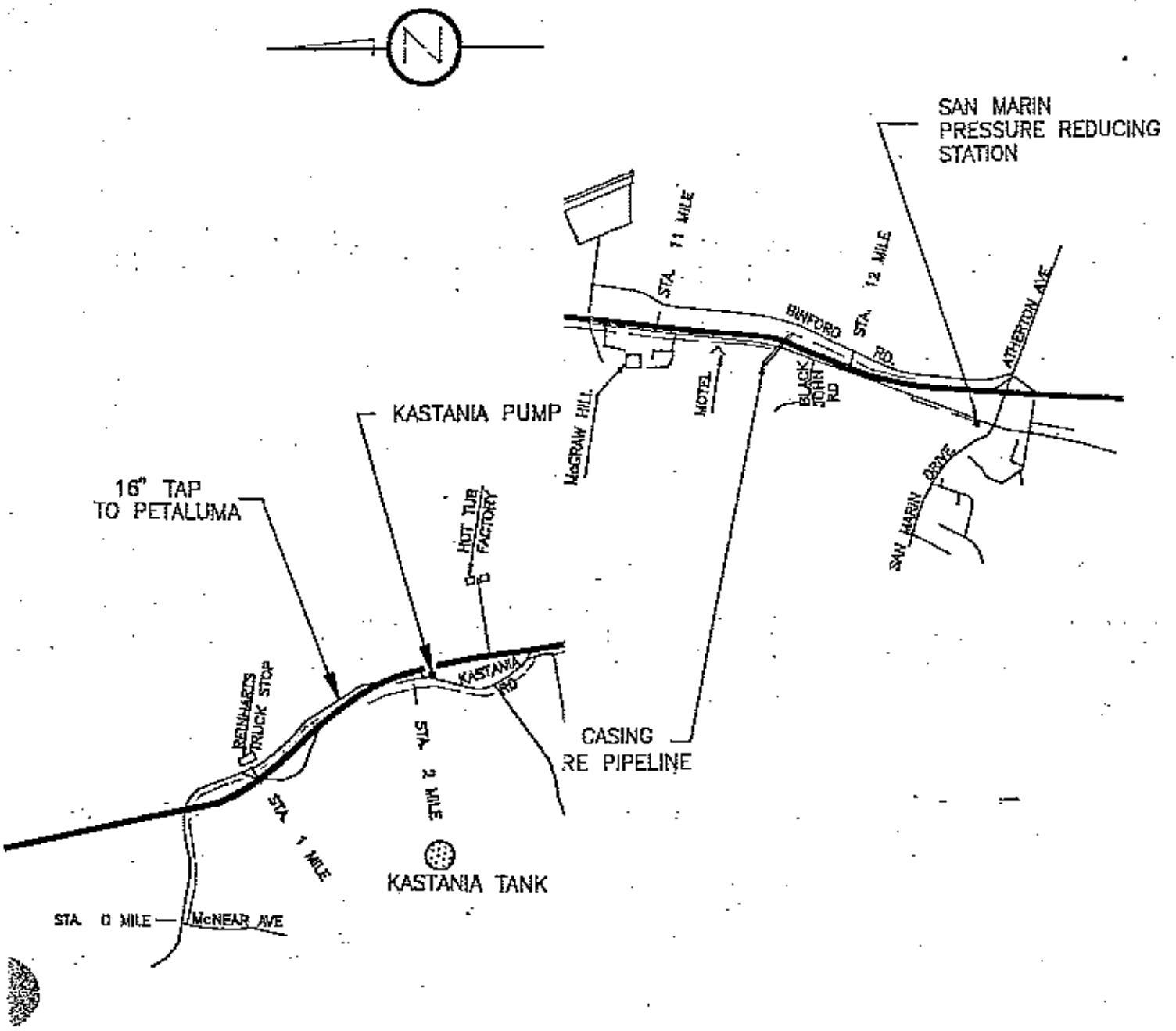

NORTH MARIN AQUEDUCT
HWY. 101 CORRIDOR

SCALE 1"=1300'±

Corrections suggested by North Marin Water District:
(John O. Nelson, Gen. Mgr., 415-897-4133 1/14/92)

H. PUBLIC SERVICES AND UTILITIES

This chapter describes existing public services and utility provisions in the study are vicinity, including water supply, sewer, police and fire protection services, schools, and electrical, natural gas, telephone, and cable television services. Public service related planning and development implications are also discussed.

1. WATER SUPPLY

a. Existing Water Facilities and Service

The City of Petaluma operates a municipal water distribution system. The city currently provides water within the city, and in various contiguous peripheral areas. The principal source of the city system water is the Sonoma County Water Agency (SCWA) regional supply system, which delivers water to the city and other users via the SCWA regional aqueduct. The primary source of water in the aqueduct is the Russian River. Water is taken from the river and chlorinated before being transferred into the aqueduct. Water quality is generally very good.[1]

The City also has 12 wells on emergency standby and a small surface water treatment plant to supplement the SCWA aqueduct supply. The surface water portion of the city's supply is relatively small; this water does not enter the SCWA aqueduct.

The south end of the city's water system currently terminates just south of McNear Avenue — of small diameter and are Existing city water line extensions into the study area are limited to some properties in the northwestern portion of the study area, including residences near McNear Avenue and the quarry. Water supply to the remainder of the study area west of US 101 is limited to individual, private, onsite wells. Specific details on the operation, quality, and adequacy of these wells are not available; however, it is likely that most would be at least 150-feet deep. The water-bearing zone in the Petaluma Valley alluvium is fractured and disconnected, and sustained water yields can vary considerably from well to well.

[1]Jim Flugem, Civil Engineer, Sonoma County Water Agency, personal communication, August 7, 1991.

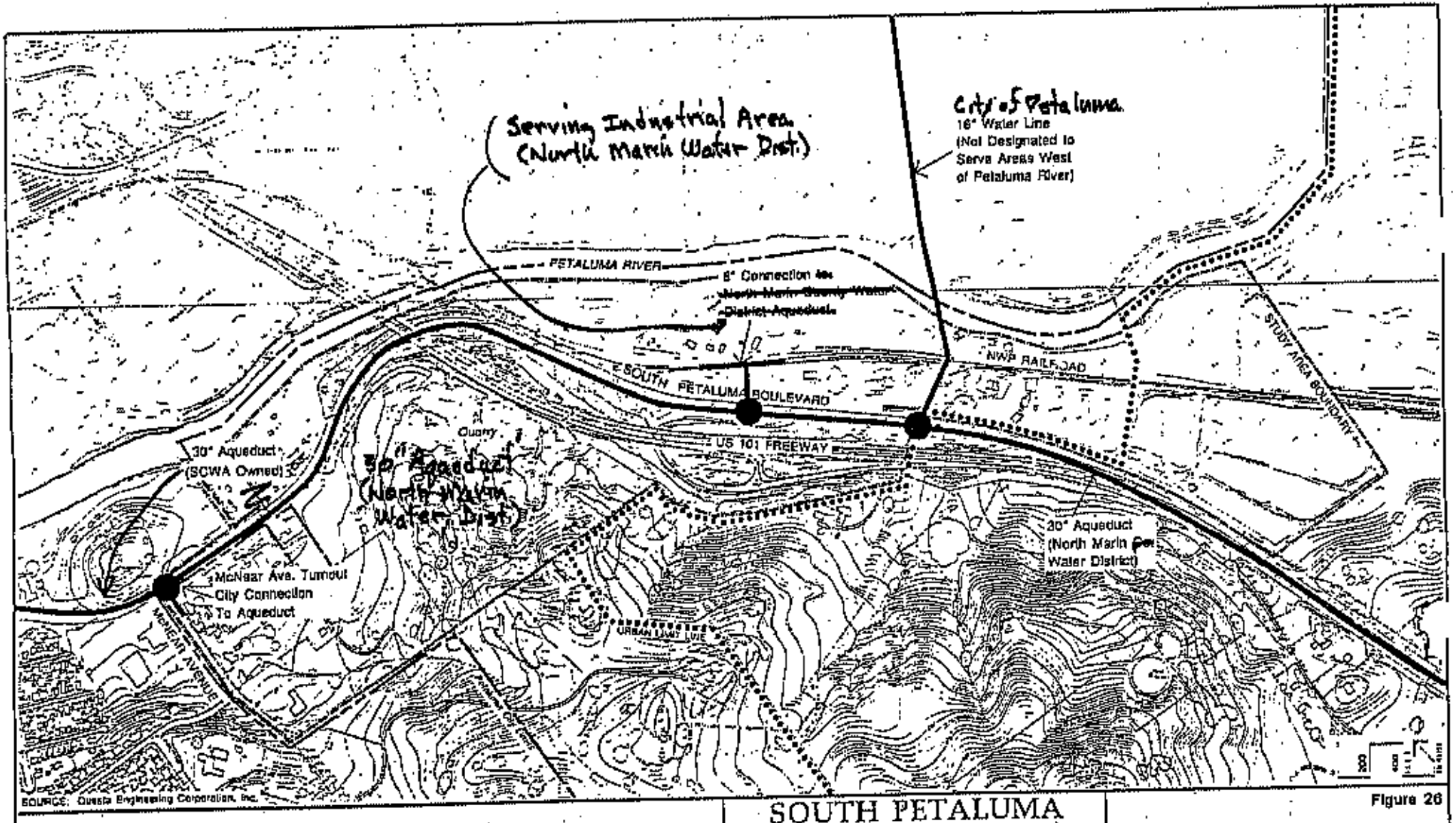

Figure 26

SOUTH PETALUMA BOULEVARD SPECIFIC PLAN

CITY OF PETALUMA, CALIFORNIA

EXISTING WATER SERVICE

owned by North Marin Water District (NMWD)

A ~~pen city~~ water system ~~currently~~ serves the portion of the study area east of US 101. This system includes an eight-inch main ~~owned by the North Marin County Water District (NMCWD),~~ and distribution system which connects to the NMCWD aqueduct, as shown in Figure 26. ~~That NMCWD aqueduct supply is also augmented by a few individual~~ onsite water wells.[1] There is no information on record with the Sonoma County Department of Environmental Health regarding ~~water quality in these wells.~~ private well water quality.

There also is at least one privately owned

The North Marin Aqueduct lies on the west side of South Petaluma Boulevard. At a point just south of the old Victorian house it crosses to the west side of the Hwy 101.

Most of

The 30-inch diameter NMCWD aqueduct passes through the study area along South Petaluma Boulevard, ~~and is part of the regional water supply system through which the Sonoma County Water Agency (SCWA) wholesales water. There are eight prime contractors, or users of this SCWA regional supply, including the City of Petaluma and the North Marin County Water District.~~ The ~~regional~~ aqueduct shown on Figure 26 is owned and maintained by the North Marin ~~County~~ Water District south of McNear Ave. ~~the Petaluma city limits,~~ and by the Sonoma County Water Agency north of that same point. The City of Petaluma has rights to connect to this aqueduct within the current city limits, and currently has seven active connections to the SCWA aqueduct ~~within the city limits and one connection south of the city limits.~~ In addition, the city recently constructed ~~this latter~~ connection to the North Marin ~~County~~ Aqueduct within the study area. From this connection, as shown in Figure 26, a water line extends to the east under the Petaluma River. This connection was constructed under an agreement between the city and the NMCWD which prohibits its use to serve areas west of the Petaluma River.[3] Additionally, the city has two inactive connections to the SCWA/~~NMCWD~~ aqueduct that are on standby for emergency purposes.[4]

The aqueduct connection at the McNear Avenue turnout shown in Figure 26 is the nearest city-controlled connection which could be used to serve the study area.

b. Water Supply Related Planning Implications

From a purely physical point of view, satisfactory water service to the study area could be provided by either the City of Petaluma or the North Marin ~~County~~ Water District with the appropriate upgrading and extension of these systems. ~~In both cases, the primary water source would be the 30-inch aqueduct which~~

[1]John Nelson, General Manager, North Marin County Water District, personal communication, August 7, 1991.

[2]Jim Flugem, Civil Engineer, Sonoma County Water Agency, personal communication, August 7, 1991.

[3]Tom Hargis, Director of Engineering, City of Petaluma, personal communication, August 6, 1991.

[4]Lou Hodge, Water Department Supervisor, City of Petaluma, personal communication, October 22, 1991.

working out an amended agreement to utilize the North Marin Aqueduct.

~~passes through the study area along South Petaluma Boulevard.~~ The least expensive and most direct ~~route for a connection to the aqueduct would be via the reach owned by the NMCWD. Such a connection would provide the most economical water service to the portion of the site located between Highway 101 and the Petaluma River.~~ If the city desires to provide water service to the study area, lines would have to be extended south from the McNear Avenue turnout, or an agreement would have to be reached with the NMCWD to ~~access their segment of the regional~~ utilize North Marin Aqueduct. Alternatively, it may be possible to amend the existing agreement between the city and NMCWD which prohibits the city from serving the study area from the new 16-inch onsite connection. An other possible ~~agreements include the redesignation of the boundary between the city's existing service area and the NMCWD service area.~~ is purchase and transfer of NMWD's 8 inch system to the City in conjunction with either extending a line from McNear one approach would be connection to our service from NMWD's Aqueduct and exis distribution system.

A properly designed water distribution system for the study area should incorporate a looped network with two or more connections to the aqueduct. A looped system would increase water supply reliability, since the failure of one connection or its piping would not prevent service through the other connection. Additionally, a looped system would make it easier to meet fire flow requirements, especially those associated with more intensive commercial and industrial development of the study area. The existing NMCWD connection at the site could be used as one of the two connections needed for a looped system, assumming the necessary transfer or agreements were worked out.

The extension of city service to the majority of the study area from the city's existing McNear Avenue aqueduct connection would necessitate the construction of at least 15,000 feet of water line extension south into the study area. Service from such a connection would not allow for a looped system, unless two parallel lines were extended south. Such a dual line extension would be unnecessarily expensive, since the lines would parallel the aqueduct for the entire distance. If the city desires to provide water service to the area, the preferable city service scenario would be the establishment of an agreement with the NMCWD to access their segment of the regional aqueduct at one or more points along South Petaluma Boulevard.

Under either a city or a NMCWD purveyor scenario, the existing NMCWD service connection to the study area could be augmented with an additional nearby connection to provide for a looped water supply network within the study area. ~~A properly sized new connection, along with the existing eight-inch connection, would be adequate to serve anticipated development in the study area.~~

We don't know this w/o making a hydraulic analysis.

If the study area is connected to the existing city system, most of the area would be within pressure Zone I of the city's water system; i.e., most of the study area is within the 60-foot elevation range served by Zone I. For development to occur above an elevation of 60 feet, pumps would be required to boost water pressure accordingly. Those areas within the study area which are above city pressure Zone I are located mostly west of US 101, and include most of the quarry. These higher pressure zones could best be served by the city water

system through an upgraded McNear Pump Station. Additional water storage would also be needed.

~~NMCWD service to portions of the study area above 60 feet would also be expected to require pumping for similar reasons.~~

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PETALUMA CITY SCHOOLS

PETALUMA CITY (ELEMENTARY) SCHOOL DISTRICT • PETALUMA JOINT UNION HIGH SCHOOL DISTRICT
200 Douglas Street, Petaluma, California 94952-2575 (707)778-4603 www.petalumacityschools.org

August 26, 2004

Pamela Tuft, Director of General Plan Administration
City Of Petaluma
27 Howard Street
Petaluma, Ca 94952

121

RE: Notice of Preparation of Draft Environmental Impact Report

Dear Pamela,

In reviewing the August 5, 2004 memo on "Notice of Preparation of Draft Environmental Impact Report", I was surprised that schools were not one of the "Potential Environmental Impacts To Be Considered." I know in our earlier discussion that you were working on a potential junior high and high school location to incorporate into the City of Petaluma General Plan 2025. A

In addition to new junior high and high schools, as the City grows some of our feeder elementary school districts will need to build elementary schools to meet the increase in student population in their attendance areas. Petaluma City (Elementary) School District is predominately developed, but this is not the case in the Waugh or Old Adobe School Districts attendance boundaries. As you know, the construction that occurred on the eastside of Petaluma in the '80's and 90's created the need for three additional elementary schools. As the City of Petaluma General Plan 2025 is developed a similar need for neighborhood elementary schools to serve growth has to be provided for. B

Thank you for the opportunity to provide this input as you proceed with the preparation of the draft environmental impact report.

Sincerely,

Steve Bolman,
Deputy Superintendent
Business and Administration

GRETA VIGUE, ED.D., SUPERINTENDENT
BOARD OF TRUSTEES: CHRISTINA KAUK, DEBORAH SLOAN, CAMILLE SAUVE, LOU STEINBERG, CAROLYN TENNYSON

Superintendent's Office (707) 778-4604 FAX (707) 778-4736
Instructional Services (707) 778-4618 FAX (707) 778-4785
Business Services (707) 778-4621 FAX (707) 778-4822
Human Resources (707) 778-5070 FAX (707) 778-4790

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September 30, 2004

Ms. Pamela Tuft, Planning Department
City of Petaluma
27 Howard Street
Petaluma, CA 94952

122

RE: NOTICE OF PREPARATION OF DRAFT ENVIRONMENTAL IMPACT REPORT (DEIR) FOR THE CITY OF PETALUMA GENERAL PLAN 2025

Dear Ms. Tuft:

The Sonoma County Water Agency (Agency) has reviewed the Notice of Preparation of the DEIR for the General Plan 2025 and, in response, submits the following comments.

1. In planning for water supply, please be aware that there are several constraints regarding the implementation of the Agency's Water Supply and Transmission System Project (WSTSP). Under the WSTSP, the Agency's water rights would be expanded from the current permit limit of 75,000 acre-feet per year (afy) to up to 101,000 afy. However, due to various constraints, the Agency cannot implement the WSTSP at this time. For further information regarding this issue, please refer to the letters sent to the Agency's water contractors, customers, and water diverters under the Agency's water rights, on August 11 and August 28, 2003. A

   In May 2004, demand on the Agency's water transmission system was approximately 75 million gallons per day (mgd). This is a significantly higher rate of delivery than in May of the prior year. Due to the possibility that demands on the transmission system this summer may exceed the reliable capacity of the transmission system, the Agency sent a letter to water transmission system customers on June 14, 2004 warning them of these potential shortfalls. This letter requests all water customers to implement water conservation measures, recycled water projects and/or increase the use of local ground water supplies immediately to reduce demand on the Agency's transmission system throughout this summer.

   These letters are attached for your reference and use.

2. Please refer to the Agency's February 26, 2003 letter, which is attached, for more comments regarding stormwater management, flood control, water supply, recycled water reuse, and other topics. B

P.O. Box 11628 - Santa Rosa, CA 95406 - 2150 W. College Avenue - Santa Rosa, CA 95401 - (707) 526-5370 - Fax (707) 544-6123

Thank you for the opportunity to comment. For questions regarding flooding and drainage issues, please contact Phil Wadsworth at 547-1945. For other questions please contact Marc Bautista at 547-1998 or bautista@scwa.ca.gov.

Sincerely,

Anne Crealock
Environmental Specialist

Enc

c Ken Goddard

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SONOMA COUNTY WATER AGENCY

June 14, 2004

TO: Water Transmission System Customers; Mayors; City Managers; City Councils

In May 2004, the Sonoma County Water Agency (Agency) delivered an average of approximately 75 million gallons per day (mgd) of water from the Agency's transmission system. This is a significantly higher rate of delivery than in May of the prior year. Currently, the Agency is delivering over 80 mgd. Assuming the same correlation between May and July/August demands as has occurred in the recent past, it is likely that demands on the transmission system this summer will substantially exceed the reliable capacity of the transmission system. This risk will increase dramatically during periods of above-average temperatures.

Given this risk, the Agency needs each of you to implement water conservation measures, recycled water projects and/or increase the use of your local ground water supplies immediately to reduce your demand on the Agency's transmission system throughout this summer. The Agency staff is completing a comprehensive analysis, and will be bringing this matter to the Agency's Board of Directors in the near future. Nevertheless, I ask that you not wait for formal action of the Board before you take steps to lower peak demands on the transmission system.

In December 1999, the Agency's Board of Directors evaluated the reliable production capacity of the Agency's water transmission system and determined that capacity to be limited to a monthly average of 84 million gallons per day. The Board called on its customers to implement water conservation measures and develop their own recycled water and local ground water supplies and storage to reduce the demands on the Agency's system. Also in response to the capacity limitation, the Agency and its largest customers entered into a Memorandum of Understanding (MOU), which allocated the Agency's existing capacity during the summer months. The allocations under the MOU for 2004 and 2005 assumed that Collector No. 6 and its connecting pipeline would be completed. However, these projects will not be completed until next summer at the earliest. Moreover, even when these projects are completed, if current trends continue, demands will exceed the system's capacity. As a result, the Agency's transmission system cannot presently reliably deliver the allocations listed in Table 1 of that MOU.

The MOU requires the Agency's customers to take certain actions to reduce the impact of the impairment to the Agency's transmission system. In particular, customers must use their "best efforts" to achieve and maintain standby local production capacity equal to approximately 40%, if feasible. Such an increase in local supply may also provide a future source to meet your demand for water above the amounts contemplated by the Eleventh Amended Agreement. In addition to the analysis I plan to present to the Board in late June, I also plan a Board workshop for this fall to review generally the capacity of the transmission system and local production capacity efforts. Agency staff will be contacting you for an update on the status of your efforts in this area before the workshop.

Your efforts to conserve water and to develop and use local supplies during the peak summer season are essential. Increased use of conservation, recycled water, and or local ground water supplies will ensure that sufficient water remains available to residents and businesses within your service area throughout

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summer months, particularly during periods of above-average temperatures when water demands are high.

Thank you for your attention to this important matter. If you have any questions regarding the foregoing or in any other respect, please feel free to call me.

Sincerely,

Michael Thompson for Randy Poole

Randy D. Poole
General Manager/Chief Engineer

Enc: Press Release

c: Board of Directors
Mike Chrystal - County Administrators
Jill Golis, Steve Shupe – County Counsel
State Department of Health Services, Drinking Water Field Operations, 50 D Street, Suite 200, Santa Rosa, CA 95404
City of Santa Rosa, Board of Public Utilities, 100 Santa Rosa Avenue, Santa Rosa, CA 95404

J:\u\Reven\WaterSupply.doc

SONOMA COUNTY WATER AGENCY

FILE: ZN/2-0-2

FILE:ZN/0-0-1 AGENCY WATER POLICY STATEMENT

February 26, 2003

Ms. Pamela Tuft, AICP
Director
Department of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952-6320

RE: PETALUMA GENERAL PLAN 2025: EXISTING CONDITIONS, OPPORTUNITIES, AND CHALLENGES REPORT

Dear Ms. Tuft:

The Sonoma County Water Agency staff (Agency) has reviewed the City of Petaluma (City) General Plan 2025: Existing Conditions, Opportunities, and Challenges Report (ECOC). In response, Agency staff submits the following comments.

GENERAL COMMENTS

SONOMA COUNTY WATER AGENCY WATER POLICY STATEMENT

During the Agency's recent Water Policy Statement workshop held on December 18, 2002, the Agency's Board of Directors (Board) directed staff to distribute a list of provisions recommended to the Board for coordinating activities with the Agency's water contractors or to be included in the upcoming Restructured Agreement for Water Supply. A number of provisions directly relate to information presented in the City's ECOC report. The applicable provisions and relationship to the Petaluma General Plan Update are described in detail below.

- **Require water contractors to implement minimum of 5 percent urban recycled water reuse (reuse must constitute 5 percent of total supply, including supply from non-SCWA sources; reuse may include groundwater protection for existing potable supplies or supplementation projects, and must offset use of Russian River water).** Under this provision, the overall goal is to promote the wise and sustainable use of water whereby recycled water is used to offset existing use of potable water. For example, the City has identified the Rooster Run Golf Course as an available user of recycled water whereby existing potable use for irrigation at the Golf Course would be discontinued. While this project presents a large step towards offsetting existing potable use, there may be additional opportunities to offset potable use including use of recycled water for landscaping, ball fields, roadway medians, or other areas that currently use potable supply. Agency staff estimate that with implementation of roughly 5-6% urban reuse, the City can eliminate the need to request new supplies of water from the Agency. In light of this, the Agency requests that the City study alternative uses for recycled water in their General Plan Water Resources section.

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- **Require Water Contractors desiring increased supply of water to make a formal presentation to Agency's Board of Directors (Board) requesting such increased supply.** Under this provision, if the City determined after exhaustive analyses that existing recycled water use and local supplies are not sufficient to meet future projected potable water demand, the City would make a presentation to the Agency's Board identifying and explaining the need for additional water supplies. As part of the City's request for additional water supply, the City would provide the following: (1) a resolution by the Petaluma City Council requesting additional water supply from the Agency; (2) a list of alternatives for achieving additional supply to be evaluated in an environmental document; (3) a plan for implementing urban reuse to maximize offset of Russian River water; and (4) a summary of the steps taken by the City to evaluate water supply needs and demands as part of the current general plan update.

- **Request the Water Contractors, Marin Municipal Water District (MMWD), Windsor, and other Russian River customers identify and take steps necessary to ensure that water supply, flood control, and sanitation activities within the Russian River watershed and other watersheds where listed fish species occur are conducted in a manner that is protective of listed fish species.** The City, as a prime water contractor, should address potential impacts of its current and future water supply, sanitation, and flood control activities and operations, as well as buildout of the proposed General Plan on listed federal and state species. In particular, as part of the General Plan Update, the City should examine the potential impacts of any project proposed adjacent to streams, waterways, or other water bodies that contain habitat for listed species, and take actions necessary to reduce and/or avoid impacts where feasible.

- **Request Water Contractors, MMWD, Windsor, and other Russian River customers to support recovery planning efforts for threatened salmonid species per the signed Memorandum of Understanding (MOU) for recovery planning between coastal California counties (including Marin and Sonoma), the NMFS, California Department of Fish and Game, and the U.S. Army Corps of Engineers, and to take such actions as are determined by the WAC to be necessary to support such recovery planning efforts.** Those entities contracting with the Agency for water supply are asked to support recovery planning efforts, including the policies and actions needed to achieve recovery of healthy and sustainable populations of salmon and steelhead within the North-central California Coast recovery planning domain. The Agency has identified the Lafferty Ranch Dam has a potential obstruction for the passage of steelhead (*Oncorhynchus mykiss*), a federally threatened species. As part of the recovery planning efforts, the City should evaluate the removal of the Lafferty Ranch Dam and the restoration of the habitat surrounding the dam, as part of the General Plan Update. In addition, there may be steps that the City can take to aid in the recovery of listed fish species. Activities may include stream restoration, fish passage improvement projects, or other activities identified during the recovery planning process. As part of the General Plan Update, the City should develop policies and actions to minimize the effects of General Plan implementation on listed fish species. For example, when completing the General Plan update, the City should: (1) assess the potential impacts of General Plan implementation on listed fish species; (2) include policies in the general plan that protect listed fish species; (3) provide policies in the general plan that promote restoration and enhancement of critical habitat for listed fish species: and where appropriate. (4) initiate ESA compliance activities as needed to address the general plan's potential impacts on listed fish species.

SPECIFIC DOCUMENT COMMENTS

Enclosed within this comment response letter, the Agency has included a copy of chapter 9: Water Resources of the City's ECOC. Within this copy, the Agency has provided the City with edits and comments to specific text within chapter 9 of the ECOC. In addition to the comments within the attached document, the Agency provides comments below:

SECTION 9.7 OPPORTUNITIES AND CHALLENGES(PAGE 9-34 THROUGH 9-47)

- **Surface Water Issues (page 9-34 through 9-39))**

1 Coordinating O&M of existing improved stormwater channels

The Agency maintains the hydraulic capacity of constructed flood control channels in Petaluma. Over the last two years, the Agency has conducted extensive vegetation management activities in the flood control channels in Petaluma. Additionally, the Agency also has continued its efforts to perform sediment removal and to obtain the necessary permits to conduct these services. The Agency has also coordinated these efforts with the City and the North Bay Watershed Association to coordinate hydraulic maintenance activities with restoration efforts on Thompson Creek. A similar coordinated project is planned for Corona Creek. In addition, the Agency has plans to initiate a Section 7 consultation under the ESA for Zone 2A activities. The Section 7 consultation process will be a cooperative effort between the U.S. Army Corps of Engineers (USACE), National Marine Fisheries Service (NMFS), Agency and the City. Preliminary meetings to discuss the breakdown of responsibilities have taken place and the process is expected to take three to four years.

As indicated in Interim Report 5, prepared by the USACE and the Agency as part of the Section 7 consultation process for the Russian River Biological Assessment, the Agency has worked with the various resource agencies to develop a channel maintenance program aimed at balancing riparian habitat needs with the need to maintain the hydraulic capacity of the flood control channels. The Agency has been operating under this program for several years. The Agency intends to work with various resource agencies to develop a channel maintenance program for Zone 2A similar to the program developed for the flood control zones in the Russian River watershed in Interim Report 5.

2 Establishing a stream maintenance program that allows the existence of a low flow channel

Paragraph 2 on page 9-35 of the ECOC, the last sentence states:

> The current regulatory-induced moratorium on stream channel capacity maintenance benefits neither the interests of aquatic habitat enhancement nor provides needed flood flow hydraulic capacity.

The term "moratorium" is an incorrect term in the context of this discussion. The Agency has curtailed some channel maintenance activity as a result of the federal listings of several threatened fish species.

In the past, the Agency has been working to develop low-flow channels in the flood control channels. An example of such a recent project is in Brush Creek in Santa Rosa. Additionally, the Agency is also working to obtain the necessary permits to perform a pilot maintenance project in Copeland Creek in Rohnert Park that would include sediment removal and installation of a low-flow channel. The Agency intends to use and improve the techniques being developed during these projects during other sediment maintenance projects in the future. In Petaluma, much of the flow in the creek channels during the dry-weather period comes from urban irrigation runoff. Such runoff may contain fertilizers and other roadway pollutants. Efforts to reduce such runoff would be greatly appreciated.

6 ***Preserving the economic investment in stormwater management infrastructure***

The last paragraph on page 9-37 of the ECOC states that Zone 2A was established more than 50 years ago. In fact Zone 2A was established in 1958, making it 45 years old. The ECOC also states that the Petaluma River Master Drainage Plan Update is limited to environmental enhancements. For clarification, the projects identified in the original master plan are being updated. With changing environmental regulations, several of the projects identified in the original plan could not be implemented. Therefore, alternatives to these original projects are currently being investigated and will be included within the update.

Paragraph 1 on page 9-38, of the ECOC states:

> Other than land use controls provided for in the Sonoma County General Plan, holistic watershed management planning and habitat conservation and enhancement planning for the basin as a whole has never been undertaken by SCWA. SCWA at present has no authority or mandate to participate in basin-wide watershed management planning, as a way of controlling or reducing the magnitude of future flood events.

Under California's Planning and Zoning law, the County of Sonoma and individual cities, not the Agency, adopt land use controls. The Agency is not a land use control entity and has no authority to develop or enforce land use regulations as part of the County General Plan or any other General Plan. The County of Sonoma and the Agency are separate legal entities. The Agency has provided comment to the County General Plan, but is not responsible for its creation or implementation.

Also in paragraph one, there is a sentence referring to a basin-wide watershed management plan and suggesting the Agency has no authority in this area. The Agency has the legal authority to participate in any basin-wide watershed management plan or any other watershed plan as directed by the Agency's Board of Directors. In order to be effective, however, any basin-wide watershed management plan would need to involve a cooperative effort between the County, City, Agency, North Bay Watershed Association, and other interested parties. Several sections of paragraph one are inaccurate and should be deleted or extensively rewritten. Edits described above are included within the attached marked up copy of the ECOC.

Paragraph 2 on page 9-38, of the ECOC states:

> Prioritization regarding how Zone 2A flood control and O&M funds are to be spent does not include sufficient local input to assure that funds are spent in accordance with locally identified needs. The Zone 2A funding authority is subject to renewal is 2006.

Paragraph two of this section states that there is not sufficient local input to insure that Zone 2A funds are spent according to locally identified needs. Projects using Zone 2A funds are currently recommended by an Advisory Committee made up of six local citizens appointed by the Agency's Board of Directors and a representative from the Petaluma City Council. In addition this paragraph states that the Zone 2A funding authority is up for renewal in 2006. Only a portion of the funding, the special assessment, is up for renewal. The remainder of the funding, a portion of the Countywide property tax, will remain in place after 2006, assuming no action from the State to reallocate the funds as part of the State budget crisis. Numerous sections of paragraph two are inaccurate and should be deleted or extensively rewritten. Edits described above are included within the attached marked up copy of the ECOC.

Paragraph 3 on page 9-38, of the ECOC states:

A solution would be to revise the SCWA mandate to encourage a basin-wide watershed management plan, revise the Zone 2A funding allocation process to allocate funds by area collected for the greatest local benefit, and revise the Zone 2A Advisory Committee to give the City greater say in capital projects and maintenance activities.

The ECOC implies that the City has not received an adequate percentage of Zone 2A funding and suggests revision of the allocation process. According to Agency records, approximately $15,366,000 of Zone 2A money has been spent since 1986; $12,240,00 in the City and $3,126,000 in the County. Thus, approximately 80% of Zone 2A funds have been spent in the City. This does not include a further $1,632,000 requested by the City, but not yet recommended by the Advisory Committee.

In general the City does not adequately address the two major issues that it is facing. The first is the upcoming implementation of Phase II of the National Pollutant Discharge Elimination System and the second is the Section 7 consultation with the NMFS. These two items will determine the direction of flood control in the Petaluma River watershed for the next generation.

Thank you for the opportunity to comment. The Agency would be happy to meet with you or your staff regarding comments and issues raised in this correspondence. For surface water issues, please contact Cordel Stillman at 547-1953. For any other questions, I can be contacted at 547-1922.

Sincerely,

William J. Keene

William J. Keene, AICP
Principal Environmental Specialist

c Randy D. Poole, Jay Jasperse, Pam Jeane, Mike Thompson, Cordel Stillman, Renee Webber, Erica Phelps, Marc Bautista

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FILE: WC/60-2-7 MOU-WATER TRANS. SYSTEM CAPACITY...
WC/49-5.1-7 RUSSIAN RIVER CWD & WC/49-5.1-7 WINDSOR WATER DIST
& WC/60-2-7 PRIMES & WC/60-2-7 MMWD
& WC/60-2-7 KENWOOD VILLAGE WATER COMPANY
WC/60-2-7 PENNGROVE WATER COMPANY
WC/60-2-7 LAWNDALE MUTUAL WATER COMPANY
WC/60-2-7 CALIF AMERICAN WATER COMPANY

August 11, 2003

TO: All Contractors, Customers, and Water Diverters under Agency Rights

RE: STATUS UPDATE REGARDING RUSSIAN RIVER DIVERSIONS REPORTED UNDER SONOMA COUNTY WATER AGENCY DIVERSION/REDIVERSION RIGHTS (1993 – 2002) AND LIMITATIONS ON THESE RIGHTS

The purpose of this letter is to provide you with current information regarding the Sonoma County Water Agency's (Agency) Russian River water supply and offer the Agency's assistance in compiling the data necessary to evaluate and track the adequacy of the remaining supply. We hope the information will assist you in preparing the water supply assessments and CEQA analysis now required by state law and in complying with Section 8(a) of the Memorandum of Understanding Regarding Water Transmission System Capacity Allocation among the Agency's water contractors, Marin Municipal Water District (MMWD), and the Town of Windsor (MOU).

The Sonoma County Water Agency's state water rights permits limit the Agency's Russian River diversions and rediversions to 75,000 acre feet per year. The Agency's Water Supply and Transmission System Project ("WSTSP") had contemplated an increase in diversions and rediversions to 101,000 afy. However, with the Court of Appeal decision in the *Friends of the Eel River* litigation, the Agency cannot implement the WSTSP at this time. Thus, it would be inappropriate for water suppliers relying on water diverted under the Agency's water rights to anticipate water deliveries based upon diversions of 101,000 afy, or to rely on the delivery estimates in the Agency's Urban Water Management Plan 2000 (which indicated that water supplies available to the Agency's water transmission customers would be adequate over the next 20 years.) However, the analysis contained in the Urban Water Management Plan of the quantity of water available for diversion and rediversion remains valid.

Last year the Agency reported diversions and rediversions of 63,841 acre-feet, well below the Agency's current 75,000 afy limit. However, the additional amount of water that will be used by projects within the Agency's customers' service areas that have been approved but not yet completed is unknown. This information must be compiled in order to determine how much of the 75,000 afy remains available for projects that have yet to be approved.

The Agency's water supply and transmission facilities provide a primary water supply to a number of public water suppliers. In addition, other public water suppliers divert water directly from the Russian River under the Agency's water rights but do not use the Agency's water supply and transmission system. The enclosed table lists the public water suppliers that receive Russian River water under the Agency's water rights. The Agency's water supply facilities include five collector wells and seven conventional wells along the Russian River near Forestville. A sixth collector well is under construction and should be

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completed in the summer of 2004. In addition, the Agency operates three wells in the Santa Rosa Plain to augment production capacity of the Russian River water supply facilities. The Agency's diversion of water from the Russian River is regulated by appropriative water right permits administered by the State Water Resource Control Board (SWRCB). The Agency developed the WSTSP to meet the future water demand that is contemplated by approved general plans governing the service areas of the Agency's contractors and customers. A component of the WSTSP consists of increasing the authorized total annual limit on diversions under the Agency's water rights from the currently approved 75,000 afy to the 101,000 afy discussed above. In the *Friends of the Eel River* litigation, the Court of Appeal concluded that the Agency's Environmental Impact Report (EIR) for the WSTSP was inadequate because it did not adequately consider the potential effects on the Russian River of potential reductions in diversions by PG&E's Potter Valley Project from the Eel River into the Russian River. Consequently, the WSTSP EIR must be supplemented to address the issues raised in the Court of Appeal ruling, and the Agency's Board of Directors must then reconsider the WSTSP. Until these issues are resolved and the SWRCB approves an increase in the annual limit in the Agency's water-right permits, the Agency's Russian River water supply will be subject to the existing limit of 75,000 afy.

In addition, as you are aware, coho salmon, steelhead, and Chinook salmon in the Russian River and its tributaries have been listed as "threatened species" under the federal Endangered Species Act (ESA). In response to these listings, the Agency, the U.S. Army Corps of Engineers, and the Mendocino County Russian River Flood Control and Water Conservation Improvement District are involved in a Section 7 Consultation under the ESA with NOAA Fisheries (formerly National Marine Fisheries Service). One of the objectives of the Section 7 consultation is to ensure compliance of the Agency's operation of its current and future facilities with the ESA. The Agency does not expect to be able to seek approval from the SWRCB for any permanent increase in the 75,000 afy limit until the consultation has been completed.

The enclosed chart presents the past 10 years (1993 through 2002) of Russian River diversions under the Agency's water rights entitlement. The total diversions for water year 2002 from the Russian River under the Agency's water rights were 63,841 acre-feet. These diversions include: (1) water diverted to the Agency's transmission system for its contractors and customers (59,803 acre-feet in 2002); and (2) water diverted by other entities (4,038 acre-feet in 2002) under the Agency's water rights (i.e., the Russian River County Water District and the Town of Windsor) as authorized by contracts with the Agency. The enclosed chart does not include water that may in the future be diverted (but is not currently diverted) under the Agency's water rights by the City of Healdsburg, the Occidental Community Services District, and the Camp Meeker Parks and Recreation District under their contracts with the Agency. The petitions that would amend the Agency's water-rights permits to authorize these diversions are pending before, but have not been acted on, by the SWRCB.

As previously mentioned, the Agency is providing this information to assist in the planning and CEQA activities of all public water suppliers that receive water from the Agency's water supply and transmission system facilities and those suppliers that report some of their diversions under the Agency's water rights. These planning efforts include complying with recent legislation requiring that public water suppliers with 3,000 or more service connections prepare water supply assessments (SB610) or verification of sufficient water supply (SB 221) for certain development projects. Because there may be substantial delays before the Agency completes the supplemental WSTSP EIR and the Board of Directors reconsiders the WSTSP, managers of all public water systems relying on water diverted under the Agency's water rights must work together with local planning agencies to determine the extent to which additional supplies are available to each system for proposed new developments, given existing demand, existing approved development, the

[1] The MOU was signed by the Cities of Santa Rosa, Rohnert Park, Cotati, Sonoma, and Petaluma; the Valley of the Moon Water District, the Forestville Water District, the North Marin Water District, the Town of Windsor, the Marin Municipal Water District, and the Sonoma County Water Agency.

water remaining available under the Agency's 75,000 afy limit and other supplies that each public water supplier may have available. While the Agency is in a position to monitor the amount of water that it delivers and is diverted under its water rights and provide that information to you, the Agency does not monitor either the amount of water you obtain from non-Agency sources or the planning and development within the service areas of each public water supplier.

As you know, Section 8(a) of the MOU, copy enclosed, specifies that the parties to the MOU will "consult with agencies that have planning and zoning powers within their water service territories." To provide a meaningful assessment and monitoring of water demand, the Agency urges your organization to undertake the coordination efforts outlined below. These activities should be coordinated with all water suppliers using Russian River water diverted under the Agency's water rights and their respective land use planning agencies. The MOU will expire on September 30, 2005 and the coordination outlined below will provide a basis for renegotiation of a successor agreement.

So that the Agency may assist you in the needed assessment, we recommend the following:

1. All water suppliers relying (entirely or in part) on water diverted under the Agency's water rights should immediately evaluate the expected future water demands for existing and approved development projects and provide the Agency and each other with that information. You should also identify the source of water for the projects (from the Agency, recycled, or other);

2. The Agency will compile the information and prepare a report for you so that you will be aware of how much of the 75,000 afy remains available for projects not yet authorized and approved;

3. All water suppliers should then evaluate the future water demands anticipated from proposed, but not yet approved, development projects. Again, upon receipt of the information, the Agency will compile the information into a report for each of you.

4. Staff of the Agency and water suppliers should meet at least every 6 months to review the information and monitor the status of proposed projects and identify other steps as may be necessary.

In the future, the Agency will also be able to compare actual diversions with previous estimates to track actual demand relative to estimated demand. Effective planning coordination activities will ensure our continued ability to provide a safe and reliable water supply. Should you have any questions regarding this matter please call either Pam Jeane or Jay Jasperse of my staff.

Sincerely,

Randy D. Poole
General Manager/Chief Engineer

Encs

c George Hicks, Jim Flugum – City of Healdsburg
Pete Parkinson – PRMD
Board of Directors
Pam Jeane, Jay Jasperse, Chris Murray, Bill Keene - SCWA

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SONOMA WATER

FILE: WC/60-2-7 MOU-WATER TRANS. SYSTEM CAPACITY,
WC/49-5.1-7 RUSSIAN RIVER CWD & WC/49-5.1-7 WINDSOR WATER DIST
& WC/60-2-7 PRIMES & WC/60-2-7 MWD
& WC/60-2-7 KENWOOD VILLAGE WATER COMPANY
WC/60-2-7 PENNGROVE WATER COMPANY
WC/60-2-7 LAWNDALE MUTUAL WATER COMPANY
WC/60-2-7 CALIF AMERICAN WATER COMPANY

August 28, 2003

TO: All Contractors, Customers, and Water Diverters under Agency Water Rights

RE: **COORDINATION ACTIVITIES REGARDING RUSSIAN RIVER WATER SUPPLY DIVERSIONS**

This letter serves as a follow-up to the August 11, 2003 letter we sent to all Agency contractors, customers, and other diverters under the Agency's water rights (water suppliers). That letter (see attached) reiterated that the Agency's existing water rights for diversion/rediversion of Russian River water is currently limited to 75,000 acre-feet per year (afy). Additionally, as I have discussed with many of you, the letter emphasized that all water suppliers need to coordinate with the appropriate planning and zoning agencies and each other to monitor and assess water demand[1] to ensure a continued safe and reliable water supply. We request that you each provide the Agency the information identified in the previous letter and summarized below by the end of this water year, September 30, 2003.

Specifically, all water suppliers that rely (entirely or in part) on water diverted under the Agency's water rights are requested to:

1. Evaluate the expected future water demands for the existing and approved development projects and also identify the source of water for the projects (i.e., Agency supplied water, recycled water, conserved water, groundwater, or other).

2. Estimate future water demands anticipated from proposed, but not yet approved, development projects and also identify the source of water for those projects. This estimate will not be the entire future demand contemplated by your general plan but will be based on development proposals or applications that are not yet approved but for which there is an identified project.

[1] Consistent with the Memorandum of Understanding Regarding Water Transmission System Capacity Allocation signed by the Agency's contractors, Marin Municipal Water District, the Town of Windsor, and the Agency.

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Because the 75,000 acre-foot annual limit is based on water year (October 1 through September 30), we request that you provide this information by September 30, 2003 so that we can provide an update for the current water year ending September 30th. Once we receive this information, we will compile it into an assessment containing:

- The total amount of actual water diverted during the latest water year based on records of Agency diversions and records received from non-transmission system water suppliers that divert under Agency water rights.
- The anticipated future water demand based on approved development projects from all the water suppliers.
- The estimated future water demand based on proposed but not approved projects.

Once the Agency's assessment is distributed, we will schedule a coordinating meeting with the water suppliers and the Agency to discuss the evaluation, projections of future water demands, and whether any modifications to this approach are appropriate. We appreciate your prompt attention to this request. If you have any questions regarding this matter or would like to meet and discuss the requested information, please call me at (707) 547-1959.

Sincerely,

James L. Jaspers, P.E.
Deputy Chief Engineer

Enc

c Jim Flugum, George Hicks - City of Healdsburg
Randy Poole, Pam Jeane, Chris Murray, Bill Keene – Sonoma County Water Agency
Board of Supervisor

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SEP 10 2004
PAMELA TUFT

SONOMA COUNTY
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

2550 Ventura Avenue Santa Rosa, CA 95403 (707) 527-1900 FAX (707) 527-1103

September 9, 2004

City of Petaluma
27 Howard Street
Petaluma, California 94952

Att: Pamela Tuft, Director
Department of General Plan Administration

123

Re: Response to Notice of Preparation of EIR
for City of Petaluma General Plan 2025

Dear Ms. Tuft:

Thank you for the opportunity to comment on the Notice of Preparation for the City's General Plan EIR. Due to the preliminary nature of the project now proposed, our comments focus on the possible contents and impacts of the complete General Plan being prepared. Following are the types of information that the EIR should contain.

General

- How mitigation measures are incorporated into text policies. A
- Rationale for the planning area boundary covered by the City's General Plan.

Land Use B

- Estimates of the development allowed by each land use designation category.
- Inconsistencies between the proposed plan and currently adopted plans and, particularly, the differences between the City's proposed land use plan designations and the current land use designations of the Sonoma County General Plan.
- Any plan proposals to annex and/or develop lands outside the Urban Service boundary shown on the County Land Use Plan Map.
- Impacts of proposed urban uses and recreational facilities on the adjacent agricultural and rural uses, including noise, lights, trespass, vandalism, drainage, traffic and odors.
- Exposure of new urban uses at the community's perimeter to the odors, chemicals and noise associated with agricultural uses.

C

Open Space

- If urban development is proposed in the County's designated Community Separators, consistency with County policies for such areas.
- Building setbacks, landscaping, sign controls and other mechanisms to provide visual protection along the County-designated Scenic Corridors (Highways 101 and 116, Adobe Road, Bodega Avenue, and Petaluma Hill Road).
- Limitations on development and vegetation removal to protect the biotic habitat along the County-designated riparian corridors (Petaluma River and Lichau Creek).

Traffic

- Long-term effects of future traffic loads on the major linkages serving predominantly regional traffic and inter-community trips (Highways 101 and 116, Adobe Road, Frates Road Lakeville Highway and Petaluma-Valley Ford Road) and on the road system in the surrounding area. D
- Daily and peak-hour traffic and levels of service for existing conditions, for existing conditions plus projected traffic generated by new development proposed by the City's plan, and for projected cumulative traffic levels anticipated from all future development in the region.
- Traffic mitigation measures, including signalization of intersections, travel lanes, turn lanes, maintaining appropriate levels of service, reducing peak-hour vehicle use and, if the City is considering additional regional retail or industrial employment which would generate substantial additional inter-community trips, cooperative fair-share solutions to regional problems.
- Specific attention to traffic impacts in the community of Penngrove and the rural residential areas west of Petaluma.

Water

- Projected water needs evaluated against the City's contractual agreements, storage capacity and use of groundwater. E
- Projected wastewater evaluated against the City's capacity for collection, treatment and disposat.
- Proposed conservation, recycling and reuse of water resources.

We appreciate the opportunity to provide comments and look forward to the completion of the draft General Plan and EIR. If you have any questions about this letter or County policies, please feel free to call me at 527-7386.

Sincerely,

Robert Gaiser

Robert Gaiser
Planner III

Copies: Board of Supervisors
CAO
SCPRMD: Pete Parkinson, Jennifer Barrett, Greg Carr
SCTPW: John Kottage
SCAP&OSD: Lori MacNab

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COUNTY OF SONOMA
GUIDELINES FOR TRAFFIC STUDIES

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- B. Traffic Studies
- C. Traffic Impact Analysis Requirements for Private Project Review Table
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- F. Thresholds

II. Attachments

- A. Standards for Traffic Studies
- B. Peak Hour Trip Generation Table
- C. Traffic Impacts Thresholds of Significance Criteria

COUNTY OF SONOMA
GUIDELINES FOR TRAFFIC STUDIES

INTRODUCTION

The Permit and Resource Management Department (PRMD) and the Department of Transportation and Public Works (DTPW) are both responsible for the review and condition of private development projects. Traffic related conditions must be based on an analysis of the potential traffic impacts that establish a reasonable nexus between the impacts of the project and the required improvements or conditions. Conditions requiring traffic improvements must be roughly proportional to the impact of the project and/or reflect a fair share contribution toward improvements related to cumulative impacts. Recent case law has determined that conformance with adopted standards and/or payment of impact fees may not, in and of itself, provide sufficient mitigation.

TRAFFIC STUDIES

A traffic study report prepared by a registered traffic engineer will be required when it appears that the criteria or any of the thresholds of significance identified below will be exceeded. The traffic study and any required peer review shall be provided at the sole expense of the applicant. Applications for development permits are considered incomplete until all required information is submitted and accepted as accurate and complete by PRMD. Peer review of traffic reports is required on all projects affecting State highways and may be required of any traffic study submitted by the applicant at the discretion of the PRMD or DTPW. Alternatively, the County may contract directly for a traffic study on behalf of an applicant and charge the cost to the applicant without requiring a peer review.

A previous traffic study for the development under review will only be acceptable if it is less than two (2) years old and only if the context in the general area has not changed significantly i.e. new development, changes in roadways, and/or land use or area plans have not occurred since preparation of the report.

The format and content of a traffic study should follow the outline provided in Attachment A, unless a different scope of work is approved by both PRMD and DTPW. If the project affects a State highway, Caltrans minimum requirements must also be included as defined in Caltrans', "*Guide for the Preparation of Traffic Impact Studies*", available on-line or at DTPW or PRMD.

The following table provides a preliminary method for determining whether a traffic study is required and what type of study should be completed on a preliminary trip generation estimate for the critical peak hour. A preliminary estimate of peak hour trip generation for various land uses is provided in Attachment B. However, the critical peak hour may vary from location to location and by the type of use such that these tables should be used for a preliminary determination only. In any case, DTPW and PRMD staff may require a traffic study to address specific issues related to a project's access, on-site circulation, parking or other issues that arise during the review process, regardless of the preliminary method used in the attached tables.

TRAFFIC IMPACT ANALYSIS REQUIREMENTS FOR PRIVATE PROJECT REVIEW

	Criteria[1]	Yes	No	Type of Traffic Analysis Required
A.	Is the proposed project located on or accessed from a State Highway?			If Yes, answer A1; If No, answer Section B.
	1. Is the state highway or area intersections currently or projected to operate at LOS D or worse?			If Yes, then a Full Traffic Study is required. If No, then answer A2.
	2. Will the project generate over 10 Critical Peak Hour trips?			If Yes, then a Focused Traffic Study may be required.
B.	Is the project located in a study area where one or more streets or intersections are currently or projected to operate at LOS D or worse?			If Yes, then a Full Traffic Study is required? If No, then answer Section C.
C.	Is the proposed project located in a study area where streets and intersections are currently or projected to operate at LOS C or better?			If Yes, then a Trip Generation Analysis is required and respond to questions C1 through C6 below.
	1. Is the proposed project anticipated to generate less than 10 vehicle-trips in the critical peak hour?			If Yes, no further traffic analysis is required.
	2. Is the proposed project anticipated to generate more than 10 but less than 25 vehicle-trips in the critical peak hour?			If Yes, only a Focused Traffic Study is required.
	3. Is the proposed project anticipated to generate more than 25 vehicle-trips in the critical peak hour?			If Yes, conduct a Full Traffic Study.
	4. Is the project located in an area with potential hazard conditions?			If Yes, a Focused Traffic Study is required.
	5. Is the proposed project anticipated to have a significant effect on the environment and may require an Environmental Impact Report (EIR)?			If Yes, a Full Traffic Study is required for incorporation into an EIR.
	6. Is the proposed project not easily categorized into one of the above categories?			If Yes, contact the Permit and Resource Management Department (PRMD) and the Department of Transportation and Public Works (DTPW) for assistance.

[1] Criteria applies to all controlled intersections except for driveways and minor side streets that have more than 30 vehicle trips per hour per approach or exclusive left turn movement.

TRAFFIC STUDY PROTOCOL

A meeting with staff from PRMD and DTPW is recommended prior to beginning the study to define the required area and scope. If the project is located on or near a State highway consultation with Caltrans is also necessary. Topics for discussion should include study area, location and timing or traffic counts, trip generation, directional distribution of traffic, trip assignment, intersection analysis and methods of projection of build-out volume. The traffic study should include analysis of adjacent local roadways and intersections located in the vicinity, including all intersections which are operating near or below thresholds in the general area. Traffic studies should also identify and evaluate the nearest access to State highways or nearest major County roadway.

Five (5) copies of the study shall be submitted to PRMD and one (1) copy shall be submitted to DTPW-Land Development Division Manager. The report will be referred to Caltrans and other agencies (i.e. SCTA, affected cities) for comment. Once accepted by PRMD and DTPW, the traffic study will be incorporated into the environmental document for the project. The environmental document will then be made available for public review and circulated to responsible agencies prior to the hearing date.

TRAFFIC IMPACT ANALYSIS METHODS

1. Study Area: Traffic studies must identify the study area including the nearest access to State highways or major County roadways in the vicinity. If the area is significantly affected by existing regional traffic patterns, then a larger study area may be needed to adequately address the traffic issues.

2. Methodology: Traffic studies should utilize current methods and practices as defined by Caltrans in the most recently adopted "Guide for the Preparation of Traffic Impact Studies" and the most current Institute of Transportation (ITE) trip generation rates or other measured counts as approved by DTPW.

   The "Florida Guidelines" available at DTPW provide pre-calculated tables for different roadway configurations that may be used for an initial determination of delay on existing roadways.

3. Future Roadway Improvements: All assumptions used in the analysis must be clearly stated in the report. Planned roadway improvements shall only be included in the traffic analysis if the improvement project has been fully funded and programmed for construction. The traffic report must identify the specific improvements, funding source and time-frame for completion of any included roadway improvements.

4. Future Land Use: Projection of future land uses and development should be made in consultation with planning staff at PRMD. A minimum 10-year growth projection is required for an interim evaluation and a long-term growth projection to 2020 is required for cumulative impact analysis consistent with the General Plan. The Countywide traffic model which is maintained and updated by the Sonoma County Transportation Authority should be used for 2020 projected traffic volumes. The analysis must identify projects in the study area that have been approved but not yet built, projects that are pending approvals, as well as general projections of growth within or affecting the study area. A tabulation of land uses by type and parcel number with the respective trip generation rates must be identified.

THRESHOLDS

1. State Highways: The impact of a project on a State highway shall be evaluated based on criteria established by Caltrans in the "*Guide for the Preparation of Traffic Impact Studies*", as amended from time to time available on the internet at:

   http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf

   Additionally, for analysis of cumulative impact, the "Traffic Impact Thresholds of Significance Criteria" for the County road systems identified in Attachment C shall be used to supplement Caltrans standards on State highways.

2. County Roads: Traffic Impact Thresholds of Significance Criteria "for evaluating traffic impacts on County roadways are defined in Attachment C. The County's standard for roadway segments is to maintain LOS C on the County roadway system as defined in the Sonoma County General Plan. The standard for intersections is to provide LOS D or better at build-out of the General Plan. Projects which take up significant existing reserve capacity at an intersection may have a significant traffic impact if the cumulative analysis indicates that the LOS deteriorates below the County standards.

3. Mitigation Measures: In order to reduce project impacts to levels of insignificance the proposed mitigation measures must result in post-development affected intersections and roadways that have an LOS that is no worse than the pre-project LOS; reduce safety impacts to insignificance by bringing the site up to Caltrans design standards; and provide adequate parking and alternative transportation facilities consistent with County plans and policies. The scope of the mitigation measures must reduce the project's impact below the identifiable thresholds found in Attachment C.

   The payment of countywide traffic impact fees in and of itself may not be adequate to mitigate a project's local impacts if the existing facilities are already below standard and the required improvements are not fully funded or programmed to be operational at the time of the project's completion. The timing of the implementation of the mitigation measure may require off-site improvements to be constructed by the developer using a Reimbursement Agreement to pay for any oversized facilities associated with the public share of the improvement pursuant to Section 26-670 of the Sonoma County Code. Fees do not cover project specific impacts related to a particular project.

   The project's contribution to cumulative impacts must also be addressed in proportion to the project's impact. A proportional fair share contribution to a traffic improvement related to a cumulative impact may be required based on the Methodology for Calculating Equitable Mitigation Measures included in Caltrans "*Guide for the Preparation of Traffic Impact Studies*" as referenced above.

   Mitigation measures for both project impacts and cumulative impacts must be implemented prior to occurrence of the impact. An analysis of the timing, funding and responsibilities for implementation of mitigation measures should be included in the traffic study.

   Payment of the countywide traffic impact fee only mitigates or addresses

cumulative countywide impacts related to projects that are programmed or listed to be funded by the fees on file with DTPW.

4. Peer Review: The County may require a peer review of any traffic report submitted by an applicant. The full cost of any traffic studies, required revisions, supplemental reports or peer reviews shall be borne by the applicant. Peer review of traffic reports will be required on all projects affecting a State highway.

ATTACHMENTS

A. Standards for Traffic Studies
B. Peak Hour Trip Generation Table
C. Traffic Impacts Thresholds of Significance Criteria.

Caltrans "Guide for the Preparation of Traffic Impact Studies", is available at DTPW or PRMD or on-line at:

www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf

ATTACHMENT A
STANDARDS FOR TRAFFIC STUDIES

INTRODUCTION

A traffic study report may be required to assess impacts of developments on existing and/or planned roads. A registered Traffic Engineer shall prepare the traffic study. The County will require a Traffic Study whenever it is determined that a proposal may have a significant, but undetermined impact on the flow of public traffic. A Traffic Study more than two years old shall be updated unless the Department of Transportation and Public Works (DTPW) determines conditions have not significantly changed.

A meeting with the DTPW is recommended prior to beginning the study. Topics for discussion could include study area, trip generation, directional distribution of traffic, trip assignment, intersection analysis, and methods of projecting build-out volume.

Five (5) copies of the study shall be submitted to the Permit and Resource Management Department (PRMD). The report will be referred to the DTPW and Caltrans for review and approval. Once accepted by the reviewing agencies, the traffic study will be incorporated into the environmental document for the project. The Department shall be free to use an approved Traffic Study for any purpose whatsoever.

Calculations, assumptions and supporting data for the conclusion presented in the Traffic Study shall be submitted as part of the Traffic Study. The calculations shall be comprehensive and easily understood.

Maps and graphs shall be to scale and must include dimensioned road geometrics (e.g., width, radii, etc.). Intersection geometrics shall include bus stops, parking areas, pedestrian crossings, driveway restrictions, etc.

Daily trips may be reduced by allowing for public transit when a transit stop is located within one thousand (1,000) feet of the development. The maximum reduction allowed is five (5) percent. Transit reductions do not apply to hotels, restaurants, retail, or financial uses. Pass-by factors may be used for retail oriented development upon approval of the DTPW.

Revisions to the Traffic Study shall be made when required by the PRMD or the DTPW. The need for revisions could be based on completeness, accuracy, consistency with standards, impact evaluation methodology and assumptions, and compatibility of the access or development plan, or other considerations. Methodologies shall conform to those found in the Caltrans "Guide for the Preparation of Traffic Impact Studies", a copy of which is found in this manual.

TRAFFIC STUDY FORMAT AND CONTENTS

Traffic studies shall be organized and present all required information using the format, content, and standards described below. A consistent format and standard will provide for easier comparison and evaluation of the report by County staff, and decision-making bodies, thus allowing for quicker review. Traffic reports must clearly state all assumptions and references used.

REQUIRED CONTENTS FOR FOCUSED TRAFFIC STUDY

If the proposed project is estimated to generate less than 50 vehicles-trips in the critical peak hours, a focused site traffic study may be required in consultation with staff from DTPW. The study shall adhere to the following guidelines:

The project applicant shall retain a professional traffic engineer or civil engineer, who is licensed to practice Traffic Engineering in the State of California. Said engineer consultant shall conduct qualitative and/or quantative analysis and submit a written "Focused Site Traffic Review" on each of the following areas that apply to the proposed project. Please note that when a concern is identified, the Traffic Engineer shall propose a solution:

Frontage Improvements: Identify and discuss all aspects of the road fronting the proposes project, which do not meet the County's minimum standards for roadways or driveways.

Parking: Discuss the parking associated with the proposed project compared with County Standards that are or may be found inadequate.

Emergency Access: Discuss proposed site designs that (may) result in inadequate emergency access.

Road Hazards: Discuss any anticipated substantial increases in potential hazards due to a design feature (e.g., sharp curves or dangerous intersections) or any perceived incompatible uses (e.g., farm equipment).

Vehicle Queues: Identify situations where the addition of project vehicles or pedestrian traffic cause the 95th percentile queue length to exceed existing roadway turn-lane storage capacity.

Signal Warrants: Identify situations where the addition of project vehicles or pedestrian traffic will cause an intersection to meet or exceed Caltrans signal warrant criteria.

Turn Lanes: Identify situations where the addition of project traffic at an intersection, including project driveways, causes an intersection to meet or exceed criteria for provision of a right or left-turn lane on an intersection approach.

Sight Distance: Identify situations where the proposed project add traffic to an existing un-signalized intersection(s), including project related driveways that have inadequate sight distance based on Caltrans and County criteria.

Pre-Project Traffic Concerns: Identify and discuss any current traffic problems in the local area, such as, high accident locations (if this applies, include a collision diagram(s) and accident rate analysis) or confusing intersections.

Neighborhood Traffic Sensitivities: Identify and discuss the sensitivities of adjacent neighborhoods or other areas that may be perceived as adversely impacted by the proposed project.

Site Driveways: Identify and discuss proposed or existing site driveway(s) that are in close proximity to other driveways or intersections that are adversely impacted by the proposed project.

Transit Operations: Identify and discuss the potential for the proposed project to adversely impact transit operations.

Pedestrian Operations: Identify and discuss the potential for the proposed project to adversely impact pedestrian safety and the adequacy or nearby pedestrian facilities.

Bicycle Operations: Identify and discuss the potential for the proposed project to adversely impact bicycle safety and the adequacy or nearby bicycle facilities.

Alternative Transportation Policies: Identify and discuss aspects of the proposed project that are/may be in conflict with adopted policies, plans or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks, etc.).

Truck Operations: When it is anticipated that the number of truck deliveries and service call will exceed an average of 10 per day, discuss the ability of the proposed project's site design to adequately handle truck loading demand and traffic circulation. Discuss excessive wear and tear associated with ongoing truck operations on County roadways.

Response to Expressed Concerns: Respond to traffic circulation comments on the proposed project that have been received others, including public agencies (e.g., Caltrans, Cities, SCTA).

Level of Service: Identify existing, projected and cumulative conditions, including documentation of all assumptions or land use and planned improvements.

REQUIRED FORMAT AND CONTENTS FOR FULL TRAFFIC REPORTS

I. TITLE PAGE

A. Project name and location
B. Project sponsor and contact person
C. Person/organization preparing the report and contact information

II. TABLE OF CONTENTS

A. Study outline
B. List of figures
C. List of tables

III. EXECUTIVE SUMMARY

A. A summary description of the scope of the study.
B. A summary description of the proposed development, including a description of each of its components and the size of each of the components.
C. A summary of the traffic generated by each of the development's components.
D. Descriptions of the primary access route(s) to the development site.
E. A description of the access point to the development site.
F. A description of the study area, including identification of the study area roads.
G. A description of the study area land use and zoning
H. A brief discussion of the findings, mitigations, and recommendations of the study.

IV. INTRODUCTION/STUDY PARAMETERS

A. Description of the proposed development
   1. Project location
   2. A description of the existing use of the development site.
   3. A description of the project including the project purpose or goal and planned completion date or phasing.
   4. A description of each of the project's components, including the size of each component and operating characteristics.
   5. Site plan (figure) with dimensions showing the proposed development, including all parking and access driveways, easements and pedestrian access.

B. Study area, circulation network and land uses
   1. A description of the study area limits, including the roadways and intersections to be studied along with the reasoning behind the choice of the study area limits.
   2. A map of the study area illustrating the circulation network, including all access to state and local roadways.
   3. Maps depicting both existing and proposed land uses and zoning in the study area.
   4. Table identifying all existing, approved and proposed developments, in the study area.
   5. References to other traffic studies.

C. Operating scenarios and hours to be studied

1. A description of the operating scenarios that will be considered in the report and the reasoning behind the selection of these scenarios.
2. A description of the hours of operation that will be considered in the report and the reasoning behind the selection of these hours. Include separate statements on weekday activities and weekend activities.
3. Phasing plan including proposed dates of project completion.

D. Description of methodologies and assumptions
1. The methodologies used in the traffic study (methods must conform to those found in the Caltrans "Guide for the Preparation of Traffic Impact Studies", unless otherwise approved by the Department. A copy of the Caltrans guide can be obtained from: http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/
2. All assumptions and the basis or rationale including all land use projections and assumed roadway improvements.
3. The assumptions used in calculating LOS for each intersection and each roadway segment.

E. Operating standards
1. Level of service (LOS) operating standards and thresholds of significance, (standards must conform to the CEQA guidelines and thresholds provided in Attachment B "Caltrans Guide" and Sonoma County "Traffic Impact Thresholds" provided in Attachment C).
2. The projected horizon (year) for the assessment.
3. Roadway capacity criteria.
4. Volume to capacity ratios.

V. TRAFFIC ANALYSIS

A. Existing conditions
1. The existing surrounding land uses that affects the development.
2. A list of prior traffic studies.
3. Traffic circulation system within the study area, including traffic controls at key intersections.
4. Key road geometric features affecting the proposed development, including roads, intersections, storage lengths and the existing access to the project site.
5. Describe existing deficiencies on roads that will be used by the project.
6. Posted speed limits within the study area.
7. Existing daily traffic counts and turning movements within the study area and the source of this information.
8. Trip generation for the existing use of the site, if any.
9. Roadway segment traffic counts within the study area.
10. Intersection traffic counts at key intersections and the source of this information.
11. Estimated pedestrian activity.
12. Estimated bicycle activity.
13. Estimated transit activity.
14. Queuing analysis.
15. Existing level of service conditions including both in terms of seconds of delay and letter LOS designation for the existing site with no project in accordance with current Caltrans methods and practices. Provide this information for key intersections and road segments in the study area. Provide the source of this information.

16. A map showing the 6above features.

B. Accident history evaluation
   1. A tabulation of accidents for the most recent years within the study area.
   2. A comparison of the accident rate with statewide averages for similar situations.

C. Future conditions
   1. Project generated trips
      a. Each component of the development that generates new trips.
      b. The size of each traffic generating component of the development.
      c. Average one-way trip generation rates for each traffic-generating components of the proposal (daily and peak hour).
      d. ADT generated by project during work week.
      e. ADT generated by project during weekend.
      f. Peak hour trips generated by project during a work week.
      g. Peak hour trips generated by project during peak weekend day.
      h. Percentage pass-by traffic (if applicable).
      i. Winery tasting room traffic (if applicable).
      j. Special events matrix showing special events by type, timing of traffic movements related to each event type and volumes of traffic associated with each event type.
      k. Trip generation rates taken from the Institute of Transportation Engineer's (ITE) "Trip Generation Manual" report. Upon approval of the Department of Transportation and Public Works rates from other sources (e.g., Caltrans) or traffic counts from similar uses may be used. For mixed-use developments, combined ITE rates may be used to estimate average daily traffic.
      l. Trip generation for the proposed use shall be calculated for the highest use or worst case scenario allowed under the proposal. If the development is staged, the trip generation related to full development shall be used for the analysis.
      m. Separate trip generation figures for truck traffic and non-truck traffic related to the development.
      n. Peak hour may be estimated by using ten (10) percent of average daily traffic upon approval of the DTPW.
      o. Passerby factors may be used upon approval of the DTPW.
      p. Internal trip reductions and modal split assumptions require analytical support and approval from the DTPW.
      q. Estimated trip generation from known future developments within the study area.
      r. Volume projections for background traffic growth may be available from the DTPW.
      s. A map(s) showing the above information.
      t. Parking analysis.
      u. Describe truck operations and excessive wear and tear associated with truck traffic.

   2. Project generated trip distribution
      a. Trip distribution and assignment for the access to the development and for intersections in the vicinity of the development, including the direction and percentage trip distribution for trips entering the development and the direction

and percentage trip distribution for trips exiting the development.

b. A discussion of survey data (e. g., origin-destination surveys) to support these estimates.

c. Market studies, area planning, council data, driveway counts at adjacent developments or other information (e.g., origin-destination surveys) to support these estimates.

d. A map(s) showing distribution of trips between the development and destinations.

3. Existing and project condition

a. Projected daily traffic volumes with existing and the proposed development, including turning movements, facility geometry (including storage lengths) and traffic controls (including signal phasing and multi-signal progression where appropriate).

b. Projected level of service and warrant analysis.

c. Potential impact of project on key intersections including entrance(s) to the site (percentage volume increase and impact on level of service conditions in both seconds of delay and letter LOS designation.

d. Potential impact of project on key roadway segments serving the proposal. This information should be presented in terms of percentage volume increase and impact on level of service conditions in both seconds of delay and letter LOS designation.

e. The impact of this condition on volume to capacity ratios.

f. Adequacy of on-site parking.

g. Adequacy of provisions for pedestrians, bicycles, emergency access, and loading areas.

4. Cumulative conditions without project

a. A listing of approved and reasonably foreseeable future developments within the study area.

b. Estimated trip generation from anticipated future developments within the study area.

c. Projected daily traffic volumes with existing and anticipated development (existing + other known or anticipated development) include turning movements, facility geometry (including storage lengths) and traffic controls (including signal phasing and multi-signal progression where appropriate).

d. Traffic volume projections for background traffic growth.

e. Potential impact on key intersections including entrance(s) to the site. Percentage volume increase and impact on level of service conditions in both seconds of delay and letter LOS designation.

f. Potential impact on key roadway segments serving the proposal. This information should be presented in terms of percentage volume increase and impact on level of service conditions in both seconds of delay and letter LOS designation.

g. The impact of this condition on volume to capacity ratios.

5. Cumulative conditions with project

a. Projected daily traffic volumes with the project and existing and anticipated development within the study area (existing + project + other known or anticipated development) including turning movements, facility geometry (including storage lengths) and traffic controls (including signal phasing and multi-signal

progression where appropriate).

b. Traffic volume projections for background traffic growth.

c. Potential impact on key intersections including entrance(s) to the site (percentage volume increase and impact on level of service conditions in both seconds of delay and letter LOS designation.

d. Potential impact on key roadway segments serving the proposal. This information should be presented in terms of percentage volume increase and impact on level of service conditions in both seconds of delay and letter LOS designation.

e. The impact of this condition on volume to capacity ratios.

D. Site access evaluation

1. Discuss requirements for the access to the development.
2. Discuss the impact of access to the project on adjoining neighborhoods.
3. Provide a left-turn ingress analysis.
4. Provide a right-turn/deceleration ingress turn analysis.
5. Provide a left-turn egress acceleration lane analysis.
6. Provide a right-turn/acceleration lane egress turn analysis.
7. Provide a sight-distance analysis.

VI. SUMMARY OF CONCLUSIONS

A. Identify and describe potentially significant adverse impacts without mitigation measures.

1. Intersection(s) with peak-hour level of service.
2. Road segments with peak-hour level of service.
3. Project generated increases in traffic that exceed the LOS or delay thresholds as outlined in Attachment B or C.
4. Cumulative increases in traffic that exceed the LOS or delay thresholds outlined in Attachment C.
5. Unsafe access point(s) to the development.
6. Unsafe primary access route(s) to the development. (e.g., substandard width for traffic volume carried, side ditches, sharp curves, poor sight distance, inadequate pavement, inadequate intersections).
7. Miscellaneous other unsafe conditions.
8. Adverse impacts on pedestrian and bicycle movements.
9. The need for a traffic signal(s) shall be justified by identifying which, if any, Caltrans Traffic Manual signalization warrants is met.
10. Temporary construction impacts.
11. Adequacy of on-site parking.
12. Adequacy of provisions for pedestrians, bicycles, emergency access, and loading areas.
13. Summarize impacts in a table/matrix.

VII. RECOMMENDATIONS

A. The study shall recommend improvements or revisions to the project to mitigate each of the adverse impacts. Improvements and/or mitigation measures shall maintain peak-hour level of service "C" or better on roads and state highway facilities and a peak-hour level of service "D" or better at local intersections. The recommendation should include:

1. Descriptions of each recommended improvement and the timing, phasing plan or required thresholds for implementing the improvement.
2. Map(s) or schematic drawings of the recommended improvements.

3. Dimensioned diagrams of the nature and extent of recommended improvements.
4. An analysis of the timing, funding and responsibilities for implementation of mitigation measures.
5. Define responsibilities for implementation of mitigation measures and funding source. Differentiate between improvements to be constructed by the developer and those to be constructed by others, including government agencies. Explain how each improvement mitigates the related adverse impact.
6. Countywide impact fees can be identified as funding of mitigation measures only if the specified improvement is included in the fee program list.
7. Define the fair share allocation as a percentage for traffic related improvements involving several developments using the "Methodology for Calculating Equitable Mitigation Measures" included in Caltran's "Guide for the Preparation of Traffic Impact Studies" provided in Attachment B.

VIII. APPENDICES

A. Data collected for the study including traffic counts (e.g., average daily, peak hour turning movements) and work sheets.
B. Projected land use assumptions (table).
C. References.
D. Study participants and persons contacted.
E. A completed winery trip generation form (if applicable).
F. A completed special events trip generation form (if applicable).

ATTACHMENT B
PEAK HOUR TRIP GENERATION
FOR VARIOUS LAND USES

Land Use / Building Type	ITE Code[1]	AM Peak Trip Rate Per Unit	PM Peak Trip Rate Per Unit	Unit	25 Trip Threshold for Full Traffic Study[2]	10 Trip Threshold for Focused Traffic Study[3]
INDUSTRIAL						
Truck terminal	30	7.28	6.55	ACRES	3.43 acres	1.37 acres
Light industrial	110	0.92	0.98	1000 Sq. Ft.	25,600 sq. ft.	10,200 sq. ft.
Heavy industrial	120	0.51	0.68	"	36,800 sq. ft.	14,700 sq. ft.
Industrial Park	130	0.89	0.92	"	27,200 sq. ft.	10,900 sq. ft.
Manufacturing	140	0.73	0.74	"	33,800 sq. ft.	13,500 sq. ft.
Warehousing	150	0.45	0.51	"	49,000 sq. ft.	19,600 sq. ft.
RESIDENTIAL				DWELLING UNITS		
Single Family Detached	210	0.75	1.01	"	25 du	10 du
Apartments	220	0.51	0.62	"	40 du	16 du
Condominium/Townhouse	230	0.44	0.54	"	46 du	18.4 du
Mobile Home Park	240	0.40	0.56	"	45 du	18 du

[1]Institute of Transportation Engineering

[2]Projects that meet or exceed the threshold require a full traffic study

[3]Projects that meet or exceed the threshold require a focused traffic study

Land Use / Building Type	ITE Code	AM Peak Trip Rate Per Unit	PM Peak Trip Rate Per Unit	Unit	25 Trip Threshold for Full Traffic Study	10 Trip Threshold for Focused Traffic Study
Senior Housing Detached	251	0.21	0.23	"	109 du	43.6 du
Senior Housing/Community	250/253	0.17	0.19	"	132 du	52.8 du
LODGING				ROOMS		
Hotel	310	0.56	0.61	"	41 rooms	16.4 rooms
Motel	320	0.45	0.47	"	53 rooms	21.2 rooms
Resort Hotel	330	0.31	0.42	"	60 rooms	24 rooms
INSTITUTIONAL / EDUCATIONAL				STUDENTS		
Elementary School	520	0.29	0.13	"	86 students	34.4 students
Middle School / Junior High	522	0.46	0.16	"	54 students	21.6 students
High School	530	0.46	0.15	"	54 students	21.6 students
Church	560	0.72	0.66	1000 Sq. Ft.	34,700 sq. ft.	13,900 sq. ft.
Day Care Center	565	0.81	0.86	STUDENT	29 students	11.6 students
Library	590	1.06	7.09	1000 Sq. Ft.	3,500 sq. ft.	1,400 sq. ft.
MEDICAL				BEDS		
Hospital	610	1.07	1.22	"	20 beds	8 beds
Nursing Home	620	0.17	0.20	"	125 beds	50 beds
Medical / Dental Office	720	2.43	3.66	1000 Sq. Ft.	6,800 sq. ft.	2,700 sq. ft.
OFFICE				1,000 Sq. Ft.		
General Office	710	1.56	1.49	"	16,000 sq. ft.	6,400 sq. ft.
Corporate Headquarters	714	1.47	1.39	"	17,000 sq. ft.	6,800 sq. ft.

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Land Use / Building Type	ITE Code	AM Peak Trip Rate Per Unit	PM Peak Trip Rate Per Unit	Unit	25 Trip Threshold for Full Traffic Study	10 Trip Threshold for Focused Traffic Study
Single Tenant Office	715	1.78	1.72	"	14,000 sq. ft.	5,600 sq. ft.
Post Office	732	8.02	10.79	"	2,300 sq. ft.	900 sq. ft.
Office Park	750	1.74	1.50	"	14,400 sq. ft.	5,800 sq. ft.
Research & Development Center	760	1.24	1.08	"	20,200 sq. ft.	8,100 sq. ft.
Business Park	770	1.43	1.29	"	17,500 sq. ft.	7,000 sq. ft.
RESTAURANT				"		
Quality Restaurant	831	0.81	7.49	"	3,300 sq. ft.	1,300 sq. ft.
High Turnover Restaurant	832	9.27	10.86	"	2,300 sq. ft.	900 sq. ft.
Fast Food w/o Drive-Thru	833	43.87	26.15	"	600 sq. ft.	200 sq. ft.
RETAIL				"		
Discount Superstore	813	1.84	3.82	"	6,500 sq. ft.	2,600 sq. ft.
Speciality Retail Center	814	0.00	2.59	"	9,700 sq. ft.	3,900 sq. ft.
Discount Store	815	0.99	4.24	"	5,900 sq. ft.	2,400 sq. ft.
Hardware / Paint Store	816	1.08	4.42	"	5,700 sq. ft.	2,300 sq. ft.
Nursery (Garden Center)	817	1.31	3.80	"	6,600 sq. ft.	2,600 sq. ft.
Nursery (Wholesale)	818	2.40	5.17	"	4,800 sq. ft.	1,900 sq. ft.
Shopping Center	820	1.03	3.74	"	6,700 sq. ft.	2,700 sq. ft.
Factory Outlet Center	823	0.67	2.29	"	10,900 sq. ft.	4,400 sq. ft.
Quick Lube Vehicle Shop	837	0.00	5.19	SERVICE POSITION	5 positions	2 positions

Land Use / Building Type	ITE Code	AM Peak Trip Rate Per Unit	PM Peak Trip Rate Per Unit	Unit	25 Trip Threshold for Full Traffic Study	10 Trip Threshold for Focused Traffic Study
Automobile Care Center	840	2.94	3.38	1,000 Sq. Ft.	7,400 sq. ft.	3,000 sq. ft.
New Car Sales	841	2.21	2.80	"	8,900 sq. ft.	3,600 sq. ft.
Auto Parts Sales	843	2.21	5.98	"	4,200 sq. ft.	1,700 sq. ft.
Gasoline / Service Station	844	12.27	14.56	FUELING POSITION	2	0.8
Gasoline w/ Convenient Mkt.	845	10.06	13.38	"	2	0.8
Gasoline w/Convenient Mkt. & Carwash	846	10.64	13.19	"	2	0.8
Sel-Service Carwash	847	0.00	5.79	WASH STALL	4 stalls	1.6 stalls
Tire Store	848	2.85	4.12	1,000 Sq. Ft.	6,100 sq. ft.	2,400 sq. ft.
Wholesale Tire Store	849	1.34	2.11	"	11,800 sq. ft.	4,700 sq. ft.
Super Market	850	3.25	11.51	"	2,200 sq. ft.	900 sq. ft.
Convenient Market (24 hour)	851	65.39	53.73	"	400 sq. ft.	200 sq. ft.
Convenient Market (15-16 hour)	852	31.02	34.57	"	700 sq. ft.	300 sq. ft.
Convenient Market w/Gas	853	45.58	60.61	"	400 sq. ft.	200 sq. ft.
Discount Club	861	0.65	3.80	"	6,600 sq. ft.	2,600 sq. ft.
Home Improvement Superstore	862	1.48	2.87	"	8,700 sq. ft.	3,500 sq. ft.
Electronics Superstore	863	0.00	4.50	"	5,600 sq. ft.	2,200 sq. ft.
Furniture Store	890	0.17	0.45	"	55,600 sq. ft.	22,200 sq. ft.

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Land Use / Building Type	ITE Code	AM Peak Trip Rate Per Unit	PM Peak Trip Rate Per Unit	Unit	25 Trip Threshold for Full Traffic Study	10 Trip Threshold for Focused Traffic Study
Video Rental Store	896	0.00	13.60	"	1,800 sq. ft.	700 sq. ft.
BANKING SERVICE				1,000 Sq. Ft.		
Walk-In Bank	911	21.49	42.02	"	600 sq. ft.	200 sq. ft.
Drive-Thru Bank	912	12.63	54.77	"	500 sq. ft.	200 sq. ft.

ATTACHMENT C
TRAFFIC IMPACT THRESHOLDS

SIGNIFICANCE CRITERIA FOR PROJECT-LEVEL AND CUMULATIVE IMPACTS

The project would have a significant traffic impact if it results in any of the following conditions:

1. **On-site roads and frontage improvements**: Proposed on-site circulation and street frontage would not meet the County's minimum standards for roadway or driveway design, or potentially result in safety hazards, as determined by the County in consultation with a registered traffic engineer.

2. **Parking**: Proposed on-site parking supply would not be adequate to accommodate parking demand.

3. **Emergency Access**: The project site would have inadequate emergency access.

4. **Alternative Transportation**: The project provides inadequate facilities for alternative transportation modes (e.g., bus turnouts, bicycle racks, pedestrian pathways) and/or the project creates potential conflicts with adopted policies, plans, or programs supporting alternative transportation.

5. **Road Hazards**: Hazards are increased due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment, heavy pedestrian or truck traffic).

6. **Vehicle Queues**: The addition of project traffic causes the 95th percentile queue length to exceed roadway turn lane storage capacity [1].

7. **Signal Warrants**: The addition of the project's vehicle or pedestrian traffic causes an intersection to meet or exceed Caltrans signal warrant criteria.

8. **Turn Lanes**: The addition of project traffic causes an intersection to meet or exceed criteria for provision of a right or left turn lane on an intersection approach [2].

9. **Sight Lines**: The project constructs an unsignalized intersection (including driveways) or adds traffic to an existing unsignalized intersection approach that does not have adequate sight lines based upon Caltrans criteria for state highway intersections and County criteria for County roadway intersections.

10. **County Intersections**: The County Level of Service standard for intersections is Level of Service D or better. The project would have a significant traffic impact is the project's traffic would cause an intersection currently operating at an acceptable level of service (LOS D or better) to operate below the standard (LOS E or F).

    If the intersection currently operates or is projected to operate below the County standard (at LOS E or F), the project's impact is significant and cumulatively considerable if it causes the delay [3] to increase by five seconds or more. The delay will be determined by comparing intersection operations with and without the project's traffic for both the existing baseline and project future conditions.

    The above criteria apply to all signalized, all-way stop controlled, and side street

controlled intersections with project traffic volumes over 30 vehicles per hour per approach or per exclusive left turn movement.

11. **County Roadway Operations**: The County Level of Service Standard for County roadway operation sis to maintain a Level of Service C, or for specific roadway segments, the level of service standard adopted in the General Plan Figures CT2c-CT2d. The project would have a significant traffic impact if the project's traffic would cause a road currently operating at an acceptable level of service to operate at an unacceptable level (i.e. LOS D, E or F).

If a road segment currently operates or is projected to operate below the adopted standard referenced above, the project's impact would be significant and cumulatively considerable if it causes the average speed to decrease by the amounts shown in Table 1 below. the change will be determined by comparing roadway conditions with and without the project's traffic for both the existing baseline and projected future conditions.

TABLE 1
TRAFFIC IMPACT THRESHOLDS FOR
2-LANE COUNTY HIGHWAYS AND RURAL CLASS 1 ROADWAYS
WITH LEVEL OF SERVICE BELOW LOS C

If the Baseline or Projected LOS without project is:	Then the existing average travel speed is (miles per hour [mph]):[3]	The project's impact is considered significant If the decrease in average travel speed associated with the project is:
D	40-45 mph	2 mph
E	40 mph or less	1 mph
F[4]		0.5 mph

These criteria apply to Rural Class 1 roadways. Other roadways will be evaluated on a case-by-case basis.

12. **State Highways**:[5] Caltrans' level of service on State Highways is to maintain the level of service at the transition between LOS C and LOS D. A project would have a significant impact if the project traffic would cause the operation of a State highway to operate below LOS C. If a State highway currently operates or is projected to operate below the standard, the project's impact would be significant and cumulatively considerable if it does not maintain the existing "measure of effectiveness". Measures of effectiveness are: (a) control delay per vehicle for signalized intersections; (b) average control delay per vehicle for unsignalized intersections; (c) average speed for two lane highways, and (d) density for multi-lane highways[6].

Footnotes:

1. Based upon HCS analysis methodology for signalized intersections and formula

contained in November 2001 ITE Article *(Estimation of Queue Length at Unsignalized Intersections)* for side street stop sign controlled intersections, or its equivalent.

2. Based upon Caltrans criteria for state highways and *Intersection Channelization Design Guide* (NCHRP Report 279, Transportation Research Board, 1985) for county roadways.

3. Average delay shall be used as defined in the year 2000 Highway Capacity Manual for the signalized and all-way stop intersections and delay for any approach or turning movement shall be used for side street stop sign controlled intersections.

4. The year 2000 Highway Capacity Manual does not provide an average travel speed breakpoint between LIS E and LOS F operation.

5. State Highway thresholds are based on *Caltrans Guide for the Preparation of Traffic Impact Studies*, State of California Department of Transportation, June 2001. The most recent version of this handbook may be found on the internet. (http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/)

6. Measures of effectiveness are defined in the most recent version of the *Highway Capacity Manual*, Transportation Research Board, National Research Council.

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Permit and Resource Management Department
VISUAL ASSESSMENT GUIDELINES

PURPOSE

The purpose of this administrative procedure is to provide guidelines for the assessment of visual impacts in the preparation of Initial Studies and Environmental Impact Reports.

GENERAL

These guidelines provide procedures to guide staff and consultant's in preparing and analyzing visual impacts. While the analysis of visual impacts involves qualitative judgements, this procedure is intended to define a methodology that utilizes to the extent practicable, objective standards that can be described and utilized in a consistent manner.

PROCEDURE

To analyze the visual effects of a specific project the following procedures should be followed.

1. Determine Viewpoints and Characterize Environmental Setting

Project impacts will be analyzed by considering public viewing points. Public viewing points include public roads, public trails, and public parks. Other public gathering places may be considered on a case-by-case basis. Start with topographic maps and aerial photos. Follow up with a "windshield" survey of roads in the vicinity of the project to determine where the project would be most visible to the general public. Consider a variety of viewpoints, and not only the point at which the project is most visible. The "baseline" environmental setting of viewpoints should be discussed in terms of existing physical features, as well as applicable regulations pertaining to development and scenic resources.

2. Prepare Photos to Illustrate Visual Impacts

Photographic analysis is required to evaluate potential visual impacts. Architectural renderings can be used for design considerations, but are discouraged in visual impact analysis because they tend to soften the effects. The visual impact analysis focuses on the mass, scale and contrast of the structure in relation to its surrounding.

A. For smaller projects, staff shall coordinate with the applicant to construct story poles, or tethered balloon clusters that accurately represent the height and location of the project. The story poles or balloon tethers should be marked at 5-foot intervals to provide a reference scale on the photos. In some instances a notice to the area residents describing the purpose for the story poles should be provided and/or site visit should be arranged for the decision-making body.

Take photos of the site from the various viewpoints identified in Step 1, or require the applicant's representative or consultant to provide photos taken from the selected viewpoints along with a site plan illustrating the location and height of each story pole and the viewpoints for the photos. If telephoto photos are to be taken, be sure that a similar photo is taken that represents the view seen by the human eye. A 360 degree panoramic view, taken from where the project will be located, is helpful to convey the surrounding landscape.

The photos should be marked by outlining the proposed structure using the story poles or balloons as a guide for the roof line and corners of the structure. In some instances, offsite views may be at such a distance, that the balloons or story poles are not readily apparent in the photos without the use of a telephoto lens – include both telephoto and normal eye view in these instances may be needed to illustrate the structure.

B. For more complex projects, a digitized photo simulation may be required. The following tasks are appropriate for visual assessments prepared by consultants:

1. Photograph site from viewpoints determined in Step 1 above. Verify site photography locations on field maps for use with computer model of the proposed project. Delineate additional field references to help verify the computer modeling and viewpoint locations.

2. Prepare baseline photographs from selected viewpoints for the simulations.

3. Develop plan and section figures describing the visual conditions within the project viewshed.

4. Produce a 3D realistic computer model of the proposed project using topographic, architectural and landscape drawings of project. Use AutoCAD or other appropriate software to develop the 3D terrain and architectural aspects of the model.

5 Additional simulations may be done to illustrate the effect of mitigation from landscape screening growth at 5- or 10-year intervals following construction.

6. Apply the proposed building materials and paint colors to the model and render, duplicating the view angle, distance, lighting conditions and time of year in the existing conditions photograph. Use existing elements in the baseline photograph as control points to register the model to the photograph. Repeat for each viewpoint.

7. Verify viewpoint accuracy using computer plot overlays on base photographs.

8. Digitize base photographs for each selected viewpoint.

9. Produce visual simulations that accurately show the proposed project ("before and after") for each selected viewpoint. The simulations should represent the mass, scale, density and proposed grading of the project. The computer simulation must include: all grading including roadways, driveways, landscape and parking areas and tree removal for required fire breaks; all structures and ancillary facilities; and landscaping at the time that construction is completed.

10. Analyze project impacts as described below.

3. Characterize the Site's Sensitivity

The visual sensitivity of the project site should be given a rating of low, moderate, high or maximum using the following criteria in Table 1.

Table 1
Site Sensitivity

Sensitivity	Characteristics
Low	The site is within an urban land use designation and has no land use or zoning designations protecting scenic resources. The project vicinity is characterized by urban development or the site is surrounded by urban zoning designations and has no historic character and is not a gateway to a community. The project site terrain has slopes less than 20 percent and is not on a prominent ridgeline and has no significant natural vegetation of aesthetic value to the surrounding community.
Moderate	The site or portion thereof is within a rural land use designation or an urban designation that does not meet the criteria above for low sensitivity, but the site has no land use or zoning designations protecting scenic resources. The project vicinity is characterized by rural or urban development but may include historic resources or be considered a gateway to a community. This category includes building or construction sites with visible slopes less than 30 percent or where there is significant natural features of aesthetic value that is visible from public roads or public use areas (i.e. parks, trails etc.).
High	The site or any portion thereof is within a land use or zoning designation protecting scenic or natural resources, such as General Plan designated scenic landscape units, community separators, or scenic corridors. The site vicinity is generally characterized by the natural setting and forms a scenic backdrop for the community or scenic corridor. This category includes building and construction areas within the SR designation located on prominent hilltops, visible slopes less than 40 percent or where there are significant natural features of aesthetic value that are visible from public roads or public use areas (i.e. parks, trails etc.). This category also includes building or construction sites on prominent ridgelines that may not be designated as scenic resources but are visible from a designated scenic corridor.
Maximum	The site or any portion thereof is within a land use or zoning designation protecting scenic resources, such as General Plan designated scenic landscape units, community separators, or scenic corridors. The site vicinity is generally characterized by the natural setting and forms a scenic backdrop for a designated scenic corridor. This category includes building or construction sites within the scenic resource designation on or near prominent ridgelines, visible slopes greater than 40 percent or where there are significant natural features of aesthetic value that are visible from a designated scenic corridor.

4. Determine Visual Dominance

The visual dominance of the project is determined comparing the contrast of the following elements or characteristics of the project with its surroundings and giving a rating of inevident, subordinate, co-dominant, or dominant:

- Form: shape, geometry, complexity
- Line: the edge of the shape, boldness, complexity of silhouette, orientation
- Color: reflectivity, hue (actual color), value (dark or light)
- Texture: surface characteristics, randomness, grain (fine or coarse)
- Night Lighting

Based on the criterion listed above, define the visual dominance of the project as described in Table 2.

Table 2
Visual Dominance

Dominance	Characteristics
Dominant	Project elements are strong – they stand out against the setting and attract attention away from the surrounding landscape. Form, line, color, texture, and night lighting contrast with existing elements in the surrounding landscape.
Co-Dominant	Project elements are moderate – they can be prominent within the setting, but attract attention equally with other landscape features. Form, line, color, texture, and night lighting are compatible with their surroundings.
Subordinate	Project is minimally visible from public view. Element contrasts are weak – they can be seen but do not attract attention. Project generally repeats the form, line, color, texture, and night lighting of its surroundings.
Inevident	Project is generally not visible from public view because of intervening natural land forms or vegetation.

5. Determine Significance of Visual Impacts

The determination of visual impact significance is made by:

a. Establishing the level of visual sensitivity of the site using the criteria discussed Table 1.

b. Characterizing the visual dominance of the project in terms of its form, line, color, texture, and lighting as described in Table 2.

c. Determining significance of the visual impact by comparing site sensitivity with visual dominance of the project in accordance in Table 3.

Table 3
Thresholds of Significance
for
Visual Impact Analysis

Sensitivity	Visual Dominance			
	Dominant	***Co-Dominant***	***Subordinate***	***Inevident***
Maximum	Significant	Significant	Significant	Less than significant
High	Significant	Significant	Less than significant	Less than significant
Moderate	Significant	Less than significant	Less than significant	Less than significant
Low	Less than significant	Less than significant	Less than significant	Less than significant

From: Sue Waxman
To: PRMD-Comp-Planning; PRMD-Environmental-Review; PRMD-Project-Review
Date: 4/23/04 2:06PM
Subject: Fwd: Re: Visual Assessment procedure

The visual assesment procedure can be found in:
S:/PROJ_REVIEW/VISUAL ASSESMENT
S:/COMP/VISUAL ASSESMENT
S:/ENV_REVIEW/VISUAL ASSESMENT

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5505
FAX (510) 286-5559
TTY (800) 735-2929

RECEIVED
SEP 17 2004
PAMELA TUFT

Flex your power!
Be energy efficient!

September 14, 2004

SONOMA- General
SON000136
SCH# 2004082065

Ms. Pamela Tuft
Director of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952

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Dear Ms. Tuft:

City of Petaluma General Plan 2025 – Notice of Preparation (NOP)

Thank you for including the California Department of Transportation (Department) in the environmental review process for the proposed general plan update. We have reviewed the NOP and have the following comments to offer:

The Draft Environmental Impact Report (DEIR) should include an analysis of the effect this general plan update and its alternatives will have on State transportation facilities, specifically U.S. 101 and State Route (SR) 116.

1. The analysis should provide a level-of-service (LOS) analysis for freeways, ramps, and ramp terminal intersections. A merge/diverge analysis should be performed for freeway and ramp junctions and all analysis should be based on AM and PM peak hour volumes. The analysis should include the (individual, not averaged) LOS and traffic volumes applicable to all intersection road approaches and turn movements. The procedures contained in the 2000 update to the Highway Capacity Manual should be used as a guide for the analysis. We also recommend utilizing Caltrans' *"Guide for the Preparation of Traffic Impact Studies"* which can be accessed from the following webpage: http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf

2. Mitigation measures should be identified where the general plan update would have a significant impact. The Department considers the following to be significant impacts:

   - Off-ramps with vehicle queues that extend into the ramp's deceleration area or onto the freeway,
   - Vehicle queues at intersections that exceed existing lane storage,

- Traffic impacts that cause any ramp's merge/diverge LOS to be worse than the freeway's LOS, and
- Traffic impacts that cause the LOS to deteriorate below LOS E for freeways and LOS D for highways and intersections. If the LOS is already "E" or "F", then a quantitative measure of increased queue lengths and delay should be used to determine appropriate mitigation measures.

3. Mitigation measures should consider highway and non-highway improvements and services. Special attention should be given to the development of alternate solutions to circulation problems that do not rely on increased highway construction. The City should consider coordinating the following possible improvements with general plan "build out", if it is determined in the traffic analysis that they would be warranted:

   - Widening interchange ramps to increase capacity,
   - Modifying ramp terminal intersections,
   - Adding auxiliary lanes between interchanges,
   - Increasing the ramp acceleration or deceleration lane length to improve merge/diverge operations, and
   - Adding signalization and ramp intersection geometric improvements at impacted interchanges

4. All mitigation measures proposed should be fully discussed, including financing, scheduling, implementation responsibilities, and lead agency monitoring.

5. Funding for planned highway and transit system improvements in the Petaluma area has not kept pace with new growth. In an effort to obtain funding for these regional highway and transit improvements, the City should consider establishing a "fair share" fee program for project developers to contribute to as mitigation, when project-related or cumulative impacts to study area regional transportation facilities are identified.

We look forward to reviewing the DEIR for this project. We do expect to receive a copy from the State Clearinghouse, but in order to expedite our review please send two copies in advance to:

Maija Cottle
Office of Transit and Community Planning
Department of Transportation, District 4
P.O. Box 23660
Oakland, CA 94623-0660

Should you require further information or have any questions regarding this letter, please call Maija Cottle of my staff at (510) 286-5737.

Sincerely,

Timothy C. Sable

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

c: State Clearinghouse

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Tuft, Pamela

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From: Tom McGaw [tdmcgaw@pacbell.net]
Sent: Wednesday, August 25, 2004 8:18 PM
To: Tuft, Pamela
Cc: Glose, Michael; Barry Lawrence; Jim Hudson
Subject: Petaluma Municipal Airport

Hello Pamela,

I'm between trips out of town and had a chance to read over your letter regarding the preparation of the draft EIR for the General Plan update.
Since I'm leaving again early tomorrow I wanted to give you my input since I won't be able to attend the Scoping Meeting on the 26th.

As you probably know, the Municipal Airport Master Plan and EIR are closely linked. The FAA has endorsed and supports our operation in alignment with this Master Plan and EIR. It includes, among other items, operational guidelines addressing noise, ground water contamination prevention, waste management, and traffic.

Since the Master Plan/EIR have been approved by the FAA and have long been used for operational purposes at the Municipal Airport any potential changes otherwise brought forward through the General Plan Update process MUST be carefully considered. Unintended consequences could negatively impact the Airport operation which would, from the Airport Commission's perspective, lead us to a position that no changes to the EIR effecting the Municipal Airport would be accepted without very careful consideration and endorsement by the Airport Commission. Any proposed changes would also, naturally, require agreement and support by the FAA. It was not clear in your letter, and it may be too early for it, what impact if any the proposed draft EIR would have on the Airport in any manner different than the current standards.

I trust my comments are not out of sequence with your intent regarding the draft EIR scooping and preparation but since we're fairly activist in our approach on the Airport Commission I thought it best for you to have my input sooner rather than later. Jim Hudson is our General Plan Liaison representative on the Airport Commission but since I'll be out of town for the next Commission meeting I thought it best to forward my input to you ASAP.

Thank you for your continuing efforts at keeping our Airport Commission in the decision making loop during the General Plan Update process. We do most certainly appreciate your efforts on our behalf.

Best regards,

Tom McGaw
Management & Performance Consulting
707-762-3724
tdmcgaw@pacbell.net

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RECEIVED
MAY 0 4 2004
PAMELA TUFT

City of Petaluma, CA
Airport Commission Meeting
April 1, 2004

Commissioners present: McGaw, Smith, Fullerton, Beene, Lawrence, O'Brien
Absent: Hudson
Staff: Michael Glose, Airport Manager, Sherry Pimsler, Administrative Secretary

Public Comment

Approval of Minutes
On page 5 of the minutes of March 11, 2004, Commissioner Fullerton suggested that the words "which are beautiful" be deleted from the last paragraph of the hangar project report. He then made a motion to approve the minutes with this correction; Commissioner Lawrence seconded. All in favor.

Correspondence
None

Old Business
None

New Business
1. Land Use and Mobility Report for the General Plan

Director of the General Plan, Pamela Tuft, spoke to the Commission on the Land Use and Mobility Report, which has been finalized and redistributed to elected and appointed officials. The goal of the 1987 General Plan was to meet the needs of the community by balancing the ability to allow residential development in conjunction with continued economic growth (to recapture sales tax leakage that now occurs towards Novato, Santa Rosa and Rohnert Park), and continue to achieve what is a reasonable jobs/housing balance. The City has done a very good job of achieving this balance. However, it does not mean that for every job in Petaluma someone lives in Petaluma, but that every working adult in Petaluma has an opportunity for a job in Petaluma. Unfortunately, we have only been able to achieve an equal outbound commute with an inbound commute, because we have not done that much to benefit the people who live and work here, something which is extremely hard to manipulate through the government process.

In the handouts, Pamela drew attention to a quote from the Transportation section of the 1987 General Plan, which is the extent of content on the airport. She also noted a quote from one policy, also from the 1987 plan, which applies somewhat to the airport as part of the transportation facilities. In the past, she has promised the Commission that the General Plan 2025 will address the airport in more detail.

Also included in the handouts was an excerpt from public comments at a recent workshop on the land use and mobility alternatives. During early discussions in late 2001 and early 2002, on identifying the vision for Petaluma, some suggestions were made to adjust the urban growth boundary, either inward or outward. The outward suggestion was to the northeast of Washington St., basically wrapping around Rooster Run, and extending all the way to Corona Rd., out to Adobe Rd. No one commented on the suggestion because no one in attendance lived in that area. That suggestion, which came early in the process, was not included in the Alternatives, because it conflicted with ALUC standards for the airport's flight pattern. For the continued success of the airport, it was felt that this wasn't the best direction to move.

The Commission was also given a handout showing progress-to-date of the last two and half years of preparation of the General Plan. Workshops will continue to be hosted, and the airport commissioners were invited to participate in one on April 10th. Location-specific discussion stations will address twelve different areas of town where the issue of density and redevelopment has brought up a number of questions. From that, a summary of the public comments will be presented to the Planning Commission and the City Council, with suggested changes to the three alternatives reports, to be refined down to a single, preferred plan.

The job of various commissioners, other than the Planning Commission, which, by State law, is the lead agency on the General Plan, is to contribute to the preparation of policies. The above-mentioned policy, excerpted from the existing General Plan, talks about the efficient use of transportation systems, but doesn't name the airport. Pamela would like to work with the commissioners to develop some policies and perhaps a program or two that meet the long-range needs of the airport for the next 21 years and beyond. She spoke to Chairman McGaw about narrative from the 1987 General Plan, which talks about airport growth from 50,000 flights per year in 1986 to about 146,000 flights by 1998. At present, the airport is around 60 to 70,000 flights. That does not mean that we should ratchet these numbers down, because it is appropriate for the airport to continue to grow to serve the southern region of Sonoma County and to offer better opportunities for commercial use. Airport-related businesses are expected to grow, yet there will be a very limited amount of land left after the hangar development. Pamela would like to address policies in the airport's master plan that could be more detailed. Are we interested in looking at intensification alternatives of that area? Are there questions on alternatives and the transportation report? She would be glad to hear some comments about where the airport is going in the way of growth, what a policy should address in the way of airport concerns, or anything else related to a general plan.

When this process began in 2001, the direction of the City Council was to base the General Plan in physical reality. Therefore, for everything for which there is a program, there will be an identified capital improvement plan for its implementation, including, to all extent possible, an estimated cost of those CIP improvements. This must be kept in mind as we move forward, so as to create a general plan that we can afford to implement, and the means to implement it are identified.

Chairman thanked Pamela, and inquired whether the workshop on April 10th would be focused enough on the airport, in terms of topics of discussion, to make the Commission's presence of value. Pamela said the Commission represents the viewpoint of appointed officials of the community, and as such, its presence is important. In addition, the history of this town which is represented on this Commission is hard to equal. Although Chairman will be out of town, Commissioners Smith and Beene will attend. Pamela stressed that attendees are often focused only on specific areas of concern that impact their own neighborhoods, while Commission members, having lived in the community for 20 plus years, and having seen the growth from the 70's through the 80's, are aware of the potential efficient use of the land we have left, and can lend a balancing to those who are passionate about a particular topic. The General Plan is something that will affect the quality of life of this community for the next 21 years.

When asked if disaster planning would be addressed, Pamela responded that the safety element is mandatory, and deals, to a certain extent, with emergency planning. Disaster planning has a lot to do with transportation planning. As people become more informed, they begin to see how transportation systems are linked to recreational assets and their availability to the population, as well as emergency services and the ability to remain mobile during times of emergency. As we move past a preferred plan into policy formation, the wisdom various commissions can offer in regard to such issues will be invaluable.

In terms of policies and plans for capital expansion at the airport, Pamela suggested working with Mike Glose and a small subcommittee. Commissioner Smith cautioned against going into a new master plan for the airport, even though we are about 20 years out and it is grant fundable. He would encourage a new master plan only if it could be controlled without getting into a $400,000 expenditure. Pamela agreed, and suggested merely tweaking the recently revised master plan. One of the programs in the General Plan could be to update the current master plan. A policy, for example, could say "growth of the airport should be encouraged to facilitate 'x' number of flights per year," or, where the existing number of planes based at the airport is discussed, "'x' number of planes are expected to be housed at the airport by 2025". These are the types of numbers she would like to glean from Mike for policies, goals or programs, endorsed by the Commission, and subsequently included in the draft General Plan, which is about two months out.

In regard to capital development, Chairman McGaw stated that once the airport accepts FAA money (currently $14 million plus), it is dictated by FAA regulations that it be self-supporting as much as reasonably possible. The airport extended this goal to "fully", rather than "as close as possible", to avoid any issues with the general public. However, if the public looked closely, they would see that the economic business generated by our facility is many times more than they might have realized. The Commission will make sure that anything in the way of development at the airport is fully self-funding and self-supporting, regardless of the funding source.

2. Hangar and Tie-Down Rent Increases

Chairman reported that we are closer to getting all the data needed to make a decision as to whether hangar and tie-down rents should be increased. Sue Simmons in the Finance Department was able to consolidate and capture some missing revenues, which appear to be within a percentage point or two of estimates, but there are still items, such as the unsecured personal property tax from the County, which did not appear in the details, so he will need to continue to pursue. On the expense side, again, it seems to be close, but some of the numbers in various line items are questionable. The other piece is additional detail on the amount needed to pay the new combined bond issue, which refinances some of the earlier debt with the new debt for the hangars. (He does have a handle on the other remaining loans.) Since he does not have all the data, he is not able to say if we are on track, or whether we should increase hangar rents, so we will defer until next month.

Commissioner Fullerton asked about trying to get substantial construction underway on the hangar project before the rains, and whether, in the meantime payments would start coming due on the new financial package. Chairman understands that we will have a partial payment due next August, but that is for the entire piece, including some of the existing revenue generated from hangars we already have. He needs to find out the amount of payment in order to determine if we have enough cash reserve in our checking account to pay that bill. Data simply isn't in.

Committee Reports

1. Budget: (See above item #2.) Chairman McGaw mentioned last meeting that he had started looking into the status of the revenue from the Rooster Run Golf Course, basically the back nine, that is built on airport property, and whether we have been receiving credits for it. There are no numbers indicating that we have. He met with Bill Thomas, Finance Director; as well as Sue Simmons. Former Airport Manager Bill Graham also met with Bill to discuss. Consequently, Bill Graham wrote a memo to Chairman McGaw, laying out the history of the funding of the airport and the property purchased using FAA funds. Attachments included excerpts from the actual Rooster Run lease, and layouts of the airport properties that were purchased with FAA funding – acreages, plots, locations. Chairman also provided Bill Thomas with relevant paragraphs from the FAA grant assurances, which state that if grant funds are used to purchase property to be used for purposes other than aviation, lease rent must be credited to the airport fund for that operation.

   The first five years from the date it opened, Rooster Run was to pay $1,000 per year to the City for the entire property; the next five years, they were to pay $10,000 per year for the entire property; the next five years, 5% of the gross green fees, golf cart rentals and driving range fees; the succeeding five years after that, 7 ½%; then 10%; then 12%; topping out at 16%. After 30 years, there is to be a full reversion of the ownership of the golf course back to the City. So, we are currently eligible to receive almost 45% of the first five years, plus the first year of the second five, or 44% of

$15,000. Next year, they will be making another $10,000 payment, of which we should get $4,478, etc. Bill Graham's letter outlines all of this, and the numbers were pulled from the Rooster Run lease, which is in the City Clerk's office. The first FAA AIP grant stipulates which plots were purchased. Don said it is clearly stated in the assurances – it is federal law. Bill Thomas was in agreement and said he wanted it resolved before he left.

2. Liaison: See hangar report below.

3. Operations: Commissioner Smith informed the Commission that the government's advisory circular regarding 5196A, does not supercede the grant assurances, as originally written, in regard to business practices on the airport. He received a couple of letters from ultralight operators who wish to give instruction from the airport, and who feel that the Commission does not have the right to force them to work out of a storefront. They would like to operate out of their hangars. Grant assurances, lease regulations and operating standards all restrict this activity. Commissioner Smith will give Mike a response to these operators. They have written to both City Manager and FAA. In addition, Councilmember O'Brien will keep Chairman and Mike informed. Joe Rodriguez, from the FAA in Burlingame called Mike because he received one of these letters to this effect. Mike drafted a memo to City Manager, and also perused the lease policy standards, grant assurances, and the new advisory. He will clarify our compliance with Mr. Highbeck of the FAA, who is the compliance officer for the grant assurances. Chairman said this topic gets to the whole issue of through-the-fence operators, which relates to mechanics as well. Commissioner Smith reminded the Commission that Santa Rosa does not allow ultralights on the airport at all, because it creates an unsafe mix of traffic; this is not uncommon. The Commission dealt with a similar issue in regard to parachutists, and FAA said no.

4. Master Plan: none

5. Hangar Project: Mike presented an overview of the hangar project status, which is pretty well on track. In regard to the SPARC review, Chairman McGaw has been in contact with the chairman of the SPARC group. They are in discussions about SPARC approval of the minor changes made to the hangar building end profile, as well as the reduction in walk-through gates for security purposes. It is still under discussion, but Chair is continuing to pursue and Councilmember O'Brien has been very helpful in that regard. Hopefully by next meeting, they will have it resolved. However, they are still proceeding on the basis that they will have to go through another SPARC hearing in May, so will be ready to go.

   Mike Shutt attended a Bay Area Airport Managers' meeting at Napa, where he learned that we can use our fully funded, $150,000/year entitlement grant for hangar construction – FAA has loosened the rules for small general aviation airports, such as ours. Also, we can apply for a multi-year grant, meaning that we can apply all at once for $600,000 in grant money, to be used toward building hangars, and dispersed at the rate of $150,000 per year over four years. According to Peter Hong, our

engineer at FAA in Burlingame, care must be taken that we don't overlook anything that needs to be funded in terms of safety or security. However, Mike Shutt feels it merits going after the entitlement grant in its entirety, because we won't be able to apply for it after the fact. He is preparing documents. Mike was told that if airports run into problems, and emergency money is need, the FAA will probably come forward with funding in any event. Regarding drawing down on the new loan, Mike Shutt said it would be appropriate, and his office is preparing the papers.

Commissioner Beene asked if there was federal money available for aviation security from FAA. Mike O'Brien suggested checking with Dept. of Homeland Security, which has quite a bit of money available. Video surveillance is one possibility.

Airport Manager's Report (No written report submitted.)

1. Fuel conversion: The work has passed all inspections, trenches have been backfilled, and concrete is soon to be poured. New software will be required to handle two cards at a time; we have been out of compliance, as records disclosed entire credit card numbers.
2. Met with Lisa Goldfien, Assistant City Attorney, who gave Mike a letter to Marion Hodge, which was delivered this morning. It explains the City's position on two sticking points, and extended an invitation to meet with Marion and her attorney to come to mutual agreement. Walt Peckham has been a great advocate for the airport.

Commissioner Comments

Chairman thanked Councilmember O'Brien for his support, once again.
Commissioner Smith reminded Commission members to submit Conflict of Interest forms to City Clerk.

s\pf&s\airport\minutes

August 10, 2000

The Honorable Clark Thompson, Mayor
City of Petaluma
11 English St
Petaluma, CA 94952

Ref: Airport Economic Impact Estimate

Dear Mayor Thompson:

Thank you for taking the time to have lunch with Barry Lawrence, Mike Glose and myself. We appreciated your openness and willingness to help the Airport Commission and our new Airport Manager be successful. We are all dedicated to the long-term economic health of the enterprise. We also appreciate your offer to help us find $10,000 to cover the initial design and planning for our new hanger construction project.

Following up on my offer to estimate the economic impact of the Municipal Airport on the community, here are my findings. I conducted interviews and gathered information from:

- Business owners at the Airport
- Petaluma Chamber of Commerce
- Sonoma County Tax Collector
- State Department of Transportation
- The Federal Aviation Administration (FAA)
- The Aircraft Owners and Pilots Association (AOPA)

Completing the estimate, I found the total impact of the Municipal Airport to be $40 million. An explanation of the method I used and detailed calculations are attached. I trust you will find them useful and informative.

I found one point quite interesting. Approximately $110,000 in personal property tax is paid to Sonoma County by the aircraft owners each year. 1/3 of the total ($37,000) comes back directly to support Petaluma schools, another 1/3 goes to the City general fund and the balance stays in the Sonoma County general fund. As you can see, every airplane at our Airport provides a direct benefit to the City, County and our schools. The new hanger project will bring an additional 30+ new aircraft owners who will increase this financial support. I'm certain this fact is not known by many within the community.

We would welcome the opportunity to discuss this economic impact estimate with you and members of the City Council as you feel appropriate. Please feel free to contact myself or the Airport Manager.

Respectfully yours,

Tom McGaw
Petaluma Airport Commission

cc. Mike Glose, Airport Manager

Petaluma Municipal Airport Economic Impact
August, 2000

Background:
How often have you heard someone say, "The airport's a drain on the taxpayers and doesn't pay its way?" Or, "The airport's only used by those rich boys for their toys?" Those in aviation know this isn't true but many others in fact do hold this view. Proving the economic benefit of the airport is one way to demonstrate to the community that the airport does play a vital role in the local economy.

To prove the point that general aviation airports provide economic benefits, consider the findings of two new studies. In one, the FAA acknowledges that a typical general aviation airport with 100 based aircraft and no commercial service saves time and reduces the travel costs of those who use that airport over the next best transportation alternative. In dollar terms, that transportation benefit alone is estimated by the FAA to be more than $1 million annually. Of course there is more benefit to a community than just reduced travel expenses. The actual total economic impact of a general aviation airport can be significantly more than one would imagine.

Basics of Economic Impact:
The economic impact of an airport is a measure of the benefits it provides **to the community**. These benefits include the jobs, wages, and expenditures that take place at the airport. They also include the effects of these expenditures in moving from hand to hand through the community, enhancing economic activity far from the airport itself.

Economic benefits also include expenditures made by those transient passengers who use the airport but spend their money at other locations. Savings in time and money that the existence of the airport permits represent another economic benefit that resides with the community. Finally, economic benefits also include the intangible effect the airport has on business decisions to locate or remain in a specific area. Business location decisions based on airport availability are intangible and hard to identify and quantify.

Economic impact as a whole comprises direct, indirect, and induced impacts. **Direct impact** is associated with providers of services at the airport. These include the operation itself and airport businesses. In short, direct impacts represent economic activity that would not occur in the absence of the airport.

Indirect impact is associated with the transient users of airport services. This includes expenditures for food, lodging, ground transportation and similar outlays.

Induced impact is often called "the multiplier effect." It gets this name because a dollar, once spent, does not disappear but continues to move through the local community until it is incrementally exported from the community. There have been a multitude of economic studies done to definitively establish this multiplier for various geographic areas and segments of the economy. These studies indicate that multipliers ranging from two to seven are appropriate to use when estimating airport economic impact. Typical conservative airport impact estimates use a factor of three. The Petaluma Chamber of Commerce uses a similar number in its economic impact calculations for various enterprises.

Petaluma Municipal Airport Economic Impact
August, 2000

Direct Impact:
Includes all payroll, capital expenditures, operating and maintenance costs, taxes and fees incurred by every provider of service.

Total business employment full and part-time:		25
Total City employees part-time:		2
Total payroll:		$400,000
Total taxes paid:		$860,000
Sales tax and fees:	$750,000	
*Aircraft property taxes:	$110,000	
Total Airport operations expense:		$ 900,000
Total Airport capital improvements:		$1,650,000
Total business operations expense:		$1,340,000
Total Direct Impact:		**$5,150,000 per year**

Indirect Impact:
Expenses related to food, lodging, ground transportation, and similar services paid by transient airport users.

**Number of flight operations per year:	65,000/yr (total takeoffs/landings)
Typically 50% are transient users:	65,000/2=37,500/yr
Divide by 2 to determine annual transient arrivals:	37,500/2=18,750/yr
FAA estimates 2.5 occupants aboard each flight:	18,750x2.5=46,875 persons/yr
FAA estimates $100 spent by each person: (Petaluma Chamber of Commerce estimates $120/person)	46,875x$100= **$4,690,000 per year**

*Airport property taxes paid by owners based on value of aircraft and hangers/tiedown spots. 1/3 to City General fund (credited back to the Airport), 1/3 to Petaluma schools, 1/3 to Sonoma County General Fund.

**Estimated annual operations are determined by Calif. Dept of Transportation. Last done in May, 2000.

Petaluma Municipal Airport Economic Impact
August, 2000

Induced Impact:
Multiplier effect frequently used is 3. e.g. $1 spent at 29er Diner pays employee wages, they spend it at Safeway, and then Safeway uses it to pay their employees.

Induced impact = 3 x (direct + indirect impact)
3 x ($5,150,000 + $4,690,000) = 3 x $9,840,000
= $29,520,000 Say: **$30,000,000 per year**

To determine **total economic impact,** add the direct, indirect and induced impacts together.

Direct	$ 5,150,000
Indirect	$ 4,690,000
Induced	$30,000,000
TOTAL	$39,840,000
Say:	**$40,000,000 per year**

Richard E. K. Brawn
141 Grevillia Drive
Petaluma, CA, 94952

RECEIVED
AUG 2 4 2004
PAMELA TUFT

August 22, 2004

Pamela Tuft, AICP
Director of General Plan Administration
City of Petaluma, CA 94952

126

Reference: Notice of Preparation of Draft Environmental Impact Report for the City of Petaluma General Plan 2005

The purpose of my letter is to address what I think should be contained in an environmental report required for the proposed General Plan.

The EIR will need to address the environment in accordance with two sets of values that are applicable and single set of standards by which those values are to be achieved.

1. First is the component that must be covered are those areas required by CEQA.

2. The second is the environmental considerations that specifically apply to Petaluma and reflect the specific values of the people of Petaluma.

With regard to CEQA, the environmental report must specifically identify the applicable standards for those elements that CEQA requires to be analyzed. Since the General Plan is a plan for the development of real estate, then geographic area to be covered by the General Plan needs to be identified. Identify the environmental standards to be applied and the source of those standards. Identify how environmental damage will be assessed and the standards used to assess mitigation.

Section A. Environmental Impact considerations driven by California State Law.

A

1. In order to make keep a perspective and not get lost in the details, I think the environment needs to be grouped into categories. It would probably be easier and cheaper to lump together all urbanized areas that are fully developed. Then lump together all areas that will be subject to future development.
   a. Urban development areas
   b. Buffer areas
   c. Urban development areas with out buffer zones
   d. Identify environmental impacts that cross the boundaries between the three zones. (That way, adjustments are easier to make)
      - Water and wastewater
      - Vehicular traffic
      - Visual/aesthetic impacts

- Etc.

e. New agricultural land being incorporated in the city

2. Identify and measure to the extent practical, the inflow of impact from outside the City

a. Petaluma River
- Drought
- Flood
- Contamination
  - Toxics and other health hazards
  - Garbage and that which can be mitigated at some cost.

b. Traffic
- Air quality
- Demand for infrastructure (gas stations, restaurants, retail, etc.)

c. Growth required by state mandate.
1. Residential development
2. Road development
3. Utilities development
4. Other categories mandated by the state.

3. Impact on the environment by economic conditions
a. Residential use vs. commercial vs. offices, vs. vacant land.
b. Conversion of use from one type to another. Example residential low density to residential high density or to commercial.

4. Criteria to be met in order for any local political authority to waive provisions of the environmental impact statement.

Section B. Environmental considerations pursuant to Petaluma specific values. B

1. Identify values specific to Petaluma
a. Petaluma Cultural values:
(1) Desirability of X ratio of flora to concrete.
(2) Neighborliness and willingness to greet strangers on the street.)
(3) Freedom from fear of theft and intentional physical harm.
(4) 25 mph traffic in neighborhood
(5) Desirability of arterial roads that are not segmented.
(6) Ratio of parks to population density
b. Desirability of boundary between agricultural land and urban land
c. Architectural aesthetic values.
d. Recreation values
e. Quiet enjoyment values.

f. Rate of change values (slow rate of change)

g. Interact ional relationships between citizens and government. (Desirability of council members to be reachable, for police chief to be reachable. This is in contrast to the San Francisco council members and police chief being as distant from the people as the Pope. People do not want a city run by a political machine)

h. City design and size.

(1) Small town

(2) Developed City Center, no sprawl

(3) No use of what is known as "villages" within the City. That is a concept of a town with a city center with satellite districts designed as suburbs with infrastructure to be small towns. Petaluma is to be one town and one city center.

I hope this provides some ideas of how to proceed outside conventional thinking. I have no pride of ownership for this and have no objection if you think it useful to use as a handout.

Sincerely,

Richard Brawn

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PAULA LANE ACTION NETWORK (P.L.A.N.)

P.O. Box 2903
Petaluma, CA 94953
Phone (707) 773-3215/763-2009/762-4802

RECEIVED
SEP 0 3 2004
PCDC

September 1, 2004

For: Pamela Tuft, General Plan Administrator
City of Petaluma
27 Howard Street
Petaluma, CA 94952

127

Subject: Petaluma General Plan 2025: Planning for Environmental Impact Report

Dear Ms. Tuft,

Thank you for the opportunity to provide comments. If we understand correctly, when a preferred Land Use and Mobility version of the potential 2025 General Plan is selected, a formal Environmental Impact Report will ensue.

Enclosed is a copy of correspondence dated 3/22/04 regarding Land Use Alternatives A-B-C and Appendix as they relate to our West Petaluma neighborhood on Paula Lane. We respectfully refer you to page 5 of that document, in which the unfortunate inadequacies of the California Natural Diversity Database are outlined. This situation has not changed with regard to identification and documentation of **biological resources**. We believe it is imperative for reputable biologists to assess biological resources and report them. We believe this will represent an important component of preservation of natural resources for the life of the revised General Plan. A

To this end, at least in our area of West Petaluma, we enclose the most recent updated Wildlife listing on Paula Lane, along with a letter and list of avian species by Petaluma wildlife biologist Dan Nelson. To date, 90+ avian species are identified, and 13 of those are on the DFG Special Animals List. The American Badger survives in our area, as well, and is also a Special Status Animal. Our neighborhood organization has filed an official petition with the Fish and Game Commission in Sacramento, dated August 7, 2004, providing required documentation and requesting review of the status of the American Badger. We are requesting consideration for change of Species of Special Concern to Threatened or Endangered, as we believe sufficient evidence exists to merit this consideration.

Additional documentation regarding biological resources, specifically, the American Badger colony and the Paula Lane corridor's relation to its survival, are in the public record in the Petaluma Community Development Department. In terms of related and cumulative impacts on the west side of Petaluma, identification of wildlife corridors and movement and foraging patterns of wildlife species is also recommended, in the interest of preservation of some of Petaluma's natural resources.

As we believe you are aware, an alternative plan for the property owners at the corner of Paula Lane and Sunset Drive to sell land for fee to the Sonoma Co. Ag. Preservation and Open Space District in the Matching Grants category, under the auspices of the City of Petaluma, has been proposed by P.L.A.N. At a recent Advisory Committee meeting of the Open Space District, one of the Mayors and Councilmembers Representatives approached our neighborhood representatives attending that meeting and encouraged us to continue with what he received to be a most worthy project. Our plan, which provides revenues for the City of Petaluma and provides

for self sustaining land, with active participation by our neighborhood organization and voluntary assistance to the City of Petaluma where needed, continues to gain community and political support as an appropriate Matching Grants Project, and a common sense solution to the desire of the property owners to sell their land. This plan is also congruent with any other property owners' desires to develop under the current county designation of Agricultural Residential, 1 house per 2 acres with county environmental review. Our plan also considers identified multiple areas of environmental constraints and opportunities.

Also of possible relevance is our understanding of the revision process of the Sonoma County General Plan, in which the Agricultural Residential designation for residential development shall remain. We understand the County desires to see strong community support for annexation of county lands to cities, as well as area annexations, rather than piecemeal annexations.

Other areas of potential significant environmental impacts in our immediate area for your consideration include:

- **potential loss of open space** - consideration of protection of fringe areas and existing open space while higher density development occurs in the center of Petaluma and along transit corridors. B
- **hydrology** - *drainage/runoff*: drainage patterns into Tributaty #5, Marin Creek, to Petaluma River and impact of volume increase, along with potentially toxic residues; *seasonal wetlands*: wetlands characteristics on property at Paula Lane and Sunset Drive with 4 identified wetlands plant species and unique topography contributing to seasonal winter wetlands; *historically low water pressure* in the Paula Lane area, considering water availability and fire safety; and *groundwater recharge*: preservation of groundwater recharge areas, including the Paula Lane/Sunset Drive property and surrounding areas for well water availablity versus complete loss of groundwater recharge area from paving over land - *interrelationship* among water resources, groundwater recharge, change in natural drainage/runoff patterns and natural characteristics of seasonal wetlands. C
- **noise** - traffic noise, impact of construction noise in a rural neighborhood, impact or urbanized noise in a rural setting.. D
- **lighting and glare** - the Paula Lane neighborhood is virtually dark (and quiet) at night. This correlates to the survival of multiple nocturnal wildlife species. An introduction of additional lighting in this area at night would dramatically impact the existing environment. E
- **traffic** - traffic counts performed by P.L.A.N. in 2003 = 1175 average vehicle trips daily, holiday week, Paula Lane. The availability for widening Paula Lane, a two-lane, unimproved county road, to accommodate more traffic and, at the same time, preserve mature trees, front yards, and the community character, are mutually exclusive. The majority of the neighborhood desires preservation of the lane in its current state and management of current traffic capacity, which is at a maximum. Our neighborhood was not designed for higher density development than county AR-2 designation. F
- **historic resources** - the Paula Lane neighborhood is one of Sonoma County's and Petaluma's earliest immigrant agricultural communities. Along Paula Lane, between Bodega Avenue and Schuman Lane are five intact farmsteads dating back to the late 1800's and early 1900's, including one of the early Jewish chicken farms. Also along Paula Lane are several 1950's bungalow style homes. Most homes on Sunset Drive, in the designated city portion of 9 residences, were constructed in the early 1960's. The community character is that of rural history. The existing open space and grasslands support this context. Our neighborhood organization is currently researching the possibility of an Historic District designation by the Sonoma County Landmarks Commission for county properties on Paula Lane. It is the desire of the majority of property owners and residents on the lane to preserve the historic character of this neighborhood, within the current county zoning designations. A representative of P.L.A.N. G

requested consideration of an Historic District designation from the Landmarks Commission in May of 2003. We were advised to return for further discussions if the subject property at Paula Lane and Sunset Drive ultimately remained in the county. This continues to be our intention. Also, as you are probably aware, the UGB vote in 1998 by Petaluma voters did not include a voice or vote by county residents in our neighborhood, and the request has been made to consider contracting the UGB to be in the middle of Paula Lane itself, for consistency, from Bodega Avenue to Schuman Lane At the very least, a benefits assessment district would provide necessary information to the City of Petaluma regarding the majority of the county property owners' desires in this regard.

- **visual/aesthetic** - the Paula Lane area is one of the oldest neighborhoods and provides a transition or separator zone from suburban life to rural life. A walk or drive along Paula Lane imparts a rural and agricultural visual and aesthetic feel. Preservation of this quality is important to the majority of both our county and city residents. As you know, visitors from Petaluma proper seeking a respite from urban life, as well as outside our area come to Paula Lane to enjoy the rural neighborhood, the abundance of wildlife visually and audiologically, and and the lovely sunsets that can be seen over open space at Sunset Drive. The vusial/aesthetic area of potential impact also correlates to the potential significant impact of loss of open space. H
- **cumulative** - We request the cumulative impact of the above individual aras of potential significance be considered, as well. In addition, consideration of the cumulative impact of previously approved developments on the West Side of Petaluma in the areas of hydrology, biological resources displacement and traffic may provide additional relevant and valuable information. I

Finally, we wish to express a desire to for due diligence in selection of experts who will perform the Environmental Impact studies for the 2025 General Plan. We believe it will be in the best interest of all for the revised General Plan and related environmental information to be academically driven and not developer driven, as one Petaluma resident observed during a public workshop regarding the Land Use Alternatives A-B-C. Selecting experts who can provide thorough and accurate documentation may also prevent additional future costs to the City in staff time and expenses.

We are hopeful the preferred plan to be presented to the City Council will be one both your staff and consultants and we in the community will see as an inspiring blueprint for the future of greater Petaluma. We also understand this is an extremely complex task, greater Petaluma is multifaceted, and we deeply appreciate your staff's dedication and hours and hours of compilation of information to reach the goal of the General Plan 2025.

We also appreciated the opportunity to participate in all recent public workshops and the Planning Commission workshops, as well, to provide input where that appeared relevant for our neighborhood.

Sincerely,

Paul Selinger, President
P.A.N.

cc: City Manager, City Councilmembers, Mayor of Petaluma

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Sincerely,

Paul Selinger, President
LA.N.

cc: City Manager, City Councilmembers, Mayor of Petaluma

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PAULA LANE ACTION NETWORK (P.L.A.N.)

P.O. Box 2903
Petaluma, CA 94953
Phone (707) 773-3215/763-2009/762-4802

July 7, 2004

Mayor David Glass and Members of City Council
Michael Bierman, City Manager
City of Petaluma
11 English Street
Petaluma, CA 94952

Re: ***Wildlife Update on Paula Lane/Sunset Drive***

Dear Mayor Glass, Councilmembers and Mr. Bierman:

Additional wildlife species continue to be identified. New species are designated in **bold & italics.** An asterisk "*" = Special Animal List of the California Natural Diversity Database, Department of Fish and Game.

The completion of a Paula Lane area avian species list by wildlife biologist Dan Nelson (his list submitted under separate cover) results in expansion of identified birds, as well as addition to the amphibians list. Our review of Mr. Nelson's list, compared to our list and avian biologist Heather Howitt's review and professional opinion, have added 26 birds. Mr. Nelson's observation extended southward from the Paula Lane property and includes migratory fly-overs. We would like to see the wetlands characteristics on the Paula Lane property enhanced to sustaining wetlands as an educational project, to encourage seasonal migratory stopovers to add to the Great Blue Heron, Snowy Egret and Great Egret now seen on the Paula Lane property in the winter. This would be part of the proposed open space acquisition and habitat enhancement. We would like to see the nesting habitat and foraging area preserved and protected.

Mammals:
*American Badger (Species of Special Concern)
Deer
Grey Fox
Skunk
Raccoon
Opossum
Grey Squirrel
Gophers
Mice
Red Fox *(information provided on 10/28/03)*
Meadow Vole

Birds:

There are 99 listings below. 8 are on the DFG Special Animals List (Species of Concern and/or Fully Protected). These birds inhabit the property that has been proposed for development and immediate vicinity, nesting in the Monterey Cypress, Oak, Pine, Eucalyptus and other trees, along with short and tall grasses. The grassland acreage is also a primary foraging area for raptors and mammals.

Turkey Vultures
Red-tailed Hawks
Barn Owls
Screech Owls
American Crows
Hummingbirds
- *Allen's *(nesting, G5S?, Federal Species of Concern; Fish & Wildlife Service, Migratory NonGame Birds of Management Concern; US Bird Conservation Watch List; Audubon Watch List)*
- Anna
- *Rufous *(nesting, G5,S1,S2, Fish & Wildlife Service Migratory Nongame Birds of Management Concern; US Bird Conservation Watch List; Audubon Watch List)*

Hutton's Vireos
Steller's Jays
Western Scrub Jays
Common Raven
Horned Larks
Western Bluebirds
American Robins
Northern Mockingbirds
European Starlings
Song Sparrows
House Sparrows
Savannah Sparrows
White-throated Sparrows
Golden-crowned Sparrows
White-crowned Sparrows
Chestnut-backed Chickadee
Brewer's Blackbirds
Red-winged Blackbirds
Wild Turkeys
Ring-necked Pheasants
House Finches
Purple Finches
American Goldfinches
Lesser Goldfinch
Black-headed Grosbeak
*Sharp-Shinned Hawks *(nesting, G5,S3, Dept. of Fish & Game Special Concern Species)*
Red-shouldered Hawks
*White-tailed Kite *(nesting, G5,S3, Federal Species of Concern; Fish & Wildlife Service Migratory NonGame Birds of Management Concern; Dept. of Fish & Game Fully Protected)*
American Kestrel (falcon)
***Cooper's Hawk** *(nesting, G5, S3, Dept. of Fish & Game Special Concern Species)*
Plain Titmouse
Oregon Junco
Dark-eyed Junco
Brown Towhee (California Towhee)
Rufous Towhee
Spotted Towhee
Northern Flickers
Ruby-crowned Kinglets

Birds (Cont'd)

Golden-crowned Kinglet
Mourning Dove
Rock Dove
Belted Kingfisher
Tree Swallow
Violet-green Swallow
Cliff Swallow
Barn Swallow
Nuttalls Woodpecker
Downy Woodpecker
Acorn Woodpecker
Nuthatches
Bullock's Orioles
Common Red-Shafted Flicker
Hooded Orioles
Cedar Waxwings (seasonal)
Brown-headed Cowbirds
Black Phoebe
Say's Phoebe
California Quail
Western Kingbird
*Oak Titmouse (G5,S?, (FSC), Birds of Concern Watch List, Audubon Watch List, Dept. of Fish & Game Species of Special Concern)
Bushtit
Western Tanager
Ash-throated flycatcher
Pacific-slope Flycatcher
Hermit Thrush
American "Water" Pipit
Wood Duck
Great-horned Owl
Bewick's Wren
White-breasted Nuthatch
Red-breasted Nuthatch
*Redbreasted Sapsucker *(nesting, G5S7, Federal Species of Concern, Fish & Wildlife Service Migratory NonGame Birds of Management Concern)*
*Snowy Egret *(rookery, G5,S4, Federal Species of Concern; US Bird Conservation Watch List)*
***Great Egret** (rookery, G5,S4, Calif. Dept. of Forestry & Fire Protection Sensitive)*
*Great Blue Heron (rookery, G5,S4, Calif. Dept. of Forestry & Fire Protection Sensitive)
***Black-Crowned Night Heron** (G5, S3, Bureau of Land Management Seinsitive)*
***Long-Billed Curlew** (G5, S2, Dept. of Fish & Game Species of Special Concern, Forest & Wildlife Svc. BCC, Birds of Management Concern Watch List, Audubon Watch List)*
Orange-crowned Warbler
Yellow-rumped Warbler
Common Snipe
Western Meadowlark

Burrowing Owls - Undetermined - habitat may have been destroyed by fire prevention disking - grasslands habitat with expansive open space lend to possibility - official study not conducted.
(Burrowing owls are G4,S2, Federal Species of Concern, Dept. of Fish & Game California Special Concern Species, Fish & Wildlife Service, Migratory NonGame Birds of Management Concern, and Bureau of Land Management Sensitive).

One additional amphibian species is ID'd below. We have been unable to further study the reptile, amphibian and insect species on the Paula Lane property to date.

Reptiles:
Pacific Gopher snake (two recently found 5 feet in length)
Garter snake
Southern Alligator Lizard
Western Fence Lizard
Western Skink

Amphibians:
Frogs - specific to be ID'd(in wetlands/vernal pools late winter and during spring)
Toads - specific to be ID'd
California Slender Salamander
Arboreal Salamander

There continues to be a question re: tiger salamander. The vernal pools in winter and spring could provide breeding grounds and subsequent migration to live in ground squirrel holes or similar den type settings, which exist on the Paula Lane property. We planned further research relative to a wetlands delineation, which has not been permitted to date.

Insects:
Meadow Grasshoppers
Crickets (Tree, Ground, Field)
Gypsy Moths
Hook-tip Moths
Butterflies:
- Comma Butterflies
- Viceroy Butterflies
- West Coast Lady Butterflies

Bumble Bees
Ground Spider
Daddy Long Legs Spider
Centipedes
Millipedes
Carpenter Ants
Field Ants
Ground Beetles
Soft-winged Flower Beetle
Wood boring Beetle
Ladybird Beetle
Boxelder Bugs
Four-lined Plant Elder Bugs
Flies (Deer, Horse, House)
Paper Wasps
Spider Wasps
Thread-Waisted Wasps
Yellow Jackets

Summary:
The updated avian species list now includes 8 birds on the Special Animals List - 2 species are federally protected *(White-tailed Kite, Red-breasted sapsucker)* and 7 are Species of Special Concern *(Sharp-Shinned Hawk, White-tailed Kite, Allen's hummingbird, Redbreasted Sapsucker, Great Blue Heron, Snowy Egret, Long-billed Curlew)*. The *American Badger* is also on the Special Animals List and currently is classified as a Species of Special Concern. We are in the process of completing a petition to submit to the Fish and Game Commission in Sacramento, requesting a review of the American Badger status with possible reclassification to threatened or endangered. We believe substantial evidence exists to merit this request.

Seasonal wetlands on the Paula Lane property may contain additional amphibian and reptile species. Additional bird and other species are yet to be identified.

The abundance of wildlife species and documentation of same, significant loss of habitat and displacement westward from Petaluma, topography of grasslands, uplands trees and wetlands characteristics, and continued identification of diversity and adaptation of species all contribute to the Paula Lane property as a significant critical habitat area. This very special feature of Petaluma exists within the context of one of Sonoma County's early areas of rural agricultural life. As decision makers continue to consider the situation on Paula Lane and possibilities within that, we continue to hope the preservation of this precious open space corridor will become a priority.

Sincerely,

Paul Selinger, President
P.L.A.N.

cc: Irene Borba, Senior Planner, City Planning Department
Heather Howitt, Avian Biologist
Kim Fitts, Bioconsultant LLC
S. Sanborn Consulting
Brandt-Hawley Law Group
Bodega Land Trust
Robert Floerke, Dept. of Fish and Game
Elizabeth Cooper, Asst. Exec. Director, LAFCO
Andrea McKenzie, Exec. Director, Open Space District
Mike Kerns, Supervisor, 2nd District
Tom Furrer, Casa Grande High School
Mike Simpson, Principal, Petaluma High School
Kim Arnst, Faculty, Petaluma High School
Petaluma Educational Foundation
Steve Bolman, Deputy Supt., Petaluma School District
Pamela Tuft, General Plan Administrator

To: City of Petaluma, Council Members, etc.

Regarding: Wildlife at Paula Lane property

m: Dan Nelson, Wildlife Biologist
Attached: Cheklist of Bird species found at Paula Lane site., and annotated cheklist with special notes, dates,etc.

Greetings to the Planning Commission and City Council members,

The following list has been researched and compiled since September, 2003, and will continue to grow as I spend more time looking. There are few, if any open spaces left here that can boast such a wide assortment of avian diversity but yet are still close to Petaluma to offer not only a choice greenbelt for asthetic reasons, but also great educational possibilities to numerous schoolchidren living nearby.

This property is the home to over 120 species of birds during the year; however limited access has prevented me from entering to formally document a number of species I am more than confident I would find if I were granted access. I am working on a supplemental list of these "search-for" species, and am confident at least 20-30 additional bird species will be documented on the premises by the end of 2004.

I want to stress that my background in Environmental Studies and Biology in Sonoma County over 20 years has led me to few localities with so much diversity in a relatively small, park-sized area. It is simply much richer than some of the flat drier areas surrounding Petaluma, and these lists reflect this.

Many of these creatures are lost forever, should the area be developed. They simply don't just relocate without causing a ripple-effect, driving other established pairs away, or, more often, they themselves being chased away from suitable areas by pairs already established there. The same goes for all the mammals, reptiles and amphibians which are known to inhabit the area.

This property should be saved, preserved, as anything less would be a tragedy.

Thank you,

Dan W. Nelson

Dan Nelson 6/30/04

Wildlife Biologist
P.H.S. graduate, 1982 ; S.S.U. 1987
Head Lifeguard, City of Petaluma, '88-89
Madrone Audubon Brd. of Directors 20+yrs
California D.F.G. (Fisheries) 10+ yrs.

1 Mallard
2 Wood Duck
3 Canada Goose
4 Greater White-fronted Goose
5 White Pelican
6 California Gull
7 Ring-billed Gull
8 Glaucous-winged Gull
9 Caspian Tern
10 Red-tailed Hawk
11 Red-shouldered Hawk
12 Sharp-shinned Hawk
13 Cooper's Hawk
14 American Kestrel
15 White-tailed Kite
16 Turkey Vulture
17 Great-horned Owl
18 Western Screech Owl
19 Barn Owl
20 California Quail
21 Ring-necked Pheasant
22 Wild Turkey
23 Great Blue Heron
24 Snowy Egret
25 Great Egret
26 Black-crowned Night Heron
27 Killdeer
28 Long-billed Curlew
29 Common Snipe
30 Mourning Dove
31 Rock Dove
32 Belted Kingfisher
33 Acorn Woodpecker
34 Nuttall's Woodpecker
35 Downy Woodpecker
36 Red-breasted Sapsucker
37 Common "Red-shafted" Flicker
38 Anna's Hummingbird
39 Allen's Hummingbird
40 Rufous Hummingbird
41 Tree Swallow
42 Violet-green Swallow
43 Cliff Swallow

45 Pacific-slope Flycatcher
46 Ash-throated Flycatcher
47 Black Phoebe
48 Say's Phoebe
American Robin
50 Hermit Thrush
51 Western Bluebird
52 Northern Mockingbird
53 Cedar Waxwing
54 Horned Lark
55 American "Water" Pipit
56 Western Scrub-Jay
57 Steller's Jay
58 Common Raven
59 American Crow
60 Chestnut-backed Chickadee
61 Oak Titmouse
62 White-breasted Nuthatch
63 Red-breasted Nuthatch
64 Bewick's Wren
65 Ruby-crowned Kinglet
66 Golden-crowned Kinglet
67 Bushtit
Hutton's Vireo
69 Wilson's Warbler
70 Townsend's Warbler
71 Yellow Warbler
72 Orange-crowned Warbler
73 Yellow-rumped Warbler
74 Western Tanager
75 Red-winged Blackbird
76 Brewer's Blackbird
77 Brown-headed Cowbird
78 European Starling
79 Western Meadowlark
80 Bullock's Oriole
81 Hooded Oriole
82 House Sparrow
83 Song Sparrow
84 Lincoln's Sparrow
85 Fox Sparrow
Savannah Sparrow
White-crowned Sparrow
88 Golden-crowned Sparrow
89 White-throated Sparrow
90 Dark-eyed Junco

91 Mouse Finch
92 Purple Finch
93 Pine Siskin
94 American Goldfinch
95 Lesser Goldfinch
96 Black-headed Grosbeak
97 Spotted Towhee
98 California Towhee

BIRDS of PAULA LN. area Compiled by : Dan Nelson <dansbird@pacbell.net>

Wildlife Biologist
P.H.S. graduate, 1982 ; S.S.U. 1987
Head Lifeguard, City of Petaluma, '88-89
Madrone Audubon Brd. of Directors 20+yrs
California D.F.G. (Fisheries) 10+ yrs.

Mallard (Fairly common)
2 Wood Duck (noted)
3 Canada Goose (fly-overs noted occasionally)
4 Greater White-fronted Goose (One group flew over in winter '04)
5 American White Pelican (flyovers noted in summer and fall)
6 California Gull (numerous winter flyover records)
7 Ring-billed Gull (numerous winter flyover records)
8 Glaucous-winged Gull (winter flyover records)
9 Caspian Tern (three seen over Paula Ln. property on 5/2/04)
10 Red-tailed Hawk (nesting species; relies year-round on this property for hunting Tall trees here are needed year-round for roosting.)
11 Red-shouldered Hawk (Recent nesting, seen daily in 2004.. Hunts here year-round)
12 Sharp-shinned Hawk (Has nested, seen through Spring '04; also winter resident)
13 Cooper's Hawk (Mostly winter visitor; relies on Paula Ln. property for winter prey)
14 American Kestrel (This miniature falcon has nested, but more numerous in winter)
15 White-tailed Kite (At least one or two prs. have nested; larger numbers in winter. Requires tall trees for nesting)
16 Turkey Vulture (Common year-round resident)
17 Great-horned Owl (Well established pair; year-round residents on property Requires open space year-round for hunting/survival)
18 Western Screech Owl (Cavity-nesting species; nesting species on property)
19 Barn Owl (Known to nest nearby, visits the property nightly for hunting. Young birds disperse in Fall and winter here on this property, 4-5 seen in"03.
20 California Quail (Our State Bird is here in modest numbers, but urbanization has driven it from most areas of Petaluma.. The few remaining birds along Paula Ln. will suredly disappear if these open areas vanish)
21 Ring-necked Pheasant (Uncommon permanent resident)
22 Wild Turkey (Uncommon but increasing numbers here in last 5 years.)
23 Great Blue Heron (Seen regularly again in Spring '04, Uncommon yr-round)
24 Snowy Egret (Uncommon visitor- possible nester?)
25 Great Egret (Uncommon visitor)
26 Black-crowned Night Heron (Uncommon evening visitor)
27 Killdeer (Fairly common year-round, requires open fields especially in winter)
28 Long-billed Curlew (Uncommon migrant; noted on 5/1/04)
29 Common Snipe (winter visitor; requires wet fields in preference to dry ones)
30 Mourning Dove (Nesting species, year-round)
31 Rock Dove (Permanant resident)
Belted Kingfisher (Uncommon visitor, noted 2-3 times in Spring '04)
33 Acorn Woodpecker (Has nested; permanent resident)
34 Nuttall's Woodpecker (Nesting species, permanent resident)
35 Downy Woodpecker (Nests, Permanent resident)

36 Red-breasted Sapsucker (Seen through spring '04, neighbors report it has nested here in the past)
37 Common "Red-shafted" Flicker (Fairly common, more numerous in winter)
38 Anna's Hummingbird (Nesing species, year-round resident)
39 Allen's Hummingbird (Nesting species, here from Jan.20 '04 through summer)
40 Rufous Hummingbird (Mostly a migrant through property, seen April and May '04)
41 Tree Swallow (Seen regularly in June '04)
42 Violet-green Swallow (Seen throughout spring and summer, nests in area)
43 Cliff Swallow (Visits the airspace over property in Summer for its' prey)
44 Barn Swallow (Summer only, arrived 3/11/04, raised young on property thereafter; juveniles seen in late June)
45 Pacific-slope Flycatcher (Uncommon ; Spring /summer visitor.)
46 Ash-throated Flycatcher (Uncommon ; Spring migrant)
47 Black Phoebe (Well-known year-round resident. Requires open/standing water)
48 Say's Phoebe (Uncommon, winter only; Sept.- March usually) Requires open fields.
49 American Robin (Year round, Nests on property. Local breeders move S. in winter but are replaced by birds from other areas N. and higher than Sonoma County.)
50 Hermit Thrush (Winter visitor only, breeds in N.W. Sonoma County)
51 Western Bluebird (Nesting-Juveniles seen 6/28/04. Larger numbers in small flocks winter here, and are dependant on the open space the Paula Lane property offers)
52 Northern Mockingbird (Permanent resident, sings all night on warm summer nights)
53 Cedar Waxwing (Flocks observed wintering here late August- May.)
54 Horned Lark (Uncommon resident, requires lg. open fields with variable.length gras.
55 American "Water" Pipit (Flocks seen in winter months, needs wet open fields)
56 Western Scrub-Jay (Common, year-round resident)
57 Steller's Jay (Small numbers are seen in area, much less common than Scrub Jay)
58 Common Raven (uncommon but regularly seen resident)
59 American Crow (Abundant year-round)
60 Chestnut-backed Chickadee (Fairly common, especially in Oaks. Nests on property and requires cavities in suitable trees for nesting)
61 Oak Titmouse (Fairly common, nesting in cavities of oaks preferably)
62 White-breasted Nuthatch (Another cavity-nesting species, year-round on Paula Ln.)
63 Red-breasted Nuthatch (Uncommon winter visitor, in variable numbers)
64 Bewick's Wren (Nests in the area, usually in some type of natural cavity)
65 Ruby-crowned Kinglet (Winter visitor to larger stands of trees)
66 Golden-crowned Kinglet (Winter visitor, usually less common than Ruby-crowned Kinglet. This species prefers dense conifers when it can find them.)
67 Bushtit (Year-round nesting species)
68 Hutton's Vireo (Uncommon, year-round and likely nests, but nests are difficult to find! Requires a very close search, but almost certainly a nesting species.)
69 Wilson's Warbler (Singing male found on property on 4/19/04.)
70 Townsend's Warbler (Seen wintering here in '03-'04)

71 Yellow Warbler (Migrant in Spring and Fall-more numbers seen in Aug.-Sept.) This species might possibly nest- especially if encouraged by proper habitat management. Will nest in tall Eucalyptus, but prefers Willow and Alder if present)
72 Orange-crowned Warbler (Small numbers breed nearby, and might also be present the property in winter in small numbers.)
73 Yellow-rumped Warbler (Common winter resident)
74 Western Tanager (Migrants are detected in April-May, and August-September)
75 Red-winged Blackbird (Fairly common resident)
76 Brewer's Blackbird (Fairly common resident)
77 Brown-headed Cowbird (Fairly common, especially spring-summer months.)
78 European Starling (Common year-round resident)
79 Western Meadowlark (Local breeding resident; requires larger open fiels with tall grass)
80 Bullock's Oriole (Breeding Summer resident. Arrived 3/15/04, nested thereafter)
81 Hooded Oriole (Seen several times in June "04)
82 House Sparrow (Abundant permanent resident)
83 Song Sparrow (Fairly common ; Nesting species occuring year-round)
84 Lincoln's Sparrow (Uncommon winter visitor to wet, brushy areas with other sparrow species present)
85 Fox Sparrow (Fairly common winter visitor)
86 Savannah Sparrow (More often seen in winter, also requires larger open fiels with few trees and no structures.)
87 White-crowned Sparrow (Common winter resident in brushy, weedy areas)
88 Golden-crowned Sparrow (Common winter resident in brushy, weedy areas)
89 White-throated Sparrow (Rare winter visitor, seen with White-crowned and Golden-crowned Sparrow flocks, especially in low,moister areas)
90 Dark-eyed Junco (Breeds in area, but larger numbers present in winter)
91 House Finch (Common year-round Breeding resident)
92 Purple Finch (Uncommon; mostly in winter)
93 Pine Siskin (Fairly common in winter, has not been seen here in summer)
94 American Goldfinch (This beauty breeds on the property, and the numbers increase about four-fold during winter months)
95 Lesser Goldfinch (Year-round; breeds on Paula Ln. property-but slightly less common than American Golfinch. Lesser Goldfinch is generally quiter than American Golfinch and is easier over-looked.)
96 Black-headed Grosbeak (Poosibly a breeding summer resident; noted along property edge during May-June. A thorough check might turn up breeding birds.)
97 Spotted Towhee (Nesting species, year-ruond resident)
98 California Towhee (Nesting species, year-round resident)

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PAULA LANE ACTION NETWORK (P.L.A.N.)

P.O. Box 2903
Petaluma, CA 94953
Phone (707) 773-3215/763-2009

March 22, 2004

For: Pamela Tuft, General Plan Administrator
City of Petaluma
27 Howard Street
Petaluma, CA 94952

Subject: Petaluma General Plan 2025: Land Use Mobility and Alternatives 2025
Technical Appendix Index (3/16/04)

Dear Ms. Tuft,

Our neighborhood organization, P.L.A.N., has reviewed the Land Use Mobility and Alternatives A-B-C, along with the index. One of our members attended the presentation to the Recreations, Parks and Music Commission. Many of us will attend the 3/23/04 Planning Commission presentation of same. We also hope as a community to participate in upcoming Public Workshops on 3/24 and 4/10.

P.L.A.N. is a neighborhood organization in existence since the late summer of 2001. We are in the process of filing our 1023 to become a 501(c)(3) nonprofit organization. Presently, about 70 households in the Paula Lane/Sunset Drive immediate area and outlying neighborhoods (including Lohrman Lane, Bodega Avenue, Schuman Lane, Elm Drive and Cindy Lane, and north Larch Drive, to name a few) are active in our neighborhood organization.

We wish to provide input for your planning process. For your records, these will be comments on

- zoning
- existing land use
- vacant and underutilized land perception
- urban growth boundary/urban separator
- environmental constraints and opportunities
- park and open space designations
- traffic

We hope our input and documentation will be helpful in accurate reflections of zoning, urban separator/urban growth boundary information, and special qualities of our west side neighborhood. We would like to see this information reflected in the General Plan Revision so that we, as individuals and as an organized neighborhood, begin to become part of the process in Petaluma.. We hope this will lead to efficiency in land use decisions, with benefit to the greater community, and interesting tie-ins of County and City elements.

1. **Zoning**: The above-referenced document indicates "Hillside/Rural Residential 0.2 to 4.0 hu/ac" on Paula Lane properties approaching and at the west urban growth boundary between Bodega Avenue and Schuman Lane.

This designation appears in Alternatives A, B and C, on the map included with the document.

We request the *actual* zoning designation of Agricultural Residential-0 to 2, or AR-2 (1 house per 2 acres), be reflected on Paula Lane, west all the way from Bodega Avenue to Schuman Lane, and other accurate county zoning designations on east Paula Lane between Bodega Avenue and West Street. Two houses, corner of West Street & Paula Lane, east side, are zoned in the City of Petaluma. Houses (9) from east Paula Lane and West Street, beginning 600 Paula Lane, to Schuman Lane, are within the city limits of Petaluma and zoned as such.

The Sonoma County General Plan revision office confirmed for us, in the current revision process of the County General Plan, there is no plan to recommend a change of zoning on Paula Lane. It was confirmed for us, to do so would require a discussion of annexation of the area to the City of Petaluma and strong community support. There is not community support for an annexation of properties along Paula Lane into the City of Petaluma. In fact, there is rather strong community opposition, as you may be aware.

Approximately 30 years ago, a benefits assessment district was formed to determine if property owners wanted to annex in, and the answer was no then. The majority of property owners and residents living in our neighborhood do not want to be annexed to the City of Petaluma. We believe the mechanism for deciding on such a route, a benefits assessment district, could be included in language regarding same in the General Plan Update, discussing pathways for annexation, the need for strong community support, and, as important, awareness of infrastructure issues and environmental constraints, with a benefits assessment district as the vehicle to determine same.

Summary: The designation of AR-2, Agricultural Residential, with a density of up to 1 house per 2 acres, should be accurately reflected on West Paula Lane properties, from Bodega Avenue to Schuman Lane. The appropriate County zoning designations on the East side of Paula Lane from Bodega Avenue to Schuman Lane should also be reflected, with the exception of 2 houses at the corner of West Street and Paula Lane and east Paula from 600 Paula to Schuman Lane, which are within the City limits of Petaluma.

2. **Existing Land Use, Figure 2-3:** The above-described properties are designated "Single Family Residential". We request the actual land use and designations for the County zoned properties be represented, that is, Agricultural Residential for west Paula Lane properties from Bodega Avenue to Schuman Lane, and we believe some east Paula Lane county zoned properties between Bodega and Schuman are also zoned as such.

It is misleading to place the "Single Family Residential" designation as such, which apparently *assumes* an annexation of such properties to the City of Petaluma and, therefore, leads to another potential misperception in Figure 2-4, "Vacant and Underutilized Land..." See #3.

3. **Vacant and Underutilized Land, Approved Development Projects as of December 2003:** Using the inaccurate existing land use designation from Figure 2-3, four properties on Paula Lane between Bodega Avenue and Schurman Lane are indicated as "underutilized." (color brown). Another property at the corner of Paula Lane and Sunset Drive is designated "vacant land" (color red).

All of these are zoned in the County of Sonoma as AR-2. The existing land use is for agricultural residential use, permitting 1 house per 2 acres of land. All of these properties are farmsteads from Petaluma's and Sonoma County's early farming days and have historic relevance. Houses on at least three of these properties were constructed in the early 1900's and one was built in the late 1800's. We wish to provide this information so that the City of Petaluma does not perceive these lands as "Single Family Residential" in the City of Petaluma, which they are not. For example, one such property, a six-acre square on West Paula Lane between Bodega Avenue and Sunset Drive, shown in brown color, is an early Jewish immigrant chicken farm of historic relevance, both to Petaluma and Sonoma County. The farmhouse was built in the 1920's. One chicken barn still stands intact, with 2 others fallen. Theoretically, under current zoning, 2 additional homes could be constructed on this property. However, because of environmental constraints, including established American Badger denning and foraging on the west 1 acre of the property, with other potential constraints, in reality, actual build-out might not be possible

We request Existing Land Use, Figure 2-3, and Vacant and Underutilized Land..., Figure 2-4, be amended to show consistence of actual County zoning and land use for the properties on Paula Lane, between Bodega Avenue and Sunset Drive.

In addition, there would be environmental constraints for the designations the City has shown in our neighborhood and we believe it would be better to reflect what actually exists, rather than place inaccurate zoning designations and land use designations for possible future misundertandings. Some of the environmental constraints that exist in the Paula Lane neighborhood, which we would like to see reflected in the environmental information of the total General Plan include:

- Paula Lane is a **two-lane county road** that could not be widened to accommodate add'l traffic without destroying front yards, endangering a Heritage Oak tree on North Paula Lane, and endangering mature oak and cypress trees lining the lane, with trunks sitting about 4 feet from the actual road, creating part of the rural and agricultural character of our neighborhood, drawing visitors from not only the west side of Petaluma, but from Greater Petaluma, as well.
- Significant **hydrology issues** exist on properties along Paula Lane, including issues with drainage, wetlands characteristics at the urban growth boundary, and groundwater recharge for well water.
- Significant **biological resources issues** exist in the neighborhood. Just take a look at your map, with land use moving west from downtown Petaluma on Bodega Avenue. As you will see, there is literally no open space in this area. In our greater neighborhood, along Bodega Avenue, just east of Paula Lane, there used to be a 21-acre meadow, frequented by deer, relied upon by raptors and nocturnal wildlife for foraging. That has become "Westview Estates," with no provision made for acceptable open space and no provision at all made for natural resources survival. What was in that area has all been displaced to the Paula Lane neighbo4rhood.

(Please see enclosed documentation of Wildlife in July 2003. Please see add'l enclosures for documentation of American Badger habitat and bird species on Paula Lane: 9 birds on DFG Special Animals List. American Badger, here for 70 to 100 years, is DFG Species of Special Concern.)

(Continued: 3. Vacant and Underutilized Land...)

For discussions of the Total Plan, we plan to provide input regarding **special status animals and plants.** We have learned from the Department of Fish and Game they have over 170 forms waiting to be placed in their database. The DFG staff is overworked and understaffed and, according to them, is focusing primarily on tiger salamanders and burrowing owls, with most everything else going by the wayside, unless individual documentation is provided and pressed. We provided information about the American Badger in July of 2003 and in December of 2003 they still had not put that in their database. Our biologist completed yet another field form and helped with the input of the information into the database. While the DFG staff told us time and time again, developers who propose development **cannot** use the absence of data in the California Natural Diversity Database as a justification for absence of special status plants and animals, we know that developers do this. Therefore, we believe some statement as to appropriate environmental studies by qualified professionals (biologists, arborists, botanists) in both known environmentally sensitive areas (such as Paula Lane) and other unknown areas, in compliance with California Environmental Quality Act requirements must be provided, would likely prevent opening the City of Petaluma to potential litigation and, also, would ensure accurate information for preservation, protection and educational opportunities for our youth.

The residents of the Paula Lane neighborhood are very protective of the wildlife that has been forcibly displaced westward and has adapted to circumstances, using the available open space on agricultural-residential lands for survival.

- Significant issues regarding changes in **lighting and noise impacts** also exist in this neighborhood. Nocturnal wildlife is able to survive in this county zoned area because of the minimal lighting. The rural agricultural lifestyle enjoyed by all is largely in part due to the existence of traffic as a primary noise modality, and not a suburban or urban neighborhood atmosphere.

- The Paula Lane neighborhood is rich in **history and historic resources**, both for early Sonoma County rural agricultural life and early Petaluma agricultural life. Five farmsteads from the late 1800's to early 1900's still exist on Paula Lane, contributing to the unique character of the neighborhood. Two additional Victorians date to 1900 and 1911. A Heritage Oak tree on north Paula Lane sits right next to the lane. At least six other homes were built in the 1950's, and several others in the 1960's. The Sonoma County Landmarks Commission indicated a willingness to work with our neighborhood for designation of an Historic District of Sonoma County, under existing county zoning.

- Significant **visual/aesthetic issues** also exist with regard to preservation of the historic components of our neighborhood. The four farmhouses in the late 1800's to early 1900's are described above. Another early Petaluma family farmland exists on west Paula Lane between Sunset Drive and Schuman Lane. There are an additional two homes built in the early 1900's between Bodega Avenue and Schuman Lane. There are at least five homes built in the early 1950's on east Paula Lane between Bodega Avenue and Sunset Drive. All of these contribute to the early Sonoma County architecture and rural character of the neighborhood, which residents wish to preserve. The few homes that have been constructed in the county in the Paula Lane area are just that - few and far between - which helps blend the historic components and open space at the urban growth boundary with the early Sonoma County architectural achievements.

4. **Urban Growth Boundary/Urban Separator:** The properties on west Paula Lane between Bodega Avenue and Schuman Lane have long been considered as an urban separator area approaching the west urban growth boundary in our neighborhood. We would like to see the designated light green urban separator shown on Alternatives A, B and C expanded to reflect urban separator beginning at Bodega Avenue and extending as shown along the west urban growth boundary. At least, this could begin north of the pink office designation on the 6-acre property on west Paula Lane, zoned AR-2, where, in that area for at least 200 feet form the urban growth boundary and moving eastward there is active American Badger denning and foraging activity, as well as raptor foraging, including the White-Tailed Kite. We would also like to see at least a 200 to 250 feet consistent designation of urban separator on the properties designated as such. We realize the general policy in Petaluma is up to a maximum of 300 feet. A 100 foot urban separator is not sufficient. With the development of revitalized downtown Petaluma and no open space existing westward, except in the Paula Lane neighborhood, we believe it is extremely important to protect and preserve what open space is left and the majority of the neighborhood wants the AR-2 county zoning designation to remain.

   Our research indicates that the Urban Growth Boundary measure passed by Petaluma voters did not give a voice to the county residents who lived on Paula Lane. Until 1987, the Urban Growth Boundary was the front 1/3 of properties on West Paula Lane where residences were built. It appears, for the sake of drawing the boundary along property lines, the urban growth boundary in our neighborhood was simply arbitrarily moved. There was no due process in this regard. We believe this should be taken into consideration at this time. There was a more consistent urban growth boundary of Paula Lane itself, we understand, from Sunset Drive to Schuman Lane.

5. **Designation of "P" (Proposed City Park) on Paula Lane at Sunset Drive.**

Neighbors find this designation interesting and we can understand why such a designation might be made, considering the lack of open space and available lands left in Petaluma and the lack of parks on the west side of Petaluma. We have no objection to the "P" designation remaining in the general area. However, as stated above, we believe a more appropriate designation for this area would be Green-Open Space, to be consistent with existing land use and environmental constraints and opportunities.

6. **Traffic: Appendix 3/04:** Increased traffic and noise, congestion and pollution from such are of great concern to residents in the Paula Lane neighborhood and outlying neighborhood. We believe Paula Lane strategically may be one of the areas to steer increased traffic away from. Paula is already used by vehicles making cross-over trips from Bodega to Petaluma Boulevard North, but we have observed this traffic to be at a stable, not increased level, in the last two years. We will share with you the traffic capacity of Paula Lane is currently at a maximum. As stated above, road improvements for widening, etc., are not possible and would also detract from the rural and agricultural and historical character of the neighborhood, all qualities we intend to protect and preserve. If traffic calming measures were desired, we would like to work with the County of Sonoma to achieve this. Only 200 feet of Paula Lane, approaching West Street, at the intersection of Sunset Drive, is a Petaluma City Street.

To provide a perspective, we will share - we are probably one of the few neighborhoods, if not the only neighborhood, in the Petaluma area, for which potholes are NOT an issue. In fact, putting a pothole in Paula Lane might be a traffic calming measure to consider! Property owners and residents would probably not object.

We conducted our own traffic study in October of 2003, during a holiday week, to document existing five-day traffic patterns. We did use peak volume times, but we wish to note that fairly consistent travel times exist during most of the days. See the attached copy of traffic study for your information. We anticipated, during a holiday week, 1175 average trips daily on Paula Lane.

Looking at Table 1-4: Key Roadway Link Peak Hour Volumes, in the Appendix 3/04, we see the area of #4, Bodega Avenue west of Lohrman Lane, with a Rainier connector postulated. The existing traffic volume is noted to be 900. We believe this is probably lower than actual traffic volumes.

We just received the Appendix and therefore have not had sufficient time to review it in its entirety. We hope to provide more input on this document at the Public Workshops.

* * * *

We hope these observations and suggestions will be helpful. Our individual property owners and residents will be making public comment at various meetings and participate in the Public Workshops for the General Plan process, as well.

We would very much appreciate revisions to accommodate the information we have provided, and we thank you for the many hours you and the consultants have devoted to this process on behalf of Petalumans, which we consider ourselves to be, but also on behalf of Sonoma County residents who live within the Petaluma area, which we also consider ourselves to be.

Sincerely,

Susan Kirks, Member
P.L.A.N.

cc: Planning Commissioners
Public Record - Planning Department, 3/23/04
City Manager Michael Bierman

Enclosures (for Ms. Tuft):
-Wildlife Summary by P.L.A.N. 7/03
- American Badger Habitat Survey, Kim Fitts, 2004
- Avian biology survey, Paula Lane property at Sunset Drive, Heather Howitt, 2003

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Abrams Associates
Transportation • Traffic • Engineering • Planning

September 21, 2004

RECEIVED
SEP 2 3 2004
PAMELA TUFT

Pamela Tuft
Department of General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952

Re: Comments on the Scoping Program for the General Plan EIR

128

Dear Ms. Tuft:

Abrams Associates have been engaged to assist the Plaza North Shopping Center and other property owners in the vicinity of the Washington/McDowell intersection in their review of the General Plan. We have reviewed the land use and transportation elements which have been provided on the City's web site.

The City is presently going through a scoping period for the General Plan EIR. We would like to offer the following comments as a part of this scoping process.

- We are pleased that City has provided the opportunity to comment on the General Plan process. The future success of the retail/commercial properties in the vicinity of Washington and McDowell is directly related to the decisions that the City is making in the General Plan.

- We recognize that the General Plan process does not yet contain specific proposals or revisions to land use. However, our concerns are related to very specific locations, in particular the traffic conditions in the vicinity of the Washington – McDowell intersection, and the traffic capacity conditions on the local streets in the vicinity of the Highway 101 freeway interchange and Washington Street in the center of Petaluma. A

- The zoning regulations in the new General Plan will lead to increases in retail-commercial development in this area east of the freeway, and also at the Kenilworth Junior High School site and the Fairgrounds. While the General Plan does not discuss the amount of new development, over 400,000 square feet is currently being proposed, with 2-3 times that amount when the fairground site is included. Even without this new development, traffic conditions in this area are terrible, and are below the Level of Service standards that have been set in the General Plan. B

- Our comments on this Notice of Preparation are that the City's scope of work for the EIR needs to describe the traffic improvements (i.e. to the 101 freeway), provide an analysis of the resulting traffic improvements, and develop a funding program where any future land use changes will contribute to the new system. All of this needs to be defined in the new General Plan, and properly evaluated in the EIR. The City of Petaluma and the EIR document need to fully describe these transportation issues.

- Based on our review of the General Plan material produced to date, it appears that the most important Petaluma traffic issue has not been addressed, and in fact appears to have

2815 Mitchell Drive, Suite 120 • Walnut Creek, CA 94598 • (925) 945-0201 • Fax (925) 945-7966

been avoided. Specifically, this issue is the widening and reconstruction of 101, and the creation of a new interchange in the Washington Street area. Unless this is part of the overall plan, there is simply no way to accommodate any significant amount of new development, or even to mitigate our existing problems.

- As an example, the three shopping centers recently provided mitigations (costing over $2 million) to the City for additional turn lanes and improvements at McDowell and Washington. With the land use changes that will occur with this current General Plan, traffic problems will be back to where they were in no time. The only long-term mitigation for traffic in this area is to rebuild the freeway interchanges and street connections.

- The General Plan will be invalid, incomplete, and unacceptable unless it includes a plan to rebuild the Washington Street / 101 interchange and to widen the freeway to six lanes through Petaluma. Without such a plan, there is no way for the City to realize any significant increases in retail-commercial development in this area east of the freeway, and no way to accommodate any redevelopment in the Fairgrounds property.

- There is a proposed shopping center with 357,000 square feet of space proposed on McDowell in the vicinity of the future Rainier connection to Highway 101. This project would further add to the traffic capacity problems on McDowell, and these mitigations need to be defined in the EIR.

- As a final issue, this is the appropriate time to meet with the City to make sure that the General Plan allows the possibility of having increased density on your property in the future. Such a future plan could include a greater FAR, structured parking, etc, on these retail/commercial properties. C

Thank you for the opportunity to discuss these issues with you. We look forward to continuing to participate in the General Plan process.

Sincerely yours

Charles Abrams
Abrams Associates Traffic Engineering

cc: Mayor and Council, City of Petaluma

Tuft, Pamela

From: CityWatchdog@cs.com
Sent: Thursday, September 30, 2004 2:39 PM
To: Tuft, Pamela
c: Dreillytorres@sbcglobal.net; bobcat.martin@comcast.net; JohnC85393@aol.com; tebarrett@att.net
Subject: General USACOE Fact Sheet on the Petaluma River Flood-Alternatives Report



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(157 KB)

129

In a message dated 9/30/04 1:12:54 PM Pacific Daylight Time, PTUFT@ci.petaluma.ca.us writes:<< Dianne,

The Notice of Preparation was distributed and published on August 11th, and the Public Scoping Meeting (referenced in the Notice of Preparation) was hosted on August 26th.

Pamela Tuft, AICP
Director of General Plan Administration City of Petaluma P O Box 61 Petaluma, CA 94953
(707) 778-4552
(707) 778-4586 (fax)
>>

Pamela, I sent you the wrong email. This is what I was working on. Diane

Dear Pamela:

I really appreciate all the work you and your team do and thank you for having the meetings filmed and aired on PCA for those of us that cannot attend. A
Even with that I have a hard time keeping up and I do have one document and question to be ormally submitted. If this comment is too late for the GP NOP please submit it formally or the next step of the process. I want to make sure it is documented somewhere.

Thank you Diane

Attached is USACOE Fact Sheet on the Petaluma River Flood Control Project. B

The project will provide the following levels of protection: (1) Federal Emergency Management Agency (FEMA) 100-year flood event to year 2005 under general plan build out; and (2) FEMA 40-year flood event after 2040 is fully watershed developed.

My question is: How will the proposed Petaluma General Plan 2025 Draft Preferred Land Use Plan effect the above levels of protection?

Thank you, Diane Reilly Torres 1657 Rainier av. Petaluma Ca 94954 765-6696 fax 782-1102

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US Army Corps
of Engineers ®
San Francisco District

Project Map

PETALUMA RIVER
CITY OF PETALUMA, CALIFORNIA

CONGRESSIONAL DISTRICT: 6th District, Rep. Lynn Woolsey

PROJECT DESCRIPTION: The Petaluma River is located within the City of Petaluma, about 35 miles N/NW of San Francisco, and drains into San Pablo Bay. Residential and commercial areas are subject to extensive flood damages from river overflows. Damages of $28,000,000 and $1,000,000 occurred in January 1982 and February 1986, respectively. Most recently, flooding occurred again in February 1998. The City of Petaluma is the project sponsor.

FISCAL YEAR 03 BUDGET: $4,000,000

POSSIBLE SOLUTIONS: The locally preferred project plan includes improvements to a 3,500 foot section of the Petaluma River near Lakeville Avenue and the confluence with Lynch Creek, which flows through residential and commercial developments. The project will provide the following levels of protection: (1) Federal Emergency Management Agency (FEMA) 100-year flood event to year 2005 under general plan build out; and (2) FEMA 40-year flood event after 2040 is fully watershed developed.

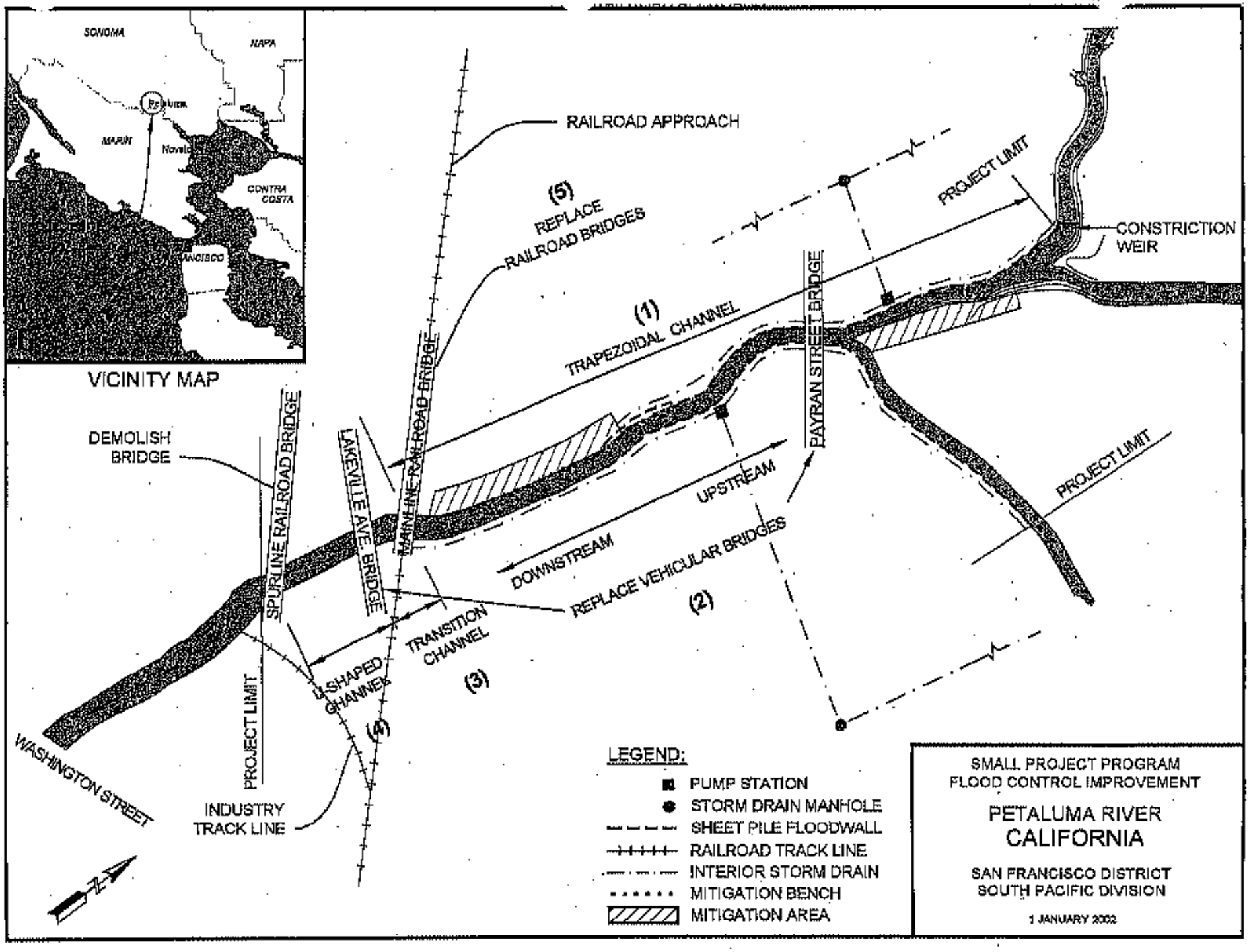
PRESENT STATUS: The project was initiated as a Continuing Authorities Project (CAP) Section 205 project under the Project Coordination Act (PCA) signed in 1996, with the Federal funding limit of $5,000,000. Under WRDA 2000, Section 112, it was changed to a specifically authorized project at 65% of the total project cost. Further Congressional direction in House Report 106-693 (accompanying the Energy & Water Development Appropriation Bill, 2001) provided guidance to the Corps to use available funds to continue the project. The PCA was amended in FY 01 with the local sponsor eligible for reimbursement due to the overspending of local contributions.

The project is divided into five parts: U-shaped Channel, Trapezoidal Channel, Transition Channel, Vehicular Bridges, and Railroad Bridges. The U-shaped Channel construction contract was awarded in March 1998, and the contract was completed in December 1998. Two locally funded (City of Petaluma) vehicular bridge replacements have been completed under the City's construction contract. The trapezoidal channel construction contract was awarded in May 1999 and completed in May 2001. The Mainline Railroad Bridge replacement contract was awarded under the City's construction contract in April 1999, and was completed in March 2001. The Transition Channel construction contract was awarded in late September 2001 and is scheduled for completion in March 2002. The sponsor transferred the design of the Mainline Railroad Approach to the Corps for completion in May FY01. The Corps is currently in the process of finalizing the plans and specifications. (The channel excavation work in the transition channel area will be incorporated into the Mainline Railroad Approach contract.) The sponsor is currently preparing the construction

estimate, plans and specifications of the Industry Railroad Track for the replacement of the second railroad bridge.

Federal funds of $3.1 million were reprogrammed to the project in FY01 to complete the Trapezoidal Channel. Additional Federal funds of $5.0 million were added in FY 02 to complete the Transition Channel, and the award of the Mainline Railroad Approach construction contract in FY 02.

FUTURE EFFORTS: Complete the construction of the Transition Channel; award the construction contract for the Mainline Railroad Approach, including the channel excavation work in the transition channel area in FY02. Coordinate with the local sponsor to complete the construction cost, plans and specifications of the Industry Railroad Track in FY 02. The Industry Track construction contract scheduled for FY03, and the amount reimbursed to the local sponsor, will be based on the availability of federal funds.



U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS

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Re: GP/DEIR

NATIONAL TRUST
for HISTORIC PRESERVATION®

March 22, 2007

By e-mail and mail

RECEIVED
MAR 23 2007
GP Administration

130

Pamela Tuft, Director
General Plan Administration
City of Petaluma
27 Howard Street
Petaluma, CA 94952
generalplan@ci.petaluma.ca.us

RE: Draft Environmental Impact Report – "Draft General Plan 2025"

Dear Ms. Tuft:

On behalf of the National Trust for Historic Preservation, thank you for the opportunity to comment on the February 2007 update Draft General Plan 2025 and its companion Draft Environmental Impact Report, dated September 2006.

The National Trust is a private, nonprofit membership organization providing leadership, education and advocacy to save America's diverse historic places and revitalize communities. Our Washington, DC headquarters staff, six regional offices and 26 historic sites work with the Trust's 270,000 members and thousands of local community groups in all 50 states, including over 20,000 members in California alone.

General Comments

A

While we have reviewed both the Draft General Plan 2025 and its companion DEIR, due to constraints on staff time, we have limited our comments to the February 2007 update of the Draft General Plan. Our current review and comments follows up on our participation in previous City of Petaluma planning efforts, most notably the 2003 Central Petaluma Specific Plan. We found that plan to be significantly flawed, in that it failed to provide sufficient protection to downtown's historic resources. While we remain concerned that Petaluma's heritage lacks adequate protection through the planning process, we are encouraged by a positive evolution in addressing historic preservation in the Draft General Plan.

Protecting the Irreplaceable
Western Office National Trust for Historic Preservation
(415) 947-0692; Fax (415) 947-0699
http://www.nationaltrust.org; E-mail: wro@nthp.org
The Hearst Building, 5 Third Street, Suite 707, San Francisco, CA 94103

1045

The February 2007 edits to the Draft General Plan significantly enhance the Historic Preservation content of the plan. While we support the consolidation of historic preservation-related items in the new draft, we nonetheless believe that the critical role of heritage in enhancing Petaluma's character, economy, and quality of life should be recognized by the creation of a separate Historic Preservation element, as has been unanimously requested by SPARC. 8

Despite the lack of a specific preservation element, we believe the Draft General Plan appropriately underscores the importance of preserving Petaluma's rich heritage while planning for a sustainable future. We commend the City for highlighting historic preservation as a "Guiding Principle" for the plan. As the draft plan states, "preservation and enhancement of the city's historic assets lends Petaluma a distinct identity, and helps sustain its smalltown character." It is the following sentence, however, that most succinctly states the challenge facing Petaluma: "As future growth turns increasingly toward infill, *efforts to guard the city's heritage need to be redoubled* and are reflected in the Plan's policies" (emphasis added).

The tension between encouraging increased density and preservation of Petaluma's historic properties and community character is most evident in the historic core of the city. We are thus pleased that preservation of downtown is another Guiding Principle: "Enhance Downtown by preserving its historic character, increasing accessibility and residential opportunities, and ensuring a broad range of businesses and activities."

We also support the emphasis in the plan placed on "green building" practices. We fully endorse the plan's goals of assuring that Petaluma's infrastructure be designed, built, and maintained in an environmentally friendly and sustainable manner. However, we believe that the current draft language fails to recognize historic preservation as an intrinsically "green" building practice. While the proposed new goal to "prepare a salvage ordinance that requires an inventory of usable materials prior to demolition" is laudable, better still would be development of policies that recognize that the maintenance and rehabilitation of existing structures is inherently greener that their demolition and replacement with new construction. Such a statement should be included in both the Green Building sections, as well as a bullet point for "environmental benefits" under the "Benefits of Historic Preservation" heading.

Specific Comments-Section 3.2 Historic Preservation

A common thread in our comments below is the need to standardize and simplify terminology. As "historic resources" is expansively defined in state statute, we suggest that this term be used throughout. In cases where the intent is to go include resources beyond those eligible for the state and national register, we suggest "historic and cultural resources." Finally, when discussing history as an intangible concept, we suggest using "cultural heritage."

Background

The "Background" text consists largely of a listing of currently designated historic resources. We believe that this section could be improved by starting begin with a broad statement regarding the role historic preservation plays in maintaining and enhancing Petaluma's character and identity. This should be followed by an overview of Petaluma's historic context, identifying the broad patterns of historic development of the community and identifying historic property types, such as buildings, sites, structures, objects or districts, which may represent these patterns of development. Such an approach would have the benefit of highlighting aspects of Petaluma's built heritage such industrial sites and post-war development that are currently underrepresented by the inventory of designated properties. All currently listed properties could be included as an appendix.

Currently, this section erroneously lists Sweed School, United States Post Office, and Old Silk Mill as "National Landmark Buildings"; we believe these properties to be "listed in the National Register."

Benefits of Historic Preservation

We are pleased that the benefits of are articulated in the Draft Plan, but believe that some key benefits have been omitted. Key among these are the environmental benefits (see above). Other benefits worth listing:

- Historic building rehabilitation, which is more labor intensive and requires greater specialization and higher skills levels, creates more jobs and results in more local business than does new construction.
- Historic commercial buildings act as natural business incubators.
- Historic residential buildings contribute to a diversified housing stock, providing more housing options; homes built before 1950 disproportionately house people of modest means.
- Heritage tourism provides substantial economic benefits. Tourists drawn by a community's historic character typically stay longer and spend more during their visit than other tourists.

Historic Preservation Goals

The text below represents a suggested re-organization and editing of ***GOAL 3-G-3: Historic Preservation****. New language is in* **bold red***; eliminated language is ~~struck out~~. To minimize confusion, the original numbering has been eliminated, and moved language is not indicated as such.*

GOAL 3-G-3: Historic Preservation. Identify, recognize and protect Petaluma's unique **and irreplaceable cultural heritage through the development of policies and programs that maintain the character and identity of the community, enhance the quality of the built environment, encourage awareness and appreciation for its history and culture, and**

contribute to its economic vitality. Ensure that future plans, ordinances, and City programs are complimentary to the historic preservation goals and policies contained within this plan. ~~unique identity through the establishment and preservation of local adopted historic districts, structures, sites and landscapes.~~

1. Protect ~~significant~~ historic and archaeological resources for the aesthetic, **cultural,** economic, educational, **environmental,** and scientific contribution they make to **maintaining and enhancing** Petaluma's **character,** identity and quality of life.

A. Develop historic preservation guidelines or standards for protecting historic quality ~~structures~~ **resources** that are not ~~located within an existing historic district~~ **currently designated** through initiating, requiring and/or encouraging ~~formation~~ **designation** of additional historic districts, or expanding the boundaries of existing districts, and identifying **and designating** local landmarks.

B. ~~As a policy, the City of Petaluma does not support demolition by neglect.~~ **Prepare an ordinance that implements fines and penalties for property owners who willfully allow for the destruction of historic resources through a lack of adequate maintenance.**

C. Maintain the character of the Petaluma Historic Commercial District, which is listed on the National Register of Historic Places, by adhering to the city's Historic Commercial District Design Guidelines.

D. Maintain the Oak Hill-Brewster and "A" Street Historic districts as adopted local historic districts.

E. Develop floor area ratio and other design standards that relate overall building size and bulk to site area for Downtown, the Oak Hill-Brewster, and "A" Street Historic District neighborhoods.

F. In accordance with CEQA and the State Public Resources Code, require the preparation of a resource mitigation plan and monitoring program by a qualified archaeologist in the event that archaeological remains are discovered.

2. **Maximize the quality and effectiveness of the City's historic preservation program.**

A. Conduct a comprehensive, city-wide survey of historic and cultural resources for the purpose of creating an historic resource inventory.

- Include updated surveys of existing Historic Districts as well as their adjacent areas.
- Identify individual resources for designation as local, state or nationally designated landmarks.
- The historic resource inventory should be updated on a regular basis, per national standards. Inventories should be phased by prioritizing critical areas **including areas targeted for development through the Central Specific Plan and this General Plan.**

B. Create a central repository for historic surveys, reports, guidelines, ordinances etc **that is easily accessible to the public, while protecting confidentiality regarding archeological sites and Traditional Cultural Places.**

C. Pursue Certified Local Government (CLG) status through the California Office of Historic Preservation.

D. **Ensure that city staff responsible for planning decisions affecting historic resources are well-versed in historic preservation theory and practice;** consider the creation of an historic preservation planner **position** on staff.

3. ~~Recognize that historic al and archaeological resources are irreplaceable, and consequently their~~ The protection **of historic resources** shall be a key consideration **and an equal component** in the development review process.

A. The loss of ~~existing and potential~~ **designated and eligible** historic ~~structures~~ **resources** shall be minimized through strict enforcement of City policies requiring proposed demolition to be reviewed by the Historic and Cultural Preservation Committee. All means shall be used to encourage preservation ~~and/or adaptive reuse or restoration of~~ **eligible historic resources** ~~structures built in 1945 or earlier~~ (Resolution 2005-198 N.C.S. as thereafter amended).

B. **Develop procedures to ensure that** ~~Encourage~~ historic resource reports and similar background materials to be submitted to Historic SPARC during preliminary review of projects involving historic or cultural resources in order to resolve potential conflicts between preservation and proposed development early in the planning process.

D. **Develop procedures and design guidelines to ensure that** new development ~~shall identify~~ adjacent to eligible designated historic resources ~~and shall be~~ **is compatible** ~~respectful~~ with the character of those resources.

E. Ensure the protection of known archaeological resources in the city by requiring a records review for any development proposed in areas that are considered archaeologically sensitive for Native American and/or historic remains.

F. Prepare a salvage ordinance that requires an inventory of usable materials, in cases where demolition is the only alternative, prior to demolition of historic structures.

4. Provide incentives for encouraging the preservation and revitalization of historic and cultural resources.

A. Continue and expand the Storefront Improvement Loan Program.

B. Consider a reduced fee for projects that involve the preservation of **historic resources** ~~ly or culturally significant structures.~~

C. Encourage **and enforce** the use of the State Historical Building Code where ~~appropriate~~.

D. Encourage owners of historic ~~ally or culturally significant~~ resources to take advantage of the Rehabilitation Tax Credit and the Mills Act.

E. Take advantage of the benefits of the Certified Local Government program such as grant funding available through the California Office of Historic Preservation.

F. Work with local nonprofits, preservation groups, and the private sector to establish funding partnerships to raise local funds for preservation projects.

5. Foster appreciation for Petaluma's cultural heritage and encourage greater public participation ~~and education~~ **in and education regarding** the preservation of ~~historic al and cultural~~ resources.

A. Create a program and standards for the installation of signs, kiosks, plaques, and/or **interpretive art** commemorating past events/sites of historical or cultural interest.
B. Annually recognize individuals, groups, or businesses that have made a significant contribution to the preservation, protection or restoration of historic ~~al or cultural~~ resources.
C. Work with local groups and organizations to provide tours, educational opportunities and other public information programs geared toward increased knowledge and understanding of Petaluma's historic ~~and cultural~~ resources.
D. Provide opportunities for ongoing education on historic and cultural preservation for City staff and elected/appointed officials.

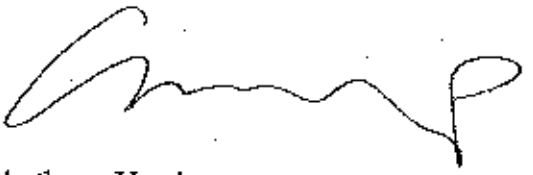
7. **Recognize landscape features, including** trees in both their urban and ~~native~~ **natural** environment, as part of Petaluma's identity and part of the character defining features of the City's historic districts.

A. Develop a program for monitoring and maintaining historic and/or contextually significant trees as defined in tree ordinance (as part of new Development Code).
B. Conduct **and periodically update** a survey of existing significant trees~~, this survey should be updated periodically~~.
C. Make information available to residents and businesses related to the protection, maintenance, and proper care of significant trees **and other historically significant landscape features.**
D. Allocate funds for the maintenance, monitoring, and planting of street trees in designated historic districts, **as appropriate to the historic character of these districts.**

8. Recognize the value of, and protect the operation of, active river-dependant and agricultural-support uses located within the City of Petaluma.

Thank you again for the opportunity to comment and offer proposals for revision of the Draft General Plan 2025. Please contact our office if you have any questions, wish to discuss any of our recommendations, or think that we might be of further assistance.

Sincerely,



Anthony Veerkamp
Senior Program Officer

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March 12, 2007

City Council
City of Petaluma
11 English Street
Petaluma, CA 94952

Re: Comments on the Draft Environmental Impact Report (DEIR), General Plan 2025 131

Dear Council Members:

I spoke at the City Council meeting on March 5th, 2007, during comments on the General Plan and the DEIR for the General Plan. At that time I distributed the section on Cultural Resources (3.12) with my notes on the pages. I also shared a copy with Pamela Tuft that evening.

This letter hopes to clarify some of the comments on those pages. A

3.12-1. Historic resources include *landscapes*, and as such the wording needs to acknowledge that. In addition, historic resources of importance do not stop with the depression years, but instead extend to those up to fifty years old. In 2025, these *may* include properties that date to1975! It must also be clarified that historic resources include buildings, structures, objects, sites, and districts. This is an inclusive definition that is universally used in this country.

3.12-2. In the discussion of Petaluma's historical context, it is unfortunate that the narrative dealing with the last half of the twentieth century is limited to the town being a bedroom community. At a minimum, it should be noted that *the town retains much of its historic downtown, its historic residential districts, and remnants of its industrial and agricultural past.*

In the discussion of additional historic resources, the Foundry Wharf and Balshaw Bridge are recent constructions and should not be included under the subheading of historic resource sites. Instead, the trestle, the livery stable, the D Street Bridge, and other properties that are either eligible as local landmarks or have been identified as eligible for listing on state and national register should be included here.

3.12-3. In the discussion of the downtown historic district, it is important to add that the *historical report for the Central Petaluma Specific Plan recommended extending the boundaries of the historic district north to Lakeville St.*

3.12-8 In the first full paragraph, it is important to state that Cultural resources that may be adversely affected by an undertaking **must** be evaluated for significance. B

Currently the word used in the DEIR is **should.** This must be done by the city to assess impacts for CEQA compliance.

Under impact analysis and mitigation measures

3-12-10 It is unclear why the same policies are repeated for both the archeological resources (3-P-7) and the historic resources. The measures included under *Impact 3.12-1* should apply specifically to archeological resources. This currently appears to be # F and #G in the list. The rest apply primarily to above-ground historic properties. C

Impact 3.12-2 should address the entire city since new infill is not limited to the downtown. Suggest wording such as "*New development in (other) areas of the city has the potential to impact properties that are historically significant.*"

3-12-11 It must be noted that not only registered sites are protected, but also eligible sites are protected as well. These can be affected by construction or development in any parts of the city. This is not limited to historic districts. D

Proposed General Plan Policies that Reduce the Impact. ...would ensure protection of these sites...by requiring new development to be not only compatible with existing historic character AND **avoid any potentially significance adverse impact on historic properties.** Note: the way the sentence reads now, it addresses new construction being compatible, but does not emphasize the more basic need to avoid adverse effects on historic properties (local, eligible, and listed) within the scope of any project.

3-P-7 E

#A and #B. The word "character" does not carry the weight in historic preservation standards that "historical integrity" does. In order to reduce impacts, the maintenance of "historical integrity" be called out to reduce impacts to a less than significant level.

#D. Add wording for the protection and initiation of additional individual historic properties. Do not limit wording to additional historic districts.

#E. Remove references to "1945 or earlier" and replace with "over 50 years old." Add: *Require the exploration of feasible alternatives to demolition per CEQA and the State Public Resources Code.*

Thank you for your consideration.

Sincerely,

Marianne Hurley

Tuft, Pamela

From: David Keller [dkeller@eelriver.org]
Sent: Monday, April 16, 2007 6:13 PM
To: CityCouncil; CDD; Mike Kerns; Tim Smith; Valerie Brown; Paul Kelley; Mike Reilly
Cc: Tuft, Pamela; Bob Gaiser; Rue Furch
Subject: Global Warming May Put U.S. in Hot Water: NYTimes 4/16/07

April 16, 2007

To: Sonoma County Board of Supervisors
Members, Sonoma County Planning Commission
Members, Petaluma City Council
Members, Petaluma Planning Commission
By E-mail

132

Comments for the record on the draft Sonoma County General Plan and draft Petaluma General Plan and their respective Draft EIRs.

Our work for global warming, greenhouse gas emissions, and watershed management must be at the forefront of goals, objectives, policies and programs for our new General Plans. Please see yet another story, in today's NYTimes story below, on real and evolving problems and opportunities which must be addressed in these general plans and their DEIRs.

We do not have any luxury of waiting for someone else to do this. The work is ours, and our respective current draft General Plans do not yet have a roadmap for measurable, mandatory reductions in GHG by a meaningful time certain. This is a serious omission, and must be addressed fully and correctly under CEQA.

Given the gravity of these issues, and the depth to which they suffuse almost all other aspects of the general plans, ***the DEIR should be updated to include these issues and their impacts, and recirculated as a Revised Draft EIR.***

There are alterations and provision of more complete and comprehensive information necessary in general plan components including GHG reductions for public and private sectors; long-term watershed and groundwater management; protections for riparian and recharge zones; flood management; protections for air quality; transportation; housing; health services; agriculture; soils management; energy production, sources and distribution; public utilities; land use; wildlands fire protection and management; diminishment of long-distance commutes; stress on protected and other public trust species; local and regional economies; and other important aspects of our lives and county over the next 20 years.

What are the plans' goals? How will it lay out a realistic and achievable path to get there? That's the job of our general plans, and this work needs serious attention to rectify the omission of these critical and complex components now.

Thank you.

David Keller

Bay Area Director
Friends of the Eel River
1327 I St.
Petaluma, CA 94952

The New York Times
nytimes.com

April 16, 2007

Global Warming May Put U.S. in Hot Water

By THE ASSOCIATED PRESS

Filed at 7:56 p.m. ET

WASHINGTON (AP) -- As the world warms, water -- either too little or too much of it -- is going to be the major problem for the United States, scientists and military experts said Monday.

It will be a domestic problem, with states clashing over controls of rivers, and a national security problem as water shortages and floods worsen conflicts and terrorism elsewhere in the world, they said.

At home, especially in the Southwest, regions will need to find new sources of drinking water, the Great Lakes will shrink, fish and other species will be left high and dry, and coastal areas will on occasion be inundated because of sea-level rises and souped-up storms, U.S. scientists said.

The scientists released a 67-page chapter on North American climate effects, which is part of an international report on climate change impact.

Meanwhile, global-warming water problems will make poor, unstable parts of the world -- the Middle East, Africa and South Asia -- even more prone to wars, terrorism and the need for international intervention, a panel of retired military leaders said in a separate report.

"Water at large is the central (global warming) problem for the U.S.," Princeton University geosciences professor Michael Oppenheimer said after a press conference featuring eight American scientists who were lead authors of the Intergovernmental Panel on Climate Change's climate-effects report.

Roger Pulwarty, one of the federal government's top drought scientists, said states such as Arizona and Colorado, which already fight over the Colorado River basin water, will step up legal skirmishes. They may look to the Great Lakes, but water availability there will shrink, he said.

Reduced snow melt supplying water for the Sacramento Valley in California means that by 2020 there won't be enough water "to meet the needs of the community," Pulwarty said. That will step-up the competition for water, he said.

On the East Coast, rising sea levels will make storm surge "the No. 1 vulnerability for the metropolitan East Coast," said study lead author Cynthia Rosenzweig of NASA. "It's a very real threat and needs to be considered for all coastal development."

Rising sea level can harm Florida's biodiversity and be dangerous during hurricanes, the scientists added.

A few hours later, retired Gen. Charles F. "Chuck" Wald focused on the same global warming problem.

"One of the biggest likely areas of conflict is going to be over water," said Wald, former deputy commander of U.S. European Command. He pointed to the Middle East and Africa.

The military report's co-author, former Army Chief of Staff Gen. Gordon R. Sullivan, also pointed to sea-level rise floods as potentially destabilizing South Asia countries of Pakistan, India, Bangladesh, Indonesia and Vietnam.

Lack of water and food in places already the most volatile will make those regions even more unstable with global warming and "foster the conditions for internal conflicts, extremism and movement toward increased authoritarianism and radical ideologies," states the 63-page military report, issued by the CNA Corp., an Alexandria, Va.-based national security think tank.

Kristi Ebi, a Virginia epidemiologist on the scientific panel, said reduced water supplies globally will hinder human health. "We're seeing mass migration of people because of things like water resource constraint, and that's certainly a factor in conflict," she added.

Peter Glieck, president of the Pacific Institute, an Oakland, Calif., think tank, said the national security and domestic infighting over water comes as little surprise.

"Water is connected to everything we care about -- energy, human health, food production and politics," said Glieck, who was not part of either panel. "And that fact alone means we better pay more attention to the security connections. Climate will effect all of those things. Water resources are especially vulnerable to climate change."

As water fights erupt between nations and regions and especially between cities and agricultural areas, Stanford scientist Terry Root said there will be one sure loser low on the priority list for water: other species.

"The fish will lose out and the birds and everything," she said.

Pollution will also worsen with global warming, the scientists said.

As places like the Great Lakes draw down on water, the pollution inside will get more concentrated and trapped toxins will come more to the surface, said Stanford scientist Stephen Schneider.

And even the air, especially in the Northeast, will become more deadly. More heat means more smog cooked and about a 4 to 5 percent increase in smog-related deaths, Ebi said. That's thousands of people, she said.

The scientists and military leaders held out hope that dramatic cuts in fossil fuel emissions could prevent much of the harm they are predicting. But they said the U.S. government -- and the rest of the world -- has to act now.

On the Net:

The Intergovernmental Panel on Climate Change chapter on global warming impacts in North America:
http://www.gtp89.dial.pipex.com/FGD/Ch14.pdf

The Intergovernmental Panel on Climate Change (IPCC) was established by the United Nations Environmental Programme (UNEP) and the World Meteorological Organization (WMO) in 1988 to assess the scientific, technical and socio-economic information relevant for the understanding of human induced climate change, its potential impacts and options for mitigation and adaptation. The IPCC has completed three full assessment reports, guidelines and methodologies, special reports and technical papers.

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The CNA Corporation's report on global warming and national security:

Global climate change presents a serious national security threat which could impact Americans at home, impact US military operations, and heighten global tensions, according to a new study released by a blue-ribbon panel of retired admirals and generals from the Army, Navy, Air Force, and Marines.

http://securityandclimate.cna.org/report/

Tuft, Pamela

From: David Keller [dkeller1@sonic.net]
Sent: Thursday, April 19, 2007 11:40 PM
To: CityCouncil; Tuft, Pamela; CDD; Mike Kerns
Subject: San Bernardino County plan fails to assess effects of GHG: Cal AG sues to nullify General Plan - LA Times 4/14/07

RE: Comments for the Public Record:
Petaluma draft General Plan and DEIR
Sonoma County draft General Plan and DEIR

Dear Supervisor Kerns, Members of Petaluma City Council, and Members of Petaluma Planning Commission:

As I have noted in previous correspondence, our draft General Plans do not adequately address the critical issues involved in reducing greenhouse gas emissions and the impacts of global warming. The DEIRs for both the Petaluma draft General Plan and the Sonoma County draft General Plan omit specific, measurable and effective programs and policies for achieving significant GHG reductions, and for addressing impacts of global warming and climate change.

Please revise the respective General Plans and their DEIRs, and recirculate revised DEIRs. These issues are far too complex and important to be left to "responses to comments" in the FEIR.

The California Attorney General has taken the correct steps in challenging San Bernardino County's certification of their General Plan EIR under CEQA.

Thank you.

David Keller
1327 I St.
Petaluma CA 94952

http://www.latimes.com/news/science/environment/la-me-berdoo14apr14,1,336033.story

State sues to nullify blueprint for growth

The San Bernardino County plan fails to assess properly the effects of various pollutants, the attorney general says.
By Tim Reiterman
April 14, 2007

SAN FRANCISCO — The growth blueprint for San Bernardino County, which projects a 25% increase in population by 2030, fails to adequately assess the effects of increased greenhouse gas emissions and other pollutants, California's attorney general alleges in a lawsuit seeking to have the plan thrown out.

In a suit filed Thursday in San Bernardino County Superior Court, Atty. Gen. Jerry Brown's office contends that the General Plan update approved last month by county supervisors violated the California Environmental Quality Act by not fully evaluating and addressing foreseeable effects on global temperatures, air quality and natural resources.

Under the plan, the population would increase from almost 2 million to more than 2.5 million in a county that already

has air quality problems and covers more land than any other in the contiguous United States.

Although a landmark state law that was passed in 2006 requires California to reduce its levels of greenhouse gas emissions to 1990 levels by 2020, the attorney general's lawsuit alleges that the county plan does not try to estimate th e increase in such emissions because of growth.

"I don't underestimate the challenge of curtailing greenhouse gases," Brown said in a phone interview. "But the state is committed to this. We're all in it together, and it's unfortunate it's going to take a lawsuit to get San Bernardino to do what is needed."

David Wert, spokesman for the county, said officials spent four years on the plan and were confident that they had done a thorough job of addressing the effects of increased traffic and development.

To cut down on pollution and greenhouse gases, Wert said, the General Plan encourages public transportation and smart development that includes jobs close to home.

"We didn't ignore global warming," he said.

The lawsuit said some of the county's measures for reducing future air pollution seemed of a "blue sky" nature, without clear statements of funding or methods of execution.

Earlier this week, the Sierra Club, the San Bernardino Valley Audubon Society and the Center for Biological Diversity filed a similar suit.

"San Bernardino County has to take responsibility for the impacts of global warming and its actions and policies that contribute to it," said Steven Farrell of the Sierra Club. "Warming may be a global issue, but it requires a local response."

**Times staff writers Sara Lin and Janet Wilson contributed to this report.*

Tuft, Pamela

From: David Keller [dkeller1@sonic.net]
Sent: Thursday, May 03, 2007 2:51 PM
To: CityCouncil; CDD; Tuft, Pamela; Pam Torliatt
Subject: Comments on draft General Plan and DEIR
Importance: High

From: David Keller
Petaluma River Council
1327 I St.
Petaluma, CA 94952
May 3, 2007

To: Petaluma City Council
Petaluma Planning Commission
Ms. Pamela Tuft, General Plan Administrator
11 English St.
Petaluma, CA 94952

By email

RE: Comments for the public record, Draft General Plan 2025 and DEIR
Riparian Setbacks; Petaluma River Access and Enhancement Plan; No net loss to wetlands; Surface water management

Dear Mayor Torliatt, City Council Members and Planning Commissioners:

While the Draft General Plan 2025 acknowledges the existence and utility of the Petaluma River Access and Enhancement Plan ("River Plan"), adopted by the City in May 1996 as an Area Plan (and incorporated in these comments by reference), the new Draft General Plan ("GP") and DEIR do not adopt the Goals, Objectives Policies and Programs of the River Plan as a specific collection of mandated actions by the City under the new GP.

The River Plan was adopted under the prior 1987 General Plan, and while it is referred to as a way to accomplish mitigations for the new GP's impacts, the actual framework of the River Plan, with all its myriad and well discussed and vetted actions, is not given a mandatory legal place in the new GP or DEIR.

Language at the DEIR, page 3.8-21, now reads:
"Proposed General Plan Policies that Reduce the Impact
4-P-1 (A). Implement the Petaluma River Access and Enhancement Plan including expanded improvements identified through project specific environmental assessment."

Languge at 4-P-1 should be clarified to read:
"A. Fully adopt and incorporate the Goals, Objectives, Policies and Programs of the Petaluma River Access and Enhancement Plan as an integral part of the General Plan 2025, and implement the Petaluma River Access and Enhancement Plan including expanded improvements identified through project specific environmental assessment."

Without a formal, mandatory inclusion of the entirety of the regulatory framework of the River Plan, there is no basis for assuming that all its policies and programs will be implemented as proposed by the GP and DEIR. As a result, there would not be any reasonable assurance that the impacts of the GP can be avoided or mitigated to the extent claimed in the DEIR.

In addition, there are inconsistencies between the DEIR's statement of 4-P-1 (D) on tributary setbacks and those adopted in the River Plan in detail throughout the River's various reaches and the tributaries: "D. Create setbacks for tributaries extending a minimum of 50 feet outward from the top of each bank, with extended buffers where significant habitat areas, vernal pools, or wetlands exist..."

This fails to address setbacks on the Petaluma River itself.

The ambiguity here creates likely confusion in implementation of the River Plan, and thus the GP, which has an extensive discussion, programs and mapping for each reach of the Petaluma River and its junctions with the tributary streams within the city limits, with specific Buffer Zones and Restoration and Preservation Zones that exceed the above mentioned 50 feet in certain important areas.(See, for one example, River Plan, 3.3 Upstream Segment, where there are mandatory setbacks ranging from 50 to 150 feet, plus a limited section of 400' setback as a floodway easement). Please note, that with the one exception noted here as a floodway easement, all riparian setbacks are measured from the Top of Bank ("TOB") as is customary professional practice, and never from the centerline of a tributary watercourse or the Petaluma River itself.

In addition, the setbacks mandated in the River Plan around oaks and wetlands are similarly ignored in the existing draft language of the GP and DEIR.

GP 4-P-2 (A) states:
"Develop standards within the Development Code for the four management zones that run the entire length of the river: 1)Restoration Zone, 2)Buffer Zone, 3)Preservation Zone, and 4)River Oriented Development Zone. These standards shall be based on the River Plan's text and sections A-A through O-O."

However, the proposed "standards" are not available in the GP or DEIR for review, or for verifying conformity with the River Plan. Absent that explicit language, the operating words above are "based on...". That does not mandate conformity or explicit agreement with the River Plan's existing Goals, Policies and Programs, all of which were very carefully and thoughtfully crafted.

Is the language for the Development Code referenced in the GP and DEIR intended to be in complete conformity with the River Plan, or merely "based on" the River Plan? Is the GP or DEIR proposing any specific language or policy or program changes? If so, what are they, and why? If not, the language of the River Plan should be explicitly adopted, and the proposed language for the Development Code available for review within the DEIR. Else, it will be impossible to make an informed decision as to whether the River Plan will be successfully implemented.

Further, any and all inconsistencies and contradictions will lead to a failure to properly implement the River Plan under the DEIR, and must be corrected and clarified through the DEIR process.

Too much work was invested in the River Plan on the part of the public, city and agency staff, the River Plan Citizen Advisory Committee, and city Planning Commissioners and Councilmembers in creating and adopting this River Plan. This included hearing and vetting the very complex and sometimes contentious issues to the point of getting a consensus document and plan. The River Plan was reviewed

and approved under CEQA as a Neg. Dec. Significant changes to its implementability would warrant a full, new review under CEQA.

RE: Wetlands

The Petaluma basin has seen the loss of hundreds of acres of wetlands over the past 50 years. Overall, over 90% of wetlands in the Bay Area have been lost to filling, draining or paving. These important habitats fall under a national policy of 'no net loss'. There has never been a complete survey of wetlands in Petaluma's jurisdiction prior to the 1987 General Plan, and we still don't have one now. We should have a complete and verified inventory of wetlands and their supporting watersheds for this draft General Plan, so we know what still exists, and have an affirmative policy of "no net loss of wetlands, in acreage and values and functions" incorporated within the GP and DEIR.

If there are to be policies or programs accepting mitigation banking or creation of wetlands, the complete policies need to be spelled out explicitly, so they can be reviewed by the public and responsible agencies prior to adoption of the GP.

In addition, there needs to be a funding vehicle *established in perpetuity* for the future care, maintenance, restoration or replacement of any wetland or protected wildlife, fish or other public trust resources that are disturbed during development as contemplated by the GP and DEIR. The responsibility for future maintenance oversight, implementation, or operation, should not fall to the city's General Fund, and its taxpayers, but should be the responsibility of the direct beneficiaries of such development. As such, the developers must provide for "perpetual care" for any such displaced and 'mitigated' resources. Too often we have seen so-called mitigation projects accepted by the city, then left to wither and die, or produce far less in environmental restoration values and functions than was promised within the environmental documents approving the project, or in the project's conditions of approval.

As a result, there has been a significant cumulative loss of wetlands, special status species and other public trust resources important to the citizens and the State of California, including water quality. These losses are either accepted as 'normal business practices', or the burden of making them work falls to the city and public taxpayers or ratepayers.

Thank you for your work to rectify these problems. If you have any questions, please contact me.

Sincerely,

David Keller
Petaluma River Council
1327 I St.
Petaluma, CA 94952
(707) 763-9336

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MAY - 7 2007

GP Administration

ACCOUNTABLE DEVELOPMENT COALITION
CONSERVATION ACTION FUND FOR EDUCATION
LIVING WAGE COALITION
NEW ECONOMY WORKING SOLUTIONS
NORTH BAY LABOR COUNCIL
PETALUMA TOMORROW
SONOMA COUNTY CONSERVATION ACTION

May 5, 2007

Via Federal Express Mail and Email
Mayor Pamela Torliatt and Members of the City Council
Department of General Plan Administration
27 Howard Street
Petaluma, CA 94952

133

RE: Comments Submitted on the Proposed Petaluma General Plan

Dear Mayor Torliatt and Members of the City Council:

We appreciate this opportunity to provide you with our detailed comments on the proposed draft Petaluma General Plan. Our comments on the proposed draft Petaluma General Plan consist of specific recommendations for modifications to land uses, policies and programs contained in the Draft Petaluma General Plan. Organizations submitting these comments include the Accountable Development Coalition, Conservation Action Fund for Education, Living Wage Coalition, New Economy Working Solutions, North Bay Labor Council, Petaluma Tomorrow and Sonoma County Conservation Action.

The focus of our comments is to ensure the Petaluma General Plan continues the City's tradition of visionary and cutting edge planning to benefit the people and businesses in Petaluma. The draft General Plan contains numerous provisions that call for protecting, enhancing and sustaining the unique identity of Petaluma that is valued by residents, business and visitors alike. Other equally important goals emphasize the need to sustain a local economy that meets the needs of the community's residents and employers. We applaud these overarching goals and encourage the City Council to modify provisions of the plan to ensure they are achieved.

Additionally, our suggested modifications to the draft General Plan are intended to ensure the General Plan is internally consistent and in compliance with the City's adoption of global warming emissions reductions, planning laws and statutes. Specifically:

- ***A General Plan must be internally consistent:*** The City has limited availability of land within the urban growth boundary. Policy 2-P-2 calls for the city to: "Use land efficiently by promoting infill development at equal or higher density

A

and intensity than surrounding uses." Other policies and programs clearly call for the City to ensure that new commercial development will have a net positive impact on Petaluma's economy, existing businesses, city finances and quality of life. Policy 9-P-2. Permitting unregulated big box commercial retail uses is inconsistent with these and other goals, policies and programs in the draft General Plan. In order to ensure internal consistency, we have suggested a number of goal, policy and program modifications below.

- ***Global Warming:*** On July 18, 2005, the City Council of Petaluma voted 6-0 to adopt a target to reduce global warming emissions by 25% below 1990 emissions by 2015. It is widely held that in order to achieve such emissions reductions, cities will need to employ a suite of strategies including strategies to use land more efficiently thereby reducing reliance on the automobile. A General Plan that continues to allow inefficient, auto oriented, low-intensity development cannot achieve these bold goals. To that end, our suggested modifications to goals, policies and programs are directed at the City achieving its promise to dramatically reduce emissions that contribute to the warming of the planet. In addition, CEQA requires an analysis of global warming emissions. We believe a comparative analysis of the proposed General Plan and our modified goals, policies and programs below, should be completed and will show that continued inefficient and monocultural land use patterns will not achieve the goal. B

- ***Bakersfield Case***: Recent case law requires assessment of individual and cumulative environmental, economic and societal impacts of large retail uses that may result in urban decay so that the full suite of social, economic and environmental consequences can be known. The proposed General Plan contains strong policies and programs to protect the City's downtown and existing businesses from decline. Moreover, cases encourage cities to have proper goals and policies in their general plans concerning the desired development outcomes as well as the specific design features required for commercial uses. A city can address the issue of whether or not big box retail is appropriate for its jurisdiction. A number of our suggested modifications to goals, policies and programs are directed at more specifically describing the circumstances under which large stores are appropriate for Petaluma. C

- ***Sustainability:*** Numerous goals and policies call for sustainable development and capitalization on the City's unique assets. Unregulated big box retail is contrary to these goals and policies as well. D

Our specific recommendations for modified and new goals, policies and programs for inclusion in the Petaluma General Plan are set forth in the Table below.

SPECIFIC RECOMMMENDATIONS FOR MODIFIED AND NEW GOALS, POLICIES AND PROGRAMS	
Element Language	**Proposed Change**
Community Design, Character, and Sustainable Building Element	
Proposed Policies only apply to Downtown	**New Policy:** *All* new and redeveloped commercial uses shall incorporate high quality design elements including, but not limited to: a vertical mix of land uses in a pedestrian orientation with vibrant "storefront" streetscape(s); parking strategies as required in the Central Petaluma Specific Plan; linkages to increase pedestrian and bicycle connectivity with existing neighborhoods; grid street patterns where possible; best management practices and green building standards; and a greater diversity and intensity of activities within each development and redevelopment project.
Land Use, Growth Management and Built Environment Element	
Existing Land Use Classification for DSL Site: General Plan: Special Industrial/Office Park Zoning: Special Industrial/Office Park	**Proposal:** Proposed Classification: Keep current GP and Zoning. Amend the General Plan land use designations and zoning only as part of a specific project approval process. See mixed use policy below, which would allow flexibility under the existing General Plan designation. See also proposed GP policy 2-P-8 which sets up a process to allow retail uses in industrial and business parks.

Goal 2-G-1, PGP, page 2-14: Maintain a balanced land use program that meets the long-term residential, employment, retail, institutional, education, recreation, and open space needs of the community.	**Modified Goal 2-G-1:** Maintain a balanced land use program that meets the long-term residential, employment, retail, institutional, education, recreation, and open space needs of the community and improves and maintains the vitality of existing land uses.
Policy 2-P-6. Encourage mixed-use development, which include opportunities for increased transit access.	**Add additional Land Use Categories and a Programs to implement Policy 2-P-6:** New Land Use Policy/Possibly also a Category or Overlay: Establish and Allow Commercial/Mixed Use Land Use Categories and Intensities in all Commercial Categories, including but not limited to: Neighborhood Commercial, Special Industrial/Office Park, Community Commercial, and Business Park among other appropriate categories. New Program: Mixed-use developments that incorporate a range of residential choices and prices in all commercial properties are encouraged and permitted in addition to the applicable Floor Area Ratio (FAR) with the following considerations: 1) the additional housing is a blend of at least 30% housing for low and very low income households and is vertically integrated into the project; and 2) projected peak hour traffic impacts and water usage of the proposed mixed use development are not greater than that for the maximum commercial development permissible on the site. Incentives for mixed use projects that include at least 30% affordable housing for low and very low income households shall include: i) fast tracking of the development process; ii) priority in residential growth management system allocations; iii) modifications to site requirements including heights and FAR so long as the physical outcome is compatible with adjacent neighborhoods; iv) and

	exemption of affordable units from paying the full cost of impact fees, among other incentives. New Program: Amend the zoning code and other City ordinances/regulations as necessary to allow and promote mixed uses, including affordable housing, in all commercial land use categories.
Policy 2-P-8: [note typo in GP 12-P-8] 2-P-8 Maintain Business Park uses by monitoring availability of industrial land area for expansion of high employment businesses. A. Provide a discretionary review process to consider allowing retail components in conjunction with uses in the industrial/business park areas.	**Modified Policy 2-P-8 as follows:** 12-P-8 Maintain Business Park uses by monitoring availability of industrial land area for expansion of high employment businesses. A. Provide a discretionary review process to consider allowing retail components in conjunction with uses in the industrial/business park areas. B. Require a use permit and Fiscal and Community Impacts Report (FCIR) for any retail components allowed in conjunction with uses in the industrial/business park areas consistent with FCIR requirements.
Economic Health and Sustainability Element	
Draft General Plan Retail Strategy at page 9-7 bullets related to Washington Core and DSL/Rainier site and Petaluma Village: Sites are suitable for larger format retailers and big box retail and off price fashion. **Policy 9-P-14** Plan and locate retail uses appropriately to their types and the sites available. D. Locate Community Commercial at the Highway 101 interchange with	Strike language in Retail Strategy at 9-7 and 9-16 re: DSL/Rainier site and Petaluma Village allowing larger format retailers and big box retail and off price fashion. **Modified Policy 9-P-14** Plan and locate retail uses, preferably in a mixed use format, appropriately to their types and the sites available. D. Retain current land use categories at

Old Redwood Highway, Rainier Avenue, and East Washington Street. E. Provide for large-format retail use at the former Kenilworth Junior High School site.	the Highway 101 interchange with Old Redwood Highway, Rainier Avenue, and East Washington Street. E. Provide for a mix of land uses, including residential and retail, at the former Kenilworth Junior High School site.
Goal 9-G-1: Establish a diverse and sustainable local economy that meets the needs of the community's residents and employers.	**Modified Goal 9-G-1:** Establish a diverse and sustainable local economy that meets the needs of the community's residents and employers by retaining existing businesses, providing incentives to attract middle income jobs in high tech/biotech and other emerging high skill or wage employment jobs, expanding the City's Living Wage Ordinance and providing and supporting training programs that promote career ladders.
Policy and Program 9-P-1: 9-P-1 Retain and attract 'basic' economic activities that bring dollars into the local economy. A. Regularly assess and identify economic activities that are locally desirable. Employment uses that advance the objective of a sustainable economy are particularly desirable. Techniques for enhancing local economic sustainability include: o Utilizing inputs (goods, services, etc.) that can be obtained locally, o Serving unmet local demands for goods, services, and intermediate products, o Generating revenue for the City to sustain and expand	**Modified Program 9-P-1:** 9-P-1 Retain and attract 'basic' economic activities that bring dollars into the local economy. Regularly assess and identify economic activities that are locally desirable. Employment uses that advance the objective of a sustainable economy are particularly desirable. Techniques for enhancing local economic sustainability include: o Utilizing inputs (goods, services, etc.) that can be obtained locally, o Serving unmet local demands for goods, services, and intermediate products, o Generating revenue for the City to sustain and expand City services as deemed

City services as deemed appropriate and necessary by the community, o Providing jobs for un- and under- employed segments of the work force, o Avoiding pollution of air or water resources, o Paying wages commensurate with the cost of living in Petaluma, etc. o Working to ensure that diverse employment opportunities exist for residents, o Other employment uses that do not violate the economic sustainability objectives listed above.	appropriate and necessary by the community, o Providing good jobs and workforce training for un- and under- employed segments of the work force, o Avoiding pollution of air or water resources, o Requiring payment of at least a living wage by ensuring compliance of all city contractors, lessees of city property, and recipients of city financial aid with the Living Wage Ordinance passed in December 2006, o Working to ensure that diverse employment opportunities exist for residents, o Investing in infrastructure, educational and skill development, and quality of life assets that support middle-income employment, o Providing incentives to businesses and supporting community benefit agreements to create middle-income employment and higher quality jobs in low-paying driver industries such as hospitality, retail, security and building services, o Implementing legislation to increase health benefits to employees and address the rising costs of businesses that try to provide healthcare for their employees. o Providing and supporting job training by collaborating with employers and

	educational institutions training programs that promote career ladders in traditionally low wage industries. o Other employment uses that do not violate the economic sustainability objectives listed above.
Policy 9-P-2: Ensure new commercial [and industrial] development will have a net positive impact on Petaluma's economy, existing businesses, city finances and quality of life. A. Require commercial development proposals over 25,000 square feet in building area to include a fiscal analysis, as a component of the project's environmental assessment, of the impacts on Petaluma's economy, existing businesses, local workforce and city finances.	**Modified Policy 9-P-2:** Ensure new commercial and industrial development will have a net positive impact on Petaluma's economy, existing businesses, city finances and quality of life. A. Require commercial and industrial development proposals over 25,000 square feet in building area to include a Fiscal and Community Impacts Report (FCIR), as a component of the project's environmental assessment, of the impacts on Petaluma's economy, the regional economy, existing businesses, local workforce and city finances. B. To implement this Policy, the City shall adopt and implement a FCIR ordinance that would allow developers, policy makers and community members to consider the economic and social impacts of large development projects on the City. The ordinance shall contain all of the components of Attachment A hereto.
Policy 9-P-13 Provide for a greater diversity of retail goods and avoid "cannibalization" of existing retail uses and functions.	**Modified Policy 9-P-13** Provide for a greater diversity of retail goods and avoid "cannibalization" of existing retail uses and functions by prohibiting single retail stores of 90,000 square feet in building area or greater, including adjacent retail space under common ownership (e.g. garden centers to major retail).

Mobility Element	
None	**New Policy:** High Auto Dependent Uses: Concentrate new major (25,000 square feet of building area or greater) commercial and industrial uses in areas with high transit accessibility. Prohibit new strip development along roadways.
General Plan Definitions	New Definition: Fiscal and Community Input Report: 1) A fiscal assessment, which independently analyzes the costs and benefits to the public agencies responsible for the project and will answer, questions such as: o To what extent does a project contribute to the local tax base? o Does the project add to the tax base or move parts of the tax base from one site to another? o What are the public costs of subsidies or infrastructure required for completion of the project? 2) An employment or job quality assessment which evaluates the number of jobs, types of jobs and will answer such questions as: o What are the wages and benefits of new jobs created at a project? o Are these jobs part-time or full-time? o Permanent or contingent jobs? 3) An affordable housing assessment, which will examine the affordability of housing, created or lost due to a project and the demand for new housing generated by the creation of new jobs which will answer questions such as:

	o Does the project increase the need for additional housing in the region? o Is the need for market rate or affordable housing? o If affordable housing, how much at each level of affordability? 4) A neighborhood needs assessment that will determine the type of retail needs in a given community and the types of human services a community requires if new employment is created such as child care, parks, or libraries. 5) A Smart Growth and livability assessment which will examine how a project impacts the character of growth and answers questions such as: o How does the project impact density and infill development? o Accessibility to mass transit and the proximity to workforce and affordable housing? o Maintenance of urban growth boundaries and or city-centered development?

Concluding Comments

Thank you for your consideration of our proposed modifications to the draft Petaluma General Plan. Please keep us apprised of any and all upcoming hearings, meetings, workshops, documents, and the like related to the City's General Plan.

Submitted by:

Michael Allen, Chair
Accountable Development Coalition

Dennis Rosatti, Executive Director
Conservation Action Fund for Education

Martin Bennett, Executive Director
New Economy Working Solutions

Alex Mallonee, Secretary-Treasurer
North Bay Labor Council

David Keller, Chair
Sonoma County Conservation Action

Eileen Morris, Co-Chair
Living Wage Coalition

Greg Reisinger, Co-Chair
Kit Lofroos, Co-Chair
Petaluma Tomorrow

Attachment A

Fiscal and Community Impact Report (FCIR)

At a minimum, a Fiscal and Community Input Report is:

1) A fiscal assessment, which analyzes the costs and benefits to the public agencies responsible for the project and will answer, questions such as:

- To what extent does a project contribute to the local tax base?
- Does the project add to the tax base or move parts of the tax base from one site to another?
- What are the public costs of subsidies or infrastructure required for completion of the project?
- What are the initial and ongoing public costs for police, fire, emergency services, roads, parks, environmental mitigations and other city services for the project?

2) An employment or job quality assessment which evaluates the number of jobs, types of jobs and will answer such questions as:

- What are the wages and benefits of new jobs created at a project?
- Are these jobs part-time or full-time?
- Permanent or contingent jobs?

3) An affordable housing assessment, which will examine the affordability of housing, created or lost due to a project and the demand for new housing generated by the creation of new jobs which will answer questions such as:

- Does the project increase the need for additional housing in the region?
- Is the need for market rate or affordable housing?
- If affordable housing, how much at each level of affordability?

4) A neighborhood needs assessment that will determine the type of retail needs in a given community and the types of human services a community requires if new employment is created such as child care, parks, or libraries.

5) A Smart Growth and livability assessment which will examine how a project impacts the character of growth and answers questions such as:

- How does the project impact density and infill development?
- Accessibility to mass transit and the proximity to workforce and affordable housing?
- Maintenance of urban growth boundaries and or city-centered development?

Model Form for FCIR

1. Goals of the Fiscal and Community Impacts Report (FCIR)

1.1 Access to information: Provide access to information about the project in a single document. It should be in a format that is easily understandable.

1.2 Co-operative dialogue and civic engagement: Create an opportunity for the community to review and comment on the impacts in a non-litigious forum

1.3 Objective decision-making: Provide the staff and public agency officials with a systematic report that helps them in making decisions to promote the objectives of the Petaluma General Plan. Contextual information about the baseline conditions in the community test the seriousness or frivolousness of a cited problem.

1.4 Risk-mitigation: Provide information on potentially controversial projects much ahead in the process to promote certainty against last-minute ill-informed opposition. This will help both applicants/developers and the City by anticipating potential pitfalls before substantial investment is made into the project.

2. Proposed Projects that will require a FCIR

2.1 All discretionary commercial or industrial development that will include 25,000 square foot of total floor area or more.

2.2 All Disposition and Development Agreements, Owner Participation Agreements and similar agreements with the City of Petaluma or Redevelopment Agency of the City of Petaluma.

2.2.1 All projects that require a General Plan Amendment or Rezoning to eliminate housing.

2.3 All discretionary residential development projects that include more than 100 units.

3. Procedures for the FCIR

3.1 *Initial determination* – If the development application requires a FCIR under Section 2, then the application instructions, pre-application meetings and other information meetings shall make it clear to the applicant/developer that a FCIR is required.

3.2 *Preparation of the FCIR* – The City staff is responsible for accepting, reviewing and distributing the FCIR. The FCIR shall be prepared by a consultant selected by City staff, and paid for by the project proponent. The staff has the discretion to correct any inaccuracies in the FCIR, based on reasonable evidence. The FCIR should be released for public review within 30 days of the development permit application, and at least 20 days prior to any approval on the project.

3.3 *Publication and availability*: The FCIR shall be made available upon public request along with other public documents related to the project and shall be

accessible to the public. The staff shall make a best faith effort to notice the availability of the FCIR in public notices under current processes, for the project.

3.4 *Subsequent Determination and Update of FCIR* – If there are minor changes in information about the project impacts, the City staff shall make a good faith effort to update the FCIR before any project approval. However, if the staff determines major changes in the project proposal including substantial changes in the land-use and scale of the project, then the FCIR will need to be updated.

4. Content of the FCIR

The FCIR shall consist of seven sections outlined in the attached FCIR questionnaire. The seven sections are:

(1) Project and Community Overview;
(2) Economic Benefits;
(3) Fiscal Benefits;
(4) Employment Benefits;
(5) Housing Benefits;
(6) Community Services Benefits;
(7) Smart Growth and Environmental Health Benefits.

In addition, there are three attachments:

Attachment 1. Community Overview
Attachment 2. Questionnaire for Applicants/Developers, Prospective Tenants, and Service Contractors
Attachment 3. Smart growth questionnaire

4.1 PROJECT AND COMMUNITY OVERVIEW

4.1.1. *Description of the project.* The description shall include the following information:

(a) Current uses and land-ownership
(b) Proposed uses and land-ownership
(c) Details of proposed uses by size (square foot) tenancy, lease or sub-lease
(d) Details of users, operators and tenants (if known)
(e) Process for approval and permits needed
(f) Size of the project, including number of residential units
(g) Project Contacts (including project manager)
(h) Details on the following:
    General or Community Plan Area
    Current Zoning Designation
    Redevelopment Plan Area
    Any Special District or Overlay Zone
    Any Special Policies or other requirements

4.1.2. *Community Overview*: Attach relevant baseline data.

4.2 ECONOMIC BENEFITS

If the applicant/developer has done a market study, please attach it.

4.2.1 For Projects that Contain a Retail Component.

If the type of retail store has been identified (i.e. supermarket, department store, drug store), the FCIR shall include a list of names and addresses of stores of that type that are located within two-mile of the Proposed Project. For region-serving retailers, the FCIR shall include a list of retailers of that type that are located within a fifteen- mile radius of the project. This study shall include these stores in the analysis of all impacts.

4.3 FISCAL BENEFITS

4.3.1. Has the project received public financing assistance from the City?
If so, provide the terms of any public grants and loans the applicant/developer has applied for or any public financing that has been approved, including the projected interest rate, the term of the loan, the method of repayment, the method of guaranteeing the loan, and the timetable for remaining approvals needed.

4.3.2. What is the net fiscal return of the project at the end of twenty years?
(Itemize those items that benefits or cost the City. Those items that do not impact the city should be kept blank).

BENEFITS TO CITY	**$**	**COSTS TO CITY**	**$**
Sales Tax		Sales tax rebate/refund	
Use Tax		Use tax rebate/refund	
Base Property Tax		Land-write-down	
Tax Increment (for redevelopment)		Public Safety (Police and Fire)	
Developer Proceeds		Support Services (incl. staffing, legislative services)	
Development Impact Fees/Facilities		Other Public Services (incl. traffic & libraries)	
Benefits Assessments		Public Improvements specifically for	
Public improvements on public property (paid by developer)		project (paid by the City), including roads, parks & environmental mitigations	
		Costs of health care and all manner of health care related services and facilities	
		New infrastructure not fully paid for by the project applicant.	

	Based on the list are competing businesses generating new sales tax or how much of sales shift is derived from cannibalizing existing businesses within the City/within the region? Related to this, what are the direct and indirect losses of business tax, sales tax, property tax and loss of employment? "Direct" means directly related to an impacted business, and "indirect" means the collateral loss of support businesses and services. What is the change in reinvestment of wealth locally? (e.g. national and regional chains owned by out of town corporation's siphon locally gained revenues to out of town headquarter banks and investments houses).
Other development fees (incl Park fees)	Water-sewer fee reductions
	Interest on loans (to developer etc)
Transient Occupancy Tax (TOT)	
	Below market leases
User fees	Park 'n Ride lease
Owner participation revenues	Owner participation payments
	Site preparation, remediation and cleanup costs
Other revenues (Please specify)	Other City assistance (Please specify)
TOTAL BENEFITS	**TOTAL COSTS**

4.3.3. Has the project received additional public assistance from other local jurisdictions, state or federal government directly or indirectly through infrastructure funding?

Quantify the value to the developer of the government assistance to the project.

4.4 EMPLOYMENT BENEFITS

4.4.1. *Construction Jobs*

a. Number of Jobs- Estimate of the total number of construction man-hours expected at the proposed project.

b. Prevailing Wages- Indicate whether federal, state, or local law or policy will require payment of prevailing wages for construction employment at

the proposed project. If prevailing wages will not be required, estimate the projected wages and benefits for the construction jobs at the proposed project.

4.4.2. *Permanent Jobs*

a. Specify the number of workers who will be employed in proposed project by occupation for each tenant and/or anticipated use. Applicant/Developer should fill out the employment questionnaire in attachment 2, describing employee compensation and benefit information for the whole project.

b. All permanent employers and prospective tenants, if known, should also fill out the questionnaire for employment in their respective establishments.

4.5 HOUSING BENEFITS

Housing Creation and Rehabilitation

4.5.1. What are the characteristics of the housing units being created?

a. The number of units to be created, the size of the units in number of bedrooms and square foot area, and the affordability levels of those units by size;

	# of detached single-family units	# of apartments	# of condos	# of attached homes	Rent/Price Distribution	Affordability level (income range)	Affordability Restriction (if any)
0 BR							
1 BR							
2 BR							
3 BR							
3 BR+							

b. The terms of any affordability restrictions; payment of in lieu fees (inclusionary housing).

Housing Displaced

(Fill this section only if there are housing units that will be demolished.)

4.5.2. What is the profile of housing being demolished?

a. Fill out the following table that gives the distribution of the units.

	# of detached single-family units	# of apartments	# of condos	# of attached homes	Rent/Price Distribution	Affordability level (income range)	Affordability Restriction (if any)
0 BR							
1 BR							
2 BR							
3 BR							
3 BR+							

b. Specify the nature of the affordability restrictions. Also, mention whether the owner accepts Section 8 subsidies, or if the project has publicly subsidized housing.

Financial Impact on Affordable Housing Funds

4.5.3. What is the contribution of the project to pubic affordable housing funds?

a. Calculate the present value of the projected tax increment from the development project dedicated to affordable housing (for redevelopment projects).
b. Describe any contributions to affordable housing that the applicant/developer will make (such as Housing Impact Fees).
c. Enumerate housing-related public funds the project will be given either loaned or granted. Specify the sources, whether they are from the Low and Moderate Income Housing Fund, or any other discretionary funding source such as Housing Trust Fund, Housing Bond, CDBG etc.

4.6 COMMUNITY SERVICES BENEFITS

4.6.1. Is the project providing any of these public facilities on-site?

a. Parks, playgrounds, open space
b. Schools
c. Child-care/day care centers
d. Medical clinics
e. Transit stops
f. Employment agency/job training center
g. Community center/youth center

4.6.3 Is the project located in a special Assessment District? Or a Mello Roos district?

4.7 SMART GROWTH & ENVIRONMENTAL HEALTH BENEFITS

4.7.1. The applicant/developer should fill out the Smart Growth questionnaire (Attachment 3).
4.7.2. List the permits that the project applicant/developer has applied for, or received from the Bay Area Air Quality Management District (BAAQMD).
4.7.3. If the project will use diesel-powered equipment or diesel vehicles, list the diesel equipment and estimate the number of diesel truck trips to and from the facility in a week.

Attachment 2: Employment Questionnaire for Applicants/Developers, Prospective Tenants, and Service Contractors

1. Name of company _____

2. At the project site, how many employees will work
   a. Part Time (0 to 35 hours per week) _____
   b. Full Time (more than 35 hours per week) _____

3. What type of medical insurance do you offer your employees?
_____ Individual health benefits only _____ Full family health benefits
_____ No medical benefits
_____ Other (please explain below)

4. If you provide medical benefits, which employees may receive them?
   _____ All employees _____ Management
   _____ Full-time _____ Employees who work over 20 hrs/week
   _____ Other (please explain below)

5. What will be the cost to the employee for these health benefits?

Individual _____ Full Family _____
Employee contribution (monthly) _____
Co-Payment for doctor's visit _____
Deductible _____

7. What retirement benefits do you provide for your employees?
401(K) Employer contribution:

6. Hourly pay for employees at the project site:

   a. $7.50 - $10.24 How many employees? _____
   b. $10.25 – $11.24 How many employees? _____

c.	$11.25 - $12.24	How many employees? _____
d.	$12.25 - $13.25	How many employees? _____
e..	$13.26 - $20.00	How many employees? _____
f.	More than $20.00	How many employees? _____

7. Describe any employee training programs, local hiring commitments or first-source hiring agreements for construction and permanent jobs in this project.

Attachment 3: Smart Growth Questionnaire

1. How is the project site accessible and visible to the public? Please describe.

2. Does the project site have existing transit service? Are there multi-modal transportation options (transit, automobile, bicycle, pedestrian) to access the site? Please describe.

3. Are there currently employment opportunities within 1/4 mile walking distance to the proposed project site? Please describe.

4. Are there currently commercial opportunities in close proximity to the proposed project site? Please describe.

5. Does the project site propose to clean up or reuse a Brownfield or Greyfield? Please describe.

6. Are there currently cultural and entertainment activities in close proximity to the proposed project site? Please describe.

7. Is there a school, library, park, or community center in close proximity to the proposed site? Please describe.

8. Does the proposed location have adequate utility capacity for water, sewer, streets, and electricity? Please describe.

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Tuft, Pamela

From: JungleGuy [jungle@junglevibes.com]
Sent: Monday, May 07, 2007 12:32 AM
To: CityCouncil; CDD; Tuft, Pamela; Pam Torliatt
Subject: Comments to Draft Environmental and Draft Petaluma General Plan

Attachments: DEIRcommentsF.doc

PETALUMA INDEPENDENT BUSINESS ALLIANCE (PIBA)

136 Petaluma Blvd. N. Petaluma, CA 94952
707-283-0609.f 707-789-0549.ibuypetaluma.org

May 6, 2007

Mayor Pamela Torliatt and Members of the City Council
Pamela Tuft, Department of General Plan Administration
27 Howard Street
Petaluma, CA 94952

RE: Comments to Draft Environmental and Draft Petaluma General Plan 134

Dear Mayor Torliatt, Members of the City Council and Pamela Tuft:

Thank you for the opportunity to present comments on the Petaluma Draft Environmental Plan and General Plan 2025 on behalf of Petaluma Independent Business Alliance (PIBA). Our comments focus on the need for support for existing independent Petaluma businesses and the unique character of our city with specific questions regarding economic, land use and traffic policies which we believe may cause urban decay and threaten the fabric of our community.

In these comments, we focus attention on independent local business and community character, Petaluma's identity as a peaceful and picturesque little river city with a new urban flair. We have every hope that Petaluma may weather the global storms to come with some grace, but without bolstering a sustainable and lasting economic foundation, and mediating the entrance of chain and formula retail stores which take wealth out of the community, urban decay may well prevail in the years to come.

Major economic trends, that Sonoma County's population is NOT growing [1] as expected, and that gas prices [2] are currently at an all-time high, shaking consumer confidence, indicate the need for caution, adding only new retail which clearly serves the city rather than adding huge new stores which without careful consideration will undermine existing sales and eventually cause blight. Compounding this, there is every indication that growth of retail space has in the past 15 years outstripped our meager population growth. This mirrors a national trend [3], showing that retail square footage has doubled in A
those 15 years while family income has increased only 23%. This out-of-proportion growth, composed almost entirely by new big box centers, has created a large surplus of stores and contributed directly to the failure of many traditional businesses.

Just as we anticipate the joy of completion of our revitalization, we could face a likelihood of store failures and empty storefronts where locally-owned businesses have long worked hard to succeed in our downtown, and the prospect of local dollars being sucked out of town by corporate headquarters with no local roots, much as if we

got cosmetic dentistry only to have some bully punch several of our front teeth out. The broken smile of blight would do nothing to build Petaluma as a tourist destination or make residents happy.

If economic vitality and sustainability are chief concerns, we should know that local businesses tend to circulate money 3½ times through the local economy while chain stores do so only once, taking our money out of town to their headquarters elsewhere. "New" sales dollars are for the most part taken from existing local stores as is shown in Stacey Mitchell's *Big Box Swindle.*[4]

We face a future where localization of products, services and manufacturing is likely to become more valuable in light of global warming, expected new regulation and rapidly rising cost of moving goods due to rising energy prices. We should not assume that consumer spending and our auto-centered culture will not change. Rather we should strive to build a strong independent local economy that will potentially be more competitive as costs rise.

We propose that the General Plan be truly forward-thinking by including language supporting the success of its local independent businesses, fostering the growth of new entrepreneurs and protecting Petaluma's rich character and quality of life by stating: B

1. Implementation of General Plan goals regarding ways to support and encourage growth of small-scale business, community-serving business and independent business located downtown or in established neighborhood business centers and existing malls shall be a priority.

2. New stores over a 15,000 square feet permeable size cap shall be required to obtain a conditional use permit and submit to an economic impact standard to demonstrate they will contribute positively to the local economy and not unduly damage existing businesses [5]

3. Impacts of formula-based stores shall be reviewed to determine conflict with the unique character of Petaluma's business culture and vitality of the existing independent business community.

4. Petaluma shall focus its economic development resources on creating and expanding independent businesses, and shall continue to develop and refine long-range plans to revitalize the Petaluma Central Specific Plan District. Transportation, infrastructure, and other municipal policies should be prioritized to support the downtown. Pedestrian improvements shall be part of transportation planning, for example, and public buildings, such as the library, schools, swim center, skate park, sports centers, conference and other public facilities shall be located in or near the downtown or accessible via convenient public transportation. Because of the expected location of many of these facilities at the Fair Grounds it is imperative to create a Specific Plan for the Washington corridor to protect and enhance connection to the downtown.

Where cities have failed to protect local business by welcoming chain and formula retail stores, often providing direct and indirect subsides to those stores with no additional resources for local business, the strength of local economies and community character have eroded.

Petaluma wants to attract and retain businesses, families and talented individuals and that should be a specific goal of this General Plan. An authentic, vibrant community life with art, music and local entrepreneurs will be a valuable asset in competing with other cities for talent and resources. We must state clearly in this plan that a strong, independent and locally-owned business community is an essential precursor for authentic local culture and that support for the local economy is a necessary prerequisite for preserving community character and long-term economic health. C

Major corporations and cities know that strong local cultural programs encourage businesses to migrate to them

and employees and their families to locate and stay.
Although Petaluma is rich with inherited assets including its historic downtown, it invests very little to attract business and commerce in terms of support for the arts, music and street culture that are increasingly the measure of a city's authentic cultural vitality.

Smart, creative and talented people want to be where other creative people live. Petaluma must invest beyond bricks and mortar of its development projects in order to optimize its investment in infrastructure, achieve true and lasting revitalization and thereby compete with other cities. We can safely speculate that having lots of fast food and chain retailers in town does not contribute to our ability to compete in this arena and could rightfully be considered short sighted and harmful to these ends.[6, 7, 8, 9]

We believe language supporting a desire to promote, protect and enhance the Petaluma Central Specific Plan district and business diversity and vitality in other existing commercial areas exists within the DEIR and GP but that that language needs to be consistent throughout the document and strengthened in order to achieve its intended aims. Also, assumptions made during the creation of the Retail Leakage Study included within the General Plan are now outdated due to addition of several businesses that meet the "missing pieces" specification listed.

Draft General Plan 2025 Compilation of Comments & Recommended Edits dated February 2007, 1.2 Scope & Purpose

D

Key Issue

Economic Health

"Ensuring diversity and balance of economic activities is essential to the economic health and fiscal sustainability of Petaluma. Of particular concern is the need to provide opportunities for new retail businesses not presently available within the city. The Leakage and Sustainable Retail Strategy Study (June 2004), identifies specific occupancy types as the 'missing pieces' in Petaluma's retail mix, such as electronics, furniture, appliance and upper-end apparel, mixed-use centers and walking access to neighborhood retail. The policies and programs in the Economic Health and Sustainability Element (Chapter 9) of the General Plan provide specific direction for ensuring that retail diversity and intensification, as well as continued development of a diverse employment base is achieved."

We would ask the following comments be considered for modification and clarification of the Key Issue section above.

1) Written in 2004, this copy from the Retail Leakage Study does not take into account later addition to Petaluma of Kohl's Department Store, Pier One home furnishings and conversion of Yardbirds/Home Depot to a home improvement store. These new stores tend to fill several categories identified in the Leakage Study, although electronics is not yet addressed. Therefore, description of "missing pieces" is inaccurate and others "missing pieces" should be questioned.

2) Although it appears that proposed East Washington Place (Regency Centers) and Deer Creek (DSL) projects will bring substantial taxes to the city, that appearance must be seen in light of new information:
   a) Regency Centers has expressed interest in bringing in Borders Books which would seriously undermine or put out of business our locally-owned Copperfield's Books, which lost one store in recent years to a national chain; Copperfield's Books is an anchor store in downtown Petaluma and its loss would be devastating and not acceptable to residents.
   b) A report on three Iowa communities and others shows that up to 84% of "new" business brought to a city by a Wal-Mart store represented sales which would have gone to existing businesses.[10]
   c) If new businesses in new shopping malls cause blight downtown and in existing shopping centers, the

city loses considerable taxes from businesses that close while deeply eroding the sense of wellbeing and true Smart Growth that our city has become known for.

d) Our much-lauded Petaluma Central Specific Plan cannot truly succeed without strong, local businesses open on Water Street, around the Turning Basin, Theater District and Theater Square

3) Many large-format chain stores have a cross category retail strategy with the goal of capturing sales from a broad range of completing businesses - some from competing chains in the region and some from existing local businesses already contributing as members of the community. Increasingly, these large-format chain retailers are characterized as predatory. The unfettered entrance of these retailers in Petaluma would have many clearly predictable negative economic impacts on established Petaluma businesses. In the above referenced study from Iowa, it was found that
Wal-Mart stores derive on average 84% of their "new" sales from businesses already existing in the community! [10]

4) Support of independent business is a goal of the General Plan. Petaluma should develop a long-range, comprehensive small business development plan focusing its economic development resources on creating and expanding small businesses and developing long-range plans to revitalize its economy especially in the downtown and key neighborhoods serving commercial areas such as the Fair Grounds and the old Kenilworth School site, now named East Washington Place. Integrated transportation and infrastructure should support these plans.

5) An Independent Business Friendly Framework: PIBA recently consulted with
Jeff Milchen, with American Independent Business Alliance, on the Economic Health and Sustainability Element of the General Plan. Although the introduction says that priorities are "broadly based on the values that participants in the general plan workshop….expressed….", and include language like "foster economic vitality, diversity and opportunity" Milchen remarked that the pyramid graphic fig. 9-1 could be used as an example of "how to best marginalize independent businesses". He is considering using it in future slideshow presentations to business groups as a model of what not to do! PIBA urges the city to include strong language such as in the following section to balance and modify this conventional yet wrong-headed approach

The Institute for Local Self-Reliance (ILSR) has proposed a development policy framework that could achieve our organization's (PIBA's) goals if integrated into Petaluma's General Plan -- *to ensure the success of Petaluma's local independent businesses, and fostering the growth of new entrepreneurs so that they can together continue to contribute to Petaluma's rich character and vibrant quality of life. Their* Legislative Platform to Strengthen America's Independent Businesses states as follow: Independent businesses have long been the backbone of the American economy and way of life. They play a critical role in --

a) **keeping the American Dream alive.** For generations, starting a small business has been a key means by which families have pulled themselves out of low-wage jobs and into the middle class.

b) **building strong communities.** Studies show that small businesses contribute more of their revenue to charitable causes than big businesses.

c) **countering sprawl, reducing traffic, and protecting open space.** Local businesses favor locations in downtowns and neighborhood business districts. These compact areas are less costly in terms of public infrastructure and services, compared to sprawling, auto-oriented shopping centers, the development of which can precipitate a rise in local tax rates.

d) **strengthening local economies.** Local businesses re-spend a much larger share of their revenue within the local economy compared to national chains, creating more jobs and opportunities.

e) **protecting consumer interests.** A marketplace of tens of thousands of independent businesses is the

best way to ensure innovation, broad product choices, and low prices over the long-term.

f) **ensuring long-term economic stability**. Communities with economies composed of many small businesses focused primarily on serving local needs are more diversified and stable than those dependent on a few large firms, and less vulnerable to distant economic forces.

g) **Despite their importance, independent businesses are rapidly disappearing** as fewer and larger corporations increasingly dominate almost every sector of the economy. Contrary to conventional wisdom, the demise of independent businesses is not the inevitable result of market forces and consumer choices. Public policy at all levels of government has played a major role in fueling the growth of large corporations at the expense of America's independent small businesses.

To level the playing field and allow small businesses to originate and flourish, we advocate the policies expressed in this framework, *(see Legislative Agenda <http://www.newrules.org/retail/platform.html> -- The full document proscribes a broad independent business healthy policy framework relevant from national to local authorities including size caps, formula business limits, infrastructure that supports local business, and an end to subsidies.)* [11]

E

6) Internal inconsistencies in the General Plan: It would appear that the economic health element of the general plan is internally inconsistent, relying heavily on old-style economic development wisdom that we should best bring big business in from outside rather than developed local business from within. This strategy shortchanges existing independent entrepreneurs and local businesses. According to another economist and supporter of strong local economy, Michael Shuman, Petaluma should indeed put out the welcome mat for many different kinds of businesses - but only offer systematic support only for locally owned ones. That's where a community's scarce people, hours, and attention should go. In Shuman's 10 arguments demonstrating a need for proactive programs in "local" development, he provide another compelling perspective on the value of independent business and the case for saving it from decline. [12]

7) Strong evidence that chain store development may reduce revenue: According to a recent study [13, 14] additional retail chain development could actually reduce government revenue. The researchers reviewed many other studies on the impacts of big-box retailers and concluded "the burden of proof would now appear to have shifted from opponents of chain stores to the proponents themselves to show that a proposed store would bring a net benefit to the economy." Studies from small towns in Maine to sizeable cities like Austin, Texas found that locally-owned independent businesses create about 3 ½ times the local economic activity as chains do. A study released in 2004 looked at the local economic impact of 10 independent businesses and 20 chains in the Andersonville neighborhood of Chicago and found that the independents generate 70 percent more local economic impact per square foot than chain stores. [15] In sum, there is ample proof to support a more cautious, deeper approach in calculating the economic benefits of large format retail development. The general plan shall have as a priority, implementation of such a higher standard for economic of analysis.

F

The most frequently used case for a city's authority to regulate development is to protect and enhance community character. Sausalito is an example of a city whose ordinances express the goals of fostering economic vitality, diversity and opportunity in order to preserve community character and quality of life (see Sausalito and Northbeach).[16, 17]
The City of Turlock's recent court case further extends that city's authority to regulate specifics beyond size, including in this case groceries at a Wal-Mart super center, if it is reasonably foreseeable that a development may case economic blight (Turlock).[18]

Many cities have for years felt compelled to facilitate a kind of strip-mall sprawl style development focusing on national chains in order to generate increased sales tax to fund services and infrastructure. It is now clear, however, that cities have most often not benefited in the long run from these past decisions. Most cities were completely unprepared for the historic onslaught of corporate chains that occurred in the past 15 years, and most

felt constrained in regulating their entrance, having been legally advised that their arguments against entry were discriminatory limits on competition and therefore not legally enforceable. Legal opinion now upholds the rights of municipalities to regulate if its goal is to protect and enhance community character and prevent foreseeable blight. Recognized tools gaining favor by policy makers are conditional use permits, economic impact analysis standards, formula retail restrictions and size caps to legally regulate development in the interes of their communities.

Petaluma must recognize before it's too late that our local economy can absorb only so much unplanned new retail without causing blight. Many other cities have enacted zoning rules that limit store size and formula retail. The City of Cotati recently passed a moratorium on formula restaurants. Sonoma, San Diego, North Beach, San Francisco, Benicia, Mt. Shasta and Agoura Hills in Los Angeles are among California communities enacting such restrictions. Limiting the size of stores filters out undesirable predatory behavior of some chains and helps sustain the character and vitality of the existing community. Store size caps also help ensure that national chains that do locate here are those willing to accommodate local concerns and character.

PIBA sees an opportunity to work together with city and civic leaders toward a policy that ensures positive long-term results for the whole community, as well as meeting immediate city budgets. We realize that to do this will require new thinking and a deep, community-wide involvement from all quarters of the city, much like the vision and planning transition represented by the Petaluma Central Specific Plan, nine years in the making. Hard, detailed and demanding work to be sure, but necessary to flourish in a future that is certain to be more localized, not less.

Please accept these comments and respond to our concerns at the following address:

Wayne Morgenthaler, Director
Petaluma Independent Business Alliance (PIBA)
136 Petaluma Blvd. North Petaluma, CA 94952
info@ibuypetaluma.org <mailto:info@ibuypetaluma.org> 707-762-6583

References:

[1] ***No Growth*, Santa Rosa Press Democrat, April 16, 2007,** Martin Espinosa, states that Sonoma County's population is stagnant, not growing to accommodate mega-retail stores.

[2] **Gas prices today stand at $3.31/gallon** nearing an all time high, an indicator of slower retail sales to come. (British report on NPR predicting retail sales would flatten when gas hits $4/gallon).

[3] **Preventing Vacant Boxes**: The United States is now littered with thousands of empty big-box stores and hundreds of vacant shopping centers and malls. Part of what's fueling this epidemic is that, in their quest for greater market share, chains like Wal-Mart and Home Depot have built far more retail space than consumers can actually support. Between 1990 and 2005, the amount of retail space in the U.S. doubled, while per capita income, adjusted for inflation, grew by only 28 percent. <http://www.newrules.org/retail/vacantbox.html>

[4] ***Big Box Swindle*, Stacy Mitchell, Beacon Press, ISBN 0-8070-3500-9**

[5] **For a discussion of other such a programs** see Main Street National Trust's Main Street News Protecting Locally Owned Retail: Planning Tools for Curbing Chains and Nurturing Homegrown Businesses <http://www.newrules.org/retail/0204msn.pdf>, National Main Street Center <http://www.mainstreet.org/>, examples of 35 municipalities with size caps <http://www.newrules.org/retail/size.html> and a Download the Store Size Cap Policy Kit

[6] ***Cultural Creatives*, The City of Austin. Identification of public cultural arts funding best practices and benchmarks. Submitted by: Dabney & Associates, Lucille E. Dabney, Eduardo Díaz, Marion A. McCollam**

<http://www.cityofaustin.org/culturalcontracts/downloads/best_practices.pdf><http://www.cityofaustin.org/culturalcontracts/downloads/best_practices.pdf> In a study done by the City of Austin, "A cultural district is a well- recognized, labeled, mixed-use area of a city in which a high concentration of cultural facilities serves as the anchor of attraction." Cultural districts increase urban revitalization in a variety of ways: beautify and animate the cities, provide employment, attract residents and tourists to the city and contribute to a creative innovative environment. Austin is known as the "happening" place for its locals and tourists due to the city's assortment of cultural offerings, which capture a variety of interests. The cultural arts are accountable for 19.8 percent of the total tourism in the state, according to the Perryman Report. Other cultural districts include; Cleveland, Dallas, Fort Lauderdale, Houston, which has two, Miami Beach, New Orleans, San Jose, St. Louis, and Tucson.

[7] **Americans for the Arts Monograph considers Richard Florida and others on creative capital - Should we invest?**

<http://www.businessthinkers.com/public/new_web/CC_images/creative_communities.pdf> This monograph discusses ideas first popularized by Richard Florida. One key is the importance of a city's authenticity and uniqueness -- Bringing their community together around their strengths. Discusses here are reasons and solutions on making cities culture oriented. Florida specifies three "T"s as factors in attracting creative talent to a region. The first is Talent; Creative people want to be around other individuals that have unique talent as well. Second is technology. There should be a high capacity for technological advances in a city along with facilities to conduct major research. The last component is tolerance. Places that are open-minded, cultivated, and inclusive are important and necessary in attracting talent. Culture districts are also becoming popular among major businesses. "It is now widely accepted that corporations and employee location discussions are significantly influenced by the strength of the local cultural sector," states Florida.

[8] **From a study of East Austin's economic conditions and prospects**

<http://www.austincdc.org/downloads/ecohub/reportsummit03.pdf>

The Austin Community Development Corporation (Austin CDC) analyses the impact of culture on its retail industry. "The expanding population in East Austin (a predominantly poor district rich in culture) and its unique demographics provide opportunities for retailers who have an intimate knowledge of the local market." One demographic that is growing in East Austin is the "creative class." This class is highly educated and makes up a large portion of Austin's workforce ranging from technology and entertainment to journalism and finance. "The creative class is naturally drawn to East Austin because of its "authenticity" and "uniqueness", with respect to its cultural diversity, historic buildings and established neighborhoods," according to Florida. The CDC states that the creative class, "prefer indigenous street-level culture---a teeming blend of cafes, sidewalk musicians, and small galleries and bistros, where it is hard to draw the line between performers and spectators. They crave stimulation, not escape. They want to pack their time full of dense, high-quality, multidimensional experiences."

[9] **Culture Plan for the Creative City: City of Toronto** <http://www.toronto.ca/culture/brochures/2003_cultureplan.pdf>

The city of Toronto recognizes that, "Great cities of the world are all Creative Cities whose citizens work with ideas, are intensely mobile and insist on a high quality of life. Such cities have an overwhelming impact on the economies of their countries and compete with one another directly for trade, investment and, most of all, for talent." Toronto's culture plan discusses the importance of culture

as an essential role in maintaining a healthy community. Investment is crucial in preserving Toronto's culture districts and competing with other creative cities. According to the City of Toronto Culture Division and Finance Department, on cultural programs "Toronto spends $14.64 per capita (for operating and capital expenditures combined). Vancouver, which has a population of only 573,500, spends $17.71 per person - 1.2 times as much as Toronto, with 2.5 million people. Montreal spends almost twice as much as Toronto, at $26.62 (for operating expenditures alone). San Francisco spends nearly six times more per capita supporting arts and culture" at $86.01.

[10] **Thomas Muller and Elizabeth Humstone,** ***What Happened when WalMart came to town?*** A report on three Iowa communities with a statistical analysis of seven Iowa counties," Washington: National Trust for Historic Preservation, 1996, pp 8." Report shows WalMart store took 84% of "new" sales from existing stores.

[11] **Legislative Platform to Strengthen America's Independent Businesses** (taken from Institute for Local Self-Reliance)

[12] **The Virtues of Local Business** (from An Open Letter to Bellingham
By Michael H. Shuman, May 2006)

(1) *Higher Standards* - The most fundamental difference between local and nonlocal businesses is that the former stick around while the latter may well move to Mexico or Malaysia. Consequently, any community seeking sustainability through nonlocal businesses, in the final analysis, cannot possibly do so, because those businesses are leading the fights against tougher environmental standards. [6] A good example of this is in my backyard, Maryland. Regulation of the chicken industry has been virtually impossible because the producers, Tyson and Perdue, are continually threatening to move to "business friendly" jurisdictions like Arkansas and Mississippi. This same problem also afflicts economic development that seeks higher wages through nonlocal industry. Yes, they may pay better, but they often fight higher labor standards for all business.

(2) *Greater Wealth* - Because nonlocal businesses come and go while local businesses more often stick around for years, even generations, they are much more reliable generators of wealth, income, and jobs. Around the country, economic developers have offered millions of dollars of incentives to attract or retain nonlocal business, and by and large these deals have been huge losers.[7] Not because these industries didn't have great performance on paper, including the promise of high wages. But because they stayed for a couple of years, took the incentives, and then vanished. There are some 300 empty Wal-Marts for example across the country - each continuing to cause environmental problems from runoff and the like - that stand as testaments to the economic developers who thought they could lure the box stores for more than a heartbeat. The comings and goings of the supposedly high quality jobs turn out to be a very poor bargain for public expenditures on economic development. According to an investigative report about the cost effectiveness of tax abatements in Lane County, Oregon, the cost to the community in lost taxes was about $23,800 per job for nonlocal firms and $2,100 per job for the local firms.[8] The nonlocal jobs were *more than ten times* more expensive, because the absentee-owned firms were so unreliable. On a net jobs basis (after the big departures), nonlocal jobs were 33 times more expensive.

(3) *Greater Stability* - The comings and goings of large, nonlocal business create Enormous stresses, especially on a small community's economy. In the Katahdin Region of Maine, where I've been working over the past few years, the shutdown of a paper mill (the parent company sought to move operations to a lower-wage area) created a regional unemployment rate of 40% over the next year. That kind of catastrophe is far less likely in a community economy built primarily around local businesses with no plans for moving to China.

(4) *Greater Multipliers* - There's a growing body of evidence that local businesses

contribute more to local multipliers - the most fundamental basis for community income, wealth, and jobs. I'll say more about this point shortly.

(5) *Less Vulnerability* - A local economy that is more self-reliant will be more immune to global surprises totally outside its control. The obvious example right now is importation of oil, which many observers link with terrorism and economic instability and which could be largely eliminated through the cost-effective implementation of local energy efficiency and renewable resources over the next generation.9 Importing food is another example, in that it leaves a community vulnerable to imported pollution, micro-organisms, and pests from less responsible farmers elsewhere in the world.

(6) *Smart Growth* - Local small business is a natural promoter of "smart growth" or anti-sprawl policies. Smart growth means redesigning a community so that residents can walk or ride bikes from home to school, from work to the grocery store. It means scrapping old zoning laws and promoting multiple uses-residential, commercial, clean industrial, educational, civic-in existing spaces, because it's better to fully use the town center than to build subdivisions on green spaces on the periphery. Because local businesses tend to be small, they can fit more easily inside homes or on the ground floor of apartment buildings. Because they focus primarily on local markets, local businesses place a high premium on being easily accessible by local residents. Marts for example across the country - each continuing to cause environmental problems from runoff and the like - that stand as testaments to the economic developers who thought they could lure the box stores for more than a heartbeat. The comings and goings of the supposedly high quality jobs turn out to be a very poor bargain for public expenditures on economic development. According to an investigative report about the cost effectiveness of tax abatements in Lane County, Oregon, the cost to the community in lost taxes was about $23,800 per job for nonlocal firms and $2,100 per job for the local firms.8 The nonlocal jobs were *more than ten times* more expensive, because the absentee-owned firms were so unreliable. On a net jobs basis (after the big departures), nonlocal jobs were 33 times more expensive.

(7) Greater Identity - Part of what makes any community great is how well it preserves its unique culture, foods, ecology, architecture, history, music, and art. Local businesses celebrate these features, while nonlocals steamroll them with retail monocultures. Outsider-owned firms take what they can from local assets and move on. It's the homegrown entrepreneurs whose time horizon extends even beyond their grandchildren and who have a vested interest in growing these assets. And it's the local firms who are most inclined to serve local tastes with specific microbrews and clothing lines. Austin's small business network employs the slogan "Keep Austin Weird," because it's "weirdness" that attracts tourists, engages locals in their culture, draws talented newcomers, and keeps young people hanging around.

(8) *Greater Creativity* - Richard Florida's arguments about the importance of a "creative class" for economic success also tend to support locally owned businesses.10 Florida argues that among the key inducements for a creative class to move to and stay in a community are its civic culture, its intellectual bent, its diversity, and its sense of self-all attributes that are clearly enhanced in a local-business economy. A local-business economy seeks to celebrate its own culture, not to import mass culture through boring chain restaurants and Cineplexes. It seeks to have more residents engaged as entrepreneurs and fewer as worker bees for a Honda plant. Myriad ideas and elements of a culture can best emerge through myriad homegrown enterprises.

(9) *Greater Social Well Being* - In 1946 two noted social scientists, C. Wright Mills and Melville Ulmer, compared communities dominated by at least one large manufacturer versus those with many small businesses.11 They found that small business communities "provided for their residents a considerably more balanced economic life than did big business cities" and that "the general level of civic welfare was appreciably higher." Thomas Lyson, a professor of rural sociology at Cornell University, updated this study by looking at 226 manufacturing-dependent counties in the United States. 12 He concluded that these communities are "vulnerable to greater inequality, lower levels of welfare, and increased rates of social

disruption than localities where the economy is more diversified."[13]

(10) *Greater Political Participation* - Studies of voting behavior suggest that the longer residents live in a community, the more likely they are to vote, and that economically diverse communities have higher participation rates in local politics. Moreover, Harvard political scientist Robert Putnam has identified the long-term relationships in stable communities as facilitating the kinds of civic institutions-schools, churches, charities, fraternal leagues, business clubs-that are essential for economic success.[14] As one group of scholars recently concluded after reviewing the social science literature: "[T]he degree to which the economic underpinnings of local communities can be stabilized-or not-will be inextricably linked with the quality of American democracy in the coming century."[15] An economy with many long-term homegrown businesses is more likely to contribute to such stability than the boom-and-bust economy created by place-hopping corporations.

[8] Sherri Buri McDonald and Christian Wihtol, "Small Businesses: The Success Story," *The Register-Guard, 10 August 2003.*
[9] Amory B. Lovins et al., *Winning the Oil Endgame: Innovation for Profits, Jobs, and Security* (Snowmass, CO: Rocky Mountain Institute, 2004).
[10] Richard Florida, *The Rise of the Creative Class* (New York: Basic Books, 2002).
[11] C. Wright Mills and Melville Ulmer, "Small Business and Civic Welfare," in *Report of the Smaller War Plants Corporation to the Special Committee to Study Problems of American Small Business*, Document 135. U.S. Senate, 79th Congress, 2nd session, February 13. (Washington, DC: U.S. Government Printing Office, 1946)
[12] Thomas A. Lyson, "Big Business and Community Welfare: Revisiting A Classic Study," monograph (Cornell University Department of Rural Sociology, Ithaca, NY, 2001): 3. Journal publication of this piece, with updated data, will occur shortly.
[13] Ibid., 14.
[14] Robert Putnam, *Making Democracy Work* (Princeton: Princeton University Press, 1993).
[15] Thad Williamson, David Imbroscio, and Gar Alperovitz, *Making A Place for Community: Local Democracy in a Global Era* (New York: Routledge, 2003), 8.

[13] Main Street National Trust's Main Street News Protecting Locally Owned Retail: Planning Tools for Curbing Chains and Nurturing Homegrown Businesses, National Main Street Center.

The Smart Planning and Growth Coalition (SPGC) was formed by independent business owners concerned about the economic impact that commercial development had on the Cape Cod community. Specifically, the impacts on local employees via livable wages and economic opportunity as well as impacts on our general infrastructure: transportation (traffic), the availability of workforce housing, the environment and educational facilities for our children.

After many meetings and contacts with other agencies, organizations and coalitions who are addressing some of the Cape's infrastructure issues, it became apparent that there was a lack of information on the economic effects of large commercial retail establishments on our community.

SPGC became involved in the review process of some retail commercial projects that were analyzed by the Cape Cod Commission, our regional regulatory authority. At that time there were weaknesses in the regulatory review process, in that there were no benchmarks, nor actual data requested that would appropriately determine the actual economic effects of a large retail commercial development on our communities beyond the additional taxes to be paid. SPGC was influential in urging the CC Commission to create a technical bulletin that defined other issues that effect our economy, such as pay scales, benefits offered, and transfer of sales. An economic development bulletin has been created as a direct result of our existence.

SPGC firmly believes that a community is made economically healthy due to the number of locally owned businesses and the existence of local residents who serve as both consumers and employees. It is

the local businesses who provide "dividends" to the local community, as they channel their money back into the community by purchasing local merchandise, local services and employing local personnel. The culmination of all these money channels creates a healthy economic, some would say sustainable, community.

Considering the fact that most of the new commercial development on Cape Cod in the past 10 years consisted mostly of large retail (chain) stores, and seeing that there was a dearth of information regarding the economic effect of these businesses on our community, the SPGC sought to fund economic research that would compare and define the economic differences between a locally owned retail business and a "foreign" owned retail business.

Funding was provided by the Cape Cod Economic Development Council, and matched on a one- to-one basis by local businesses, organizations, chambers and individuals.

FXM Associates was selected to conduct the research. Due to unavailable data (see the executive summary) it was impossible to define existing businesses in the County as locally owned or non-locally owned. Therefore the research proposition was modified to address the economic effect of regional and national "chain stores" vs. independent or single owner stores on the community.

The results of this study are invaluable to communities interested in maintaining a healthy local economy. Many have asked the question "Now that we know this, what can we do about it?" SPGC suggests there are many applications for this data: those engaged in economic development in their communities, and helping to write local comprehensive plans could use this in determining what types of businesses are desirable. Those interested in redeveloping our downtown centers should examine this report and apply its findings to their efforts when accommodating developers and tenants. Individual developers may also use this information when determining which tenants they would like to attract. Our planning departments and boards may choose to get creative with specific zoning. For example, there is a community in the southwest that created an Independent Business Investment Zone in response to a clearly defined vision of redevelopment in a downtown area. In another case, West Palm Beach has limited "Main Street" development to 2,500 square feet. If a business chooses a larger floor plan, they need to indicate why they need more space, as Main Street development is to serve the general neighborhood, and if a business can demonstrate that not more than 50% of their business will come from regional areas, the increase in square footage is approved. There are areas in tune to supporting local communities through positive planning efforts

It is our opinion that there is much work to be done, and many places where this information is useful in helping to determine the future economic health and welfare of our communities. We urge our town management and leaders to look beyond just the issue of increasing the tax base for your individual town, and evaluate the entire economic impact of future commercial projects on your community. Without such holistic analysis, we are doing our local communities a disservice and destroying the very backbone that keeps our communities alive and vibrant: our local businesses. We are burdening our taxpayers with deferred costs from nonexistent health care benefits, as well as driving our residential workforce away.

SPGC would like to recognize Barnstable County and the receipt of Cape and Island license plate funds, without whose financial support this study would not have materialized. We also would like to acknowledge the efforts and unending determination of Frank Mahady, principal of FXM Associates, whose persistence and resolve drove the completion of this project.

In addition to the CCEDC grant, matching funds were contributed by the following businesses, individuals, and organizations. The Smart Planning and Growth Coalition is grateful for their support and foresight in believing that economic research will ultimately help improve long term economic opportunities on Cape Cod.

[14] **Study Finds Chains Could Harm Cape Cod Economy**

A study commissioned by the Massachusetts-based **Smart Planning & Growth Coalition <http://www.gotcommunity.org>** has concluded that additional chain retail expansion on Cape Cod would undermine the region's economy.

The study, "**Assessment of the Direct, Indirect, and Induced Economic Effects of Chain Stores on the Regional Economy of Cape Cod <http://www.gotcommunity.org/meetings.asp>**," was conducted by FXM Associates, an economic and planning research firm.

SPGC commissioned the study in part because of concerns about Cape Cod's rapid growth. The region is currently home to about 230,000 residents and is expected to add an additional 27,000 people over the next decade. With limited land and a fragile coastal environment, SPGC believes the region should adopt policies that foster commercial development that maximizes local economic benefits while minimizing land consumption

The study suggests that locally owned businesses provide greater economic returns with less negative impact compared to big-box retail.

[15] **Andersonville study**

The Andersonville Study of Retail Economics <http://www.civiceconomics.com/Andersonville> - By Civic Economics, Oct. 2004

This compelling study, commissioned by the Andersonville Development Corporation, finds that locally owned businesses generate 70 percent more local economic impact per square foot than chain stores. The study's authors, Dan Houston and Matt Cunningham of Civic Economics, analyzed ten locally owned restaurants, retail stores, and service providers in the Andersonville neighborhood on Chicago's north side and compared them with ten national chains competing in the same categories. They found that spending $100 at one of the neighborhood's independent businesses creates $68 in additional local economic activity, while spending $100 at a chain produces only $43 worth of local impact. They also found that the local businesses generated slightly more sales per square foot compared to the chains ($263 versus $243). Because chains funnel more of this revenue out of the local economy, the study concluded that, for every square foot of space occupied by a chain, the local economic impact is $105, compared to $179 for every square foot occupied by an independent business.

[16] **Sausalitos Formula Retail Ordinance**, 10.44.240 Formula Retail

[17] **North Beach Ordinance** [Zoning - North Beach NCD] amending part II, chapter II of the San Francisco municipal code (planning code) by amending 178 and 186.1

[18] **Turlock Ordinance Upheld**

A California appeals court upheld an ordinance enacted by the city of Turlock that prohibits the construction of supercenters, defined as stores larger than 100,000 square feet that devote more than 5 percent of their sales floor to groceries.

Wal-Mart had challenged the ordinance on the grounds that it illegally restricted competition. A lower court sided with the city, as did the appeals court, which ruled that the ordinance was a valid use of local authority and was reasonably related to protecting the public welfare.

"[The] city made a legitimate policy choice when it decided to organize development using neighborhood shopping centers dispersed throughout the city," the court concluded in its **decision <http://www.courtinfo.ca.gov/opinions/documents/F047372.PDF>**. "The ordinance was reasonably related to protecting that development choice."

Turlock, a city of 67,000 people in the central part of the state, enacted the measure in early 2004 after Wal-Mart expressed interest in building a large supercenter that would combine general merchandise and a full grocery department. The city determined that such a store would harm neighborhood shopping centers anchored by grocery stores. This would frustrate the community's goal of having retail dispersed in neighborhoods throughout the city (rather than centralized in a few big developments) and result in increased driving and air pollution.

Wal-Mart argued that it was singled out by the ordinance and that the city exceeded its authority because the law suppresses competition and is not reasonably related to protecting the public welfare.

The court rejected those arguments. "The simple fact that Wal-Mart was the first company to feel the effect of the Ordinance is not sufficient to establish that Wal-Mart was targeted in any unconstitutional manner," the court concluded. "If that fact were enough to require a finding that a local governmental entity had exceeded its police power, then local government could never react to new situations brought to its attention by a specific proposal."

The court ruled that even though the ordinance might affect competition, this did not invalidate it. While it is illegal for a city to use zoning to stifle competition, an ordinance enacted for a legitimate public purpose - in this case, **maintaining viable neighborhood shopping centers and preventing retail vacancy and blight - that has an incidental effect on competition is valid.**

With regard to whether the ordinance is reasonably related to protecting the public welfare, the decision noted that the courts generally "recognize that such ordinances are presumed to be constitutional, and come before the court with every intendment in their favor. . . [S]o long as it remains a 'question upon which reasonable minds might differ,' there will be no judicial interference with the

Additional references:

Cotati stopping fast food Council considers moratorium on new chain restaurants. Robert Digitale, Press Democrat, March 6, 2007

Benicia City Council To Vote On Formula Businesses
CBS5.com KPIXTV news online April 2, 2007 (see attached)
Apr 2, 2007 7:50 pm US/Pacific

Deep Economy; The wealth of communities and the durable future, Bill McKibben, Henry Holt & Co., 2007 ISBN-13-: 978-0-8050-7626-4



DEIRcommentsF.doc (95 KB)

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Duplication – Removed

Tuft, Pamela

From: David Keller [dkeller1@sonic.net]
Sent: Thursday, March 22, 2007 2:17 AM
To: CityCouncil; CDD; Tuft, Pamela
Subject: Comments on Petaluma General Plan and DEIR: Floodplain and Stormwater Management Program

From: David Keller
Petaluma River Council
1327 I St.
Petaluma, CA 94952
March 21, 2007

To: Petaluma City Council
Petaluma Planning Commission
Ms. Pamela Tuft, General Plan Administrator
11 English St.
Petaluma, CA 94952

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RE: Public comments on the draft General Plan and General Plan DEIR: Hydrology; Land Use; Parks; Biology and Hydrology; Public Health and Safety; Utilities

Dear City Council Members and Planning Commissioners:

One of the most comprehensive and effective flood management programs in the US, Tulsa, Oklahoma has become a leader in how to do this right, along with Kings County WA (Seattle) and several others.

This is what Petaluma owes to our residents, property owners and businesses. This type of program should be incorporated into the General Plan Policies and Programs regarding Hydrology, Flood management, River and Waterways management, Land Use, Parks and Recreation, Public Health and Safety, and Utilities.

Tulsa's flooding history is instructive for Petaluma, as many issues, constraints and early policies were similar - except that Tulsa has taken its sad history of loss of life, property and treasure to heart, and created one of the best floodplain management systems in the country. A

"Tulsa is located in one of the most scenic natural areas of Oklahoma. Unfortunately, many locations within the city suffer repeated flood damages when torrential storms strike. Some of these areas are not in a designated floodplain.

In the 1970s and '80s Tulsa County had the most federal disaster declarations in the nation. In 1984, a flash flood caused $180 million in damages and 14 deaths. Since that time, Tulsa has made tremendous progress. Dozens of flood projects have been completed, and more are planned and under way. Tulsa has established an award-winning, comprehensive flood program that is cited as a national model. Overall, the risk of flooding has been substantially reduced - but not eliminated. Because of its climate and location, Tulsa can never be considered 100 percent floodsafe.

Inevitably, Tulsa will flood again."

"In July 1992, FEMA selected Tulsa for its Outstanding Public Service Award because of the city's "significant contributions and distinguished leadership" to the nation in floodplain management.

No discussion of this subject would be complete, however, without ***a warning:***

Tulsa will flood again.

Tulsans live in tornado alley, a land of freak storms.

Much of the system is still being built.

And the Tulsa system is largely based on the federal 100-year flood standard. Larger rains — and flood damages — will occur.

But, when the inevitable next flood occurs, danger and damage should be lessened because of lessons learned — the hard way — in crafting Tulsa's flood-hazard mitigation program."

I am including some excerpts from their program for comparison with Petaluma's current and proposed planning, to show that there is a more comprehensive and effective model than is currently proposed in our General Plan. The environmental, safety, biological, hydrologic and economic benefits of undertaking this kind of comprehensive surface water management plan is superior to what Petaluma is currently proposing.

Please note, that this information was provided to the Planning Commission, City Council and City Staff (Dean Eckerson, PE) during the early preparation of the General Plan. I also supplied Mr. Eckerson with the complete Kings County (WA) Flood Management Design and Regulatory Manuals. These Manuals provide very clear and specific guidance and rules on all conditions necessary to minimize future flooding, including strict requirements and oversight of project proponents' modeling, options for fill, storage, detention, retention, minimizing runoff, maximizing stormwater quality, mapping, monitoring, etc.

Unfortunately, significant portions of this comprehensive approach were not included in the Draft General Plan and DEIR, but should have been proposed and explored as additional options and alternatives.

Petaluma, too, has suffered repetitive flood losses, although without loss of life, yet. We must be prudent and conservative as we review and plan for our floodplain management systems for the next 20 years. We cannot afford to continue the kinds of huge losses in property, business, homes and city expenses and liabilities that we have endured in the past 40 years. Petaluma has seen city expenses related to flood damages and management projects in excess of $150,000,000 (2007 dollars) during this time, with over $60,000,000 expenditures in public funds. This outflow of capital, human and natural energy has direct and indirect impacts on our town's physical and mental health and safety, as well as future development, avoidance of blight, and reassurance to our population that this is indeed a city that cares about its future.

There are examples of doing this better for our review and adaptation and adoption. Our current General Plan and DEIR are remiss in not including a more comprehensive approach, as was anticipated when we started the General Plan process while I was on Council between 1996 and 2000. The currently proposed policies and programs are significantly incomplete, and leave our city at too high a risk for future flood damages and losses, to our citizens, businesses, homes, property owners, and environment.

Please also be aware that in areas behind the Petaluma River Flood Control Project's ("Project") walls, particularly in the Payran neighborhood, properties that are currently within the FEMA designated FIRM maps' "100 year flood plain" will be removed from that designation after the Project is completed and the FIRM maps are redrawn and accepted by FEMA. This means that they will no longer be required to carry flood insurance for any federally insured lenders' mortgages or loans. However, these "former floodplains" are still subject to overtopping of the flood project by storms larger than a designated 100 year event, as will happen during their lifespans. B

When the project is overtopped by a larger storm, there will be a wall of water coming through these neighborhoods, with higher velocities and depths coming much quicker than in floods prior to the Project's completion. This is a national problem, recognized by California Office of Emergency Services and the Association of State Floodplain Managers. (http://www.floods.org/home/default.asp). Petaluma needs to include some policies and programs within the General Plan to avoid the financial and physical disasters that will happen in these areas in the future. This is particularly important if any of the design 100 year flood event protections are diminished by upstream building and channelization beyond what was anticipated in the design assumptions by the Corps of Engineers for this Project. The Corps of Engineers Final EIS/EIR for the Project noted very clearly that upstream development beyond that anticipated in the 1987 General Plan, loss of floodplain storage in Denman Flats, and channelization of Willow Brook and the upper Petaluma River will reduce Payran and downtown flood protection levels of the Project to the equivalent of a 40 year flooding event. We cannot afford that predictable disaster. The current draft General Plan and DEIR do not adequately address these very serious problems.

Federal policy regarding construction in the floodplain, as defined in the 1993 Galloway Report on the Mississippi floods: C
1. Don't build in the floodplain.
2. If existing construction in the floodplain does not have to be located there, remove it from the floodplain
3. If the floodplain construction is critical public infrastructure or water-dependent construction, then protect it.

Thank you for considering this carefully, revising our proposed programs accordingly, and improving the environmental impacts of our growth during the next 20 years.

Tulsa's Flooding History:

http://www.cityoftulsa.org/CityServices/FloodControl/History.asp

- Stormwater Fee and Funding
- Stormwater Management Plan
- Flood Insurance
- Flood Safety
- Stormwater Drainage Advisory Board
- Stream Quality and Pollution Control : http://www.cityoftulsa.org/Environment/StreamQuality/
  - Erosion and Sediment Control
  - Fertilizers
  - Household Pollutants
  - Motor Oil

- Outside Washing
- PACE Program
- Pesticides
- Responsible Pet Ownership
- Ten Solutions to Stormwater Pollution

- Related Links



Tulsa's Flooding History

Tulsa has grown up with flooding. Many of the causes are locational: The city is based on a wide river, in a zone of violent storms, and on a frontier where a man had a right to do as he wished with his land.

Flood records are sparse before 1900. In 1908, only a year after statehood, Arkansas River flooding at Tulsa caused $250,000 in damages ($13.15 million in 1994 dollars).

By 1920, the town had outgrown its raw, boomtown image. As riches mounted and investors and speculators poured in, Tulsa grew to a wealthy city of 72,000. Development edged closer and closer toward the river.

On June 13, 1923, the river flooded Tulsa's waterworks, caused $500,000 in damages ($11.94 million in 1994 dollars), and left 4,000 homeless. City fathers responded with Tulsa's first land-use plan, which envisioned upland boulevards and housing. In the lowlands, such as Mingo Creek east of town, would be generous parks and recreational trails.



The waterworks moved to higher ground, near a band of Bird Creek bottoms that became one of the nation's largest city parks. That far-sighted preservation of Tulsa's 2,800-acre Mohawk Park was destined to save the city innumerable future flood losses.

The Structural Era of Flood Control

Meanwhile, around the nation, the 1920s ushered in what has been called the Structural Era of Flood Control, generally 1928 to 1968. In response to the Great Mississippi River Flood of 1927, Congress in 1928 passed the Lower Mississippi Flood Control Act, authorizing the U.S. Army Corps of Engineers to construct dams and levees to control flooding.

The major impact first came to Tulsa during World War II. As an emergency national defense project, and in response to 1943 flooding, the Corps built levees around Tulsa's oil refineries along the Arkansas

River.

By 1950, in the post-war building boom, housing was fanning out, onto the floodplains to the south and east. Land that had periodically flooded with little harm now was awash in wave after wave of urban flooding.

By the late 1950's, flooding of newly developed subdivisions along the river spurred calls for flood control. In 1964, the Corps completed Keystone Dam 15 miles upstream from Tulsa. For years to come, Tulsans would believe that the Arkansas River was forever tamed.

Tulsa enjoyed another boom in the 1960s, when the city's population grew 25 percent. Tulsa's rapid growth required pastures and meadows to be piped and paved, as new buildings continued to spill into the lowlands of the creeks and streams that etch the area. The rapidly urbanizing Mingo watershed was annexed to the city in 1966.

Floods struck every two to four years during the 1960s and early 1970s. The response was classic: emergency response and recovery, reconstruction as quickly as possible, and denial of the possibility that floods could reoccur.



Victims petitioned for neighborhood flood control, with limited success.

The Regulatory Era of Floodplain Management
Nationally, flood losses continued to rise despite billions of dollars in federal flood-control projects. The dilemma prompted a decade of actions that could be called the Regulatory Era of Floodplain Management, generally from 1968 to 1978.

Flood control structures offered spot protection but sometimes caused offsite problems. They also could produce a false sense of security that lured more development into floodplains, flirting with catastrophe. To compound this problem, the value of the induced growth was counted as a benefit in project evaluations.

In the 1960s, this problem was illuminated in the landmark House Document 465, A Unified National Program for Managing Flood Losses. In response, the late 1960s brought Presidential Executive Order 11296 espousing floodplain management and the National Flood Insurance Act of 1968, which made federally subsidized flood insurance available to communities that agreed to adopt minimum floodplain regulations to stem future losses.

The Mother's Day flood of 1970 in Tulsa caused $163,000 in damages ($340,000 in 1994 dollars) on rapidly developing Mingo and Joe creeks.

The City responded by joining the National Flood Insurance Program's "emergency program" and promising to adopt federal floodplain regulations. In August 1971, the NFIP issued its block rate maps. A month later, Labor Day floods hit Flat Rock, Bird and Haikey creeks, and many suburban communities. In December, Bird Creek flooded again. Tulsa joined the NFIP's "regular" program, adopted a new 100-year flood standard, and promised to regulate floodplain land use.

The Year of the Floods, 1974, brought April and May floods that left $744,000 in damages ($2.11

million in 1994 dollars) on Bird Creek. Violent storms June 8 caused widespread flooding on Joe, Fry, Haikey and Mingo creeks, with more than $18 million in damages ($40.24 million in 1994 dollars). On September 19, Mingo Creek flooded again; for some citizens, it was the third flood in a year.

Angry, drenched victims waded out of the floods to demand help. They contended the city wasn't enforcing NFIP regulations. They tried to halt development, to avoid deeper flooding until existing problems could be solved. Developers objected strenuously.

Thus began a community debate over floodplain management, locally called "Tulsa's great drainage war," destined to last years. The city responded with a plan to widen part of Mingo Creek, including clearance of 33 houses in the right of way. The houses were removed just before the next flood.

The 1976 Memorial Day Flood marked a milestone in Tulsa's search for flood solutions. A three-hour, 10-inch deluge was centered over the headwaters of Mingo, Joe and Haikey creeks. The resulting flood killed three and caused $40 million in damages ($75 million in 1994 dollars) to more than 3,000 buildings.

By this time, the victims were becoming skilled lobbyists and gathering sympathizers citywide. They stormed City Hall.

Newly elected city commissioners responded with a wave of actions. They enacted a floodplain building moratorium; hired the city's first full-time hydrologist; developed comprehensive floodplain management policies, regulations and drainage criteria; enacted stormwater detention regulations for new developments; instituted a fledgling alert and warning system; and began master drainage planning for major creeks.

In 1978, an earth change ordinance was also adopted, giving the city control over alterations to Tulsa's landscape, including floodplains and stream channels.

The Nonstructural Era of Stormwater Management

The Nonstructural Era, a third major phase of stormwater management, began with the President's 1978 Water Policy Initiative. It recognized the need to place nonstructural techniques on a par with flood-control structures and to preserve the natural values of floodplains and wetlands.

To curb continuing losses, in the early 1980s the federal government developed the Federal Inter-agency Hazard Mitigation process. In the days after disasters, federal teams were dispatched to identify hazard mitigation opportunities basically ways to make the response to each disaster reduce the scope of the next one. The mitigation concept focused on correcting the causes of losses, including removing, raising, or flood proofing the most vulnerable of the damaged buildings.

Tulsans worked with the Federal Emergency Management Agency to develop the process. Tulsa's early exposure to the new FEMA mitigation program was to have a significant impact on the city's response to future floods.

The 1984 Memorial Day Flood, the worst in the city's history, was Tulsa's watershed point.

After a muggy Sunday afternoon, a stalled cool front produced some 15 inches of mid-night rain, centered over Mingo Creek but also extending across most of the city. The results were disastrous.

The 1984 Memorial Day Flood killed 14, injured 288, damaged or destroyed nearly 7,000 buildings, and

left $180 million in damages ($257 million in 1994 dollars). Mingo Creek alone accounted for $125 million of the damages.

The newly elected mayor and street commissioner had been in office for only 19 days, but both knew the issues well. In the darkest hours of the city's worst disaster, they pledged to make their response reduce the likelihood that such a disaster would ever be repeated.

Before daylight, they had assembled the city's first Flood Hazard Mitigation Team to develop the city's strategy.

Within days, a new approach to Tulsa flood response and recovery was born.

As ultimately completed, the program included relocation of 300 flooded homes and a 228-pad mobile home park, $10.5 million in flood control works, and $2.1 million for master drainage plans. The total capital program topped $30 million, mostly from local capital sources, flood insurance claim checks, and federal funds.

It was only the beginning.

A **Unified Program** was created after the 1984 flood. The work didn't end with the initial flood response and recovery. In fact, it was only the first step in a long and continuing journey to make Tulsa floodsafe.

The 1984 flood also persuaded Tulsans that a coordinated, comprehensive stormwater management program was needed from the rooftop to the river.

The Department of Stormwater Management in 1985 centralized responsibility for all city flood, drainage, and stormwater programs.

A stormwater utility fee was established by ordinance in 1986 to operate the program. The utility fee ensures stable funds for maintenance and management, independent of fickle political winds. The ordinance allots the entire fee exclusively for floodplain and stormwater management activities.

The 1986 Arkansas River Flood was a first test of the new stormwater management program. It also served as a reminder of the finite protection of Keystone Dam. Between September and October 1986, Keystone Reservoir filled to capacity, forcing the Corps to release water at the rate of 310,000 cubic feet per second. Downstream flooding was inevitable. At Tulsa, a private westbank levee failed, causing $1.3 million in damages to 64 buildings. The city fielded its hazard-mitigation team and cleared 13 substantially damaged structures.

Institutionalization and acceptance came in the 1990s, after Tulsans approved a change in city government from the mayor-commission to the mayor-council form.

A new Department of Public Works consolidated all public works services. Stormwater management was reintegrated and finally institutionalized into the city structure.

Today, storm drainage management is generally an accepted part of the city's services.

Tulsa's system has not been tested by a catastrophic rainfall since 1986, but the system has handled smaller rains well. Leaders believe improved maintenance, continuing capital projects, stringent

regulations, and aggressive citizen awareness programs will reduce ' but cannot entirely eliminate future flood losses.

The greatest testimony to the program is that, since comprehensive regulations were adopted in 1977, the city has no record of flood damages to any building that complies with those regulations.

In the early 1990s, FEMA ranked Tulsa first in the nation for its floodplain management program, allowing Tulsans to enjoy the nation's lowest flood insurance rates. The program was also honored with FEMA's 1992 Outstanding Public Service Award; and the Association of State Floodplain Managers has twice given Tulsa its Local Award for Excellence.

Leaders consider the Tulsa program still in progress. They know that much remains to be done, and that there is an inevitable next flood ahead. The program continues to evolve.

The Watershed Era of Comprehensive Management
The Great Midwest Floods on the Mississippi and other heartland rivers in 1993 caused more than $10 billion in damages to 72,000 structures and, in some cases, entire communities.

The 1993 Midwest floods spurred national leaders to re-examine their programs. Although Tulsa was not directly affected, local leaders also took advantage of the lessons that the nation was learning. The 1993 floods served as a catalyst to launch a fourth era in the nation's attempts to stem disaster losses, according to Dr. Gilbert F. White, a leader in national floodplain management for the past 50 years, and Larry Larson, Executive Director of the Association of State Floodplain Managers.

That new era looks above and beyond the floodplains, beyond response to a specific disaster, and takes a longer and broader view.

"It examines in an integrated fashion the whole regional floodplain environment," White says. "It is a program which takes into account the human values, the local resource decisions, the whole pattern of local community management as it is related to flood-hazard and the floodplain."

"Until this year," says Larson, "the government mostly helped people rebuild at risk of the next flood. A monumental change has occurred in federal attitudes and programs that assist people and communities in flood recovery. That change will result in relocation of structures out of flood hazard areas or elevation above flood levels with government assistance."

This new direction a comprehensive, regional approach to long-term solutions, based on collaborative partnerships mirrors the best of Tulsa's local goals and priorities.

The long journey and hard lessons continue. In the words of a former Tulsa mayor, "We're all learning together."

Find out more about the Stormwater Management Plan

Stormwater Management Plan

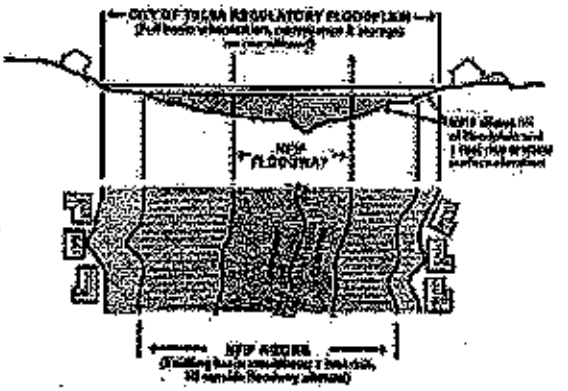
http://www.cityoftulsa.org/CityServices/FloodControl/StormwaterPlan.asp

Tulsa's floodplain and stormwater program includes three key goals:

- Prevent new problems.
- Correct existing problems.
- Enhance the community's safety, environment, and quality of life.

This page highlights major program elements used to achieve those goals.

Regulation
In general, Tulsa growth is welcomed – so long as it will not flood or cause flooding elsewhere.



Beyond the 100-year standard
Experience showed that the National Flood Insurance Program's minimum standard is insufficient for Tulsa. Therefore, the city's regulations exceed NFIP's standard in several important ways, highlighted below.

Ultimate watershed urbanization. Runoff generally becomes deeper and faster, and floods become more frequent, as watersheds develop. Water that once lingered in hollows, meandered around oxbows, and soaked into the ground now speeds downhill, shoots through pipes, and sheets off rooftops and paving.

Insurance purposes require the NFIP floodplain maps to be based on existing watershed development.



But unless plans and regulations are based on future watershed urbanization, development permitted today may well flood tomorrow as uphill urbanization increases runoff. Tulsa enforces the NFIP minimum regulations and maps, to retain eligibility for federal flood insurance.

In addition, the city enforces its own more extensive maps and regulations, which are based on ultimate watershed urbanization as forecast in the comprehensive plan.

Watershed-wide regulation. Floodplains are only part of flood-management considerations. Water gathers and drains throughout entire watersheds, from uplands to lowlands. Each watershed is an interactive element of the whole. A change at one place can cause changes elsewhere, whether planned or inadvertent.

Stormwater detention. One way to avoid increased flooding downstream from new development is to provide stormwater detention basins throughout watersheds.

New or substantially improved developments must detain the excess stormwater on site – unless they are exempted in master plans or allowed to pay a fee in lieu of on-site detention. Water from detention basins is released slowly downstream.

In-lieu fees are allocated for regional detention facilities. In most instances, the city has found regional detention basins to function more satisfactorily than smaller, scattered on-site facilities.

Valley storage. Flood water cannot be compressed. It requires space. Encroachments into a channel or floodplain can dam, divert, or displace flood waters. So Tulsa requires compensatory excavation if a development – including a flood control project – would reduce valley storage. Preserving or recreating floodplain valley storage is a keystone of the city's program.

Freeboard. NFIP regulations require finished floors of new development to be at or above the base flood elevation, based on existing watershed conditions. Tulsa includes freeboard as another margin of safety, requiring finished floors to be at least 1 foot above the regulatory flood elevation, based on ultimate watershed urbanization.

Erosion and sedimentation. Erosion and sedimentation rob hillsides of valuable topsoil, dam lowlands, clog streams, and pollute rivers. Builders must control site erosion from new development.

Permits and performance standards. Tulsa requires a watershed development permit to be issued before developing, redeveloping, building, excavating, grading, regrading, paving, landfilling, berming, or diking of any property within the city. There are five types of watershed development permits: floodway, floodplain, stormwater drainage, stormwater connection, and earth change permits. Individual residential lots outside the floodplain are exempted.

Tulsa's regulations are based on adopted floodplain maps (both Tulsa and NFIP), watershed-wide master drainage plans, and development permits based on specific performance standards.

Planning and Capital Projects

A decade ago, Tulsa faced up to its need for $500 million in corrective flood projects. The city had been built, over decades, without much of a drainage system, and the result was disastrous. The task appeared overwhelming.

Since then, Tulsa has completed or has under construction more than $200 million in capital plans and projects, including $80 million in federal funds.

The capital program includes structural, nonstructural and multi-objective projects. By combining techniques, flood hazards have been reduced for thousands of Tulsans.

More than $300 million in flood-reduction projects are still needed. Tulsa's program is still under way, and will be for years, to correct drainage problems that were created over many decades.

Planning

The backbone of Tulsa's stormwater management system is its master drainage planning. The planning process involves extensive citizen participation, including hundreds of public meetings over the past decade.

Master drainage plans. Tulsa has completed master drainage plans for virtually all drainage basins. Each plan is a comprehensive, watershed-wide study of a drainage basin that documents existing floodplain information and recommends solutions for flooding and drainage problems.

A typical master drainage plan is developed within the context of the community, and so takes into

account community values, existing conditions, goals and objectives, and future plans. The result is a plan for actions and projects, including costs and benefits.

City-wide master plan. In 1989, the city synthesized its various master drainage plans into one city-wide document, The City of Tulsa Flood and Stormwater Management Plan, 1990-2005. This city-wide plan ranks and prioritizes hundreds of recommended projects, to guide capital scheduling.

Capital projects
Priority-setting was challenging. Citizens in every watershed faced severe flooding problems. In general, priorities are based on hazard, cost, benefit, and feasibility.

Mingo Creek project. The 61-square-mile Mingo watershed drains the eastern one-third of the city but has accounted for two-thirds of Tulsa's flood damages in recent years. The U.S. Army Corps of Engineers and the city worked together in the late 1970s to develop a plan for Mingo flood control, which Congress authorized for construction in 1986.

The Corps estimates that the completed $143 million project will prevent $32 million in average annual flood damages. With an average annual cost of about $16 million, the Mingo project has a benefit-to-cost ratio of 2 to 1.

The local cooperation agreement signed by the city helped forge new legislation, written into the Water Resources Development Act of 1986, which also gives communities credit for past construction projects. The federal government recognized that before 1986 Tulsa had constructed some Mingo channels and detention basins that were compatible with the Corps project. The federal government agreed to give the city credit toward its local share plus reimbursement for the federal share of prior expenditures that pertain to the project. Tulsa has received $10 million in reimbursements and expects to receive about $10 million more.

Acquisition and relocation. Over the past 15 years, Tulsa has cleared more than 900 buildings from its floodplains. The largest clearance came after the 1984 flood, when more than 300 single-family homes and 228 mobile homes pads were acquired and cleared.

The city's floodplain program is gradually reducing its inventory of thousands of floodprone buildings. The city is also updating its post-flood mitigation plan to include acquisition and relocation recommendations for before, during, and after a flood.

Small capital projects. Many flooding and drainage projects throughout the city are localized but troublesome. They are addressed through small capital projects, generally less than $100,000 each. Every year, $700,000 is allocated from the utility fee for small projects. Some are also funded through long-range capital sources.

Floodproofing. In some instances flood damages to existing structures can be averted by spot flood-proofing, such as elevation of the existing structure on site, shields for windows and doors, and ring levees. Oklahoma law does not allow the city to spend public funds to floodproof individual structures, so currently the city's role is limited to technical assistance to private property owners.

Stormwater Quality

Stormwater quality is of growing concern in municipal drainage management. Tulsa has geared up to meet new federal requirements for stormwater discharge NPDES permits (National Pollutant Discharge

Elimination System permits). Tulsa's most serious problem with runoff quality was found to be sediment, which is being addressed through vigorous regulation of erosion from construction projects.

The city is also emphasizing street sweeping, environmental monitoring, and stormwater laboratory services as part of its stormwater quality program.

Maintenance and Operations

City leaders clearly saw the need for better maintenance when the 1984 flood swamped debris-choked creeks and channels, clogged and collapsed sewers, and neglected pump stations. The resulting public and private costs were enormous.

The flood triggered a search for stable, continual maintenance funding. The answer came in 1986, when city fathers approved a drainage utility fee. Now maintenance is an essential element of Tulsa's program.

The contrast is telling:

In 1980, the city spent about $400,000 on stormwater maintenance.
By comparison, in 1993, the city was able to spend about $6 million on stormwater maintenance.

- The difference was the stormwater utility fee.
- The maintenance program's first goal is to keep systems operating at full capacity.

The system includes hundreds of miles of surface channels and floodplains, thousands of miles of underground sewers, public detention basins, pump stations, roadside ditches, bridges, and the curbs and inlets along the street system.

The list of duties continues to expand, extending through turf control and tree planting, debris removal, emergency response during storms, and management of maintenance trails along drainageways.

Emergency Management

Capricious climate makes Tulsa vulnerable to weather emergencies, particularly tornadoes, violent thunderstorms, and floods.

Overall responsibility during emergencies lies with the city-county Tulsa Area Emergency Management Agency; but in flood management, TAEMA shares its lead with Tulsa's Public Works Department.

Tulsa's emergency management goal is to reduce hazard and damage before, during and after storms.

Forecasting and warning
Flash floods require the earliest possible warnings. Tulsa's system works in cooperation with the National Weather Service, news media, TAEMA, and the City of Tulsa. A computerized ALERT system includes 39 rain, 19 stream, and seven detention gauges that report changes as they happen. The system is based on detailed basin inventories and includes a hydrologic program that develops stream and flood forecasts, to be released for appropriate action before flooding occurs.

Response
Emergency response is triggered by the possibility of severe weather anywhere in the community.

Response teams are guided by detailed plans and protocols – and their extensive field experience during emergencies. The plans also identify critical facilities with hazardous materials, vulnerable occupants, and essential community functions.

Recovery and mitigation
Traditionally, recovery meant rebuilding as fast as possible. But recurring disasters have taught Tulsans that rebuilding in kind can mean reinvesting in disaster. Tulsa today emphasizes mitigation projects, which seek to make the response to each disaster reduce future losses. For example, hundreds of flooded homes have been relocated to dry sites. In addition, the city is updating its flood-hazard mitigation plans, to include actions to be taken before, during, and after a flood.

Public Awareness

The city pushes public information and involvement to keep citizens aware that floods frequent Tulsa, requiring prudent preparation.

Diverse information pieces include flood maps, brochures, news releases, fact sheets, reports, slide shows, videos, direct mailings, displays, speeches and presentations, roadway signs, and individual contacts – anything and everything possible to get out the word.

For example, the city mails periodic notices to floodplain occupants, warning them of hazards, offering them flood preparedness tips, and urging them to buy flood insurance.

Tulsa's stormwater ordinances include requirements that full information about flood hazards must be provided by property sellers to prospective buyers, and by landlords to tenants.

Stormwater Fee and Funding

http://www.cityoftulsa.org/CityServices/FloodControl/FeeandFunding.asp

Benefits of the Tulsa Program

- ✓ Lowest flood insurance premiums in the nation
- ✓ Open green space for playgrounds, soccer fields and trails
- ✓ Wetlands and ponds (Wildlife habitat)
- ✓ Flood-resistant commercial and residential development
- ✓ Safer streets due to drainage improvements that can handle heavier amounts of rainfall
- ✓ Better water quality

Stormwater fees lag behind rising maintenance costs
When the Memorial Day flood devastated Tulsa in 1984, the City had 57 detention ponds. Three years later, the first stormwater fee was collected to fund the flood control measures citizens had requested to save lives and property in the future. By 2000, there were 85 detention ponds plus other stormwater facilities operated and maintained by the Public Works Department. The number of ponds rose 33 percent, yet stormwater utility fees went up only 18 percent (using 1987 dollars to factor in inflation).

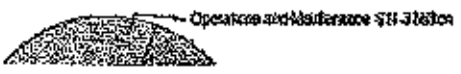
As the areas and facilities that must be maintained continue to grow, and with inflation, maintenance costs will rise again. Stormwater fees must keep pace to protect the City's investment in flood control structures and to implement additional measures necessary to improve Tulsa's quality of life.

Where does the stormwater program funding come from?
Public Works, in conjunction with the Stormwater Drainage Advisory Board and numerous citizen groups, has developed a phased implementation program for projects identified in the City's basin drainage plans. The projects are funded by stormwater fees, sales tax revenues or bond issues.

Funding for Operations and Maintenance:
Residential Customer Fees $4.63/month (1 ESU*)
Commercial, Multi-family, Industrial Fees $4.63/month for each ESU* * An Equivalency Service Unit – or ESU – is the projected annual cost of maintaining 2,650 square feet of property.

Funding for Large Capital Improvements:
Large capital projects are funded by City sales tax revenues and bond issues. The money is used for acquisition of lands and construction of large water retention facilities, major drainage basin improvements and other such large capital items.

Where does the stormwater fee money go?



As the pie chart shows, stormwater fees are used

primarily for maintenance of stormwater detention facilities, stream channels, pumping stations, culverts, ditches and other drainage facilities.

After storms and when needed at other times, crews remove material blocking water flow in channels and detention sites. On average, they clean more than 22 miles of ditches and clear about 5 miles of drainage pipe each year. They remove tons of silt from channels and reconstruct eroded earthen channels.

Flood Insurance

http://www.cityoftulsa.org/CityServices/FloodControl/Insurance.asp

Tulsa is located in one of the most scenic natural areas of Oklahoma. Unfortunately, many locations within the city suffer repeated flood damages when torrential storms strike. Some of these areas are not in a designated floodplain.

In the 1970s and '80s Tulsa County had the most federal disaster declarations in the nation. In 1984, a flash flood caused $180 million in damages and 14 deaths. Since that time, Tulsa has made tremendous progress. Dozens of flood projects have been completed, and more are planned and under way. Tulsa has established an award-winning, comprehensive flood program that is cited as a national model. Overall, the risk of flooding has been substantially reduced - but not eliminated. Because of its climate and location, Tulsa can never be considered 100 percent floodsafe.

Inevitably, Tulsa will flood again. Spring is our most vulnerable time.

The Stormwater Drainage Advisory Board, a citizen board appointed by the Mayor, conducts meetings throughout the city to hear citizens' ideas on drainage problems. Public Works provides the Board and interested citizens with updates on planned or proposed projects at each meeting.

The Tulsa Hazard Mitigation Citizens Advisory Committee conducts meetings to hear citizens' ideas related to flooding as well as other natural hazards.

Most of Tulsa's creeks and rivers periodically have flash floods. The flash floods usually have high velocities and are extremely dangerous. Flood damages have occurred at various times along the Arkansas River and numerous creeks, including Valley View, Flat Rock, Dirty Butter, Bird, Coal, Mingo, Haikey, Fry, Vensel, Fred, Joe, Hager, Nickel, Mooser, Cherry-Red Fork, Perryman, Crow, Elm, Park View, Oak, Harlow and Bigheart.

Flood insurance is available for all properties in Tulsa
Most homeowners' policies do not cover flood losses. You can protect your home and contents through the National Flood Insurance Program. You should obtain coverage for structure and contents. There can be more damage to the contents than the structure. Renters can buy contents coverage even if the owner does not insure the structure.

There is a 30-day waiting period before the policy becomes effective.

Flood insurance is required by law in order to obtain federally secured financing to buy, build, or renovate a structure located in a flood hazard area. This financing includes federal grants, FHA and VA loans, and most conventional mortgage loans. "A General Guide to Regulatory Floodplains" includes a map that shows where flood hazard areas are in the City of Tulsa. The guide is available from the Mayor's Action Center.

To find out more about flood insurance, contact any licensed property/casualty agent or broker - the same person who sells your home and auto policies. All agencies charge the same premiums. You may be denied federal assistance after a disaster if you don't have flood insurance.

Tulsa's natural floodplains

Many local floodplains have been preserved for recreational activities and as wetland habitat for wildlife. A beautiful natural area, Red Bud Valley, has been preserved and is open to the public. Detention areas throughout the city serve as soccer fields and walking trails when they are not storing excess stormwater. Also, several drainage improvements include planting of special water plants and grasses to improve their natural functions of wildlife habitat and filtering nutrients and impurities from water.

While natural floodplains are inviting during sunny weather, they can be treacherous during heavy rainfall or freezing temperatures. Avoid entering these areas when flooding is occurring. Skating on icy detention ponds also should be avoided since the ice in Tulsa is usually too thin to support the weight of even a small child.

Protect your property from flood damage

Over the years, the City of Tulsa has completed many flood control projects to keep floodwaters from reaching buildings. The City also regularly maintains drainage ditches and storm sewers to prevent water from backing up into streets and homes. Despite these efforts, the risk of flooding has not been – and cannot be – completely eliminated. Therefore, citizens should take measures to protect their property.

You may see what your flood risk is by examining the detailed floodplain boundary maps in this atlas. To request a free, written flood-zone determination contact the Mayor's Action Center and provide the correct address or legal description of the property.

In some cases, retrofitting existing buildings or regrading a yard can help reduce the potential for flood damages to structures and their contents. Retrofitting techniques include elevating buildings above flood levels, wet or dry floodproofing (commercial structures), and installing backflow preventers to protect floors and contents from sewer backups. Structural barriers such as levees and floodwalls may also be constructed to protect property from floodwaters. Remember, a building permit may be required for retrofitting or structural projects.

A publication of the Federal Emergency Management Agency (FEMA), "Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding" (Publication #312), includes information on technical and financial assistance. The book can be obtained free by calling 1-800-480-2520 or going online to www.fema.gov/mit/rfit. Free Internet access is available to library cardholders at all Tulsa City/County Library locations.

There are temporary measures you may take to protect your property during a flood event. Plan ahead about where and how you will move furniture out of harm's way. Keep materials like sandbags, plywood, plastic sheeting and lumber handy for emergency waterproofing. Clear brush and debris away

from storm drains and ditches.

Qualified City staff is available at the Permit and Licensing Center to discuss your options and to help you plan and build a safe project while complying with City floodplain development policies.

Building permits ensure safe construction inside and outside floodplains

The City of Tulsa's permitting process is designed to ensure that all construction in Tulsa is safe. A permit is required for all new construction and, most of the time, you must obtain a permit for repairing or replacing existing features. Before you begin construction or add on to your existing building, find out which permits are required by contacting the Permit and Licensing Center.

In addition to regular building permits, special regulations apply to construction in floodways and the Regulatory Floodplain. No construction, including filling, is allowed in the mapped floodway without an engineering analysis that shows the project will not increase flood damage elsewhere. Any activity outside the floodplain but within a natural or man-made watercourse also requires a permit.

A floodplain watershed development permit must be obtained from the City of Tulsa before commencing construction, landfill, or excavation in the floodplain. New buildings in the floodplain must be protected from flood damage so our building code requires that new buildings be elevated at least one foot above the elevation of the City of Tulsa Regulatory Floodplain.

Homeowners who are planning substantial improvements should contact the Permit & Licensing Center for a residential building permit. Elevation or floodproofing may be required if you want to construct a substantial improvement (the cost of the improvement or add-on is 50 percent of the value of the existing building).Permits also are required for a repair if it's more than just cleanup after a storm. If your property is substantially damaged (50 percent of the value of the building), federal regulations may require you to elevate or floodproof before you can rebuild.

To report illegal floodplain development or to verify that proper construction permits have been issued for a project, contact the Mayor's Action Center. An inspector will investigate.

Cleaner creeks: You can help
Tulsa's storm sewers were designed to divert excess rainwater to creeks that flow to the Arkansas River and Bird Creek. It is important to protect the quality and control the quantity of the water flowing into the drainage system. City workers monitor the system regularly for oil and grease, fertilizers, pesticides, and sediment. Crews also routinely remove debris from drains and sewers to prevent water from backing up into streets and homes when it rains. Unfortunately, actions such as littering and dumping yard waste and household fluids down storm drains can lead to blockages between scheduled maintenance work.

Please do your part to keep the inlets and drainage ways clear of brush and debris. Here are steps you can take to protect the quality and control the quantity of water in Tulsa's creeks. These actions also will beautify your neighborhood and reduce the risk of dangerous flooding.

- Maintain your vehicle so hoses and reservoirs do not leak or break causing fluids to spill onto streets.
  Don't pour used motor oil, antifreeze, old pesticides or any other pollutants into the storm drainage system. Contact the Metropolitan Environmental Trust (M.e.t.) for proper disposal methods and locations. (584-0584 or www.metrecycle.com)

- Apply fertilizers and pesticides properly. Read labels to determine how much to use and when to apply the products. The Master Gardener Program has volunteers who are trained to answer questions about pesticides and fertilizers. Call the Master Gardener Hotline at 746-3701.

- Use a mulching mower or bag your grass and leaves instead of blowing the yard waste into the street. Yard waste can clog storm drains and, since it is organic matter, it can reduce the amount of oxygen in the creek. Fish need oxygen to survive.

- Pick up litter around your neighborhood or business place so the trash doesn't collect on drainage inlets or clog sewer pipes. If you see someone littering, report the incident to the Oklahoma Litter Hotline, 1-888-5-LITTER.

- If you spot a blocked drain or notice illegal dumping, call the Mayor's Action Center at 596-2100, and an inspector will investigate. Putting foreign substances into the storm sewer is a violation of City ordinance.

Tulsa Oklahoma was one of the most floodprone cities in the US, suffering the largest damages repeatedly with loss of lives and property. Through an aggressive and responsible approach to its flood management, it has become one of the safer and more livable communities.

This overview from the US Department of Energy provides some of the background and policy decisions made, which have been recognized as a leadership position in flood management. Along with Kings County Washington (Seattle) and several others, this has become one of the textbook case studies in doing it right.

I have excerpted 4 of the sections. The entire report, with maps and photos, is available online.

http://www.doe.gov/pubs/harmsway/index.shtml
[Preface] [Overview] [History] [Buyout or Bailout?] [Garden City & Beyond] [Conclusion] [References] [Appendix]

Preface

It is widely believed that, after disaster strikes, "rebuilding is good therapy."

For decades, our local and national flood-recovery strategies have been geared to rebuilding as quickly as possible, setting the stage for each next disaster.

And so it was in Tulsa, Oklahoma. But for many families in Tulsa, rebuilding became a way of life in the 1950s, '60s, and '70s. Flood disasters were occurring with numbing regularity, every two to four years, each one worse than the last. By the early 1980s, Tulsa County was leading the nation in the frequency of flood disasters, with nine federal flood disaster declarations in 15 years.

We were rebuilding the same houses on the same floodplains over and over again, at great public and private expense. Homes had been flooded and rebuilt as often as five times in six years. Some began to call it folly.

Then, without warning in the wee hours of a Sunday morning before Memorial Day, 1984, more than a foot of rain fell on Tulsa. Abruptly, the city was awash, immobilized. Routed from sleep, city managers

huddled in Tulsa's basement emergency operations center, dazed by each new volley of reports of death and destruction. We could do little more than preside over the unfolding disaster.

The floods were flashing down Tulsa's creeks and lowlands like wet tornadoes. Throughout much of the city, thousands of people were trapped in the lightning-sparked darkness, begging for boats or swimming blindly for dry ground. Their cries for help mingled with thunder, the screams of emergency sirens, and the eerie whine of auto horns shorting out in rising water. Drivers were careening into walls of water 10 feet high, spinning and washing away down instant rivers. Cars, trucks, and mobile homes, crumpling like discarded Styrofoam cups, became waterborne projectiles. As the storm raged on, 40 people clung to rooftops in a mobile home park until they could be rescued, one by one, by an outstretched hand from a life-flight helicopter.

Morning light found 14 dead, 288 injured. Seven thousand cars were damaged or destroyed, including three fire trucks, 80 police cars, and 10 ambulances. Nine bridges and two streets were shattered; 10,000 homes and businesses were without power. More than 6,800 buildings were damaged or destroyed, including 500 mobile homes, 2,500 apartment units, and 3,370 homes. The damage toll: more than $180 million.

In the basement emergency operations center, Tulsa leaders said: "Enough.".

Even while the water was still rising, we began working on what came to be called "flood-hazard mitigation," searching for ways to make the response to our 1984 flood reduce the scope of Tulsa's next disaster. None of it was easy, but it was essential.

This report traces some of the lessons Tulsa learned, flood by flood, over generations. We hope our hard lessons can be of use to others. We're still learning.

Rebuilding may be therapeutic, but what of the family who repeatedly rebuilds the same house or business in the same floodplain and waits, perennially, for the next disaster? For such a family ‹ and the taxpayer ‹ flood-hazard mitigation would be far better therapy.

Tulsa growth

On land shaped by wind and water, early settlers came in slow waves to the rolling blackjack and prairie hills that would someday become the city of Tulsa, Oklahoma.

Bottomlands held the lure of easy water, drawing early Caddoan tribes, then the Osage, then the Cherokees. By the late 1700s, Frenchmen were exploring the rivers, giving them names such as Arkansas and Verdigris. By the early 1800s, the Creeks, removed by force to Indian Territory, were torching their council fires on a high bank by the Arkansas River near what would someday be known as Tulsa's Council Oak Tree. Early settlers also were drawn by nearby forts and trading posts, then a post office and a depot ‹ after the railroad came through in 1882, booming the town up to 800 folk. In 1898, Tulsa incorporated. In 1907, Indian Territory became the State of Oklahoma. Growth exploded in the early 1900s with the discovery of oil near Tulsa, continuing strongly during the early decades of this century when Tulsa proclaimed itself to be the oil capital of the world.

Today, Tulsa has about 375,000 citizens, covers about 200 square miles, and is governed by a new mayor-council city government. Its diversified economic base includes oil, aerospace, technical, scientific and communications industries.

Natural setting

Tulsa is located in the middle of "tornado alley," where colliding weather systems make the city vulnerable to violent thunderstorms, particularly in the spring and fall. Normal annual rainfall is about 37 inches, but storms have produced as much as 15 inches of rainfall in a few hours, with little or no warning. Thunderstorms occur principally in the spring and secondarily in the fall; but violent storms know no season and can occur any time of the year.

Its riverfront site also makes Tulsa floodprone; an estimated 10-15 percent of the community is in floodplains. Most of that area is subject to flash floods that strike in minutes during a storm.

A major ridgeline bisects the city, northwest to southeast, so stormwater from a network of smaller basins ultimately drains either to the Arkansas River or the Verdigris River east of Tulsa.

Flooding history

Tulsa's early flood problems generally occurred along the Arkansas River. Disastrous floods occurred in 1908 and again in 1923, when the city's water plant was flooded. (Subsequently, the water plant was moved to higher ground.) Other Arkansas River floods occurred in mid-century years, including the 1940s and 1950s. During World War II, the Corps built Arkansas River levees along portions of Tulsa; in 1964 the Arkansas flood threat was further reduced by an upstream Arkansas River dam, Keystone.

As Tulsa grew, development fanned out across lowlands along the city's network of tributary streams to the Arkansas and Verdigris systems. These smaller, flashy streams became the focus of flooding that generally revisited Tulsa, during the 1960s and 1970s, every two to four years. Several thousand buildings had been built on floodprone lands. Despite piecemeal pipes and paving, damage tolls rose with each flood. The community had few if any regulations over floodplain use, and funds were scarce for structural works.

Notable recent floods occurred in 1970, 1974, 1976, 1984, and 1986. The most damage in those years occurred along Mingo Creek, which drains 61 square miles in east Tulsa. Mingo drains about one-third of the city but has accounted for about two-thirds of the city's flood damages in modern times.

Program development

Tulsa's progress in solving its flood problems has come in a series of actions, largely in response to specific floods. After the 1970 Mother's Day flood left $1 million in damages, Tulsa entered the new National Flood Insurance Program and began, slowly, regulating its floodplains.

After the 1974 June 8 flood caused $18 million in damages, Tulsa began a community debate ‹ which was destined to take many years ‹ on the best approaches to flood control.

After the 1976 Memorial Day flood caused $34 million in damages and killed three, Tulsa developed comprehensive drainage regulations and began developing master drainage plans for major creeks. Consensus formed to include channels, stormwater detention, and regulations in the program. The city forged a partnership with the Corps of Engineers, to develop a program for Mingo Creek. A fledgling alert system was developed.

After the 1984 Memorial Day flood killed 14 and left $180 million in damages, Tulsa was shocked into really coming to terms with its flooding problems. A national study showed that Tulsa led the nation in numbers of federally declared flood disasters, with nine flood disasters in 15 years. Leaders recognized

that they must install a comprehensive, stable flood-management program with political and fiscal continuity.

After the 1984 flood, the city acquired and cleared about 500 of the most severely damaged houses and mobile homes --- before they were rebuilt --- using combinations of local and federal funds, including flood insurance checks.
In 1986, Tulsa realized the limits of existing Arkansas River flood control levees and dams, when heavy rains forced the Corps of Engineers to release 300,000 cubic feet per second from the upstream Keystone Dam. The high water caused about $3 million in damage at Tulsa, compared to $67 million in the region. This flood focused attention on the need for improved regional planning and coordination. As a result of this flood, Tulsa acquired a swampy pocket of flooded homes along the Arkansas River west bank.

Management program

Today, Tulsa's floodplain and stormwater management program includes:

>> **An ongoing floodplain clearance program.** Overall, since the 1970s, Tulsa has acquired and cleared some 875 buildings from its floodplains. Voters have approved $600,000 for the next phase, to get under way next year.
Stable funding for maintenance and management, through a stormwater utility. Residents pay $2.58 a month, per house; business fees are based on runoff from their impervious areas. The fund brings in $8 million a year.
Watershed-wide regulations. New developments must meet stringent standards so they will not flood or aggravate others' flooding.

>> **An aggressive public awareness program.** For example, the city mails annual warnings to floodplain inhabitants, touting flood insurance and preparedness planning.

>> **A sophisticated forecasting and alert system.** Master drainage plans for the entire city, and a good record on obtaining capital funding. In the past decade, Tulsans have approved more than $100 million for flood control capital projects that are now completed, under construction, or planned. In addition, the Corps of Engineers is completing the $143 million Mingo Creek project, a combination of 23 detention ponds and downstream channelization, which includes about $80 million in federal funds. Construction is to be complete in 1996.

>> **Recreation, open space, and nature preserves** incorporated into many flood projects. Example: Stormwater detention basins, dry except during floods, are used for soccer fields and other recreational activities. Along channels, maintenance lanes are used for hiking and biking trails, which are being linked together with other trails into a community-wide network.

Scope of this report

This report focuses on Tulsa's floodplain clearance activities --- one aspect of the city's comprehensive flood-hazard mitigation program --- with emphasis on the 1984 post-flood acquisition.

This report is based on the remarkable work of many people. The list includes Tulsa citizens; many courageous political and civil-servant leaders; a diligent local news media; generous national experts; and our partners in the Federal Emergency Management Agency and the U.S. Army Corps of Engineers. This summary acknowledges their contributions, with gratitude.

Garden City and beyond.

1986 flood

Between September 25 and October 4, 1986, a series of storms battered northeastern Oklahoma, including Tulsa. High creek waters affected 49 buildings around the city --- but the more serious problems were along the Arkansas River. Upstream from Tulsa, Keystone Reservoir filled, forcing the Corps of Engineers to release water that caused downstream flooding. At their height, the releases topped 300,000 cubic feet per second. Sandbaggers, levee watchers, and emergency teams worked around the clock for days.

Along the river around Tulsa, widespread flood damage occurred. But in Tulsa, river flooding was more contained. A levee broke west (upstream) of downtown, but sandbaggers prevented significant damage. Levees and open-space preserves largely did their jobs. Along the river front, Tulsa's River Parks were swamped, but dollar damages were limited to about $113,000. The most serious problem occurred on the Arkansas west bank at Tulsa, in a little neighborhood called Garden City --- an aging cluster of low-income homes wedged between the river, refineries, and heavy industry, on land long contaminated by industrial pollution.

River water entered Garden City from a low-point breach in an old, private levee along the river's west bank. In all, about $1.3 million in damages occurred to 14 homes, 11 industrial buildings, and 39 mobile homes. A low scattering of homes --- some just shotgun shacks --- flooded up to the rafters. The toxic, trapped water lingered up for days giving rise to an echo of the 1984 question --- was it wise public policy to rebuild?

1986 program

By the 1986 flood, the 1984 buy-out was still controversial. But the new mayor, Dick Crawford, toured of Garden City and agreed with recommendations by Street Commissioner J.D. Metcalfe that the city should immediately convene another Tulsa Hazard-Mitigation Team and consider whether the response to the 1986 flood could reduce the city's future flood vulnerability.

After weeks of debate, the city agreed to purchase 13 parcels in Garden City, including seven homes. The acquisition program was voluntary. Considerable debate arose over whether to rebuild the breached Garden City levee; ultimately, the city decided it must be rebuilt to provide at least limited protection to extensive industrial areas on the city's west bank.

Recent acquisitions

By the late 1980s, Tulsa's stormwater management program was well into an era of master drainage planning. As part of the implementation of plans, limited floodplain acquisition occurred between 1986 and 1993. In some instances, the acquisitions were a first phase for structural projects, even if no funding was identified for later structural construction. Others were in residual flooding areas, to be preserved in floodplain open space.

Future acquisitions

In 1991 voters approved a line-item $600,000 in a sales tax package specifically for floodplain

acquisition or floodproofing. Subsequently, the city Legal Department held that Oklahoma law did not allow the city to spend public funds on private properties for floodproofing, so the focus of the project shifted back to floodplain acquisition, In 1993, consultant French and Associates completed a draft report outlining criteria for preflood site selection and acquisition priorities. Approval of the report, and subsequent acquisition program design, are pending at this writing.

At least two aspects of this program are significant. First, there was virtually no public discussion of the sales tax allocation, before or after the vote, perhaps signifying public acceptance, at last, of the concept of floodplain acquisition. Second, this ongoing program is testimony that the City of Tulsa has finally institutionalized the idea of floodplain clearance, to be used selectively as one aspect of its multi-faceted flood-hazard mitigation program.

Conclusion

Since the 1980s, Tulsa's stormwater management system (much of it still being built) has not been tested by a massive storm. But a number of moderately large rainfalls have occurred, with few or no major problems.
A Mother's Day 1993 rain, for example, a was comparable to the Mother's Day 1970 storm. In 1970, the community experienced major flooding; in 1993, virtually no damage occurred.

In May of 1993, the Corps again had to release large amounts of water from Keystone Reservoir, this time up to 140,000 cubic feet per second. Although these discharges were half those released during the 1986 flood, they nonetheless carried potential for downstream flooding. Emergency managers evacuated some areas outside the City of Tulsa and battled problems along the Tulsa levee, including several malfunctioning flap gates. This time, however, emergency management and intergovernmental coordination worked well, building on teamwork founded in previous crises, and no serious flood damages occurred.

Other moderate rainstorms have occurred that previously would have caused some flooding in Tulsa --- but the system handled them without major incident. Another significant indicator is that the city has no record of flood damage to any structure built in accord with regulations adopted in the late 1970s. City hydrologists believe Tulsa's flood-damage vulnerability has been much reduced because of its aggressive and comprehensive approach to flood and stormwater management. The city has not attempted to develop any dollar estimate of damages averted.

One things is certain: houses cleared from Tulsa floodplains have not flooded again and will not flood again. Without question, some would have sustained repeated damage if they had not been moved from harm's way.
Tulsa's program has been recognized in several ways.

In 1987 and 1992, Tulsa received top awards from the 500-member Association of State Floodplain Managers, which plans to hold its national convention in Tulsa in 1994.

In 1992, the city's flood program received the nation's highest rating in the National Flood Insurance Program's community rating system --- allowing Tulsans to enjoy the lowest flood insurance rates in the U.S.

In July 1992, FEMA selected Tulsa for its Outstanding Public Service Award because of the city's "significant contributions and distinguished leadership" to the nation in floodplain management. No discussion of this subject would be complete, however, without a warning:

Tulsa will flood again.

Tulsans live in tornado alley, a land of freak storms.

Much of the system is still being built.

And the Tulsa system is largely based on the federal 100-year flood standard. Larger rains --- and flood damages --- will occur.

But, when the inevitable next flood occurs, danger and damage should be lessened because of lessons learned --- the hard way --- in crafting Tulsa's flood-hazard mitigation program.

Boston Globe, Feb. 19, 2006

Flood-zone development said to raise risk

By Andrew Bridges, Associated Press | February 19, 2006

ST. LOUIS -- Concentrated development in flood-prone parts of Missouri, California, and other states has significantly raised the risk of New Orleans-style flooding as people buy new homes even in areas recently deluged, researchers said yesterday.

Around St. Louis, where the Mississippi River lapped at the steps of the Gateway Arch during flooding in 1993, more than 14,000 acres of flood plain have been developed since then. That has reduced the region's ability to store water during future floods and potentially put more people in harm's way, said Adolphus Busch IV, a scion of the Anheuser-Busch brewing family who is chairman of the Great Rivers Habitat Alliance.

Similar development has occurred around Dallas; Kansas City, Mo.; Los Angeles; Omaha; and Sacramento; said Gerald Galloway, a professor of engineering at the University of Maryland.

"The half-life of the memory of a flood is very short. You can already hear it in Washington, D.C.: New Orleans where?" Galloway said of the response to Hurricane Katrina last summer.

The research was presented yesterday at the annual meeting of the American Association for the Advancement of Science.

In California, development in the Sacramento-San Joaquin delta, where flood-control efforts first started in the mid-1800s, represents a major risk to cities such as Stockton as they expand, said Jeffrey Mount, a professor of geology at the University of California, Davis.

"We are reinventing Katrina all over again," Mount said.

Mount estimates a two-in-three probability over the next 50 years of a catastrophic levee failure in the

massive delta region east of San Francisco.

Even a moderate flood could breach the delta's levee system, while a larger one, perhaps after an earthquake, would inundate the region, Mount said.

The Sacramento-San Joaquin delta, which covers 738,000 acres, receives runoff from more than 40 percent of California. Much of the land is below sea level and relies on more than 1,000 miles of levees for protection against flooding, according to the California Department of Water Resources.

"In California, we know that we have two kinds of levees: Those that have failed and those that will fail," Mount said.

The lack of coordination among local, state, and federal officials after a flood was evident with Katrina. Similarly, even before a storm hits, coordination on issues such as land use and development is a problem, Galloway said.

"Local land decisions later result in cries for federal help. Does that make sense? No," Galloway said, adding that the federal flood program was "rudderless."

Nor do efforts to guard against floods automatically reduce risks, said Nicholas Pinter, a professor of geology at Southern Illinois University.

Pinter said as much as 85 percent of the Mississippi in St. Louis is confined behind levees, which have raised flood levels 10 feet to 12 feet higher than they were just a century ago.

That parallels the situation in New Orleans, which suffered catastrophic flooding when levees failed because of Katrina. ■

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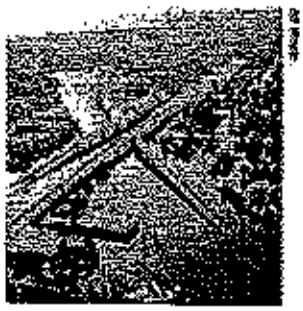
newsVOA.com

1993 Recommendations Could Have Prevented Some Flooding

By Rosanne Skirble , Voice of America
15 September 2005



The enormous devastation from Hurricane Katrina was not totally unexpected. Studies had warned for years that continued development in **floodplains** and watersheds and lack of structural and natural protection would put the Gulf Coast states at greater risk of a catastrophic natural disaster.

In 1993 Gerald Galloway headed a White House task force to study the floods that had inundated the American Midwest that year. The report went beyond the $12 billion disaster along the Mississippi and Missouri rivers, and focused on the vulnerability of people and property in floodplains nationwide.

New Orleans under water from hurricane Katrina

It outlined the importance of a coordinated response among state, local and federal officials and the private sector, and stressed the need to protect and preserve the environment.

Mr. Galloway -- now a professor of engineering at the University of Maryland -- says less than half of the recommendations were acted upon. "Many of the recommendations went into the 'too hard box' and floated in a bureaucratic malaise over the years until the memory of the flood floated away. " The professor adds, "The half-life of memory of a flood is very short. And even with something as disastrous as the Mississippi or New Orleans flood, it won't be long until people have let it slip off of their radar screens."

Mr. Galloway and his team documented the widespread failure to discourage development in floodplains, provide more protection for existing population centers, and protect critical facilities such as hospitals, water treatment plants and fire stations. The study recommended strengthening levees, floodwalls and dams, and encouraging voluntary measures such as flood proofing and relocating homes and businesses.



Two breeches in the Florida Street levee, looking toward the Mississippi River, are shown Tuesday, Aug. 30, 2005, in New Orleans after Hurricane Katrina moved through the area

Mr. Galloway says it also urged the President to revise the outdated Principles and Guidelines for federal water projects, a 22-year old document signed by President Reagan. "It does not include a focus on the social and environmental costs," he says. "And, if we learned one thing from New Orleans -- and we learned the same thing from the Mississippi flood -- the social costs of such a flood in terms of family disruption, in terms of business collapse is tremendous and our 'Principles and Guidelines' need to reflect that. We recommended that environmental quality (including these social goals) be given co-equal status with national economic development."

The Galloway report recognized the critical need to **protect wetlands** which harbor fisheries and migratory birds, help contain rainwater and act as a natural barrier against storm surges. Since 1930, development along the Gulf coast has cost Louisiana 49,000 square kilometers of wetland, a loss which continues at the rate of 62 square kilometers per year.

Mark Davis, Executive Director of the **Coalition to Restore Coastal Louisiana**, says people are at greater risk from extreme weather events when natural protections - like wetlands and barrier islands - are destroyed. He says the payoff for investment in levees and coastline protection is economic resilience.

"We may be beginning to clean up New Orleans and turn on the lights," he says, "but you just have to look at what's happening in Lake Pontchartrain and with the loss of additional storm buffers that it is not just a question of the ecological implications, we now have thousands of fishers and farmers out of work. You are essentially loosing the fabric of communities and an economy, and the ripple effects are not going to stop anytime real soon.

New Orleans is not an isolated case of a city unprepared for disaster. The University of Maryland's Gerald Galloway says some 20,000 communities across the United States are vulnerable including major population centers like, Portland, St. Louis, portions of Seattle, Pittsburgh, Louisville, Memphis, Tucson, Phoenix, Dallas, Sacramento, Baton Rouge, Chicago, Kansas City, Los Angeles, and Orange County, California .

New Orleans is just the latest victim. Professor Galloway says Hurricane Katrina is a wake-up call for the public and private sectors to jointly enact plans that can mitigate the social hardship, environmental damage and economic impact of any future natural disaster.

Flood prevention 11/08

Survey Results - Argus Courier, Nov. 8, 2006

The Argus-Courier is asking people to share their concerns about flooding and opinions about flood prevention.

1. Are you concerned about flooding in Petaluma during the upcoming winter?

VERY CONCERNED	22	46%
SOMEWHAT CONCERNED	14	29%
NOT VERY CONCERNED	6	12%
NOT CONCERNED	5	10%
NOT SURE	1	2%
Total	48	100%

2. Do you think the city is better prepared for flooding this year than it has been in the past?

BETTER PREPARED	12	25%
SAME AS BEFORE	21	44%
LESS PREPARED	10	21%
NOT SURE	5	10%
Total	48	100%

3. Do you think clearing the creeks and dredging the river will significantly reduce the extent of flooding?

YES	19	40%
NO	19	40%
NOT SURE	10	21%
Total	48	100%

4. Do you think the city should work more closely with the Sonoma County Water Agency to develop and implement a regional detention pond holding system to contain and control floodwaters?

YES	27	56%
NO	9	19%
NOT SURE	12	25%
Total	48	100%

5. Do you think the city should construct a terracing system along the Petaluma River and its tributaries to increase the capacity during a major flood event?

YES	13	27%
NO	20	42%
NOT SURE	15	31%
Total	48	100%

6. How much do you believe existing buildings, roads and parking lots in the flood plain have or have not exacerbated flooding?

A LOT	24	50%
A SIGNIFICANT AMOUNT	12	25%
A LITTLE BIT	6	12%

NONE	3	6%
NOT SURE	3	6%
Total	48	100%

7. OPTIONAL COMMENTS. Share any thoughts you have about flooding and flood prevention in Petaluma. (We may reprint your comments, but we will do so anonymously, without using your name, e-mail or phone number.)

24 Responses

end

Tuft, Pamela

From: David Keller [dkeller1@sonic.net]
Sent: Wednesday, February 21, 2007 1:31 AM
To: Tuft, Pamela; CityCouncil; CDD; Mike Kerns
Cc: Rick Savel; John Fitzgerald; Bob Martin
Subject: RE: General Plan DEIR: No Adverse Impact Floodplain Management - ASFPM 2004

To: The City of Petaluma, General Plan and DEIR management, Supervisor Kerns, and Members, Zone 2A:

Please add the following summary as comments on the Petaluma General Plan DEIR, and as a further definition of more effective and comprehensive objectives, policies and programs, which are currently absent from the DEIR and Draft General Plan.

The use of this "No Adverse Impact Floodplain Management" approach by the City of Petaluma and the County of Sonoma will help ensure an integrated management strategy that affects all development in the Petaluma River watershed with far better impacts than what is currently proposed and evaluated in the DEIR.

For example, one strategic policy that should be included within the General Plan and the DEIR is the requirement for Zero-net Increment in Stormwater Runoff, applied to all new development and to significant redeveloped sites upstream of the Downtown Reach of the Petaluma River. The Basin modelling should allow a parcel by parcel analysis of proposed changes and impacts throughout the basin, along with the policies and programs to eliminate off site impacts.

As the onetime Project Manager for the Corps of Engineers' Petaluma River Flood Management Project told the City Council in about 1998, "you will need to make up for past mistakes in flood management in the Petaluma Valley, meaning that just staying neutral in runoff, flood peaks, and floodplain fill is not sufficient: you will have to 'go negative'."

More information about these policies and programs is readily available from the Association of State Floodplain Managers, at http://www.floods.org

David Keller
Petaluma River Council
1327 I St.
Petaluma, CA 94952

'No Adverse Impact' Floodplain Management

Association of State Floodplain Managers, 2004

Background

Flood damages in the United States continue to escalate. From the early 1900's to the year 2000, flood damages in the United States have increased six fold, approaching $6 billion annually. This occurred despite billions of dollars for structural flood control, and other structural and non-structural measures.

We continue to intensify development within watersheds and floodplains, and do it in a manner where flood prone or marginally protected structures are suddenly prone to damages because of the actions of others in and around the floodplain.

Current national floodplain management standards allow for: floodwater to be diverted onto others; channel and overbank conveyance areas to be reduced; essential valley storage to be filled; or velocities changed with little or no regard as to how these changes impact others in the floodplain and watershed. The net result is that through our actions we are intensifying damage potentials in the nation's floodplains. This current course is one that is not equitable to those whose property is impacted, and is a course that has shown to not be economically sustainable.

Over the past 50 years a system has been established that in many locations has substituted local and individual accountability with federal government programs of flood control and disaster assistance of the. While funding for the Corps of Engineers, NRCS and other agencies of the federal government will fluctuate, the pattern of the federal government responding to disasters has become firmly entrenched and will not likely change in the foreseeable future. However, what has changed is how disaster relief impacts other domestic programs.

Ten years ago, when Congress was faced with a large disaster, they would fund the disaster with deficit spending. Today, each time Congress passes a bill to provide disaster supplemental funding for disasters, offsetting cuts in domestic programs must be made. Despite investment theories regarding benefits and costs, our problem has become one of cash flow. Each needless incremental increase in flood damage represents a lost opportunity for support of essential domestic programs of the United States.

Considering the recent emphasis on domestic security and military buildup, the cash flow problem is only going to get worse. At its broadest level, No Adverse Impact floodplain management is about local government taking steps to reduce the drain on national resources, as well as local and state resources. These resources can then be applied to domestic programs enhancing the economy, environment, education and defense. In essence, current floodplain management approaches are only sustainable at the expense of other important programs.

More directly for local governments, No Adverse Impact floodplain management represents a way to prevent worse flooding in your community---right now! While some state and local governments may have abdicated their responsibility, most local governments have simply assumed that the federal approaches are an acceptable standard of care, perhaps not realizing those very approaches could induce additional flooding and damage within their community. Instead, No Adverse Impact offers communities an opportunity to promote responsible floodplain development through community-based decision making. Communities will be able to determine better use of federal and state programs to enhance their proactive initiatives and utilize those programs to their advantage as a community. The No Adverse Impact floodplain management initiative empowers the local community (and its citizens) to build stakeholders at the local level. No Adverse Impact floodplain management is a step towards individual accountability by not increasing flood damages to other properties. No Adverse Impact floodplain management is about local communities being proactive in understanding potential impacts and implementing programs of mitigation before the impacts occur.

No Adverse Impact Floodplain Management Defined

"No Adverse Impact Floodplain Management" is a managing principle that is easy to communicate and from a policy perspective tough to challenge. In essence, ***No Adverse Impact floodplain management is***

where the action of one property owner does not adversely impact the rights of other property owners, as measured by increased flood peaks, flood stage, flood velocity, and erosion and sedimentation. No Adverse impact floodplains could become the default management criteria, unless a community has developed and adopted a comprehensive plan to manage development that identifies acceptable levels of impact, appropriate measures to mitigate those adverse impacts and a plan for implementation. No Adverse Impact could be extended to entire watersheds as a means to promote the use of retention/detention or other techniques to mitigate increased runoff from urban areas.

While the No Adverse Impact approach will result in reduced damages for the 1% chance flood event, its true strength is that it virtually ensures that future development actions which impact the floodplain must be part of a locally adopted plan. This removes the mentality that floodplain management is something imposed by FEMA, and promotes local accountability for developing and implementing a comprehensive strategy and plan for the floodplain. Giving locals the flexibility to adopt comprehensive local management plans, which would be recognized by FEMA and other federal programs as the acceptable management approach in that community, will provide the community with control and support for innovative approaches.

Finally, No Adverse Impact is an approach that makes sense and is the right thing to do. Too often our discussions on development approaches turn into arguments over the range of application and the impact these approaches might have on those who are choosing to encroach into the floodplain. It is time to change and begin managing from the perspective of not inducing additional flood impacts on other properties, giving local communities the ability to manage flood losses through comprehensive local plans.

Conclusion

This central message--- that we are inducing flood damages---has not been communicated effectively, in part due to the floodplain management community as a whole spending too much time debating issues of individual standards while not stepping back and evaluating the broad impact of the range of management approaches throughout the watershed.

Current management systems to reduce flood losses are costly and often allow development that fails to evaluate or mitigate adverse impacts on other properties, both now and in the future.

No Adverse Impact is an approach that will lead to reduced flood losses throughout the nation while promoting and rewarding strong management and mitigation actions at the local level.

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http://www.floods.org/NoAdverseImpact/whitepaper.asp

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PAIGE J. SWARTLEY, ESQ.
104 8th Street # 4
Petaluma CA 94952

415.515.6227
paige@preservationlawyers.com

March 19, 2007

Mayor Pamela Torliatt and Members of the
Petaluma City Council
11 English Street
Petaluma CA 94952

Re: March 19, 2007 City Council Meeting
Agenda Item 7(B): Draft General Plan 2025 and Draft EIR
Sub Area 8:A Lands of Davidon (Scott Ranch), APN 019-120-041

136

Dear Mayor Torliatt and City Councilmembers:

As you know, Petaluma has such a wonderful stock of irreplaceable historic buildings, but it risks losing them to insensitive development. In proposing revisions to the General Plan and in reviewing any proposed projects, the City must do everything it can to identify and preserve all of the cultural resources that make this town such a beautiful and special place.

As a historic preservation professional, I know that demolishing our heritage (including the built environment, cultural landscapes, and archaeological resources) can have numerous negative effects on a town, including the loss of tourism dollars, community character, and civic pride.

I see this every day in my professional and nonprofit roles. I serve on the Board of Trustees of the California Preservation Foundation (the only statewide nonprofit dedicated to the preservation of California's historic resources), and am currently the Northern California Vice President. I also have a master's degree in historic preservation planning and I am an historic preservation and environmental lawyer with the Brandt-Hawley Law Group in Glen Ellen, focusing on compliance with the California Environmental Quality Act (CEQA). Indeed, the City of Petaluma co-sponsored a California Preservation Foundation workshop on CEQA, held in January 2007, and many staff members attended the workshop.

I am writing to you today to encourage you to designate the Scott Ranch as a rural residential property *and* to ensure that the historic and cultural resources on the property are not demolished or moved as part of any future development. Moving the barns is not an acceptable option, because doing so will destroy the historic setting and location and impair the historic integrity that conveys the buildings' significance. The barns are a tangible link to Sonoma County's and Petaluma's agricultural heritage -- a link that is being erased with every agricultural building

that falls to the wrecking ball or to the forces of nature. Everyone who uses D Street to travel between Petaluma and the Coast and Marin County knows and loves these barns.

I fully support the preservation of these important historic barns, and support the designation of the property as rural residential, with an increase in the park acreage. If you have any questions about historic preservation, please do not hesitate to contact me.

Thank you very much.

Sincerely,

Paige J. Swartley

Paige J. Swartley, Esq.

cc: Pamela Tuft (ptuft@ci.petaluma.ca.us)

February 20, 2007

Pamela Tuft
City of Petaluma
General Plan Administration
27 Howard Street
Petaluma, CA 94952

137

Re: Draft Environmental Impact Report for Proposed General Plan

Dear Ms. Tuft:

The following are comments on the draft environmental impact report (DEIR) prepared on the proposed draft general plan. This letter supplements the oral comments I presented at the various Planning Commission and City Council hearings on the DEIR.

The DEIR did not adequately analyze several significant impacts including water supply, land use as explained more specifically below.

1. Water Supply

A

The water supply section of the DEIR does include the necessary information to determine if there is an adequate water supply for development proposed under the general plan. As required by *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova*, 40 Cal. 4th 412 (2007), the DEIR must include the following:

- Sufficient facts to evaluate the pros and cons of supplying the water development under the general plan will need. This analysis is not included.
- An adequate environmental impact analysis for the general plan cannot be limited to the water supply for a part of the development anticipated under the general plan. Impact 3.5-1 states that water supplies may be exceeded by the projected development and the measure to mitigate this impact is to develop a

comprehensive water supply plan. This deferral of information and thus, effectiveness of the mitigation measure, violates CEQA. CEQA's demand for meaningful information is not satisfied by simply stating information will be provided in the future.

- Future water supplies identified and analyzed in an EIR must be reasonably likely to prove available; speculative sources and unrealistic allocations or possibilities do not provide an adequate basis for decision making under CEQA. We are concerned that reliance on the South Transmission Project is a speculative source of water.

- Where a full analysis leaves some uncertainty regarding the availability of anticipated future water sources, CEQA requires some discussion of possible replacement or alternative supply sources, and of the environmental consequences of resorting to those sources. This analysis is not contained in the DEIR.

- CEQA's informational requirements may not be met simply by providing that future development will not proceed if the anticipated water supply for a project fails to materialize. It seems that program/policy 8-P-7 contemplates such an approach. Also, the DEIR acknowledges that there is a projected shortfall of water (an annual demand of 773 million gallons and an ADMM shortfall of 5 mgd (p. 3.5-16). The DEIR then concludes that this shortfall can be met through water conservation and groundwater. There is no evidence that this amount of shortfall can be found in the groundwater or through water conservation measures.

Without this information, it is not possible to understand the extent of the water supply impacts and whether or not they can be mitigated.

2. Land Use B

During the hearings on the DEIR, the Planning Commission and City Council took straw votes to change the proposed land use designations on certain lands. For example, the DEIR analyzed a "mixed use" designation for the DSL site, but the City Council at its meeting on February 20, took a straw vote to change the land use designation to "community commercial." The City Council will reconsider this straw vote at its meeting on March 19. If the DSL site is changed to "community commercial," the DEIR must be revised to analyze all the potential impacts that will result from this change. Similarly, all the land uses that were changed by a straw vote from those contemplated in the draft general plan and analyzed in the DEIR, must be re-analyzed under the newly proposed land use designation.

Thank you for this opportunity to comment.

Very truly yours,

Janice Cader-Thompson

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May 7, 2007

Pamela Tuft
City of Petaluma
11 English Street
P.O. Box 61
Petaluma, CA 94953

Via Facsimile (707) 778-4586

RECEIVED
MAY 08 2007
GP Administration

Re: General Plan Update/Lafferty Ranch

Dear Ms. Tuft:

138

This comment letter is submitted on behalf of the Sonoma Mountain Conservancy. The current version of the Draft Petaluma General Plan 2025 and Draft EIR references Lafferty Ranch as a site for a regional park, including public trail access. Table 6.1-1 includes a reference to a proposed 269 acre "regional park" which we presume to be the Lafferty Ranch. Under the discussion of "regional parks" on page 6-8 of the draft General Plan, the last sentence of the discussion refers to the utilization of Lafferty Ranch as a City owned facility that would provide access to hiking trails on Sonoma Mountain for the greater Sonoma County area. Table 6.1-5 on page 6-9 also refers to the Lafferty Ranch as a proposed "regional park." Last, Goal 6-13 on page 6-16 of the draft General Plan states "Work with the Sonoma County Regional Parks Department to encourage the development of Tolay Lake and Lafferty Ranch as an open space and passive use assets for the residents of Petaluma and southern Sonoma County."

On page 3.3-12 of the draft EIR, it is stated that "The City also recognizes the long term development of two regional parks: The 269 Lafferty Ranch located on Sonoma Mountain (P-15 on Figure 3.3-1) and the 1737 acre Tolay Lake Park..." Page 3.3-14 of the draft EIR also includes a reference to Goal 6-P-13 stating that the City will work with the Sonoma County Regional Parks Department to encourage the development of the Lafferty Ranch as a passive use asset.

The previously prepared Environmental Impact Report for Lafferty Ranch identified traffic safety and fire danger as significant unmitigated impacts. Your General Plan EIR does not identify or even discuss these impacts as significant and unmitigated. Accordingly, if you desire to retain these references to Lafferty as a location for park use or trail use in the General Plan, it would be necessary to recirculate the EIR accompanying the draft General Plan. It is fundamental that the purpose of a general

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plan EIR is to discuss the potential impacts resulting from implementation of the policies being adopted.

It would not be sufficient simply to cross reference the Lafferty EIR in the recirculation process in as much as that EIR did not adequately address, among other things, the significant impacts of sudden oak death syndrome. Enclosed is a synopsis of a recent symposium noting the direct connection between public access and sudden oak death syndrome. Sudden oak death must be further studied as it relates both to the spread of the disease and secondary impacts relating to fire dangers, much of which has been verified since completion of the Lafferty Ranch EIR.

We believe that changing the general plan designation relating to Lafferty Ranch represents the piecemealing of a larger project to open Lafferty for public access. Such piecemealing is contrary to CEQA. Most important, the General Plan EIR is clearly inadequate to support inclusion of Lafferty Ranch as a public access facility.

Unless and until adequate environmental review is completed, all references to Lafferty Ranch for any type of park or trail use must be deleted.

Very truly yours,

LESLIE R. PERRY

LRP:ao
cc: Sonoma Mountain Conservancy

Human Activity and the Spread of *Phytophthora ramorum*

J. Hall Cushman, Sonoma State University, Department of Biology, Rohnert Park, CA, USA, 94928; cushman@sonoma.edu; **Michelle Cooper**, Bodega Marine Laboratory, UC Davis; **Ross Meentemeyer**, University of North Carolina - Charlotte; **Shelly Benson**, USDA Forest Service - Olympic National Forest

Increasing numbers of studies are finding that humans can facilitate the spread of exotic plant species in protected wildlands. Hiking trails commonly serve as conduits for invaders and the number of exotic plant species occurring in protected areas is often correlated positively with visitation rates. Despite such evidence linking human activity to the spread of exotic plants, few studies have addressed this possibility for plant pathogens.

Over the past four years, we have been evaluating the role that humans play in promoting the spread of *P. ramorum* and the disease it causes. Our previous research has suggested that human activity is hastening the spread of *P. ramorum* in northern California's Sonoma County; the pathogen was more commonly found in soil on hiking trails than from soil in adjacent areas off trails; public lands open to recreation had higher proportions of diseased host trees than private lands; and the chance that host trees were infected by *P. ramorum* increased as the density of human populations increased in the surrounding area. Collectively, these data suggest that human activity can inadvertently disperse *P. ramorum* throughout the landscape, further spreading the pathogen into already infected areas and introducing it into previously uninfected areas.

More recently, we have conducted additional studies that further link two forms of human activity - hiking and mountain biking - to the dispersal of *P. ramorum*. First, at a nature preserve in Sonoma County, we have shown that hikers can disperse *P. ramorum* in soil on their shoes at least 60-100 m into areas that lack local sources of inoculum. Second, we found that 5-10 % of the visitors entering a recreational area in Marin County had the pathogen in soil on their shoes and tires, and 20-30 % carried it out with them. Although hikers and mountain bikers did not differ significantly in the capacity to transport *P. ramorum*, there was a trend indicating that during dryer conditions, the higher a person

traveled along a trail, the more likely they were to pick up and transport the pathogen. In addition, although our data suggest that humans can serve as effective dispersal agents, the temporal window for doing so is constrained, as the pathogen could not be cultured from soil on hikers' shoes after 24 hours, although this time was extended to at least 72 hours if the soil on hiking shoes was kept moist. These results suggest that human dispersal of *P. ramorum* may be limited to certain kinds of situations: further spread of the pathogen in already infected areas or instances in which visitors move rapidly from one region to another, especially when hiking shoes or mountain bikes have been stored in moist conditions.

In summary, our research suggests that there may be conflicts between human activities and disease spread, and that efforts to address this epidemic may require aggressive management, which may be logistically and politically challenging to implement.

Dissemination of Aerial and Soilborne *Phytophthoras* by Human Vectors

Joan Webber and Joan Rose, Forest Research, Alice Holt Lodge, Farnham, Surrey, UK, GU10 4LH; joan.webber@forestry.gsi.gov.uk

Two new invasive *Phytophthora* pathogens, *Phytophthora kernoviae* and *P. ramorum*, have recently established in the UK. They are most prevalent in the south west of England in woodland areas where they cause intense episodes of dieback on wild rhododendrons (*Rhododendron ponticum*), but both also cause lethal stem cankers on a range of broadleaf trees. As both these *Phytophthoras* are aerial pathogens their deciduous sporangia, produced on foliage of infected rhododendron and other foliar hosts, are dispersed in mists and rain splash on a local basis. However, patterns of disease spread suggest that vertebrate vectors may also aid the spread of these pathogens over longer distances. Infected rhododendron leaves are quickly shed and incorporated into the dense litter layer and the inoculum they contain appears to persist for months if not years in the litter layer. People and animals frequently walk through these contaminated areas and may pick up infested soil or litter on their feet and transfer it to new sites. A study was therefore set up to analyse how frequently *Phytophthora* could be isolated from the soil or litter attached to people's boots, particularly those walking in woodlands and gardens known to be infested with *P. kernoviae* and/or *P. ramorum*. The study, which started in July 2004 has shown that in total more than 30 % of samples collected from walkers' boots were contaminated with *Phytophthora*. The most commonly occurring species was *P. citricola*, but 10-15 % of the samples contained either *P. ramorum* or *P. kernoviae*. In addition, other species of both aerial and soilborne *Phytophthoras* were also found. The study suggests that human vectors could provide significant pathways for disease spread for quarantine pathogens such as *P. ramorum* and *P. kernoviae* as well as for other aerial and soilborne *Phytophthoras*.

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COUNTY OF SONOMA
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT
2550 Ventura Avenue, Santa Rosa, CA 95403-2829
(707) 565-1900 FAX (707) 565-1103

May 7, 2007

Pamela Tuft;
City of Petaluma
P.O.Box 61
Petaluma, California 94953

139

Re: City General Plan Policy regarding Lafferty Ranch

It has recently come to our attention that the Draft Petaluma General Plan and EIR include background and policy references regarding the City's Lafferty Ranch property. These references essentially support the future use of the property for recreational purposes, either as a regional park or as an "open space and passive use asset". As you know, park and/or trail use of this property has been the subject of some debate in the past. Use of the Lafferty Ranch site for recreational use continues to be an issue for County residents along Sonoma Mountain Road and for the immediate neighbors in the area surrounding the site.

In addition, the triangle that appears on the County General Plan maps does not mean that the Lafferty Ranch property is designated for park or trail use. This designation means only that there is a need for parkland in the general area. For example, the Tolay Park site was found to be consistent with the General Plan on the basis of the same triangle.. Further, the use of the property for a trail is inconsistent with the County General Plan. As noted in our letter to the City of August 25,1997 in response to the City's Notice of Preparation for the Lafferty Ranch Access and Management Plan, the site is not included on the General Plan Trails Map.

The County General Plan fully supports the acquisition and development of additional parkland and trails in the Sonoma Mountain area. The Sonoma County Regional Parks Department is actively planning and developing the Tolay Park site for public recreational use and is preparing the final draft of a Recreation Plan that will address Countywide recreation needs in a comprehensive manner.

As a result, we request that the City General Plan be modified to emphasize more promising regional park and trail opportunities such as Tolay Park and other locations in the Sonoma Mountain area consistent with the forthcoming Recreation Plan. Thank you for your consideration of this request and please feel free to contact me at 565-7381 if you have any questions regarding this matter.

Sincerely,

Greg Carr, Comprehensive Planning Manager

cc: Supervisor Mike Kerns
Pete Parkinson, Director, PRMD
Jennifer Barrett, Deputy Director, PRMD
Mary Burns, Director, Regional Parks Department

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GP Administration

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HERITAGE HOMES OF PETALUMA

MAY 07 2007

May 7, 2007

RECEIVED
MAY 09 2007
GP Administration

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Mike Bierman, City Manager
City of Petaluma
11 English Street
Petaluma, CA 94952

RE: Draft Environmental Impact Report—Draft General Plan 2025

Dear Mr. Bierman:

The board of directors for Heritage Homes of Petaluma has had an opportunity to read the letter written to you on March 22, 2007, by Anthony Veerkamp of the National Trust for Historic Preservation (Western Office).

We are pleased to learn that his recommendations for the Draft General Plan 2025 as stated in **GOAL 3-G-3: Historic Preservation** are in accord with the stated goals and interests of Heritage Homes.

Our board of directors wholeheartedly urges you to consider and adopt the changes Mr. Veerkamp indicated in red in his letter.

Respectfully,

Kit Schlich

Kit Schlich
Past President, 2005–2006

PH: Pamela Tuft

P.O. Box 2152 • Petaluma, CA 94953 • Messages: 707-762-3456 • heritagehomes@widerview.com

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General Plan Comments, May 7, 2007

Marianne Hurley, 15 Howard Street

141

The National Trust for Historic Preservation reviewed the General Plan relative to historic preservation principles, goals, and policies. As the representative of Heritage Homes on the Historic and Cultural Preservation Committee, I want to emphasize and underscore the content of the March 22, 2007 letter that was sent via mail and email by the National Trust to Pamela Tuft. The Board of Directors of Heritage Homes formally endorsed the recommendations in that letter at their April meeting.

1) **Terminology.** The letter recommends consistent terminology commonly used in the historic preservation and archeological fields to clarify the intent of the chapter.

2) **Background.** The letter suggests expanding this section to not only list current historic properties, but to also review the importance preservation plays in maintaining Petaluma's character and identity. Also needed is an expanded historic context that includes identifying property types and patterns of development that have played an important role in the past.

3) Under **3.2, Benefits of Historic Preservation,** an additional bullet item should acknowledge that Historic Preservation is an intrinsically "green" building practice. Likewise, under the Green Building sections, this should be repeated to emphasize that rehabilitation of existing buildings over 50 years old is environmentally friendly and is a sustainable and green approach as opposed to demolition. Additional benefits of historic preservation that bear inclusion in the General Plan include specifics relative to skill levels, business advantages, housing, and tourism.

4) **GOAL 3-G-3.** The letter has offered expanded wording and clarified this goal. ***Identify, recognize, and protect Petaluma's unique and irreplaceable cultural heritage through the development of policies and programs that maintain the character and identity of the community, enhance the quality of the built environment, encourage awareness and appreciation for its history and culture, and contribute to its economic vitality. Ensure that future plans, ordinances, and city programs are complimentary to the historic preservation goals and policies contained within this plan.***

5) **Policies**: Specifics are offered in this letter that include consequences for demolition by neglect, an update the historical survey, incentives for preservation, historic landscapes, etc. All of these are sound preservation recommendations that will support our city's already state guiding principle ..the preservation and enhancement of the city's historic assets ..."

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Thoreson, Karen

From:	Diane Reilly Torres [dreillytorres@sbcglobal.net]
Sent:	Friday, May 11, 2007 10:28 AM
To:	Ban, Michael; Cooper, Claire; General Plan Administration; david@davidrabbitt.com; freitaspr@comcast.net; kpetersonnau@aol.com; mike4pet@aol.com; Pam Torliatt; petalumamike@aol.com; Teresa Barrett
Cc:	csamson@arguscourier.com; cyoung@arguscourier.com; Dave Glass; David Keller; jsanchez@pressdemocrat.com; lreed@swagroup.com; Tuft, Pamela; penngrove@sonic.net; Duiven, Scott; Spence F. Burton; tyoung@pressdemocrat.com; Eckerson, Dean
Subject:	Water Wasters
Attachments:	pat1223375384; pat596867537; pat888071665; pat363966087; pat542020206; 2577283691-CommentGP DEIR+Urban Water Plan.txt

To: Mayor and City Council Members

Instead of sending in my comment I attended last Monday's 3pm City Council meeting for the Urban Water Management Plan public hearing. I was at City Hall until almost 6:30 and had to go home so I submitted these pictures and the attached to Mike Ban. I guess I should of given them to the City Clerk.

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Water Resources & Conservation Director,
General Plan Administrator,
Mayor and City Councilembers

RE: City of Petaluma's 2005 Urban Water Management Plan Comment
and Draft General Plan+DEIR Comment

Per our telephone conversation I am providing you the addresses and my comment for Item 6A on the May 7, 2007 City Council Agenda

In the last two weeks after taking my husband to work (The Stero Co.on Lakeville) I saw the lawns being watered Attached are pictures of our drinking water being wasted by watering the sidewalks, roads and lawns by the City and Business Parks.

It is unfair to expect the residents of this city to conserve more water so it can be wasted in this way. I want to point out that currently the vacancy rate in the Business Parks is 35%. In the new General Plan instead of building more Commercial and Retail on vacant land we should reuse the vacant buildings. The proposed land use map does not allow this and I want this addressed as a comment on the GP+DEIR.

Other cities that seeked and encouraged public input have found that was critical to the plan's success, some reviewed key findings and solicited **input** from the **public** perspective, and guest speakers. If you would like to see more water wasters and hear more of my comments please watch my City Watchdog program Channel 26 Sat 3+9pm and Sun 4+10pm.

Thank you,

Diane Reilly Torres

1155

5/11/2007

Diane Reilly Torres comment GP-DEIR + Urban Water Management Plan

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.

10620 (d) (2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

The City's ordinance or plan should include For customers who knowingly and willfully violate rationing rules and restrictions, that the Department may install a device to restrict flow or discontinue service altogether.

In Santa Cruz The fee for installing a flow restrictor is $ 35.00 and another $35.00 is charged for removal when the matter has been resolved. Reconnection charges
are determined by the size of the meter and range in price from $50.00 for a 5/8 x 3/4 inch
meter to $1,250.00 for a 6 inch meter.

For each of these stages, the percent water consumption reduction goal should be City-wide.
The water consumption of individual water customers should not necessarily be tracked
for a specific percent reduction in water use. For those customers who engage in water
conserving activities or who have homes or businesses already fitted with water conserving
plumbing fixtures and appliances, conservation would be more difficult, and requiring the
same amount of conservation from them as normally non-conserving water customers would
serve as a penalty to those water customers who conserve on their own.

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Tuft, Pamela

From: Diane Reilly Torres [dreillytorres@sbcglobal.net]
Sent: Monday, May 21, 2007 10:05 AM
To: Tuft, Pamela
Cc: ghcart@netzero.net; oldeastpetaluma@yahoo.com
Subject: General Plan DEIR Comment --

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Diane Reilly Torres Comment on the Draft General Plan + DEIR

3-P-113 Require development on sites greater than ¼-acre in size to demonstrate no net increase in peak-day stormwater runoff.
This is lined out and says Move policy to Chapter 8: Water Resources

I can not find this policy in Chapter 8 : Water Resources I did find a 10-29-06 request by the Regency Centers to delete it.

Please put it back in.

I have submitted comments but wish to comment on the proposed Petaluma River Corridor (PRC) set aside for the design and construction of a flood terrace system to allow the River to accommodate a 100-year storm event within a modified River channel.

Goal 8-G-8: Surface Water Management
Provide surface drainage and flood protection facilities to meet the community's needs.

Is developing in the floodplain a community need or is not being flooded a community need? . Please define "community needs"

Policies and Programs:
8-P-28 The area upstream of the Corps weir, and below the confluence of Willowbrook Creek with the Petaluma River, located within the 1989 FEMA floodplain (and any amendments thereto) and adjacent to the Petaluma River, shall include a Petaluma River Corridor (PRC) set aside for the design and construction of a flood terrace system to allow the River to accommodate a 100-year storm event within a modified River channel.

A. The Water Resources and Conservation Department shall work with the Community Development Department, through the project entitlement process, to insure the PRC is implemented at the cost of the development.

Does the project entitlement process include the required permits by other regulated entities? Please identify the agency's and the required permits in order for the City to modify a river channel, by constructing a "flood terrace system".

B. Maintenance, in perpetuity, of the PRC and applicable flood terrace, storm water flow capacity, environmental habitat and public access improvements shall be maintained, through a funding mechanism approved by the City, as a condition of project

entitlement.

8-P-29 Working with the SCWA and the Sonoma County Board of Supervisors, the City shall identify the necessary setbacks for the Willowbrook, Marin and Liberty Creek corridors within the Petaluma
Planning Referral Area to include a Creek Corridor set aside for the design and construction of a flood terrace system to allow the Creeks to accommodate a 100 year storm event within a modified creek
channel.

What agency's require permits for the city to modify a creek channel?What is the design and how will the flood terrace system be constructed?

C. The City shall, in accordance with the XP-SWMM analysis of the Petaluma River corridor, work with the regulatory and advisory agencies and property owners along the River to implement the identified physical improvements to accommodate the 100-year storm event within a modified River channel.

What are the identified physical improvements?

Diane Reilly Torres

Activist's Corner

Northern California River Watch Activist's Blog

« California Supreme Court on CEQA Compliance

State Supreme Court Decision on CEQA and Water

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Dear Friends:

RE: Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova and Sunrise Douglas Property Owners Association et al.
Decision by California Supreme Court, 2/1/07 [attached]

This is an excellent decision, and will help us immensely as we look at CEQA reviews of the upcoming General Plans for Sonoma County and Petaluma, no less for other major development projects being proposed. The impacts of these plans and projects on the long-term health and viability of the Russian and Eel Rivers and their fisheries, and our groundwater resources, must be included in depth in the DEIR. The information presented in the current DEIRs is clearly deficient.

The California Supreme Court has ruled that under CEQA, the provision of water for a new development must look at the impacts over the long term, not just the short term, including the impacts on migratory fish:

"We conclude that while the EIR adequately informed decision makers and the public of the County's plan for near-term provision of water to the development, it failed to do so as to the long-term provision and hence failed to disclose the impacts of providing the necessary supplies in the long term. While the EIR identifies the intended water sources in general terms, it does not clearly and coherently explain, using material properly stated or incorporated in the EIR, how the long-term demand is likely to be met with those sources, the environmental impacts of exploiting those sources, and how those impacts are to be mitigated. On the second issue, we agree with plaintiffs that the Draft EIR must be revised and recirculated for public comment on the newly disclosed potential impact on Cosumnes River fish migration." [pg 2]

"The preparation and circulation of an EIR is more than a set of technical hurdles for agencies and developers to overcome. The EIR's function is to ensure that government officials who decide to build or approve a project do so with a full understanding of the environmental consequences and, equally important, that the public is assured those consequences have been taken into account. (Laurel Heights I, supra, 47 Cal.3d at pp. 391-392.) For the EIR to serve these goals it must present information in such a manner that the foreseeable impacts of pursuing the project can actually be understood and weighed, and the public must be given an adequate opportunity to comment on that presentation before the decision to go forward is made. On the important issues of long-term water supply and impacts on migratory fish, the County's actions in the present case fell short of these standards." [pg 44]

Please take the time to read the full decision.

Please ensure that preparation of the Draft and Final EIRs for the Petaluma General Plan and the Sonoma County General Plan, as well as for all significant new water demanding developments, will meet the standards specified by the California Supreme Court.

It is clear that CEQA review of a project cannot be limited to the near term impacts of a project. The same principle would seem to apply to other basic parts of the infrastructure and our public trust resources.

Congratulations to Steve Volker and the other supporting attorneys on this victory, including Bill Lockyer for the State of California.
The opposing firms included Meyers, Nave, Riback, Silver and Wilson; Remy, Thomas, Moose and Manley; Morrison Foerster and others.

David Keller
Bay Area Director
Friends of the Eel Riverranchocordovaruling.pdf

This entry was posted on Friday, February 9th, 2007 at 12:48 am and is filed under Streams and Wetlands, Groundwater. You can follow any responses to this entry through the RSS 2.0 feed. You can leave a response, or trackback from your own site.

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Mail (will not be published) (required)

Website

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This blog is protected by dr Dave's Spam Karma 2: 135 Spams eaten and counting...

Thoreson, Karen

From: Ellen Bicheler [ellenb@sonic.net]
Sent: Friday, May 11, 2007 3:42 PM
To: ptorliatt@aol.com; Teresa Barrett; David@davidrabbitt.com; KPetersonnau@aol.com; freitaspr@comcast.net; mike4pet@aol.com; petalumamike@aol.com
Cc: General Plan Administration; Petaluma_Tomorrow@yahoogroups.com
Subject: CEQA Alert: Global Warming and the Future of CEQA

Attachments: ATT204043.htm; ATT204044.txt; ATT204045.txt

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ATT204043.htm (15 KB) ATT204044.txt (869 B) ATT204045.txt (848 B)

This will be relevant with regard to our General Plan. Is the proper language in our plan for impacts of global warming?

Ellen Bicheler
ellenb@sonic.net

CEQA

Global Warming And The Future Of CEQA

California's Attorney General has launched an attack that puts global warming at the forefront of controversies under the California Environmental Quality Act. The Attorney General has taken the unusual step of filing a CEQA claim against San Bernardino County for failing to address effects on global warming in its Environmental Impact Report for its General Plan update. The Attorney General's suit, combined with similar claims by environmental groups against other public entities and developers, sends a clear signal that the global warming debate has intersected with the enforcement of California's environmental laws.

Global warming is no longer just a topic for the academic world. In 2006, the California Legislature enacted AB 32, which seeks a 25% reduction in greenhouse gases by 2020. Also in 2006, the California Attorney General filed suit against six automakers, seeking damages related to global warming. More recently, the United States Supreme Court issued a 5-4 decision in *Massachusetts v. Environmental Protection Agency*, which held that the EPA has authority under the Clean Air Act to regulate greenhouse gas emissions from new vehicles.

It was only a matter of time before the issue reached CEQA actions. An early greenhouse gas challenge to a CEQA document came in November 2006. The Center for Biological Diversity filed a lawsuit against the City of Banning, seeking to overturn the approval of a 1500 home development. The suit alleges that the project will result in large emissions of carbon dioxide, a greenhouse gas, because the project will increase vehicle trips, and the EIR prepared for the project fails to analyze those emissions or associated global warming impacts. That case remains pending.

The Center filed a similar lawsuit on April 11, 2007, challenging San Bernardino County's new General Plan. Two days later, the Attorney General also sued. San Bernardino updated its General Plan to accommodate a projected 25% increase in the county's population by the year 2030. The Attorney General contends "despite the enactment of AB 32, the FEIR on the General Plan update . . . makes no attempt to analyze the effects of those [greenhouse gas emission] increases on global warming or the greenhouse gas emissions reductions required by AB 32 . . .". It will take several months before the trial court reaches any decision in the case.

In the short term, agencies and developers can expect lawsuits similar to those filed by the Center and the Attorney General. With no published case directly on point, the parties will seek to establish precedent that will shape California's environmental future. In the long term, many agencies will be finding a way to address greenhouse gas

emissions in their CEQA documents. For the foreseeable future, the legal battles over this issue will be hotly contested.

For furtherinformation, please contact the following attorneys:

Barbara J. Schussman	barbara.schussman@bingham.com	925.975.5319
Geoffrey K. Willis	geoffrey.willis@bingham.com	714.975.0606
Gregory Woodard	gregory.woodard@bingham.com	714.830.0634

Bingham McCutchen's Land Use and Development group is among the largest and most accomplished in the nation.Please visitwww.bingham.comfor more information about our attorneys and our work.

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05.2007

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Thoreson, Karen

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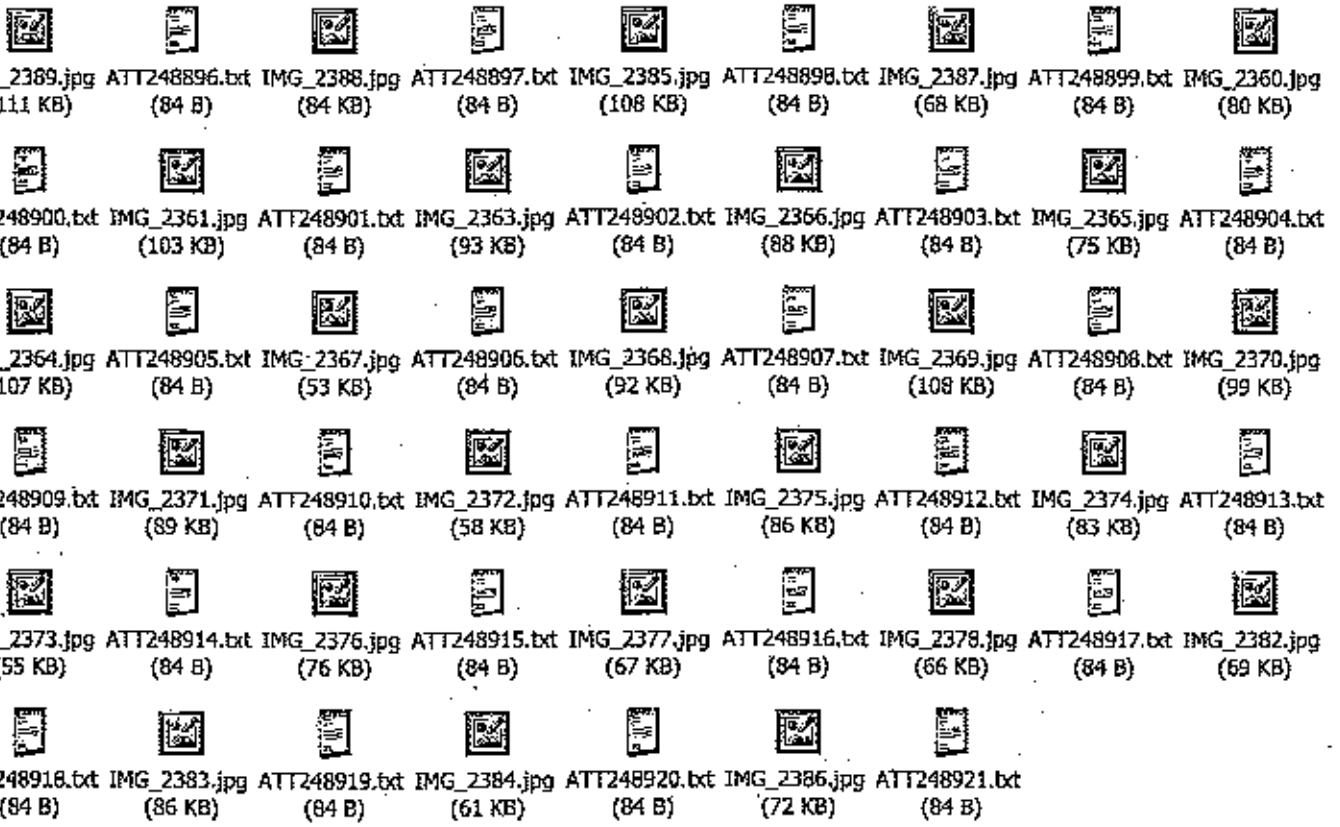
From: Tuft, Pamela on behalf of General Plan Administration
Sent: Monday, May 21, 2007 8:42 AM
To: Thoreson, Karen
Subject: FW: General Plan DSL site photos 2007

Attachments: IMG_2389.jpg; ATT248896.txt; IMG_2388.jpg; ATT248897.txt; IMG_2385.jpg; ATT248898.txt; IMG_2387.jpg; ATT248899.txt; IMG_2360.jpg; ATT248901.txt; IMG_2363.jpg; ATT248902.txt; IMG_2366.jpg; ATT248903.txt; IMG_2365.jpg; ATT248904.txt; IMG_2364.jpg; ATT248905.txt; IMG_2367.jpg; ATT248906.txt; IMG_2368.jpg; ATT248907.txt; IMG_2369.jpg; ATT248908.txt; IMG_2370.jpg; ATT248909.txt; IMG_2371.jpg; ATT248910.txt; IMG_2372.jpg; ATT248911.txt; IMG_2375.jpg; ATT248912.txt; IMG_2374.jpg; ATT248913.txt; IMG_2373.jpg; ATT248914.txt; IMG_2376.jpg; ATT248915.txt; IMG_2377.jpg; ATT248916.txt; IMG_2378.jpg; ATT248917.txt; IMG_2382.jpg; ATT248918.txt; IMG_2383.jpg; ATT248919.txt; IMG_2384.jpg; ATT248920.txt; IMG_2386.jpg; ATT248921.txt

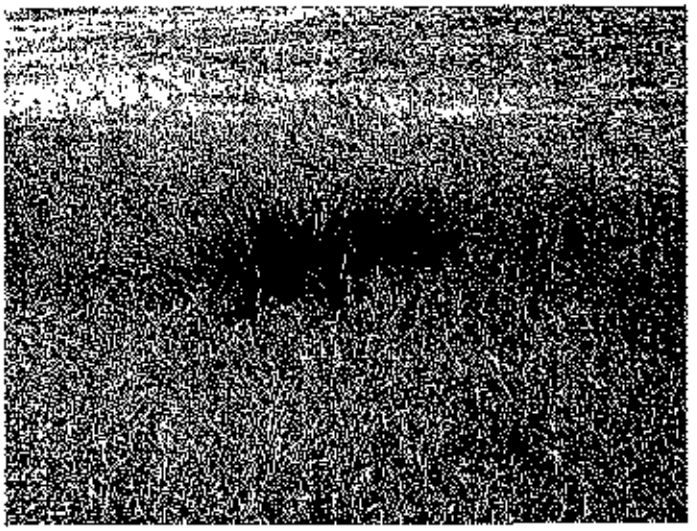


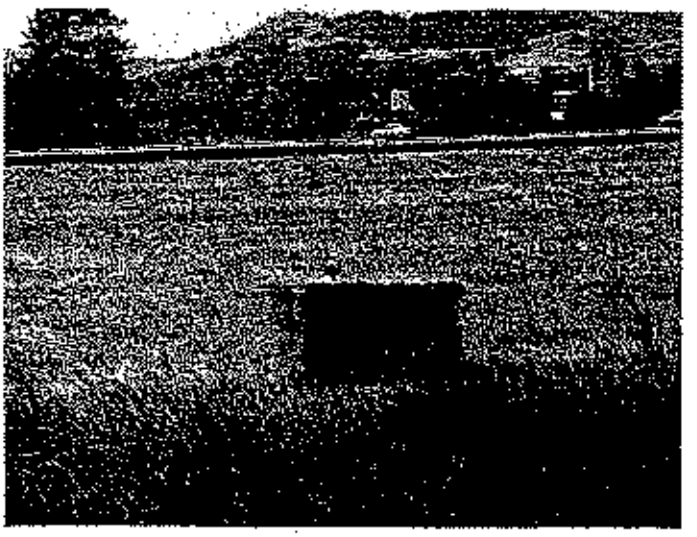
-----Original Message-----
From: Janice Cader-Thompson [mailto:JANICECADER@COMCAST.NET]
Sent: Sunday, May 20, 2007 10:46 PM
To: Tuft, Pamela; Pam Torliatt
Cc: Janice Cader-Thompson
Subject: RE: General Plan DSL site photos 2007

RE: General Plan specifically the DSL site wetlands and habitat.
Please accept my comments and photo's for the General Plan process. I will be sending you photo's from 2007 and 2006.

Pamels, this set of photo's show the wetlands on the DSL site. These photo's were taken on 5/20/07. This is

the second or third year the wetlands have not been plowed. I will be sending you photo's from 2006 of the sit; you can clearly see the wetlands are enlarging and birds are using this area for nesting and or feeding. As I walked this area the smaller brown birds flew out of the wetlands. The Black birds were perched on the taller grasses. For the past three years the farmer who plows the field have stayed out of the wetlands except to cross from the former Grey/Friedman parcels. You can see in the photo's where the tractors crossed through the wetlands. Fish and Game should review these photo's for the General Plan process.







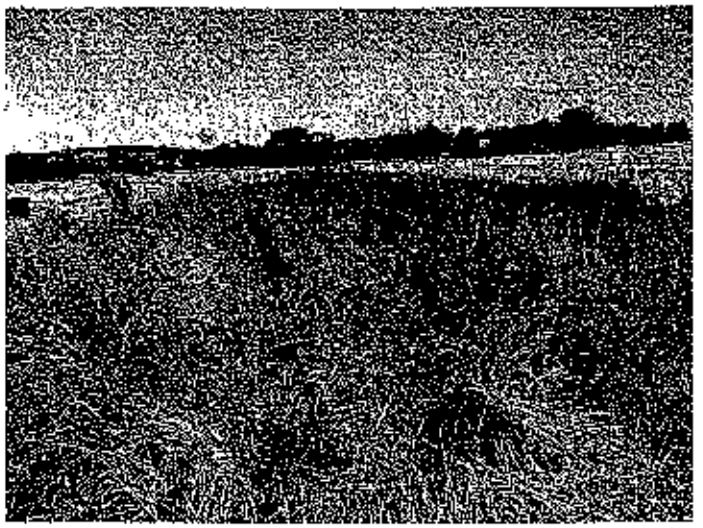












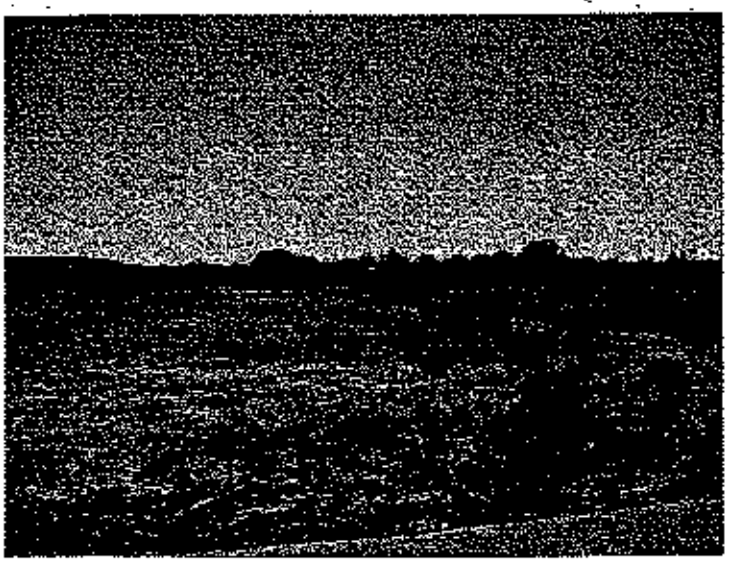


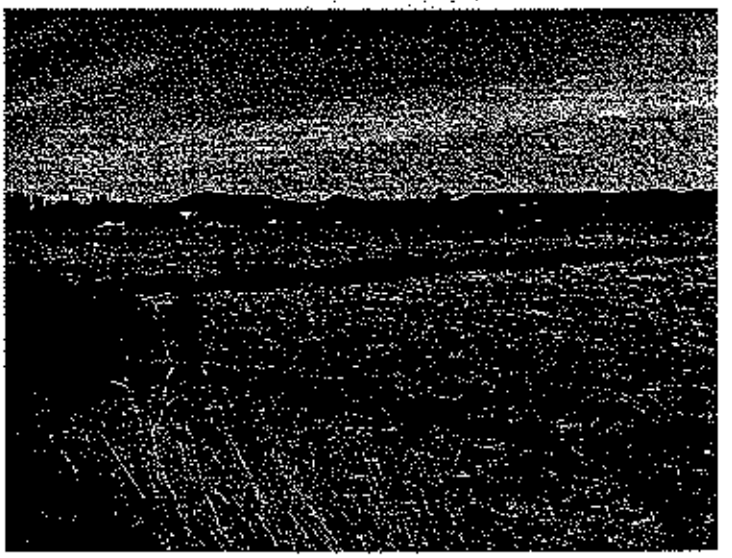
From: Janice Cader-Thompson <JANICECADER@COMCAST.NET>
Date: May 20, 2007 10:54:29 PM PDT
Pamela Tuft <PTUFT@ci.petaluma.ca.us>, Pamela Tuft <PTUFT@ci.petaluma.ca.us>
Janice Cader-Thompson <Janicecader@comcast.net>
Subject: Re: General Plan DSl site 2006 wetland photos

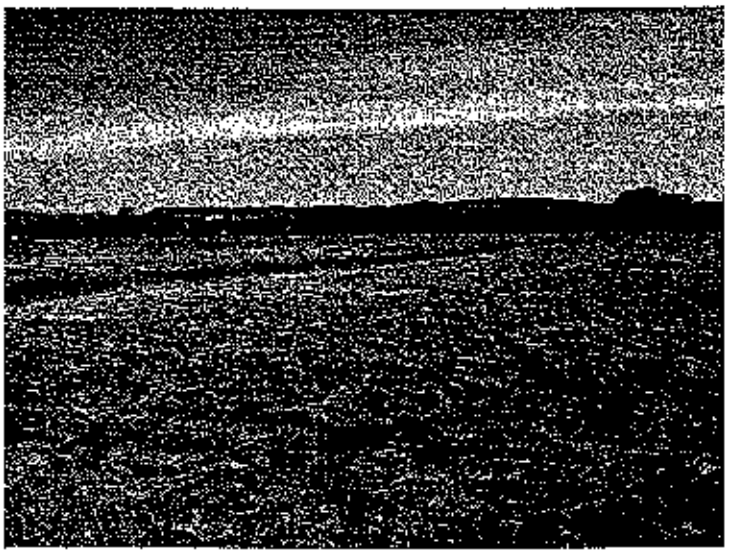
RE: General Plan, DSL site 2006 wetland photo's

Pamels, Please accept the 2006 and 2007 photo's as part of my comments for the General Plan. As you can see the wetlands in the 2006 photo's of the DSL site were much smaller than 2007 photo's of the DSL site. I believe it has been 2 or 3 years since the wetlands have been plowed under. Deer Creek is coming back. I would like reviewed where this water comes from and when the Park Place Subdivision was developed did the developer pipe Deer Creek or what? When this site is developed will this create flooding for the Park Place Subdivision and especially those homes build over Deer Creek?

Janice Cader-Thompson

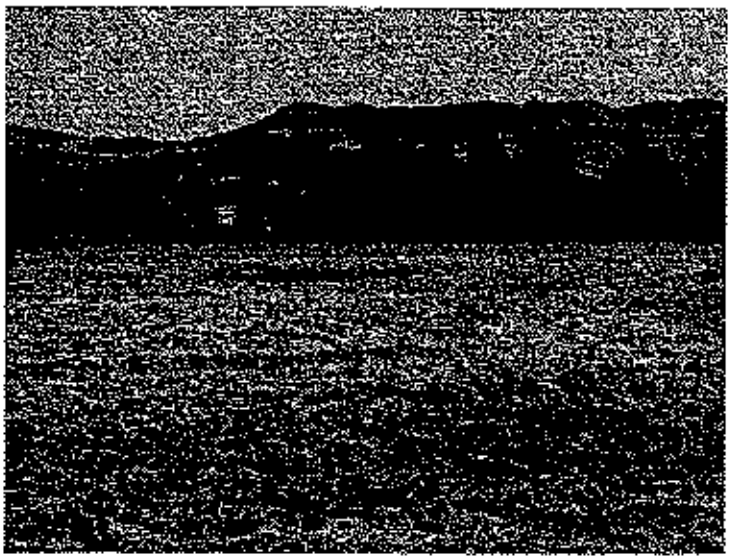




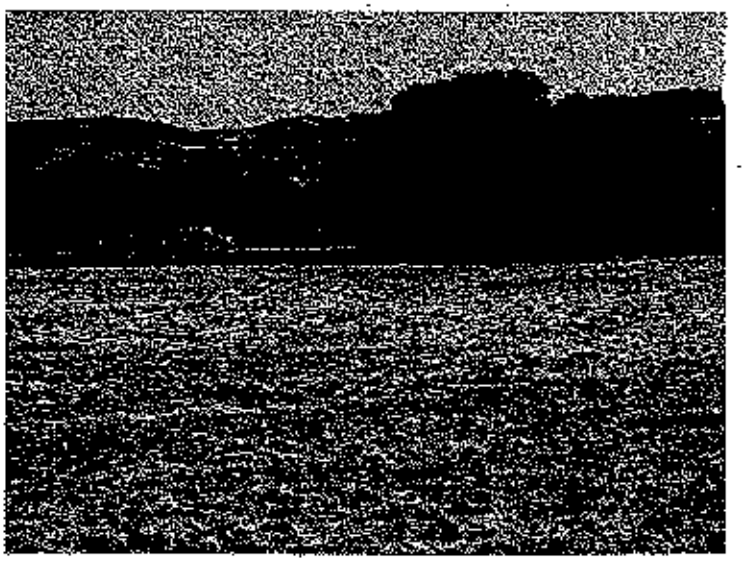








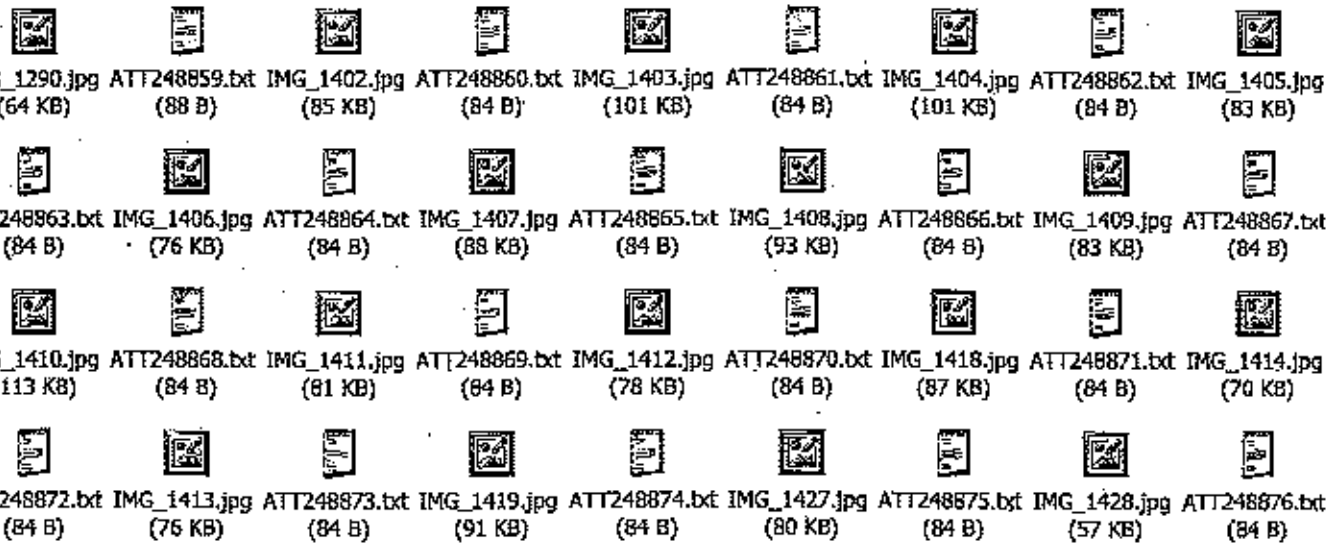




Thoreson, Karen

From: Tuft, Pamela on behalf of General Plan Administration
Sent: Monday, May 21, 2007 8:42 AM
To: Thoreson, Karen
Subject: FW: General Plan DSI site 2006 wetland photos

Attachments: IMG_1290.jpg; ATT248859.txt; IMG_1402.jpg; ATT248860.txt; IMG_1403.jpg; ATT248861.txt; IMG_1404.jpg; ATT248862.txt; IMG_1405.jpg; ATT248863.txt; IMG_1406.jpg; ATT248864.txt; IMG_1407.jpg; ATT248865.txt; IMG_1408.jpg; ATT248866.txt; IMG_1409.jpg; ATT248867.txt; IMG_1410.jpg; ATT248868.txt; IMG_1411.jpg; ATT248869.txt; IMG_1412.jpg; ATT248870.txt; IMG_1418.jpg; ATT248871.txt; IMG_1414.jpg; ATT248872.txt; IMG_1413.jpg; ATT248873.txt; IMG_1419.jpg; ATT248874.txt; IMG_1427.jpg; ATT248875.txt; IMG_1428.jpg; ATT248876.txt



-----Original Message-----
From: Janice Cader-Thompson [mailto:JANICECADER@COMCAST.NET]
Sent: Sunday, May 20, 2007 10:54 PM
To: Tuft, Pamela; Tuft, Pamela
Cc: Janice Cader-Thompson
Subject: Re: General Plan DSI site 2006 wetland photos

RE: General Plan, DSL site 2006 wetland photo's

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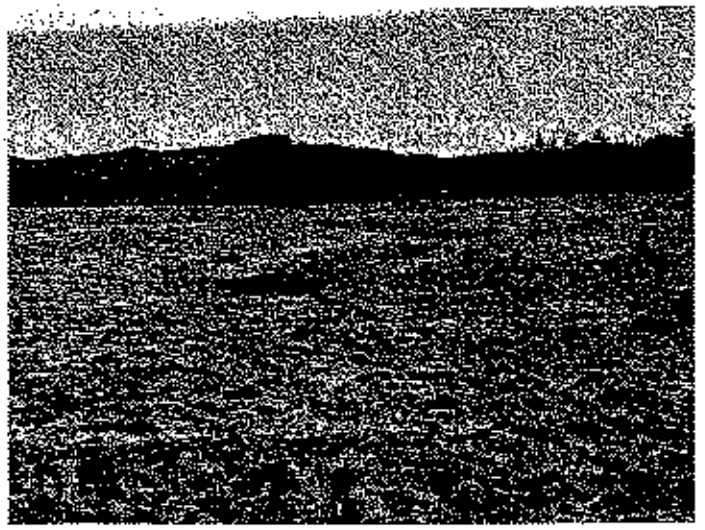
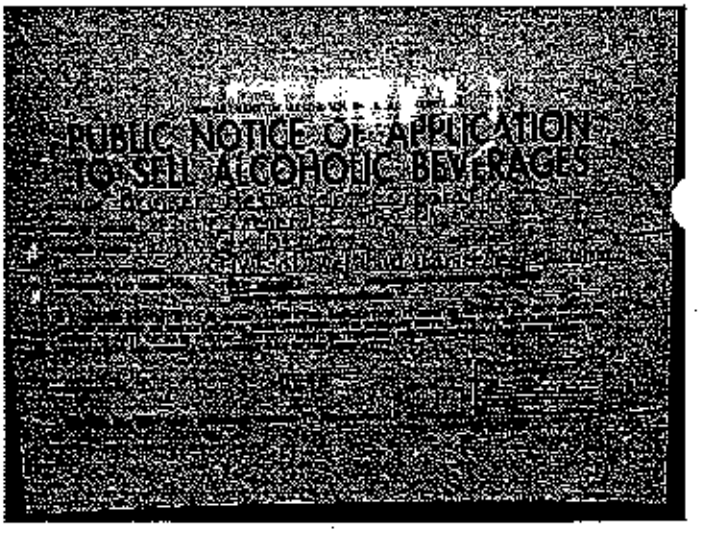
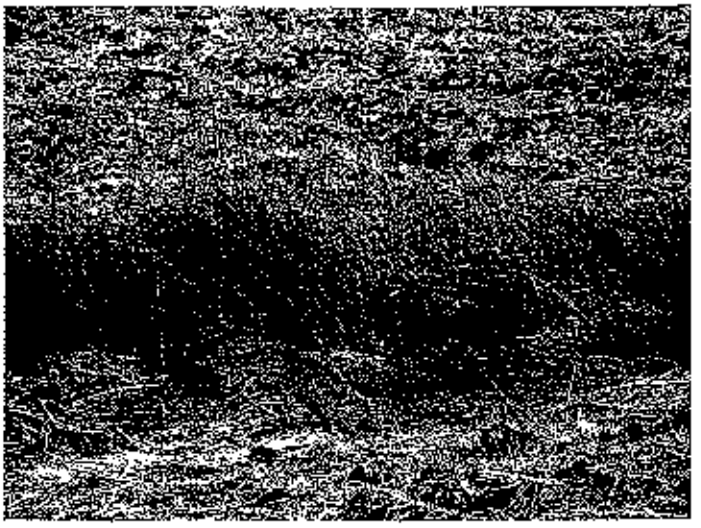
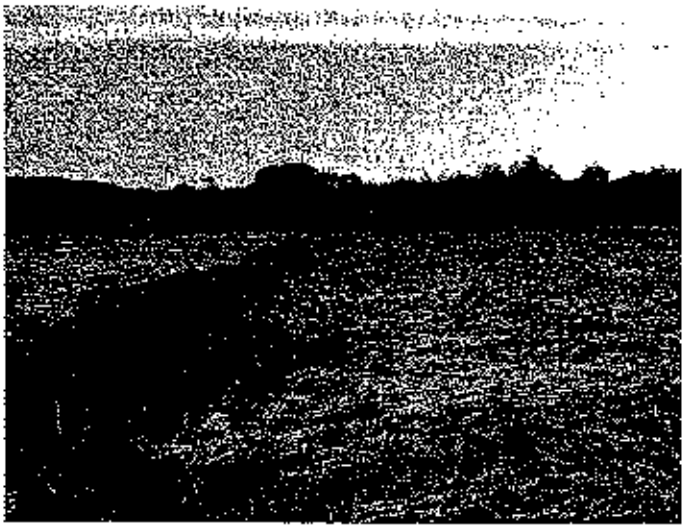



PUBLIC NOTICE OF APPLICATION
TO SELL ALCOHOLIC BEVERAGES













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Tuft, Pamela

147

From:	David Keller [dkeller@eelriver.org]
Sent:	Friday, April 20, 2007 10:46 PM
To:	CityCouncil; CDD; Mike Kerns; Rue Furch; Bob Galser; Tuft, Pamela
Subject:	Recommendations on GHG Emissions Analysis in CEQA Documents
Attachments:	ATT86189.dat

April 20, 2007
Comments for the Public Record, Sonoma County draft General Plan and EIR; Petaluma draft General Plan and DEIR

Please enter the following comment, excerpted information and attached 21 page document to the public comment record for the above documents.

The document, "Recommendations by the Association of Environmental Professionals (AEP) on How to Analyze Greenhouse
Gas Emissions and Global Climate Change in CEQA Documents" by the Association of Environmental Professionals (AEP) offers a roadmap on how to analyze greenhouse gas emissions and global climate change in CEQA documents.

This draft is being circulated by the California Air Resources Board (CARB), the entity who had been charged with much of the implementation of AB32 (the senate bill approved last fall on Greenhouse Gas Reductions).

I believe that this will be helpful in redrafting the respective General Plans and recirculating the DEIRs to more completely and correctly address the many issues that arise in including GHG emissions and global climate change in these important Plans, which is currently omitted from the draft Plans and DEIRs.

Thank you,
David Keller
Bay Area Director
Friends of the Eel River
1327 I St.
Petaluma, CA 94952

Recommendations by the Association of Environmental Professionals (AEP) on How to Analyze Greenhouse Gas Emissions and Global Climate Change in CEQA Documents

Comment Draft: attached to this email for inclusion as comments for the Public Records

March 5, 2007
Principal Authors: Michael Hendrix & Cori Wilson, Michael Brandman Associates
Contributing Authors: Tony Held, Ph.D., Terry Rivasplata, et al., Jones & Stokes

Introduction
The American public and government have recently become concerned about greenhouse gas (GHG)

emissions and their effects on global climate change. In 2006, the State Legislature signed AB 32 which charged the California Air Resources Board (CARB) to develop regulations on how the state would address global climate change (also known as "global warming"). However, the State Attorney General's Office and some environmental groups are already asking individual projects to analyze the impacts on global warming as part of the California Environmental Quality Act (CEQA) process. CARB, the State EPA, the U.S. EPA, or other appropriate governmental organizations have not yet developed guidelines on how to prepare an impact assessment for global climate change.

The Association of Environmental Professionals (AEP) is a state-wide professional group of environmental planners. A primary focus of the AEP is the preparation of CEQA compliance documents such as Negative Declarations and Environmental Impact Reports (EIRs). The AEP has prepared this "White Paper" for consideration by the Governors Office of Planning and Research (OPR) and the California Air Resources Board (CARB). This paper recommends a reasonable interim approach to analyze the impact of individual development and planning projects on GHG emissions and global climate change in CEQA documents until official guidance or regulations are issued by the appropriate agencies. There is an immediate need for this type of guidance because Lead agencies are now being asked to assess a project's significance with regards to global climate change in CEQA documents.

This paper focuses on the evaluation of climate change impacts in CEQA documents that result from typical development-related projects such as private development (residential, commercial, and industrial) and planning programs (Specific Plans, General Plan Updates, etc.). There are many other kinds of actions and projects undertaken or approved by lead agencies that are not addressed in this proposed approach, such as timber harvest plans, water quality management plans, highway improvement projects and others that do not directly contribute to GHG emissions or have complicated interrelationships to GHG balance in the atmosphere.

From the Executive Summary:
The following approach is used to assess the significance of the project's cumulative contribution to global climate change:
1) Inventory: An inventory of greenhouse gas emissions (i.e., carbon dioxide, methane, nitrous oxide) generated by the project will be presented for informational purposes. The inventory will also be compared to the inventory for California and/or the County, when those inventories become available.
2) Compliance with Strategies: Project compliance with the emission reduction strategies contained in the California Climate Action Team's (CCAT) Report to the Governor will be assessed. This report proposes a path to achieve the Governor's greenhouse gas reduction targets. Projects can ensure compliance with strategies by including the incorporating the following design features: vehicle trip reduction strategies; providing multi-modal transportation options; increasing energy efficiency beyond Title 24 requirements; increased recycling; and incorporating green building technology.

Recommendations by the Association of Environmental Professionals (AEP) on How to Analyze Greenhouse Gas Emissions and Global Climate Change in CEQA Documents

Comment Draft

March 5, 2007

Principal Authors: Michael Hendrix & Cori Wilson, Michael Brandman Associates

Contributing Authors: Tony Held, Ph.D., Terry Rivasplata, et al., Jones & Stokes

Introduction

The American public and government have recently become concerned about greenhouse gas (GHG) emissions and their effects on global climate change. In 2006, the State Legislature signed AB 32 which charged the California Air Resources Board (CARB) to develop regulations on how the state would address global climate change (also known as "global warming"). However, the State Attorney General's Office and some environmental groups are already asking individual projects to analyze the impacts on global warming as part of the California Environmental Quality Act (CEQA) process. CARB, the State EPA, the U.S. EPA, or other appropriate governmental organizations have not yet developed guidelines on how to prepare an impact assessment for global climate change.

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This paper focuses on the evaluation of climate change impacts in CEQA documents that result from typical development-related projects such as private development (residential, commercial, and industrial) and planning programs (Specific Plans, General Plan Updates, etc.). There are many other kinds of actions and projects undertaken or approved by lead agencies that are not addressed in this proposed approach, such as timber harvest plans, water quality management plans, highway improvement projects and others that do not directly contribute to GHG emissions or have complicated interrelationships to GHG balance in the atmosphere.

Executive Summary

In California, global climate change is a growing concern that needs to be addressed in CEQA documents. There are currently no published thresholds for measuring the significance of a project's cumulative contribution to global climate change. An individual project does not generate enough greenhouse gas emissions to significantly influence global climate change. Global climate change is a cumulative impact; a project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of greenhouse gases. The following approach is used to assess the significance of the project's cumulative contribution to global climate change:

1) Inventory: An inventory of greenhouse gas emissions (i.e., carbon dioxide, methane, nitrous oxide) generated by the project will be presented for informational purposes. The inventory will also be compared to the inventory for California and/or the County, when those inventories become available.

2) Compliance with Strategies: Project compliance with the emission reduction strategies contained in the California Climate Action Team's (CCAT) Report to the Governor will be assessed. This report proposes a path to achieve the Governor's greenhouse gas reduction targets. Projects can ensure compliance with strategies by including the incorporating the following design features: vehicle trip reduction strategies; providing multi-modal transportation options; increasing energy efficiency beyond Title 24 requirements; increased recycling; and incorporating green building technology.

If a project complies with the State's strategies to reduce greenhouse gases to the levels proposed by the governor, it follows that the project would have a less than significant cumulative impact to global climate change. In addition, projects that cannot comply with CCAT strategies may also be able to reduce their cumulative contributions to GHG emissions to less than significant levels by contributing to available regional, state, national, or international mitigation programs such as reforestation, tree planting, or carbon trading.

Global Climate Change

General Overview

Global climate change alleged to be caused by greenhouse gases (GHG) is currently one of the most important and widely debated scientific, economic, and political issues in the United States. Global climate change is a change in the average weather of the earth, which can be measured by wind patterns, storms, precipitation, and temperature. Historical records have shown that temperature changes have occurred in the past, such as during previous ice ages. Some data indicates that the current temperature record differs from previous climate changes in rate and magnitude.

The United Nations Intergovernmental Panel on Climate Change constructed several emission trajectories of greenhouse gases needed to stabilize global temperatures and climate change impacts. It concluded that a stabilization of greenhouse gases at 400-450 ppm carbon dioxide-equivalent concentration is required to keep global mean warming below 2° Celsius, which is assumed to be necessary to avoid dangerous climate change (IPCC 2001).

Greenhouse Gases

Gases that trap heat in the atmosphere are often called greenhouse gases, analogous to a greenhouse. Greenhouse gases are emitted by natural processes and human activities. The accumulation of greenhouse gases in the atmosphere regulates the earth's temperature. Without these natural greenhouse gases, the Earth's surface would be about 61°F cooler (CA 2006). Emissions from human activities such as electricity production and vehicles have elevated the concentration of these gases in the atmosphere.

Greenhouse gases have varying global warming potential (GWP). The GWP is the potential of a gas or aerosol to trap heat in the atmosphere; it is the "cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas" (EPA 2006a). The reference gas for GWP is carbon dioxide; carbon dioxide has a GWP of one. For example, methane has a GWP of 21, which means that it has a greater global warming effect than carbon dioxide on a molecule per molecule basis. One teragram of carbon dioxide equivalent (Tg CO_2 Eq.) is the emissions of the gas multiplied by the GWP. One teragram is equal to one million metric tons. The carbon dioxide equivalent is a good way to assess emissions because it gives weight to the GWP of the gas. The atmospheric lifetime and GWP of selected greenhouse gases are summarized in Table 1. As shown in the table, GWP ranges from 1 (carbon dioxide) to 23,900 (sulfur hexafluoride).

Table 1: Global Warming Potentials and Atmospheric Lifetimes

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100-year time horizon)
Carbon Dioxide	50 – 200	1
Methane	12 ± 3	21
Nitrous Oxide	120	310
HFC-23	264	11700
HFC-134a	14.6	1300
HFC-152a	1.5	140
PFC: Tetrafluoromethane (CF4)	50000	6500
PFC: Hexafluoroethane (C2F6)	10000	9200
Sulfur Hexafluoride (SF6)	3200	23900
Source: EPA 2006b		

Water vapor is the most abundant, important, and variable greenhouse gas in the atmosphere. It is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. The main source of water vapor is evaporation from the oceans (approximately 85%). Other sources include evaporation from other water bodies, sublimation (change from solid to gas) from ice and snow, and transpiration from plant leaves.

Carbon dioxide (CO_2) is an odorless, colorless natural greenhouse gas. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus;

evaporation from oceans; and volcanic outgassing. Anthropogenic (human caused) sources of carbon dioxide are from burning coal, oil, natural gas, and wood. Concentrations are currently around 370 ppm; some say that concentrations may increase to 540 ppm by 2100 as a direct result of anthropogenic sources (IPCC 2001). Some predict that this will result in an average global temperature rise of at least 2° Celsius (IPPCC 2001).

Methane is a flammable gas and is the main component of natural gas. When one molecule of methane is burned in the presence of oxygen, one molecule of carbon dioxide and two molecules of water are released. There are no health effects from methane. A natural source of methane is from the anaerobic decay of organic matter. Geological deposits known as natural gas fields contain methane, which is extracted for fuel. Other sources are from landfills, fermentation of manure, and cattle.

Nitrous oxide (N_2O), also known as laughing gas, is a colorless greenhouse gas. Higher concentrations can cause dizziness, euphoria, and sometimes slight hallucinations. Nitrous oxide is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is used in rocket engines, as an aerosol spray propellant, and in race cars.

Chlorofluorocarbons (CFCs) are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface). CFCs were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. They destroy stratospheric ozone; therefore their production was stopped as required by the Montreal Protocol.

Hydrofluorocarbons (HFCs) are synthetic man-made chemicals that are used as a substitute for CFCs for automobile air conditioners and refrigerants.

Perfluorocarbons (PFCs) have stable molecular structures and do not break down though the chemical processes in the lower atmosphere. High-energy ultraviolet rays about 60 kilometers above Earth's surface are able to destroy the compounds. PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane and hexafluoroethane. Concentrations of tetrafluoromethane in the atmosphere are over 70 ppt (EPA 2006d). The two main sources of PFCs are primary aluminum production and semiconductor manufacture.

Sulfur hexafluoride (SF6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It also has the highest GWP of any gas evaluated, 23,900. Concentrations in the 1990s were about 4 ppt (EPA 2006d). Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

Ozone is a greenhouse gas; however, unlike the other greenhouse gases, ozone in the troposphere is relatively short-lived and therefore is not global in nature. According to CARB, it is difficult to make an accurate determination of the contribution of ozone precursors (NOx and VOCs) to global warming (CARB 2004b). Therefore, project emissions of ozone precursors would not significantly contribute to global climate change.

Aerosols are particles emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light. Cloud formation can also be affected by aerosols. Sulfate aerosols are emitted when fuel with sulfur in it is burned. Black carbon (or soot) is emitted during bio mass burning incomplete combustion of fossil fuels. Particulate matter regulation has been lowering aerosol concentrations in the United States; however, global concentrations are likely increasing.

International and Federal Legislation

In 1988, the United Nations and the World Meteorological Organization established the Intergovernmental Panel on Climate Change to assess "the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation" (IPCC 2004).

The United States joined other countries around the world in signing the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC was entered on March 21, 1994. Under the Convention, governments: gather and share information on greenhouse gas emissions, national policies, and best practices; launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change (UNFCCC 2007).

The Kyoto Protocol is a treaty made under the UNFCCC. Countries can sign the treaty to demonstrate their commitment to reduce their emissions of greenhouse gases or engage in emissions trading. More than 160 countries, 55% of global emissions, are under the protocol. United States Vice President, Al Gore, symbolically signed the Protocol in 1998. However, in order for the Protocol to be formally adopted, or ratified, it must be adopted by the legislature, which was not done by the Clinton administration. The current President, George W. Bush, has indicated that he does not intend to submit the treaty for ratification.

The Montreal Protocol was originally signed in 1987 and substantially amended in 1990 and 1992. The Montreal Protocol stipulates that the production and consumption of compounds that deplete ozone in the stratosphere--chlorofluorocarbons (CFCs), halons, carbon tetrachloride, and methyl chloroform--were to be phased out by 2000 (2005 for methyl chloroform).

In October 1993, President Clinton announced his Climate Change Action Plan, which had a goal to return greenhouse gas emissions to 1990 levels by the year 2000. This was to be accomplished through 50 initiatives that relied on innovative voluntary partnerships between the private sector and government aimed at producing cost-effective reductions in greenhouse gas emissions.

California Legislation

Although not originally intended to reduce greenhouse gas emissions, California Code of Regulations Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. The latest amendments were made in October 2005. Energy efficient buildings require less electricity. Electricity production by fossil

fuels results in greenhouse gas emissions. Therefore, increased energy efficiency results in decreased greenhouse gas emissions.

California Assembly Bill 1493 (Pavley) enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce greenhouse gases emitted by passenger vehicles and light duty trucks. Regulations adopted by CARB will apply to 2009 and later model year vehicles. CARB estimates that the regulation will reduce climate change emissions from light duty passenger vehicle fleet by an estimated 18% in 2020 and by 27% in 2030 (CARB 2004).

California Governor Arnold Schwarzenegger announced on June 1, 2005 through Executive Order S-3-05, GHG emission reduction targets as follows: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; by 2050, reduce GHG emissions to 80 percent below 1990 levels (CA 2005). Some literature equates these reductions to 11 percent by 2010 and 25 percent by 2020.

The U.S. EPA does not regulate greenhouse gases from motor vehicles. Notwithstanding the lack of U.S. EPA regulation of greenhouse gas emissions, in 2006, the California State Legislature adopted AB 32, the California Global Warming Solutions Act of 2006. AB 32 requires CARB, the State agency charged with regulating statewide air quality, to adopt rules and regulations that would achieve greenhouse gas emissions equivalent to statewide levels in 1990 by 2020. On or before June 30, 2007, CARB is required to publish a list of discrete greenhouse gas emission reduction measures that can be implemented. Emission reductions shall include carbon sequestration projects and best management practices that are technologically feasible and cost-effective. Greenhouse gases as defined under AB 32 include: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

AB 32 requires that by January 1, 2008, the state board shall determine what the statewide greenhouse gas emissions level was in 1990, and approve a statewide greenhouse gas emissions limit that is equivalent to that level, to be achieved by 2020. While the level of 1990 GHG emissions has not yet been approved, other publications indicate that levels varied from 425 to 468 Tg CO_2 Eq. (CEC 2006). In 2004, the emissions were estimated at 492 Tg CO_2 Eq. (CEC 2006). Using the range of 1990 emissions, a reduction of between 5 and 13 percent would be needed to reduce 2004 levels to 1990 levels.

Executive Order S-01-07 was enacted by the Governor on January 18, 2007. Essentially, the order mandates the following: 1) that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020; and 2) that a Low Carbon Fuel Standard ("LCFS") for transportation fuels be established for California.

Inventory

In 2004, total GHG emissions were 20,135 Tg CO_2 Eq., excluding emissions/removals from land use, land use change, and forestry (UNFCCC 2006). In 2004, the U.S. contributed the most GHG emissions (35% of global emissions). In 2004, GHG emissions in the U.S. were 7074.4 Tg CO_2 Eq., which is an increase of 15.8 percent from 1990 emissions (EPA 2006a).

California is a substantial contributor of global greenhouse gases as it is the second largest contributor in the U.S. and the sixteenth largest in the world (CEC 2006). In 2004, California produced 492 Tg

CO_2 Eq. (CEC 2006), which is approximately seven percent of U.S. emissions. The major source of GHG in California is transportation, contributing 41 percent of the state's total GHG emissions (CEC 2006). Electricity generation is the second largest source, contributing 22 percent of the state's GHG emissions.

Health and Other Effects

The potential health effects from global climate change may arise from temperature increases, climate-sensitive diseases, extreme events, and air quality. There may be direct temperature effects through increases in average temperature leading to more extreme heat waves and less extreme cold spells. Those living in warmer climates are likely to experience more stress and heat-related problems (i.e., heat rash and heat stroke). In addition, climate sensitive diseases may increase, such as those spread by mosquitoes and other disease carrying insects. Those diseases include malaria, dengue fever, yellow fever, and encephalitis. Extreme events such as flooding and hurricanes can displace people and agriculture, which would have negative consequences. Drought in some areas may increase, which would decrease water and food availability. Global warming may also contribute to air quality problems from increased frequency of smog and particulate air pollution (EPA 2006c).

California Environmental Quality Act Analysis

CEQA Challenges

The California Environmental Quality Act (CEQA), unlike other single-topic environmental laws, encourages the protection of all aspects of the environment by requiring state and local agencies to prepare multidisciplinary environmental impact analysis and to make decisions based on the analysis regarding the environmental effects of the proposed project (CEQA Guidelines § 15002(a)). To this end, the public and many groups of individuals concerned with the environment have used CEQA to block development projects they see as detrimental to the environment or insist upon additional mitigation to address environmental impacts of a project. CEQA challenges have been used to require analysis of impacts never contemplated by the lead agency or mandated in CEQA. As an example, the Center for Biological Diversity filed a CEQA challenge to the Black Bench Specific Plan project (*Center for Biological Diversity* vs. *City of Banning*) for failure to mitigate GHG emissions. In another case, the Natural Resource Defense Council filed a CEQA challenge to the development of land in the San Joaquin River delta (*Natural Resource Defense Council* vs. *Reclamation Board*) for failure of the EIR to analyze climate change impacts associated with the development. In addition, the State Attorney General is demanding that development projects assess climate change impacts in comments sent by the State Attorney General during the CEQA comment period for large development projects.

Until the passage of AB 32, CEQA documents did not generally evaluate GHG emissions or impacts on global climate change. The primary focus of air pollutant analysis in CEQA documents was the emission of criteria pollutants, or those identified in the state and federal Clean Air Acts as those that were of most concern to the public and government agencies. If any comments were made on a Draft EIR regarding GHG emissions or global warming, the Response to Comments would generally follow along the lines that the project was too small or did not produce GHG emissions, or that the procedures to estimate such emissions were too speculative and beyond the scope of the EIR. With the passage of AB 32, a more detailed analysis of GHG emissions is recommended in CEQA documents.

Analysis of Criteria Pollutants vs. GHG Emissions

Current procedures for estimating emissions of "criteria" pollutants identified in the Clean Air Act have been well established by state and federal agencies for many years (e.g., URBEMIS program developed by the South Coast Air Quality Management District). To the extent practical, the analysis of GHG emissions should be based on current emission inventory models such as the California Air Resource Board's EMFAC 2007 emissions model and U.S. EPA emission factors. Proposed mitigation to reduce greenhouse gas emissions should first emphasize on those measures that also reduce criteria pollutant emissions such as reducing vehicle trips, improving the efficiency of buildings in the project, and restricting idling time when feasible. The project should be evaluated based on GHG emission reduction measures in recent state legislation to determine if the project is consistent with those reduction measures.

CEQA Mandates for Analysis of Impacts

CEQA requires that Lead Agencies inform decision makers and the public about potential significant environmental effects of proposed projects, identify ways that environmental damage can be avoided or reduced, prevent significant, avoidable environmental damage through the use of feasible mitigation measures and/or project alternatives, and disclose to the public the reasons why the Lead Agency approved a project in the manner the agency chose if significant environmental effects are involved (CEQA Guidelines §15002). CEQA also requires Lead Agencies to evaluate potential environmental effects based to the fullest extent possible on scientific and factual data (CEQA Guidelines §15064b). Considering a review of scientific and factual data, the recent adoption of AB 32, and the requirements of CEQA, it is apparent that an analysis of a development project's incremental contribution to global warming impacts is needed in CEQA documents if they are to be legally defensible.

Cumulative vs. Project Specific

Even a very large individual project cannot generate enough greenhouse gas emissions to influence global climate change. A project participates in this potential impact by its incremental contribution combined with the cumulative increase of all other sources of greenhouse gases, which when taken together form global climate change impacts.

Thresholds of Significance

There are currently no published thresholds of significance for measuring the impact of global climate change on or from a project. However, that does not relieve the lead agency of establishing a threshold.

Alternative Approaches to Analysis of Climate Change Impacts

In the absence of regulatory guidance, and prior to the resolution on various legal challenges for global climate change analysis, CEQA documents must address GHG emissions on a base-by-case basis using ad-hoc methods and individual judgment of existing CEQA guidance. The following section explores the various methodologies that could be used in CEQA documents to address global climate change impacts analysis. Options are presented in order of difficulty to implement.

Approach 1: Do not address GHG emissions at all in a CEQA document

This approach is effectively the continuation of the status quo where GHG emissions and global climate change impacts are not mentioned in CEQA documents. Because it is difficult to determine how a proposed project would contribute to climate change and what the overall impacts would be based on that contribution, some lead agencies have determined it to be speculative to attempt to

analyze a project's contribution to climate change. Obviously, this is the easiest approach, but it is likely that the omission of a climate change discussion on a project will result in critical remarks during the comment period and provides a foothold for legal challenge of the project's CEQA review process.

Approach 2: Discuss climate change only qualitatively without a significance determination

This approach would involve a discussion of what global climate is and potential ways the project will participate in the generation of GHG emissions, but does not provide any significance conclusions. Explanations may be added to the discussion about the fact that there is no regulatory guidance or established threshold of significance to compare with project impacts. This approach at least addresses the CEQA requirement for disclosure of potential impacts, but lacks a significance finding.

Approach 3: Discuss climate change qualitatively and determine impacts significant

This approach indicates that all projects are significant with regard to global climate change though it is an improvement upon approaches 1 and 2 in that it describes the impacts and makes a significance conclusion. Also, without offering reasonable mitigation measures and comparing impacts to a threshold, this approach is vulnerable to challenge.

Approach 4: Analyze GHG emissions quantitatively without a significance determination

In this approach, GHG emissions from the project are quantified but are not compared to a quantitative threshold. The level of sophistication has increased and the analysis has the "look and feel" of a standard CEQA air quality analysis used to determine air quality impacts, but lacks an actual significance conclusion. A paragraph may be added describing the lack of an established threshold. While the analysis shows effort toward quantifying emissions, this approach actually has the same vulnerabilities as approach 2 (i.e. lacking a significance determination).

Approach 5: Analyze GHG emissions quantitatively and use "no net carbon increase" as a threshold of significance

This approach would quantify GHG emissions and has a very conservative threshold that must be met requiring significant mitigation. However, this approach would make almost any project's impacts significant with regard to global climate change impacts. This approach favors emissions banking systems such as the Climate Change Registry as mitigation to address impacts as the only way to achieve the "no net carbon increase" is to buy emissions that are produced by the project. There are several problems with this approach. First, it sets the precedent that all projects without mitigation would be significant, which is implied within the threshold. This approach would deemphasize onsite mitigation that would lower GHG emissions through innovative energy conservation design, trip reduction measures, etc. Collectively, it does not make sense to rely on emissions banking systems to provide the bulk of mitigation and not change the way projects are designed. Also, the heavy reliance on emissions banking systems to mitigate project impacts may be problematic. While emissions banking systems may work in theory, it is unlikely that the CEQA document would have enough details about the emission banking system (i.e., the physical improvements and the schedule of when those physical improvements would be implemented). Legally defensible mitigation requires an adequate description of what physically would occur to reduce emissions and when those changes would take place.

Approach 6: Discuss climate change qualitatively and to the fullest extent possible determine GHG emissions quantitatively with significance criteria and mitigation methods

Both qualitative and quantitative approaches in determining significance criteria would be employed in this approach. This approach lends itself to a variety of project types and sizes. For most projects of small to moderate size, GHG emissions could be to some extent quantified, but the analysis would focus on qualitative compliance with the emission reduction strategies contained in the California Climate Action Team's Report to the Governor. This report proposes a path to achieve the GHG reduction targets found in AB 32 and Executive Order S-3-05. While the report and Executive Order S-3-05 does not specifically mention CEQA, they do include a list of various measures that can be employed to achieve the GHG reduction targets. It can be easily argued that proposed projects that implement all appropriate actions listed in the emissions reduction strategies relevant to the proposed project would have a less than significant impact to global climate change. This same type of approach can be used for projects within counties that have an adopted GHG Reduction Plan (currently Marin County is the only one). In cases where quantifying emissions is not reasonable or possible, such as Specific Plans where the development is at a very programmatic approach, this approach could still be used and is defensible.

For projects that have an established emissions inventory (such as cities, counties, or specific plans) the analysis can rely more heavily upon the quantitative analysis by estimating the existing GHG emissions inventory, the past GHG emissions inventory for year 2000, year 1990, and the future year emissions inventory with the project. This approach can then quantitatively show how the project will (or will not) meet the GHG emissions targets (i.e. achieve the year 2000 GHG emissions inventory by year 2010, and the 1990 GHG emissions inventory by year 2020) found in Executive Order S-3-05. The types of projects that can rely upon the quantities of GHG emissions in determining significance is fairly limited, but lend themselves to General Plan updates.

By combining both a qualitative and quantitative approach, the analysis can be tailored to the particular type and size of the project and still provide, to the fullest extent feasible, a comprehensive analysis of global climate change impacts that includes a comparison of significance criteria and mitigation methods. This is the most legally defensible method currently available.

Recommended Climate Change Impact Analysis Process

As discussed earlier, the most defensible method to assess the significance of a project's cumulative contribution to global climate change involves: 1) project compliance with emission reduction strategies, or when available and feasible comparison of emissions inventories; and 2) an inventory of project GHG emissions.

Onsite Mitigation - Compliance with Strategies

Project compliance with the greenhouse gas emission reduction strategies contained in the California Climate Action Team's Report to the Governor will be assessed. If new projects are consistent with those strategies, it follows that the project would not be significantly contributing to a cumulative global climate change impact. To reduce California's greenhouse gas emissions to the levels proposed in Executive Order S-3-05, the California EPA Climate Action Team developed a report that outlines strategies for meeting the Governor's targets. Use of the strategies in the report to determine project consistency are the most appropriate to use at this time because the report "proposes a path to achieve the Governor's targets that will build on voluntary actions of California businesses, local government and community actions, and State incentive and regulatory programs" (CA 2006). AB 32 requires that a list of emission reduction strategies be published to achieve the

goals set out in AB 32. However, until those reduction strategies are published, emission reduction strategies to meet Executive Order S-3-05 will be relied upon.

The strategies are assigned to a responsible agency. The strategies that CARB is to implement over the next two years are summarized in Table 2. Strategies to be implemented by other agencies are summarized in Table 3.

Table 2: California Air Resources Board Greenhouse Gas Emission Reduction Strategies

Strategy	Description of Strategy
Vehicle Climate Change Standards	AB 1493 (Pavley) required the state to develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of climate change emissions emitted by passenger vehicles and light duty trucks. Regulations were adopted by the ARB in September 2004.
Diesel Anti-Idling	In July 2004, the CARB adopted a measure to limit diesel-fueled commercial motor vehicle idling.
Other Light Duty Vehicle Technology	New standards would be adopted to phase in beginning in the 2017 model year
Hydrofluorocarbon Reduction	1) Ban retail sale of HFC in small cans; 2) Require that only low GWP refrigerants be used in new vehicular systems; 3) Adopt specifications for new commercial refrigeration; 4) Add refrigerant leak-tightness to the pass criteria for vehicular Inspection and Maintenance programs; 5) Enforce federal ban on releasing HFCs.
Transportation Refrigeration Units, Off-Road Electrification, Port Electrification	Strategies to reduce emissions from TRUs, increase off-road electrification, and increase use of shore-side/port electrification.
Manure Management	The proposed San Joaquin Valley Rule 4570 will reduce volatile organic compounds from confined animal facilities through implementation of control options.
Alternative Fuels: Biodiesel Blends	CARB would develop regulations to require the use of 1 to 4 percent biodiesel displacement of California diesel fuel.
Alternative Fuels: Ethanol	Increased use of ethanol fuel.
Heavy-Duty Vehicle Emission Reduction Measures	Increased efficiency in the design of heavy duty vehicles and an education program for the heavy duty vehicle sector.
Reduced Venting and Leaks in Oil and Gas Systems	Rule considered for adoption by the Air Pollution Control Districts for improved management practices.
Hydrogen Highway	The California Hydrogen Highway Network (CA H2 Net) is a State initiative to promote the use of hydrogen as a means of diversifying the sources of transportation energy.
Achieve 50% Statewide Recycling Goal	Achieving the State's 50 percent waste diversion mandate as established by the Integrated Waste Management Act of 1989, (AB 939, Sher, Chapter 1095, Statutes of 1989), will reduce climate change emissions associated with energy intensive material extraction and production as well as methane emission from landfills. A diversion rate of 48% has been achieved on a statewide basis.

	Therefore, a 2% additional reduction is needed.
Landfill Methane Capture	Install direct gas use or electricity projects at landfills to capture and use emitted methane.
Zero Waste - High Recycling	Additional recycling beyond the State's 50% recycling goal.
Source: Summarized from CA 2006.	

Table 3: Other California Agency Greenhouse Gas Emission Reduction Strategies

Strategy	Description of Strategy
Department of Forestry	
Urban Forestry	A new statewide goal of planting 5 million trees in urban areas by 2020 would be achieved through the expansion of local urban forestry programs.
Afforestation/Reforestation Projects	Reforestation projects focus on restoring native tree cover on lands that were previously forested and are now covered with other vegetative types.
Department of Water Resources	
Water Use Efficiency	Approximately 19 percent of all electricity, 30 percent of all natural gas, and 88 million gallons of diesel are used to convey, treat, distribute and use water and wastewater. Increasing the efficiency of water transport and reducing water use would reduce greenhouse gas emissions.
Energy Commission (CEC)	
Building Energy Efficiency Standards in Place and in Progress	Public Resources Code 25402 authorizes the CEC to adopt and periodically update its building energy efficiency standards (that apply to newly constructed buildings and additions to and alterations to existing buildings).
Appliance Energy Efficiency Standards in Place and in Progress	Public Resources Code 25402 authorizes the Energy Commission to adopt and periodically update its appliance energy efficiency standards (that apply to devices and equipment using energy that are sold or offered for sale in California).
Cement Manufacturing	Cost-effective reductions to reduce energy consumption and to lower carbon dioxide emissions in the cement industry.
Municipal Utility Strategies	Includes energy efficiency programs, renewable portfolio standard, combined heat and power, and transitioning away from carbon-intensive generation.
Alternative Fuels: non-Petroleum Fuels	Increasing the use of non-petroleum fuels in California's transportation sector, as recommended in the CEC's 2003 and 2005 Integrated Energy Policy Reports.
Business Transportation and Housing	
Measures to Improve Transportation Energy Efficiency	Builds on current efforts to provide a framework for expanded and new initiatives including incentives, tools and information that advance cleaner transportation and reduce climate change emissions.

Strategy	Description of Strategy
Smart Land Use and Intelligent Transportation Systems (ITS)	Smart land use strategies encourage jobs/housing proximity, promote transit-oriented development, and encourage high-density residential/commercial development along transit corridors. ITS is the application of advanced technology systems and management strategies to improve operational efficiency of transportation systems and movement of people, goods and services. Governor Schwarzenegger is finalizing a comprehensive 10-year strategic growth plan with the intent of developing ways to promote, through state investments, incentives and technical assistance, land use, and technology strategies that provide for a prosperous economy, social equity, and a quality environment. Smart land use, demand management, ITS, and value pricing are critical elements in this plan for improving mobility and transportation efficiency. Specific strategies include: promoting jobs/housing proximity and transit-oriented development; encouraging high density residential/commercial development along transit/rail corridor; valuing and congestion pricing; implementing intelligent transportation systems, traveler information/traffic control, incident management; accelerating the development of broadband infrastructure; and comprehensive, integrated, multimodal/intermodal transportation planning.
Department of Food and Agriculture	
Enteric Fermentation	Cattle emit methane from digestion processes. Changes in diet could result in a reduction in emissions.
State and Consumer Services Agency	
Green Buildings Initiative	Green Building Executive Order, S-20-04 (CA 2004), sets a goal of reducing energy use in public and private buildings by 20 percent by the year 2015, as compared with 2003 levels. The Executive Order and related action plan spell out specific actions state agencies are to take with state-owned and -leased buildings. The order and plan also discuss various strategies and incentives to encourage private building owners and operators to achieve the 20 percent target.
Public Utilities Commission (PUC)	
Accelerated Renewable Portfolio Standard (33 percent by 2020)	The Governor has set a goal of achieving 33 percent renewables in the State's resource mix by 2020. The joint PUC/Energy Commission September 2005 Energy Action Plan II (EAP II) adopts the 33 percent goal.
California Solar Initiative	The solar initiative includes installation of 1 million solar roofs or an equivalent 3,000 MW by 2017 on homes and businesses, increased use of solar thermal systems to offset the increasing demand for natural gas, use of advanced metering in solar applications, and creation of a funding source that can provide rebates over 10 years through a declining incentive schedule.

Strategy	Description of Strategy
Investor-Owned Utility	This strategy includes energy efficiency programs, combined heat and power initiative, and electricity sector carbon policy for investor owned utility.
Source: Summarized from CA 2006.	

The preferred approach to reducing a project's impact on global climate change is to incorporate design features into the project that comply with the state's strategies to reduce greenhouse gas emissions. Features that could apply to residential projects are presented in Table 4. Features that could apply to commercial and/or industrial projects are presented in Table 5. Features that could apply to agricultural and select industrial projects are contained in Table 6.

Table 4: Residential Design Features

State Strategy to Reduce Greenhouse Gas Emissions	Project Design Features to Comply With Strategy
Vehicle Climate Change Standards and Other Light Duty Vehicle Technology	These are CARB enforced standards; vehicles that access the project that are required to comply with the standards will comply with the strategy.
Hydrofluorocarbon Reduction	This measure applies to consumer products. When CARB adopts regulations for these reduction measures, any products that the regulations apply to will comply with the measures.
Achieve 50% Statewide Recycling Goal	In multi-family housing, separate recycling and waste receptacles should be planned.
Zero Waste - High Recycling	
Urban Forestry	Trees planted near dwelling units act as insulators from weather thereby decreasing energy requirements. Onsite trees also provide carbon storage.
Afforestation/Reforestation	Clustering residential development to preserve forest/woodland resources, increasing density, and preserving and restoring open space would comply with this strategy.
Water Use Efficiency	Features to increase water use efficiency include use of both potable and non-potable water to the maximum extent practicable and use of low flow appliances (i.e., toilets, shower heads, washing machines, etc).
Building Energy Efficiency	Pursuant to the description of Building Energy Efficiency in Table 3, it is recommended that a project achieve 20 percent reduction in the residential building's combined space heating, cooling and water heating energy compared to the current Title 24 Standards.
Appliance Energy Efficiency	Use of energy efficient appliances (i.e., washer/dryers, refrigerators, stoves, etc.)
Smart Land Use and Intelligent Transportation Systems	Encourage high-density residential and commercial mixed use.
Green Buildings Initiative	Increase energy efficiency 20 percent beyond Title 24 requirements. Use of other green building design (i.e., natural daylighting and on-site renewable, electricity generation)

State Strategy to Reduce Greenhouse Gas Emissions	Project Design Mitigation to Comply with Strategy
California Solar Initiative	Sample Mitigation The applicant shall join the California Energy Commission's New Solar Homes Partnership for this project. The Partnership mandates that a minimum of 50 percent of the residences have solar panels installed. In addition, each appliance provided by the builder must be Energy Star if an Energy Star designation is applicable for that appliance. One of the requirements of the Partnership is selection of one of the following building efficiency options: a) 15 percent reduction in the residential building's combined space heating, cooling and water heating energy compared to the current Title 24 Standards; or b) 35 percent reduction in the residential building's combined space heating, cooling and water heating energy and 40 percent in the residential building's air conditioning energy compared to the current Title 24 Standards.
1) Source: Table 2 and Table 3	

Table 5: Commercial and Industrial Design Features

State Strategy to Reduce Greenhouse Gas Emissions	Project Design Mitigation to Comply with Strategy
Vehicle Climate Change Standards and other Light Duty Vehicle Technology	These are CARB enforced standards; vehicles that access the project that are required to comply with the standards will comply with the strategy.
Diesel Anti-Idling	Signs posted that restrict idling; onsite education for truck drivers regarding health impacts of diesel.
Hydrofluorocarbon Reduction	This measure applies to consumer products. When CARB adopts regulations for these reduction measures, any products that the regulations apply to will comply with the measures.
Transportation Refrigeration Units, Off-Road Electrification, Port Electrification	In projects where TRUs access the site, implement measures to reduce emissions; install electrification in applicable projects (i.e., truck stops, warehouses, etc.)
Heavy-Duty Vehicle Emission Reduction Measures	These are CARB enforced standards; vehicles that access the project that are required to comply with the standards will comply with the strategy.
Achieve 50% Statewide Recycling Goal and Zero Waste - High Recycling	1) Design locations for separate waste and recycling receptacles. 2) Utilize recycled components in the building design.
Urban Forestry	Trees act as insulators from weather thereby decreasing energy requirements. Onsite trees also provide carbon storage.
Afforestation/Reforestation	Increasing density; preserving and restoring open space.
Water Use Efficiency	Features to increase water use efficiency include: use of both potable and non-potable water to the maximum extent practicable; low flow appliances (i.e., toilets, dishwashers, washing machines, etc.); automatic shut off valves for sinks in restrooms; drought resistant landscaping; "Save Water" signs near water faucets.

State Strategy to Reduce Greenhouse Gas Emissions	Project Design Mitigation to Comply with Strategy
Building Energy Efficiency Standards	Increase energy efficiency by 20 percent beyond Title 24 requirements.
Appliance Energy Efficiency	Use of energy efficient appliances
Smart Land Use and Intelligent Transportation Systems	Encourage high-density residential and retail mixed use, infill development, transit oriented design, jobs/housing proximity, alternative forms of transportation, pedestrian friendly design features, etc.
Green Buildings Initiative	Increase energy efficiency 20 percent beyond Title 24 requirements. Use of other green building design (i.e., natural daylighting and on-site renewable, electricity generation)
California Solar Initiative	Encourage solar panels.
1) Source: Table 2 and Table 3	

Table 6: Design Features for Agriculture and Other Land Uses

State Strategy to Reduce Greenhouse Gas Emissions	Project Design Mitigation to Comply with Strategy
Manure Management	San Joaquin Valley: In projects that address confined animal facilities, project design as recommended in proposed Rule 4570 would reduce GHG emissions.
Alternative Fuels: Biodiesel Blends	The use of alternative fuels would be applicable to some industrial and agricultural projects.
Alterative Fuels: Ethanol	
Landfill Methane Capture	Methane capture would be applicable to projects involving landfills.
Cement Manufacturing	Features to reduce emissions would be applicable to projects involving cement manufacturing.
Enteric Fermentation	In agricultural/cattle related projects, design features that reduce emissions would be implemented.

Offsite Mitigation - Established Programs

It may be necessary for some projects to find other ways of reducing their GHG emission impacts other than compliance with onsite CCAT strategies. In those instances, projects could contribute to established regional, state, federal, or international GHG mitigation programs, such as reforestation, planting/replanting, or carbon trading program. Programs that introduce new plants or trees help reduce GHG emissions by absorbing carbon dioxide and producing oxygen. Once the overall carbon dioxide emissions of a project are calculated, a developer could offset their project GHG emissions by making a monetary contribution to a planting program that would provide for the absorption of that amount of GHG emissions over a reasonable period of time (i.e. three to five years).

In addition, the Kyoto Protocol established a number of ways of reducing project-level GHG emissions called Clean Development Mechanisms (CDMs) with approximately 20 different

categories, including: voluntary activities implemented jointly; registry systems; emission trading; and Joint Implementation Programs. The Kyoto Protocol implementation program considered CDMs and Joint Implementation Programs to be most applicable to specific development projects. According to the Union of Concerned Scientists website, the benefits of some CDMs such as carbon sequestration (storing carbon geologically or biologically) or a carbon tax are unknown or overly speculative at this time. However, carbon trading is an already established program that could be a very successful way of mitigating GHG emissions from typical development projects. Carbon trading may be especially beneficial for smaller projects for which it may be difficult to mitigate using design changes for larger projects such as onsite photovoltaic electric production, increased public transit, etc. Carbon trading also compliments market based "cap and trade" options which CARB is considering as one method of mitigating GHG emission impacts within California. With this program, a project could purchase offsets or credits to compensate for its proportion of GHG emissions.

Carbon trading involves paying into established third party programs such as alternative energy projects with proven track records that construct or invest in biomass, wind energy, alternative vehicular fuels, or increased energy efficiency programs. For example, a company called "TerraPass" provides carbon trading schedules for various types of development impacts, mainly housing occupancy and personal vehicle use. It should be noted that most of the following data and examples mainly address carbon dioxide emissions, since those are the most likely GHGs to be generated by development compared to other GHGs (ie., methane, nitrous oxide, hydroflourocarbons, perflourocarbons, and sulphur hexaflouride). For example, the TerraPass website indicates that the installation of compact fluorescent light bulbs instead of incandescent bulbs in a typical residential unit would save 362 pounds per year (ppy) of carbon dioxide, while cleaning the heating and air conditioning ducts and changing the heater filter every six months would save approximately 37.3 ppy of carbon dioxide.

Using the TerraPass website figures as a guide, a typical residential unit generates 7500 ppy of carbon dioxide from utility usage, while vehicular emissions from a personal vehicle driven under "normal" conditions (current average fleet vehicle driven 10,000 miles per year) generates 9,000 ppy of carbon dioxide. Typical TerraPass offsets would be $40 for 7,500 ppy and $45 for 9,000 ppy. If a project were to "pay" a third party to offset these emissions, it would cost approximately $85 per year or $850 per house if averaged over 10 years. The values presented in Table 7 are based on typical estimates from the TerraPass website.

Table 7: Offsite Mitigation Cost

Home Occupancy		Vehicle Use	
Emissions (pounds)	Cost ($)	Emissions (pounds)	Cost ($)
7000	35	6000	30
12000	60	8000	40
20000	100	12000	50
28000	140	20000	80
Source: TerraPass 2007 (www.terrapass.com)			

Project Inventory of Greenhouse Gases

An inventory of greenhouse gas emissions (carbon dioxide, ethane, nitrous oxide) generated by the project will be presented for informational purposes and for full disclosure. The inventory will be compared to the California inventory and/or the County, when they become available.

The emissions are typically estimated in tons per year, which are converted to teragrams of carbon dioxide equivalents (Tg CO_2 Eq.) using the formula: Tg CO_2 Eq. = (tons of gas) x (GWP) x (Tg / 1,000,000). One Tg is equal to one million metric tons. The global warming potential (GWP) for selected gases assessed are located in Table 1. The emissions are also compared with the current inventory for California, the air district, the county, and/or the city, as available.

Most commercial, residential, and industrial projects attract or use motor vehicles. Motor vehicles emit carbon dioxide, methane, and nitrous oxide. URBEMIS2002 currently does not estimate emissions of carbon dioxide. However, URBEMIS2007, which should be released later this year, will estimate emissions of carbon dioxide. In the interim, carbon dioxide from motor vehicles can be manually calculated using emission factors from EMFAC2002 or EMFAC2007, whichever version of EMFAC the air district with jurisdiction over the basin in which the project is located has accepted. Emissions of methane from motor vehicles can also be calculated with EMFAC. There are a couple of different U.S. EPA emission factors available to calculate nitrous oxide and methane emissions from vehicles (EPA 2004, EPA 2004b).

Stationary sources of greenhouse gases should also be estimated. One stationary source is natural gas combustion. URBEMIS2002 includes default natural gas usage rates for residential, industrial, hotel/motel, retail/shopping, and office. Emission factors for natural gas are from the U.S. EPA (EPA 1998).

Air conditioning equipment installation, leakage, and disposal emit a small amount of HFC emissions (EPA 2004c). As mentioned previously, there is a ban for chlorofluorocarbons; therefore, projects will not generate emissions of chlorofluorocarbons. Perfluorocarbons and sulfur hexafluoride are typically used in industrial applications. If the project will involve emissions of perfluorocarbons and/or sulfur hexafluoride, that would need to be identified.

Level of Significance after Mitigation

With the proposed onsite and/or offsite mitigation, the project's cumulative incremental contribution to greenhouse is anticipated to be less than significant.

CEQA Projects Affected by Climate Change Impacts

The impacts of climate change will also affect projects in various ways. Effects of climate change specifically mentioned in AB 32 such as rising sea levels and changes in snow pack should be addressed in CEQA documents as well. However, the extent of climate change impacts at specific locations remains unclear. In the near term, these effects can be described in generally using the language found in AB 32 to describe impacts imposed upon a project. However, it is expected that California agencies will more precisely quantify impacts in various regions of the State. As an example, it is expected that the Department of Water Resources will formalize a list of foreseeable water quality issues associated with various degrees of climate change. Once state government agencies make these lists available, they could be used to more precisely determine to what extent a project is affected by global climate change impacts.

Conclusions

We are currently in a period of transition within the regulatory community with regards to global climate change impact. With the passage of AB 32, the issue of climate change has moved from the scientific speculation into reality. It is anticipated that other states, and eventually the federal government, will pass legislation similar to AB 32.

AB 32 is essentially a roadmap and timeline of how climate change will be addressed in California. Consequently, it does not issue any new explicit regulations or guidelines for environmental review of new projects. However, AB 32 and supporting documents (i.e. Executive Order S-3-05, and the California Climate Action Team's Report to the Governor) give great credence to the argument that climate change should be addressed during the CEQA review process.

Prior to the explicit issuance of new CEQA guidance, it is anticipated that the courts will issue rulings on the need for global climate change impact analysis in determining specific cases. The recommended framework and methodology discussed in this paper can form the basis by which lead agencies can address and evaluate climate change impacts in CEQA.

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Tuft, Pamela

From: Diane Reilly Torres [dreillytorres@sbcglobal.net]
Sent: Monday, May 21, 2007 6:22 PM
To: Tuft, Pamela
Subject: Fwd: FW: Comment Draft GP + DEIR-
Attachments: pat1749570452; pat1438259354

Comment Draft GP + DEIR 148

Why is this not included in the draft gP or DEIR under Water Consevation? A
Diane Reilly Torres

Brian Lee <brianl@scwa.ca.gov> wrote:

> Subject: FW: Smart Controller Rebate Program
> Date: Mon, 14 May 2007 13:40:03 -0700
> From: "Brian Lee" <brianl@scwa.ca.gov>
> To: <dreillytorres@sbcglobal.net>
>
> Sorry. I spelled your name incorrectly the first time.
>
> ---
>
> **From:** Brian Lee
> **Sent:** Monday, May 14, 2007 1:39 PM
> **To:** 'dreilleytorres@sbcglobal.net'; 'teresa4petaluma@comcast.net'
> **Subject:** Smart Controller Rebate Program
>
> Diane,
>
> Thank you for your interest in water conservation. Attached is the information you requested regarding the Smart Irrigation Controller Rebate Program. Petaluma is included in the SCWA materials. NMWD has separate materials. If you have any questions, please do not hesitate to call me.
>
> -Brian
>
> BRIAN LEE
> WATER CONSERVATION SPECIALIST
> SONOMA COUNTY WATER AGENCY
>
> phone | (707) 547-1918
> fax | (707) 524-3782
> email | brianl@scwa.ca.gov
> office | 404 AVIATION BLVD - SANTA ROSA, CA 95403
> mailing address | PO BOX 11628 - SANTA ROSA, CA 95406
> web | www.sonomacountywater.org

Diane Reilly Torres

SONOMA COUNTY WATER AGENCY

Smart Irrigation Controller Rebate Program Rules

A weather-based irrigation controller, or Smart Controller, is an effective technology for reducing water usage outdoors, replacing the standard automatic timer that controls landscape sprinkler systems. Unlike a standard automatic timer that turns water on at set intervals regardless of plant needs, a Smart Controller uses weather data and site information such as plant type and sprinkler system output to adjust watering times and frequency. This provides more efficient watering, reduces water run-off and improves the health of your landscape.

This technology is more expensive than the standard equipment found in most homes today. In order to make this technology more accessible, the Sonoma County Water Agency and your water provider have partnered to provide rebates for the purchase of a Smart Controller. A limited number of rebates are available on a first-come, first-serve basis through June 30, 2007 while funding lasts.

Minimum Requirements:

- Fully operational in-ground irrigation system operated by an automatic sprinkler timer
- At least 1,500sqft of automatically irrigated landscaping
- At least 500sqft of well maintained, automatically irrigated turf grass
- Be a potable water customer of:
  - City of Petaluma
  - City of Rohnert Park
  - City of Sonoma
- Agree to release historical and future water usage data for statistical purposes
- Onsite pre- and post-installation verification
- Smart Controller must be installed and operational at the installation site for at least two (2) years
- Purchase and install a qualified Smart Controller with a minimum of 3 years pre-paid signaling fees
- Install a rain sensor with the Smart Controller (required for businesses, recommended for homes)

Rebate Amount:

	Up to 12 active stations	13 to 24 active stations	25 or more active stations
75% rebate on the purchase price (hardware only)	Up to $300	Up to $700	Up to $1,100
100% rebate on signaling fees (For homes only)	Up to $150	Up to $150	Up to $150

How to Participate:

1. Confirm eligibility by setting up a pre-installation verification. For residents, call the free *Water Smart Home Program* at (707) 547-1910. For businesses, call (707) 547-1918.
2. Read and understand the rebate form. Complete the form.
3. Purchase and install a qualifying Smart Controller (see list of qualifying models).
4. Arrange an onsite post-installation verification by calling (707) 547-1918.
5. Submit the completed application and a copy of the purchase invoice(s)/receipt(s) to the representative during your verification appointment.
6. Please allow 6 to 8 weeks for the rebate check to arrive after your verification appointment.

SONOMA COUNTY WATER AGENCY

Smart Irrigation Controller Rebate Program

List of Qualified Smart Controller Models:

ETwater – All models
100 Tamal Plaza, Suite 250
Corte Madera, CA 94925
www.etwater.com
1-800-438-3400

HydroPoint Data Systems – All WeatherTRAK models
1726 Corporate Cir
Petaluma, CA 94954
www.hydropoint.com
Contact: Sharon Connelly (707) 285-3251

Irritrol – All Smart Dial Series models
www.irritrol.com/controllers/smartdial.html

Local Distributors:

Harmony Farm & Supply
3244 Gravenstein Hwy
Sebastopol, CA 95472
(707) 823-9125
info@harmonyfarm.com

John Deere Landscape
180 Sebastopol Rd
Santa Rosa, CA 95407
(707) 526-1171

Watersavers Irrigation, Inc.
1004 Lakeville St
Petaluma, CA 94952
(707) 763-5415

Toro – All Intelli-Sense Series models
http://www.toro.com/irrigation/res/smturfcont/Intelli/Index.html

Local Distributors:

Ewing Irrigation
550 Irwin St
San Rafael, CA 94901
(415) 457-9530

Learn more:
Visit the Irrigation Association at ***http://www.irrigation.org/SWAT*** to learn more about Smart Controllers and irrigation systems and principals to help you water your landscape efficiently.

Disclaimer:
This list is subject to change. The Sonoma County Water Agency and participating water utilities do not endorse or warrant the performance of any product listed above. Installation of any of these products does not guarantee water savings.

SONOMA COUNTY WATER AGENCY

Smart Irrigation Controller Rebate Program

Customer Number

Property Owner Information

Name (first, last)		
Address		
City	Zip Code	Phone
Mailing Address (if different)		
City	Zip Code	Phone
Type of Building (home, apt. complex, office, etc.)	Year Constructed	Years at Site
Number of Bathrooms	Num of Residents	☐ Own ☐ Rent
Water Provider	Water Account Number	
Total Lot Area	Total Irrigated Area	
Total Irrigated Turf Area	Total Irrigated Non-Turf Area	

For Office Use Only

Appointment Date/Time:
Cross Street
Arrival Time / Departure Time
No Show / Cancellation / Rescheduled
Advisor
Special Requests / Notes / Instructions
Landscape Health ☐ Above Avg ☐ Average ☐ Below Avg
WSHP Customer Number

Smart Irrigation Controller Information

Make	Purchase Price $
Model	Signaling Service Period ☐ 3 years (minimum)
Serial Number	Signaling Fee Paid $
Rain Sensor Make/Model (Required for Businesses, Optional for Residents)	Number of Active Stations
Installation (Who installed the controller?) Check one. ☐ Self ☐ Landscape Professional ☐ Other _____	
Smart Controller Programming (Who programmed the controller?) Check all that apply. ☐ Self ☐ Landscape Professional ☐ Other _____	Form ET-Program-rel 04/09

I am the owner of the above described property. In exchange for rebating to me certain costs specified in the Smart Irrigation Controller Program Rules, I agree to install, maintain, and manage the use of the Smart Irrigation Controller (Smart Controller) for a minimum of two (2) years. During this two-year period, I agree to allow Sonoma County Water Agency and Water Provider staff to monitor my water usage through billing data. I also give the Sonoma County Water Agency and Water Provider permission to enter and to be on my property for the purpose of conducting the mandatory installation verification and reviewing and/or modifying the Smart Controller programming. I agree that participation in this program does not exempt me from any water use ordinances that may become or are already in effect, including imposed landscape watering restrictions during periods of drought. I, the property owner am responsible for complying with all ordinances and restrictions.

I agree on behalf of myself, and my heirs, executors, legal representatives, and assigns, to release, defend, indemnify, protect, and hold harmless the Sonoma County Water Agency (SCWA) and Water Provider, their agents, officers, and employees, from and against any and all costs or expenses, including attorneys' fees, and all claims asserted or liability established for costs or expenses including attorneys' fees, and/or damages or injuries to any persons or property, or from conditions on my property arising out of or in connection with the Smart Irrigation Controller Rebate Program; provided, however, that my duty to indemnify and hold harmless shall not include any liability arising from the established sole negligence or willful misconduct of SCWA or Water Provider, their agents, officers or employees, in performing the above described work or services for me.

I agree that SCWA and Water Provider have the right to deny any application for the following two reasons: (1) SCWA and/or Water Provider lack sufficient funds to honor the rebate, or (2) the rebate application does not meet all program requirements as specified in the Rebate Program Rules. I have read, understand and agree to the terms and conditions above and as specified in the Program Rules in the program description included as part of this application.

Name (Print) _____ Signature _____ Date _____

SONOMA COUNTY WATER AGENCY

Smart Irrigation Controller Rebate Program

A weather-based irrigation controller, or Smart Controller, is an effective technology for reducing water usage outdoors, replacing the standard automatic timer that controls landscape sprinkler systems. Unlike a standard automatic timer that turns on the water at set intervals regardless of plant needs, a Smart Controller uses weather data and site information such as plant type and sprinkler system output to adjust watering times and frequency. This provides more efficient watering, reduces water run-off and improves the health of your landscape.

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- At least 1,500sqft of automatically irrigated landscaping
- At least 500sqft of well maintained, automatically irrigated turf grass
- Be a potable water customer of the North Marin Water District
- Agree to release historical and future water usage data for statistical purposes
- Onsite pre- and post-installation verification
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SONOMA COUNTY WATER AGENCY

Smart Irrigation Controller Rebate Program

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www.hydropoint.com
Contact: Sharon Connelly (707) 285-3251

Irritrol – All Smart Dial Series models
www.irritrol.com/controllers/smartdial.html

Local Distributors:

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Sebastopol, CA 95472
(707) 823-9125
info@harmonyfarm.com

John Deere Landscape
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Santa Rosa, CA 95407
(707) 526-1171

Watersavers Irrigation, Inc.
1004 Lakeville St
Petaluma, CA 94952
(707) 763-5415

Toro – All Intelli-Sense Series models
http://www.toro.com/irrigation/res/smturfcont/intelli/index.html

Local Distributors:

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550 Irwin St
San Rafael, CA 94901
(415) 457-9530

Learn more:
Visit the Irrigation Association at ***http://www.irrigation.org/SWAT*** to learn more about Smart Controllers and irrigation systems and principals to help you water your landscape efficiently.

Disclaimer:
This list is subject to change. The Sonoma County Water Agency and North Marin Water District do not endorse or warrant the performance of any product listed above. Installation of any of these products does not guarantee water savings.

SONOMA COUNTY WATER AGENCY

Smart Irrigation Controller Rebate Program

Customer Number

Property Owner Information			For Office Use Only
Name (first, last)			Appointment Date/Time:
Address			Cross Street
City Novato	Zip Code	Phone	Arrival Time / Departure Time
Mailing Address (if different)			No Show / Cancellation / Rescheduled
City	Zip Code	Phone	Advisor
Type of Building (home, apt. complex, office, etc.)	Year Constructed	Years at Site	Special Requests / Notes / Instructions
Number of Bathrooms	Num of Residents	☐ Own ☐ Rent	
Water Provider North Marin Water District	Water Account Number		
Total Lot Area	Total Irrigated Area		Landscape Health ☐ Above Avg ☐ Average ☐ Below Avg
Total Irrigated Turf Area	Total Irrigated Non-Turf Area		WSHP Customer Number

Smart Irrigation Controller Information	
Make	Purchase Price $
Model	Signaling Service Period ☐ 3 years (required for rebate)
Serial Number	Signaling Fee Paid $
Rain Sensor Make/Model (required for Businesses, optional for Residents)	Number of Active Stations
Installation (Who installed the controller?) Check one. ☐ Self ☐ Landscape Professional ☐ Other _____	
Smart Controller Programming (Who programmed the controller?) Check all that apply. ☐ Self ☐ Landscape Professional ☐ Other _____	Form ET NMWD 03/11

I am the owner of the above described property. In exchange for rebating to me certain costs specified in the Smart Irrigation Controller Program Rules, I agree to install, maintain, and manage the use of the Smart Irrigation Controller (Smart Controller) for a minimum of two (2) years. During this two-year period, I agree to allow Sonoma County Water Agency (SCWA) and North Marin Water District (NMWD) staff to monitor my water usage through billing data. I also give the SCWA and NMWD permission to enter and to be on my property for the purpose of conducting the mandatory installation verification and reviewing and/or modifying the Smart Controller programming. I agree that participation in this program does not exempt me from any water use ordinances that may become or are already in effect, including imposed landscape watering restrictions during periods of drought. I, the property owner am responsible for complying with all ordinances and restrictions.

I agree on behalf of myself, and my heirs, executors, legal representatives, and assigns, to release, defend, indemnify, protect, and hold harmless SCWA and NMWD, their agents, officers, and employees, from and against any and all costs or expenses, including attorneys' fees, and all claims asserted or liability established for costs or expenses including attorneys' fees, and/or damages or injuries to any persons or property, or from conditions on my property arising out of or in connection with the Smart Irrigation Controller Rebate Program; provided, however, that my duty to indemnify and hold harmless shall not include any liability arising from the established sole negligence or willful misconduct of SCWA or NMWD, their agents, officers or employees, in performing the above described work or services for me.

I agree that SCWA and NMWD have the right to deny any application for the following two reasons: (1) SCWA and/or NMWD lack sufficient funds to honor the rebate, or (2) the rebate application does not meet all program requirements as specified in the Rebate Program Rules. I have read, understand and agree to the terms and conditions above and as specified in the Program Rules in the program description included as part of this application.

Name (Print) _____ Signature _____ Date _____

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Tuft, Pamela

Also presented verbally to Council 5/21/07

From: Diane Reilly Torres [dreillytorres@sbcglobal.net]
Sent: Monday, May 21, 2007 6:50 PM
To: Tuft, Pamela
Subject: Fwd: Comment Draft GP + DEIR
Attachments: pat917897962; pat150136863

COMMENT ON DRAFT GP + DEIR

B

California Gov Code Sec 65302(a) requires the Land Use Element in a General Plan identify areas covered by the plan which are subject to flooding. Neither the Draft General Plan Land Use Element or Land Use Map identify areas that are subject to flooding. This must be done and until the FEMA map is updated you must include it in the General Plan.

Chapter 2. Land Use, Growth Management, and the Built Environment. This Element provides the physical framework for development in the city. It establishes policies related to the location and intensity of new development, and citywide land use policies.

Vacant land and development/redevelopment potential also exists along the Petaluma River corridor. Much of the land area north of Payran Street between Petaluma Boulevard North and Highway 101 has not yet developed.
Should floodplain improvements permanently reduce development constraints, these parcels could provide significant infill and public amenity opportunities within the General Plan timeframe. Will they be developed?

The land use framework of the General Plan is illustrated on the Land Use Map (Figure 2-1).

Under the Park and Open Space classification Floodway is defined as, Floodway delineates the channel of the Petaluma River or other watercourse and the adjacent land areas that must be reserved in order to discharge the "base flood" without cumulatively increasing the water surface elevation more than one foot. No new development is allowed. The boundary of the Floodway is determined by the Federal Emergency Management Agency's (FEMA)
California Gov Code Sec 65302(a) requires the Land Use Element in a General Plan identify areas covered by the plan which are subject to flooding not masqueraded under a different name such as Petaluma River Corridor as open space in the Park Element.

Flood Insurance Rate Maps (FIRM); amendments to the FIRMs will be subsequently reflected on the City's General Plan Land Use Map. The Petaluma River Access and Enhancement Plan (adopted 1996) and the future Surface Water Master Plan address the Floodway and Floodplain areas in greater detail than the General Plan.California Gov Code Sec 65302(a) requires the Land Use Element in a General Plan identify areas covered by the plan which are subject to flooding not in an Area Plan that has no EIR or in a future Master Plan.

The Overlays classification list:
Floodplain. The Floodplain represents lands subject to periodic inundation in a 100-year storm event, as defined by the FEMA Flood Insurance Rate Maps. The Floodplain delineation is intended as an overlay for informational purposes and to distinguish properties subject to

regulations outlined in the Development Code. and
Petaluma River Corridor. Areas determined to be needed for the implementation of the adopted Petaluma River Access and Enhancement Plan (1996) and to provide for future floodplain management projects. Development potential may be transferable, subject to other applicable policies and regulations.with

The requirements of this section shall apply to charter cities.

California Government Code Section 65302.

The general plan shall consist of a statement of development policies and shall include a diagram or diagrams and text setting forth objectives, principles, standards, and plan proposals. The plan shall include the following elements:

(a) A land use element that designates the proposed general distribution and general location and extent of the uses of the land for housing, business, industry, open space, including agriculture, natural resources, recreation, and enjoyment of scenic beauty, education, public buildings and grounds, solid and liquid waste disposal facilities, and other categories of public and private uses of land. The land use element shall include a statement of the standards of population density and building intensity recommended for the various districts and other territory covered by the plan.

The land use element shall identify areas covered by the plan which are subject to flooding and shall be reviewed annually with respect to those areas.

(b) A circulation element consisting of the general location and extent of existing and proposed major thoroughfares, transportation routes, terminals, any military airports and ports, and other local public utilities and facilities, all correlated with the land use element of the plan.

THE DRAFT GP + DEIR DOES NOT HAVE HAVE THIS. WHY?

(g) A safety element for the protection of the community from any unreasonable risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche, and dam failure; slope instability leading to mudslides and landslides; subsidence, liquefaction and other seismic hazards identified pursuant to Chapter 7.8 (commencing with Section 2690) of Division 2 of the Public Resources Code,

and other geologic hazards known to the legislative body; flooding; and wild land and urban fires. The safety element shall include mapping of known seismic and other geologic hazards. It shall also address evacuation routes, military installations, peakload water supply requirements, and minimum road widths and clearances around structures, as those items relate to identified fire and geologic hazards.

On 4-2-2007 the Petaluma City Council passed the following that was on their consent calender, so the City could obtain FEMA funds

H. Resolution 2007-057 N.C.S. to Approve Annexing Petaluma to the Association of Bay Area Governments (ABAG) - FEMA approved Hazard Mitigation Plan. (Marcngo/Lackie)

2HHazardMitigationPlan

This was added to the Saferty element but FLOODING was omited, and needs to be included per the ABAG - FEMA approved Hazard Mitigation Plan

C

10-P-6 Protect the community from risks associated with seismically induced surface ruptures, groundshaking,ground failure, slope instability leading to mudslides and landslides, subsidence, liquefaction, and other seismic, geologic, and fire hazards.
A. Adopt and maintain a Hazard Mitigation Plan (HMP) in compliance with applicable state and federal regulations.

Diane Reilly Torres

California Gov Code Sec 65302(a) requires the Land Use Element in a General Plan identify areas covered by the plan which are subject to flooding. Neither the Draft General Plan Land Use Element or Land Use Map identify areas that are subject to flooding. This must be done and until the FEMA map is updated you must include it in the General Plan.

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2-P-8 Maintain Business Park uses by monitoring availability of industrial land area for possible expansion of high employment businesses.
A. Provide a review process to consider allowing retail components in conjunction with uses in the industrial/business park areas.

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A. Adopt and maintain a Hazard Mitigation Plan (HMP) in compliance with applicable state and federal regulations.

CITY OF PETALUMA, CALIFORNIA

AGENDA BILL

2.H
April 2, 2007

Agenda Title:
Approve Resolution Annexing Petaluma to the Association of Bay Area Governments (ABAG)- FEMA Approved Hazard Mitigation Plan

Meeting Date:
April 2, 2007

Meeting Time: ☒ 3:00 PM ☐ 7:00 PM

Category: ☐ Presentation x☒ Consent Calendar ☐ Public Hearing ☐ Unfinished Business ☐ New Business

Department:	Director:	Contact Person:	Phone Number:
Public Works	Vince Marengo	Susan Lackie	778-4478

Cost of Proposal: $30,000

Amount Budgeted: $30,000

Account Number:
G500150-54140
Name of Fund:
2360

Attachments to Agenda Packet Item:
1. Mitigation strategies as identified and ranked by City staff
2. City of Petaluma Annexation application to the ABAG Hazard Mitigation Plan
3. Resolution annexing City of Petaluma with the ABAG Hazard Mitigation Plan

Summary Statement: There is a variety of hazard mitigation grant funding available through FEMA. However, in order for the City to apply for this funding, a FEMA approved hazard mitigation plan (HMP) must be in place. The Association of Bay Area Governments (ABAG) does have a FEMA approved plan in place, and the City of Petaluma, by virtue of its membership in ABAG, its Bay Area location, and its participation in the planning process of the FEMA approved plan, is eligible to become annexed to it. Annexation to the ABAG Plan allows Petaluma to become eligible for the opportunity to apply for future hazard mitigation funding. Strategies, required as part of the annexation application, were prepared and approved by ABAG and FEMA and were reviewed and ranked by Public Works, Parks and Recreation, Water Resources and Conservation, Community Development, Fire Marshal, and Administrative Services staff. The high and moderate ranked strategies are not commitments by the City to accomplish any of the strategies, but rather an indication that, should funding become available, these tasks should be undertaken. Strategies ranked very high will be undertaken regardless of FEMA or other funding availability. FEMA will use these rankings to assess the high and moderate needs of the City and use those rankings to potentially make grant funding available to all applicants with an approved HMP, via the competitive process currently in place. Upon FEMA's decision to make grant funds available, all agencies with approved hazard mitigation plans will be eligible to apply for the grants, regardless of how the strategies were ranked at the time the HMP was created. In order to compete for the grant funds, an HMP must be in place and updated every five years. Upon submittal to ABAG, the City's annexation application document, and the list of the City of Petaluma strategies, ABAG will publish them via an internet link, allowing for public review and comment. This public comment period began February 15, 2007 with publication of strategies on ABAG website http://quake.abag.ca.gov/mitigation/. and continues until adoption by City Council.

Recommended City Council Action/Suggested Motion:
Approve Resolution Annexing Petaluma to the Association of Bay Area Governments' FEMA approved Hazard Mitigation Plan

Reviewed by Admin. Svcs. Dir:	Reviewed by City Attorney:	Approved by City Manager:
Steve Carmichael	RL	MM
Date: 3/20/07	Date:	Date:

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CITY OF PETALUMA, CALIFORNIA

APRIL 2, 2007

AGENDA REPORT

APPROVE RESOLUTION ANNEXING PETALUMA TO THE ASSOCIATION OF BAY AREA GOVERNMENTS (ABAG) - FEMA APPROVED HAZARD MITIGATION PLAN

1. **EXECUTIVE SUMMARY:**

There is a variety of hazard mitigation grant funding available through FEMA. However, in order for the City to apply for this funding, a FEMA approved hazard mitigation plan (HMP) must be in place. The Association of Bay Area Governments (ABAG) does have a FEMA approved plan in place, and the City of Petaluma, by virtue of its membership in ABAG, its Bay Area location, and its participation in the planning process of the FEMA approved plan, is eligible to become annexed to it.

Annexation to the ABAG Plan allows Petaluma to become eligible for the opportunity to apply for future hazard mitigation funding. Strategies, required as part of the annexation application, were prepared and approved by ABAG and FEMA and were reviewed and ranked by Public Works, Parks and Recreation, Water Resources and Conservation, Community Development, Fire Marshal, and Administrative Services staff.

The high and moderate ranked strategies are not commitments by the City to accomplish any of the strategies, but rather an indication that, should funding become available, these tasks should be undertaken. Strategies ranked very high will be undertaken regardless of FEMA or other funding availability. FEMA will use these rankings to assess the high and moderate needs of the City and use those rankings to potentially make grant funding available to all applicants with an approved HMP, via the competitive process currently in place. Upon FEMA's decision to make grant funds available, all agencies with approved hazard mitigation plans will be eligible to apply for the grants, regardless of how the strategies were ranked at the time the HMP was created.

In order to compete for the grant funds, an HMP must be in place and updated every five years. Upon submittal to ABAG, the City's annexation application document, and the list of the City of Petaluma strategies, ABAG will publish them via an internet link, allowing for public review and comment. This public comment period began February 15, 2007 with publication of strategies on ABAG website http://quake.abag.ca.gov/mitigation/. and continues until adoption by City Council.

2. **BACKGROUND:**

The goal of a hazard mitigation plan document is to maintain and enhance a disaster-resistant region by reducing the potential loss of life, property damage, and environmental degradation from natural disasters, while accelerating economic recovery from those disasters.

ABAG's hazard mitigation plan is a multi-jurisdictional effort to enhance disaster resistance in the San Francisco Bay Area. The counties included within this effort are Sonoma, Napa, Marin, Solano, San Francisco, Contra Costa, Alameda, San Mateo, and Santa Clara.

FEMA provides various pools of hazard mitigation funding. Annual section 404 funds are intended to benefit undamaged facilities from a future disaster by reducing or eliminating the potential disaster (i.e., installation of flood walls around an existing facility). Additionally, FEMA also includes a grant to cover 75% of the cost to prepare a hazard mitigation plan.

3. **ALTERNATIVES:**

The City would not be eligible to receive or compete for certain FEMA funded hazard mitigation grants

4. **FINANCIAL IMPACTS:**

The cost to prepare the hazard mitigation plan is $30,000, of which the City may be able to recoup $22,500 (75%), if application and funding for grant application is approved.

5. **CONCLUSION:**

If approved by the City Council, staff will submit the approved resolution and application package to Association of Bay Area Governments (ABAG) and FEMA for approval.

6. **OUTCOMES OR PERFORMANCE MEASUREMENTS THAT WILL IDENTIFY SUCCESS OR COMPLETION:**

The City will be allowed to compete for FEMA funded HMP grant funds.

6. **RECOMMENDATION:**

Approve Resolution Annexing Petaluma to the Association of Bay Area Governments' FEMA approved Hazard Mitigation Plan

ATTACHMENT 1

Infrastructure Mitigation Strategies

	Specific Mitigation Strategy	Existing Program	Very High	High	Moderate	Under Study	Not Applicable, or Not Appropriate, or Not Cost Effective	Not Yet Considered	Responsible Agency or Department (Required if Existing Program, Very High, High, or Under Study)	Ordinance or Resolution # (if existing program), Estimated Cost and Possible Funding Agency (if high priority), Estimated Date of Completion (if study) OR Other Comments
INFR - a - Multihazard										
1)	Assess the vulnerability of critical facilities designated by lifeline operators to damage in natural disasters or security threats, including facilities owned outside of the Bay Area that can impact service delivery within the region. Note - Lifeline agencies, departments, and districts are those that operate transportation and utility facilities and networks.	X							Sonoma County Water Agency	Ongoing
2)	Comply with State of California and federal requirements to assess the vulnerability of dams to damage from earthquakes, seiches, landslides, liquefaction, or security threats.								N/A	No Dams
3)	Encourage the cooperation of utility system providers and cities, counties, and other special districts to develop strong and effective mitigation strategies for infrastructure systems and facilities.	X							DWRC for Utilities	Member of WARN II (Water Agency Response Network)
4)	Retrofit or replace critical lifeline facilities and/or their backup facilities that are shown to be vulnerable to damage in natural disasters.	X							DWRC for Utilities	Capital Improvement Plan
5)	Support and encourage efforts of *other* (lifeline) agencies as they plan for and arrange financing for seismic retrofits and other disaster mitigation strategies. (For example, a city might pass a resolution in support of a transit agency's retrofit program.)	X							DWRC for Utilities	Water Advisory Committee to the Sonoma County Water Agency
6)	Plan for speeding the repair and functional restoration of lifeline systems through stockpiling of shoring materials, temporary pumps, surface pipelines, portable hydrants, and other supplies, such as those available through the Water Agency Response Network (WARN).	X							DWRC for Utilities	Member of WARN II (Water Agency Response Network) and our local inventory -

Infrastructure Mitigation Strategies

	Specific Mitigation Strategy	Existing Program	Very High	High	Moderate	Under Study	Not Applicable, Not Appropriate, or Not Cost Effective	Not Yet Considered	Responsible Agency or Department (Required if Existing Program, Very High, High, or Under Study)	Ordinance or Resolution # (if existing program), Estimated Cost and Possible Funding Agency (if high priority), Estimated Date of Completion (if study) OR Other Comments
7)	Engage in, support, and/or encourage research by others on measures to further strengthen transportation, water, sewer, and power systems so that they are less vulnerable to damage in disasters.	X							DWRC for Utilities	Water Master Plan and General Plan Programs
8)	Pre-position emergency power generation capacity (or have rental/lease agreements for these generators) in critical buildings of cities, counties, and special districts to maintain continuity of government and services.	X							DWRC for Utilities	Capital Improvement Plan
9)	Have back-up emergency power available for critical intersection traffic lights.	X							XXXX	Resolution #?
10)	Develop unused or new pedestrian rights-of-way as walkways to serve as additional evacuation routes (such as fire roads in park lands).				X				XXXX	
11)	Coordinate with PG&E and others to investigate ways of minimizing the likelihood that power interruptions will adversely impact vulnerable communities, such as the disabled and the elderly.			X					XXXX	Unknown Cost District/Federal Funds/State/Bond Funds
12)	Encourage replacing aboveground electric and phone wires and other structures with underground facilities, and use the planning-approval process to ensure that all new phone and electrical utility lines are installed underground.	X							XXXX	Resolution #?
13)	Coordinate with the State Division of Safety of Dams to ensure an adequate timeline for the maintenance and inspection of dams, as required of dam owners by State law.	X							DWRC for Utilities	Lawler Reservoir is Inactive
14)	Encourage communication between State OES, FEMA, and utilities related to emergencies occurring outside of the Bay Area that can affect service delivery in the region.							X	N/A	N/A

Infrastructure Mitigation Strategies

	Specific Mitigation Strategy	Existing Program	Very High	High	Moderate	Under Study	Not Applicable, Not Appropriate, or Not Cost Effective	Not Yet Considered	Responsible Agency or Department (Required if Existing Program, Very High, High, or Under Study)	Ordinance or Resolution # (if existing program), Estimated Cost and Possible Funding Agency (if high priority), Estimated Date of Completion (if study) OR Other Comments
15)	Ensure that transit operators, private ambulance companies, cities, and/or counties have mechanisms in place for medical transport during and after disasters that take into consideration the potential for reduced capabilities of roads following these same disasters.			X					XXXX	Uknown Cost District/Federal Funds/State/Bond Funds
16)	Effectively utilize the Transportation Management Center (TMC), the staffing of which is provided by Caltrans, the CHP and MTC. The TMC is designed to maximize safety and efficiency throughout the highway system. It includes the Emergency Resource Center (ERC) which was created specifically for primary planning and procedural disaster management.			X					XXXX	Uknown Cost District/Federal Funds/State/Bond Funds
INFR-b= Earthquakes										
1)	Expedite the funding and retrofit of seismically-deficient city- and county-owned bridges and road structures by working with Caltrans and other appropriate governmental agencies.			X					Public Works	Uknown Cost District/Federal Funds/State/Bond Funds
2)	Establish a higher priority for funding seismic retrofit of existing transportation and infrastructure systems (such as BART) than for expansion of those systems.							X	N/A	N/A
3)	Include "areas subject to high ground shaking, earthquake-induced ground failure, and surface fault rupture" in the list of criteria used for determining a replacement schedule for pipelines (along with importance, age, type of consinuction material, size, condition, and maintenance or repair history).							X	N/A	N/A
4)	Install specially-engineered pipelines in areas subject to faulting, liquefaction, earthquake-induced landsliding, or other earthquake hazard.							X	N/A	N/A
5)	Replace or retrofit water-retention structures that are determined to be structurally deficient.	X							DWRC	Water Master Plan

Infrastructure Mitigation Strategies

	Specific Mitigation Strategy	Existing Program	Very High	High	Moderate	Under Study	Not Applicable, Not Appropriate, or Not Cost Effective	Not Yet Considered	Responsible Agency or Department (Required if Existing Program, Very High, High, or Under Study)	Ordinance or Resolution # (if existing program), Estimated Cost and Possible Funding Agency (if high priority), Estimated Date of Completion (if study) OR Other Comments
6)	Install portable facilities (such as hoses, pumps, emergency generators, or other equipment) to allow pipelines to bypass failure zones such as fault rupture areas, areas of liquefaction, and other ground failure areas (using a priority scheme if funds are not available for installation at all needed locations).	X							XXXX	Resolution #7
7)	Install earthquake-resistant connections when pipes enter and exit bridges.	X							DWRC	Plan Review Process
8)	Comply with all applicable building and fire codes, as well as other regulations (such as state requirements for fault, landslide, and liquefaction investigations in particular mapped areas) when constructing or significantly remodeling infrastructure facilities.	X							DWRC	Plan Review Process
9)	Clarify to workers in critical facilities and emergency personnel, as well as to elected officials and the public, the extent to which the facilities are expected to perform only at a life safety level (allowing for the safe evacuation of personnel) or are expected to remain functional following an earthquake.				X				XXXX	XXXX
10)	Examine the feasibility of developing a water-borne transportation "system" – comprised mainly of relatively inexpensive barges – across the Bay for use in the event of major earthquakes. Implementation of such a system could prove extremely useful in the event of structural failure of either the road-bridge systems or BART and might serve as an adjunct to existing transportation system elements in the movement of large numbers of people and/or goods.						X		N/A	N/A
INFR-c - Wildfire										
1)	Ensure a reliable source of water for fire suppression (meeting acceptable standards for minimum volume and duration of flow) for existing and new development.	X							Fire Department	ORD 2109

Infrastructure Mitigation Strategies

	Specific Mitigation Strategy	Existing Program	Very High	High	Moderate	Under Study	Not Applicable, Not Appropriate, or Not Cost Effective	Not Yet Considered	Responsible Agency or Department (Required if Existing Program, Very High, High, or Under Study)	Ordinance or Resolution # (if existing program), Estimated Cost and Possible Funding Agency (if high priority), Estimated Date of Completion (if study) OR Other Comments
2)	Develop a coordinated approach between fire jurisdictions and water supply agencies to identify needed improvements to the water distribution system, initially focusing on areas of highest wildfire hazard.	X							Fire Department	ORD 2109
3)	Develop a defensible space vegetation program that includes the clearing or thinning of (a) non-fire resistive vegetation within 30 feet of access and evacuation roads and routes to critical facilities, or (b) all non-native species (such as eucalyptus and pine, but not necessarily oaks) within 30 feet of access and evacuation roads and routes to critical facilities.	X							Fire Department	ORD 2109
4)	Ensure all dead-end segments of public roads in high hazard areas have at least a "T" intersection turn-around sufficient for typical wildland fire equipment.	X							Fire Department	ORD 2109
5)	Enforce minimum road width of 20 feet with an additional 10-foot clearance on each shoulder on all driveways and road segments greater than 50 feet in length in wildfire hazard areas.	X							Fire Department	ORD 2109
6)	Require that development in high fire hazard areas provide adequate access roads (with width and vertical clearance that meet the minimum standards of the *Fire Code* or relevant local ordinance), onsite fire protection systems, evacuation signage, and fire breaks.	X							Fire Department	ORD 2109
7)	Ensure adequate fire equipment road or fire road access to developed and open space areas.	X							Fire Department	ORD 2109
8)	Maintain fire roads and/or public right-of-way roads and keep them passable at all times.	X							Fire Department	ORD 2109
INFR = d - Flooding										
1)	Conduct a watershed analysis of runoff and drainage systems to predict areas of insufficient capacity in the storm drain and natural creek system.	X							DWRC	General Plan Programs

Infrastructure Mitigation Strategies

	Specific Mitigation Strategy	Existing Program	Very High	High	Moderate	Under Study	Not Applicable, Not Appropriate, or Not Cost Effective	Not Yet Considered	Responsible Agency or Department (Required if Existing Program, Very High, High, or Under Study)	Ordinance or Resolution # (If existing program), Estimated Cost and Possible Funding Agency (If high priority), Estimated Date of Completion (If study) OR Other Comments
2)	Develop procedures for performing a watershed analysis to look at the impact of development on flooding potential downstream, including communities outside of the jurisdiction of proposed projects.	X							DWRC	General Plan Programs
3)	Conduct a watershed analysis at least once every three years.								DWRC	General Plan Programs
4)	Assist, support, and/or encourage the U.S. Army Corp of Engineers, various Flood Control and Water Conservation Districts, and other responsible agencies to locate and maintain funding for the development of flood control projects that have high cost-benefit ratios (such as through the writing of letters of support and/or passing resolutions in support of these efforts).	X							DWRC	General Plan Programs
5)	Pursue funding for the design and construction of storm drainage projects to protect vulnerable properties, including property acquisitions, upstream storage such as detention basins, and channel widening with the associated right-of-way acquisitions, relocations, and environmental mitigations.	X							DWRC	General Plan Programs
6)	Continue to repair and make structural improvements to storm drains, pipelines, and/or channels to enable them to perform to their design capacity in handling water flows as part of regular maintenance activities.	X							DWRC	General Plan Programs
7)	Continue maintenance efforts to keep storm drains and creeks free of obstructions, while retaining vegetation in the channel (as appropriate), to allow for the free flow of water.	X							DWRC	General Plan Programs

Infrastructure Mitigation Strategies

	Specific Mitigation Strategy	Existing Program	Very High	High	Moderate	Under Study	Not Applicable, Not Appropriate, or Not Cost Effective	Not Yet Considered	Responsible Agency or Department (Required If Existing Program, Very High, High, or Under Study)	Ordinance or Resolution # (If existing program), Estimated Cost and Possible Funding Agency (If high priority), Estimated Date of Completion (If study) OR Other Comments
8)	Enforce provisions under creek protection, stormwater management, and discharge control ordinances designed to keep watercourses free of obstructions and to protect drainage facilities to confirm with the Regional Water Quality Control Board's Best Management Practices.	X							DWRC	General Plan Programs
9)	Develop an approach and locations for various watercourse bank protection strategies, including for example, (1) an assessment of banks to inventory areas that appear prone to failure, (2) bank stabilization, including installation of rip rap, (3) stream bed depth management using dredging, and (4) removal of out-of-date cofferdams in rivers and [illegible] storage.	X							DWRC	General Plan Programs
10)	Use reservoir sediment removal as one way to increase storage for both flood control and water supply.	X							DWRC	General Plan Programs
11)	Elevate critical bridges affected by flooding to increase stream flow and maintain critical access and egress routes.	X							DWRC	General Plan Programs
12)	Provide a mechanism to expedite the repair or replacement of levees that are vulnerable to collapse from earthquake-induced shaking or liquefaction, rodents, and other concerns, particularly those protecting critical infrastructure.	X							DWRC	General Plan Programs
13)	Ensure that utility systems in new developments are constructed in ways that reduce or eliminate flood damage.	X							DWRC/CDD	General Plan Programs
14)	Determine whether or not wastewater treatment plants are protected from floods, and if not, investigate the use of flood-control berms to not only protect from stream or river flooding, but also increasing plant security.	X							DWRC	General Plan Programs

Infrastructure Mitigation Strategies

	Specific Mitigation Strategy	Existing Program	Very High	High	Moderate	Under Study	Not Applicable, Not Appropriate, or Not Cost Effective	Not Yet Considered	Responsible Agency or Department (Required if Existing Program, Very High, High, or Under Study)	Ordinance or Resolution # (if existing program), Estimated Cost and Possible Funding Agency (if high priority), Estimated Date of Completion (if study) OR Other Comments
8)	Enforce provisions under creek protection, stormwater management, and discharge control ordinances designed to keep watercourses free of obstructions and to protect drainage facilities to confirm with the Regional Water Quality Control Board's Best Management Practices.	X							DWRC	General Plan Programs
9)	Develop an approach and locations for various watercourse bank protection strategies, including for example, (1) an assessment of banks to inventory areas that appear prone to failure, (2) bank stabilization, including installation of rip rap, (3) stream bed depth management using dredging, and (4) removal of out-of-date coffer dams in rivers and tributary streams.	X							DWRC	General Plan Programs
10)	Use reservoir sediment removal as one way to increase storage for both flood control and water supply.	X							DWRC	General Plan Programs
11)	Elevate critical bridges affected by flooding to increase stream flow and maintain critical access and egress routes.	X							DWRC	General Plan Programs
12)	Provide a mechanism to expedite the repair or replacement of levees that are vulnerable to collapse from earthquake-induced shaking or liquefaction, rodents, and other concerns, particularly those protecting critical infrastructure.	X							DWRC	General Plan Programs
13)	Ensure that utility systems in new developments are constructed in ways that reduce or eliminate flood damage.	X							DWRC/CDD	General Plan Programs
14)	Determine whether or not wastewater treatment plants are protected from floods, and if not, investigate the use of flood-control berms to not only protect from stream or river flooding, but also increasing plant security.	X							DWRC	General Plan Programs

Infrastructure Mitigation Strategies

	Specific Mitigation Strategy	Existing Program	Very High	High	Moderate	Under Study	Not Applicable, Not Appropriate, or Not Cost Effective	Not Yet Considered	Responsible Agency or Department (Required if Existing Program, Very High, High, or Under Study)	Ordinance or Resolution # (if existing program), Estimated Cost and Possible Funding Agency (if high priority), Estimated Date of Completion (if study) OR Other Comments
15)	Work cooperatively with water agencies, flood control districts, Caltrains, and local transportation agencies to determine appropriate performance criteria for watershed analysis.	X							DWRC	General Plan Programs
16)	Work for better cooperation among the patchwork of agencies managing flood control issues.	X							DWRC	General Plan Programs
17)	Work cooperatively with upstream communities to monitor creek and watercourse flows to predict potential for flooding downstream.	X							DWRC	General Plan Programs
INFR - e - Landslides										
1)	Include "areas subject to ground failure" in the list of criteria used for determining a replacement schedule (along with importance, age, type of construction material, size, condition, and maintenance or repair history) for shelters.							X	N/A	N/A
2)	Establish requirements in zoning ordinances to address hillside development constraints in areas of steep slopes that are likely to lead to excessive road maintenance or where roads will be difficult to maintain during winter storms due to landsliding.	X							CDD	Resolution #7
INFR - f - Building Reoccupancy										
1)	Ensure that critical buildings owned or leased by special districts or private utility companies participate in a program similar to San Francisco's Building Occupancy Resumption Program (BORP). The BORP program permits owners of buildings to hire qualified structural engineers[1] to create facility-specific post-disaster inspection plans and allows these engineers to become automatically deputized as City/County inspectors for these buildings in the event of an earthquake or other disaster. This program allows rapid reoccupancy of the buildings. **Note** - A qualified structural engineer is a California licensed structural engineer with relevant experience.			X					CDD	Unknown Cost District/Federal Funds/State/Bond Funds

Infrastructure Mitigation Strategies

	Specific Mitigation Strategy	Existing Program	Very High	High	Moderate	Under Study	Not Applicable, Not Appropriate, or Not Cost Effective	Not Yet Considered	Responsible Agency or Department (Required if Existing Program, Very High, High, or Under Study)	Ordinance or Resolution # (if existing program), Estimated Cost and Possible Funding Agency (if high priority), Estimated Date of Completion (if study) OR Other Comments
INFR - g - Public Education										
1)	Provide materials to the public related to planning for power outages.						X		N/A	N/A
2)	Provide materials to the public related to family and personal planning for delays due to traffic or road closures.	X							XXXX	Resolution #?
3)	Provide materials to the public related to coping with reductions in water supply or contamination of that supply.	X							DWRC	DWRC
4)	Provide materials to the public related to coping with disrupted storm drains, sewage lines, and wastewater treatment.	X							DWRC	DWRC
5)	Facilitate and/or coordinate the distribution of materials that are prepared by others, such as by placing materials in city or utility newsletters, or on community access channels, as appropriate.	X							DWRC	DWRC

Local Hazard Mitigation Plan ANNEX
City of Petaluma

Introduction

The City of Petaluma is a moderately-sized city in Sonoma County, California. The City has a population of 56,727 people, based on the 2006 census[1]. Last year, the City's budget was $168,442,000. The City employs approximately 333 people and provides both police and fire protection services.

The Planning Process

The process of preparing this plan was familiar to the City of Petaluma, which has a Safety Element to its General Plan (last updated in 1987 and currently in the process of being updated) that includes a discussion of fire, earthquake, flooding, and landslide hazards. In addition, the City routinely enforces the California Environmental Quality Act (CEQA), which, since 1988, has required mitigation for identified natural hazards. Petaluma's effort has focused on building on these pre-existing programs, identifying gaps that may lead to disaster vulnerabilities, and addressing these risks through mitigation.

Many of the activities conducted by the City were fed into the planning process for the multi-jurisdictional plan. Petaluma participated in various ABAG workshops and meetings, including the general "kick-off" meeting. The City was particularly instrumental in the development of this plan due to the participation of City Council members on both ABAG's Regional Planning Committee, as well as its Executive Board. In addition, the City has provided oral comments on the multi-jurisdictional plan. Finally, the City provided information on facilities that are viewed as "critical" to ABAG.

Key City staff met to identify and prioritize mitigation strategies appropriate for Petaluma. Staff involved in this meeting included representatives from Risk Management, Parks and Recreation, Water Resources, Community Development, Public Works, and the Fire Department. At the meeting, the general priorities and appropriate City departments were identified, as well as preliminary budgets and potential funding sources for strategies designed as "high" priority. The City will provide opportunity for the public to comment on the DRAFT mitigation strategies selected by staff at the City Council meeting on April 2, 2007. The resolution adopting the plan and strategies will be on the City Council agenda at that time. These mitigation strategies will become an implementation appendix to the Safety Element.

[1] For complete Census information on this city, see http://www.bayareacensus.ca.gov/.

Hazard and Risk Assessment

The ABAG multi-jurisdictional Local Hazard Mitigation Plan, to which this is an Annex, lists nine hazards that impact the Bay Area, five related to earthquakes (faulting, shaking, earthquake-induced landslides, liquefaction, and tsunamis) and four related to weather (flooding, landslides, wildfires, and drought). These hazards also impact this community, except for surface faulting. Surface faulting is not a hazard to Petaluma because no active faults are located in the City.

While the City has undertaken a number of general hazard mapping activities since the first Safety Element was prepared, the maps are less detailed and are not as current as those shown on the ABAG website at **http://quake.abag.ca.gov/mitigation/**.

Information on disasters declared in Sonoma County is at **http://quake.abag.ca.gov/mitigation/disaster-history.html.**

The City examined the hazard exposure of City urban land, based on the information on ABAG's website at **http://quake.abag.ca.gov/mitigation/pickdbh2.html**. Of the 8,226 urban acres in the City:

- Earthquake faulting – No active faults run within the City, so rupture of a fault is not a direct concern.
- Earthquake shaking – 1,028 acres are in the highest two categories of shaking potential.
- Earthquake-induced landslides – The California Geological Survey has not completed mapping of this hazard in the City of Petaluma. However, because few areas have been mapped as landslides, this hazard is viewed as similar to that posed by weather-related hazards.
- Earthquake liquefaction – 6,572 acres are in areas of moderate, high, or very high liquefaction susceptibility.
- Tsunamis – While tsunamis may be a hazard to Petaluma, mapping of the inundation area has not been completed at this time. However, if one assumes that there is a 42 foot tsunami at the entrance to the Bay (as stated in the multi-jurisdictional LHMP), the wave height on the opposite bank in the Oakland-Berkeley area will be roughly half (21feet) and roughly 10% or 4 feet at each end (Alviso in San Jose and the north side of San Pablo Bay). In this situation, the wave height in Petaluma will be somewhere less than four feet - insignificant hazard that would only impact wetland areas. The California OES has funded the mapping of tsunami inundation evacuation planning maps for within San Francisco Bay; however, this mapping is not yet complete. This LHMP will be modified to examine the hazard of tsunamis when the maps are available.
- Flooding –125 acres are in the 100-year flood plain, while an additional 284 acres are in the 500 year flood plain.
- Landslides – 1,402 acres are in areas of existing landslides, 702 acres in areas of few landslides, 700 acres are in areas of existing landslides, including three schools located in predominantly landslide area. Two critical facilities are located predominantly within a landslide area.
- Wildfires – No urban acres are in the extreme critical fire area (because of the urban nature of the city); however, 1,416 acres are in the fire threat area for wildland urban interface.
- Dam inundation – No acres are subject to dam inundation.
- Drought – all 8,226 acres are subject to drought.

The City also examined the hazard exposure of infrastructure based on the information on ABAG's website at **http://quake.abag.ca.gov/mitigation/pickdbh2.html**. Of the 211 miles of roadway in the City:

- Earthquake faulting – No active faults run within the City, so rupture of a fault is not a direct concern.

- Earthquake shaking – 192 miles of roadway are in the moderate category of shaking potential, 13 miles in the next highest category for earthshaking potential, and zero roads in the highest category of shaking potential.
- Earthquake-induced landslides – The California Geological Survey has not completed mapping of this hazard in Petaluma. However, this is unlikely to be an issue because no roads are in existing landslide areas
- Earthquake liquefaction – 170 miles of roadway are in areas of moderate, high, or very high liquefaction susceptibility. 157 miles of pipeline are in areas of moderate, high or very high liquefaction susceptibility.
- Tsunamis – While tsunamis may be a hazard in the City of Petaluma, mapping of the inundation area has not been completed at this time.
- Flooding – Nine miles of roadway are in the 100-year flood plain, while an additional one mile is in other flood-prone areas.
- Landslides – No roads are in areas of existing landslides.
- Wildfires – One mile of roadway is subject to high, very high, or extreme wildfire threat, and 108 miles of roads are in wildland-urban interface threat areas.
- Dam inundation – No miles of roadway are in an area subject to dam inundation.
- Drought – is not a hazard for roadways.

Finally, the City examined the hazard exposure of critical health care facilities, schools, and city-owned buildings, based on the information on ABAG's website at http://quake.abag.ca.gov/mitigation/pickerit.html. Of the critical facilities in the City:

- Earthquake faulting – No active faults run within the City, so rupture of a fault is not a direct concern.
- Earthquake shaking – All 24 elementary schools and all 11 health care facilities are located in moderately high areas with earthquake shaking potential. While 40 of the critical facilities owned by Petaluma have moderately high earthquake shaking potential, six are in very high areas.
- Earthquake-induced landslides – The California Geological Survey has not completed mapping of this hazard in the City of Petaluma However, this is unlikely to be an issue because no roads are in existing landslide areas
- Earthquake liquefaction – Of the 11 health care facilities located in Petaluma, seven are in moderate, high, or very high areas of susceptibility to earthquake liquefaction. Of the 24 schools, 18 are in moderate, high, or very high areas of susceptibility to earthquake liquefaction. Of the 46 City-owned critical facilities, 14 are in a moderately high area, 12 are in a high area and 10 are in a very high area for potential earthquake liquefaction.
- Tsunamis – While tsunamis may be a hazard to the City, the mapping of the inundation area has not been completed at this time
- Flooding – No critical health care facilities, schools, or city-owned facilities are in either the 100-year flood plain or in other flood-prone areas.
- Landslides – No critical health care facilities, schools, or city-owned facilities are in areas of existing landslides.
- Wildfires – Seven health care facilities, 10 schools, and 24 city-owned critical facilities are in the wildland-urban interface threat areas.
- Dam inundation – No critical health care facilities, schools, or city-owned facilities are in an area subject to dam inundation.
- Drought – Drought will not affect City buildings directly. However, the City does operate a water-supply distribution system.

There have been 38 properties that have suffered repetitive flood losses, three located in the 500-year flood plain and 35 outside the flood plain. Information can be found at **http://quake.abag.ca.gov/mitigation/pickflood.html.**

The City plans to work with ABAG during 2007 to improve the risk assessment information being compiled by ABAG by providing information on unreinforced masonry buildings and soft-story apartments located in the City.

Drought, though a potential problem in the City, is not fully assessed. The City will work with ABAG and various water supply agencies on this issue.

The City plans to work with ABAG to develop specific information about the kind and level of damage to buildings, infrastructure, and critical facilities which might result from any of the hazards previously noted.

As these impacts are not fully developed, the City has reviewed the hazards identified and ranked the hazards based on past disasters and expected future impacts. The conclusion is that earthquake (particularly shaking), flooding, wildland-urban interface fires, and landslides (including unstable earth) pose a significant risk for potential loss.

Mitigation Activities and Priorities

As a participant in the ABAG multi-jurisdictional planning process, City of Petaluma staff helped in the development and review of the comprehensive list of mitigation strategies in the overall multi-jurisdictional plan. The list was discussed at a January 31, 2007 meeting of the various City departments, including Risk Management, Parks and Recreation, Water Resources, Community Development, Public Works, and the Fire Department. At the meeting, all of the mitigation strategies were reviewed. The tentative decision on priority was made, based on a variety of criteria, not simply on an economic cost-benefit analysis. These criteria include being technically and administratively feasible, politically acceptable, socially appropriate, legal, economically sound, and not harmful to the environment or our heritage.

Over time, we are committed to developing better hazard and risk information to use in making those trade-offs. We are not trying to create a disaster-proof region, but a disaster-resistant one. In addition, several of the strategies are existing City programs.

These draft priorities will be submitted to the City Manager for review. They will then be provided to the City Council on April 2, 2007. The public will be provided with an opportunity to comment on the DRAFT priorities. The final strategies (as shown in the attached table) will become an *Implementation Appendix* to the City's Safety Element.

The City has identified 109 high priority mitigation strategies for which the City will be seeking funding from a variety of sources. The City plans to become very proactive in the hazard mitigation during the coming years.

The Plan Maintenance and Update Process

The City Public Works Department will ensure that *monitoring* of this Annex will occur on an ongoing basis. However, the major disasters affecting our community, legal changes, notices from ABAG as the lead agency in this process, and other triggers will be used. Finally, the Annex will be analyzed yearly by City departments, and updated as needed. At that time, staff will focus on *evaluating* the Annex in light of technological and

political changes during the previous year or other significant events. This group will be responsible for determining if the plan should be updated.

The City of Petaluma is committed to reviewing and *updating* this plan annex at least once every five years, as required by the Disaster Mitigation Act of 2000. To that end, the Public Works Project Manager will contact ABAG four years after this plan is approved to ensure that ABAG intends to undertake the plan update process. If so, the City again will participate in the multi-jurisdictional plan. In the event ABAG is unwilling or unable to act as the lead agency in the multi-jurisdictional effort, other agencies will be contacted, including the County's Office of Emergency Services. ABAG counties should then work together to identify another regional forum for developing a multi-jurisdictional plan.

The *public* will continue to be involved whenever the plan is updated, as appropriate, during the monitoring and evaluation process. Prior to adoption of updates, the City will provide the public with an opportunity to comment on the updates. A public notice will be posted prior to the meeting to announce the comment period and meeting logistics.

RESOLUTION APPROVING THE ABAG REPORT "TAMING NATURAL DISASTERS" AS THE CITY OF PETALUMA LOCAL HAZARD MITIGATION PLAN

WHEREAS, the Bay Area is subject to various earthquake-related hazards such as ground shaking, liquefaction, land sliding, fault surface rupture, and tsunamis; and

WHEREAS, the Bay Area is subject to various weather-related hazards including wildfires, floods, and landslides; and

WHEREAS, the City of Petaluma recognizes that disasters do not recognize city, county, or special district boundaries; and

WHEREAS, the City of Petaluma seeks to maintain and enhance both a disaster-resistant Petaluma and region by reducing the potential loss of life, property damage, and environmental degradation from natural disasters, while accelerating economic recovery from those disasters; and

WHEREAS, the City of Petaluma is committed to increasing the disaster resistance of the infrastructure, health, housing, economy, government services, education, environment, and land use systems in Petaluma, as well as in the Bay Area as a whole; and

WHEREAS, the federal Disaster Mitigation Act of 2000 requires all cities, counties, and special districts to have adopted a Local Hazard Mitigation Plan to receive disaster mitigation funding from FEMA; and

WHEREAS, ABAG has approved and adopted the ABAG report *Taming Natural Disasters* as the multi-jurisdictional Local Hazard Mitigation Plan for the San Francisco Bay Area;

NOW, THEREFORE, BE IT RESOLVED that the City of Petaluma adopts, and adapts with its local annex, this multi-jurisdictional plan as its Local Hazard Mitigation Plan.

NOW, THEREFORE, BE IT FURTHER RESOLVED that the City of Petaluma commits to continuing to take those actions and initiating further actions, as appropriate, as identified in the City of Petaluma Annex of that multi-jurisdictional Local Hazard Mitigation Plan.

Greenbelt Alliance

PROTECTING OPEN SPACE AND PROMOTING LIVABLE COMMUNITIES

May 21, 2007

Via Facsimile – 1 Page

149

Petaluma City Council
C/O City Clerk's Office
11 English Street
Petaluma, California 94952

Re: Comments to Petaluma Draft General Plan and Draft Environmental Impact Report

Dear Mayor Torliatt and Members of the Petaluma City Council,

Greenbelt Alliance is the Bay Area's leading land conservation and urban planning non-profit organization. Our mission is to make the nine-county San Francisco Bay Area a better place to live by protecting the region's greenbelt and improving the livability of its cities and towns. As such, we have long supported voter-approved Urban Growth Boundaries (UGB) in communities throughout region. Locally, we have played a key role in securing the eight UGBs that exist in Sonoma County. A

After reviewing the City's current draft General Plan and DEIR, we are seriously concerned that each of three General Plan alternatives call for an expansion of Petaluma's Urban Growth Boundary. We urge you to direct staff to create a fourth, and **more realistic** alternative, that does NOT include development in these expansion areas. You must consider how and where Petaluma will grow, and plan to meet the community's needs within the *current* City boundaries. As expansion into these areas is only permitted with a vote of 6 out of 7 City Council members, it is unrealistic to rely on these areas to accommodate demand for growth. Furthermore, the language will only permit development that "cannot otherwise be provided for within the current UGB limits". Rather than relaying on this language, this development should be planned for *within* the UGB during the GP update process, in order to avoid using these expansion areas. These three proposed expansion areas are not within Petaluma's jurisdiction now, may never be within Petaluma's jurisdiction, and therefore should not be included within the General Plan or covered in the DEIR. Otherwise, the General Plan and DEIR must reconcile the difference between these proposed expansion areas and the limits that are in force until 2018 in the current UGB. For example, what impact will these proposed expansion areas have on the any future UGB and on future water demand? B

While I am unable to attend this evening's meeting, I look forward to further engaging Petaluma's General Plan Update/DEIR process. In closing, I urge you to remove the planning for these three UGB expansion areas from the General Plan and DEIR. Short of that, I ask that you require drafting of an alternative in the DEIR that does not include these areas.

Sincerely,

Daisy Pistoy-Lyhne
Sonoma/ Marin Field Representative

MAIN OFFICE • 631 Howard Street, Suite 510, San Francisco, CA 94105 • (415) 543-6771 • Fax (415) 543-6781
SOLANO/NAPA OFFICE • 725 Texas Street, Fairfield, CA 94533 • (707) 427-2308 • Fax (707) 427-2315
SOUTH BAY OFFICE • 1922 The Alameda, Suite 213, San Jose, CA 95126 • (408) 983-0856 • Fax (408) 983-1001
EAST BAY OFFICE • 1601 North Main Street, Suite 105, Walnut Creek, CA 94596 • (925) 932-7776 • Fax (925) 932-1970
SONOMA/MARIN OFFICE • 555 5th Street, Suite 300B, Santa Rosa, CA 95401 • (707) 575-3661 • Fax (707) 575-4275
info@greenbelt.org • www.greenbelt.org

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Tuft, Pamela

From: Diane Reilly Torres [dreillytorres@sbcglobal.net]
Sent: Monday, May 21, 2007 10:05 AM
To: Tuft, Pamela
Cc: ghcart@netzero.net; oldeastpetaluma@yahoo.com
Subject: General Plan DEIR Comment –

150

Diane Reilly Torres Comment on the Draft General Plan + DEIR

3-P-113 Require development on sites greater than ¼-acre in size to demonstrate no net increase in peak-day stormwater runoff.
This is lined out and says Move policy to Chapter 8: Water Resources

I can not find this policy in Chapter 8 : Water Resources I did find a 10-29-06 request by the Regency Centers to delete it. A

Please put it back in.

I have submitted comments but wish to comment on the proposed Petaluma River Corridor (PRC) set aside for the design and construction of a flood terrace system to allow the River to accommodate a 100-year storm event within a modified River channel.

Goal 8-G-8: Surface Water Management
Provide surface drainage and flood protection facilities to meet the community's needs.

Is developing in the floodplain a community need or is not being flooded a community need? . Please define "community needs" B

Policies and Programs:
8-P-28 The area upstream of the Corps weir, and below the confluence of Willowbrook Creek with the Petaluma River, located within the 1989 FEMA floodplain (and any amendments thereto) and adjacent to the Petaluma River, shall include a Petaluma River Corridor (PRC) set aside for the design and construction of a flood terrace system to allow the River to accommodate a 100-year storm event within a modified River channel. C

A. The Water Resources and Conservation Department shall work with the Community Development Department, through the project entitlement process, to insure the PRC is implemented at the cost of the development.

Does the project entitlement process include the required permits by other regulated entities? Please identify the agency's and the required permits in order for the City to modify a river channel, by constructing a "flood terrace system".

B. Maintenance, in perpetuity, of the PRC and applicable flood terrace, storm water flow capacity, environmental habitat and public access improvements shall be maintained, through a funding mechanism approved by the City, as a condition of project

entitlement.

8-P-29 Working with the SCWA and the Sonoma County Board of Supervisors, the City shall identify the necessary setbacks for the Willowbrook, Marin and Liberty Creek corridors within the Petaluma Planning Referral Area to include a Creek Corridor set aside for the design and construction of a flood terrace system to allow the Creeks to accommodate a 100 year storm event within a modified creek channel.

What agency's require permits for the city to modify a creek channel?What is the design and how will the flood terrace system be constructed?

C. The City shall, in accordance with the XP-SWMM analysis of the Petaluma River corridor, work with the regulatory and advisory agencies and property owners along the River to implement the identified physical improvements to accommodate the 100-year storm event within a modified River channel.

What are the identified physical improvements?

Diane Reilly Torres

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Public Comment 2/20/07
General Plan Discussion

GP Administration

FEB 26 2007

I am here with Petalumans for Responsible Planning but also as a Citizen of Petaluma.

first: Most of the agencies my wife and I have talked to over the last 27 years know very little about what happens to Kelly Creek.

I hope to clear up some misconceptions and shed light on the facts about Kelly Creek and the Thompson Creek By-pass as I know it.

162

Kelly Creek runs into town along D Street. It is joined by Weiss Creek which is the tributary which runs down from Helen Putnam Park through the Scott Ranch Property. It passes under D Street by the Pinnacle Subdivision

A

While it is true that some water is taken out of Kelly Creek before it passes under Sunnyslope Avenue, a near equal amount of water is reintroduced just past the weir dam. It's origins are fuzzy to me but it comes from the other side of "D" street up El Rose and I think up towards Victoria and is also part of the storm drains. It flows under Sunnyslope Ave and connects there with Kelly Creek in the tunnel the creek goes through across Sunnyslope Ave. By the way, we believe this new water has polluted the Creek as it inters our yard.

When the system is working it does divert some water away but when it over flows it floods out the intersection of Sunnyslope Avenue and Sunnyslope Road and crosses into Kelly Creek. It is my experience that at such times water does whatever it wants.

Kelly Creek is private from Sunnyslope Avenue to 8th Street and flows through many back or side yards including my own. Though some infrastructure along the creek is fine, some is in horrible shape. There is a 4'x4'x40' culvert constricting Kelly Creek as it leaves our yard which the county did not know about when they did the work in circa 1991. This culvert has been here since long before we moved in and there have been a succession of owners during that time. I suppose it is grandfathered in and no one seems to have the authority to require it be changed. There are some very tired 10 foot retaining walls holding back what will be very wet soil just past the culvert and if they fail and they will, flooding will be throughout the entire area. I'm guessing that none were done with permits.

It is my understanding that the city of Petaluma and Sonoma County Water agency have no jurisdiction to change anything in the course of Kelly Creek through private yards yet continue to allow stress to the system with unbridled upstream development. We've lived here for 27 years and have seen the results of the counties work. The Kelly Creek through our yard used to be dry during the summer and filled with frogs in Spring. Now it has year round flow and the frogs are above the dam but not below where the street runoff inters. The Water quality has been Diminished.

Much of the new building allowed is not in the form of subdivisions but is incremental. Five houses here, Eight houses there. Within just one year the slope draining into Kelly Creek might acquire 20 or more new homes. None of these homes catch their run off. When they do and divert it to the culvert under Sunnyslope Ave. It does not go into Thompson Creek but only into Kelly Creek.

The FEMA map of the area is from circa 1989 and is woefully out of date. It does not reflect the current situation. It is my understanding that FEMA would have to be commissioned by the City for a new map.

The photograph that we showed to the planning commission of a stump in the by-pass was to illustrate the neglect of the system and it did not cause flooding on Kelly Creek as has been rumored. Though the water was very high, it did not crest during the New Years Flood of '06. We thankfully didn't have the brunt of the storm cell over us that night. We did have it here in 1998 after the counties work, when the street and our yard was under water.

I think it's clear that we know very little about how weather works. Most calculations on flooding, like the 50 years and the 100 years floods was done before anything was known about El Nino. How may 100 year floods happen in 100 years. My guess is at least 5. So how do these figures help us. B

Now I'll mention Global Warming or Climate change as I think optimists call it. 30 years from now what will another 3' to 6" in height in the Petaluma River do to the flooding situation. How much more common might the El Nino effect be.

I hope and trust that the Citizens of Petaluma have elected a far sighted Mayor and council members and hope that you make considered decisions that respect existing infrastructure and future unknown weather condition.

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AUG – 3 2007

GP Administration

Geoffrey H. Cartwright
56 Rocca Drive
Petaluma, Ca. 94952
(707) 763 2883

General Plan Administration
City Of Petaluma
27 Howard Street
Petaluma, Ca. 94952

March 18, 2007

Dear Ms. Tuft,

Please have the consultants address the following concerns pertaining to the PETALUMA GENERAL PLAN 2025 DRAFT ENVIRONMENTAL IMPACT REPORT (SECTION 3.6 HYDROLOGY AND WATER QUALITY). 163

I know that your office has been made aware of the San Francisco Bay Conservation and Development Commissions recent release of information pertaining to the Intergovernmental Panel on Climate Change and the 2006 California Climate Action Team Report. The information reported shows a seven inch rise of the sea level in the San Francisco Bay over the past 150 years and further indicates a twelve (12) to thirty six (36) inch rise in mean sea level over the next one hundred (100) years.

Being aware that the scope of the new General Plan only covers the next twenty (20) years it is possible that the consultants for the Petaluma General Plan 2025 may at first glance consider such projections pertaining to the next one hundred (100) years as outside of the scope of the new General Plan. Therefore I believe it is necessary to point out that provided there is no increase in the rate of the mean sea level rise and one follows the predictions as reported by the San Francisco Bay Conservation and Development Commission (BCDC) It is safe to assume, over the next twenty (20) years we will most likely see an increase in the mean sea level between two point four (2.4) and seven point two (7.2) inches.

It is stated in the (BCDC) report pertaining to sea level rise and I quote "Sea level rise models indicate that a 30 cm (11.8 inch) rise in sea level would shift the 100-year storm surge-induced flood event to once every 10 years. With each flood event, the Bay Area stands to lose valuable real estate, critical public infrastructure, and natural resources."

Considering the Petaluma River, the altitude of much of Petaluma relative to sea level, the flood plain and the already severe flooding that Petaluma has experienced I believe any rise in sea level over the next twenty (20) years approaching between 2.4 and 7.2 inches would be significant. It is my firm desire to see these issues thorough addressed in the Petaluma General Plan and Draft EIR.

Sincerely,
Geoffrey H. Cartwright

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Claire McCarthy
714 Jefferson Street
Petaluma, CA 94952

(707) 769-0878
justclaire@gmail.com

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GP Administration

March 21, 2007

Reference: Draft General Plan 2025

Dear Claire Cooper,

My name is Claire McCarthy and I have been a resident of Petaluma for over 14 years. I am married with two children ages 6 and 3. I am the US Environmental, Health and Safety Manager for a large technology company in Santa Rosa and have over 19 years work experience in the field of environmental management. In addition, I am a fellow of the Leadership Institute for Ecology and the Economy. 164

I am writing to you today to air my concerns over the Kenilworth development proposed in my neighborhood. I have received a copy of the Draft Environment Impact Report (DEIR) and have read excerpts of the Draft General Plan on line. My concern centers on the lack of a Community Impact Report (CIR) to hold the developers accountable to the policy makers and the residents of the community in which they develop.

The following outlines basic elements that need to be included as part of this development:

1. **A complete fiscal assessment analyzing all direct and indirect costs including long term benefit to public agencies.**
    - Case studies have shown that development projects in which a CIR is included ensure that the taxpayer's money is spent more efficiently by highlighting projects that truly provide significant public benefit.
    - Examples of win-win developments that have included a CIR include LAX Airport, The Staples Center, City of Inglewood, City of Vallejo, City of Oakland, and many others.

2. **A "neighborhood needs assessment" to determine the project retail benefits and the service needs facing the affected neighborhood.**
    - A neighborhood needs assessment will identify the assets of the neighborhood and the potential concerns that these assets will face in light of the new development.
    - For this development, impacted neighborhood assets include childcare facilities, a public park, the public library, and Live Oak Charter School (K-8 elementary school).

3. **A smart growth assessment to determine whether the project will make the affected neighborhood more livable.**
    - The definition of a livable neighborhood includes affordable housing, thriving independent local business, a protected environment, reduced auto dependency, and civic policies that promote a high quality of life for all residents.
    - The current General Plan or the DEIR do not include an impact assessment on the affected neighborhood per the above definition.

4. **An employment assessment to determine the long term viability of job creation including locally owned and operated businesses.**
    - This would provide information on the number of jobs expected to be created and the *quality* of those jobs.
    - An employment assessment also incorporates the long term viability of employment retention and creation in a diverse array of job categories.

Claire McCarthy
714 Jefferson Street
Petaluma, CA 94952

(707) 769-0878
justclaire@gmail.com

5. **A health impact assessment to determine the long term health costs and impacts of this project on the affected neighborhood.**
    - Long term health impacts need to be assessed especially for our most vulnerable community members (children, seniors, infirm).
    - Deteriorated health due to development and increased traffic will increase the demand on health care providers, thus generating a critical need for improved access to health care.
    - A health assessment will also evaluate the impact on health care costs and civic costs to provide health care and emergency response to city residents.

6. **A housing assessment to determine the affordability of housing (no more than 30% of income spent on housing and associated costs) created or lost in the affected neighborhoods as a result of the project**
    - A housing assessment in the affected neighborhoods in the categories of home ownerships, rental housing, senior housing and special needs housing.
    - Such an assessment will protect the capacity for water and sewer infrastructure, allow planning for schools, and determine the best traffic patterns.
    - Determine the potential exposure to law suits brought against local government by homeowners and businesses due to the devaluation of property under the Fifth Amendment property rights provision.

The work you do today as Petaluma's civic leadership *is* your legacy. You are presented with an opportunity to create a more meaningful legacy for future generations by going beyond conventional zoning codes, short term sales tax gain, and regressive thinking. In this voter's mind, you have come up with a significantly short sighted plan.

I challenge you to consider the needs of today's residents as well as future generations by passing an ordinance requiring Community Impact Reports as part of current, proposed, and future developments to create a healthy, economically viable, and environmentally protected community for you, me, and all Petaluma residents.

I would be happy to discuss the contents of this letter with you or be part of a fact finding team.

Please contact me at 769-0878.

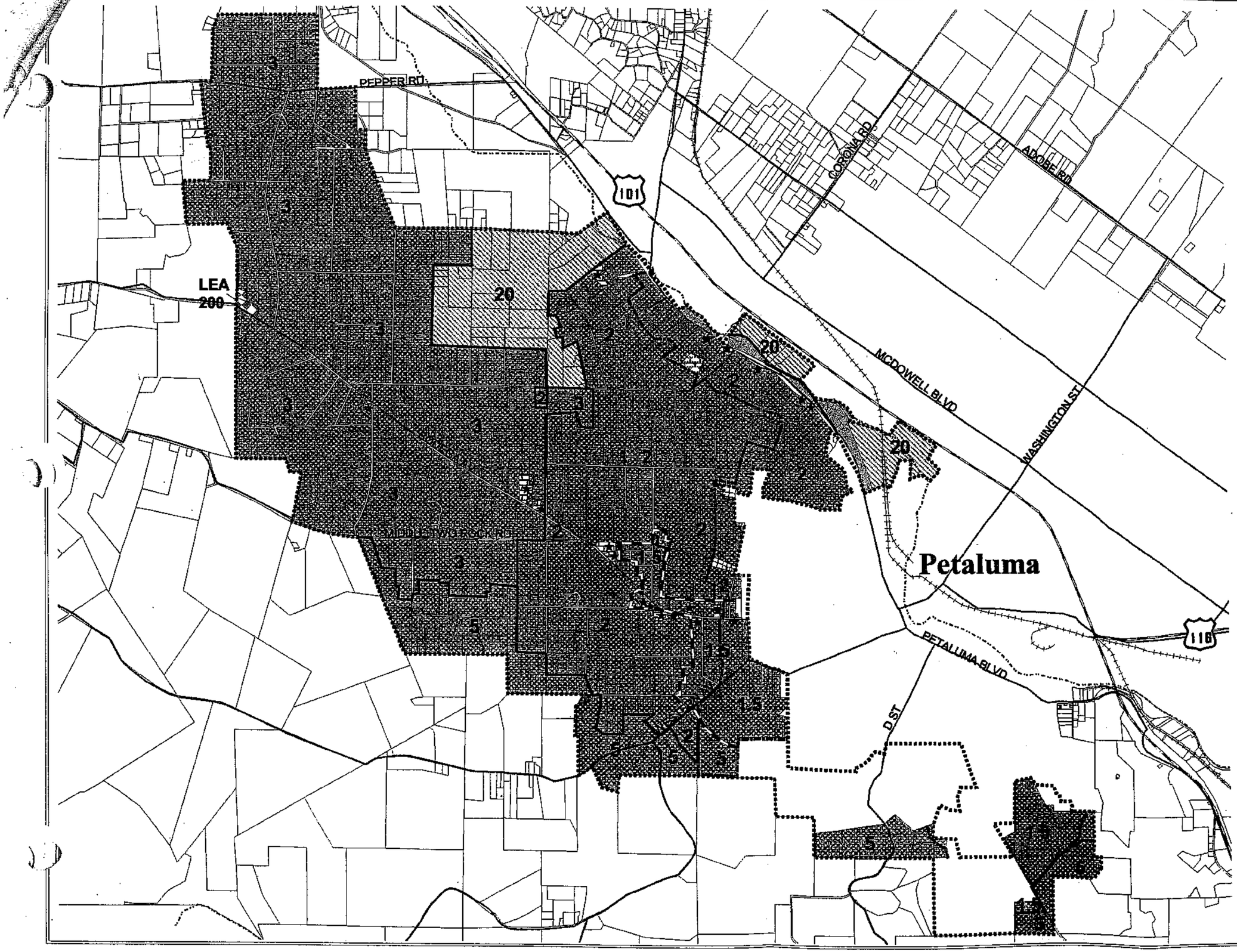
Sincerely,

Claire McCarthy

Copies to:
Members of Petaluma City Council
Mayor Pamela Torliatt, City of Petaluma
Pamela Tuft, City of Petaluma
City Clerk, City of Petaluma
Old East Neighborhood Committee

West Petaluma Area Plan

Land Use



LEGEND

Land Use
- Diverse Agriculture
- Limited Commercial
- General Commercial
- Rural Residential
- Land Extensive Agriculture
- Public/Quasi Public

- Limited Service Boundary
- Area Plan Boundary
- Change in Density
- Urban Service Boundary
- Parcel
- Railways
- Hydrography
- Highway
- Major Road

Numbers on map indicate maximum density in acres/unit.

N

0.5 0 0.5 Miles

500 0 500 1000 Meters

Permit and Resource Management Department
County of Sonoma
2550 Ventura Avenue Santa Rosa, CA 95403
707-565-1900 Fax: 707-565-1103

July 1, 2001

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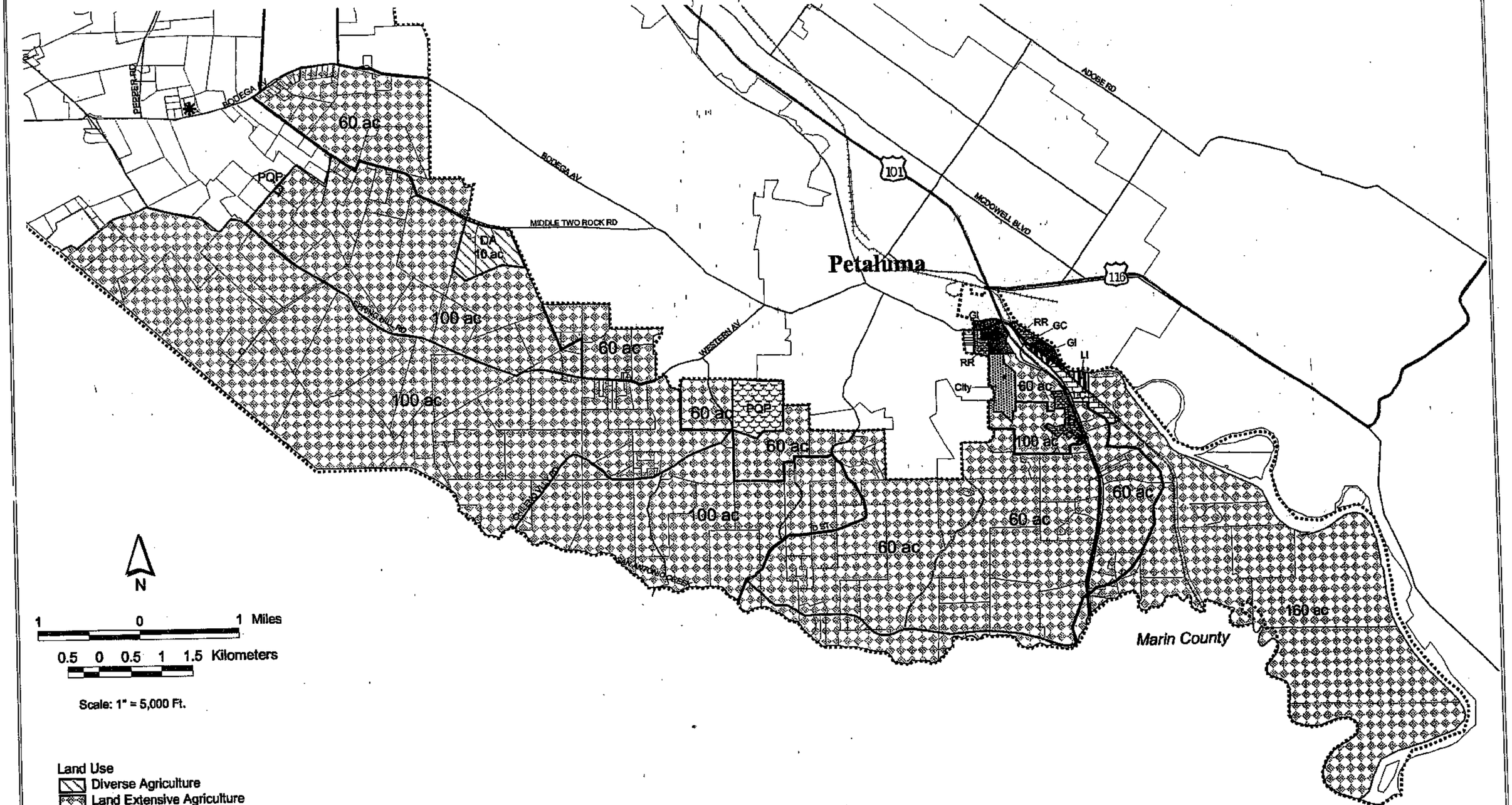

Petaluma Dairy Belt Area Plan

Land Use Plan

(South Portion)

County of Sonoma
Permit and Resource Management Department
2550 Ventura Avenue
Santa Rosa , California 95403
(707) 565-1900

July 1, 2001

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8/11/81

3. Low Density Residential Land Use, 1-2 dwellings per acre is changed to Low Density Residential Land Use, 15-1.5 acres per dwelling unit.
4. Add Limited Services Boundary as shown on Exhibit "A" on file with the Planning Department. The residential density within the Limited Services Boundary is 1.5 acres per dwelling unit.
5. Rural Residential Land Use, 2 acre density is changed to Rural Residential Land Use, 3 acre density.
6. Rural Residential Land Use, 1.5 acre density is changed to Rural Residential Land Use 2 acre density.

D. THE BOARD OF SUPERVISORS SUPPORTED A REQUEST BY THE CITY OF PETALUMA FOR IMPOSITION OF A LIMITED SERVICE BOUNDARY AND THE FOLLOWING SET OF POLICIES:

1. LANDS WITHIN THE URBAN BOUNDARY:

a. Service and Annexation
Services will be available to such lands from the City of Petaluma. Major utility expansions should be planned to serve logical groups of properties, wherever possible. The receipt of services will require annexation of the affected properties to the City, or where such properties are temporarily precluded from annexation due to location, an irrevocable request to annex shall be offered by the owners of such properties, and accepted by the City.

b. Annexation
Prior to annexation, properties must meet the most current annexation policies of the City regarding provision of utilities, fees, and direct public street access to the properties, improved to City standards.

c. Development Review
All development and subdivision applications within the Urban Boundary shall be reviewed by the City of Petaluma prior to County approval. All such proposed development and subdivisions shall be subject to compliance with City street and other applicable City development criteria.

d. Residential Density
Densities on County land should remain low with lot sizes larger than 1.5-2 acres per dwelling unit unless City services can be provided, annexation is arranged, and plans for additional development are approved by the City. Where these development criteria can be met and services can be provided, densities will be permitted to increase up to 2 dwelling units per acre.

2. LANDS WITHIN LIMITED SERVICE BOUNDARY:

a. Services
Water or sewer service could be delivered in various

locations within the Limited Service Boundary. Such services may be made available to such lands where the proposed development meet the City development review standards, and does not exceed the density policy.

b. Annexation
Annexation should not normally be a requirement for the provision of services.

c. Development Review Standards
In order to receive public services, proposed developments, lots and subdivisions must meet City development standards. Such proposed development shall be referred to and be recommended for approval by the City as a condition of the provision of services.

d. Residential Density
Densities on County lands should remain low with lot sizes larger than 2 acres per dwelling unit unless City services are provided to them, in which case densities could increase to 1 1/2 acres per dwelling unit.

COUNTY OF SONOMA
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT
2550 Ventura Avenue, Santa Rosa, CA 95403-2829
(707) 565-1900 FAX (707) 565-1103

General Plan 2020
Citizen's Advisory Committee Meeting

Summary Minutes, Meeting of August 19, 2004

CAC Attendees:

Tamara Boultbee	Don Marquardt
Rand Dericco	Bob Marshall
Dick Fogg	Vickie Mulas
Craig Harrington	Dick Osborn
Tony Korman	Rick Savel

Staff:
Greg Carr, Scott Briggs, Lisa Posternak, PRMD; John Kottage, DPTW

Specific and Area Plans

Greg Carr introduced the subject. In past years, the County prepared and adopted Specific and Area Plans that set very specific land use designations and densities around the County. At the time, the General Plan was very vague and hard to interpret on a parcel-by-parcel basis, and these plans were used to bring the community into the planning process, and to establish very specific zoning and land use and to develop policies which, while being similar to other areas, also had unique characteristics that reflected that particular area. Legal issues arose from inconsistencies between the specific plans and the General Plan with regard to zoning, density, riparian corridors and other things. The 1989 General Plan was formulated around the idea all of the zoning and land use from the specific plans would be reflected in one document. Unique character aspects of those specific plans were not all included, such as design guidelines, development guidelines, etc. The Board decided to get rid of some of the older specific plans, and keep some of the others and eliminate duplication. The Larkfield and the Windsor Plans are proposed to be eliminated. The current Area Plans still reflect important aspects to certain communities, and are presented at this time with changes that are necessary for consistency with the general plan. The regulations of the general plan are pre-eminent, but Area Plans can vary and provide more detailed information and policies in those areas where it does not conflict with the General Plan. The remaining Area Plans were checked for consistency and were not rewritten. Greg went on to say that the area plans will be needed less over time, as more and more of the policies and standards come in to the general plan. The downside of an Area Plan is that every time something is done, both Area Plan and the General Plan need to be checked to maintain consistency. Both documents come into play when dealing with the public on projects. There is a desire to have uniqueness in communities, and it is dealt with by allowing design guidelines to be created in certain communities that can provide for that uniqueness.

Lisa Posternak added that there is no map of the study areas attached. Under each of the area plans, staff identified those areas where there are inconsistencies with the General Plan, and provide pertinent policy. Staff also recommended amendments of the policy to create consistency with the General Plan.

Sonoma County Planning Commission
ACTIONS

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AUG - 3 2007

Sonoma County Permit and Resource Management Department
2550 Ventura Avenue, Santa Rosa, CA 95403
(707) 565-1900 FAX (707) 565-1103

GP Administration

Date: **July 25, 2006**
Meeting No.: **06-031**

ROLL CALL

COMMISSIONERS	STAFF MEMBERS	STAFF MEMBERS
__X__ Don Bennett	__X__ Jennifer Barrett	__X__ Denise Peter
__X__ Nadin Sponamore	__X__ Gary Helfrich	__X__ Sue Dahl
__X__ Dennis Murphy	__X__ Bob Gaiser	__X__ Sally McGough, Deputy County Counsel
__X__ Rue Furch	__X__ Greg Carr	__X__ David Hurst, Chief Deputy County Counsel
__X__ Dick Fogg, Chair	__X__ Lisa Posternak	
	__X__ Amy Wingfield	

TITLE: AREA PLAN AMENDMENTS

PROBLEM STATEMENT: Sonoma County has eight Area Plans, all of which were last revised in 1993 pursuant to Policy LU-1a of the 1989 General Plan. By law, the Plans must be consistent with the General Plan. Recommended changes under the General Plan Update may render these Area Plans inconsistent with draft General Plan 2020.

EXISTING POLICY: The Area Plans are consistent with the 1989 General Plan.

KEY ISSUES AND ANALYSIS: In some cases policies in the West Petaluma, Petaluma Dairy Belt, Penngrove, Sonoma Mountain, South Santa Rosa, Bennett Valley, and Franz Valley Area Plans conflict with draft General Plan 2020.

RECOMMENDATIONS:

Staff	Add or revise policy in the above Plans regarding Riparian Corridors, special status species, Biotic Habitat Areas, Scenic Landscape Units and Community Separators, urban growth and urban services boundaries, outdoor lighting, landscaping, and transportation as appropriate.
CAC Subcommittee	N/A
CAC	Follow staff recommendations with the following two modifications: *Penngrove Area Plan:* Retain policy about evaluating alternative routes for Petaluma Hill Road that would divert traffic around central Penngrove. Add policy about consideration of intersection improvements affecting circulation and traffic volumes through Penngrove. *South Santa Rosa Area Plan:* Add "Petaluma Hill Road" to the list of Local Roads. Revise policy regarding improvements to roads within the Santa Rosa Urban Service Area to include language that the improvements should follow the City of Santa Rosa General Plan and be consistent with city road classifications and design standards unless these standards are less than County standards. Votes on all Area Plans: 10:0

BOARD OF FORESTRY AND FIRE PROTECTION
P.O. Box 944246
SACRAMENTO, CA 94244-2460
(916) 653-8007
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Website: www.fire.ca.gov/bof

RECEIVED
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GP Administration
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August 31, 2007

City of Petaluma
27 Howard Street
Petaluma, CA 94952

Re: City of Petaluma General Plan Fire Safety Element Recommendations

Dear Ms. Pamela Tuft:

The State Board of Forestry and Fire Protection (Board) is required to review and provide recommendations to the safety element of county and local government general plans when such plans are being updated. This review is in accordance with Government Code (GC) §65302.5 which requires the Board to review the fire safety element when the general plan update contains State Responsibility Areas or Very High Fire Hazard Severity Zones.

Enclosed is a list of standard recommendations titled "*General Plan Fire Safety Elements Standard Recommendations* "' which should be incorporated into the General Plan. Each entity should evaluate their general plan and include the appropriate recommendations from the list.

The Board realizes this submission may be outside the comment period stated in GC §65302.5. Given these circumstances, the Board submits the attached recommendations for use in the next general plan update. Thank you for the opportunity to participate in your planning process. We hope this input leads to greater protection and reduced cost and losses from wildfires to the County and adjacent wildlands.

Sincerely,

Stan Dixon
Chair, State Board of Forestry and Fire Protection

Bill Hoehman, Northern Region Chief
Ernie Loveless, Lake Sonoma Napa Unit Chief
Wayne Mitchell, State Fire Marshal Office
Allan Robertson, Chief Environmental Coordinator

General Plan Fire Safety Element

Standard Recommendations

August 29, 2007

State Board of Forestry and Fire Protection

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Purpose and Background

Methodology for Review and Recommendations

Standard List of Recommendations

Purpose and Background: The State Board of Forestry and Fire Protection (BOF/Board) is required to review and make recommendations to the fire safety element of general plan updates in accordance with Government Code (GC) §65302.5. The review and recommendations apply to those general plans with State Responsibility Area (SRA) (Public Resources Code 4125) or Very High Fire Hazard Severity Zones (VHFHSZ) (GC 51175).

The statutory requirements for the Board review and recommendations pursuant to GC 65302.5 (a)(1) and (2), and (b) are as follows:

- *"The draft elements...to the fire safety element of a county's or a city's general plan...shall be submitted to the Board at least 90 days prior to... the adoption or amendment to the safety element of its general plan [for each county or city with SRA or VHFHSZ]."*

- *"The Board shall... review the draft or an existing safety element and report its written recommendations to the planning agency within 60 days of its receipt of the draft or existing safety element...."*

- *"Prior to adoption of the draft element..., the Board of Supervisors... shall consider the recommendations made by the Board... If the Board of Supervisors...determines not to accept all or some of the recommendations...," the Board of Supervisors... shall communicate in writing to the Board its reasons for not accepting the recommendations.*

Methodology for Review and Recommendations: The Board has created a standard list of fire protection evaluation factors and recommendations related to these factors. The factors and recommendations provide civic planners general plan goals and policies for mitigation of fire hazard and risks. The factors and recommendations were developed using CAL FIRE technical documents and input from local fire departments.

The recommendations on the attached list are the Board's general recommendations for any entity. Each entity should evaluate their general plan using the factors and include the appropriate recommendations from the list.

Standard List of General Plan Safety Element Recommendations

1. **General Plan References and Incorporates County or Unit Fire Plan:** ☐ Yes ☐ Partial ☐ No

Recommendation: Identify, reference or create (if necessary) a fire plan for the entity. Plan should incorporate the general concepts and standards from any county fire plan, fire protection agency (federal or state) fire plan, and local hazard mitigation plan.

Recommendation: Ensure fire plans incorporated by reference into the GP contain evaluations of fire hazards, assessment of assets at risk, prioritization of hazard mitigation actions, and implementation and monitoring components.

2. **Land Use Planning:**

2.1 Goals and policies include mitigation of fire hazard for future development. ☐ Yes ☐ Partial ☐ No

Recommendation: Ensure the fire safe development codes used as standards for fire protection for new development in the VHFHSZ portions of the entity's jurisdiction meet or exceed statewide standards used for State Responsibility Area in 14 California Code of Regulations Section 1270 et seq.

Recommendation: Include policies and recommendations that incorporate fire safe buffers and greenbelts as part of the development planning. Ensure that land uses designated near high or very fire hazard severity zones are compatible with wildland fire protection strategies/capabilities.

2.2 Disclosure of wildland urban interface hazards including Very High Fire Hazard Severity Zones designations and Communities at Risk designations: ☐ Yes ☐ Partial ☐ No

Recommendation: Specify whether the entity has a VHFHSZ designation and include a map of the zones. Clearly indicate any area designated VHFHSZ pursuant GC 51175. Adopt CAL FIRE proposed Fire Hazard Severity Zones including model ordinance terms and conditions developed by the Office of the State Fire Marshal for establishing VHFHSZ areas.

3. **Housing:**

3.1 Incorporation of current fire safe building codes. ☐ Yes ☐ Partial ☐ No

Recommendation: Adopt the International Fire Code Council Urban Interface Model Code for new development in wildland urban interface areas in State Responsibility Areas or local Very

High Fire Hazard Severity Zones. Adopt newly proposed Title 24 CCR Wildland Urban Interface Building Codes.

3.2 Identification of substandard fire safe housing relative to fire hazard area. ☐ Yes ☐ Partial ☐ No

Recommendation: Identify plans and actions to improve substandard housing structure conformance with contemporary fire standards in VHFHSZ or SRA. Plans and actions should include structural rehabilitation, occupancy reduction, demolition, reconstruction, community education, and community based solutions.

3.3 Compatibility of development, construction and building standards relative to access, flammability and fire flow. ☐ Yes ☐ Partial ☐ No

Recommendation: Ensure existing residential structures, and other "legacy" substandard residential structures, meet current fire safe ordinances pertaining to access, water flow, signing, and vegetation clearing.

3.4 Consideration of occupancy category effects on wildfire protection. ☐ Yes ☐ Partial ☐ No

Recommendation: Ensure risks to uniquely occupied structures, such as seasonally occupied homes, multiple dwelling structures, or other structures with unique occupancy characteristics, are considered for appropriate and unique wildfire protection needs.

3.5 Urban development and wildfire encroachment resistance features. ☐ Yes ☐ Partial ☐ No

Recommendation: Ensure residential housing zoning provides minimum fire safe standards, particularly in VHSHSZ or SRA. For example, zone designations that allow less expensive housing should conform to contemporary fire safe building and development standards.

3.6 Fire engineering structures (sprinklers/alarms). ☐ Yes ☐ Partial ☐ No

Recommendation: Ensure new development proposals contain specific fire protection plans, actions or referenced codes for fire engineering features for structures in VHFHSZ. Examples include codes requiring automatic sprinklers in VHFHSZ.

4. Conservation and Open Space:

4.1 Identification of critical natural resource values relative to fire hazard areas.
☐ Yes ☐ Partial ☐ No

Recommendation: Determine maximum acceptable wildfire size and initial attack suppression success rates for protection of critical natural resources.

4.2 Inclusion of resource management activities to enhance protection of open space (prescribed burning, fuel breaks, vegetation thinning and removal). ☐ Yes ☐ Partial ☐ No

Recommendation: Provide vegetation management fire mitigation measures that provide protection of open space natural resources, reduce fire hazards to adjacent assets, and allow for safe fire suppression tactics.

4.3 Mitigation for unique pest, disease and other forest health issues leading to hazardous situations. ☐ Yes ☐ Partial ☐ No

Recommendation: Establish goals and policies that address unique pest, disease, exotic species and other forest health issues in open space areas relative to reducing fire hazard.

4.4 Integration of open space into fire safety effectiveness. ☐ Yes ☐ Partial ☐ No

Recommendation: Establish goals and policies for reducing the wildland fire hazards within the entity's boundaries and on adjacent private wildlands, federal lands, vacant residential lots, and greenbelts. Wildland fuels should be treated in those areas to reduce the intensity of fires. Identify goals and policies for engaging adjacent wildland owners regarding hazard mitigation plans on lands with fire hazards that threaten the entity.

4.5 Policies for dedication, construction and maintenance of systematic fire protection improvements in open space. ☐ Yes ☐ Partial ☐ No

Recommendation: Establish goals and policies for incorporating, systematic fire protection improvements for open space. Specifics should include standards for adequate access for firefighting, fuel modifications for open space within and on the perimeter of the entity, mitigation planning with agencies managing open space, water sources for fire suppression, and other fire prevention and suppression needs.

4.6 Urban forestry plans relative to fire protection: ☐ Yes ☐ Partial ☐ No

Recommendation: Ensure residential areas have appropriate fire resistant landscapes and discontinuous vegetation adjacent to open space or wildland areas.

Recommendation: Evaluate and resolve existing laws and local ordinances which conflict with fire protection requirements. Examples include conflicts with vegetation hazard reduction ordinances and listed species habitat protection requirements.

5. Circulation and Access:

5.1 Existing and planned transportation system incorporates requirements for designs that minimize wildfire damage to natural resources and minimizes hazards to human life.
☐ Yes ☐ Partial ☐ No

Recommendation: Incorporate adequate access for firefighting, especially for existing "legacy" neighborhoods in VHFHSZ, SRA. Goals for standards for access should be consistent to those in 14 CCR 1270.

5.2 Adequacy of existing and future transportation system to incorporate fire infrastructure elements such as turnouts, helispots and safety zones. ☐ Yes ☐ Partial ☐ No

Recommendation: Establish goals and policies for transportation system fire infrastructure elements or otherwise reference appropriate supporting documents where these topics are addressed.

5.3 Adequate access to high hazard areas. ☐ Yes ☐ Partial ☐ No

Recommendation: Establish goals and policies that delineate high hazard areas, establish adequate access that meets or exceeds standards in 14 CCR 1270 for lands with no structures, and maintaining conditions of access in a suitable fashion for suppression access or public evacuation.

5.4 Standards for evacuation of residential areas in high hazard areas. ☐ Yes ☐ Partial ☐ No

Recommendation: Goals and policies should be established to delineate residential evacuation routes and evacuation plans in high fire hazard residential areas.

6. Hazard Mapping and Fire Safe Regulations:

6.1 Fire Hazard Mapping Designations ☐ Yes ☐ Partial ☐ No

Recommendation: Specify whether the entity has an official VHFHSZ designation and include a map of the zones. Clearly indicate any VHFHSZ pursuant GC 51175. Adopt CAL FIRE proposed Fire Hazard Severity Zones.

6.2 Adopt or incorporate local fire safe ordinances which meet or exceed standards similar to those in 14 CCR § 1270 for State Responsibility Area. ☐ Yes ☐ Partial ☐ No

Recommendation: Establish goals and policies for specific ordinances addressing evacuation and emergency vehicle access; water supplies and fire flow; fuel modification for defensible space; and home addressing and signing.

6.3 Geographic specific mitigation measures for fuel modification and fire risk reduction.
☐ Yes ☐ Partial ☐ No

Recommendation: Establish goals and policies that identify structures that have adequate fuel modification or other features that provide adequate fire fighter safety when tactics call for protection of a specific asset (i.e. which houses are safe to protect).

6.4 Fuel Modification around homes. ☐ Yes ☐ Partial ☐ No

Recommendation: Establish ordinances in VHFHSZ for vegetation fire hazard reduction around structures that meet or exceed the Board of Forestry and Fire Protection's Defensible Space Guidelines, (http://www.bof.fire.ca.gov/pdfs/Copyof4291finalguidelines9_29_06.pdf) for SRA.

6.5 Adequacy of defense zones. ☐ Yes ☐ Partial ☐ No

Recommendation: Establish goals and policies for wildfire defense zones for emergency services including fuel breaks, back fire areas, or other staging areas that support safe fire suppression activities.

7. Emergency Services:

7.1 Map/description of existing emergency service facilities and areas lacking services: ☐ Yes ☐ Partial ☐ No

Recommendation: Include descriptions, maps, and standards for levels of emergency services. Review, develop or incorporate Local Agency Formation municipal services reviews for evaluating level of service, response times, equipments condition levels and other relevant emergency service information.

Recommendation: Incorporate goals and policies that establish emergency services consistent with state or national standards.

Recommendation: Ensure new development includes appropriate facilities to assist and support wildfire suppression.

7.2 Assessment and projection future emergency service needs: ☐ Yes ☐ Partial ☐ No

Recommendation: Establish goals and policies for new development emergency service needs and ensure appropriate levels of service are established consistent with state or national standards.

7.3 Adequacy of training. ☐ Yes ☐ Partial ☐ No

Recommendation: Establish goals and policies for emergency service training that meets or exceeds state or national standards.

7.4 Inter-fire service coordination preparedness/mutual aid and multi-jurisdictional fire service agreements. ☐ Yes ☐ Partial ☐ No

Recommendation: Adopt the Standardized Emergency Management Systems for responding to large scale disasters requiring a multi-agency response. Ensure and review mutual aid and cooperative agreements with adjoining emergency service providers.

8. **Post Recovery and Maintenance:** The Recovery and Maintenance recommendations address an opportunity for the community and landowners to re-evaluate land uses and practices that affect future wildfire hazards and risk.

8.1 Revaluate hazard conditions. ☐ Yes ☐ Partial ☐ No

Recommendation: Incorporate goals and policies that provide for reassessment of fire hazards following wildfire events. Adjust fire prevention and suppression needs commensurate for both short and long term fire protection needs. Develop burn area recovery plans that incorporate comprehensive recovery and fire safe maintenance.

8.2 Incorporate wildlife habitat//endangered species considerations. ☐ Yes ☐ Partial ☐ No

Recommendation: Establish goals and policies for consideration of wildlife habitat//endangered species into long term fire area recovery and protection plans.

8.3 Native species reintroduction. ☐ Yes ☐ Partial ☐ No

Recommendation: Incorporate native species habitat needs as part of long term fire protection and fire restoration plans.

8.4 Evaluation of redevelopment. ☐ Yes ☐ Partial ☐ No

Recommendation: In High and Very hazardous areas, ensure redevelopment utilizes state of the art fire resistant building standards with 100 foot set backs (when possible) to ensure adequate defensible space is maintained around structures.

8.5 Long term maintenance of fire hazard reduction mitigation projects ☐ Yes ☐ Partial ☐ No

Recommendation: Provide polices and goals for maintenance of fire hazard reduction projects, activities, or infrastructure.

9. **Flood and Landslides:** Recommendations for flood and landslides hazards, risks and vulnerabilities relative to past wildfire should be developed to mitigate potential losses to life, human assets and critical natural resources.

9.1 Establish flood and landslide vulnerability areas related to post wildfire conditions.
☐ Yes ☐ Partial ☐ No

Recommendation: Establish goals and policies that address the intersection of flood /landslide/post fire burn areas into long term public safety protection plans. These should include treatment assessment of fire related flood risk to life, methods to control storm runoff in burn areas, revegetation of burn areas, and drainage crossing debris maintenance.

10. <u>Terrorist Preparedness and homeland security impacts on wildfire protection:</u>
These recommendations are included to ensure that terrorist preparedness actions do not substantially increase fire risk or unduly restrict emergency response.

10.1 Communication channels during incidences. ☐ Yes ☐ Partial ☐ No

Recommendation: Establish goals and policies consistent with the Governor's Blue Ribbon Fire Commission of 2005 for communications and interoperability. Example goals and policies should address fire personnel capability to communicate effectively across multiple frequency bands and update and expansion of current handheld and mobile radios used on major mutual aid incidents.

10.2 Fire prevention barriers. ☐ Yes ☐ Partial ☐ No

Recommendation: Identify goals and policies that address vital access routes that if removed would prevent fire fighter access (bridges, dams, etc.). Develop an alternative emergency access plan for these areas.

10.3 Prioritizing asset protection from fire with lack of suppression forces. ☐ Yes ☐ Partial ☐ No

Recommendation: Identify and prioritize protection needs for assets at risk in the absence of response forces.

Recommendation: Establish fire defense zones that provide adequate fire protection without dependency on air attack.

End Standard Recommendations (version 8/29/07)

Tuft, Pamela

From: Tiffany Renee [tiff@designmotif.com]

Sent: Friday, November 30, 2007 11:17 AM

To: Pamela Torliatt; Mike Harris; Mike O'Brien; Karen Nau; David Rabbitt; Samantha Freitas; Chris Arras; John Mills; Tanya Sullivan; Will Dargie; Spence F. Burton; Teresa Barrett; Kathy Miller; Dennis Elias; Larry Reed; Hans Grunt; Terry

Cc: Tuft, Pamela; Scott Duivan; Bierman, Mike; Cooper, Claire

Subject: FW: The Party's Over . . .

Ok, this week has put me on a tear... Consider this my opening comments to the General Plan revisions. I will have much more to say before the time is up. I know the news is astonishing at times. But we don't have time to wallow in our psyche's shock right now. We got to move forward. I've been hearing a lot of whispers and groans that we are facing the impossible in regards to reducing GHGs with our GP 2025.

I can't help but think about the ration stamps my grandmother gave me from WWII. Her ability to hoard canned food was amazing. The stamps clarified the whole thing for me after 30+ years of wondering why she had enough food to feed an army stockpiled away in her cupboards. Now the idea of driving rations seems impossible, but peak oil and climate crisis could make this necessary. We are not there yet, but we could be if we don't act. We've just got comfortable and lazy-brained as my grandmother would say.

We can and we must do all we can to get people out of their cars and working from a local place of business or from home. This is how businesses will manage their GHG reductions and deal with the economic transition. I heard Agilent is already underway with a program to make their employees work from home a couple days a week. Mandatory parking permits for all street parking would make people think twice about additional cars in front of their households (and would clean up the streets from toxic run off). It's not popular. Council members may not get re-elected if you did it (I certainly wouldn't have it as a campaign platform!), but permits seem much more doable than driving rations. We need to make it easier for people to do away with multiple cars now. Incentives for people without cars (free transit) or with electric cars or motorcycles (free street parking) is another approach.

Stop charging so much for Home Occupation Permits (the city could make up the difference in parking permit fees). Not charging for HO permits is a form of micro-lending to encourage home-based business incubation (and people don't need as many cars when working from home or locally). The tax credits from home-based businesses are what will help struggling people offset their income when they are making less at first (and an easy way to transfer some of that Federal tax money back to the local level, money the city would otherwise not get back from the Feds because the larger the buildings the more people don't understand reciprocity. The buildings in D.C. are huge...). Pretty simple... There is a reason this form of economics won a Nobel Prize. It works. You can do this.

We don't have time to wait for today's kindergarteners to give up their option to drive when they turn 16. I'm making my daughter choose now how she spends her mileage as a new driver. And I'm proud that my older daughter didn't even want to learn how to drive. What assumptions are we building into our lives that are just plain wrong? Driving is a privilege.

Don't wait until the State/Feds have implemented laws to force us to change our driving habits when it's already too late (or looks the other way when we suffer from draught —or salty groundwater— and flood), because the sea has already risen a few more inches and we've done almost nothing to stop it (IPCC summary from November says almost 2 inches from 1993 until now). How many more inches do we need before we respond? Petaluma will be among the first to be affected by rising sea levels. Building in the floodplain is not an option in the face of global warming. It is engineered poverty and suffering. Will you be accountable to this flooding if you build in the floodplain? If not, get out of the way.

This article talks of collapse. It's not collapse, it's transition. We can deny what's happening and miss our window to act or we can pull up our bootstraps and get to work. We need your creativity and courage now

more than ever. It's time for unorthodox urban innovation. No time like the present... Be sure to read the last line of the article a few times...

Best,
Tiff

»»»

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------ Forwarded Message

This from yesterday's Sydney Morning Herald (remember that Liberals here refers to conservatives). Could this be our future too?
Bruce

>>>>>>>>>>>>>>>>>>>>>>
<http://www.smh.com.au/news/opinion/the-partys-over-and-liberals-will-soon-be-history/2007/11/28/1196036982629.html>

The Party's Over and Liberals Will Soon Be History
By Steve Biddulph
The Sydney Morning Herald
Thursday 29 November 2007

The Liberal Party is in trauma. The corporate sector is attempting to calm its nerves, and even the victors in the Labor Party cannot quite believe the seismic change in the landscape of power. But the ramifications of last Saturday may be much greater than just one election won or lost. In a way that seems unthinkable to us now, 2007 may mark the end of the Liberal Party itself. It won't happen overnight, but just watch it happen.

We are so conditioned to the idea that two main parties define politics, we even call them left and right as if they were parts of our body. But parties spring up in response to the primary tensions in a certain time and place. In the 20th century that polarisation was capital versus labour. A century earlier, before even the idea of power among the working poor, politics was aristocrats versus tradesmen, the growing middle class of shopkeepers and artisans that formed the basis of the Tories.

This is no longer the central tension in modern democracies. Centrist governments cover all the bases, and conservative politics has begun to wither away. This is a change that has come late to Australia. But social evolution is now speeding up and even this alignment is becoming dated.

The issue of the future, coming down on us now like a steam train, is of course the environment, the double hammer blows of climate change and peak oil. Energy, weather and human misery are the factors that will define our lives for decades to come. You can cancel your newspaper, those are the only four words you need to know.

Linked to this, but compounding it in frightening ways, is the imminent demise of the United States economy. In fact the whisper, the subplot in economist circles, was that this election was one to lose. That whoever inherited Australia in 2007 inherited a coming economic collapse in globalised trade that would suck Australia and much of the rest of the world down with it. For two years now the best predictions have been that the subprime meltdown would act as merely the detonator of a much larger explosive charge created long ago by US consumer debt, concealed by Chinese and Arab investment in keeping that great hungry maw that is America sucking in what it could not begin to pay for. The avalanche-like fall of US house prices will be closely followed by the same in linked economies worldwide, and presage a harsh and very different

world than the one we have lived in. In short, the party is over. We are a civilisation in collapse.

Labor is the right party to manage this. Despite the widespread belief after years of cynical politics that politicians are all the same, Rudd and Gillard are not in power for power's sake. I am willing to stake my 30 years as a psychologist on this, but I think many observers have also come to this conclusion. Kevin and Julia, as Australia already calls them, want to make this country a better place for the people in it. In the coming times of deprivation, they have the value systems that will be needed to care for the sudden rise in poverty, stress, and need. They also have the unity.

So what will be the new polarity in future elections? It's the ecology, stupid. The Greens will emerge as the new opposition, though this will take probably two election cycles. By the 2010 election, 20 per cent will vote Green, simply because peak oil and climate catastrophe will have proven them right, and thinking people will see the need for austerity now for our children's tomorrow. The Liberal Party will be lucky to attract 30 per cent, which is the habitual, rusted-on portion of the community that thinks greed is good.

By 2014, we will have a struggle between a new left and right - Labor and Green - and the issue will be simply how green, how to balance the need for a much simpler and more communal kind of life, with the need to give people comfort and amenity now. This issue will continue to define life for the rest of this century.

Climate change will bring horrific costs this century unless a global effort is rallied in a way that has never been done before to regulate our gluttonous use of the air and water. Perhaps a billion lives are at risk, let alone 2 to 3 billion refugees, as agriculture and water supplies collapse across southern Asia and elsewhere, and producer countries, like Australia, find they can barely feed themselves.

The big lie of Liberal supremacy was economic management. In fact, they knew how to generate income, but not how to spend it. We could have been building what Europe built in this past decade - superb hospitals, bullet trains, schools and training centres, low cost public transport of luxurious quality, magnificent public housing. We pissed it all away on tax giveaways and consumer goods. On bloated homes that we will not be able to cool or heat, or sell, and cars we won't be able to afford to drive. A party based on self interest may evaporate along with our rivers and lakes, and have no role to play in a world where we co-operate or die.

Steve Biddulph is a psychologist and author.

------ End of Forwarded Message

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EDMUND G. BROWN JR.
Attorney General

State of California
DEPARTMENT OF JUSTICE

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January 3, 2008

By Electronic Mail and Telecopy

Pamela A. Tuft
Director of General Plan Administration
City of Petaluma
P.O. Box 61
Petaluma, CA 94953

RE: Comments on Revised Draft EIR (Greenhouse Gas Emissions Section) and Revised Draft General Plan (Air Quality: Greenhouse Gas Emissions Section)

Dear Ms. Tuft:

The Attorney General submits these comments on the Revised Draft Environmental Impact Report (Greenhouse Gas Emissions Section) ("Draft EIR") and Revised Draft General Plan (Air Quality: Greenhouse Gas Emissions Section) for the City of Petaluma.

We know that Petaluma is a City that takes very seriously the threat of global climate change. Petaluma has demonstrated a commitment to reduce climate change by joining the U.S. Mayors' Climate Protection Agreement and participating in the Cities for Climate Protection program. The City has completed a greenhouse gas (GHG) emissions inventory and adopted GHG reduction targets of 25% below 1990 levels by 2015 and 20% below 2000 levels by 2010 for municipal operations. The City has also devoted substantial time and effort to identifying policies to include in the General Plan that are intended to reduce GHG emissions.

Climate Change Background

Emissions of GHG on the Earth's surface accumulate in the atmosphere: the increased atmospheric concentration of these same gases in turn adversely affects the climate.[1] According

[1] Intergovernmental Panel on Climate Change, Fourth Assessment Report (IPCC 4th) (2007), Working Group (WG) I, Frequently Asked Question 2.1, *How do Human Activities*

to NASA's James Hansen, proceeding at the emissions rate of the past decade will result in "disastrous effects, including increasingly rapid sea level rise, increased frequency of droughts and floods, and increased stress on wildlife and plants due to rapidly shifting climate zones."[2] The atmospheric concentration of carbon dioxide (CO_2), the leading GHG, is now 379 parts per million (ppm), higher than any time in the preceding 650,000 years.[3] According to some experts, an atmospheric concentration of CO_2 "exceeding 450 ppm is almost surely dangerous" because of the climate changes it will effect, "and the ceiling may be even lower."[4] Experts are clear that if we continue our "business as usual" emissions trend, atmospheric concentrations of CO_2 will likely exceed 650 ppm by the end of the century.[5]

The need to make substantial cuts in emissions drives the global targets embodied in the

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Contribute to Climate Change and How do They Compare with Natural Influences? http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1_Pub_FAQs.pdf.

[2] http://www.giss.nasa.gov/research/news/20070530/; see also *Hansen et al., Dangerous Human-Made Interference with Climate* (2007) 7 Atmos. Chem. Phys. 2287–2312 http://pubs.giss.nasa.gov/docs/2007/2007_Hansen_etal_1.pdf.

[3] IPCC 4th, WG I, Frequently Asked Question 7.1, *Are the Increases in Atmospheric Carbon Dioxide and Other Greenhouse Gases During the Industrial Era Caused by Human Activities?* http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-faqs.pdf.

[4] http://www.nasa.gov/centers/goddard/news/topstory/2007/danger_point.html.

[5] http://www.epa.gov/climatechange/science/futureac.html.

Kyoto Protocol and the State's targets established by Governor Schwarzenegger 's Executive Order S-3-05, and AB 32, California's Global Warming Solution Act of 2006. In California, by these authorities, we are committed to reducing emissions to 1990 levels by 2020, and 80% below 1990 levels by 2050. Achieving the 2020 target will require California to reduce emissions by 29% below projected levels.[6]

[6] California Energy Commission, 2007 Integrated Energy Policy Report, December 2007, at p. 16.

In short, our past and current GHG emissions have pushed us to a climatic "tipping point." If we continue our business-as-ususal emissions trajectory, dangerous climate change will become unavoidable. The recent Bali accord recognized that we must cut greenhouse gas emissions from 25 to 40% *below* 1990 levels by 2020 to avoid the most catastrophic impacts of climate change, which is even more aggressive than the reductions required in California under AB 32. And, the experts tell us, we have very little time to take decisive action.[7] Rajendra Pachauri, Chairman of the United Nations Intergovernmental Panel on Climate Change ("IPCC") recently declared: "If there's no action before 2012, that's too late. What we do in the next two to three years will determine our future. This is the defining moment."[8]

CEQA Requirements

As the legislature has recognized, global warming is an "effect on the environment" as defined by the California Environmental Quality Act ("CEQA"), and a project's contribution to global warming can be significant.[9] CEQA was enacted to ensure that public agencies do not approve projects unless they include feasible alternatives or mitigation measures that substantially reduce the significant environmental effects of the project.[10] CEQA requires that "[e]ach public agency shall mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so."[11] This requirement is extremely important and is recognized as "[t]he core of an EIR ... ."[12] The City has determined in the Draft EIR that the global warming-related effects of the General Plan are cumulatively significant. This triggers the lead agency's obligation to require feasible mitigation. (Pub. Res. Code, § 21002.1(b)). The City must ensure that the measures adopted to mitigate or avoid these significant effects "are fully enforceable through permit conditions,

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[7] *Id.* For further discussion of dangerous climate change, see IPCC 4th, WG III, Ch. 1 at pp. 6-7 http://www.mnp.nl/ipcc/pages_media/FAR4docs/chapters/CH1_Introduction.pdf.

[8] Rosenthal, *U.N. Chief Seeks More Leadership on Climate Change*, N.Y. Times (November 18, 2007).

[9] See Pub. Res. Code section 21083.05, subd. (a); see also Sen. Rules Com., Off. of Sen. Floor Analyses, Analysis of Sen. Bill No. 97 (2007-2008 Reg. Sess.) Aug. 22, 2007.

[10] Public Resources Code § 21002.

[11] Public Resources Code §§ 21002.1(b) and 21081; see also, *Mountain Lion Foundation v. Fish and Game Commission,* 16 Cal.4th 105, 134 (1997).

[12] *Citizens of Goleta Valley v. Board of Supervisors of Santa Barbara County* (1990) 52 Cal.3d 553, 564-65.

agreements, and other measures."[13] Accordingly, where there are goals and policies in the proposed General Plan that "support" or "encourage" measures that would reduce GHG emissions, these should be strengthened wherever possible, to establish enforceable requirements.

Potential Mitigation Measures

The proposed General Plan includes policies to employ "smart growth" principles and "mixed use development" as a way to reduce vehicle trips, and therefore reduce GHG emissions resulting from new development. While these are laudable policies, in some respects it appears that the City could strengthen the land use designations in the draft General Plan to insure that "smart growth" development principles are actually carried out and that "mixed use" development actually occurs. Modifications to the proposed land use designations could ensure a mix of uses, with higher residential density near existing commercial areas and public transit, that will allow a shift from driving trips to alternative transportation choices including walking, biking, use of transit and ridesharing. In addition to facilitating a shift in transportation choices, mixed uses and higher densities are typically a prerequisite to increasing transit opportunities and other options such as car sharing programs. Some potential modifications to the proposed General Plan land use designations to further reduce GHG emissions include the following: A

- Mandatory Mixed Uses: modify mixed use policies and land use designations to require a mix of uses (rather than to merely allow a mix, with no assurance that it will occur). The City could establish a ratio for residential to non-residential uses on these parcels. B

- Identify Additional Mixed Use Sites: change proposed single-use commercial, business park, and medium and high density residential land use designations to "mixed use." Some examples of this are the Pleasanton Hacienda Business Park which is incorporating housing into a pre-existing Business Park (see http://tod.hacienda.org/SP/home.html) and a new Whole Foods in Novato with residential units above the market (see http://ci.novato.ca.us/docs/Whole_Foods_Views.pdf). C

- Incentives for Mixed Use Development: increase the intensity of development by providing a mixed use density bonus – where compatible with neighborhood constraints – for mixed use projects that incorporate high quality design, a grid street pattern, a mix of non-residential and residential uses, a specified percent of affordable housing, shared parking and other features that increase the opportunities for walking and biking, reduce vehicle use, and D

[13] Pub. Res. Code, § 21081.6; *Federation of Hillside and Canyon Associations v. City of Los Angeles* (2000) 83 Cal.App.4th 1252, 1261.

increase transit accessibility.

- Existing Single Family Residential: increase density in single family residential areas located near transit routes or commercial areas. For example, allow duplexes in residential areas and increased height multi-unit buildings on main arterial streets. E

- Land Use/Growth Management Element: add a policy to require the high end of the density and intensity range for residential and mixed use projects, where compatible with surrounding uses. F

In addition to the suggestions related to the land use designations, there may be additional opportunities to include policies in the General Plan, or modify proposed goals and policies, to further reduce greenhouse gas emissions, including the following:

- adopt and implement a Heat Island Mitigation Plan that requires residential buildings to have "cool roofs" with the highest commercially available solar reflectance and thermal emittance; adopt a program of building permit enforcement for re-roofing to ensure compliance with existing state building code "cool roof" requirements for non-residential buildings; evaluate and pursue options for using lighter colored, more reflective pavement;[14] plant trees for strategic shading. G

- strengthen the policies contained in Policies and Programs 5-P-32 and 7-P-15 (draft General Plan, at pp. 5-25 and 7-13) that support efforts to increase walking, biking and carpooling to schools and reduce congestion around schools. According to some estimates, parents driving their children to school account for 20-25% of the morning commute. While the draft General Plan includes a policy to "Participate in and support recommendations of the Safe Route to Schools program" (5-P-22 J. at p. 5-24; see also 7-P-15 B., at p. 7-13), more specific actions are needed. The City could implement a citywide Safe Routes to Schools Program H

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[14] See http://eetd.lbl.gov/HeatIsland/ and www.epa.gov/heatisld/images/extra/level3_pavingproducts.html. Using lighter-colored pavement could also be part of the "green streets standards" that the City will develop. (See General Plan, Policies and Programs 3-P-104 B., at p. 3-27).

(which could be the responsibility of the City Pedestrian and Bicycling Coordinator) that will: identify and prioritize, for each school, the improvements needed to facilitate walking and biking; identify potential funding sources; include a schedule for completing the improvements; provide education and incentives to increase walking, biking, carpooling and school bus use; monitor the results of the program and make appropriate updates and revisions.[15] Add a policy to give priority for city funding of the planning and construction of the street improvements that are identified.

- under Policies and Programs 7-P-12 (draft General Plan at p.7-13), add a requirement that new schools are cited in locations that maximize opportunities for access by walking and biking. I

[15] See Safe Routes to School Toolkit, National Highway Traffic Safety Administration (2002) at www.nhtsa.dot.gov/people/injury/pedbimot/bike/Safe-Routes-2002; see also www.saferoutestoschools.org.

· develop and implement a comprehensive parking management program to encourage walking, biking, carpooling, and transit use.[16] The City should evaluate use of the parking management options listed at page 5-14 of the General Plan, including, but not limited to, the following: employ "unbundled" parking (where rent for residential or commercial space does not include parking spaces; parking is paid for separately); eliminate minimum parking requirements; adopt appropriate on-street parking fees to reduce time spent searching for spaces in locations where off-street paid parking is available; use parking revenue to improve walkability in the area where the fees are collected. The draft General Plan requires the City to study feasibility of a citywide Transportation Demand Management Program (which includes parking management) funded by development fees (Policies and Programs 5-P-13 A., at p. 5-15), but does not require that the feasible parking management measures (either citywide or for the downtown area) are implemented. J

· add a policy/program to implement Goal 5-G-4 : Transportation Demand Management and Parking (draft General Plan at p. 5-15) that requires evaluation of actions the City could take to increase ridesharing and transit use by City residents who commute to work outside of the City and requires the City to adopt and implement the feasible measures. K

· add a policy to give priority to funding infrastructure improvements and public amenities in and around the areas with mixed use and high density residential land use designations; L

· modify the policy for a climate action plan by requiring a climate action plan with implementation measures to meet the city's municipal GHG reduction target within 6 months; and requiring a climate action plan with implementation measures to meet the city-wide GHG reduction target within one year (the proposed Policies and Programs appear to make this optional, by stating: "The City *may* prepare a Community Climate Action Plan..." Revised Draft General Plan, Policies and Programs 4-P-22, at p. 4-23). M

· instead of a goal to "provide leadership and guidance to encourage" sustainable site planning and green building practices, these should be *required.* (See draft General Plan, Goal 3-G-18: Sustainable Building, at p. 3-27) (this will make the goal consistent with the policies and programs in Chapters 3 and 4 that require such measures). N

· specify the time-frame for adopting a mandatory green building ordinance (this is required in Policies and Programs 3-P-125 (Revised Draft General Plan at p. 4-25) but no time- O

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[16] For examples, see Reforming Parking Policies to Support Smart Growth, Handbook/Toolkit at: http://www.mtc.ca.gov/planning/smart_growth/parking_seminar/Toolbox-Handbook.pdf; City of San Buenaventura Downtown Parking Management Plan at: www.ci.ventura.ca.us/depts/comm_dev/planning_communities/resources/downtown/DPMP.pdf; Todd Littman, "Parking Management: Strategies, Evaluation and Planning, Victoria Transport Policy Institute (August 24, 2007) at www.vtpi.org/park_man.pdf.

frame is specified).

· require recycling in all buildings (rather than just "encourage waste reduction and recylcing... ." See draft General Plan, Policies and Programs 4-P-19, at p. 4-16). P

· expand Policies and Programs 4-P-13 C (Revised Draft General Plan at p. 4-27) by adding that sources of renewable power that the City will investigate and implement include: installing solar photovoltaic systems to generate electricity for city buildings and operations; using methane to generate electricity at the City wastewater treatment plant; and installing combined heat and power systems. Q

· add the following policies to implement Goal 4-G-4: Energy (draft General Plan at p. 4-14): R

- require energy efficiency and water conservation upgrades to existing non-residential buildings at the time of sale, remodel, or additions;[17]

- require new residential development to participate in the California Energy Commission New Solar Homes Partnership and include onsite solar photovoltaic systems in at least 50% of the residential units (see http://www.gosolarcalifornia.ca.gov/nshp/index.html); S

- require onsite solar generation of electricity in new retail/commercial buildings and parking lots/garages (solar carports); T

- develop a program to provide innovative, low-interest financing for energy efficiency and renewable energy projects. For example, allow property owners to pay for energy efficiency improvements and solar system installation through long-term assessments on individual property tax bills.[18] U

· adopt stronger requirements for use of recycled and reclaimed water. For example, modify or add to the Policies and Programs that implement Goals 8-G-1, 8-G-2 and 8-G-3 to: V

- require installation of graywater systems in new buildings, if feasible, to allow use of recylced water for irrigation (see: www.owue.water.ca.gov/docs/graywater_guide_book.pdf);
- require new buildings to include plumbing for graywater systems;
- require new development to provide the infrastructure needed for the City to deliver reclaimed water to the property for use in irrigation, if feasible.

Thank you for your consideration of these comments. We would appreciate the

[17] See Berkeley's building efficiency ordinance at http://www.ci.berkeley.ca.us/sustainable/buildings/ceco.html.

[18] The City of Berkeley is in the process of instituting a "Sustainable Energy Financing District." See: http://www.cityofberkeley.info/Mayor/GHG/SEFD-summary.htm

opportunity to meet with you at your convenience if you would like to discuss these issues. If you have any questions, please contact me at the number above, or Deputy Attorney General Cliff Rechtschaffen, at 510-622-2260.

Sincerely,

/Sandra Goldberg/

SANDRA GOLDBERG
Deputy Attorney General

For EDMUND G. BROWN JR.
Attorney General

cc: Mayor Pamela Torliatt

Tuft, Pamela

From: Todd Tamura [todd@tamuraenv.com]
Sent: Friday, January 04, 2008 3:33 PM
To: Tuft, Pamela
Subject: GHG comments
Attachments: GHG comments.doc

Pam, attached are my GHG comments.

Todd

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Comments on Petaluma General Plan 2025: Air Quality – Greenhouse Gas Emissions Section, Revised DEIR, November 2007

1. The reference to "halocarbons...known as gases that deplete the ozone layer [and regulated by the] Montreal Protocol" (pp. 3.10-21 and -22) is misleading. Only a specific subset of halocarbons—principally, those molecules containing 0-1 hydrogen atoms—was regulated by the Montreal Protocol. This cold be fixed by simply keeping the first sentence of this paragraph and deleting the rest. Alternatively, the halocarbons entry could be deleted entirely; they are not usually "principal" greenhouse gases, and the user's manual for the emission inventory software that appears to have been used to generate Petaluma's inventory indicates that they are also not included in that software (see subsequent comments below). A

2. There are some questions regarding CEC's inventories that were published in 2006. For the paragraph on p. 3.10-22 starting with "In 2004 California produced..." change the language to read "The California Energy Commission (CEC) estimates that in 2004, California produced..." B

3. It is very, very important to understand the geographical boundaries of emission inventories, get the timeframe correct, and make sure that consistent methodologies are used (as much as possible). Are we going by City limits? If not, then what? Being consistent with years is also important. The last paragraph on p. 3.10-22 estimates Petaluma's emissions as being 610,400 tons of CO_{2e} and states that this equates to 0.113% of the State's emissions. Given that CEC's 2006 report only estimated inventories out to 2004, what is the reference for the State's emissions in 2005? Also, it appears that state emissions are being reported in metric tonnes (about 2200 lb/tonne) and city emissions are being reported in short tons (2000 lb/ton), the document should consistently use one or the other. C

4. Page 3.10-23 states that the City is committed to participate in "the Cities for Climate Protection". Is this referring to the Cities for Climate Protection Campaign developed by the International Council for Local Environmental Initiatives (ICLEI)? If so, say so; if not, identify whose program this refers to. D

5. The measures identified at the bottom Page 3.10-24 include a major lighting retrofit of 844 light fixtures which is estimated as resulting in a savings of 150,000 kWh/yr. This seems high; 150,000 kWh/yr is what would be saved if 844 light fixtures averaging 1550 Watts each and running for 24 hours/day, 365 days/year were completely eliminated. More details on this calculation would be helpful. E

6. Other measures identified at the bottom of Page 3.10-24 are implied as reducing greenhouse gas emissions but in fact are targeting other emissions. For example, there is mention of "zero emission" and "low vehicle emission" vehicles; note that this is in reference to traditional air pollutants (e.g., NO and NO_2, or NO_x), and F

not necessarily greenhouse gases; in fact, reducing NO_x emissions can often come at a fuel efficiency penalty (and therefore greenhouse gas emissions increase). For the buses, new equipment was identified as reducing "fleet emissions output by 90%"; this is referring to traditional pollutants, and the change in greenhouse gases is much smaller (and may have even increased).

7. A reference should be provided for the "Clean Air and Climate Protection Software (released May 2003)" identified on p. 3.10-25, that was used to generate Petaluma's emission inventory. For example: "Clean Air and Climate Protection Software Users' Guide, June 2003 (available from http://www.cacpsoftware.org/)." Page 5 of this manual states that "The greenhouse gases CO_2, nitrous oxide (N_2O), and methane (CH_4) are aggregated and reported as carbon dioxide equivalents (eCO_2)"; i.e., halocarbons appear to be excluded. G

8. If emissions from the "community as a whole" are to be examined (as identified on p. 3.10-25), they need to include more sources than just buildings, municipal services, solid waste, and transportation. For example, the CEC's GHG inventory for the state included industrial sources and agriculture. The 2006 IPCC Guidelines for National Greenhouse Gas Inventories include emissions from land use as well (e.g., urban forestry, which is identified as a mitigation measure on p. 3.10-31 even though associated emissions are not accounted for in the inventory). Airplanes and marine vessels travel within the city limits and do not appear to have been included in the city's inventory either. Even the CO_2 exhaled by residents is likely to be more than 10,000 tons/year. The documentation for energy usage for municipal services ("calculated from PG&E records (for the Hopper Street facility) as well as from known pump station horsepower and water flows") does not appear to include energy usage in the street lights (for which credit was taken on page 3.10-24). Therefore, because of these omissions, the percentage of GHG emissions attributed to "buildings" is biased high. H

9. Table 3.10-7 is unclear. What year were the reductions estimated for? If the building programs apply to new buildings and are implemented in 2009, it seems likely that they will have relatively little impact in 2009 but increasing impact over time as older buildings are replaced by newer buildings. I

10. In Table 3.10-8, most of the reductions appear to be associated with RPS (31,300 tons/yr) and vehicle efficiency. But it has been shown that renewable fuels (e.g., crop-based) do not necessarily reduce GHG emissions, and it seems that reductions associated with vehicles may be getting double-counted between the reductions associated with the Vehicle Climate Change Standards (37,300 tons) and Low Carbon Fuel Standard (18,600 tons). Also, because Petaluma already has urban planning, it is not clear whether we can really take credit for the statewide reductions associated with Transportation Energy Efficiency (11,200 tons) and Smart Land Use/Intelligent Transportation (22,400 tons). J

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From: David Keller
Petaluma River Council
1327 I St.
Petaluma, CA 94952
Jan. 7, 2008

To: Petaluma Mayor and City Council
Ms. Pamela Tuft, General Plan Administrator
11 English St.
Petaluma, CA 94952

RE: Comments on Revised Draft General Plan 2025 ("RDGP"), Air Quality: Greenhouse Gas Emissions and Revised DEIR, GHG Emissions ("RDEIR")
Via Email and Hand delivered to the Council Hearing.

Dear Mayor Torliatt and Members of the City Council:

The Petaluma River Council submits the following comments on the RDEIR and Revised General Plan in the interests of long term health of our watershed, our larger environment and for human health and safety.

We appreciate the extra effort that has been done to address GHG emissions in the RDEIR and RDGP. However, these efforts fall significantly short of what is necessary for public policy, in Petaluma, California, our Nation, and globally. We know better, and now we have to do much better.

Now is the time to take responsibility for accomplishing at a very minimum the City's declared commitment to reduce city-wide GHG emissions by 25% below 1990 levels by 2015, and 20% below 2000 levels by 2010 for municipal operations. Words do not count; deeds count. And the negative consequences of inaction are drastic.

Petaluma has failed in its General Plan efforts, and commits to a GHG emissions reduction by 2025 of only 8% below 2005 levels. A

"Therefore, it cannot be determined to a reasonable degree of certainty that buildout under the General Plan will not result in a cumulatively considerable incremental contribution to the significant cumulative impact of global climate change. Therefore, cumulative global climate change impacts could remain significant and unavoidable." (RDEIR, pg. 3.10-35).

Reductions in VMT and other issues.

One area that is not adequately addressed in the RDGP and RDEIR is substantial reduction of Vehicle Miles Traveled per capita. Given the high percentage of GHG emissions that are directly attributable to vehicle operations, this is fertile ground for improvements. B

In destination surveys conducted by the City for the 1996 Rainier Crosstown Connector DEIR, the largest percentage of PM Peak Hour car trips through the most congested intersections in the City, Washington and McDowell, and Washington and Petaluma Blvd. N., were trips 'to and from public facilities.' These facilities are predominantly sports fields, all located on the East side of the City.

Petaluma has many thousands of children, from age 6 through 18, involved as sports team members: baseball, soccer, football, basketball, swimming and more. Most of them are driven by parents or other adults to their practice and game fields during peak PM hours.

Potential Mitigation Measures:

Some additions to the list would be helpful in focusing the City's efforts to significantly lower automobile demands, particularly at PM peak hours on weekdays:

1 - Create new parks and ballfields on the Westside of Petaluma, which are safely accessible for children playing organized team sports. With the minor exception of limited use fields at Petaluma Junior High School, there are no fields for teams for children over age 6 on the Westside of Petaluma. As a result, parents must drive their children to the fields on the Eastside of town. This produces 2 or 4 auto trips, mostly during peak afternoon traffic loads, through the most congested streets, collectors and arterials. (2 trips is 'there and home'; 4 trips is 'there, go shopping/run errands, back to fields, home'. I've done it both ways with my kids, as do many other parents.) New Westside fields would allow a huge number of auto trips to be eliminated for a modest cost with high multiple benefits. This could be accomplished in significant part by establishing fields and parks in the Petaluma River Floodplain, in the Corona Reach adjacent to the Outlet Mall on both northern and southern parcels, with visitor serving facilities at the Mall or on the park properties themselves. C

2 - Provide transit services to all the city's fields during afternoon game times. Van pools originating from school sites would also reduce car trips, as many of the younger sports teams are predominantly school based. Vans or shuttles could pick up children at their local school site, take them to the game fields, and then return them to their school sites afterwards. A regular schedule of vans could significantly help reduce VMT and GHG emissions. D

3 - Safe passage to schools is absolutely necessary, by foot and bicycle. Safe passage to sports fields is also critical. Most of the major Eastside fields are inaccessible to children on foot or bicycle, except those from the immediate neighborhoods. The new park and ballfields east of the Airport is virtually inaccessible to all except by driving, thus increasing VMT and GHG emissions. E

4. Provide shorter headway for local bus and shuttle service (max 15 min. during peak hours - preferably 10 minutes) to increase ridership. At midday, provide short headway bus or shuttle service from business parks at the north and south ends of the City to the downtown, for employees to have lunch, run errands and have business meetings without having to drive individual cars. Business park owners would likely be interested in supporting such a service, as it is a major benefit to their tenants. Provide marked and sheltered bus stops throughout the neighborhoods and districts served by local transit (remarkably, most neighborhood stops are not marked, no route maps and timetables posted, or no weather proof bus shelters provided). These incentives and added convenience will significantly increase ridership, revenues and reduce GHG emissions. F

5. Adopt much more aggressive program for residential, retail, commercial, industrial and institutional water and energy use. Improvements to efficiencies can be paid for with savings amortized over the life of the equipment replacements, designed so that savings in water, gas and electricity are greater than the amortized expenses of making the changes in equipment and processes. This is already being done in places, and Petaluma has already had some pilot projects to do just that successfully (including savings in wastewater generation, reducing both wastewater volumes and organic loads). G

6.Mandatory Green Building standards; required gold or platinum LEED standards for all new commercial buildings; provide incentives for retrofits on existing buildings, perhaps through Redevelopment low-interest loans or grants. H

7. Require solar water heating and installation of solar electrical generating capabilities on all new commercial structures or larger multi-unit residential structures, and require new residential construction to make such connections easy for homeowners. Provide incentives for retrofits on existing buildings, perhaps through Redevelopment low-interest loans or grants. Examine the City of Berkeley's newly adopted policies for energy self-reliance as a model for Petaluma, and adopt and implement a similar program. I

8. Plan for the worst. *"...therefore, cumulative global climate change impacts could remain significant and unavoidable."* (RDEIR, pg. 3.10-35). Since the City's RDGP and RDEIR seem to accept our inability to reduce GHG emissions that are the leading cause of global warming, we must in good conscience adopt very stringent restrictions in new construction in our floodplains and lower elevations. In fact, we need to look closely at removal of those critical pieces of public and private infrastructure from these areas that will be increasingly subject to higher flood inundation with higher severity storms and with higher sea levels. J

There are certainly other strategies and programs that are being used in California, the US, and throughout the world: We cannot afford to stand still.

The time to act is now. The choice for all of us is now in your hands. You must do far better than is proposed in the RDGP and RDEIR.

Sincerely,

David Keller
Director
Petaluma River Council

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Tiffany Renée

843 B Street Petaluma, CA 94952

To: General Plan Administration
CC: City Hall
11 English St.
Petaluma, CA 94952

Re: General Plan 2025 GHG reductions policies

July 17, 2007

Dear Pamela Tuft,

Below you will find recommendations for the 25% reductions below 1990 GHG levels by 2015 Goal and policies to achieve that goal. Several Sonoma County municipalities have already set higher goals than this. This is the goal the city signed onto with Climate Protection Campaign. I am also attaching a draft of the SCWA's draft emissions inventory (carbon footprint) as an example of assessing the current emissions. I believe the Climate Protection Campaign is also working on an inventory, but I have not seen that document. I have requested it and will forward if/when it is available. Also forthcoming is their community action plan (in progress).

It is important to note that when the State's cap and trade program come online, energy costs will increase as power plants see the real cost of energy production under the cap and trade program (this has already happened in the European Union). One approach to this issue would be to exercise a CCA and/or large-scale renewable energy project.

The most significant reductions in GHGs can come from VMT reductions and renewable energy (40% and 20% of emissions, respectively, come from these sources). (http://www.climate-change-eis.com/ab32.html) And both require making choices in life-styles. But we can see significant gains through solid planning that can assist in these life-style choices everyt step of the way to build-out of the General Plan, and we could even see a higher quality of life from these changes. Please review Jones & Stokes whitepaper on "Addressing Global Warming in CEQA and NEPA documents in the Post AB32 Regulatory Environment". (http://www.climate-change-eis.com/docs/cc-whitepaper.pdf) for further language and policy recommendations to include in the General Plan 2025. A

Thank you for all your hard work on this.
Sincerely,

Tiffany Renée
707-766-9917
tiff@designmotif.com

Tiffany Renée 843 B Street Petaluma, CA 94952

Air Quality

Goal: Reduce greenhouse gas emissions 25% below 1990 levels by 2015. (Areas of concern: Energy consumption, vehicle and machine emissions, commerce and industry emissions, wood burning, indoor air pollutants, solid waste emissions) B

P1: Create climate protection advisory committee to analyze carbon footprint and implement reduction plans at City and Community levels (Fleets, street lights, buildings, employee commute, water/waste water, solid waste and recycling). Also, review CCAs and other large-scale renewable energy project solutions.

Energy:

P2: Increase energy efficiency, reduce energy consumption of City workforce (50% reduction goal). Upgrade to energy efficient technology and machines (IT, Public Works, Parks, etc.)

P3: Initiate or join a Community Choice Aggregation and/or regional power authority to purchase and/or install clean, renewable energy.

Building:

P4: Initiate policies in Zoning Ordinances and Codes to reduce green house gas emissions in building design and materials. Require LEED certification and carbon footprint analysis as part of site plan review (using Urbemis-GHG software: http://www.climate-change-eis.com/urbemis.html). Increase percentage requirement of projects built with renewable energy (Wind, PV). Require energy efficiency conversions and wood-burning fireplace removals on resale of homes built prior to 2004.

Vehicles:

P5: Reduce Vehicle Miles Traveled (VMTs) through prioritizing walkable housing and business projects, increase public transit and alternative transportation methods.

P6: Business outreach and support for emissions reductions, commute policy and energy efficiency. Consider tax incentives or financial awards for top-achieving businesses.

Solid Waste:

P7: Create achievable waste reduction policies for residents and businesses. Future garbage contracts must include local resource recovery park to recapture valuable materials; no dumping of green waste without emissions capture program; no dumping at Redwood landfill on the Petaluma Marsh or other areas that can compromise the quality of our local groundwater supply and sensitive watershed and ecosystem.

Tiffany Renée 843 B Street Petaluma, CA 94952

To: City Council, City of Petaluma
11 English St.
Petaluma, CA 94952

January 7, 2008

Re: Public Comments to General Plan 2025 Revised Draft EIR and Revised General Plan 2025 Air Quality: Greenhouse Gas Emissions

Dear Council and General Plan Administration,

My apologies for the late date of my follow up comments to the General Plan revisions. I am including a copy of my initial comments sent to General Plan Administration back in July 2007 that suggested various items for new policies as it was not included in the record of Public Comments made during the Public Hearing of the last several weeks (although it appears many suggested items are included in the revised GP).

I was fairly stunned to see a staff recommendation to City Council for a statement of overriding considerations given I could not ascertain the requirements needed to make the case for such a statement. The only suggestion I have found thus far in the Hearing process is that because certain mitigations are difficult to quantify it is not possible to know if the target goals of 25% below 1990 levels by 2015 can be reached. My questions, which I am requesting response to for the Final EIR and for your consideration in your decision-making process today, are:

1. What, if any, is the threshold of significance for this revision of the General Plan 2025? Are the reductions targets the threshold of significance? C D
2. What analytic approach was used to arrive at a statement of overriding considerations (quantitative, qualitative, with or without significance determinations, etc.)? E
3. What are the findings of overriding considerations? F
4. How can staff suggest that the cumulative reductions are not possible or feasible if they cannot determine the quantity of reductions of certain policies? This does not follow. G
5. What is the specific evidence that local agency and community actions in the General Plan 2025 that have a cumulative impact on GHG emissions override the environmental considerations of reducing GHGs to target levels?
6. What are the effects of activities that contribute to GHG emissions at the city and community level that are under the jurisdiction of the City of Petaluma? H
7. Wouldn't the environmental considerations of not reaching targets have a far more significant impact to Petaluma than reaching the target reductions through a more thorough set of policies in the General Plan? It would seem if you can't answer this question then you don't have the evidence needed to make a statement of overriding considerations. I

The suggested policies from my July comments, as well as Allen Tacy and the California Attorney General's office all suggest mitigations that could further significantly reduce GHG emissions beyond the revised GP. Specifically creating or joining Marin's Community Choice Aggregate that sets bold energy purchase standards at 100% renewable would reduce energy-related emissions as much as 20% or 122,000 tons based on 2005 community electricity usage levels. Many members of your staff attended an October 2007 workshop in Petaluma for information about CCA. If you haven't received a staff report on this please refer to the presentation notes[1] of the meeting (see links in footnote). A 100%

[1] http://www.lgc.org/events1/past/cca_petaluma07.html and Navigant Consulting's update on Marin's CCA: http://www.lgc.org/events1/docs/cca_petaluma07/cca_pilot_project_findings.pdf

renewable energy purchase is an additional 2.14 tons per capita (if electricity is 20% of carbon load) bringing us to mitigated levels of 5.56 tons per capita. This is very close to the 25% below 1990 levels of 5.02 per capita level at 2015 based on a population of 65,000. J

The revised GP2025 has not gone far enough with smart growth land use measures. Three of large commercial retail projects (equaling 1.5 million square feet) would significantly increase GHG emissions through increased vehicle miles traveled, as many of the products sold would require car trips rather than create walkability through shopping experiences. Additionally, I refer you to my earlier comments on the East Washington Place DEIR[2] that many of the products offered at large-scale retail businesses are products made in China, or overseas, that must be shipped to the U.S. and produce significant air quality issues from pollution drifts that fall in California. Many of my comments in the April letter apply to the Economic section, but no policies have been written to address retail consumption patterns (only its brother, waste reduction, has been briefly addressed and you can't reduce waste if consumption isn't addressed) in the Economic element of the GP2025 as it pertains to GHGs[3]. And the consumption cannot be separated from GHG emissions, but it can be mitigated in land use density and retail mix (smaller stores with smaller footprints and short walking distances from or within neighborhoods). They are intertwined, as climate change is the result of human activity. (Please see Attorney General's office January 3, 2008 memo, footnote #2 for statements of human-made interference in climate change.) K

Going 100% renewable energy purchasing is the kind of bold steps our economy needs to make the shift towards a green economy. It would create additional green collar jobs and increase manufacturing jobs. At some point we have to take the leap. Otherwise our choice could literally be sink or swim. It is in our city's nature and history that we are leap-takers and leaders.

As the January 3, 2008 memo from the Attorney General's office (included in your packets) quoted Rajendra Pachauri, Chair of the UN IPCC, "If there is no action before 2012, that's too late. What we do in the next two to three years will determine our future. This is the defining moment." The message is clear that you must be bold. And if you lack the courage to be bold, as former Vice-President Al Gore has stated, "Political will is a renewable resource." I'm sure our fine voting population will let you know come November what they think of your lack of courage. Therefore I strongly discourage you from making a statement of overriding consideration and request staff do the work necessary to implement a General Plan that is in alignment with the reality of our climate changing planet, a plan that reaches our livable targets to do what is right and just to live in harmony with this planet for the future of Petaluma and us all.

Thank you,
Tiffany Renée

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[2] Letter from Tiffany Renée submitted to City Council, April 30th, 2007 regarding East Washington Place DEIR.

[3] Please include the http://www.storyofstuff.com/ 20 minute video as a model of human activity as it pertains to retail and economic and environmental health. (Can also be downloaded here: http://web.1.c3.audiovideoweb.com/1c3web3536/StoryOfStuff.mov)

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5505
FAX (510) 286-5559
TTY 711

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GP Administration

Flex your power!
Be energy efficient!

January 9, 2008

SON000136
SCH#2004082065

Pamela Tuft
City of Petaluma
11 English Street
P.O. Box 61
Petaluma, CA 94953

Dear Ms. Tuft:

City of Petaluma Revised Draft General Plan – Revised Draft Environmental Report

Thank you for continuing to include the California Department of Transportation (Department) in the environmental review process for this project. The Department would like to commend the City of Petaluma's effort to continue to reduce greenhouse emissions and provide pedestrian and bicycle connectivity and integration of green-concepts throughout the city. Below are some issues and concerns the Department has in regards to City of Petaluma Draft General Plan:

Please describe how the city will provide accessible sidewalks in existing and future developments that are compliant with the American with Disabilities Act (ADA) design criteria.

Under the Natural Environment section on Page 4-26, the draft plan references integrated Intelligent Transportation Technologies (ITS). Please specify the ITS strategies the City of Petaluma recommends or envisions?

How do these specific ITS strategies sustain reduction of green-house emissions?

Will the ITS system developed by the City of Petaluma conform to the regional ITS architecture sponsored by the Metropolitan Transportation Commission and mandated by the Federal Highway Administration?

Should you require further information or have any questions regarding this letter, please call or email Ina Gerhard of my staff at (510) 286-5737 or ina_gerhard@dot.ca.gov .

Sincerely,

TIMOTHY C SABLE
District Branch Chief
IGR/CEQA

DD4
DEC 2 8 2007

Richard E. K. Brawn
141 Grevillia Drive
Petaluma, CA 94952

RECEIVED
DEC 2 8 2007
MAYOR

December 27, 2007

To: Mayor Pamela Torliatt ←
Council Member Teresa Barrett
Council Member Samantha Freitas
Council Member Mike Harris
Council Member Karen Nau
Council Member Mike O'Brien
Council Member David Rabbitt

Dear Dcm

SUBJECT: City Revenues under the proposed General Plan

I have written comments and attached material that I believe will help you in your consideration of the proposed General Plan.

My comments focus upon the relevance of the Economic Annex to the General Plan and the projection of city revenues.

Sincerely,

Richard E. K. Brawn

FYI: Pamela Tuft

Future City Revenues and the General Plan

Most likely I will not be able to attend the airing of the General Plan. But I do want to address the Economic Annex and city revenue expectations. I do not share the revenue projections of the General Plan.

The Annex contains an arbitrary inflation rate and then applies an equally arbitrary discount rate. This approach is not usually acceptable. Any change the rates provides a different answer. For that reason, such analysis devices are not acceptable in projecting revenues for financial instruments. I am sure you note as I do that the selected rates do provide politically cozy numbers. Revenues are conveniently expected to exceed inflation. Unfortunately, nothing could be further from the truth. A

The year selected as a base year reflected stability of growth rather than recession, and the dollar amount of deferred maintenance were not tabulated. What we now know is that the Federal Government and the State government are in such financial disarray that a permanent squeeze can be expected to be applied to county and city revenues. In addition, all of us can expect to be economically squeezed by future energy prices. I have enclosed two charts to make this point about revenues. B

Declining Federal Operating Revenues C

The first chart shows increasing use of Federal Non-Social Security tax receipts to pay Social Security and Medicare. As we all know, SS dollars in excess of current SS expenditure have been completely siphoned off by Congress and what we have in the SS trust fund are IOUs to pay SS from future Non-SS revenues. Medicare costs are expected to skyrocket. These revenue needs will suck dry any Federal welfare funding to the cities. Already, HUD funding of housing assistance to low income elderly and others is on a short leash and reflect only some 90% of actual operational costs. 2007 should have been a great year for state revenues to support city activities. Was it? From this incredible pinnacle of state revenues, the Governor projects $15 billion deficit plus the compounding effect of interest payments on the state debt will divert more and more tax revenues from current operations. (How long this will continue will be touched upon later.) The state bond rating is one notch above junk bond status. Given these conditions, raising city revenues through increasing taxes will not be possible. Of course, in politics, anyone can assume anything they like about the future and the public who is completely ignorant of such things may well accept such nonsense. But surely City Council is above that for the General Plan.

Declining Liquid Fuels Energy Sources. D

The second Chart shows petroleum production and its sources. I have printed the image in super fine detail so if you have a magnifying glass, you can read the details. I have a wall chart of the same and will post it in the City Council Chambers. The chart shows production of liquid petroleum fuels. Until now alternative fuels such as liquefied natural gas and natural gas into liquids such as diesel have made up for declining physical production of petroleum. So we are probably on some sort of plateau. The attached chart is not in dispute. What limited dispute exists is that some analysts believe the price of petroleum can rise to astronomical levels... eg $300 per barrel in today's dollars and thus pay for the cost of producing the more expensive petroleum that is needed to satisfy demand, without destroying the world economy. Production is limited by the cost to bring the product to the consumer.

The world is not running out of petroleum. We have only pumped perhaps one quarter of that in the earth. But what we have consumed is the petroleum that was cheap to find and cheap to produce. Today, the cost to bring a barrel of light sweet petroleum oil to the shipping point from an old well in Saudi Arabia is something like $3.00. The cost to produce a barrel of oil from the Athabasca Tar sands is no less than $45 and is produced with horrendous environmental consequences. Deep water oil fields in the Gulf of Mexico are small pools of oil rather than the monster fields found back in the mid 1900s. A single exploratory well in the Jack field that was drilled by Chevron Oil is estimated to have cost $150 million. Each field needs dozens of wells. At $100 per barrel, Chevron is does not think drilling the field is economic. Our ability to pay for an ever increasing cost of production will determine how much of a declining share of world oil production we here in Petaluma get. The impact on US, California and Petaluma will be no different from that of a tax that will rise exponentially.

In the mean time, population is increasing exponentially. The light yellow line at the top of the chart is population. Globalization being pushed by our Washington D.C. elite means all of those people will compete with Petalumans for the world's resources such as raw materials, food and energy.

Growth and Energy

Growth is promoted by all levels of government and no less so than here in Petaluma. Growth as we know it is tied inseparably to energy. There is not a single thing that we do that does not need energy. A barrel of oil is estimated to provide something like 5 man-years of work. Conservation works only in emergencies. As a standard policy, it does not work because it is overwhelmed by demand from new growth. To think of conservation as equivalent to cost cutting in business is completely wrong. Certainly cost cutting can obtain savings that can increase the

E

profit. But cost cutting by itself does not increase market share of any of the other measures of an expanding business.

We have to assume that new technologies will ultimately get us through this coming period. Anything less would mean a literal return to the Dark Ages. But as a rule of thumb, it takes 3-5 years from the date of discovery of new technology to bring a discovery from the lab to a point where it can be engineered. Another 2-5 years is needed to prove the commercial viability of the technology. Finally, design of mass production facilities takes quite some time. If the technology is completely new it will necessitate new infrastructure and associated education and training programs. My point is that our General Plan is coming to publication ahead of a period during which we will have to accommodate considerable change and we do not have the capital or financial resources at any level of government to deal with such change. In fact, right now, today; we have to import $2 billion per day from foreign savings just to support our current national consumption of imported goods and services. Our national credit card is pretty well maxed out. F

Economic Annex Missing Features

The economic annex does not provide a bottom up analysis of costs. Instead it shortcuts the process by proposing a base year and assumes a continuation of the city services of that base year. What should have been done was a tabulation of all costs associated with city operations in the coming years including such unknowns as the flood control project, roads and other infrastructure upon which the city is dependent. It should have identified who pays for every item upon which the city depends. It should have identified that which was not actually paid/accounted for in the base year (eg. flood control). This mistake in the General Plan would have been evident if the City had supported a matrix of metrics to determine the cost of running the city. Even a matrix showing the cost to the city for each new resident would have been useful. Unfortunately, that opportunity is passed. G

In light of tax revenue needs by higher echelons of government, inflation exceeding wage growth and rising energy costs. no new taxes will be possible. The city, like the state will have to accept the fact that the future is one of declining real revenues. We can all expect the Federal Government to print lots of money to pay its bills. That excess will ensure price inflation (in attrition to that caused by energy) as all those new dollars compete with those collected in taxes by the city to purchase goods and services. Located at the lowest level on the government totem pole, the needs of the state and Federal government will dictate what is left over for the city. Even with those crumbs, the city will buy less and less with its revenues.

I hope that this short analysis makes it clear to you that the economic annex does not provide a single clue of how to dovetail this future with expenses driven by details of the planned build out of the city.

Fairness to the General Plan Economic Annex

We need to also be fair. While these matters were known to everyone in the Congress and the Executive branch for years, there has been no political leadership. What public comments were made were carefully crafted rhetoric and suppression of the data by the Executive branch. Who can forget that the Secretary of the Treasury was fired for releasing a study on Federal unfunded liabilities? Who can overlook the comment on **60 Minutes** by the Chairman of the Appropriations Committee that these liabilities were known but nobody in Congress wanted to talk publically about them. Only in the past two years have these matters been made known to us in a meaningful way by a handful of brave public officials and many private citizens researching the data for truth.

I hope this analysis has been useful. As a minimum, please take the time to explore the issue of peak oil (or just energy) and the quagmire of unfunded Federal and state liabilities.

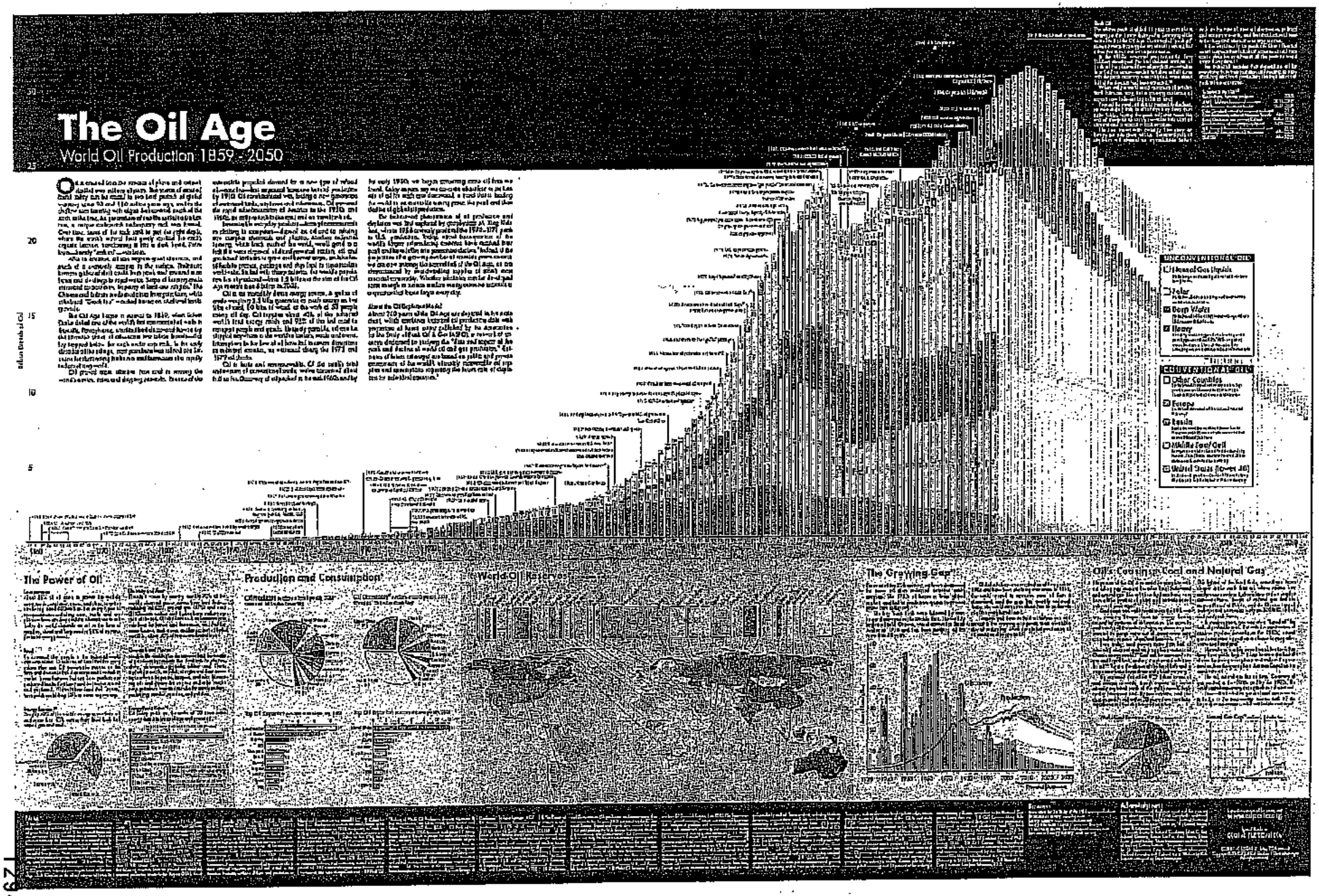
Sincerely,

Richard Brawn

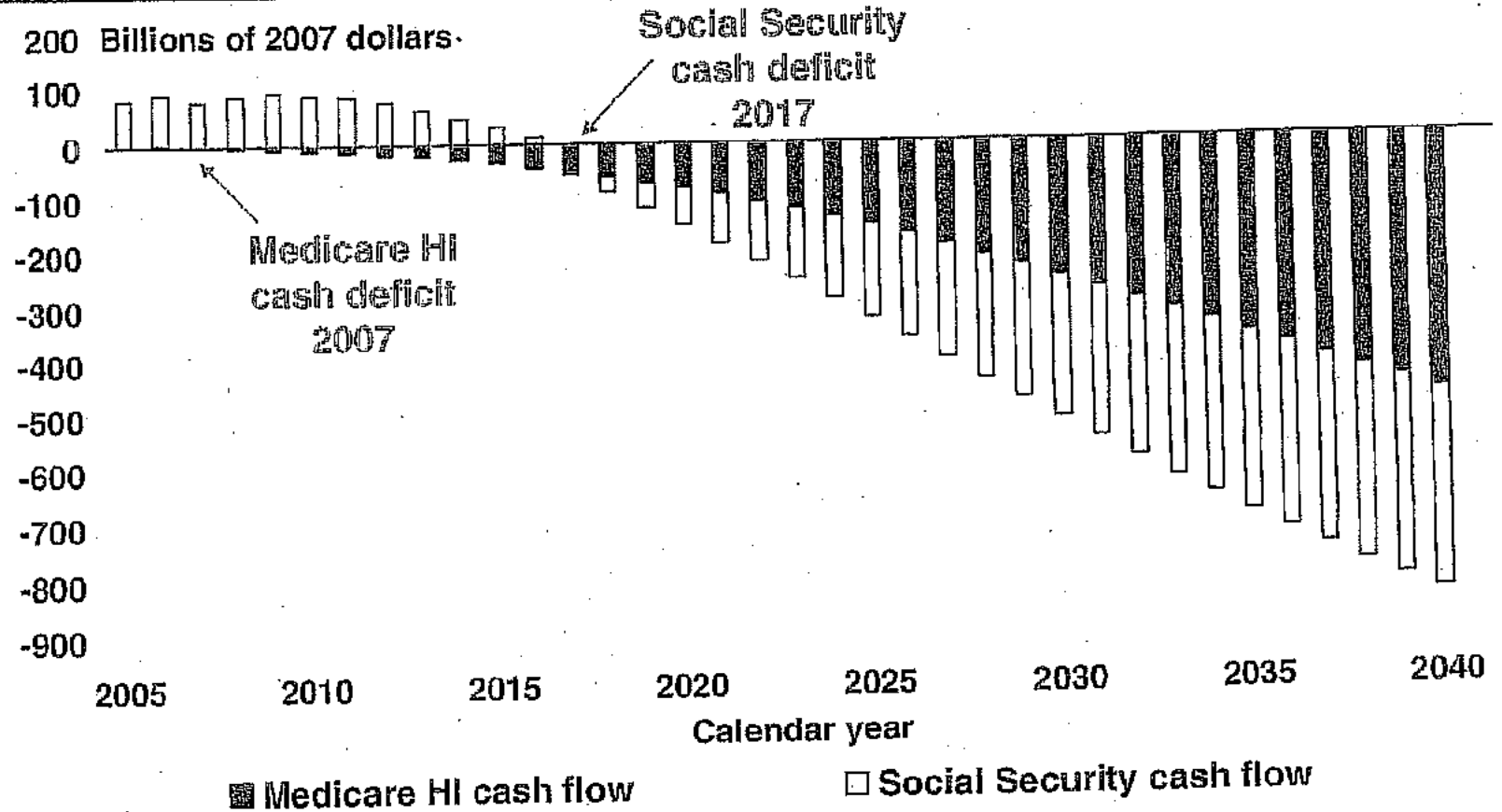
Resident of Petaluma

The Oil Age

World Oil Production 1859 - 2050



Social Security and Medicare's Hospital Insurance Trust Funds Face Cash Deficits



Source: GAO analysis of data from the Office of the Chief Actuary, Social Security Administration and Office of the Actuary, Centers for Medicare and Medicaid Services.

Note: Projections based on the intermediate assumptions of the 2007 Trustees' Reports. The CPI is used to adjust from current to constant dollars.

GAO-08-217CG

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U.S. Department of Homeland Security
FEMA Region IX
1111 Broadway, Suite 1200
Oakland, CA. 94607-4052

FEMA

November 29, 2007

Pamela A. Tuft
Director, General Plan Administration
City of Petaluma
P. O. Box 61
Petaluma, California 94953

Dear Ms. Tuft:

This is in response to your request for comments on the Notice of Public Hearings and Notice of Availability of Revised Draft Environmental Impact Report (Air Quality: Greenhouse Gas Emission Section) - Draft General Plan 2025 to facilitate the adoption of a new General Plan 2025.

Please review the current effective Flood Insurance Rate Maps (FIRMs) for the City of Petaluma (Community Number 060379), Map revised September 29, 1989. Please note that the City of Petaluma, Sonoma County, California is a participant in the National Flood Insurance Program (NFIP). The minimum, basic NFIP floodplain management building requirements are described in Vol. 44 Code of Federal Regulations (44 CFR), Sections 59 through 65.

A summary of these NFIP floodplain management building requirements are as follows:

- All buildings constructed within a riverine floodplain, (i.e., Flood Zones A, AO, AH, AE, and A1 through A30 as delineated on the FIRM), must be elevated so that the lowest floor is at or above the Base Flood Elevation level in accordance with the effective Flood Insurance Rate Map.

- If the area of construction is located within a Regulatory Floodway as delineated on the FIRM, any ***development*** must not increase base flood elevation levels. **The term *development* means any man-made change to improved or unimproved real estate, including but not limited to buildings, other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, and storage of equipment or materials.** A hydrologic and hydraulic analysis must be performed *prior* to the start of development, and must demonstrate that the development would not cause any rise in base flood levels. No rise is permitted within regulatory floodways.

- All buildings constructed within a coastal high hazard area, (any of the "V" Flood Zones as delineated on the FIRM), must be elevated on pilings and columns, so that the lowest horizontal structural member, (excluding the pilings and columns), is elevated to or above the base flood elevation level. In addition, the posts and pilings foundation and the structure attached thereto, is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components.

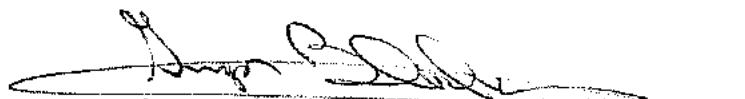
- Upon completion of any development that changes existing Special Flood Hazard Areas, the NFIP directs all participating communities to submit the appropriate hydrologic and hydraulic data to FEMA for a FIRM revision. In accordance with 44 CFR, Section 65.3, as soon as practicable, but not later than six months after such data becomes available, a community shall notify FEMA of the changes by submitting technical data for a flood map revision. To obtain copies of FEMA's Flood Map Revision Application Packages, please refer to the FEMA website at http://www.fema.gov/business/nfip/forms.shtm.

Please Note:

Many NFIP participating communities have adopted floodplain management building requirements which are more restrictive than the minimum federal standards described in 44 CFR. Please contact the local community's floodplain manager for more information on local floodplain management building requirements. The City of Petaluma floodplain manager can be reached by calling Michael Moore, Director, Community Development, at (707) 778-4301. The Sonoma County floodplain manager can be reached by calling David D. Knight, Transportation and Public Works Department at (707) 565-2231.

If you have any questions or concerns, please do not hesitate to call Michael Hornick of the Mitigation staff at (510) 627-7260.

Sincerely,



Gregor Blackburn, CFM, Branch Chief
Floodplain Management and Insurance Branch

cc:
Michael Moore, Director, Community Development Department, City of Petaluma
David D. Knight, Transportation and Public Works Department, Sonoma County
Ray Lee, State of California, Department of Water Resources, Central District
Michael Hornick, Floodplanner, DHS/FEMA Region IX
Alessandro Amaglio, Environmental Officer, DHS/FEMA Region IX

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

STATE CLEARINGHOUSE AND PLANNING UNIT

ARNOLD SCHWARZENEGGER
GOVERNOR

CYNTHIA BRYANT
DIRECTOR

January 11, 2008

RECEIVED

JAN 17 2008

GP Administration

Pamela Tuft
City of Petaluma
11 English Street
P.O. Box 61
Petaluma, CA 94953

Subject: City of Petaluma Revised Draft General Plan 2025
SCH#: 2004082065

Dear Pamela Tuft:

The State Clearinghouse submitted the above named Revised Environmental Impact Rep to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on January 9, 2008, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Terry Roberts

Terry Roberts
Director, State Clearinghouse

Enclosures
cc: Resources Agency