3.3.3 Section C: Individuals

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3.3.3.1 Letter Robert Auguscik, February 4, 2020

Letter Auguscik

Sierra Meadows Apartments
P.O. Box 1217
Loomis CA. 95650

February 10, 2020

Planning Department, Anders Hauge
Town of Loomis
P.O. Box 1330
Loomis, CA 95650

Re: Recicurlated Draft Environmental Impact Report (DEIR), Costco Warehouse

Dear Anders,

Regarding the Recirculated Draft Environmental Impact Report ("RDEIR") for the proposed Costco Warehouse to be located at the southeast corner of the Sierra College Boulevard/Brace Road intersection in the Town of Loomis. Based on the RDEIR the 17.4 +/- acre project will consist of a 152,101 square-foot Costco warehouse building, with 777+/- parking stalls, a fuel facility and tire center. The project is being proposed with three general access points, one on Sierra College Blvd and two on Brace Road for nighttime truck deliveries and customer traffic. After reviewing the RDEIR, I submit the following comments and concerns. Auguscik-1

1. Land to the east and west of the Sierra Meadows apartments is currently zoned for residential use. These parcels are part of the residential zoning that runs from the Sierra Meadows Apartments along Brace Road and continues into rural Loomis. Consideration should be given to keeping the residential zoning along Brace Road to maintain a buffer between existing residential properties and the Costco Warehouse. Inserting commercial parking in between two residential parcels is concerning and would have a significant detrimental impact on the livability and safety of all surrounding residential properties on Brace Road and Hunters Drive. The RDEIR Auguscik-2 Auguscik-3

does not address rezoning of these properties to commercial use; however, the property is going to be used for commercial use.

Auguscik-3 (Cont.)

New State law prevents the rezoning of Residential property after Jan 1, 2020. The DEIR shows the property as commercial parking and entrances. I believe that if this project is allowed to move forward it would be a violation of SB 330.

Auguscik-4

2. The RDEIR site plan shows a shared entrance with the Sierra Meadows Apartments. However, there has been no discussion or agreement on the entrance shown and is contradictory to statements made by Costco and the Town of Loomis regarding entrance placement. On May 31 2019 Costco Approached the Auguscik's to do a lot line adjustment to give Costco property to the Auguscik Property. (Please See attached signed agreement). This agreement was made between Costco and the Auguscik Family Trust with no mention of any development proposal. Over the last 8 months we have repeatedly asked Costco to perform on their agreement. Costco and the Town of Loomis had meetings regarding the lot line adjustment, and we were told that they were working on it. The town continually stalled saying they had to research the easement through the property. I called Anders Hauge on July 25th, 2019 to discuss the lot line adjustment. I sent a follow up email to Anders Hauge on July 29th, asking the town to move forward on the lot line adjust. I received no response. Since that time, I have spoken to Anders Hauge many times asking that they move forward with the lot line adjustment. He kept telling me they would as soon as Costco submitted one. On December 17 2019 Anders Hauge and Mary Beth Van Voorhis finally agreed to meet with me only after I sent a request to meet with Sean Rabe', the current Loomis Town Manager. During our meeting I was told that the town would move forward with the lot line adjustment as soon as they received the application. After several letters and Don Mooney's help, we finally got Costco to submit a lot line adjustment to the Town of Loomis on January 9, 2020. (See Attached) In follow up communications Costco assured us that our access would not be interfered with as it is currently used. On November 19 2019 the Town revealed a

Auguscik-5

site plan of the Costco project showing a closed entrance to the Sierra Meadows Apartments. When I asked for clarification on the entrance from Anders Hauge during the meeting, he deferred the question to the Town's attorney who then contradicted the site plan saying that both a Costco entrance and the entrance to Sierra Meadows Apartment would remain open. (Video of meeting available) This contradicts everything Costco and the Town of Loomis had discussed with us. A mutual entrance is not acceptable, and will cause safety and logistic concerns with parking, garbage storage and pickup for the apartments. This shared entrance will allow Costco traffic to take the path of least resistance through the apartment parking area. It will interfere with the way traffic flows through the parking lot and will create a loss of parking spaces that we cannot afford. It will also affect the accessibility of the office to prospective tenants. Thereby limiting the number of inquiries from perspective tenants. This has been a very cost-effective way of finding quality new residents. The office and signage would have to be relocated to the west side of the complex. Planned barriers to prevent Costco customers from parking on Brace Road and Starlight Lane and walking into the Costco parking lot are inadequate. This is already happening with Homewood customers. Costco will make this situation much worse and will impair the Sierra Meadows Apartments from operating as a residential apartment community by significantly impacting access, parking and safety of the residents.

Auguscik-5 (Cont.)
Auguscik-6
Auguscik-7
Auguscik-8
Auguscik-9
Auguscik-10

3. The RDEIR proposes that the Brace Road entrance be used for truck delivery traffic during the nighttime hours. This is against town policy as per the Loomis General Plan. Brace Road is an Arterial, as defined in the town's circulation element. Appendix E of the Traffic Study list Brace Road as a minor street. Having two entrances within 20 feet of each other is against the Town of Loomis Circulation Element and Land Development Manual. Two entrances that close together cause many problems the third Homewood entrance across the street make this a confusing and dangerous intersection.

Auguscik-11

The RDEIR's Noise report does not give any results of actual testing for noise levels produced by delivery trucks and trailer as it would affect the residents in the closest apartment building. The estimate of 70 db is not realistic for a semi decelerating and accelerating around a corner. Studies have shown that most truck noise will be in the range of 82.5-96 db. **(See attached Noise Study prepared for the Washington State Highway Commission)**This would have a significant negative impact on the existing apartments and their right to enjoy their homes. This would also significantly impact the rentability of apartments and would result in a substantial decrease in market value. This truck entrance should be relocated away from existing residential buildings. Auguscik-12 Auguscik-13 Auguscik-14

4. Mitigation measures proposed in the RDEIR include building a 13-foot-high wall, as well as replacing some of the windows at the Sierra Meadows Apartments directly adjacent to the entrance. Constructing a 13-foot-high wall to try to mitigate noise and pollution from diesel engines and exhaust stacks will not make up for the proximity of the entrance to residential dwellings. Trucks will be coming within 46 feet of the apartment buildings. This is way too close. The noise and vibration levels will be unacceptable. This truck entrance should be relocated away from existing residential buildings. Auguscik-15

5. The wall will have to be set back from Brace Road to allow for safe and clear visibility for residents exiting the apartments. This setback will make the wall ineffective in stopping noise from traveling into the residents, thereby not having much noise reduction affect. The wall will not prevent this impact from being significant. This truck entrance should be relocated away from existing residential buildings. Auguscik-16

6. The wall will not stop the headlight of turning trucks from coming into residence front windows throughout the night. This will affect almost all of the windows facing North on Brace road. Auguscik-17

7. Having three delivery trucks per/hour disrupting residents at night is like setting your alarm clock to wake you three times an hour all night long. This will have a significant Auguscik-18

impact on the rentability of these units. The RDEIR notes: Nighttime interior noise levels may exceed noise standards for short durations during each delivery. Therefore, this impact would be significant".

Auguscik-18 (Cont.)

Replacing windows will not mitigate the fact that residents will no longer be able to open their windows at night. The existing apartments were built in 1962 without central air conditioning. Residents depend on opening windows at night to allow cool air to enter apartments. Not being able to open windows because of truck noise and pollution from exhaust stacks would have a significant negative impact on the livability of the apartments. This truck entrance should be relocated away from existing residential buildings.

Auguscik-19

8. Current mitigation measures propose building a wall around the Sierra Meadows Apartments with landscaping on the side facing Costco. If it is built, it is imperative that this wall be constructed in a way that is aesthetically pleasing to the residential side. Sierra Meadows apartments would be imprisoned by walls on three sides. The walls planned to surround the Sierra Meadows Apartments would be claustrophobic. This would have a significant negative effect on the livability of the apartments. Construction of such walls should be decorative and include landscaping on both sides of the wall. An example would be the wall built around Walmart in Rocklin with landscaping on the residential side.

Auguscik-20

9. The effect of trains along Taylor Road is not addressed in the traffic plan. The trains currently create a significant disruption to traffic flow.

Auguscik-21

10. The Sierra Meadows Apartments sole source of drinking water comes from a well located on the south easterly border of the property. The Apartment well is considered a public water system and therefore is regulated and protected by the Department of Water Resources, The Safe Drinking water Act and wellhead protection program. The Bio-retention area along the North boundary line bordering the apartments is within 25 ft or less of the existing well head. This is well within the

Auguscik-22

50 well site control zone. It may also be in violation of Zone A-Microbial/Direct Chemical Contamination Zone with a minimum radius of 600 ft. for all ground water drinking sources. (See Attached regulation from the California Drinking Water Source Assessment and Protection Program) (Letter from Placer County Environmental Health)

Auguscik-22 (Cont.)

Building a Costco Warehouse that wraps around existing residential on three sides has never been done before. This project would have significant detrimental effects on the surrounding residential properties, as well as the town of Loomis. This project should be studied and evaluated carefully because it pushes the boundaries between existing residential use and proposed warehouse use that will have a major impact to the livability of the adjacent residential properties. The DEIR appears to be incomplete, especially in the areas of traffic planning and control, town planning and zoning, air pollution, aesthetics, and life and safety effects on adjacent residential properties and surrounding area. I urge the Town of Loomis conduct additional studies to ensure the welfare of existing residential properties, as well as the Town itself. I reserve the right to provide further comments on the RDEIR and on the Final EIR..

Auguscik-23

Auguscik-24

If there are any questions regarding these comments, please feel free to contact me at (916) 316-1309. Also, please copy me on all documents and correspondence regarding the proposed development and EIR.

Sincerely,

Robert Auguscik / Owner
Sierra Meadows Apartments

COSTCO WHOLESALE

May 31, 2019

VIA PERSONAL DELIVERY

The Auguscik Family Trust
Robert D. Auguscik, Trustee
Diane J. Auguscik, Trustee

Dear Trustees:

Costco Wholesale Corporation ("Costco") is in contract to purchase land (the "**Ryan Property**") adjoining your property (the "**Auguscik Property**") in the Town of Loomis, Placer County, California. As a condition to its purchase of the Ryan Property, Costco desires to resolve any issues regarding rights to access the Auguscik Property over the Ryan Property. Costco expects this resolution will not be possible until after it has acquired the Ryan Property. Therefore, Costco requests your agreement to finalize the resolution, if and promptly after Costco acquires the Ryan Property, on the following terms:

1. Costco shall process, at no cost to you, a lot line adjustment to move the boundary between the Auguscik Property and the Ryan Property eastward as depicted on the attached plat of the proposed lot line adjustment.

2. You agree to join in the lot line adjustment as depicted promptly following Costco's delivery of the lot line adjustment documents to you and to take all necessary actions reasonably requested of you to implement the lot line adjustment.

3. The lot line adjustment documents shall include, without limitation, quitclaim deeds and preliminary change of ownership reports by which you quitclaim to Costco any right, title and interest in the Ryan Property as it shall be described following the lot line adjustment, and Costco shall quitclaim to you any right, title and interest in the Auguscik Property as it shall be described following the lot line adjustment. The quitclaim deeds shall release and terminate any and all claims either party may have in the lands of the other party as revised by the lot line adjustment, including, without limitation, any and all claims to implied or prescriptive easements or any and all other right, title or interest of any nature whatsoever in the other party's property.

4. The land added to the Auguscik Property shall be transferred to you as-is, in its existing condition, without any representations or warranties.

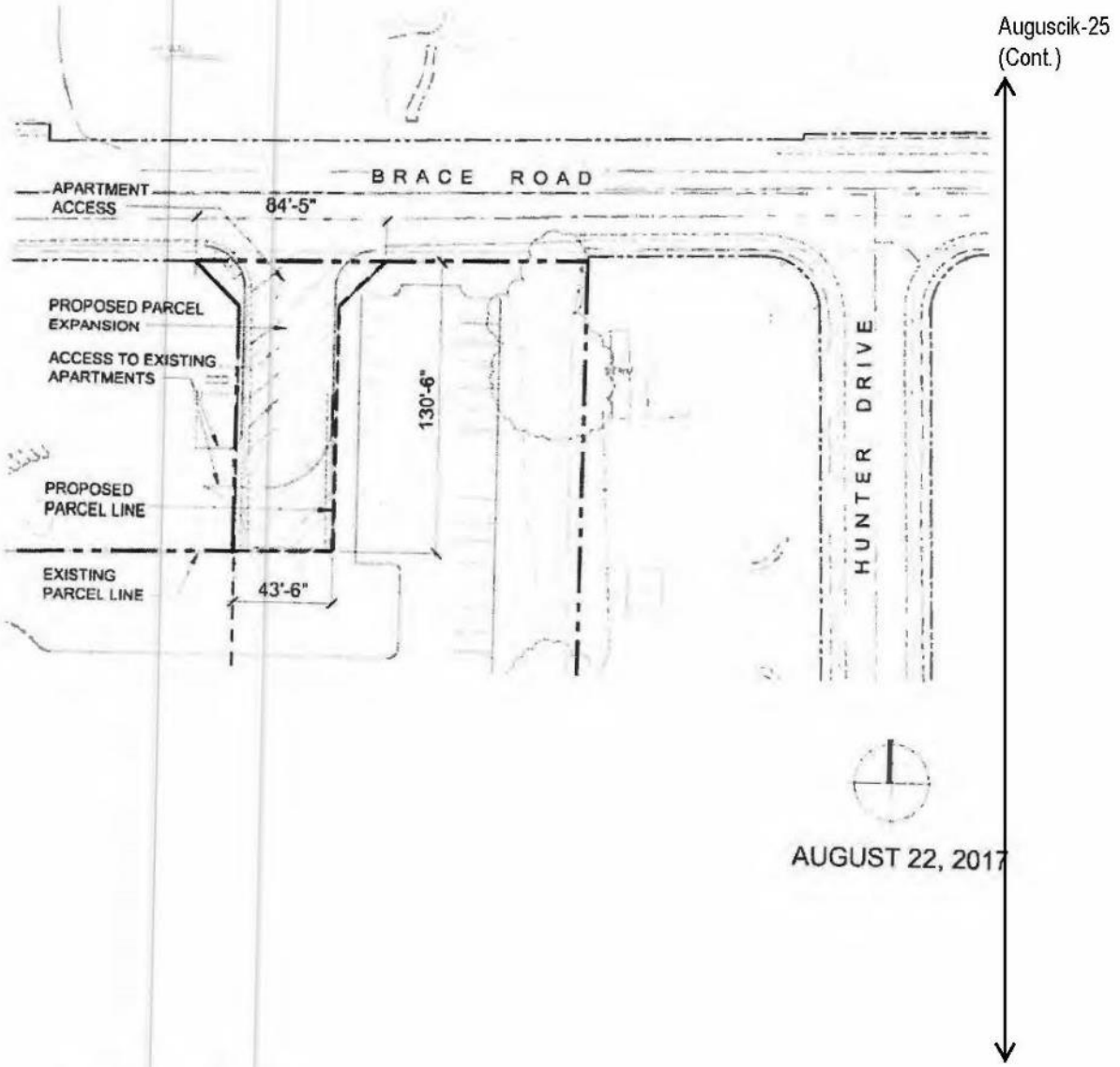
If these conditions are acceptable to you, please sign a copy of this letter and return it to the undersigned by mail or email by no later than June 14, 2019, as follows:

Costco Wholesale Corporation
999 Lake Drive
Issaquah, WA 98027
Attn; Seth S. Katz, Corporate Counsel

Or by email to:
skatz@costco.com

Auguscik-25

Auguscik-25
(Cont.)



AUGUST 22, 2017

EXHIBIT 1

Upon your sending a signed copy to Costco, this letter shall be an agreement binding on you and Costco, and our respective successors and assigns.

Sincerely,

Costco Wholesale Corporation

By: _____
Seth S. Katz, Corporate Counsel

We hereby accept the above terms and agree to be bound by and perform in accordance with them.

The Auguscik Family Trust

By: _____
Robert D. Auguscik, Trustee

By: _____
Diane J. Auguscik, Trustee

Auguscik-25
(Cont.)

LAW OFFICE OF DONALD B. MOONEY
417 Mace Blvd, Suite J-334
Davis, CA 95618
530-758-2377
dbmooney@dcn.org

October 4, 2019

Seth S. Katz
Corporate Counsel
Costco Wholesale Corporation
999 Lake Drive
Issaquah, WA 98027

Re: May 31, 2019 Agreement Between Costco Wholesale and The Auguscik Family Trust

Dear Mr. Katz:

This letter is on behalf of The Auguscik Family Trust regarding the May 31, 2019 Agreement between Costco Wholesale Corporation and the Auguscik Family Trust. The Agreement specifically provides that after Costco acquires the Ryan Property, Costco shall promptly process a lot line adjustment to move the boundary between the Auguscik Property and the Ryan Property eastward as depicted on the plat of the lot line adjustment that was attached to the Agreement.

Auguscik-25 (Cont.)

It is my understanding that Costco acquired the Ryan Property in June 2019. That acquisition triggered Costco's obligation to promptly submit the lot line adjustment. Despite Costco's obligation, to date Costco has failed to perform its obligations. The Auguscik Family Trust, hereby request that without any further delay, Costco process the lot line adjustment as set forth in the May 31, 2019 Agreement. Any further delay by Costco in fulfilling its obligations under the Agreement will be considered a breach of the agreement and The Auguscik Family Trust reserves all of its rights to enforce the terms of the Agreement.

Please do not hesitate to call me if you have any questions regarding this matter. In the meantime, please forward to me a copy of the proposed filing for the lot line adjustment.

Sincerely,

Donald B. Mooney

cc: Robert D. Auguscik

RODRIGUEZ | WRIGHT

David B. Franklin | Partner
369-B Third Street, Suite 361
San Rafael, CA 94901

T: 628-777-2300
F: 628-203-2045
E: dfranklin@rodriguezwright.com

October 15, 2019

VIA EMAIL

dbmooney@dcn.org

Donald B. Mooney
Law Office of Donald B. Mooney
417 Mace Boulevard, Suite J-334
Davis, CA 95618

RE: May 31, 2019 Agreement Between Costco Wholesale and The Auguscik Family Trust

Dear Mr. Mooney:

My firm serves as local counsel for Costco Wholesale Corporation in connection with the prospective Loomis, California Costco Wholesale warehouse. Our client has forwarded to me the letter of October 4, 2019 that you sent to its Corporate Counsel, Seth Katz, and has requested that I respond to you on its behalf.

Costco's civil engineering consultant is working on the lot line adjustment plan. This requires more than mere preparation of a drawing. It is interfacing with the City and other stakeholders to determine any issues the plan may face, including alignment with and/or distance from other Brace Road curb cuts. While approval of a particular plan as presented can never be certain when working with governmental agencies, the chances for approval are enhanced by working with staff first at the preparatory stage. Costco expects to have a plan ready for Mr. Auguscik's review and comment in the next few weeks. Costco's civil engineer will work with Mr. Auguscik to address any comments he has or to explain to him the parameters that the lot line adjustment must meet in order to optimize its chances for approval.

Auguscik-25 (Cont.)

Please assure your client that Costco is working on the lot line adjustment and, pending its completion, Costco will not interfere with your client's access as it currently is being exercised.

Sincerely,

Rodriguez Wright LLP

By: David B. Franklin

cc: Seth Katz

rodriguezwright.com

LAW OFFICE OF DONALD B. MOONEY
417 Mace Blvd, Suite J-334
Davis, CA 95618
503-758-2377
dbmooney@dcn.org

November 13, 2019

VIA REGULAR MAIL AND
ELECTRONIC MAIL
dfranklin@rodriguezwright.com

David B. Franklin
Rodriguez Wright
369-B Third Street, Suite 361
San Rafael, CA 94901

Re: May 31, 2019 Agreement Between Costco Wholesale & The Auguscik Family Trust

Dear Mr. Franklin:

We are in receipt of the proposed Lot Line Adjustments per the above referenced agreement. The Existing Parcels Lot Line Adjustment and Proposed Parcels Lot Line Adjustment look fine. As such, please move forward with filing the lot line adjustment.

As previously stated, submittal of the lot line adjustment is not contingent on the Town of Loomis' approval of the proposed Costco Project. Additionally, neither the above referenced agreement nor the approval of the lot line adjustment constitutes a waiver or resolution of any potential impacts raised by Robert Auguscik or others associated with parking and traffic regarding the Draft Environmental Impact Report for the proposed Costco project.

Auguscik-25 (Cont.)

Please do not hesitate to call me if you have any questions regarding this matter. In the meantime, please forward me the final documents and forms for my client's review and signature.

Sincerely,

Donald B. Mooney
Attorney

Cc: Robert Auguscik

LAW OFFICE OF DONALD B. MOONEY
417 Mace Blvd, Suite J-334
Davis, CA 95618
503-758-2377
dbmooney@dcn.org

November 22, 2019

VIA REGULAR MAIL AND
ELECTRONIC MAIL
dfranklin@rodriguezwright.com

David B. Franklin
Rodriguez Wright
369-B Third Street, Suite 361
San Rafael, CA 94901

Re: May 31, 2019 Agreement Between Costco Wholesale & The Auguscik Family Trust

Dear Mr. Franklin:

Per the original agreement dated May 31, 2019 it has always been my clients' understanding that access to the Sierra Meadows Apartments would remain unchanged. Based on new developments presented by Costco at the November 19th Loomis Planning Commission meeting, my client has concerns that need to be discussed prior to finalizing the lot line request.

Auguscik-25 (Cont.)

Again, nothing in the Agreement or lot line adjustment should be interpreted as consenting to site plans proposed by Costco or waiver of any comments/objections to the proposed Costco project.

Sincerely,

Donald B. Mooney
Attorney

Cc: Robert Auguscik

COPY

TOWN OF LOOMIS

3665 Taylor Road, Loomis CA 95650

January 30, 2020

VIA E-MAIL AND U.S. MAIL

Costco Wholesale Corporation, a Washington Corporation
Attn:
Michael Okuma
9 Corporate Park, Suite 230
Irvine, CA 92606

Robert D. Auguscik and/or Diane J. Auguscik, Trustees of the Auguscik Family Trust
P.O. Box 1217
Loomis, CA 95650

Re: Application for Costco Loomis Lot Line Adjustment

Auguscik-25
(Cont.)

Dear Mr. Okuma and Mr. and Mrs. Auguscik,

The Town of Loomis (the "Town") is in receipt of your application dated December 18, 2019 and fee in the amount of $2,002.00 (Receipt #28775) to process a lot line adjustment. The application and payment were received by the Town on January 9, 2020. The location of the lot line adjustment is at the southeast corner of Sierra College Boulevard and Brace Road, Placer County Assessor Parcels 045-042-11, -012, -016-, -017, -022, -034, and -035. This application for a lot line adjustment is part of a pending development project, the Costco Loomis Warehouse Project.

This letter is to advise you, that in conformance with Loomis Municipal Code section 14.12, the Town will consider this application in connection with the pending development project.

Very truly yours,

Britt Snipes for
Mary Beth VanVoorhis
Planning Director
Town of Loomis

c.c. Britt Snipes
Anders Hauge

1925285.1 9361-026

(916) 652-1840 ~ (916) 652-1847
3665 Taylor Road ~ P.O. Box 1330 ~ Loomis, CA 95650

RECEIVED
JAN 09 2020
TOWN OF LOOMIS

TOWN OF LOOMIS
6140 Horseshoe Bar Rd, Suite K
Loomis, CA 95650
(916) 652-1840 FAX (916) 652-1847

For Town Use
File Number
Application Fee(s)
Receipt #
Date Received
Paid $

PLANNING DEPARTMENT

Planning Application

Auguscik-25 (Cont.)

1. **Project Title:** COSTCO LOOMIS
2. **Street Address/ Location:** SOUTHEAST CORNER OF SIERRA COLLEGE BLVD. & BRACE RD.
3. **APN(s):** 045-042-011, -012, -016, -017, -022, -034 & -035 **Acreage:** 11.9334 +/- ACRES

   Zoning: CG & RH **General Plan Designation:**

   Current Site Use: VACANT LAND & HIGH DENSITY RESIDENTIAL

   Surrounding Land Use(s): HIGH DENSITY RESIDENTIAL & MEDIUM DENSITY RESIDENTIAL
4. **Property Owner:** Robert D. Auguscik and/or Diane J. Auguscik, Trustees of the Auguscik Family Trust dated June 9, 2006

   Address: P.O. Box 1217, Loomis, CA 95650
   City State Zip

   Telephone: **email:**
5. **Project Applicant:** Costco Wholesale Corporation, a Washington corporation

   Address: Attn: Michael Okuma, 9 Corporate Park, Suite 230, Irvine, CA 92606
   City State Zip

   Telephone: 714-978-5020 **email:** mokuma@northwestatlantic.com
6. **Project Engineer/Architect:** KIER & WRIGHT (ATTN: JIM HICKENBOTTOM)

   Address: 2850 COLLIER CANYON ROAD LIVERMORE CA 94551
   City State Zip

   Telephone: 925-245-6788 **email:** JHICKENBOTTOM@KIERWRIGHT.COM
7. **What actions, approvals or permits by the Town of Loomis does the proposed project require?**

[ ]	Appeal	[ ]	Miscellaneous Permit
[ ]	Certificate of Compliance	[ ]	Planned Development
[ ]	Conditional Use Permit	[ ]	Second Unit Permit
[ ]	Design Review	[ ]	Sign Review
[ ]	Development Agreement	[ ]	Tentative Review
[ ]	Environmental Review	[ ]	Minor Land Division
[ ]	General Plan Amendment	[ ]	Subdivision
[ ]	Hardship Mobile Home Permit	[ ]	Variance
[X]	Lot Line Adjustment	[ ]	Zoning Amendment (Rezone)
[ ]	Other		

8. **Does the proposed project need approval by other governmental agencies?**
   [ ] Yes [X] no If yes, which agencies?

9. **Which agencies/utilities provide the following services to the project?** **(Please note if not hooked up to sewer or water)**

Electricity	PG&E	Natural Gas	PG&E
Fire Protection	SOUTH PLACER FPD	Water/Well	PLACER COUNTY WATER AGENCY
Sewer/Septic	SPMUD	Telephone	AT&T

High School PLACER UNION HIGH SCHOOL DISTRICT Elem. School LOOMIS UNION SCHOOL DISTRICT
Other

10. **The Town had informed me of my responsibilities pursuant to California Government Code, Section 65962.5(f), regarding notifying the Town of hazardous waste and/or hazardous substance sites on the project site. I have consulted the lists consolidated by the State Environmental Protection Agency dated** and find: Regulatory identification number N/A

Date of list N/A No problems identified THE SITE IS NOT INCLUDED ON THE LISTS

Type of problem N/A

I declare under penalty of perjury of the laws of the State of California that the foregoing is true and correct.

Dated Applicant

11. **Project Description (Describe the project so that a person unfamiliar with the project would understand the purpose , size, phasing, duration, required improvements, duration of construction activities, surrounding land uses, etc. associated with the project. Attach additional pages as necessary.)** A LOT LINE ADJUSTMENT TO RECONFIGURE (4) LOTS INTO (2) ADJUSTED LOTS.

Auguscik-25 (Cont.)

12. **Owner Authorization:**
I hereby authorize Costco Wholesale Corporation, the above-listed applicant, to make applications for project approvals by the Town of Loomis, regarding the above-described project and to receive all notices, correspondence, etc., from the Town regarding this project. I also hereby authorize the town staff to place a noticing board (approximately 4' x 3') on my property, visible from the street, at least ten (10) days prior to the first hearing on my project, and for subsequent hearings as determined necessary by the Planning Director.

Signature(s) of Owner(s)	Auguscik Family Trust by: Printed Name(s)	Date
	Robert D. Auguscik, Trustee	12/18/2019
Diane Auguscik	Diane J. Auguscik, Trustee	12/18/19

13. **Applicant and/or Owner Hold Harmless:**
Owner, and Applicant (if different from Owner), agrees to hold Town harmless from all injuries, damages, costs and expenses, including attorney's fees resulting from the negligence of owner, and Applicant (if different from Owner), and their employees, contractors, subcontractors and agents, in connection with any proceeding brought in any State or Federal court with respect to the applicant's project.

Signature(s) of Owner(s)	Printed Name(s)	Date
	Michael Ohuma (Contract of Costco)	12/18/19
		Date

14. **Applicant and/or Owner Acknowledgment:**
Owner/Applicant expressly agree they are solely responsible for assuring compliance with all applicable laws, rules, regulations, and practices required to implement this development, and that Town staff's errors or 123 omissions in explaining what is required, whether on this application form or otherwise, do not establish a basis for Owner/Applicant failing to comply with all such laws, rules, regulations and practices.

Signature(s) of Owner(s) and/or Applicant	Printed Name(s)	Date

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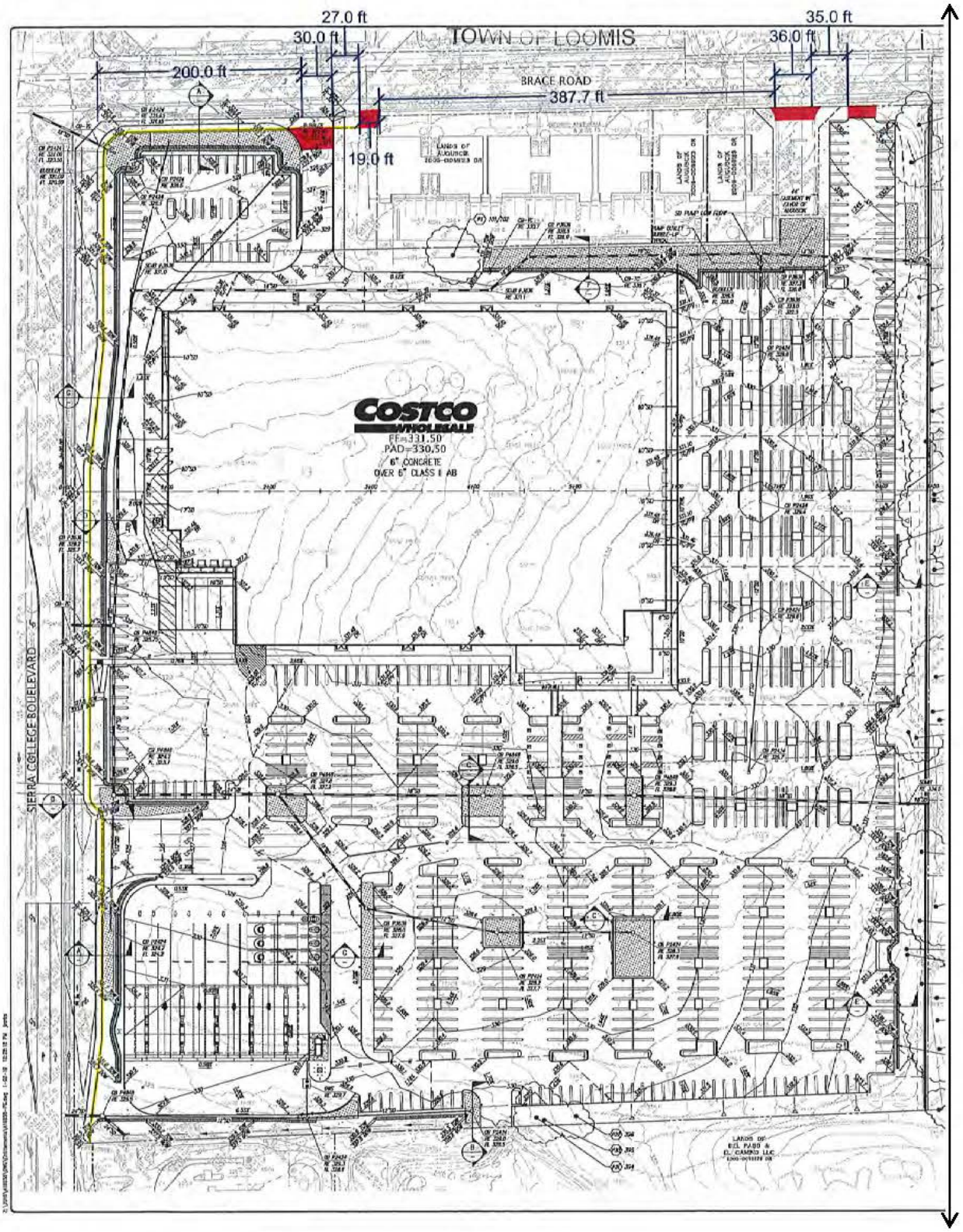
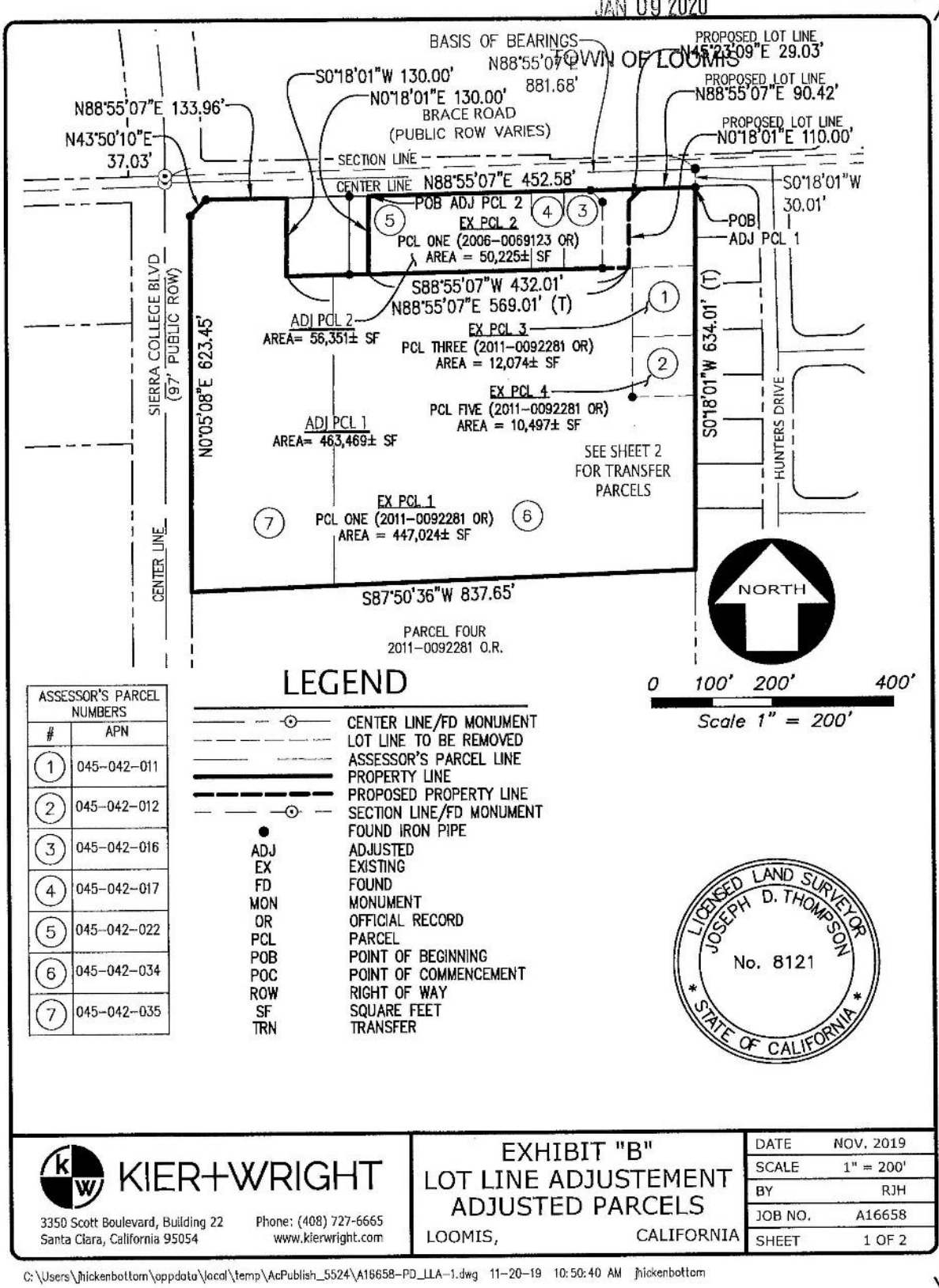
JAN 09 2020

Auguscik-25
(Cont.)



RECEIVED
JAN 09 2020
TOWN OF LOOMIS



ASSESSOR'S PARCEL NUMBERS	
#	APN
1	045-042-011
2	045-042-012
3	045-042-016
4	045-042-017
5	045-042-022
6	045-042-034
7	045-042-035

LEGEND

	CENTER LINE/FD MONUMENT
	LOT LINE TO BE REMOVED
	ASSESSOR'S PARCEL LINE
	PROPERTY LINE
	PROPOSED PROPERTY LINE
	SECTION LINE/FD MONUMENT
	FOUND IRON PIPE
ADJ	ADJUSTED
EX	EXISTING
FD	FOUND
MON	MONUMENT
OR	OFFICIAL RECORD
PCL	PARCEL
POB	POINT OF BEGINNING
POC	POINT OF COMMENCEMENT
ROW	RIGHT OF WAY
SF	SQUARE FEET
TRN	TRANSFER

LICENSED LAND SURVEYOR
JOSEPH D. THOMPSON
No. 8121
STATE OF CALIFORNIA

KIER+WRIGHT
3350 Scott Boulevard, Building 22
Santa Clara, California 95054
Phone: (408) 727-6665
www.kierwright.com

EXHIBIT "B"
LOT LINE ADJUSTEMENT
ADJUSTED PARCELS
LOOMIS, CALIFORNIA

DATE	NOV. 2019
SCALE	1" = 200'
BY	RJH
JOB NO.	A16658
SHEET	1 OF 2

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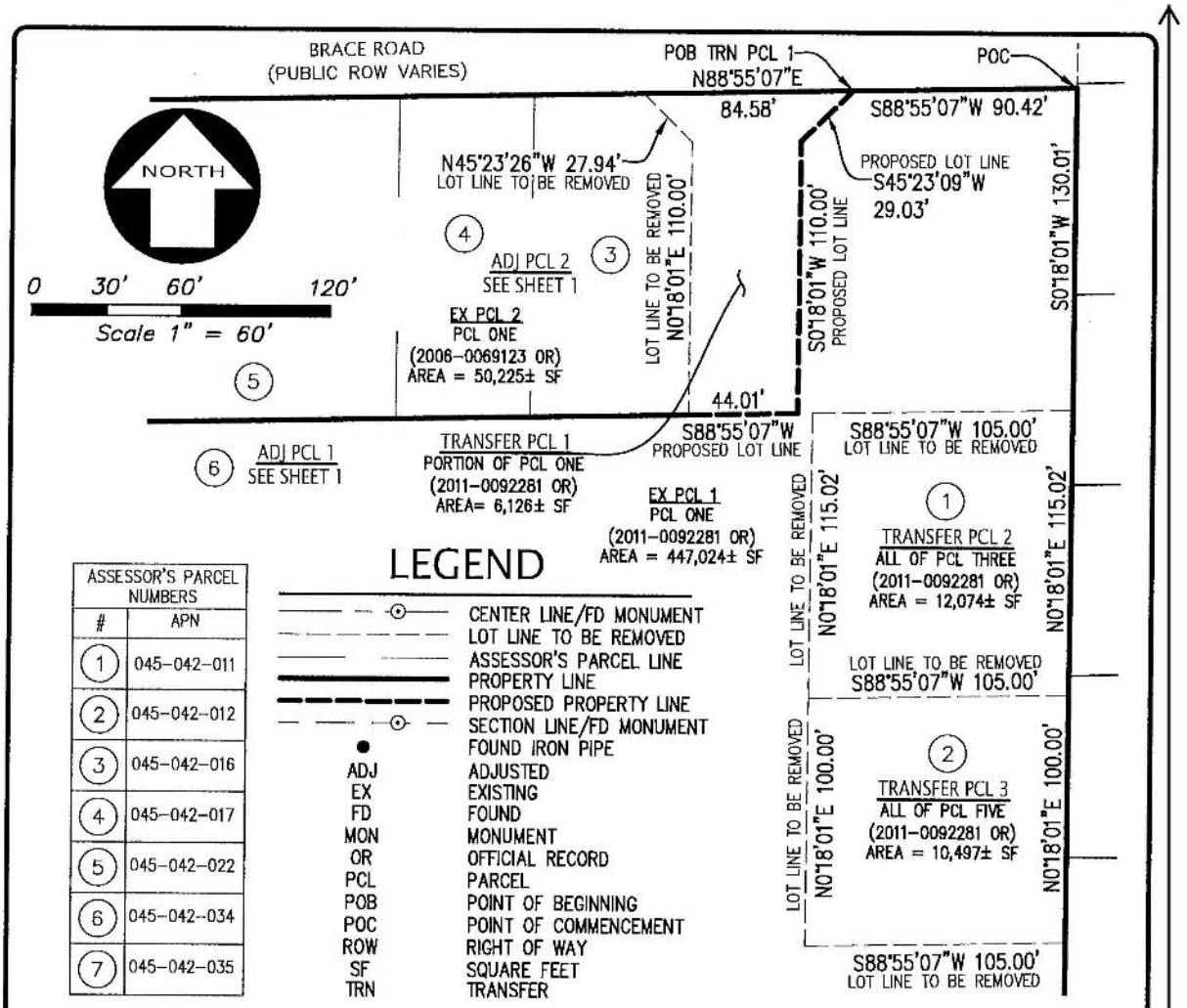

ASSESSOR'S PARCEL NUMBERS	
#	APN
1	045-042-011
2	045-042-012
3	045-042-016
4	045-042-017
5	045-042-022
6	045-042-034
7	045-042-035

LEGEND

	CENTER LINE/FD MONUMENT
	LOT LINE TO BE REMOVED
	ASSESSOR'S PARCEL LINE
	PROPERTY LINE
	PROPOSED PROPERTY LINE
	SECTION LINE/FD MONUMENT
	FOUND IRON PIPE
ADJ	ADJUSTED
EX	EXISTING
FD	FOUND
MON	MONUMENT
OR	OFFICIAL RECORD
PCL	PARCEL
POB	POINT OF BEGINNING
POC	POINT OF COMMENCEMENT
ROW	RIGHT OF WAY
SF	SQUARE FEET
TRN	TRANSFER

PARCEL AREA TABLE

	EX AREA (SF)	TRN AREA (SF) (EX 1 TO EX 2)	TRN AREA (SF) (EX 3 TO EX 1)	TRN AREA (SF) (EX 4 TO EX 1)	PROPOSED AREA (SF)
EX PCL 1	447,024±				
EX PCL 2	50,225±				
EX PCL 3	12,074±				
EX PCL 4	10,497±				
TRN PCL 1		6,126±			
TRN PCL 2			12,074±		
TRN PCL 3				10,497±	
ADJ PCL 1					463,469±
ADJ PCL 2					56,351±
TOTAL	519,820±				519,820±

KIER+WRIGHT
3350 Scott Boulevard, Building 22
Santa Clara, California 95054
Phone: (408) 727-6665
www.kierwright.com

EXHIBIT "B"
LOT LINE ADJUSTEMENT
TRANSFER PARCELS
LOOMIS, CALIFORNIA

DATE	NOV. 2019
SCALE	1" = 60'
BY	RJH
JOB NO.	A16658
SHEET	2 OF 2

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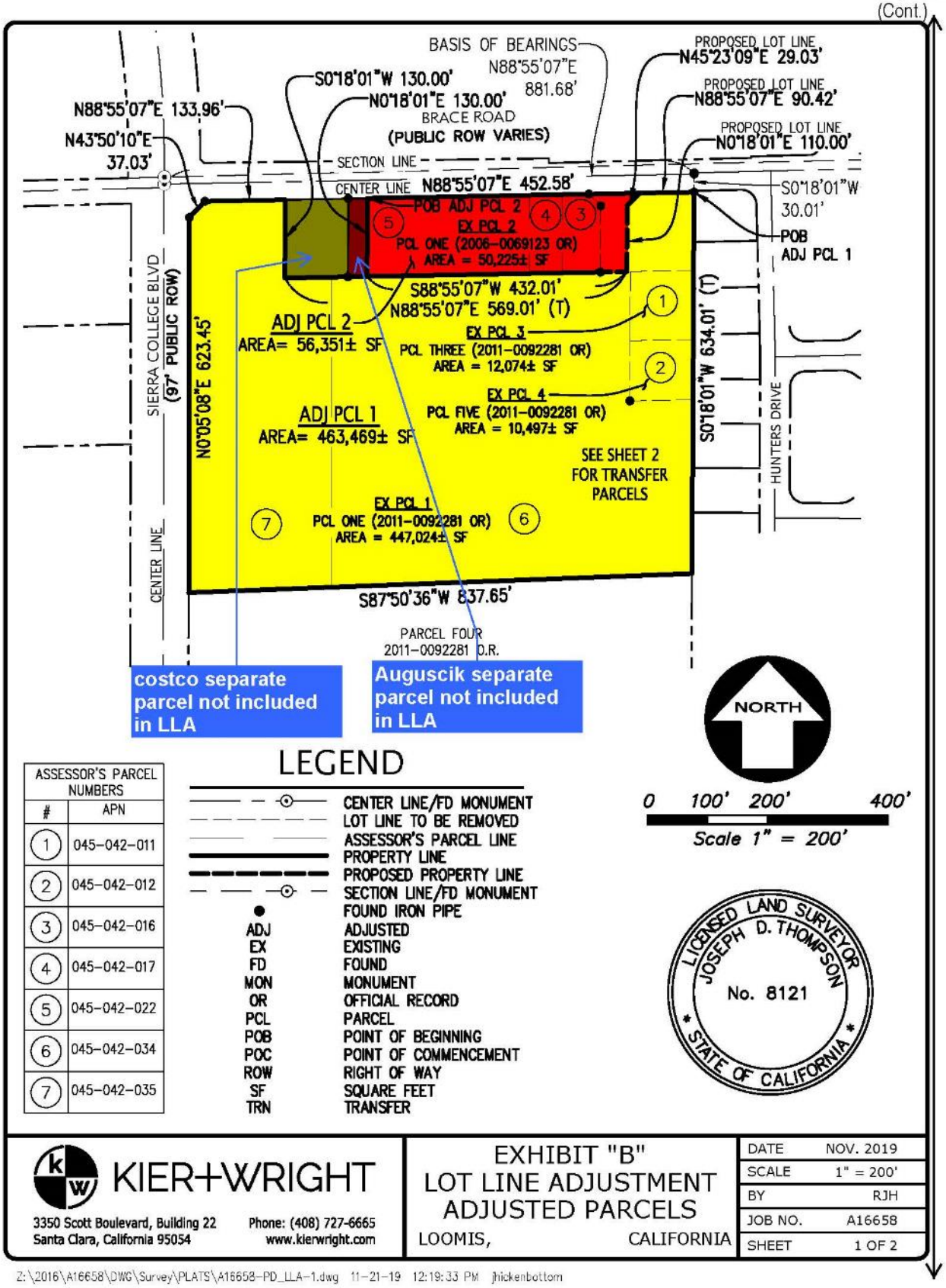

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4	045-042-017
5	045-042-022
6	045-042-034
7	045-042-035

LEGEND

	CENTER LINE/FD MONUMENT
	LOT LINE TO BE REMOVED
	ASSESSOR'S PARCEL LINE
	PROPERTY LINE
	PROPOSED PROPERTY LINE
	SECTION LINE/FD MONUMENT
●	FOUND IRON PIPE
ADJ	ADJUSTED
EX	EXISTING
FD	FOUND
MON	MONUMENT
OR	OFFICIAL RECORD
PCL	PARCEL
POB	POINT OF BEGINNING
POC	POINT OF COMMENCEMENT
ROW	RIGHT OF WAY
SF	SQUARE FEET
TRN	TRANSFER

LICENSED LAND SURVEYOR
JOSEPH D. THOMPSON
No. 8121
STATE OF CALIFORNIA

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EXHIBIT "B"
LOT LINE ADJUSTMENT
ADJUSTED PARCELS
LOOMIS, CALIFORNIA

DATE	NOV. 2019
SCALE	1" = 200'
BY	RJH
JOB NO.	A16658
SHEET	1 OF 2

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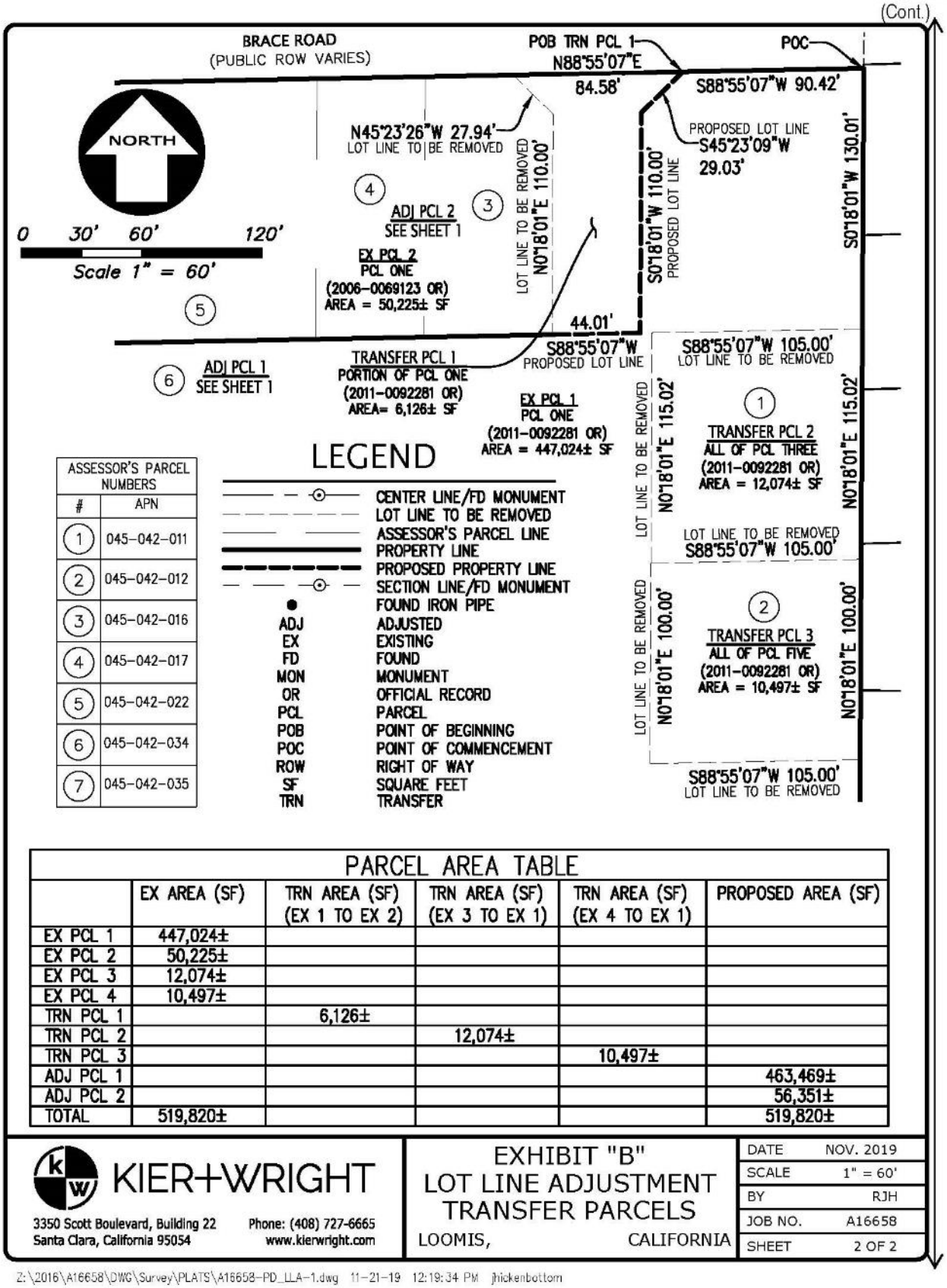

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SHEET	2 OF 2

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Gmail Robert Auguscik <rdauguscik@gmail.com>

Lot line agreement

1 message

Robert Auguscik <rdauguscik@gmail.com> Mon, Jul 29, 2019 at 9:48 AM
To: Anders Hauge <ahauge@haugebrueck.com>
Cc: "Dobrota,Mike" <mdobrota@northwestatlantic.com>

Hi Anders,

After our conversation last week I had Placer Title research APN 045-042-034. There is an easement only for the purpose of parcel 12, but no public right of way through the property that Costco is transferring to us. Our agreement with Costco states that the lot line adjustment and transfer of land be done promptly after COE. Costco is currently in the process of putting together the paperwork for the lot line adjustment and tranfer. I am asking the town to move forward with this request. This has nothing to do with the approval of the project and should not be delayed because of it.

Auguscik-25 (Cont.)

Best,

Robert D. Auguscik
Black Diamond Properties
CA DRE # 01196148

916 316-1309

Placer County
Health and Human Services Department

February 6, 2020

Sierra Meadows Apartments
Attention: Robert Auguscik
P.O. Box 1217
Loomis, CA 95650

Re: Sierra Meadows Apartments Water System, PWS# 3100061
Required Public Well Setbacks

Auguscik-25
(Cont.)

Dear. Mr. Auguscik,

Recently you contacted this office to inquire about the potential impacts of the development proposed adjacent to the public well serving the Sierra Meadows Apartments public water system. The draft plans for the Costco development indicate a bio retention area to be installed approximately 25 feet from the existing public well. Based on information within the environmental impact report for this project, stormwater runoff will be collected by curbs and swales which will direct the runoff to the retention area where it would filter through sand and soil to a catch basin in the trench that would ultimately discharge to the various storm drains.

A 50-foot control zone around a public well is important to prevent any contaminating activities from occurring nearby. Setbacks between a water well and potentially contaminating activities are outlined in California's Water Well Standards, Bulletin 74-81 and 74-90. The minimum separation distance between a sewer (sanitary or storm) and a water well source is 50 feet. Should this development occur, the Sierra Meadows Apartments public well would be out of compliance with this setback. The runoff entering the retention area will not only potentially contain oil, gasoline and antifreeze from the parking lot but could also contain other hazards such as brake dusts and cleaning chemicals from the tire shop which will be approximately 70 feet away from the wellhead. The Water Well Standards describe that adequate setbacks should be maintained between a water well and areas with storage and preparation of chemicals.

This office consulted with State Water Resources Control Board Division of Drinking Water regarding the effects this development may have on the Sierra Meadows Apartments public water system. The presence of stormwater runoff collecting into an area that is partially unlined poses a risk to the water quality of the public well. A contaminated water well would require the installation and monitoring of a treatment system or possibly the construction of a new public water well which is capable of meeting all requirements. Connection to a publicly treated water supply, in this case, Placer County Water Agency, would eliminate the potential hazards posed by the Costco Development on this small public water system.

Do not hesitate to contact me if you have any questions.

Sincerely,

Danielle Pohlman

Danielle Pohlman, REHS
Environmental Health Specialist
Direct Line (530) 745-2390
dpohlman@placer.ca.gov

Community Development and Resource Agency Building, 3091 County Center Drive, #180, Auburn, CA 95603
530.745.2300 ● www.placer.ca.gov ● fax 530.745.2370

Drinking Water Source Assessment and Protection (DWSAP) Program

JANUARY 1999

Revision 1: Pages 13 and 15, April 1999
Revision 2: Pages 114, 155, and 193, January 2000

Division of Drinking Water and Environmental Management

California Department of Health Services

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Part Four: Voluntary Drinking Water Source Protection Programs

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APPENDICES TO BE USED FOR A GROUND WATER SOURCE

List of Tables

List of Figures

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Auguscik-25 (Cont.)

Glossary of Terms

Abandoned Well: A well (1) the use of which has been permanently discontinued, or (2) that is in such a state of disrepair that no water can be produced. Because abandonment is a state that also involves intent on the part of the well owner, a definition that prescribes a set of conditions and a time limit for use in applying standards appears in California Well Standards, California Department of Water Resources (DWR) Bulletin 74-90, Section and DWR Bulletin 74-81, Section 21.

Assessment: An evaluation of a drinking water source that includes delineation of the boundaries of the source area and protection zones, as applicable, identification of possible contaminating activities (PCAs) within the delineated areas, a determination of the PCAs to which the source is most vulnerable, and a summary of the vulnerability of the source to contamination.

Assessment Map: A map that shows the location of the drinking water source, the source area and protection zones (if applicable), and an indication of the types of possible contaminating activities (PCAs) that exist within the source area and zones. The assessment map is part of a complete source water assessment. The recommended base map for the DWSAP program is a USGS quadrangle map (7.5 minute series).

Buffer Zone: A zone delineated to provide added protection to drinking water sources. The buffer zone is generally upgradient from the protection zones for a ground water source and may include the entire zone of contribution for the well, indirect recharge areas, or locations where the aquifer may be exposed at the surface.

Augusciak-25 (Cont.)

Community Water System: A public water system which serves at least 15 service connections used by yearlong residents or regularly serves at least 25 yearlong residents.

Contaminants of concern: Microorganisms of drinking water importance, including fecal coliform bacteria, *Escherichia coli*, viruses, *Giardia lambia*, and *Cryptospordium*; chemicals for which maximum contaminant levels (MCLs) or California drinking water action levels have been established, and unregulated chemicals in drinking water for which monitoring is required (Table 7-1); turbidity and total organic carbon (TOC).

Detection: Detection of a contaminant at or above the "Detection limit for purposes of reporting" (DLR), pursuant to California Code of Regulations, Chapter 15, Title 22, Section 64400.45. DLRs have been established in regulation for inorganic chemicals and organic chemicals with MCLs. In addition, DHS has established DLRs for unregulated chemicals for which monitoring is required.

Drinking Water System: See Public Water System.

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Improperly Destroyed Well: An abandoned well that has not been destroyed in accordance with California Well Standards, DWR Bulletin 74-90, Section 23 and DWR Bulletin 74-81, Section 23.

Local Primacy Agency: A county health authority which has received primacy delegation for the administration and enforcement of public water system requirements for community water systems serving less than 200 service connections, and noncommunity water systems.

Noncommunity Water System: A public water system that is not a community water system.

Nontransient-noncommunity water system: a public water system that is not a community water system and that regularly serves at least the same 25 persons over 6 months per year. Typically, a noncommunity water system serves a predominantly stable population (e.g., a school or factory).

Physical Barrier Effectiveness: A determination of the effectiveness of the physical barriers in preventing contaminants from reaching the drinking water source.

Physical Barrier Effectiveness Evaluation: A review of a drinking water source and its site characteristics to determine physical barrier effectiveness. As a minimum, the review considers the natural geologic materials and/or hydraulic conditions and the construction features of the well or intake. These characteristics are generally independent of land use, PCAs, or contaminant characteristics.

Auguscik-25 (Cont.)

Possible Contaminating Activity (PCA): Human activities that are actual or potential origins of contamination for a drinking water source. PCAs include sources of both microbiological and chemical contaminants that could have adverse effects upon human health.

Protection: The process of managing the activities within a delineated source area or protection zone to prevent drinking water source contamination.

Protection Zone: A delineated area within the source area of a drinking water source. Zones differentiate areas of varying significance in terms of threat to the water source from contamination.

Public Water System (also Drinking Water System): A system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out of the year. A public water system includes the following: (1) Any collection,

treatment, storage, and distributions facilities under control of the operator of the system which are used primarily in connection with the system, (2) Any collection or pretreatment storage facilities not under the control of the operator that are used primarily in connection with the system, (3) Any water system that treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption.

Service Connection: The point of connection between the customer's piping or constructed conveyance, and the water system's meter, service pipe, or constructed conveyance.

Source Area: The capture area for a drinking water source. For a surface water source, the source area is the watershed. For a groundwater source, the source area is the recharge area and the area within delineated protection zones.

Source Water: Water drawn to supply drinking water from an aquifer by a well or from a surface water body (e.g., reservoir, lake, river) by an intake. Such water may or may not be treated before being distributed by a drinking water system for consumption.

Susceptibility: see Vulnerability.

Transient-noncommunity water system: a public water system that is not a community water system or a nontransient-noncommunity water system. Typically, a noncommunity water system that serves a predominantly changing population (e.g., a restaurant or campground).

Auguscik-25 (Cont.)

Vulnerability: A determination of the most significant threats to the quality of the water supply that takes into account the physical barrier effectiveness of the drinking water source. The vulnerability evaluation also considers the type and proximity to the water supply of activities that could release contaminants. Vulnerability, as defined in the DWSAP Program, is consistent with existing California regulations (see Section 8.4). Vulnerability is equivalent to "susceptibility," as the latter is used in US EPA source water assessment and protection guidance.

Acronyms

ARB	Air Resources Board
AWWA	American Water Works Association
BMP	Best Management Practice
Cal/EPA	California Environmental Protection Agency
CDF	California Department of Forestry and Fire Protection
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Calculated Fixed Radius
CSFM	California State Fire Marshal
CWA	Clean Water Act
CZARA	Coastal Zone Act Reauthorization Amendment
DDWEM	Division of Drinking Water and Environmental Management
DFA	Department of Food and Agriculture
DHS	Department of Health Services
DOC	Department of Conservation
DOGGR	Division of Oil, Gas, and Geothermal Resources
DPR	Department of Pesticide Regulation
DTSC	Department of Toxic Substances Control
DWFOB	Drinking Water Field Operations Branch
DWR	Department of Water Resources
DWTPB	Drinking Water Technical Program Branch
DWSAP	Drinking Water Source Assessment and Protection
EPA	U.S. Environmental Protection Agency
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
GIS	Geographical Information System
GPS	Global Positioning System
GWR	Ground Water Rule
IWMB	Integrated Waste Management Board
LPA	Local Primacy Agency
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
NRCS	National Resources Conservation Service
OEHHA	Office of Environmental Health Hazard Assessment
PCA	Possible Contaminating Activity
RCRA	Resource Conservation and Recovery Act
RWQCB	Regional Water Quality Control Board
SDWA	Safe Drinking Water Act
SWAP	Source Water Assessment Program
SWP	Source Water Protection

Auguscik-25 (Cont.)

SWRCB	State Water Resource Control Board
USDA	US Department of Agriculture
USGS	US Geological Survey
US EPA	U.S. Environmental Protection Agency
WHPP	Well Head Protection Program
ZOC	Zone of Contribution

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PART ONE

Introduction

An introduction to the California Drinking Water Source Assessment and Protection Program document, and a summary of the minimum components for an assessment

Section 1—California's process of developing the DWSAP Program and information on State contacts

Section 2—The DWSAP Program's background, goals and schedule

Section 3—The minimum components of a drinking water source assessment under the DWSAP Program

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1.0 Introduction

This document presents California's Drinking Water Source Assessment and Protection (DWSAP) Program. The Department of Health Services' (DHS') Division of Drinking Water and Environmental Management is the lead agency for development of the DWSAP Program and its implementation.

The DWSAP Program has been prepared in response to the 1996 reauthorization of the federal Safe Drinking Water Act (SDWA), which included an amendment requiring states to develop a program to assess sources of drinking water and encouraging states to establish protection programs. A drinking water source protection program envisions a partnership between local, state, and federal agencies to ensure that the quality of drinking water sources is maintained and protected.

The drinking water source assessment is the first step in the development of a complete drinking water source protection program. The assessment includes a delineation of the area around a drinking water source through which contaminants might move and reach that drinking water supply. In addition, it includes an inventory of activities that might lead to the release of microbiological or chemical contaminants within the delineated area. This enables a determination to be made as to whether the drinking water source might be vulnerable to contamination.

California's DWSAP Program will address both ground water and surface water sources, drawing upon US Environmental Protection Agency (EPA) guidance, DHS' experiences from other related programs, and advice from advisory committees and the public. The EPA has indicated in its drinking water source assessment guidance (US EPA, 1997) that delineation and contaminant inventory elements for ground water sources are to be consistent with wellhead protection program approaches. Since California has not developed a wellhead protection program, the ground water portion of the DWSAP will serve as the State's wellhead protection program. For surface water sources, DHS' experience with other activities, such as watershed sanitary surveys, will be helpful in developing the surface water components of the DWSAP.

Auguscik-25 (Cont.)

The California DWSAP Program will be submitted to EPA by early 1999. DHS anticipates that the submitted document will clearly convey to the public and to drinking water systems the goals and objectives that DHS and EPA seek to accomplish with the DWSAP program, along with methods that are technically appropriate and easily understood.

This document describes California's DWSAP Program and presents the DHS procedures for conducting drinking water source assessments. Although DHS is responsible for performing these assessments, the Department recognizes that some public water systems may wish to perform their own assessments. In such cases, the systems will need to conduct assessments in conformance with the DHS procedures.

Public water systems may also choose to perform more complex drinking water source assessments. The water purveyor should contact DHS prior to conducting an assessment in order to receive the latest program documentation.

When a public water system has completed an evaluation through another program that is the functional equivalent of a portion or all of the drinking water source assessment, that information may be submitted for purposes of the drinking water source assessment.

For example, drinking water systems that utilize surface water sources are required under California law to perform watershed sanitary surveys on a 5-year cycle. Many of the watershed sanitary surveys done prior to the DWSAP Program will most likely adequately satisfy most of the components of the assessment process, other than the vulnerability ranking. Where watershed sanitary surveys may not be adequate for the DWSAP assessment, the cyclic nature of these surveys offers opportunities to incorporate the components of the DWSAP Program.

Groundwater evaluations done for purposes of an Assembly Bill 3030 Groundwater Management Plan (Water Code §10750 et.seq.) may contain information pertinent to DWSAP Program components.

This document also contains DHS' recommendations for voluntary protection activities for public water systems and communities.

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1.1 Description of the DWSAP Program Document

The development of the DWSAP Program is summarized below and discussed in greater detail in Parts One and Two of this document. The "Source Water Assessment" portion of the program, for which DHS is responsible, is presented in Part Three. The "Source Water Protection" aspects of the program, which are optional and may be enacted voluntarily by drinking water systems or communities, are presented in Part Four.

Fundamental to the assessment and protection elements are issues related to technical data, which will be addressed in appropriate sections of this document.

The DWSAP Program document describes the following:

- The background of the State's DWSAP Program and its goals.
- The minimum acceptable components of a drinking water source assessment under the DWSAP Program.
- The State's efforts to ensure public participation, including meeting with other state agencies, the formation of both Technical and Policy Advisory Committees, and public workshops.

- The roles and duties of government agencies with respect to drinking water source assessment and protection.
- Procedures for performing assessments.
- Guidance for protection programs.

1.1.1 Assessments

The DWSAP Program describes DHS' procedures for conducting drinking water source assessments, including:

- Location of the drinking water source
- Delineation of source area and protection zones for both surface water and ground water sources. The surface water source areas are defined by the boundaries of the watershed; zones, if delineated, are closer to the drinking water supply. The ground water source areas and protection zones are delineated based on readily available hydrogeologic information on ground water flow, recharge and discharge, and other information deemed appropriate by the State.
- Identification of possible contaminating activities (PCAs) that are considered potential origins of contamination within each drinking water source area and its protection zones. PCAs include activities associated with both microbiological and chemical contaminants that could have adverse effects upon human health.
- Determination of the PCAs to which the drinking water source is most vulnerable. The vulnerability determination considers the characteristics of the source and site, the risk ranking of PCAs identified in the inventory, and the proximity of the PCAs to the source.
- Assessments for new drinking water sources by public water systems.

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1.1.2 Protection

The DWSAP Program includes California's recommendations to encourage voluntary drinking water source protection:

- Descriptions of state actions to support local entities in developing local protection programs. These include technical assistance, financial assistance, training and demonstration projects.
- Identification of management approaches that can be used to protect the water supply from contaminants associated with PCAs. These approaches may include, as appropriate, implementation of regulatory and non-regulatory control measures and public education.

- Criteria for developing contingency plans indicating the location and provision of alternate drinking water supplies for each public water system in the event of loss of one or more of the normal sources of supply.

1.1.3 Implementation of Assessment and Protection Programs

The DWSAP Program includes California's approach for implementing assessment and protection activities, including

- Description of the methods DHS will use for assessing California's nearly 16,000 active drinking water sources. These methods comprise the minimum components of drinking water assessments.

- Guidance for larger public water systems and others that may choose to perform their own assessments. This guidance states that watershed sanitary surveys already completed satisfactorily for compliance with DHS regulations fulfill most of the assessment components for surface water supplies.

- Guidance for implementing successful drinking water source protection programs at the local level.

Auguscik-25 (Cont.)

1.2 State Contacts

To find out more information about the California DWSAP Program, please contact:

Alexis Milea
Department of Health Services
Drinking Water Program Technical Unit
2151 Berkeley Way, Room 461
Berkeley, CA 94704
(510) 540-2177

Leah Walker
Department of Health Services
Drinking Water Program Technical Unit
50 D Street, Suite 200
Santa Rosa, CA 95404
(707) 576-2295

The Division of Drinking Water and Environmental Management's Web site, accessible via "Prevention Services" on the DHS Web site at http://www.dhs.ca.gov, also contains information on the DWSAP. The site includes a schedule of DWSAP-related events, advisory committee meeting notes, and updates of draft documents related to the program, as well as other material pertinent to California's drinking water.

2.0 DWSAP Program Background, Goals, and Schedule

2.1 Background

2.1.1 Requirement and Authority for DWSAP Program Development

The 1986 Amendments to the SDWA established a new Wellhead Protection Program to protect ground waters that supply drinking water wells of public water systems. Under SDWA Section 1428, each State was required to prepare a Wellhead Protection Program and submit it to EPA by June 19, 1989.

The 1996 Amendments to the SDWA established a related program for states, called the Source Water Assessment Program (SWAP). The key elements of this program—protection area and zone delineation, inventory of possible contaminating activities (PCAs), and vulnerability analysis—are also elements of a Wellhead Protection Program.

EPA's guidance indicates that the intent of the 1996 SDWA amendments was to promote source water protection, with assessments being the initial step.

Section 116762.60 of the California Health and Safety Code requires DHS to develop and implement a program to protect sources of drinking water. The program is to include a source water assessment program and a wellhead protection program.

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2.1.2 Coordination of the State Source Water Assessment Program

In California, the source water assessment program is being called the Drinking Water Source Assessment and Protection (DWSAP) Program, and it will satisfy the mandates of both the 1986 and 1996 SDWA amendments. The DWSAP Program is intended to address assessments, and also to facilitate the development of protection programs for both ground and surface waters.

The DHS Drinking Water Program is coordinating the effort with technical support from the State Water Resources Control Board (SWRCB). Members of the DHS DWSAP Program Task Force are:

Bob Hultquist (Chair)	DHS Drinking Water, Technical Programs
Alexis Milea	DHS Drinking Water, Technical Programs
Leah Walker	DHS Drinking Water, Technical Programs
Steve Book	DHS Drinking Water Program Headquarters
Jeff Stone	DHS Drinking Water, Technical Programs
Rich Haberman	DHS Drinking Water, Field Operations Visalia District
Cliff Bowen	DHS Drinking Water, Field Operations San Francisco District
Toby Roy	DHS Drinking Water, Field Operations San Diego District
Gunther Sturm	DHS Drinking Water, Field Operations Lassen District
Burt Ellsworth	DHS Drinking Water, Field Operations Northern California Region
Ken Harris	State Water Resources Control Board, Water Quality Division

Judy Bloom USEPA Region IX, Ground Water Office

2.1.3 Existing Drinking Water Source Protection Programs

Since Congress passed the Wellhead Protection Program requirement in 1986, wellhead protection has been an active program on the national level. As of 1996, 44 states had wellhead protection programs approved by EPA. The remaining states (California, Alaska, Pennsylvania, Iowa, Florida and Virginia) have some elements of wellhead protection or source water protection in place. The groundwater elements of this DWSAP Program constitute California's Wellhead Protection Program.

In California, a number of communities and counties have wellhead protection or watershed protection programs under development or already implemented.

2.1.4 Drinking Water-Related Efforts in California

Under California's surface water treatment regulations, water systems that use surface water for a drinking water supply were required to complete a watershed sanitary survey. This survey included the determination of watershed boundaries and identification of PCAs. January 1, 1996, was the deadline for survey completion and updates are required every five years. As of June 1997, almost all the larger water systems (greater than 1,000 service connections) had completed their surveys. Some small systems have not completed the required surveys, but they will be completed as part of this program.

Auguscik-25 (Cont.)

A number of government agencies, ground water management districts and others have already mapped ground water basins and water supplies within those basins. Some water suppliers, Regional Water Quality Control Boards, and the DHS Drinking Water Program have done a preliminary identification of activities of concern to drinking water sources.
The Groundwater Management Act (Assembly Bill 3030) took effect in January 1993. Under this act, local water agencies or groups of agencies can create their own ground water management plans according to their own requirements and may raise money to run them. A Wellhead Protection Program is an allowable element of an Assembly Bill 3030 (AB 3030) Groundwater Management Plan. As of June 1997, 88 AB 3030 Groundwater Management Plans had been adopted throughout the state. In addition, there are 42 resolutions of intention to adopt plans, and another 55 agencies considering plan adoption.

2.2 Goals of the DWSAP Program

The goals of the DWSAP Program are listed below (not in order of priority):

- **Protection and benefit of public water systems of the State.**

  The focus of the program is information gathering and attention to activities that may affect drinking water quality to enable communities and public water systems to better protect and manage the surface water and ground water resources of the state

- **Improve drinking water quality and support effective management of water resources.**

  The assessments can be used to develop protection strategies that are more economical and desirable than monitoring and treatment of drinking water supplies.

- **Inform communities and drinking water systems of contaminants and possible contaminating activities that may affect drinking water quality or the ability to permit new drinking water sources.**

  As communities and public water systems gather information about activities that have contaminated or may contaminate drinking water sources, they will be able to make better decisions about how to protect and manage existing and future drinking water sources.

- **Encourage a proactive approach to protecting drinking water sources and enable protection activities by communities and drinking water systems.**

  Water suppliers, communities, planners and the public at large are encouraged to actively manage and plan activities around drinking water sources and within their delineated protection areas and zones to reduce or eliminate the threat of contamination.

Auguscik-25 (Cont.)

- **Refine and target the monitoring requirements for drinking water sources.**

  State and federal regulations require water suppliers to monitor for a long list of inorganic and organic chemicals. With proper identification of PCAs, monitoring requirements can be targeted to the needs of the drinking water source. The result is enhanced public health protection with a potential saving in monitoring costs.

  Similarly, regulations require monitoring for microbiological contaminants, some of which may be targeted to specific PCAs. Regulatory limits on other parameters such as turbidity must also be met by drinking water systems. To the extent that these "non-chemical" constituents can be controlled by effective assessment and protection programs, they may bring about monitoring and/or treatment relief. Reductions in organic matter in a drinking water source may also result in lower concentrations of disinfection byproducts.

- **Focus cleanup and pollution prevention efforts on serious threats to surface and ground water sources of drinking water.**

By identifying activities that may pose greater health risks than others to drinking water sources, communities and agencies may be able to prioritize their environmental activities. For example, hazardous waste cleanup, pollution prevention efforts, and other activities of environmental and public health significance that directly improve or protect drinking water supplies may be addressed earlier or allocated more resources than others that are not related to drinking water supplies.

- **Meet federal requirements for establishing wellhead protection and drinking water source assessment programs.**

  Compliance with requirements ensures that the California program meets the minimum national standard for source water protection, and is necessary in order to receive future federal source water protection funds.

- **Assist in meeting other regulatory requirements.**

  Information that is obtained in the DSWAP Program will be of assistance to state and local agencies, communities and public water systems in meeting various regulatory requirements. Examples include the requirements of the California Environmental Quality Act (CEQA), and upcoming federal regulatory requirements, such as the Ground Water Rule and the Enhanced Surface Water Treatment Rule.

Auguscik-25 (Cont.)

2.3 Statutory Schedule and Timeline

States are required to submit a program to EPA within 18 months of EPA's publication of guidance, which occurred on August 6, 1997. Therefore, California must submit its Program to EPA no later than February 1999. California's submittal to EPA for approval will be for both its DWSAP Program and for its Wellhead Protection Program, which is incorporated into the DWSAP.

EPA has nine months to approve California's program. This would occur no later than November 1999.

Thereafter, the State will have two years to complete the assessment for all drinking water sources (November 2001), though an 18-month extension may be obtained (May 2003). US EPA has indicated that it will grant the 18-month extension to states, if requested.

California's time line for completion of assessments for its 16,000 active drinking water sources includes the 18-month extension, so that assessments will be completed by May 2003.

3.0. Minimum Components of Drinking Water Source Assessments

This section includes a brief listing of the minimum components of a drinking water source assessment, with references to pertinent sections and appendices of the document.

An overall review of the implementation of a drinking water source assessment is presented in Section 9.0, and comprehensive checklists for the submission of the assessment are presented in Appendix G for surface water sources and in Appendix N for ground water sources.

DHS recommends using information that is the functional equivalent of all or some components of the source water assessment to fulfill the DWSAP when such information exists. In other words, if a watershed sanitary survey for a surface water source has been prepared, that information should be used for the DWSAP Program. Similarly, when an evaluation of a ground water basin, as done for example for a Groundwater Management Plan, provides information applicable to a ground water source, that information should also be used.

A public water system that is conducting its own drinking water source assessment and intends to use information that it believes is the functional equivalent of a component of the DWSAP Program, should work with DHS to assure that the intended approach satisfies components of the DWSAP Program.

Auguscik-25 (Cont.)

3.1 Surface Water Source of Drinking Water

✓ **Location of the Drinking Water Source.** Section 9.1 and Appendix A.

The location (latitude, longitude) of the intake or well shall be determined by a global positioning system (GPS) with accuracy of 25 meters, or by another method with equivalent accuracy. An interim location may be obtained through use of a USGS quad map (7.5 minute series)., or another method with similar accuracy.

✓ **Delineation of Source Area and Protection Zones.** Section 6.1, and Appendix B.

Identify watershed boundaries.

Zones are not required, but if they are established, the distances listed below may be used. For large water bodies, the zones may be limited to the area within an appropriate travel time distance from the intake.

400 feet from banks of reservoir, or primary stream
200 feet from tributaries
2,500 feet from intakes

✓ **Drinking Water Physical Barrier Effectiveness Checklist.** Section 8.2.1 and Appendix C.

Evaluate the drinking water source and its site characteristics in terms of the effectiveness of the physical barriers in preventing contaminants from reaching the source:

> Complete form and make determination of the effectiveness of the source's physical barriers to contamination, based on geology and hydrogeologic considerations: Low, Moderate, or High.

✓**Inventory of Possible Contaminating Activities (PCAs).** Section 7.0 and Appendix D.

Use checklists to identify the types of PCAs that occur in the source area (watershed) and in zones, if zones are established.

> Attach a list to the assessment map of the types of PCAs identified in the inventory and the area or zone(s) in which they occur (see Vulnerability Ranking).

✓**Vulnerability Ranking.** Sections 8.0 and Appendix F.

Evaluate each PCA in terms of its risk ranking, location (on watershed or in zones), and the Physical Barrier Effectiveness of the source. Prioritize PCAs to identify those to which the source is most vulnerable. Prepare prioritized listing of PCAs and attach to the assessment map.

Auguscik-25 (Cont.)

✓**Assessment Map.** Section 9.0 and Appendix G.

Prepare an assessment map (based on a USGS quadrangle map, 7.5 minutes series) that shows:

1. Location of the drinking water source (surface water intake)
2. Source area (watershed for surface water source)
3. Zones (optional for surface water sources)
4. Attached prioritized listing of PCAs with the area or zone(s) in which they occur, and indicating to which the source is most vulnerable.

✓**Completion of Assessment and Summary.** Section 9.5 and Appendix G.

Complete the assessment and prepare a summary. Submit to the DHS Drinking Water Program district office.

The completed assessment should include the assessment map, delineation calculations, physical barrier effectiveness checklists, PCA inventory forms, vulnerability ranking, and other information presented on the checklist in Appendix G.

✓ **Public Notification.** Section 9.6 and Appendix G.

The following information on the assessment must be included in the water system's annual consumer confidence report:

- A statement that a drinking water source assessment has been conducted.
- The date of the assessment.
- Location where assessment is available for review (local DHS district office and, when feasible, at the public water system's office).
- A statement that a summary of the assessment can be mailed upon request.
- A vulnerability summary of the assessment identifying the PCAs to which the system is most vulnerable.
- A contact phone number.

3.2 Ground Water Source of Drinking Water

✓ **Location of the Drinking Water Source.** Section 9.1 and Appendix H.

The location (latitude, longitude) of the intake or well shall be determined by a global positioning system (GPS) with accuracy of 25 meters, or by another method with equivalent accuracy. An interim location may be obtained through use of a USGS quad map (7.5 minute series) or another method with similar accuracy.

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✓ **Delineation of Source Area and Protection Zones.** Section 6.2 and Appendix I.

Identify recharge area boundaries (if known) and indicate on the assessment map.

Zones are required.

Minimum acceptable method for determining zones

Calculated fixed radius (CFR) method.

Modified CFR, if direction of groundwater flow is known.

[DHS and LPAs may use arbitrary fixed radius, at minimum distances specified in Table 6-2, for non-community systems.]

Minimum distances of zones

The minimum radii of zones, determined from CFR equation, except for wells in fractured rock aquifers, are:

600 feet for Zone A (microbiological)
1,000 feet for Zone B5 (chemical)
1,500 feet for Zone B10 (chemical)

For fractured rock aquifers, the minimum radii are:

900 feet for Zone A (microbiological)
1,500 feet for Zone B5 (chemical)
2,250 feet for Zone B10 (chemical)

Delineation methods more sophisticated than CFR or modified CFR are not subject to minimum distances.

Maximum distances of zones

Zones for a drinking water source need not extend beyond a known hydrogeologic boundary.

Auguscik-25 (Cont.)

✓**Drinking Water Physical Barrier Effectiveness Checklist.** Section 8.2.1 and Appendix J.

Evaluate the drinking water source and its site characteristics in terms of the effectiveness of the physical barriers in preventing contaminants from reaching the source:

Complete form and make determination of the effectiveness of the source's physical barriers to contamination, based on geology and hydrogeologic considerations: Low, Moderate, or High.

✓**Inventory of Possible Contaminating Activities (PCAs).** Section 7.0 and Appendix K.

Use checklists to identify the types of PCAs in the protection zones (and in the source area, if information is readily available).

Attach a list to the assessment map of the types of PCAs identified in the inventory and the area or zone(s) in which they occur (see Vulnerability Ranking).

✓**Vulnerability Ranking.** Sections 8.2.1 and Appendix M.

Evaluate each PCA in terms of its risk ranking, location (zone), and the Physical Barrier Effectiveness of the source. Prioritize PCAs to identify those to which the source is most vulnerable. Prepare prioritized listing of PCAs and attach to the assessment map.

✓**Assessment Map.** Section 9.0 and Appendix N.

Prepare an assessment map (based on USGS quadrangle map, 7.5 minute series) that shows:

1. Location of the drinking water source (well).

2. Source area (zones plus recharge area, if known, for groundwater source)

3. Zones (required for ground water sources)

4. Attached prioritized listing of PCAs with the area or zone(s) in which they occur, and indicating to which the source is most vulnerable.

✓**Completion of Assessment and Summary.** Section 9.5 and Appendix N.

Complete the assessment and prepare a summary. Submit to the DHS Drinking Water Program district office.

The completed assessment should include the assessment map, delineation calculations, physical barrier effectiveness checklists, PCA inventory forms, vulnerability ranking, and other information presented on the checklist in Appendix N.

Auguscik-25 (Cont.)

✓**Public Notification.** Section 9.6 and Appendix N.

The following information on the assessment must be included in the water system's annual consumer confidence report:

- A statement that a drinking water source assessment has been conducted.
- The date of the assessment.
- Location where assessment is available for review (local DHS district office and, when feasible, at the public water system's office).
- A statement that a summary of the assessment can be mailed upon request.
- A vulnerability summary of the assessment identifying the PCAs to which the system is most vulnerable.
- A contact phone number.

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PART TWO

Roles of the Public and Government Agencies in the Development of California's DWSAP Program

A description of the public participation in the development of the DWSAP, and the activities of government agencies that are related to drinking water assessment and protection

Auguscik-25 (Cont.)

Section 4—Public participation in the DWSAP Program

Section 5—Roles and responsibilities of government agencies

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4.0 Public Participation in the DWSAP Program

Public participation in developing the DWSAP Program is crucial to the success of the program, because it:

(1) ensures that interested parties understand the proposed program
(2) provides technical review of the program elements
(3) helps forge consensus among parties affected by the program
(4) ensures that concerns of the public are fully addressed, and
(5) fosters a closer working relationship between government agencies and the public.

Public involvement in the program itself is required at three different levels. The first level is during the development of the statewide DWSAP Program. The second level is the availability or distribution of drinking water source assessments for public review after they are completed (Part Three of this document). The third level is during development of voluntary local drinking water source protection programs (Part Four).

Listed below are the public involvement steps in the development of the California DWSAP Program.

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4.1 Stakeholders in the Process

Agency stakeholders. In April 1997 the Department of Health Services convened an interagency group of federal, state and local agencies including: the US Environmental Protection Agency, the US Geologic Survey, the US Bureau of Land Management, the US Bureau of Reclamation, the US Forest Service, the CalFed Program (which deals with issues of San Francisco Bay and the Sacramento River/San Joaquin River Delta), the Department of Water Resources, the State Water Resources Control Board, Regional Water Quality Control Boards (North Coast, Colorado River Basin, Lahontan, Central Valley), the Department of Pesticide Regulation, the Department of Food and Agriculture, the Department of Forestry and Fire Protection, the California Council of Directors of Environmental Health, and local environmental health departments (Riverside County and Contra Costa County).

The purpose of the meeting was to explain the DWSAP Program, identify key players in related programs, and discuss program implementation. The principal issues discussed were standardized mapping to facilitate integration of information, protection areas and zones for delineation purposes, PCA inventories, drinking water source and site characteristics, vulnerability analyses, and public participation.

Other stakeholders. A list of approximately 120 individuals or representatives from various organizations interested in or potentially affected by the DWSAP program has been developed for California. This list, which represents a broad spectrum of the general public, was used to develop the Public Policy Advisory Committee, described below. Additional people or organizations were added during development of the program.

Stakeholder groups are presented in Table 4-1.

4.2 Technical and Policy Advisory Committees

A Technical Advisory Committee was developed to review and comment on the technical elements of the program. This committee was comprised of technical experts in ground water and surface water and protection (Table 4-2). The Technical Advisory Committee met in August and November 1997 and February, April, June, August and November 1998 to review and comment on proposed program elements. A subcommittee of the Technical Advisory Committee met six times by telephone during February to June 1998.

The Public Policy Advisory Committee included stakeholders who wanted to be actively involved in the program development. DHS sent invitations for the first meeting of the advisory committee to over 120 individuals representing stakeholder business, industry, agriculture, environmental groups, medical and public health advocacy organizations, and others. The committee also met in August and November 1997 and February, April, May, August and October 1998 to review and comment on drafts of the DWSAP program, and on the schedule, format, and agenda for the public workshops.

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Members of both committees were invited to comment on any aspect of the program, and to attend each other's meetings. Meetings were also open to any interested parties.

4.3 Mailing List of Interested Parties

A DWSAP Program mailing list of approximately 300 was developed, comprised of interested parties, including members of the various advisory committees and the interagency group. Notifications of meetings of the technical and public policy advisory committees and public workshops, along with drafts of the DWSAP Program, were sent to those on the mailing list.

4.4 Development and Availability of Draft DWSAP Program Documents for Comment

Drafts of the DWSAP Program were submitted to the advisory committees for review and comment. Additionally, drafts were sent to local, state and federal agencies, the American

Waterworks Association, Association of California Water Agencies, and other organizations. These groups were requested to submit comments. As mentioned above, drafts were also provided to those on the DWSAP Program mailing list.

DHS also made drafts of the DWSAP Program available by posting them on the Internet (accessible via "Prevention Services" and "Division of Drinking Water and Environmental Management" at the DHS Web site, http://www.dhs.cahwnet.gov), with a request for comments. DHS is responding to comments submitted by the public during development of the DWSAP program, and intends to indicate its response in its submittal to US EPA. Comments received by e-mail are read and incorporated into revised documents as appropriate, but only those comments received as hard copy are addressed in the more formal response mechanism.

4.5 Public Outreach

Materials on the Internet

Since October 1997, DHS has used its Web site to present information related to the DWSAP Program. The information includes the schedule of advisory committee meetings, workshops, and other activities, notes from those meetings, and other information that provides updates on the program and invites public participation. Copies of this information have been provided to the DWSAP mailing list, and on request to those without Internet access.

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Staff presentations

Presentations on the DWSAP Program were made in 1997 and 1998 by DHS staff from headquarters and field offices staff. Information on the programs was presented to professional organizations, water supplier organizations, watershed management groups, and other interest groups and organizations. A list of presentations will accompany the program submittal to US EPA.

Public workshops

Nine informational workshops were held at five locations around the state (Chino, Fresno, Redding, San Francisco Bay Area, Thousand Oaks) in April and May 1998. These workshops explained the DWSAP Program and invited comments from the general public.

4.6 Revisions of the DWSAP Program Document

Comments and suggestions for improvements from members of the advisory committees, and other comments that DHS staff received from the public (for example, during presentations or workshops) have been incorporated into the DWSAP Program document. The first draft

DWSAP was released in October 1997. Revised drafts were made available to the public in January, April, and August 1998.

4.7 Final Public Comment Period

A public comment period on the final review draft occurred in August-September 1998. Written comments were received from eighteen agencies, organizations and individuals. DHS has prepared a response to the comments and has addressed many of the concerns in the final draft of the DWSAP program.

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Table 4.1 Potential Stakeholders

Public Agencies
Counties
Cities
Regional Water Quality Control Boards
Water Districts
Sewage Districts
Sanitation Districts
Flood Control Districts
Ground Water Management Districts
Resource Conservation Districts
Department of Fish and Game
Department of Toxic Substances Control
Department of Pesticide Regulation
Integrated Waste Management Board
Office of Environmental Health Hazard Assessment
Department of Water Resources
Department of Food and Agriculture
State Water Resources Control Board
Teale Data Center
National Resources Conservation Service
US Bureau of Reclamation
US Environmental Protection Agency
US Fish and Wildlife Service
US Forest Service
US Geological Survey

Private Companies
Agriculture
Mining
Gravel Production
Private Water Companies
Well Drillers
Manufacturing, Petroleum, and other Industries
Landfill Operators

Private Organizations
Farm Bureau
Chambers of Commerce
Construction/Real Estate Organizations
Well Drillers' Groups
Mutual Water Companies
Agricultural Groups
Environmental Groups
Recreational Groups
Watershed Conservancies
Consumer Groups
Rate-payer Groups
Water-Oriented Associations
Planning Associations

Individuals
Pumpers
Farmers
Rate-payers
Consumers
Educators

Others
UC Agricultural Extension
Public Health Groups
Vulnerable Population Groups
Business Groups representing Chemical Manufacturing
Tribes

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Table 4.2 Technical Advisory Committee

January 1999 – with April 1999 and January 2000 revisions

Elaine Archibald	Water Industry Consultant
Norm Brown	Integrated Water Technologies
Neil Dubrovsky	US Geological Survey
Pat Dunn	California Department of Pesticide Regulation
Terry Fleming	US Environmental Protection Agency
Carl Hauge	California Department of Water Resources
John Letey	University of California Center for Water & Wildland Resources
Bruce Macler	US Environmental Protection Agency
Mary Ann Mann	Metropolitan Water District of Southern California
Jon Marshack	Central Valley Regional Water Quality Control Board
Sue Murphy	California Rural Water Association
Richard Nagel	San Fernando Valley Water Master
Harrison Phipps	Groundwater Resources Association of California
Anthony Saracino	Groundwater Resources Association of California
Paul Veisze	California Department of Fish and Game
Nira Yamachika	Orange County Water District

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5.0 Roles and Responsibilities of Government Agencies

A variety of state, local and federal agencies have responsibilities and authority for protection of ground water and surface water supplies. Drinking water source protection does not transfer authority for potential pollution control away from existing agencies. Information developed during source water assessments (delineation, PCA inventory and vulnerability analysis) may be used by agencies with existing authority in setting priorities for technical assistance, outreach, field inspections, enforcement actions and other activities.

Private water purveyors also administer some water-related activities, especially in regard to water importation, recharge, reclamation, pumping, and reuse.

This section will describe the roles and responsibilities of various governmental agencies with respect to the drinking water source assessment and protection program. Information generated and maintained by a number of these agencies is accessible through DHS' directory of source water protection-related activities.

A number of government agencies were contacted to determine their existing activities that may have application in carrying out a drinking water source assessment or in providing information for a voluntary source water protection program. A survey form was sent out and responses were received from the agencies listed below. A compilation of the information received is shown in Table 5-1.

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Local Agencies

City of Benicia

Contra Costa County, Environmental Health Division
Sonoma County, Permit and Resource Management Department
Placer County Environmental Health Department
Riverside County, Department of Environmental Health

State Agencies

Air Resources Board, Stationary Source Division
Department of Water Resources
Department of Forestry and Fire Protection (CDF)
State Fire Marshall/ Pipeline Safety and Enforcement Division (Part of CDF)
Integrated Waste Management Board

Department of Toxic Substances Control
Department of Pesticide Regulation
Department of Health Services, Division of Drinking Water and Environmental Management
State Water Resources Control Board, Clean Water Programs
State Water Resources Control Board, Division of Water Quality
State Water Resources Control Board, Division of Water Rights
Regional Water Quality Control Board, North Coast Region 1
Regional Water Quality Control Board, Central Coast Region 3
Regional Water Quality Control Board, Los Angeles Region 4
Regional Water Quality Control Board, Central Valley Region 5
Regional Water Quality Control Board, Lahontan Region 6
Regional Water Quality Control Board, San Diego Region 9

Federal Agencies

U.S. Department of Agriculture, Forest Service
U.S. Department of Agriculture, Natural Resources Conservation Service
Department of the Interior, Bureau of Land Management
U.S. Environmental Protection Agency, Region 9

State/Federal Agency

CalFed Bay Delta Program

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5.1 Local Agencies

5.1.1 Counties and Cities

California has fifty-eight (58) counties. Various county departments, such as planning, building, permitting, public works and environmental health, have jurisdiction over many activities that are related to the protection of water supplies. Thirty-four (34) of the counties have been designated Local Primacy Agencies (LPAs) to carry out the regulation of small public water systems.

Besides its counties, California also has more than 450 incorporated cities and many other municipalities. These local governments are often concerned with ensuring the availability of high-quality water supplies to residents. State enabling legislation gives local governments variable powers and duties, depending on how they were formed, to protect water supplies.

A variety of water-related activities are undertaken by county and city governments. These include:

Ground Water Recharge
Hazardous Materials Spills Emergency Response
Hazardous Waste Management Planning
Land Use Planning and Zoning
Large and Small Water Supply Systems Monitoring
Pesticide Regulation by County Agricultural Commissioners
Regulation of Individual Waste Disposal (Septic) Systems
Regulation of Underground Storage Tanks
Sanitary Landfill Ground Water Monitoring
Solid Waste Management Planning
Water Well Permitting
Watermaster for an Adjudicated Basin

5.1.2 Special Districts

California has thousands of special districts that undertake or have authority for activities related to drinking water source assessment and protection. The types of districts include:

Flood Control and Water Conservation Districts
Public Utility Districts
Community Services Districts
Sewer and Sewer Maintenance Districts
Storm Water Drainage and Maintenance Districts
Water Replenishment Districts
Reclamation Districts
Irrigation Districts
Levee Districts
Local Drainage Districts
Resource Conservation Districts and Water Conservation Districts

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The drinking water protection related activities that these districts undertake may overlap those of cities and counties. The activities include:

Ground Water Management
Control/Correction of Saline Water Intrusion
Ground Water Recharge
Land Reclamation
Watershed Protection
Water Conservation

Irrigation Water Supply
Sewer Construction and Maintenance
Drinking Water Supply
Sewage Collection, Treatment and Disposal
Power Supply
Refuse Disposal
Soil Conservation
Wet, Swamp and Overflowed Land Drainage

Local governments sometimes expand and coordinate activities through "Joint Powers Authorities" pursuant to §6500 et seq. of the California Government Code, which includes the formation of separate agencies or entities.

5.2 State Agencies

A number of State agencies, boards, departments, and offices share responsibility with federal and local agencies for ground and surface water protection in California (see Table 5-1). They are identified and their roles briefly described below:

The **Health and Welfare Agency** houses the **Department of Health Services (DHS)**:

Division of Drinking Water and Environmental Management (DDWEM)

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The DDWEM, within DHS, promotes public health through the regulation and monitoring of public water systems, wastewater reclamation projects, disposal of low level radioactive waste, shellfish production and harvesting operations, and medical waste generators.

DDWEM is responsible for carrying out the federal Safe Drinking Water Act (SDWA) in California. Activities of DDWEM related to drinking water source assessment and protection are primarily conducted by the Drinking Water Field Operations Branch (DWFOB) and the Drinking Water Technical Programs Branch (DWTPB).

The DWFOB is responsible for the inspection and regulatory oversight of approximately 8500 public water systems to assure delivery of safe drinking water to all California consumers. There are 15 district offices distributed widely throughout the state. Activities involved in the oversight of public water systems include issuing permits, performing inspections of existing facilities, reviewing plans for new facilities, issuing administrative orders and citations to public water systems for violations of laws and regulations, and ensuring that public water systems comply with water quality standards and monitoring requirements.

The DWTPB is responsible for providing technical support for the drinking water program and carrying out its administrative functions. The branch is composed of the Technical Operations Section and the Technical Programs Section. The Technical Operations Section administers its programs through several units: Certification Unit (certification of water treatment operators and water treatment devices), the Standards and Technology Unit (development of monitoring and water quality regulations and conduct special studies and programs), and the Recycled Water Unit (development of recycled water criteria and regulations, proposal evaluation and recommendations). The Technical Programs Section includes the Data Management Unit, which collects, compiles, evaluates and reports drinking water quality data from large and small drinking water systems in the State.

The **California Environmental Protection Agency (Cal/EPA)** serves as the point of accountability for the management of the State's environmental protection programs, bringing together functions that cut across various programs designed to address environmental pollution. Organizations in Cal/EPA are:

State Water Resources Control Board (SWRCB)

The SWRCB formulates and adopts the State's policy for water quality control, assisting and overseeing the Regional Water Boards, and in conjunction with the courts, administers California's system of water rights.

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Regional Water Quality Control Boards (Regional Water Boards)

The nine Regional Water Boards formulate, adopt, and implement (with State Water Board approval) water quality control policies and plans within their jurisdiction. Collectively, the nine Regions cover all of California. Each Regional Water Board designates beneficial uses of surface and ground water resources, and establishes water quality objectives to reasonably protect existing and potential beneficial uses of water resources in its region, as well as implements programs to achieve compliance with the water quality objectives. Beneficial uses, water quality objectives, and the implementation program are specified in each region's Water Quality Control Plan, as called for in the California Water Code, §13240.

Regional Board activities related to drinking water source assessment and protection include:

Basin Planning
Each Regional Water Board has adopted one or more Water Quality Control Plans (Basin Plans) for their jurisdiction, which is based upon surface water hydrologic basin boundaries. The Basin Plans identify existing and potential beneficial uses of marine, ground, and surface waters; establish water quality objectives to protect the beneficial uses; specify implementation programs to achieve these objectives; and describe surveillance and monitoring activities to evaluate the effectiveness of the water quality program.

Basin Plans contain standards for surface water and ground water quality that are independently established by each Regional Water Board as water quality objectives necessary to protect the identified beneficial uses. Thus, there are differences both among and within Regions, depending upon the particular ground water basin and the assigned beneficial uses.

National Pollutant Discharge Elimination System (NPDES) and Waste Discharge Requirements
Under the authority of the federal Clean Water Act, the NPDES program regulates point source discharges to surface waters such as wetlands, lakes, rivers, estuaries, bays and oceans. In California, the Porter-Cologne Water Quality Control Act regulates any discharge of waste that may affect water quality in California. Waste discharges are declared to be a privilege, not a right, and require permission from the applicable Regional Water Board.

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Waste Discharges to Land
The State Water Board has adopted regulations (California Code of Regulations, Title 23, Chapter 15, and Title 27) which implement provisions in the Porter-Cologne Act. These regulations apply to all hazardous and non-hazardous wastes discharged to land, including surface impoundments. The Chapter 15 regulations prescribe siting standards, construction standards, ground water and vadose zone monitoring requirements, and closure and post-closure procedures and requirements.

Protecting ground and surface water from the migration of contaminants from solid waste disposal facilities is the responsibility of the State and Regional Water Boards. This responsibility is executed by requiring all solid waste disposal facilities to conform to waste discharge requirements adopted by a Regional Water Board.

Hazardous Waste Facility Monitoring
Under a Memorandum of Agreement with DTSC, the State and Regional Water Boards carry out a ground water monitoring and surveillance program, perform water quality-related review work, and develop regulations, standards, and

guidelines pursuant to the federal Resource Conservation and Recovery Act (RCRA).

Underground Storage Tanks

In 1983, the California Legislature enacted underground tank legislation requiring an inventory of underground storage tanks along with a program to permit their continued use. The State Water Board, the nine Regional Water Boards, and local agencies share responsibility for enforcement and cleanup. The State Water Board compiled the inventory of underground containers in California and provided this information to the appropriate Regional Water Boards, cities, and counties. The container inventory, as directed by the legislation, also included pits, ponds, sumps, and lagoons, each storing a wide variety of substances.

The State Water Board established standards for the monitoring of existing tanks and the construction of new ones. These, along with requirements for repair and closure, are described in the California Code of Regulations, §2610 et seq.

Non-Point Source Pollution

The federal Clean Water Act was amended in 1987 to include Section 319, which required the states to develop and implement non-point source management programs. The State Water Board subsequently adopted a "Non-point Source Management Plan" in 1988, and by early 1990, had organized a multi-faceted, surface and ground water, non-point source program which focused on agriculture, mining, urban runoff, construction, and pesticides. The non-point source program seeks to reduce or eliminate surface and ground water pollution through the implementation of management measures to control non-point source pollution at its source.

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Remediation

The Regional Water Boards, in responding to a surface or ground water pollution problem or nuisance, may issue a "cleanup and abatement" order to any responsible party to require corrective action. Their authority covers all discharges of waste, hazardous or otherwise, which enter or threaten to enter surface or ground water.

Coastal Zone Act Reauthorization Amendment (CZARA) of 1990

The two primary federal statutes that establish a framework for address nonpoint source (NPS) pollution are Section 319 of the Clean Water Act (1987) and Section 6217 of the CZARA. Together, they encourage states to assess water quality problems associated with NPS and to develop programs to control NPS sources of pollution. CWA §319 requires that states develop an assessment report and a management program specifying NPS controls. CZARA §6217(a) requires states to establish coastal NPS programs to develop and implement management

measures for NPS pollution to restore and protect coastal waters. California received $5.4 million of federal funding under the CWA in 1997 to carry out its NPS program.

In 1988, the SWRCB adopted the California NPS Management Plan that outline a three-tiered approach for address polluted runoff: (1) voluntary implementation of Best Management Practices (BMPs), (2) regulatory-based encouragement of BMPs, and (3) effluent limitations. In response to CZARA §6217, the SWRCB, the RWQCBs, and the California Coastal Commission initiated a joint effort to improve the state-wide NPS program and comply with CZARA requirements. As a result, California is working to enhance its state-wide NPS program by better utilizing existing state authorities and programs, pursuing watershed approaches, and encouraging voluntary cooperation.

Other Activities Conducted by the State and Regional Boards
Other activities related to source water protection include: Water quality assessments (Clean Water Act Section 303d updates), routine aerial surveillance, AB2021 report to legislature (Pesticide Contamination Prevention), and the Above Ground Storage Tank program.

Department of Toxic Substances Control (DTSC)

The DTSC protects public health and the environment from the improper handling storage, transport, and disposal of hazardous substances.

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DTSC's primary activities related to drinking water source assessment and protection are included in two programs mandated by federal law:

Resource Conservation and Recovery Act (RCRA)
Under the federal Toxic Substances Control Act, the USEPA regulates the treatment, disposal (including incineration, landfill, alternative technology), and storage of hazardous chemical substances. The federal RCRA Program has been delegated to DTSC. This program regulates the treatment, transportation, storage and disposal of hazardous waste.

DTSC, under Health and Safety Code §25100, issues permits that govern the general operation of hazardous waste management facilities. They specify conditions on the way hazardous materials may be transported, handled, treated, stored, or disposed. The permits also impose conditions for waste analysis, record keeping, site monitoring, containment procedures, site improvements, closure procedures, and financial responsibility.

California Superfund Program

DTSC is authorized by California's Hazardous Waste Control Law and Hazardous Substance Account Act (California Superfund) with enforcement powers for the cleanup of hazardous substances. Their program complements the federal "Superfund" program and provides for: (1) cleanup or impact reduction at hazardous waste sites, (2) response capability to State and local agencies in hazardous substance emergencies, and (3) compensation to persons who suffer loss or injury caused by the release of a hazardous substance.

DTSC specifies their approach in their *Preliminary Endangerment Assessment Guidance Manual*. The DTSC cleanup strategy is based on a health risk assessment approach.

Department of Pesticide Regulation (DPR)

DPR regulates the use and management of pesticides to prevent pollution of surface water bodies and ground water aquifers that may be used for drinking water supplies, as mandated in the State Pesticide Contamination Prevention Act (1986).

DPR is responsible for regulating the sale and use of pesticides, evaluating and mitigating environmental and human health impacts of pesticide use, and promoting alternative pest control strategies. The DPR program relies on authorities in the California Food and Agriculture Code (§13141 et seq.).

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Additional authorities in the California Pesticide Contamination Prevention Act require the DPR to carry out specific activities to prevent ground water from being contaminated. Prevention is the preferred goal, because once ground water has become contaminated, cleanup activities are very difficult, expensive, and time consuming. This Act requires: (1) Pesticide registrants to submit specific information to the DPR regarding the impacts of their products on ground water; (2) DPR to identify pesticides that have the potential to pollute ground water to be put on a Ground Water Protection List; and (3) DPR to conduct a monitoring program for pesticides in soil and ground water.

As specified in a Memorandum of Understanding between DPR and the State Water Board, DPR is the first agency to respond to any detection of a pesticide in surface water or ground water with voluntary measures and/or regulatory action.

DPR is currently developing a program to identify areas in the state where ground water is potentially vulnerable to pesticide contamination.

Integrated Waste Management Board (IWMB)

The IWMB oversees the safe treatment, storage, recycling, disposal of solid waste by local agencies.

Air Resources Board (ARB)

The ARB regulates emissions of air pollutants than can effect the quality of surface and ground water.

Office of Environmental Health Hazard Assessment (OEHHA)

OEHHA provides information to environmental regulators and the public about adverse health effects that result from environmental exposures to noninfectious agents.

OEHHA's mission is to protect and enhance public health and the environment by objective scientific evaluation of risks posed by hazardous substances.

OEHHA's functions and responsibilities related to drinking water source assessment and protection include developing health-protective exposure standards for different media (air, water, land) to recommend to regulatory agencies, including drinking water chemical contaminant standards for DHS. OEHHA's Water Toxicology Unit performs major risk assessment and hazard evaluations relating to chemical contaminants in drinking water. These activities include developing health advisories, action levels, proposed maximum contaminant levels, and public health goals for chemical substances, additives, and pollutants in drinking water and on chemical monitoring activities for the drinking water supply. The program also provides education to the public and other governmental agencies on drinking water contamination and regulatory standards development.

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OEHHA is responsible for implementing the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). This initiative statute prohibits businesses from discharging into drinking water sources chemicals identified by the State to cause cancer or reproductive toxicity. It also requires warnings to be provided whenever exposures to those chemicals are anticipated to occur.

The **Resources Agency** includes several pertinent departments:

Department of Water Resources (DWR)

The DWR develops, conserves, and manages the water resources of the State.

The mission of the Department of Water Resources is to manage the water resources of California in cooperation with other agencies, to benefit the State's people, and to protect, restore, and enhance the natural and human environments.

Major responsibilities of the Department include preparing and updating the California Water Plan to guide development and management of the State's water resources. The State and Regional Water Boards must consider this Plan in their decisions. In addition, the Porter-Dolwig Ground Water Basin Protection Law (California Water Code §12920 et seq.) gives the DWR authority to initiate or participate in investigations, studies, plans and design criteria for projects to prevent degradation of ground water throughout the State.

The Department also administers increasingly complex programs involving flood control for the Central Valley, dam safety for more than 1,200 dams statewide, local assistance projects, water management strategies, water quality improvement, and water supply data collection and studies. DWR staff provides technical and financial assistance to local water communities; works with a number of governmental and wildlife agencies on environmental issues and projects; manages State Water Project and Reclamation Board lands; educates the public about California's water resources; and operates and maintains the State Water Project.

DWR provides support for the use of ground water though the distribution of hydrogeologic studies and other technical information. In addition, well drillers are required to file a report to DWR on each well drilled.

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Department of Conservation (DOC)

Among other functions, the Division of Oil, Gas, and Geothermal Resources (DOGGR) within the DOC acts to prevent contamination of ground water due to the drilling, operation, maintenance, and abandonment of oil, gas, and geothermal wells. This includes both extraction and injection wells.

The State Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) issues permits for the approximately 21,000 Class II (oil/gas production) injection wells in California. These are accepted by the USEPA for the Underground Injection Control program under one Memorandum of Understanding with DOGGR and accepted by the Regional Water Boards under another Memorandum of Understanding.

California Department of Forestry and Fire Protection (CDF)

The Department of Forestry and Fire Protection protects the people of California from fires, responds to emergencies, and protects and enhances forest, range and watershed value providing social, economic and environmental benefits to the citizens of the State. Managing California's natural resources is an important part of the Department's mission. CDF oversees enforcement of California's forest practice regulations. This includes review of Timber Harvest Plans submitted by private landowners and logging companies who want to harvest trees on their property. CDF also operates six Demonstration State Forests where research and experiments in forest management are conducted.

State Fire Marshal, Pipeline Safety Division (CSFM)

Within CDF, the California State Fire Marshal has the exclusive responsibility of regulating and enforcing safety on all intrastate hazardous liquid pipelines within the state, including some of the pipelines coming from offshore platforms located within three miles of the California coast.

CSFM is also recognized as an interstate agent of the United States Department of Transportation's Office of Pipeline Safety (OPS). As such, CSFM is responsible for inspection, investigation and emergency response concerning interstate pipelines.

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The **Department of Food and Agriculture (DFA)** is a cabinet level agency.

Among other functions, DFA inventories agricultural operations, dairies, and animal feedlots. DFA also investigates water quality issues involving the accumulation of nitrate in ground water.

5.3 Federal Agencies

Federal water programs are administered primarily by the U.S. Environmental Protection Agency. The U.S. Army Corps of Engineers, the U.S. Bureau of Reclamation, the U.S. Department of Agriculture (USDA) and other federal agencies play complementary roles. The U.S. Geological Survey (USGS) principally compiles information that assists others in their water protection efforts.

National Resources Conservation Service (NRCS)

NRCS (previously known as the Soil Conservation Service) has a long history of addressing non-point source pollutants by working with farmers and communities

through voluntary implementation programs. NRCS assistance has primarily focused on nutrients, pesticides, sediment, animal wastes, and salinity issues in surface and ground waters. Assistance encompasses planning and preventive measures to small scale monitoring and suggestions of conservation practices to help solve non-point source pollution problems. NRCS also offers point, field and watershed models to predict the transport and fate of these parameters in surface and subsurface waters.

US Geological Survey (USGS)

The role of the USGS is to serve as the primary earth sciences research agency in the United States. The Survey has no regulatory or management responsibilities, and is focused entirely on the need to provide sound scientific data, information, and assessments in support of those agencies that have regulatory and management responsibilities for geologic, hydrologic and, now, biologic resources.

U.S. Environmental Protection Agency (US EPA)

Several federal programs related to drinking water source assessment and protection are administered by the U.S. Environmental Protection Agency. The primary purpose of the Safe Drinking Water Act (SDWA) is to ensure the safety of drinking water served to the public. The SDWA includes the Wellhead Protection Program, the Sole Source Aquifer Program, and the Underground Injection Control Program.

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Other federal environmental laws to protect water supplies include, but are not necessarily limited to, the Clean Water Act (CWA) which ensures protection of surface waters designated, in part, for use as drinking water; the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, otherwise known as "Superfund"), and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). These laws provide authorities, financial support, and technical assistance to protect sources of drinking water, especially ground water.

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Table 5-1. Matrix of Drinking Water Source Water Assessment and Protection Roles.

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Pages 1 and 2 of Table 5-1
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Page 2 of oversized table — not available in this version

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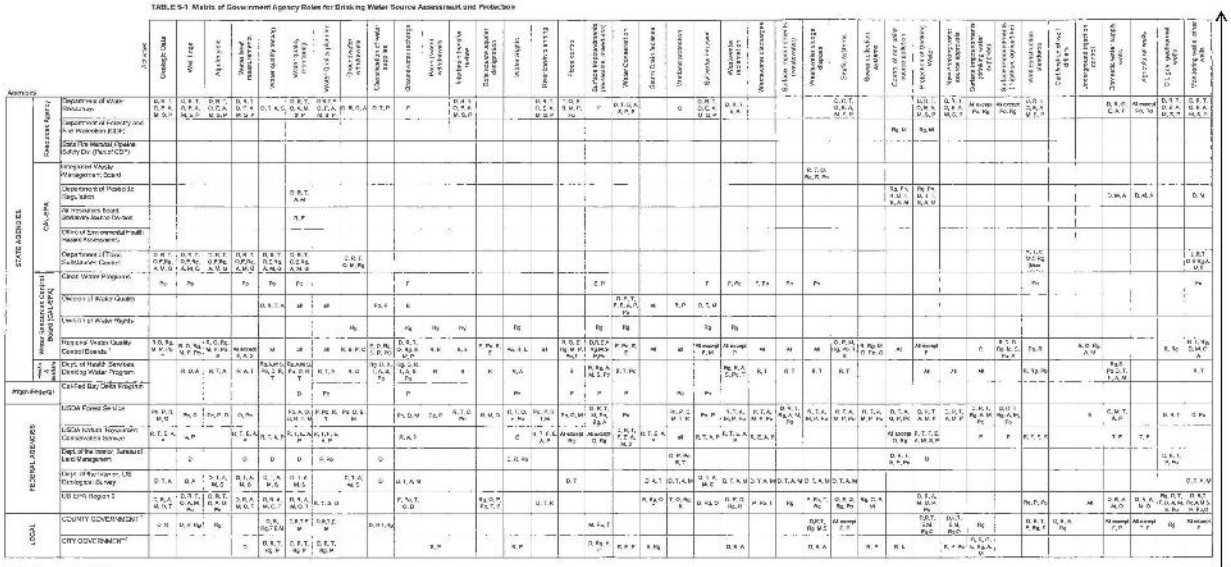
TABLE 5-1 Matrix of Government Agency Roles for Drinking Water Source Assessment and Protection



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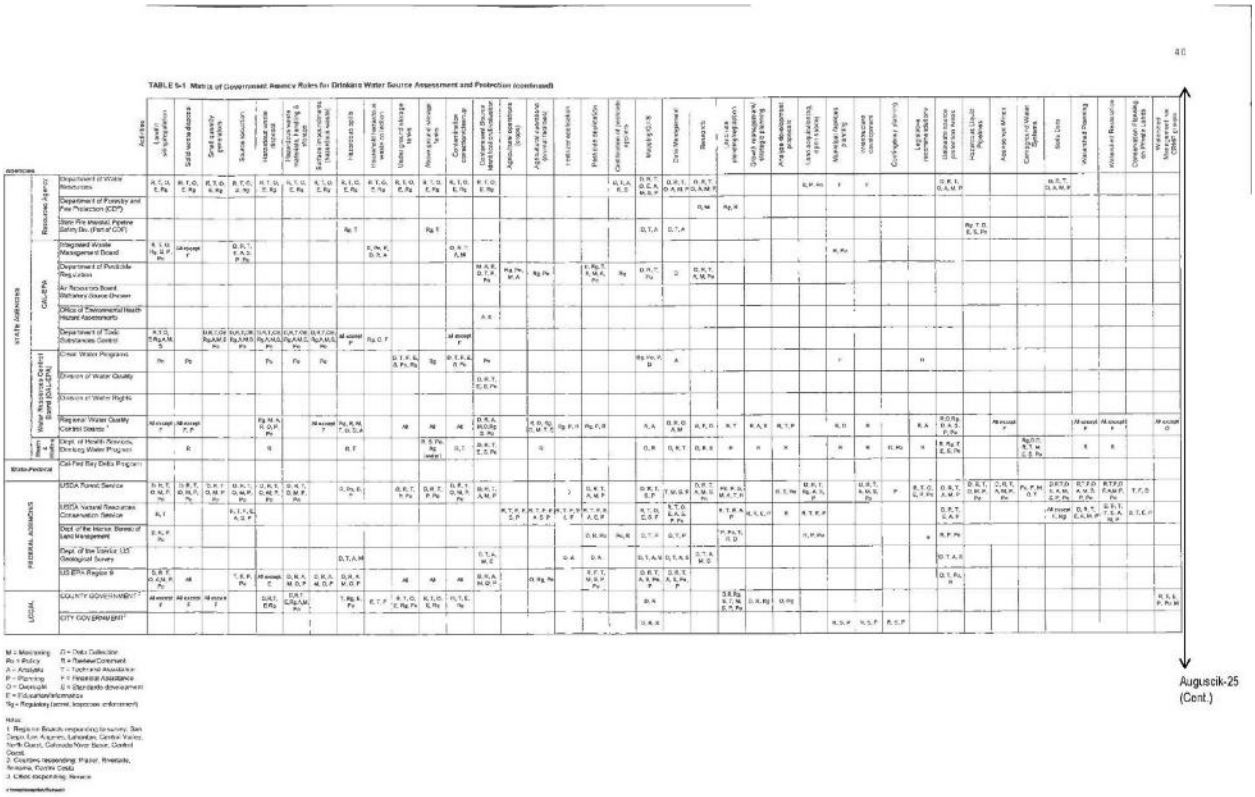

TABLE 5-1 Matrix of Government Agency Roles for Drinking Water Source Assessment and Protection (continued)

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PART THREE

Source Water Assessments

A description of the procedures DHS will use in conducting source water assessments for ~16,000 active drinking water sources in California

Section 6—Delineation of source areas and protection zones

Section 7—Inventory of activities within source areas and protection zones

Section 8—Vulnerability of drinking water sources to contamination

Section 9—Implementation of the Drinking Water Source Assessment Program

Section 10—New drinking water sources

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6.0 Delineation of Source Areas and Protection Zones

The delineation step in the assessment defines the boundaries of the areas to be evaluated. Appendices A and B should be used for source location and delineation of surface water sources, and Appendices H and I, for ground water sources.

6.1 Delineation for Surface Water Sources

The source area for surface water sources in the DWSAP Program is the area within the boundaries of the watershed that is tributary to the surface water intake. This is consistent with California Code of Regulations, Title 22, Chapter 17, Section 64665, which requires each public water system with a surface water source to conduct a watershed sanitary survey. In December 1993, a Watershed Sanitary Survey Guidance Manual was prepared by the American Waterworks Association (AWWA), California/Nevada Section, Source Water Quality Committee, in conjunction with the DHS Division of Drinking Water and Environmental Management. The guidance specifies that the area to be surveyed should include the entire watershed boundary.

As an option, in addition to the source area, a public water system may desire to establish zones closer to the surface water intake. The purpose of these zones is to define portions of the watershed where activities have a higher risk of contaminating the water supply. Within the zones, there could be a more thorough evaluation of activities that occur. The zones would aid in establishing both the appropriate levels of surveillance, and management (or voluntary protection) approaches.

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Zones can potentially reduce the effort involved in conducting source water assessments. California surface water treatment regulations require water purveyors to survey the entire watershed. If zones are established, DHS may allow a less detailed review on portions of the watershed outside the zones. In addition, in the vulnerability analysis (Section 8.0), surface water sources that have zones defined will be able to assign less risk to possible contaminating activities (PCAs) located on the watershed, but outside of the zones. If zones have not been defined, PCAs are considered to be of equal risk, regardless of their location on the watershed.

To establish zones for surface water sources of drinking water, a variety of methods may be used. These include:

1. **Fixed Distance:** In this method, an example of which is shown in Figure 6-1, setbacks from reservoir boundaries, tributaries and/or the intake may be established by using fixed distances. This method, while not technically sophisticated, is relatively simple to implement.

2. **Time-of-Travel:** In this method, the protection zone is actually a stream reach rather than an area. This method is typically used for determining response times for spill events. The time-of-

travel between an upstream monitoring point and the point of interest is calculated. Potential contaminants with a certain time-of-travel would be of primary concern.

3. **Modeling:** Surface runoff and ground water discharge models can be used to assess the impact of individual contaminants from possible contaminating activities (PCAs), and to identify areas within the watershed with the greatest potential impact on drinking water source quality.

Regardless of the method used, factors that may be considered in determining zones include topography (slopes), soils, geology, vegetation, precipitation, hydrology and land uses.

Establishment of zones, if done by public water systems or communities, should be done in consultation with DHS.

Interested water suppliers, communities or groups that require additional information may wish to refer to the EPA document, *State Methods for Delineating Source Water Protection Areas for Surface Water Supplied Sources of Drinking Water* (US EPA, 1997).

If zones within the watershed are established for a surface water source, DHS suggests distances of 400 feet from reservoir or primary stream boundaries, 200 feet from tributaries, and 2,500 feet from intakes. The zones may be limited to that portion of the watershed within a travel-time distance from the intake that allows adequate time to respond to spill events.

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Ground water under the influence of surface water

For drinking water sources that have been classified as ground water under the direct influence of surface water (GWUDI), the source area should include the land area within the watershed boundaries. This is consistent with DHS regulations, because GWUDI wells are considered surface water sources and are subject to surface water treatment regulations. Zones for these sources may be established by ground water methods and/or surface water methods.

For drinking water sources that are indirectly under the influence of surface water (e.g. where the source of water is underflow of a surface water body, and the source has not been classified as GWUDI) it is appropriate to include the land area within the watershed boundaries in the source area. The recharge area, if different than the watershed area, may also be included in the source area. Zones are to be established using ground water methods as appropriate. The areas to be assessed should be determined in consultation with DHS.

6.2 Delineation for Ground Water Sources

The source area for a ground water source includes the recharge area; where the recharge area is separate from the well, the source area also includes the area within the protection zones established for the well. In addition, the source area may include a buffer zone, if one is established. These areas and zones are described in this section.

6.2.1 Types of Aquifers

The DWSAP Program assumes two primary types of aquifers for ground water sources: porous media and fractured rock. Although there are additional types of aquifers in California, this program uses a simplified approach by categorizing sources into one of these two types. A water system conducting its own assessment may use a different approach after consultation with DHS.

For **porous media aquifers**, open spaces within the aquifer are assumed to exist between individual particles that comprise the aquifer. In a typical porous material, such as sediment (e.g., sand and gravel), the openings are primary–that is, they represent the spaces between grains that were formed when the sediment was originally deposited. Consequently, they are numerous and regularly spaced, with a density and orientation of open spaces that tends to be isotropic (uniform in all directions) within the aquifer. Using water well data, ground water flow conditions of such aquifers are readily measured and quantified.

Fractured rock aquifers may also have primary porosity and permeability, such as cavities which form in new lava flows. Most "bedrock" aquifers, however, have open space along faults and fractures which formed long after the rock was formed ("secondary permeability and porosity"). Because fractures develop in response to geologic stresses, they are often grouped in specific directions, creating permeability and ground water flow paths which are anisotropic (not uniform in all directions). Such aquifers can have highly localized and complex ground water flow properties which may be difficult to characterize quantitatively.

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6.2.2 Recharge Areas

The source area for a ground water source includes the recharge area. Recharge areas, which may be natural or artificial, are land areas that contribute water to an aquifer. Recharge occurs naturally from lakes, wetlands, direct precipitation, stream inflow, and subsurface inflow from upgradient sources of groundwater. Figure 6-2 is an illustration of a recharge area.

Artificial recharge can occur as a result of injection wells and man-made facilities such as spreading grounds, unlined canals, and activities such as irrigation practices. Wells and bore holes can act as conduits to aquifers.

Recharge Areas for Porous Media Aquifers

The **primary** recharge area consists of the area with permeable alluvial materials directly overlying an unconfined or semi-confined aquifer, where there is direct percolation of water into the unconfined or semi-confined aquifer. The primary recharge area for a confined aquifer also consists of the permeable materials, but the recharge area may be several or many miles away from the area of the confined aquifer from which extraction takes place.

Secondary or upland (i.e., watershed) recharge areas include the land at higher elevations usually consisting of a rock type that is much less permeable than the alluvial materials. Water recharges aquifers from these areas by overland flow of surface water and infiltration from stream flow into fractures in the rock. The groundwater in these fractures may then recharge groundwater in the alluvial aquifers.

Recharge Areas for Fractured Rock Aquifers

Recharge areas for fractured rock aquifers are similar to those for porous media, but because flow patterns are typically more complex, recharge area boundaries are more difficult to determine. Fractured rock aquifers can also exist in either confined or unconfined settings. In unconfined or poorly confined conditions, these aquifers can have very high flow (and contaminant transport) rates under rapid recharge conditions such as storm events. Transport times across fractured rock flow systems may be as short as hours to weeks, much more brief than in porous media aquifers.

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Most types of fractured rock aquifers have proportionally less water storage capacity than porous media aquifers. Bedrock aquifers may still provide significant water supply where the aquifers are part of regional bedrock ground water systems, or whether the aquifers are associated with mountainous areas of high precipitation and recharge. Fractured rock aquifers are characterized by rapid and large rises in the water table during recharge/maximum flow events, and can be influenced by recharge from a large portion of the drainage basin. For this reason, in the DWSAP program the initial estimates of the boundaries of a recharge area for a well in a fractured rock aquifer are the general physical boundaries of the drainage basin.

The recharge area for each ground water source should be identified to the extent possible from a review of the topography, hydrogeology, and other information for the area. If possible, the approximate location of the recharge area should be shown on the drinking

water source assessment map. An assessment of the entire recharge area is not necessary for this program, but may be useful to a water purveyor.

Though the recharge area for a ground water well may be some distance away from the well, defining protection zones immediately around the ground water source provides a starting point for PCA inventories and protection efforts.

Even ground water sources that are in confined aquifers where the recharge area is located at a distance are susceptible to nearby activities that may cause contamination (e.g., improperly constructed wells, or abandoned, improperly destroyed wells).

6.2.3 Delineation Methods for Ground Water Zones

According to the 1986 Safe Drinking Water Act Amendments, the areas to be assessed and protected for ground water sources (wellhead protection areas) are defined as "the surface and subsurface area surrounding a water well or well field, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or well field".

For purposes of the DWSAP, the areas to be assessed for ground water sources are a set of protection zones at the land surface adjacent to and surrounding the well. Zones identify and differentiate areas of varying significance in terms of threat to the water source from contamination.

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In confined aquifers, the zones are adjacent to and surrounding the well, but the recharge area may be located at a distance from the area immediately associated with the well, as discussed above. Unconfined aquifers may also have primary recharge areas at some extended distance from the well. Table 6-1 presents information about the confinement of aquifers.

There are a number of methods for defining zones for ground water sources. The methods recommended for use in California are listed below with a brief description. The primary criterion to be used is time-of-travel (the time for ground water to travel from a point in an aquifer to a pumping well). Particular contaminants may travel faster or slower than ground water, though it is generally rare that contaminants move faster than water within an aquifer. In some cases, contaminants (e.g., free phase solvents) are not necessarily subject to the same limitations as water. The time-of-travel criterion is more accurate for estimating zones than an arbitrary distance approach. However, due to limited resources to conduct assessments, zones for non-community water systems may be initially delineated by the arbitrary fixed distance method.

Delineation methods range from simple to complex, requiring varying amounts of hydrogeologic data and technical expertise. Simpler methods may be done initially to approximate the zones and to determine where more detailed hydrogeologic data is

needed. If necessary, the delineations can be refined at a later date using a more complex method if the drinking water source is determined to be vulnerable to PCAs.

There are six primary delineation methods selected for use in California, in order of increasing technical sophistication.

1. Arbitrary fixed radius
2. Calculated fixed radius
3. Modified calculated fixed radius
4. Analytical methods
5. Hydrogeologic mapping
6. Numerical flow/transport models

These methods range from simple and inexpensive to highly complex and costly. It is important to note that more than one method can be used to determine protection areas and zones for a ground water source. When resources, site-specific information and technical expertise are available, the more sophisticated analytical, mapping or modeling methods can be used to provide a higher degree of accuracy. Listed below is a description of each method.

Arbitrary Fixed Radius

This method involves drawing a circle of a specified radius around a well being protected. The radius is a reasonably conservative minimum distance determined by DHS based upon general hydrogeological considerations and professional judgement. In the DWSAP program this method may only be used for non-community water systems.

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Calculated Fixed Radius

The pumping of wells within an aquifer results in artificially induced changes (such as drawdown and cones of depression) to the natural ground water system. (See Figure 6-3). This delineation method attempts to define zones that encompass the land surface area impacted by the changes due to a pumping well.

The calculated fixed radius (CFR) method involves drawing a circle around a well to estimate the zone of contribution (ZOC) for a specified time-of-travel criterion. A radius is calculated using Equation 6-1 shown below that is based on the theoretical volume of water that will be drawn to a well in the specified time. The input data required by the equation includes the pumping capacity of the well, the screened interval of the well and the effective porosity of the aquifer. The time period to be used is described in Section 6.2.5.

The protection zone determined by the calculated fixed radius (CFR) (Equation 6-1) is a circle that extends the same distance in all directions from the well. In an area with a flat water table, this is a reasonable approximation of the zone of contribution. This method

provides a more accurate estimate of the appropriate size of zones than the arbitrary fixed radius method, but may still be inaccurate because it does not take into account the actual rate and direction of ground water flow, recharge and other factors that may influence contaminant transport.

The equation for the calculated fixed radius is

$$R_t = \sqrt{Q\,t / \pi\,\eta\,H} \qquad \textbf{Equation 6-1}$$

where

R_t = radius of zone (feet) for time period t
Q = pumping capacity of well (ft^3/year), where ft^3/year = gpm x 70,267
t = travel time (years) (2, 5, or 10 years, as described in Section 6.2.5)
π = 3.1416
η = effective porosity (decimal percent)
H = screened interval of well (feet)

The pumping capacity to be used is the maximum rate the well can be pumped, in gallons per minute converted to the equivalent in cubic feet per year. Pumping capacity of the well should be known by the water purveyor. If the capacity is unknown, the purveyor may conduct a pump test to determine the appropriate value. If that is not possible, an estimate can be made if justification is provided. If there are no references to use to estimate the pumping rate, DHS should be consulted for assistance in determining the appropriate value to use in the delineation.

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For wells that are used intermittently, using the maximum pumping rate of the well may result in extremely large zones which do not correspond to the actual production of the well, particularly at the 5 and 10-year travel times. In this case, with the concurrence of DHS, a water supplier may use the total annual production of the well (in ft3/year) in the highest of the previous three to five years. Water suppliers are encouraged to consider future production levels if significant growth is expected to occur in the service area.

The length of screened interval to be used in the equation should be based on well construction information. If the actual value is unknown, an initial conservative estimate can be made equal to 10% of the pumping capacity of the well in gallons per minute (gpm), with a minimum of 10 feet. For example, the estimated screened interval for a well that pumps at 400 gpm is 40 feet.

Effective porosity should be estimated using available information for the aquifer. However, if a value is not known, a value of 0.2 can be used for an initial calculation. The estimated value of 0.2 for effective porosity is reasonably conservative for most aquifers in California based on available information.

Figure 6-4 is an illustration of the CFR method. Figure 6-5 is a conceptual illustration of the three zones using the CFR method.

Modified Calculated Fixed Radius Method

In an area with a sloping water table (the most common situation), the circle described by Equation 6-1 tends to overestimate the zone of contribution (ZOC) in the down-gradient direction and to underestimate the ZOC in the up-gradient direction. To address this situation, the DWSAP provides a modified calculated fixed radius approach for sites where the direction of ground water flow is known. This approach is appropriate for ground water sources located in porous media aquifers.

In the modified approach, the radius is calculated using Equation 6-1 and the associated input data. The upgradient extent of the zone is determined as **1.5 R** (e.g., one and one-half times the calculated radius). The down-gradient extent of the zone is **0.5 R** (e.g., one-half the calculated radius). The resulting shape is a circle with a radius of **R**, shifted upgradient by a distance of **0.5 R**. Figure 6-6 is a conceptual illustration of the three zones using the modified CFR method. The sizes of the zones in the modified CFR are the same as those determined by the CFR method (Figure 6-5).

If a water purveyor wishes to use the modified CFR method, the calculations used to determine the direction of ground water flow should be submitted with the assessment report (see below).

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Estimation of direction of ground water flow. In order to accurately estimate the direction of ground water flow, the estimate must use at least three (3) wells in the vicinity of the drinking water well. The topographic elevation at each well, the distances between the wells, and the total head at each well must be known. Ground water "contours" or equipotential lines are determined from the information for the three wells, and the ground water flow direction is perpendicular to the contour lines. For more information in determining the direction of ground water flow, refer to the EPA document *Ground Water and Wellhead Protection*, pages 30 to 31 (US EPA, 1994).

The "total head" is the water level in a well, usually expressed as feet above sea level, which consists of the elevation head and the pressure head. In an unconfined aquifer, the pressure head equals zero at the water table surface.

Analytical Methods

These methods involve the use of equations to define ground water flow and contaminant transport. The uniform flow equations (Todd, 1980) shown in Figure 6-7 are often used to define the area of contribution to a pumping well in a sloping water table. These are the most widely used methods for accurately delineating ground water protection zones.

These methods require the input of various hydrogeologic parameters to calculate the distance to the downgradient divide, or stagnation point, and the width of the zone of contribution to the well. The upgradient extent of the protection area can then be calculated based on either a time-of-travel or flow boundaries criterion. Site specific hydrogeologic parameters are required as input data for each well at which the method is applied. These parameters can include the transmissivity, porosity, hydraulic gradient, hydraulic conductivity, and saturated thickness of the aquifer.

Figure 6-8 illustrates an example of a protection zone determined by using the analytical methods.

Detailed Hydrogeologic Mapping

In many hydrogeologic settings, flow boundary and time-of-travel criteria can be mapped by geological, geophysical, and ground water tracing methods. The flow boundaries are defined by lithologic variation or permeability contrasts within the aquifer. Geological observations may provide surface indications of lithology changes, which will correlate with ground water source area boundaries. Detailed hydrogeologic mapping may also include mapping of ground water levels in order to identify ground water drainage divides.

This method for delineating ground water protection zones within a source area may be particularly useful for shallow aquifers, and for fractured rock aquifers.

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Figure 6-9 is a conceptual example of using hydrogeologic mapping to delineate ground water protection zones in fractured bedrock.

Numeric Flow/Transport Models

Ground water source areas and protection zones can be delineated using computer models that approximate ground water flow and/or solute transport equations numerically. A wide variety of numerical models are presently available both commercially and through various organizations.

Numeric flow/transport models are particularly useful for delineating protection areas where boundary and hydrogeologic conditions are complex. Input data may include such hydrogeologic parameters as permeability, porosity, specific yield, saturated thickness, recharge rates, aquifer geometry, and the locations of hydrologic boundaries. Solute transport parameters such as dispersivity may also be incorporated in these models.

To be accurate, these models require site-specific field verification and adjustment.

6.2.4 Selecting A Ground Water Delineation Method

Protection zones within a source area should be delineated using the times-of-travel specified in Section 6.2.5. The preferred delineation method is one that utilizes the most detailed information available, although a simpler approach may be appropriate for an initial delineation, with a more detailed evaluation later (e.g., in a voluntary protection program). A simpler approach may result in larger delineated protection zones than might be obtained from a more elaborate approach, given the conservative (i.e., health protective) nature of the simple models.

DHS staff will use simple approaches, due to the number of drinking water sources that need to be assessed. However, DHS believes that the more complex approaches are beneficial where appropriate data are available. Such approaches give the most site-specific information, and may preclude the initiation of protection activities beyond those that are needed for protection of a specific ground water source.

Table 6-2 provides guidance on the types of delineation methods that should be used.

Porous Media Aquifers

As a general approach, DHS will use the calculated fixed radius method for delineations for assessment purposes. For non-community water systems, DHS may choose to use the arbitrary fixed radius method. Where DHS has sufficiently detailed information on the direction of ground water flow, the modified calculated fixed radius method will be used.

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Fractured Rock Aquifers

In fractured rock aquifers, the complexity of the flow system does not lend itself to a simple delineation method that accurately reflects the appropriate size, shape and direction of zones. Given the resources and time available to conduct the assessments, DHS recommends the minimum delineation method in fractured rock to be the calculated fixed radius method, increasing the calculated radius of each zone by 50%. The default effective porosity of 0.2 would be used in the equation. Increasing the size of the zones in fractured rock reflects the increased vulnerability of these sources compared to those in porous media aquifers.

Wells in Multiple Aquifers

When a well is located in multiple aquifers, the protection zones should be delineated using the methods and values that are more conservative (i.e., health protective). If the well is located in multiple porous media aquifers with varying effective porosity or other parameters, the delineation should use the values that produce the larger delineated area. If the well is located in porous media and fractured rock aquifers the delineation should use the fractured rock method.

Ground water under the influence of surface water

For wells that are ground water under the direct influence of surface water (GWUDI), the source area should include the land area within the watershed boundaries. This is consistent with DHS regulations, because GWUDI wells are considered surface water sources and are subject to surface water treatment regulations. Zones for these sources may be established by ground water methods and/or surface water methods.

For wells that are indirectly under the influence of surface water (e.g., where the source of water is underflow of a surface water body, and the source has not been classified as GWUDI) it is appropriate to include the land area within the watershed boundaries in the source area. The recharge area, if different than the watershed area, may also be included in the source area. A source that is indirectly under the influence of surface water may be indicated if the ground water zones encompass a surface water body. Zones are to be established using ground water methods as appropriate. The areas to be assessed should be determined in consultation with DHS.

6.2.5 Approach for Defining Ground Water Zones

All ground water sources should have zones defined. The suggested approach is to define four zones, and an optional fifth zone. See Figure 6-10 for a conceptual illustration of these zones.

If the delineated area for a ground water source encompasses a surface water body (lake, river, stream, creek, wetland, etc.), the source may be under the influence of surface water and the delineation should be reviewed in consultation with DHS (see Section 6.2.4).

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Suggested protection activities for each of the zones are discussed in Part Four, Voluntary Drinking Water Source Protection Programs.

Well Site Control Zone

The well site control zone encompasses the area immediately surrounding the well, what most people think of as the "wellhead." The purpose of this zone is to provide protection from vandalism, tampering, or other threats at the well site.

This zone is determined by using a simple radius, (or equivalent area if a different shape, i.e., a square, is desired). DHS recommends a minimum radius of 50 feet for well site control zones for all public water systems in the state.

Zone A - Microbial/Direct Chemical Contamination Zone

The purpose of this zone is to protect the drinking water supply from viral, microbial and direct chemical contamination. The zone is defined by the surface area overlying the portion of the aquifer that contributes water to the well within a **two-year time-of-travel**.

The two-year time-of-travel criterion is used because this is the current recommendation of the proposed Ground Water Rule (GWR). Existing research indicates that bacteria and viruses survive less than two years in soil and ground water. Use of this criterion provides consistency with the proposed GWR.

This area provides only a limited time for responding to serious microbiological contamination or chemical spills.

As an illustration of what the size of Zone A might be, see the chart in Figure 6-11, for the calculated fixed radius method using the two-year time-of-travel, with porosity assumed as 0.2 and varying screened intervals. The DHS-recommended minimum radius is 600 feet for all ground water sources of drinking water in porous media aquifers, and 900 feet in fractured rock aquifers. These distances are believed to be sufficiently conservative (i.e., health protective) for protection from microbiological contaminants.

Zones B5 and B10 - Chemical Contamination Zones

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The purpose of Zones B5 and B10 is to prevent chemical contamination of the water supply, and to protect the drinking water source for the long term. These zones are used to focus attention on possible chemical contamination that may exist near the well but at a greater distance than Zone A.

Zone B5 encompasses the area between the two- and **five-year time-of-travel**. This zone provides for more response time for chemical spills than Zone A.

Zone B10 encompasses the area between the five- and **ten-year time-of-travel**. The primary purpose of this zone (along with the recharge area) is to encourage decision-makers and planners to recognize long-term aspects of the drinking water source. The ten-year time-of-travel allows for some attenuation or remediation of contaminant sites, or if necessary, time to develop alternate sources of water supply.

Figures 6-12 and 6-13 are illustrations of the sizes of Zones B5 and B10, respectively, determined by the calculated fixed radius method, using five- and ten-year travel times, with porosity assumed as 0.2 and varying screened intervals.

The DHS-recommended minimum radius is 1,000 feet for Zone B5, and 1,500 feet for Zone B10 for porous media aquifers, and 1,500 and 2,250 feet, respectively, for fractured rock aquifers.

A more sophisticated delineation method (e.g., as done voluntarily by a public water system) may determine zones that encompass a smaller area than a circle with the DHS minimum radius.

This may be technically appropriate for the source and documentation should be provided to DHS.

Buffer Zone—Additional Zone, If Needed

The purpose of this zone is to provide added protection for drinking water sources. It can be used to delineate a larger setback away from activities that may be significant potential sources of contamination (e.g., landfills or hazardous material disposal sites), and to provide additional information that may be helpful for longer term planning. The buffer zone is generally upgradient from the protection zones and may include the entire zone of contribution for the well, indirect recharge areas, or locations where the aquifer may be exposed at the surface.

Drinking water systems that choose to establish a Buffer Zone may do so based on activities that occur outside of the protection zones, and the vulnerability of the drinking water source to possible contamination.

Detailed analytical methods may be necessary to determine the appropriate area for the Buffer Zone. Determination of Buffer Zones may be done in consultation with DHS. An assessment of the buffer zone may be useful to the water purveyor.

6.2.6 Modification of the Shape and Size of Zones

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Local knowledge and professional judgement may be used to modify the shape and size of the zones to allow for site-specific characteristics, taking into account the DHS minimum distances. For example, where several wells have overlapping protection areas, it may be appropriate to combine the zones of the individual wells into a larger combined zone. The larger combined zone could then be evaluated as a single entity for purposes of subsequent steps in the assessment. Similarly, if narrow areas of land exist between delineated zones of neighboring wells, it may be appropriate to merge the zones of the two wells, incorporating the area in between, and evaluate the merged area as a single zone.

For wells located within the same wellfield, it may be appropriate to consider the wellfield as one larger well with the combined production capacity of all the wells. Zones could be established around the entire wellfield.

6.3 Assessment Map

After the delineation of the source area and protection zones has been completed, the locations should be shown on the assessment map. The map should be based on a USGS quadrangle 7.5 minute series topographic map, and should also show the location of the drinking water source.

6.4 Boundary Drinking Water Sources

Several drinking water sources originate beyond California's boundaries (e.g., Colorado River, Klamath River). DHS will work with Region 9 of the US EPA and other states, as appropriate, to obtain information pertinent to source water assessments for drinking water systems that utilize these water bodies. For ground water sources with source areas or protection zones that may cross California's boundaries, DHS will also work with US EPA Region 9 and other states to obtain pertinent information and coordinate assessments to the extent practical.

Where drinking water sources outside of California (e.g., Truckee River) may require information for their source water assessments, DHS will also work with US EPA Region 9 and other states, as appropriate, to provide information.

6.5 Tribal Drinking Water Sources

For drinking water sources on tribal lands, DHS will work with US EPA Region 9 and tribes to provide pertinent information that is needed to complete drinking water source assessments for tribal lands. Where tribal lands occupy protection areas or zones of non-tribal sources of drinking water, DHS will work with US EPA Region 9 and tribes to obtain information that is needed for those specific assessments.

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6.6 Transmission Facilities from Drinking Water Intake to Treatment Plant

When a drinking water intake is located at a different site than the treatment plant (if there is one), the untreated water may be conveyed through an aqueduct, canal, pipeline or other transmission facility. There is the possibility that an activity may exist within the vicinity of the transmission facility that could contaminate the water supply. In California, the threat of contamination to the water supply through this means is reviewed in two ways:

1. Water systems using surface water sources that utilize open channel transmission facilities are required to include the drainage area that contributes to the channels in the watershed sanitary survey for the source. As part of the DWSAP program, the transmission facilities will be assessed using the information from the watershed sanitary surveys.

2. Closed transmission facilities (pipelines) are reviewed and evaluated by DHS (or LPAs) during water system inspections (sanitary surveys).

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Table 6-1. Indicators of presence and degree of confinement of aquifers.

Information Source	Highly Confined	Semiconfined (Leaky)
Geologic		
Geologic maps and cross-sections	Presence of continuous, unfractured, confining strata (clays, glacial till, shale, siltstone).	Evidence of vertical permeability in confining strata (fracture traces, faults, mineralization or oxidation of fractures observed in cores).
Environmental geologic and hydrogeologic maps	See above.	Presence of artificial penetrations (abandoned or producing oil and gas wells, water wells, exploration boreholes).
Hydrologic		
Water level elevation (single well) of potentiometric surface	Above the top of the aquifer (not diagnostic for differentiation of highly and semi-confined aquifers).	Same
Hydraulic head differences between aquifers	Large head difference in water levels measured in wells cased in different aquifers (not diagnostic for differentiation of highly and semiconfined aquifers).	Same
Water level fluctuations (continuous measurement)	Short-lived and diurnal fluctuations in response to changes in barometric pressure, tidal effects, external loading, no response to recharge events.	Similar to highly confined aquifer, but may also exhibit relatively large and rapid response to recharge events because of leakage through discrete points.
Hydrologic measurements in confining strata	No changes in water levels in response to pumping; diurnal but not seasonal water level fluctuations (see above).	Changes in water levels in response to pumping; seasonal water-level fluctuations in response to seasonal variations in precipitation.
Pump test for storativity	Storativity less than 0.001.	Between 0.01 and 0.001 (not diagnostic).
Pump test for leakage	Pump drawdown vs time curve matches analytical solution(s) for highly confined aquifer. Estimated or calculated leakage less than 10^{-3} gal/day/ft2.	Pump drawdown vs time curve requires use of analytical solution for leaky aquifer. Estimated or calculated leakage 10^{-2} to 10^{2} gal/day/ft2
Numerical modeling	Simulation of potentiometric surface possible without estimates of leakage, or required estimates are low (see above).	Simulation of potentiometric surface requires use of large leakage values.
Hydrochemistry		
General water chemistry	Chemical characteristics indicative of long distance from recharge area(region-specific).	Qualifies as confined using other criteria, but chemical characteristics more similar to ground water in recharge zones.
Anthropogenic atmospheric tracers	No detectable tritium or fluorocarbons in ground water.	Detectable concentrations of tritium or fluorocarbons (less than 40 years old).
Isotope chemistry	Carbon-14 dating of water samples indicates age > 500 years.	See above.
Contaminants	No detectable concentrations of potential contaminants identified by inventory of possible contaminating activities.	Qualifies as confined using other criteria, and contaminants detected in aquifer.
Changes in water chemistry over time	Head declines from long-term pumping have not resulted in changes in water chemistry indicators of vertical leakage.	Head declines from long term pumping have resulted in changes in water chemistry indicators of vertical leakage (see above).
Time of travel through confining strata	Time of travel calculations based on measured or estimated values of difference in hydraulic head, porosity and hydraulic conductivity exceed 40 years.	Time of travel through confining strata < 40 years based on calculations or presence of tritium or fluorocarbons.

Source: Handbook Ground Water and Wellhead Protection, EPA, September 1994, Document EPA/625/R-94/001

Table 6-2. Delineation methods, types of system that may use particular methods, minimum data that are required, and the minimum radii of zones.

Delineation method	Type of system that may use method	Minimum data required	Minimum radius of zone
Arbitrary fixed radius	Non-community	Location of source	See below for Porous Media and Fractured Rock
Calculated fixed radius (CFR) (porous media)	All*	Location of source, Pumping capacity of well (gpm), Screened interval of well (indicate method used to estimate), Effective porosity (indicate method used to estimate)	A = 600 feet B5 = 1,000 feet B10 = 1,500 feet
CFR (fractured rock) Note that fractured rock uses CFR and increases size by 50 percent.	All*	Location, Pumping capacity, Screened interval, Effective porosity	A = 900 feet B5 = 1,500 feet B10 = 2,250 feet
Modified CFR	All*	Location, Pumping capacity, Screened interval, Effective porosity, Direction of ground water flow	A = 600 feet B5 = 1,000 feet B10 = 1,500 feet
Analytical methods	All	Location, Capacity, Screened interval, Effective porosity, Hydraulic conductivity, Hydraulic gradient, Direction of ground water flow	No minimums**
Hydrogeologic mapping	All	Hydrogeologic parameters, Lithology, Groundwater level	No minimums**
Numeric flow/transport models	All	Hydrogeologic parameters, Recharge rates, Aquifer geometry, Hydrologic boundaries	No minimums**

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* Systems with detailed hydrogeologic data are encouraged to conduct more sophisticated analyses.

** Systems using more sophisticated methods are encouraged to compare the sizes of zones to minimum sizes derived by simpler methods to assist in the review of the delineation.