

# AREA PLAN

Adopted May, 1996

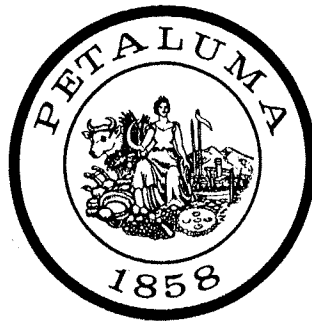


## PETALUMA RIVER ACCESS AND ENHANCEMENT PLAN

# **AREA PLAN**

Adopted May, 1996

Funded by  
California Coastal Conservancy  
for the City of Petaluma



# **PETALUMA RIVER ACCESS AND ENHANCEMENT PLAN**

**"River planning is central to Petaluma planning. A plan for the river is the core of any General Plan for Petaluma."**

Participant in March 14, 1992 River Walk Community Workshop

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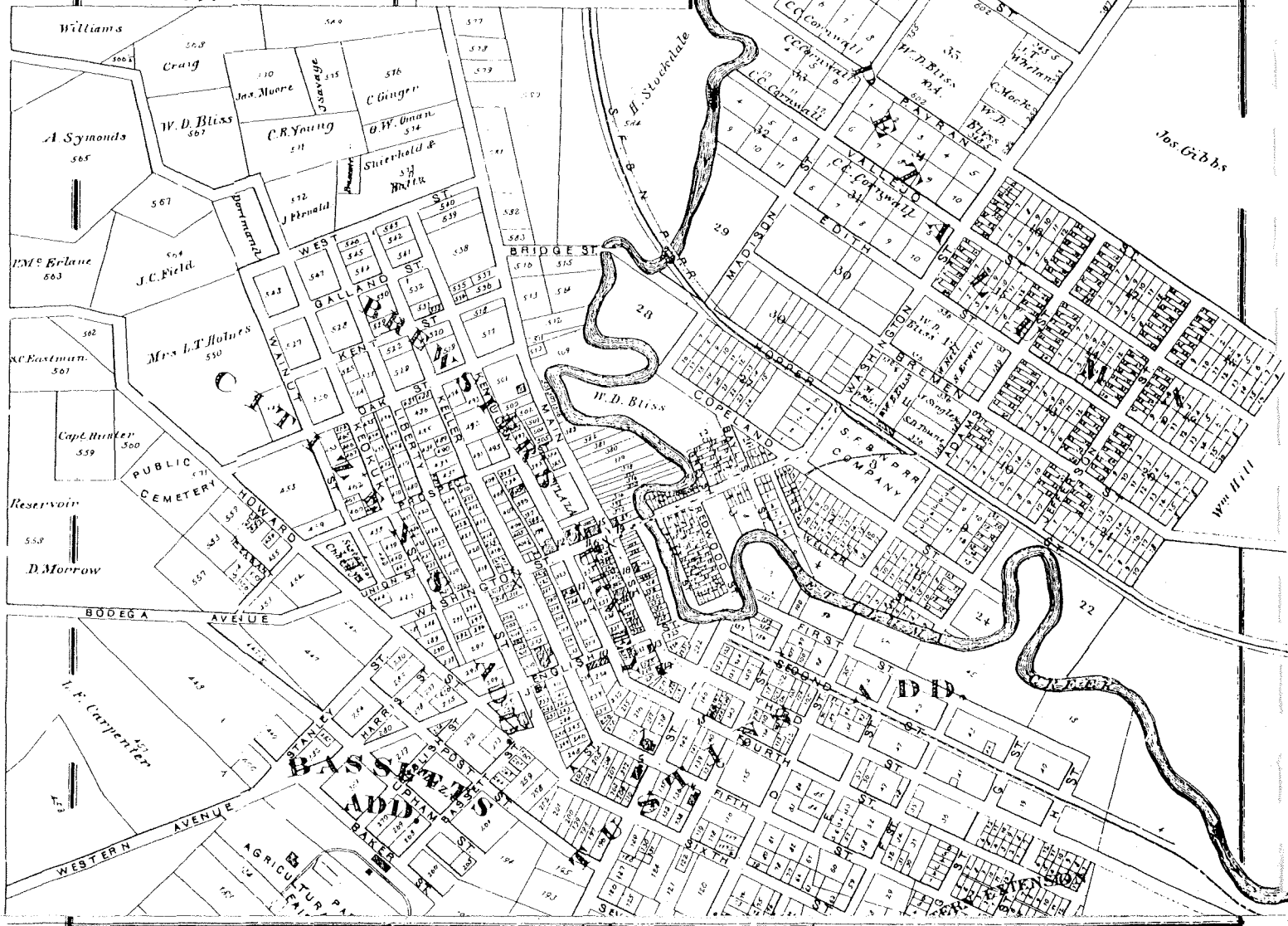
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# MAP OF PETALUMA CITY

SONOMA CO. CALIF.  
1877  
Scale 600 Feet to an Inch.

## PROMINENT BUILDINGS

No.	Description
1	CATHOLIC CHURCH
2	METHODIST CHURCH NORTH
3	METHODIST CHURCH SOUTH
4	EPISCOPAL CHURCH
5	CONGREGATIONAL CHURCH
6	POST OFFICE
7	PUBLIC SCHOOL
8	YOUNG LADIES SEMINARY
9	AMERICAN HOTEL
10	CITY HOTEL
11	WASHINGTON HOTEL
12	BROOKLYN HOTEL
13	UNION HOTEL
14	COSMOPOLITAN HOTEL
15	BANK OF SONOMA CO.
16	PETALUMA SAVINGS BANK
17	PETALUMA THEATER
18	HALL
19	PETALUMA ARGUS.



## SUMMARY AND BACKGROUND

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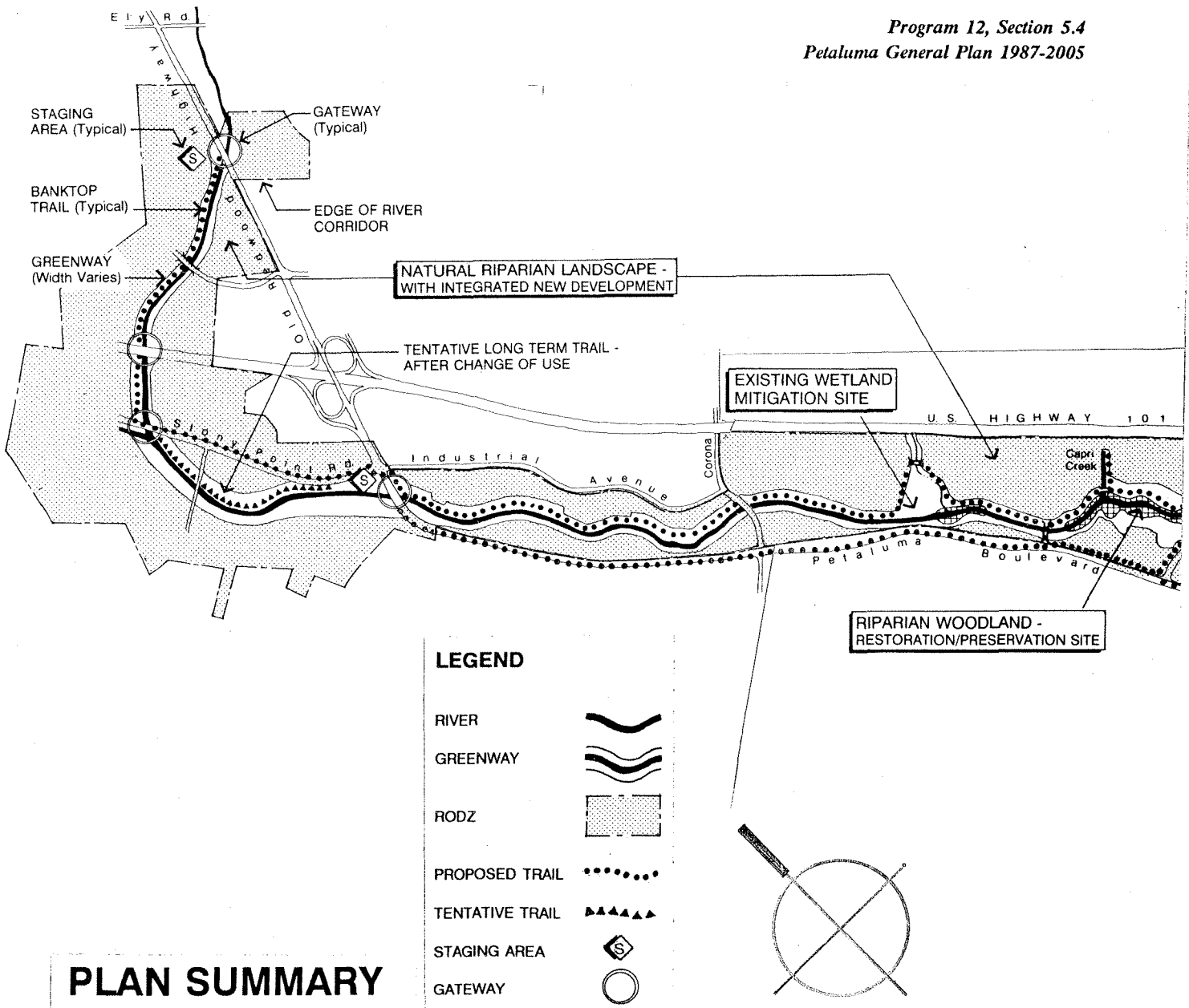
Moore Iacofano Goltsman  
Community Participation

- Jim Oswald

# CHAPTER 1.0

*"Prepare a comprehensive plan  
for the Petaluma River..."*

*Program 12, Section 5.4  
Petaluma General Plan 1987-2005*



## PLAN SUMMARY

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# PLAN SUMMARY

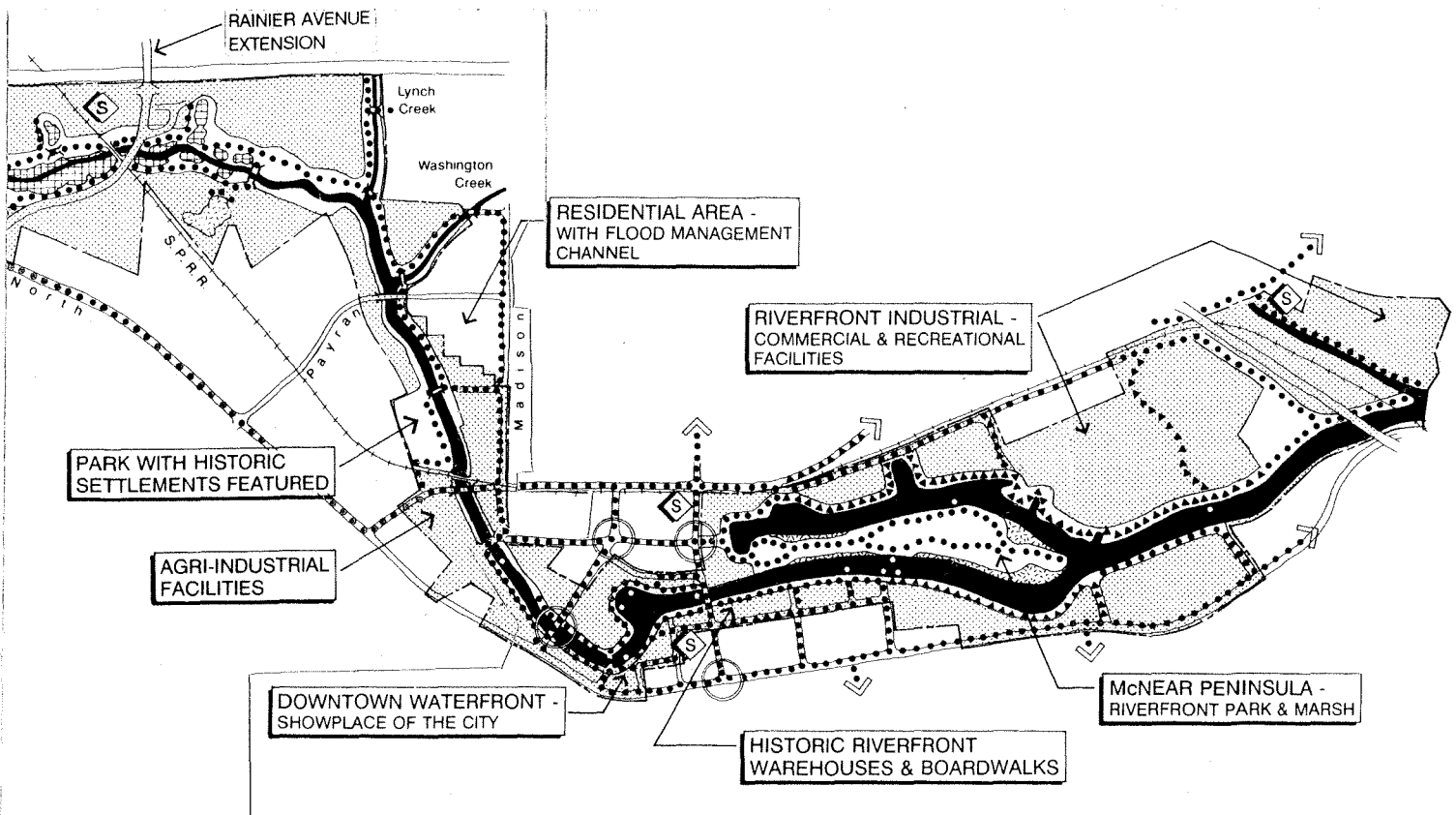
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## 1.1 PURPOSE

Petaluma is a river town. The Petaluma River is its lifeblood.

The overriding purpose of the Petaluma River Access and Enhancement Plan is to describe this community's vision for the Petaluma River, including its riverfront uses, activities, and developments. Implementation of this plan will result in a waterfront environment that is the jewel in Petaluma's crown.

This plan elaborates on the Petaluma General Plan 1987-2005 regarding the river and the properties abutting it. As the most comprehensive statement of this community's vision for the river and riverfront development, this plan will be used by policy-makers, property owners, and interested citizens to guide the metamorphosis of the river into the central feature of Petaluma.



In order to achieve the vision of this plan, the city must balance four principal components of the General Plan's directives:

- \* **Restoration and preservation of the natural resources.**
- \* **A pedestrian walkway and bike trail for the entire length of the river within the city limits.**
- \* **A vibrant, high density water-related commercial environment with combined tourism, recreation, commerce, and industry in and around downtown by the year 2015.**
- \* **A mixture of different uses and activities along the entire river corridor that complement the riverfront location.**

During the past half-century, the Petaluma River became a sadly neglected resource. Where once the city turned toward the river for its very life, the city began to turn away. Substantial opportunities to provide recreational and commercial services to a society with changing tastes, changing needs, and changing habits were too often ignored.

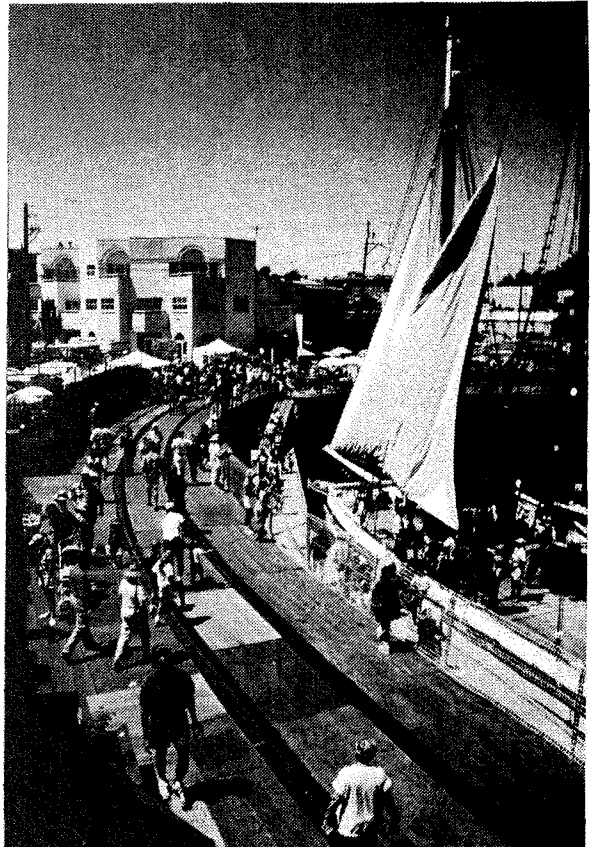
In recent years, efforts of local government, community groups, and individual entrepreneurs have begun to address the fact that there is tremendous potential for this river -- and potential to provide long-lasting benefits for the citizens of Petaluma.

To date, there has been no blueprint or comprehensive vision to guide future use and planning for this vitally important waterway. The River Plan is designed to provide that blueprint.

Implementation of this plan will result in a riverfront with people near the water, enjoying its presence and actively engaged in walking,

boating, working, dining, or shopping -- whatever the activity -- with a heightened sense of place and relationship to the natural environment. This plan bases Petaluma's future relationship to its river on models of historic active waterfronts combined with modern environmental sensitivities.

Described in this plan are various means of enhancing the river, encouraging compatible developments along the river frontage, creating and maintaining a system of river-related public trails and direct riverfront access, and other methods of achieving goals of the Petaluma General Plan.



*Over 20,000 people enjoyed the tenth annual River Festival at the downtown waterfront in August, 1995. The people of Petaluma are rediscovering their riverfront as a central community amenity and gathering place.*

## 1.2 FORMAT OF THE PLAN

The Petaluma River Access and Enhancement Plan is organized to be consistent with the format of the Petaluma General Plan 1987-2005. Statements that guide future actions have been separated into goals, objectives, policies, and programs. This hierarchical approach allows the public and City decision-makers to distinguish between the desires of the community with respect to the river (stated as "goals" and "objectives") and the methods through which these desires can be achieved (stated as "policies" and "programs").

The *goals, objectives, policies and programs* are italicized and are adopted as city directives. As official city procedure, these directives must be considered by all city decision makers.

Contextual and other explanatory information in regular type clarify the intent of the adopted policies, but are not adopted as city directives.

Key terms and phrases are highlighted in bold print.

Maps, cross sections, sketches, and other graphic illustrations are provided to clarify the recommendations of the plan. Unless otherwise specified in the text and their titles, these are intended to be illustrative and are not intended to be statements of policy.

### Definitions and Symbols

**1. GOAL: A GENERAL, OVERALL, AND ULTIMATE PURPOSE, AIM OR END TOWARD WHICH THE CITY WILL DIRECT EFFORT.**

**(1.1) OBJECTIVE: A SPECIFIC STATEMENT OF DESIRED FUTURE CONDITIONS TOWARD WHICH THE CITY WILL EXPEND EFFORT IN THE CONTEXT OF STRIVING TO ACHIEVE A BROADER GOAL.**

**1. Policy: A specific statement of principle or of guiding actions which implies clear commitment but is not mandatory. A general direction that the City will follow in order to meet its goals and objectives by undertaking specific action programs.**

**1a. Program: An action, activity, or strategy carried out in response to adopted policy to achieve a specific objective. Policies and programs establish the "who", "how", and "when" for carrying out the "what" and "where" of goals and objectives.**

Chapter 3, Goals, Objectives, Policies & Programs, provides the core regulatory features of the plan. The overall Systemwide policies that apply to the entire river corridor are discussed in the first part of the chapter, while the policies and programs specific to individual River Segments are described in the second part of the chapter. Projects proposed along the river will be subject to systemwide directives as well as those for the specific river segment.



### 1.3 RIVER PLAN AREA

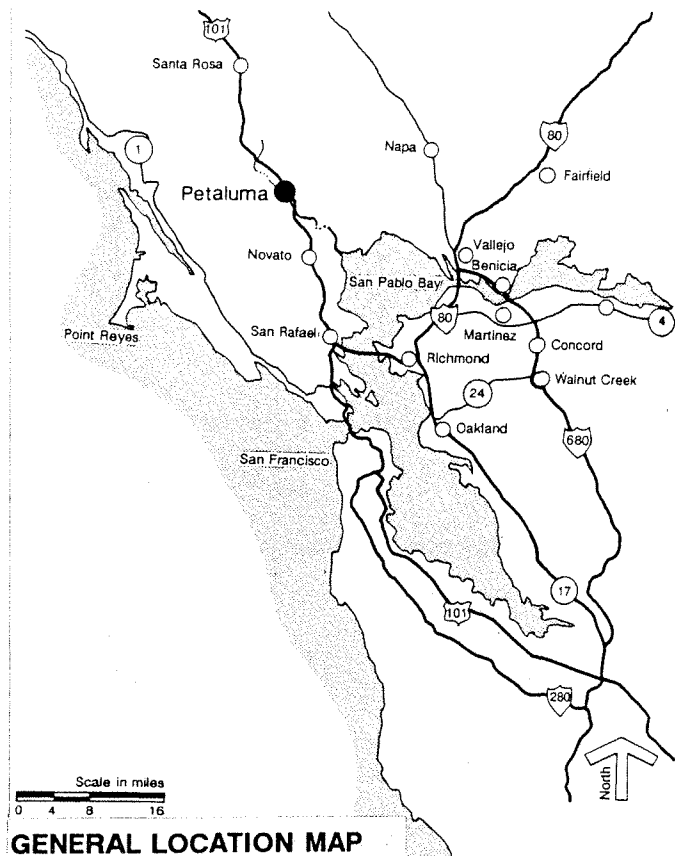
The subject of the River Plan is the 6.5-mile long, 800-acre section of the river and abutting properties that lie mostly in the City of Petaluma from the Old Redwood Highway road bridge over Willow Brook Creek near Redwood Business Park to the Petaluma Marina at the Highway 101 bridge. The river plan area (or **river corridor**) includes the river, its banks, and all properties that either directly abut the river or are near enough to be affected by the provisions of this plan (see River Segment Map page 18 and 19). Within the river corridor are industrial and commercial land uses (some that relate to the river and some that do not), the historic downtown commercial and warehouse districts, remnant agricultural areas, residential areas, riparian vegetation, existing and planned open spaces, and recreational facilities.

The **greenway** created by this plan is that part of the river corridor where flood waters are accommodated and where river front public access and habitat enhancement are recommended. The greenway includes the river channel and its banks, flood protection alterations, the trail and access amenities, habitat protection and enhancement zones, public parks as designated on the General Plan, and a buffer zone between the top of bank and the adjacent development.

For ease of reading, the Petaluma River Access and Enhancement Plan will be referenced simply as the **River Plan** or 'this plan' throughout this document.

#### Setting

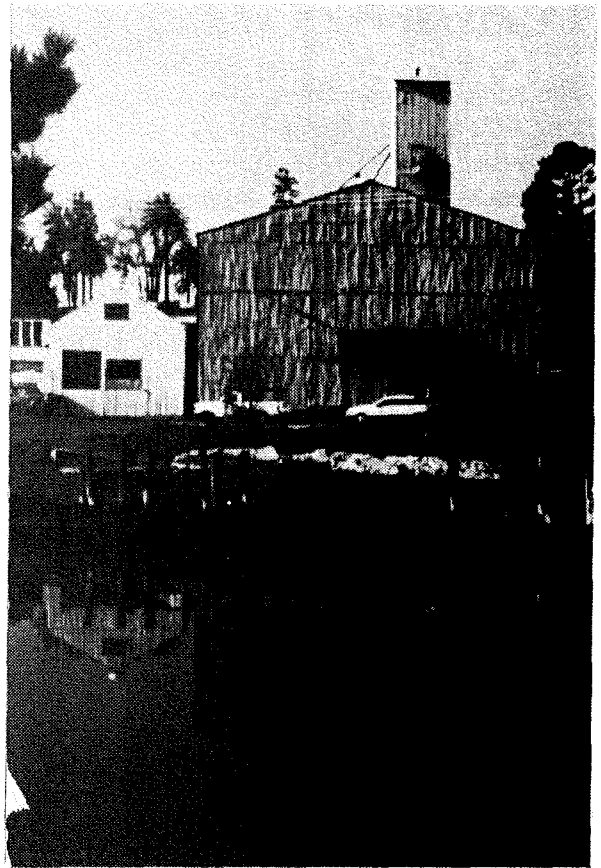
The headwaters of the Petaluma River are several miles northeast of the City of Petaluma. The river flows first through gently sloping farmland, then through the center of the city, and finally, bordered by levees and salt marsh, past agricultural fields and small residential areas to San Pablo Bay, approximately fourteen miles from downtown Petaluma. It drains a watershed of approximately 32 square miles. Tributary streams are seasonal in the upper reaches of the watershed, but intercept groundwater in the flat valley landscape and sometimes flow year-round near the downtown area. There, the freshwater mixes with the salt water that flows up from the bay with the tides. Levees, cultivation, channelization, and urban development have significantly altered the natural riparian and wetland habitats that once flanked the river.



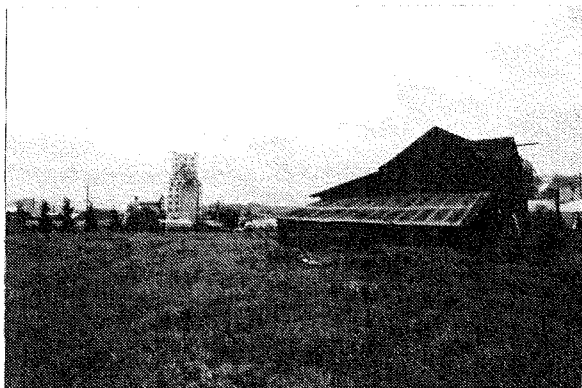
### A Riverfront City

The river has been one of the most important factors in the evolution of the City of Petaluma. There is evidence of significant early Coast Miwok settlements along its banks just upstream of the downtown area. Later, shipping of goods in support of miners and settlers led to the development of the colorful historic downtown along its banks. Agricultural, industrial, and other commercial enterprises, dependent upon the river for shipping, flourished along the river from the late nineteenth to the early twentieth centuries.

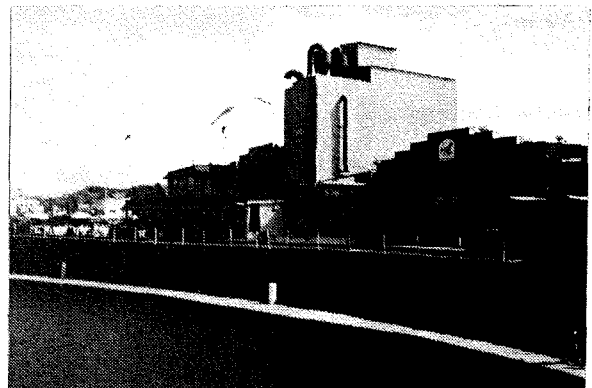
The river tied Petaluma to the outside world with paddlewheel steam ships, barges, and scows transporting Petaluma's agricultural bounty and manufactured goods to the outside world and bringing many necessities of life to the young city. The city grew outward from the bustling waterfront in a pattern responding to the location, activities, and shape of the river.



*Old warehouses and wharf pilings are a common site along the riverfront near downtown.*



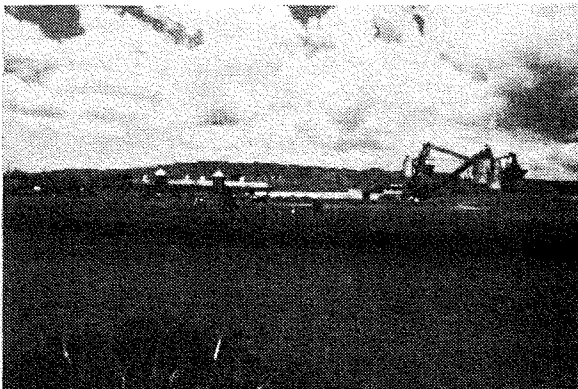
*An old Coast Miwok village and an early 20th century farm are found at the Cedar Grove property, just upstream of the granary towers and downtown Petaluma, seen in the distance. The River Plan encourages recognition of historic sites and events along the waterfront.*



*The Great Petaluma Mill and Steamer Gold are typical of the historic buildings facing the river that define the character of the downtown waterfront.*

While most of the active river-dependent businesses have now disappeared, many old riverfront buildings remain. Downtown's development pattern is still inextricably linked to the river. Several viable river-dependent businesses remain, keeping up the tradition of an active working waterfront. The collection of old buildings hugging the banks of the river, a historic downtown that reminds us of the river's prominence in the town's formative years, active waterfront industries, and the heritage of riverfront settlements create the unique urban character of Petaluma. Today, this character supports a bustling pedestrian-oriented commercial center and increasing tourist trade.

Some of the largest remaining areas of open land within Petaluma are located along the river. Future use of these properties, like those found in the historic downtown, will also be linked to the river and its riparian habitats. The river will continue to be a central organizing feature of the city as it grows.



*The view across the river from the end of "G" Street includes McNear Peninsula in the foreground, riverfront industries, and the Sonoma Mountains in the distance. At a glance, the natural and cultural setting of the city is revealed with the river at the core.*

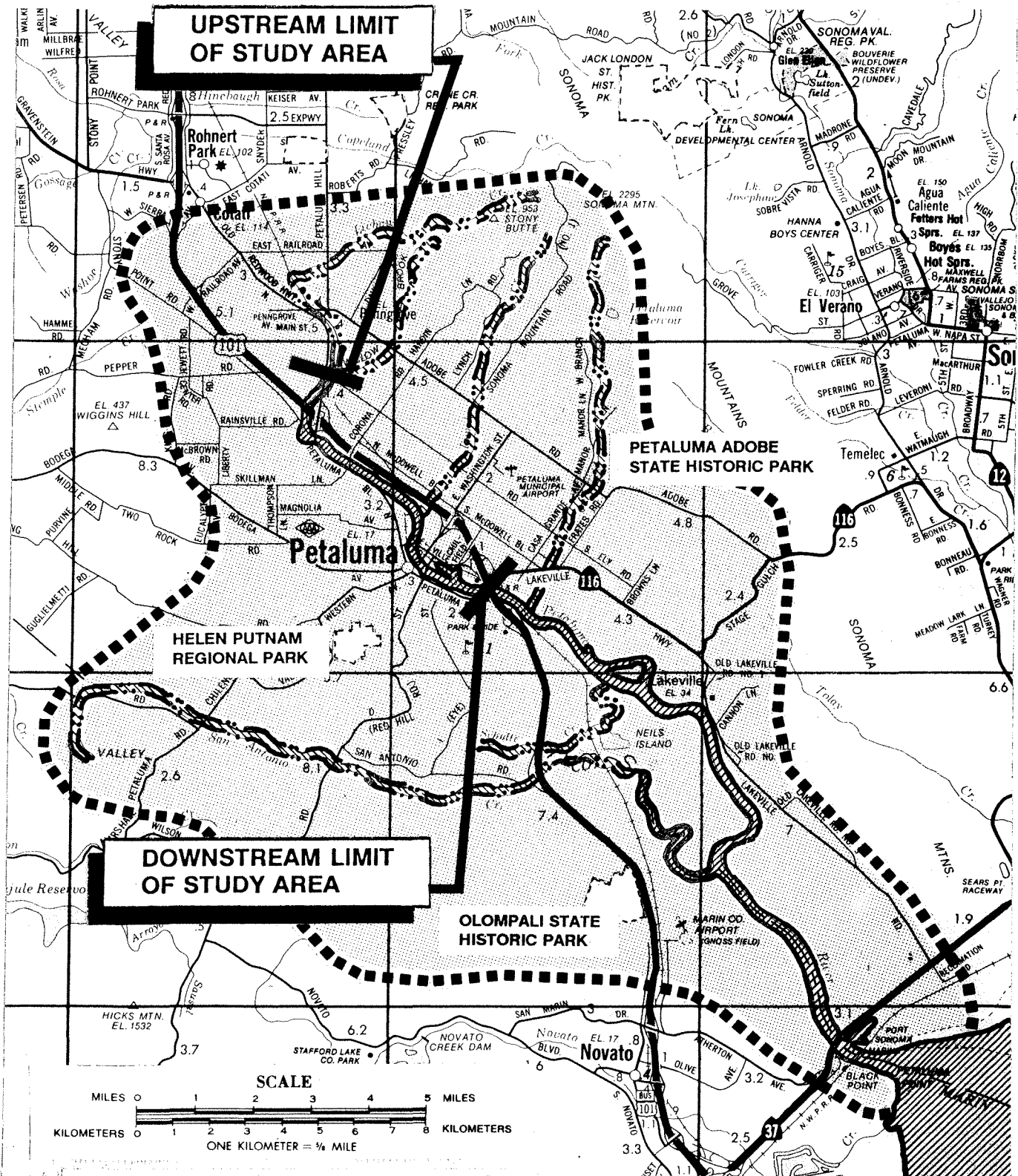
### **The River as a System**

In the planning area, the Petaluma River is typical of urban streams in which water, plants and animals, and human activity interact as a dynamic system. The River Plan will enable all of the components to thrive interdependently, each enriched by the others and their relationship to the river. As envisioned, the river corridor will again become the most significant unifying feature of the city. It will provide peaceful settings amid nature, scenic backdrops to active workplaces, and an invigorating pedestrian and bicycle pathway network connecting many centers of activity within the city. If properly planned and cared for, the river will flourish as a life supporting habitat corridor and a focus for human interaction, commerce, and transportation.

This plan recognizes that the river corridor described in this document is only one portion of the entire river system. Actions taken within this area will affect and will be affected as well by the upstream and downstream reaches outside the City of Petaluma's jurisdiction.



*Oak Creek Apartments, just upstream of Lynch Creek, successfully integrates the natural flood zone into the property's open space network and preserves the existing oak trees.*



**WATERSHED DIAGRAM**

## 1.4 GUIDING CONCEPTS OF THE ACCESS AND ENHANCEMENT PLAN

Through an aggressive public information and outreach process, the community's vision for the Petaluma River was gradually revealed. Consideration of the emerging themes guided the planning and design concepts for the plan. The following description of these themes is provided to give readers a conceptual framework for the regulatory text contained in Chapter 3.

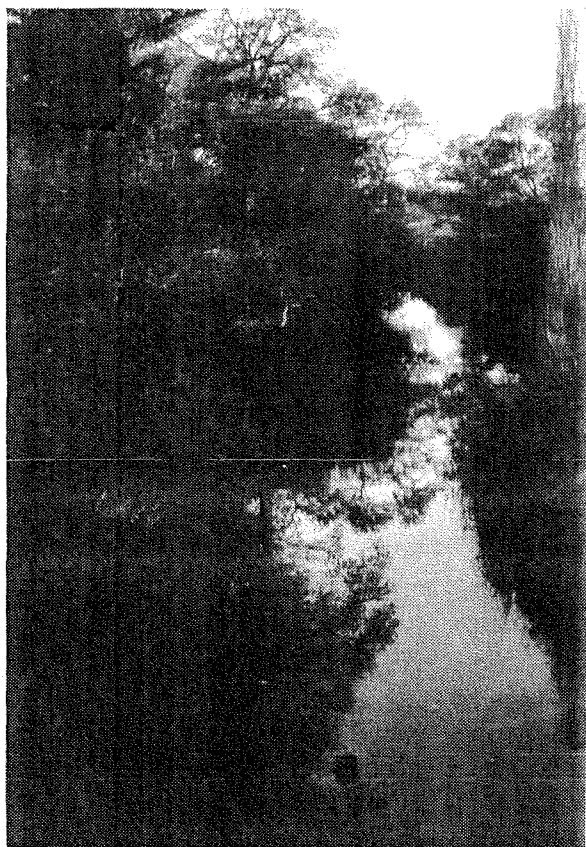
### Diversity: Urban and Wild

The river corridor is diverse and complex. Its richness reflects the heritage of local development patterns as well as the nature of

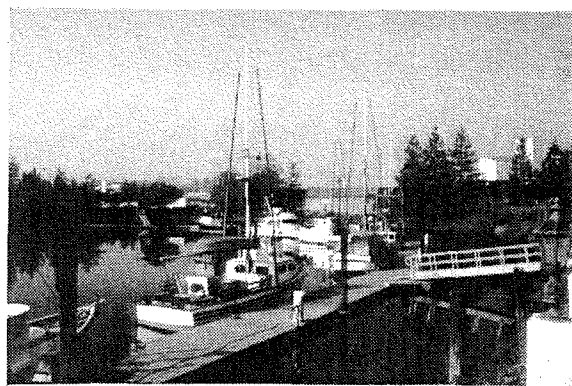
the river itself. An important concept of the River Plan is to accept and build upon this heritage of diversity in a manner that will create a cohesive, mutually supportive whole. Urban features will be interwoven with the natural and wild, each contributing equally to the character of the Petaluma River corridor.

### Complementary Riverfront Developments

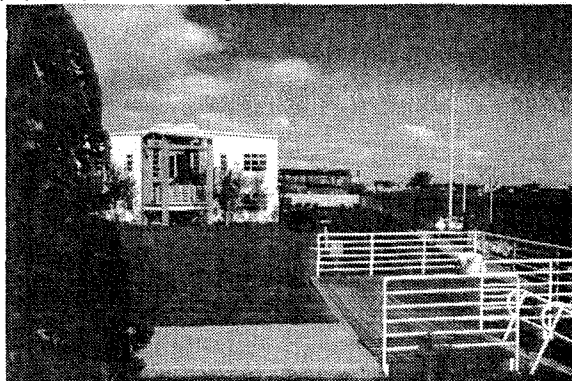
Developments that feature the river as an integral component of their design are encouraged. New developments should build upon the city's authentic waterfront heritage. A revitalized, bustling urban waterfront in the downtown area will be supported by riverfront commercial, industrial, recreational, and residential activities throughout the river corridor.



*The natural riparian area near the upstream railroad trestle is a prime wildlife habitat that will be expanded.*



*Downtown Turning Basin improvements will build upon the popularity of this boating destination.*



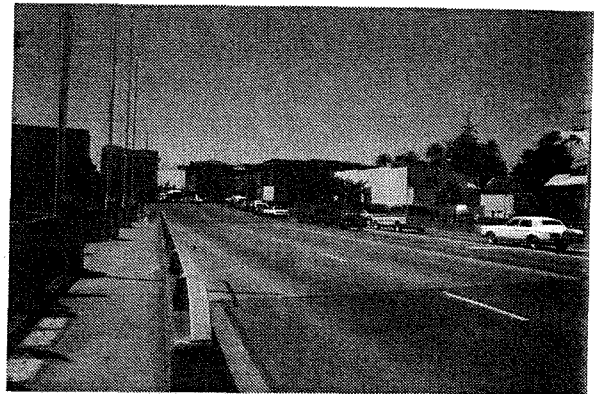
*The Foundry Wharf features its river frontage and is a model for other complementary riverfront developments.*

**Education/Interpretation**

The river's importance as natural habitat and its historic, cultural, and economic significance within the city provide rich material for learning about the region. Key topics of interest in the river area are Coastal Miwok activities, the history of later settlements, development of agricultural and industrial economies, use of the river and railroad as transportation systems, hydrology and geology, and the river's ecological functions. In addition, the current process of planning for, protecting, and restoring the river can be described as part of any public interpretation program.

**City Gateways**

The Petaluma General Plan recommends the creation of "gateways" at important roadway approaches to the city. These areas impart a sense of entry to Petaluma and provide local information through extraordinary design, signs, and landscaping. Major river crossings and other points with distinct views of the river should also serve as gateways that link the river to the visitor's first impression of the city. Other river crossings or views can be similarly highlighted to orient and educate the viewer. The river corridor will be a continuous unifying element in the city's urban design, connecting such otherwise disparate elements as the historic downtown and riverfront industry to salt marsh habitat and oak woodlands. Gateways to the river will help orient visitors to their location within the city as well as to the city's place in the Petaluma valley and North Bay Region.

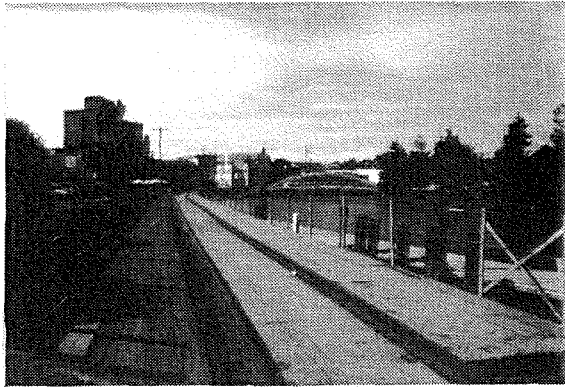


*Recommended gateway improvements at the Washington Street bridge entry to downtown include riparian tree planting, expanded pedestrian areas and amenities, informational signs, trail links, and framed views of interesting buildings.*



*A city gateway along Petaluma Boulevard North at Stony Point Road would feature the restored riparian forest and could include a staging area.*



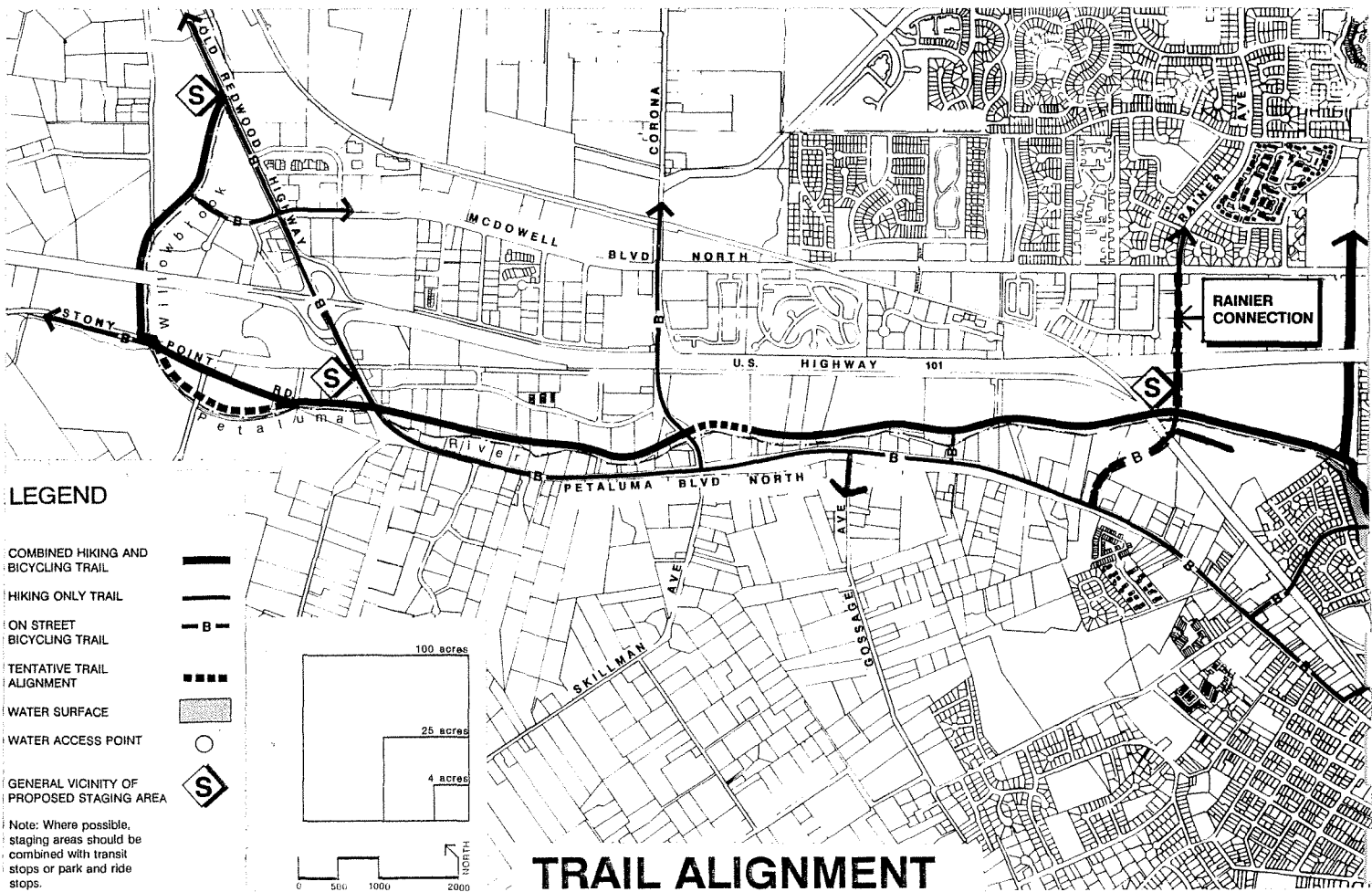


An important trail link will be made along the railroad trestle through downtown.

### Continuous Trail System

The River Plan will unite the 6.5 mile river corridor with a continuous trail system for bicyclists and pedestrians. The trails will link together neighborhoods, places of employment, commercial and cultural facilities, parks, and natural areas into a coherent system of amenities serving locals and visitors alike. A variety of direct water access points will encourage recreational and commercial activities throughout the river corridor.

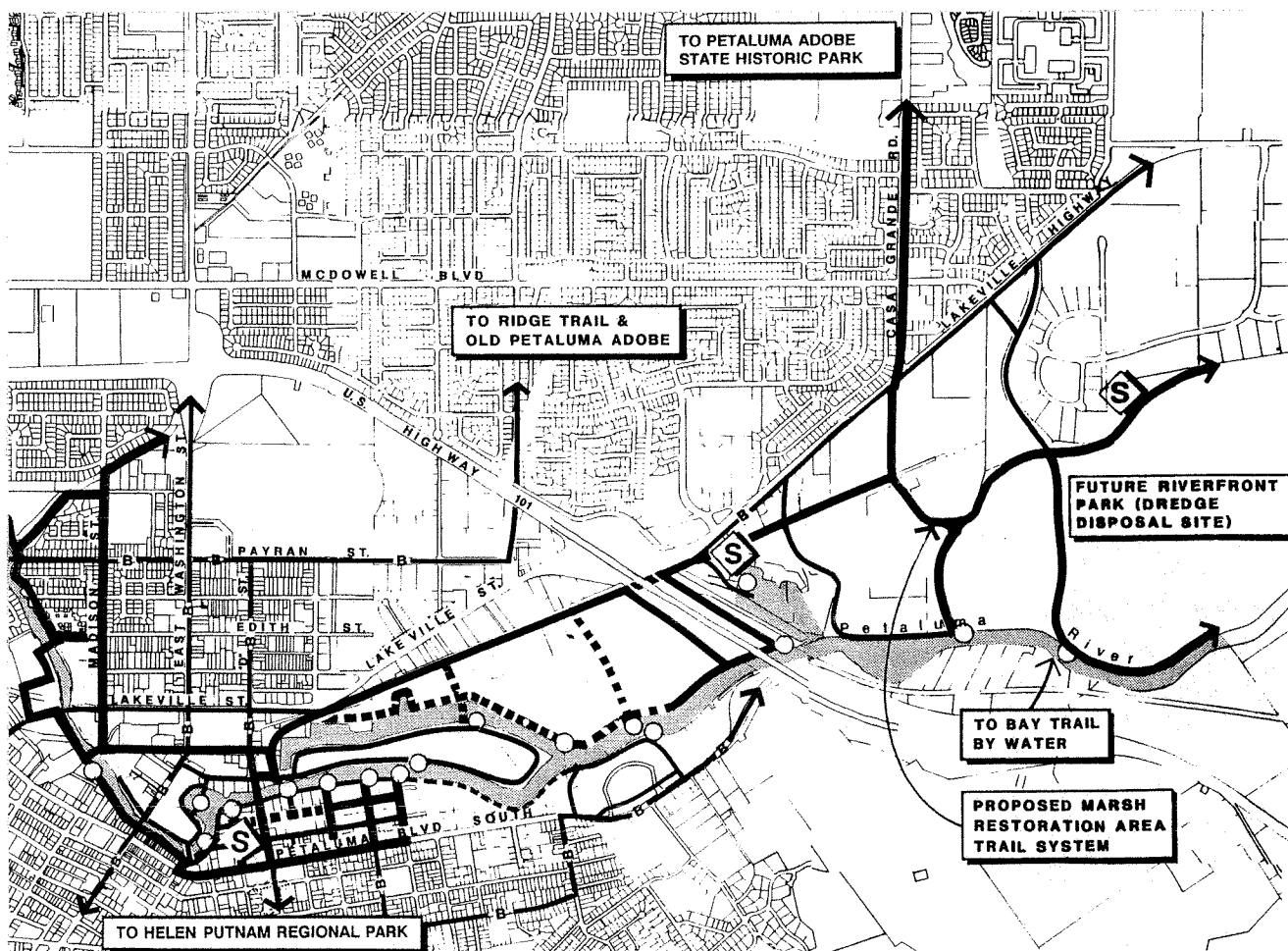
The river trail offers connections to a wide network of trails extending throughout the city and region. Ties to the Bay Area Ridge Trails and Bay Trail are encouraged.



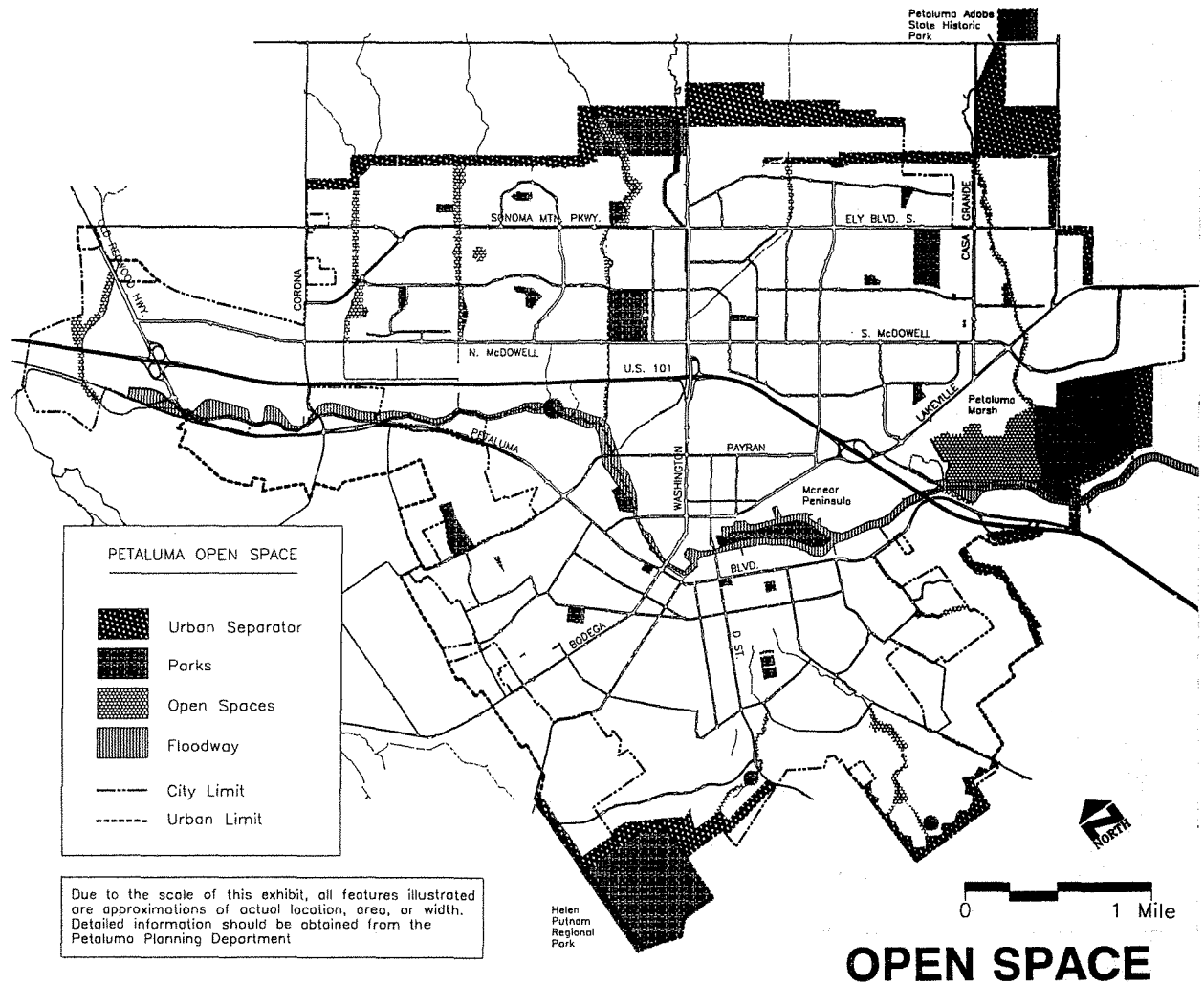
### Riverfront Habitats Enhanced and Linked

According to this plan, existing wildlife habitat and natural areas along much of the river corridor will be restored, linked, and protected. Landscape improvements in urbanized areas will also be designed to provide habitat. Bank stabilization and flood protection activities will utilize techniques that help support healthy environments appropriate for that property.

Within the city, river habitats vary from tidal salt marsh to fresh water stream. Linking these disparate areas into a linear continuum will provide untold benefits to the health and quality of the entire river eco-system.







The oak woodland along river banks in the upstream segment is recommended for preservation.

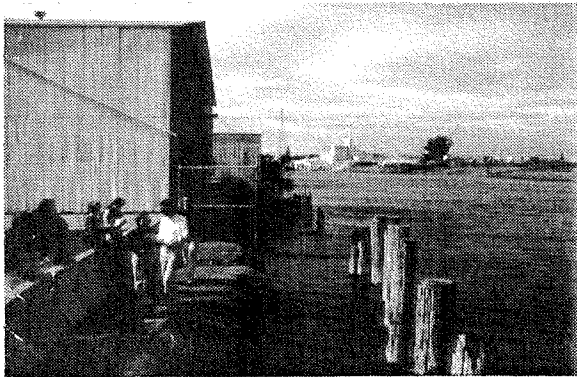


The Cedar Grove property in the Payran segment is proposed for a public park with river access and historic features.

### Immediate and Long Term Implementation

This plan presents a long term vision of the river as a central feature for Petaluma. It will take many years to accomplish and require multiple phases of public and private investment and action.

Most portions of the plan will be implemented by private development activities as they occur over time on riverfront properties. Utilization of the river as both a visual and recreational amenity, as well as a travel and activity corridor, will add value to adjoining properties, offsetting the burden to the property owners of implementing their portion of the plan. Initial public funding is recommended for high visibility and high impact improvements in or near the downtown area. Success with the earliest improvements will spark enthusiasm to carry out future phases of the plan. The River Plan coordinates each incremental improvement into a cohesive whole.



*Waterfront improvements in the vicinity of downtown are recommended as first priority public investments, such as public access at the end of 'G' Street in the Warehouse Segment.*

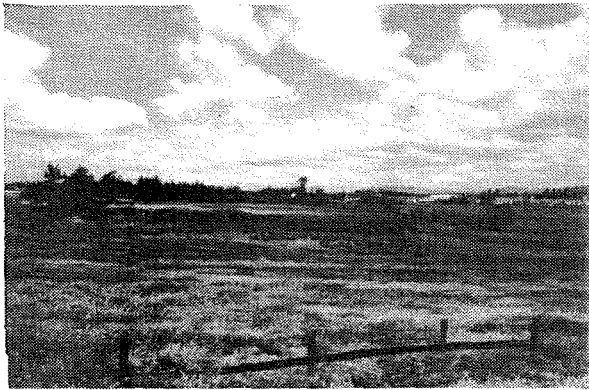
## 1.5 RIVER SEGMENTS

For planning purposes, the river corridor has been divided into six segments, each with distinct characteristics and internal similarities that allow logical clustering of design and planning policies. In Chapter 3, goals, objectives, policies, and programs are provided for the entire access and enhancement plan area (systemwide) as well as for the individual river segments. The planning and design concepts for each of the segments are summarized as follows:

### 1. Upstream Segment (Chapter 3.3)

The Upstream Segment, the largest of the six segments and the one most likely to change significantly in the near future, contains remnants of an extensive riparian forest that marked the river's course through the broad valley landscape. The remaining groves of trees are recognized as unique resources to be protected and enhanced, and will supply the stock from which a continuous riparian forest will be re-established along the greenway.

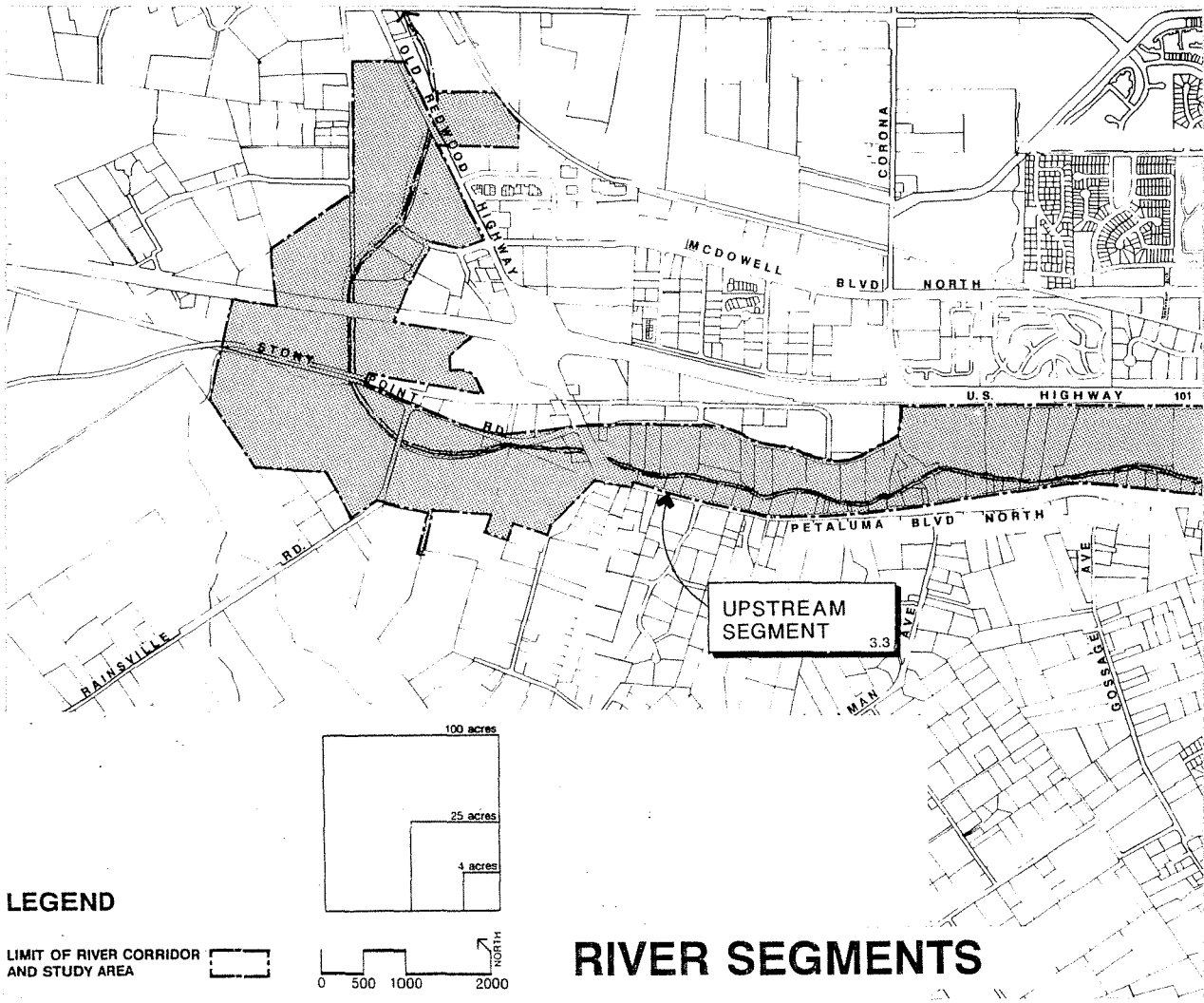
The open rural/agricultural land uses in this area are gradually being replaced by higher density centers of employment, commerce, and residential growth. The River Plan acknowledges this pressure for change and recommends an integrated approach for new complementary development to occur with riverfront public access, flood mitigation, and habitat preservation/enhancement. Improvements in the greenway will become an integral part of each parcels' site design.



Open land in the **Upstream Segment**, like this Corona Reach river frontage, is under pressure to change.



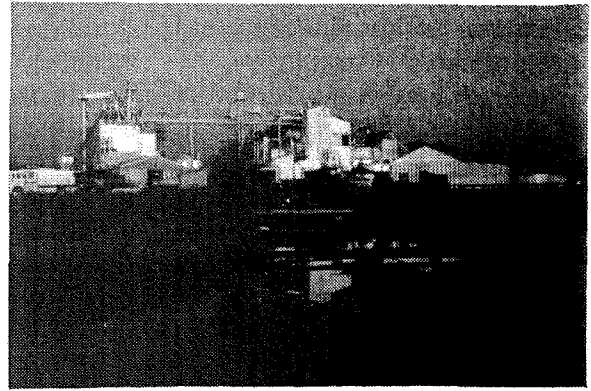
Preservation, restoration, and enhancement of the dense riparian forests, like this near Corona Road, will characterize the greenway in the **Upstream Segment**.



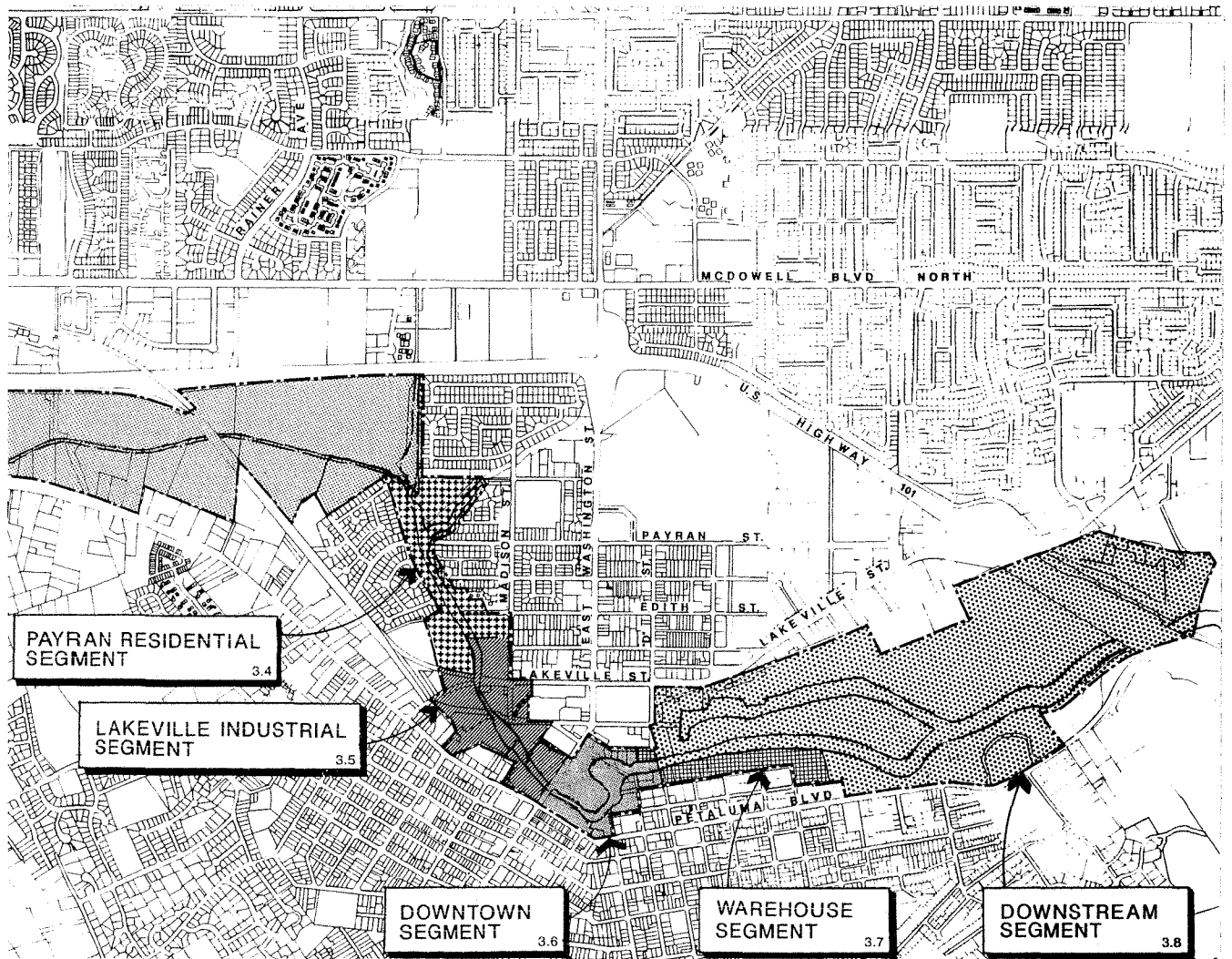
## RIVER SEGMENTS



Flood protection for residences built very close to the river banks is recommended for the **Payran Residential Segment**.



The prominent food processing industries such as Hunt & Behren's, as seen from Copeland St. in the **Lakeville Industrial Segment**, characterize this portion of the riverfront.



- 2. Payran Residential Segment (Chapter 3.4)**  
Comprised primarily of residential properties with houses and yards very close to the river banks, this area has been repeatedly subject to extensive flooding. The U.S. Army Corps of Engineers (COE) has prepared Payran Reach flood control recommendations for the City. The River Plan is prepared with the COE flood control plans in mind. For instance, it is recommended that one maintenance road act as the trail route.

At the former Cedar Grove Park there is evidence of a significant Coastal Miwok village and an old, intact farm complex that represents the town's earliest settlements. The Petaluma General Plan identifies this property as a potential park site. The River Plan recognizes the site for its potential public access to the water and historical/educational attributes.

This segment represents a transition between the forested freshwater riparian habitats upstream and the open brackish tidally influenced habitats downstream. The River Plan recommends integration of new development with riverfront public access, habitat preservation/enhancement, and flood mitigation activities.



*Historic buildings along Water Street in the **Downtown Segment** can re-orient to the river as a new riverfront pedestrian promenade replaces parking.*

- 3. Lakeville Industrial Segment (Chapter 3.5)**  
This segment is a transition between the residential areas upstream that still contain some riparian habitat, and the more urbanized, pedestrian orientated downtown area. It is primarily an industrial riverfront that, like the Payran Residential Segment, will be partially affected by the COE flood project.

This area, with its prominent feed processing industries, illustrates the important role of agriculture in shaping Petaluma. The trail and greenway through this area will be secondary to maintaining these industrial activities. Habitat restoration and beautification through increased landscaping are encouraged, especially just upstream of the Washington Street bridge although the design of the greenway will emphasize the industrial character of this segment.



*Riverfront improvements around the Turning Basin in the **Downtown Segment** will make this the primary destination of the trail system and activity center of the river corridor.*

**4. Downtown Segment (Chapter 3.6)**

This segment covers the waterfront of the city's traditional and historic central business district. This is the primary destination of the trail system and activity center of the river corridor. Recommended in this plan is the completion the existing system of docks, boardwalks, and overlooks surrounding the Turning Basin in a way that builds upon the historic downtown development



*The historic character of the commercial riverfront in the **Warehouse Segment**, as seen from the 'D' Street bridge, will be retained with riverfront boardwalks to replace the decayed wharves.*



*Retention of river dependent industries and their barge traffic is a priority in the **Downstream Segment**, as well as acquisition of McNear Peninsula (on the right) for a park and marsh restoration.*

patterns and creates urban open spaces that are full of activity. It encourages further reorientation of the buildings toward the river to heighten the area's vigorous, bustling commercial and recreational activities. Downtown waterfront improvements are recommended as early components of this plan as a catalyst for improvements in other segments.

**5. Warehouse Segment (Chapter 3.7)**

The downtown Warehouse Segment, located along the western side of the river from "D" to "H" Streets, provides a unique river frontage with the peaked roof warehouses at banktop and decaying wharf pilings at the water's edge. This plan calls for a new riverfront boardwalk to replace the decayed wharves of a bygone era, improved water access at the ends of "F", "G", and "H" Streets, and building ventures that accentuate the historic character of this mixed use neighborhood. Improved pedestrian access between this segment and downtown will spur rehabilitation and bring new economic vitality into this area.

**6. Downstream Segment (Chapter 3.8)**

Besides containing some of Petaluma's largest industries, this riverfront segment also has extensive undeveloped land, including the 32 acre planned city park on McNear Peninsula. In this segment the river is a broad tidal slough, periodically dredged for navigability, amid a landscape of commercial and heavy industrial establishments with barges, recreational, and commercial boat traffic. Greenway improvements such as bank stabilization, trails, and revegetation depend greatly on the nature of development along the river. Maintaining authentic industrial waterfront activities, visible from the trail, is a priority of the River Plan for this area. Early acquisition and improvements to McNear Peninsula for public use is a high priority.



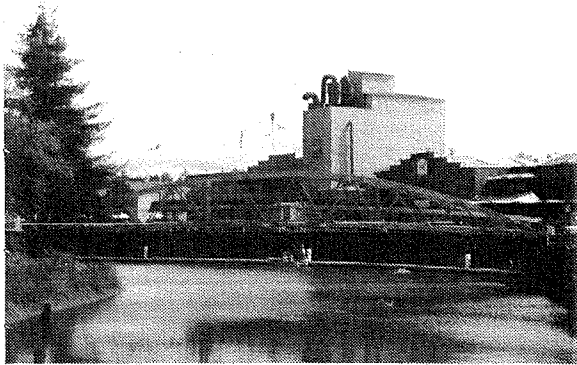
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## CHAPTER 2.0

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**"Emphasize and maintain economic and architectural diversity. Keep Petaluma River Corridor a 'working', living (residential/commercial) entity that has characterized the community for more than 100 years."**

*Examples of successful local initiatives that have used the river as a resource:*

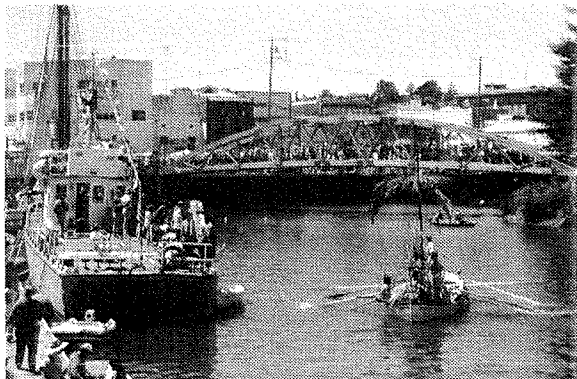


*The Great Petaluma Mill is a successful adaptive reuse of an historic riverfront building in downtown. The Balshaw Bridge was part of the first River Walk improvements.*

Participant in Community Workshop, 1992



*Foundry Wharf, located at First and 'H' Streets, is an example of a successful riverfront development that harmoniously blends new and old structures.*



*The annual River Festival, organized by local entrepreneurs, draws attention to the increasingly active downtown waterfront.*



*Valley oaks along the river in the Corona reach were once part of an extensive riparian forest typical of the freshwater reaches above downtown. The River Plan encourages preservation and expansion of these natural resources.*

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# PLANNING BACKGROUND

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## 2.1 ORIGINS OF THE RIVER PLAN

### Citizens and Property Owners

Awareness of the Petaluma River as a local resource and important tourist destination has grown over the last 20 years. The gradual, successful redevelopment of riverfront properties such as the Great Petaluma Mill, Foundry Wharf, Petaluma Yacht Club, and several waterfront restaurants, and growing attention by the City, Chamber of Commerce, civic groups, and environmental groups underscored the river's improved status as a



*The new Marina and nearby marsh restoration project have drawn attention to the natural and recreational aspects of the downstream river reaches.*



*Several excellent restaurants, a micro-brewery, and other pedestrian oriented businesses have taken advantage of the active riverfront walkways.*

community treasure. In 1986, the City prepared and adopted the River Walk Master Plan to provide a blueprint for a promenade around the Turning Basin. The Balshaw Bridge, additional floating docks, and beautification improvements were installed to encourage pedestrian activity near the river. The annual River Festival, Chamber/Yacht Club visitor program, and the City's marsh restoration projects have stimulated increased public activity in riverfront areas. Founded on citizen input, the River Plan builds upon these past successes and plots an ambitious course for the future.

### General Plan

The Petaluma General Plan 1987-2005, the result of extensive citizen input, recognizes the river as one of the city's principal assets and as an underutilized local resource. To bring new vitality to a growing city, the General Plan recommends enhancement of the river as a recreational resource, thriving natural habitat, primary feature of the city's open space system, conveyance for flood waters, central attraction for locals and tourists, and centerpiece for a more active downtown.

To fulfill these potentials, the General Plan specifically recommended preparation of a comprehensive river plan to address the many interrelated issues concerning the river and the adjacent properties. It further recommended that a Citizen Advisory Committee work with staff to prepare this plan. In early 1989, the city initiated the process to create a river plan. By late 1990, a 19-member Petaluma River Citizen Advisory Committee (CAC) had been appointed by the City Council and, in 1991, grant funding was secured from the State Coastal Conservancy.



### Economic Development

After adoption of the General Plan in 1987, the City Council embarked on an evaluation of the Plan's economic development policies and recommendations. The product of this effort, Market Outlook and Economic Development Report (March, 1991), reinforced the General Plan's presumption that proper treatment of the river would attract and support business opportunities, particularly in the downtown; contribute to the town's considerable charm; and provide strong incentives for businesses choosing to locate in Petaluma. A high quality master plan was recommended to resolve the conflicting objectives of flood control, navigation, recreation, preservation and economic development. The River Plan is intended to satisfy this need.

"Petaluma's strongest long term economic development strategy is the detailed master planning and staged construction of a first class river park along the banks of the Petaluma River including McNear's Island (Peninsula). This park should not only have walking paths along the river but should have major active and passive recreation areas for the local population. It should become Petaluma's central amenity and a focal point for future commercial, tourist retail, office and multi-family development. A great river park will enable Petaluma to become one of the most desirable places to live and work in all of Northern California."

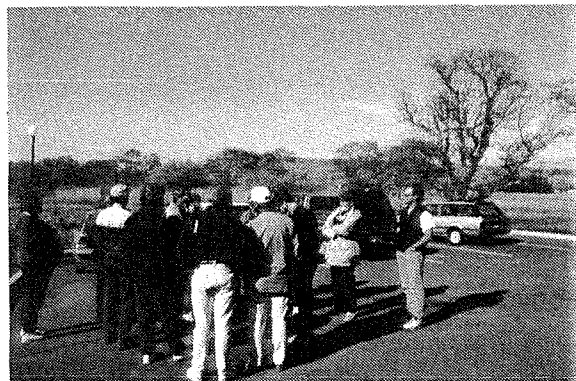
Market Outlook and Economic Development Report, March, 1991

### State Coastal Conservancy

Calling the River Plan "...an ambitious and visionary program..." (1991 staff report), the California State Coastal Conservancy generously recognized the importance of the river as one of the state's principal economic, recreational, and biological water resources by funding the preparation of this plan and providing technical support. The Conservancy, which had already funded restoration and enhancement projects along the lower reaches of the river, has a high level of interest in comprehensive and coordinated planning for coastal and riverine resources.

### Staff, the CAC, and Consultants

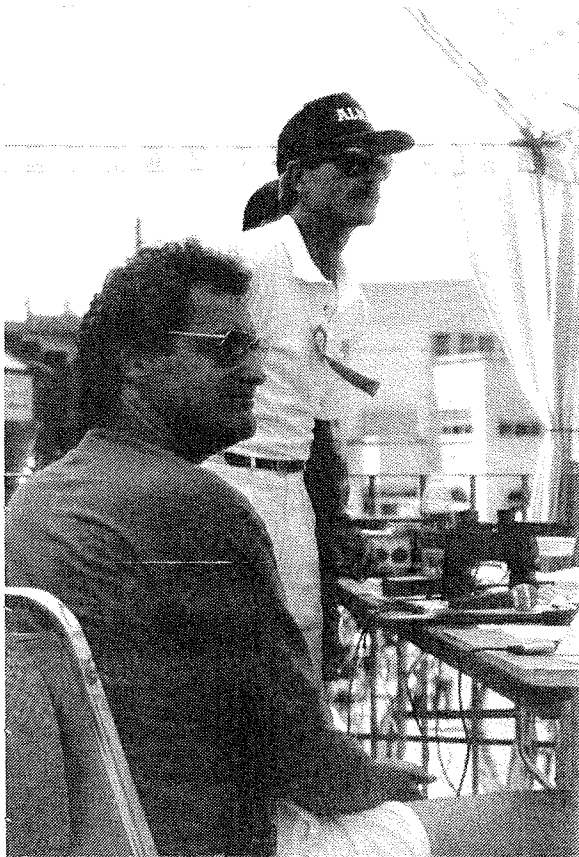
After a two year effort to define a coordinated planning process and identify an adequate funding source, a consultant team of landscape architects, biologists, hydrologist, planners, urban designers, architectural historians, communications specialists, and economists was selected by the Citizen Advisory Committee (CAC) in 1991 to assist in the preparation of this comprehensive plan. City staff, the CAC and consultants have worked closely to collect information, involve property owners and the public at large in the planning process, and distill a multitude of issues into a single coordinated vision.



The CAC, seen here in the field during one of their many meetings, was appointed by the City Council to oversee development of the River Plan.

## 2.2 AREA PLAN AUTHORITY

The River Plan has been formulated as an **Area Plan**, a reference document of the Petaluma General Plan 1987-2005, as authorized by California Government Code sections and encouraged by the General Plan.



*The renewed vitality of Pelaluma's waterfront and the creation of the River Plan is a result of efforts of dedicated citizens, like CAC members and River Festival organizers John FitzGerald and Ed Love.*

The River Plan is consistent with and expands upon the policies contained in the General Plan. For instance, the goals for the river as adopted in the General Plan are accepted as the goals for this Area Plan, and General Plan land use designations and flood management programs have been left intact.

All subdivision, public works projects, and zoning decisions for properties within the City's planning area are reviewed for consistency with the General Plan and its area plans, such as this document.

Additionally, there are many properties along the river for which a separate coordinated planning effort has been or will be created prior to development or redevelopment of those properties. These include the Corona Reach (from Corona Road to Lynch Creek), the downtown Riverwalk, the Petaluma Marsh, and South Petaluma Boulevard Specific Plan Area. The River Plan provides policy direction and assumes that future actions will be completed in a manner consistent with this plan.

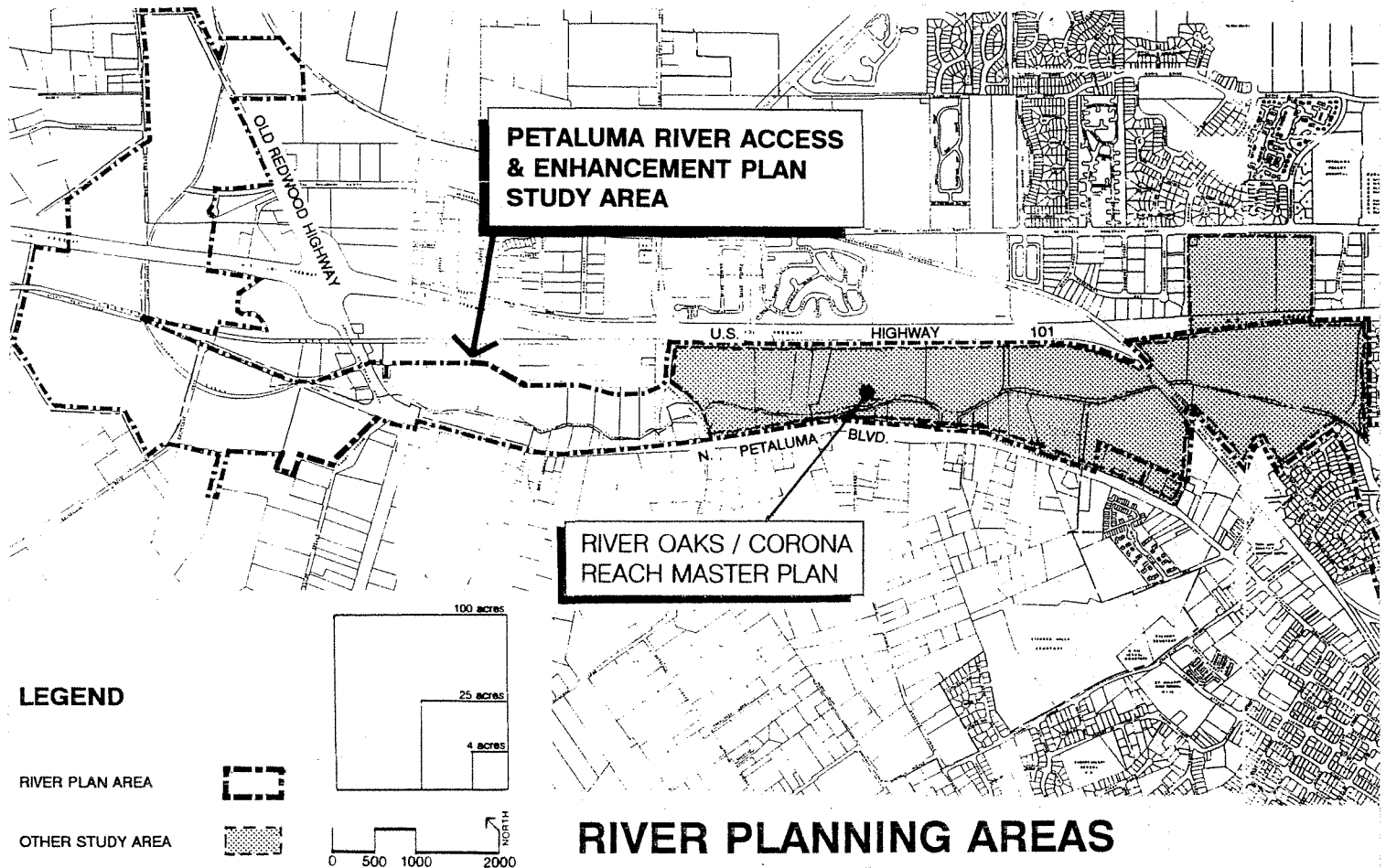
Most of the river planning area (96 percent) is located within the Petaluma General Plan **urban limit line**, which denotes those unincorporated lands whose annexation to the city is anticipated. There are only three parcels in the designated river planning area which are located outside of the current urban limit line (near Stony Point Road), and not formally subject to Petaluma General Plan policies. Their inclusion in this plan was desired to treat the river as a whole and avoid gaps in the ultimate vision for the use and improvement of the river frontage. Although the Sonoma County General Plan provides land use direction for these three parcels, it is hoped that the River Plan will influence the County to also consider the river as a continuous system that crosses political boundaries.

### 2.3 GENERAL PLAN GOALS FOR THE RIVER

The Petaluma General Plan 1987-2005 describes the Petaluma River as a resource to be preserved, seen, and used in one of the seven Central Goals and in the three River Goals. Enhancement of the river is also a key component for most of the other Central Goals, including projects to mitigate the 100-year flood, open space preservation, economic development, convenient transportation systems, and improved quality of developments. The following Central Goals of the 1987-2005 General Plan, quoted from that document, are directly relevant to the River Plan:

*\* IMPROVE THE QUALITY OF NEW DEVELOPMENT, AND ADD CHARACTER TO EXISTING NEIGHBORHOODS, AND PRESERVE HISTORIC DISTRICTS AND STRUCTURES.*

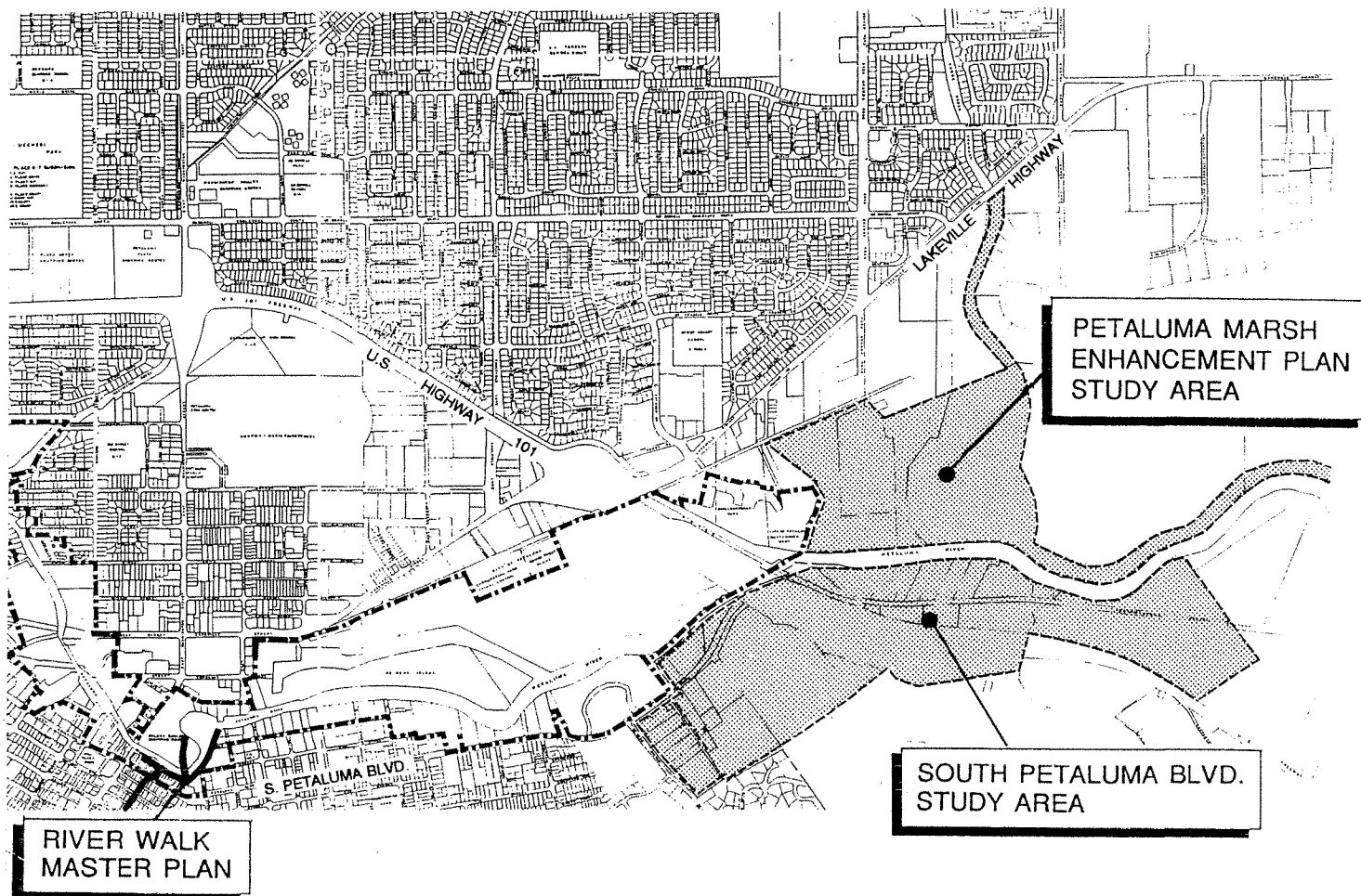
This General Plan goal recognizes the relationship between preservation of the community's historic character and its economic viability. Many of the city's significant historic structures, interesting neighborhoods, and natural features are found along the river, including the downtown core. Guidelines for the quality of future development within the river



corridor, a significant amount of which will be subject to new development and redevelopment, are provided in the River Plan. Recognition and preservation of significant and interesting features are integral aspects of this plan.

**\* ENHANCE THE PETALUMA RIVER AS A RESOURCE TO BE PRESERVED, SEEN AND USED.**

The General Plan recognizes that the health, beauty and accessibility of the Petaluma River will benefit the entire community in almost every aspect. The economic, social, cultural and environmental fabric of the city is tied directly to the treatment of the river.



**\* PURSUE MITIGATION OF THE 100-YEAR FLOOD.**

The General Plan commits the city to adopt the most reasonable, sensitive, and effective proposals of the Sonoma County Water Agency's 1986 Petaluma Watershed Master Drainage Plan. Although the River Plan is not a flood control plan, the flood channel work proposed through other processes has been coordinated with this plan. It is likewise assumed that flood managing modifications to the river channel will proceed and that access and enhancement opportunities specified in this plan will be considered during the flood planning and design process.

**\* ATTRACT JOBS THAT WILL EMPLOY PETALUMANS; ENHANCE DOWNTOWN AS THE COMMUNITY'S BUSINESS CENTER; NEW DEVELOPMENT SHOULD PAY FOR ITSELF.**

A central feature of the River Plan is the improvement of the riverfront in a manner that attracts investment, creates jobs and improves property values along the length of the river. Treatment of the river as a pivotal attraction will have a beneficial spin-off effect on the general prosperity throughout the entire community, not just the river corridor. A special emphasis of the plan is in the downtown waterfront area, a prime local and regional destination treated as the catalyst for the rest of the riverfront developments.

Implementation of this river plan relies upon a combination of public and private investment, directed first toward river related improvements in the downtown area. Additional private investment will be concentrated on site improvements that primarily benefit a specific property, but contribute incrementally to the whole.

**\* MAKE IT EASY TO TRAVEL IN AND AROUND PETALUMA; TIE ALLOWABLE DEVELOPMENT INTO THE CAPACITY OF ROADWAYS; PREVENT INTRUSION OF NON-NEIGHBORHOOD TRAFFIC INTO NEIGHBORHOODS; DEVELOP COMPREHENSIVE TRANSIT AND BIKEWAY SYSTEMS.**

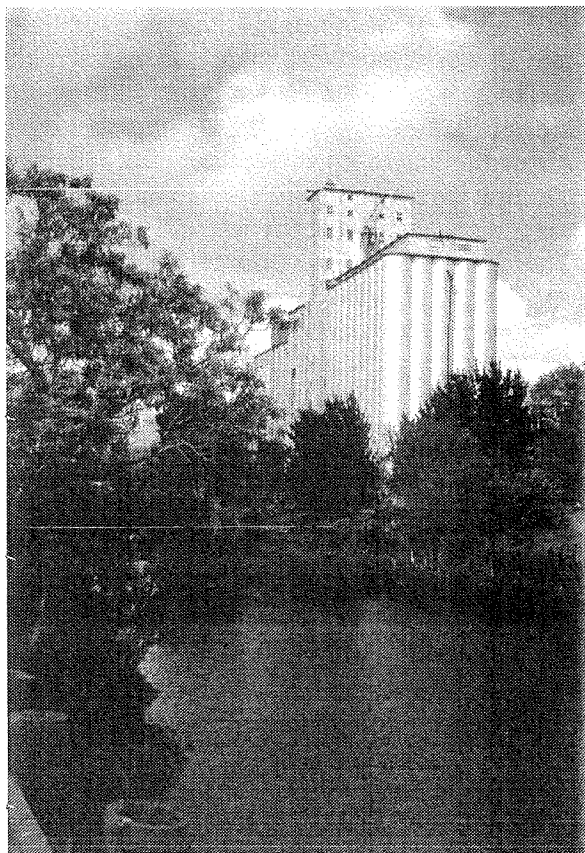
This plan shows how the linear river corridor will provide the backbone to a continuous and convenient off-road transportation corridor with connections to parks, many workplaces and shopping areas, and other significant activity areas throughout the City. Coupled with secondary trails along creeks and roadways, this pedestrian/bicycle network offers a viable alternative to automobile travel, serves local businesses, and provides significant recreational amenity for residents, employees, and tourists alike.



*Petaluma Adobe State Historic Park, located along Adobe Creek, and other regional facilities will be linked to the river via a pedestrian and bicycle trail network.*

**\* CREATE A SYSTEM THAT PRESERVES OPEN SPACE WITHIN AND OUTSIDE OF PETALUMA. USE THE SYSTEM TO TIE TOGETHER OPEN SPACES AND ACTIVITY CENTERS.**

The River Plan proposes a 6.5-mile-long 300-acre linear open space system linked to neighborhoods, commercial centers, and other open spaces throughout the city and into the regional park and trail complex. The plan provides the framework for the preservation of the river corridor as a habitat area, recreation system, and low impact transportation link to all the components.



*Dairyman's Feed, an architectural icon representing the heritage of the agricultural economy of the region, is an important feature of the river greenway and the river-oriented development zone.*

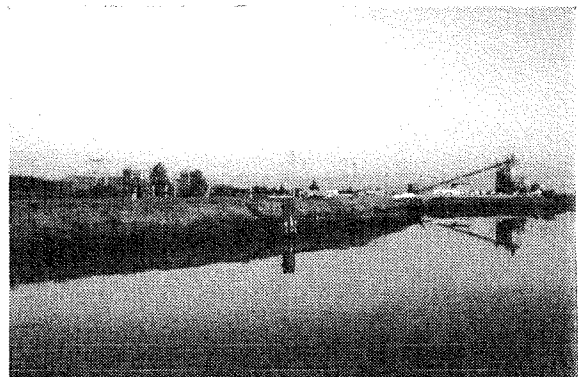
The following are the specific River Goals from General Plan Chapter 5, The River:

**Goal 1. DEVELOP RECREATIONAL AND CULTURAL OPPORTUNITIES ALONG THE PETALUMA RIVER IN A MANNER SENSITIVE TO THE ENVIRONMENT.**

**Goal 2. PRESERVE AND PROTECT THE PETALUMA RIVER AND STREAMS IN THEIR NATURAL STATE AS OPEN SPACES, NATURAL RESOURCES AND HABITATS.**

**Goal 3. MAINTAIN THE PETALUMA RIVER AS A NAVIGABLE RIVER TO THE HEAD OF NAVIGATION.**

These goals provided guidance for the river planning process. This plan is consistent with and helps achieve these goals.



*A public park and trail at McNear Peninsula (on the left) with a restored salt marsh at its edges and a navigable shipping channel will become Petaluma's central public amenity.*

## 2.4 PLAN FORMULATION PROCESS

### 2.4.1 FIVE PHASE PROCESS

This plan was developed using a progressive five phase process beginning with a reconnaissance of the plan area and culminating in a Final Area Plan. The work of each phase was summarized in reports, copies of which are available for review at the Petaluma Planning Department and Petaluma Public Library.

The planning process relied heavily on public input through use of committees, public workshops, neighborhood meetings, wide distribution and review of background reports, and public hearings. The general public, regulatory agencies, and civic organizations were invited to participate in each phase of the planning process. What follows is a description of each planning phase.

### I. Inventory and Analysis

The existing conditions of the river corridor were described to provide baseline data from which proposed alterations or regulations could be developed. The Existing Conditions Report (February, 1992), the product of this phase, assessed the following attributes of the planning area:

- \* Opportunities and constraints of the river hydrology and biology;
- \* Existing planning context and regulatory environment;
- \* Landscape architecture, architecture and urban design;
- \* Financing and implementation opportunities.

A public tour of the entire planning area and public workshop were held to identify key issues of concern, to communicate the analytical findings of the studies, and to receive public input. The Technical Advisory Committee (TAC) was convened to discuss regulatory agency concerns and regulations. The Citizen Advisory Committee (CAC) met regularly to provide information, develop project goals, and review public input.

## PLANNING PROCESS

### I ANALYZE EXISTING CONDITIONS

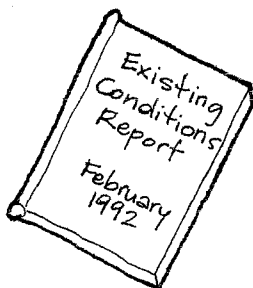
- Citizens Advisory Committee
- Technical Advisory Committee
- Neighborhood Groups
- Project Walk-Through and Workshop
- Property Owners

### II DEVELOP ALTERNATIVES

- Citizens Advisory Committee
- Technical Advisory Committee
- Neighborhood Groups
- Public Workshop
- Property Owners

### III DEVELOP PRELIMINARY FINANCIAL ANALYSIS AND PREFERRED SCHEMATIC PLAN

- Citizens Advisory Committee
- Technical Advisory Committee
- Property Owners





**II. Alternative Access and Enhancement Concepts**

This phase explored:

- \* Alternative approaches to an overall river access system;
- \* Options for access in specific segments and properties;
- \* Variations in approaches to natural system enhancements;
- \* Alternate urban design improvements.

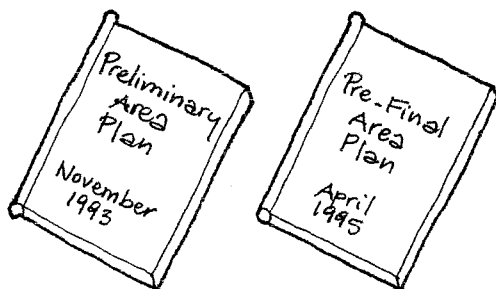
The alternatives were identified from community, CAC, and staff input based upon the characteristics, opportunities, and constraints of the corridor identified in the prior phase. A second widely advertised public workshop and another Technical Advisory Committee meeting were held during this phase in order to review the alternatives and to receive additional input. The Alternatives Report (June, 1992) is the product of this phase. The preferences that were expressed by the CAC formed the basis of the next phase.

**III. Preferred Schematic Plan**

The Preferred Plan and Preliminary Financial Analysis (April, 1993) was developed from the public's and committees' review of the alternatives. Strategies for financing and implementing the preferred plan were developed and reviewed by city staff and the Citizen's Advisory Committee.

**IV PREPARE PRELIMINARY PLANS**

- Citizens Advisory Committee
- Technical Advisory Committee
- Public Hearings



**IV. Preliminary Area Plan**

The Preferred Schematic Plan was refined over a long period of time to better reflect community concerns and priorities, the Citizen Advisory Committee's preferences for content and presentation, and the continually changing regulatory environment. This process formed the basis for the Preliminary Area Plan. CAC review resulted in the interim Pre-Final Area Plan, a text-only document.

**V. Draft and Final Area Plan**

Subsequent editorial review by the CAC and staff resulted in the consensus Draft Area Plan that was brought before city boards and commissions for public hearings integral to the adoption of an official Area Plan. The Draft Area Plan was reviewed by the Planning Commission; Recreation, Music, and Parks Commission; Site Plan and Architectural Review Committee, and City Council prior to adoption.

The final Area Plan is a revision of the Draft Area Plan and reflects additional input received during the public hearings and environmental review process. Adopted by the City Council as a reference document to the Petaluma General Plan 1987-2005, the Area Plan is become official policy of the City of Petaluma.

**V PREPARE FINAL PLANS**

- Public Hearings
- City Council Approval



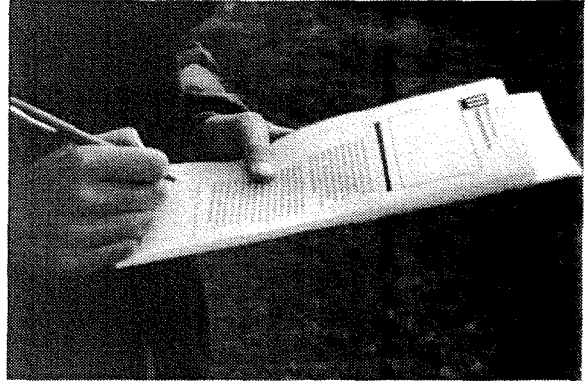


### 2.4.2 PUBLIC PARTICIPATION

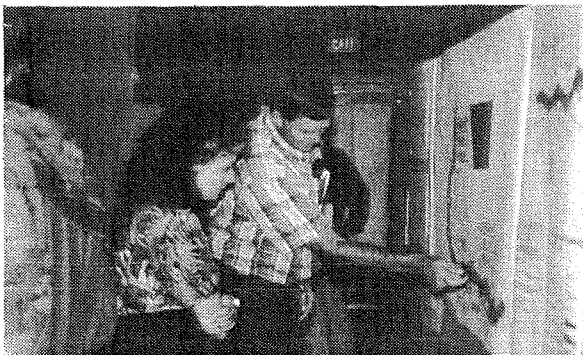
The public participated extensively in various forums throughout the preparation of this plan, as described below.

#### Citizen Advisory Commission (CAC)

This City Council-appointed task force, numbering 19 members throughout most of the planning process and representing a cross section of the Petaluma community, was the focus of the public input process. They met routinely in public, advertised **CAC Meetings** to review material at each phase of the process, and gave direction to the staff and planning team. The CAC sponsored a series of thirteen **Neighborhood Meetings** for riverfront property owners affected by the emerging river plan. Additional meetings and site visits were made to resolve site specific issues. The CAC also hosted a series of three community-wide **Public Workshops** at different stages of the project, including one with a bus and walking tour of the river corridor. Nearly all CAC related meetings were videotaped and the tapes made available to anyone interested. The Area Plan reflects the recommendations of the CAC.



*Comments written in workbooks during the walk-thru workshop influenced the plan.*



*Participants at one of the community workshops.*



*The CAC, members of the public, staff, and consultants during a field workshop in the Upstream Segment.*

**Technical Advisory Committee (TAC)**

This loose-knit group representing 21 government agencies and other interest groups with special technical expertise was formed to review and comment on the emerging plans. All TAC members were informed of other public meetings, were provided all work products, and invited to comment on all aspects of the plan as it emerged. TAC Meetings with the consultants and staff were held at critical junctures to review and comment in a group setting on specific material. In addition, TAC members conducted independent site visits and provided data for the consultants and CAC. The input from the TAC members, reflecting their regulatory and technical knowledge of the river, was especially valuable in creating an integrated multi-objective plan. TAC involvement will facilitate implementation of the plan since these same agencies will remain involved throughout the permit and construction phases.

**Public Hearings**

Formal public hearings on the Draft and Final plans were held by the **Planning Commission** and the **City Council**. Each of these entities has review and approval responsibilities for amendments to the city General Plan. Other city commissions interested in the river corridor, such as the Recreation, Music and Parks Commission and the Site Plan and Architectural Review Committee also met in public sessions to review and comment on the plan prior to its adoption.

**2.5 PLAN AMENDMENT  
PROCESS**

As time goes on and circumstances along the river change, the city may determine that it is necessary to revise portions of this river plan and/or General Plan to reflect these changes. Amendments may be initiated by staff, city commissions, the City Council, or property owners affected by the plan.

State law requires that any decision on a General Plan amendment or Area Plan must be supported by findings of fact. The following findings must be made for any future amendment to a regulatory section of this plan:

- a. The proposed amendment is deemed to be in the public interest.
- b. The proposed amendment is consistent with the rest of the Petaluma River Access and Enhancement Plan and the General Plan.
- c. The proposed amendment has been processed in accordance with the applicable provisions of the California Government Code and the California Environmental Quality Act (CEQA).



*Downtown Petaluma at the Turning Basin of the Petaluma River looking southwest, 1986. Activating and revitalizing the downtown waterfront is the centerpiece of the River Plan.*

## **PLAN REGULATIONS & MANAGEMENT**

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## CHAPTER 3.0

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**"...A balance of uses..."**

Participant in Neighborhood Meeting, 1992

The River Plan creates a new set of land use regulations that range from broad systemwide goals to site-specific programs, or statements of mandatory actions. These directives are used by city decision-makers to review development proposals for conformity to this community's vision of the future. This chapter describes this new regulatory framework as well as the collective dream for the Petaluma waterfront.

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# GOALS, OBJECTIVES, POLICIES, AND PROGRAMS

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## 3.1 PLAN GOALS

The Petaluma General Plan 1987-2005 acknowledges the role of the river as a central defining feature of the city and calls for a comprehensive vision of the river. The River Plan satisfies this directive by creating a long range plan for riverfront improvements.

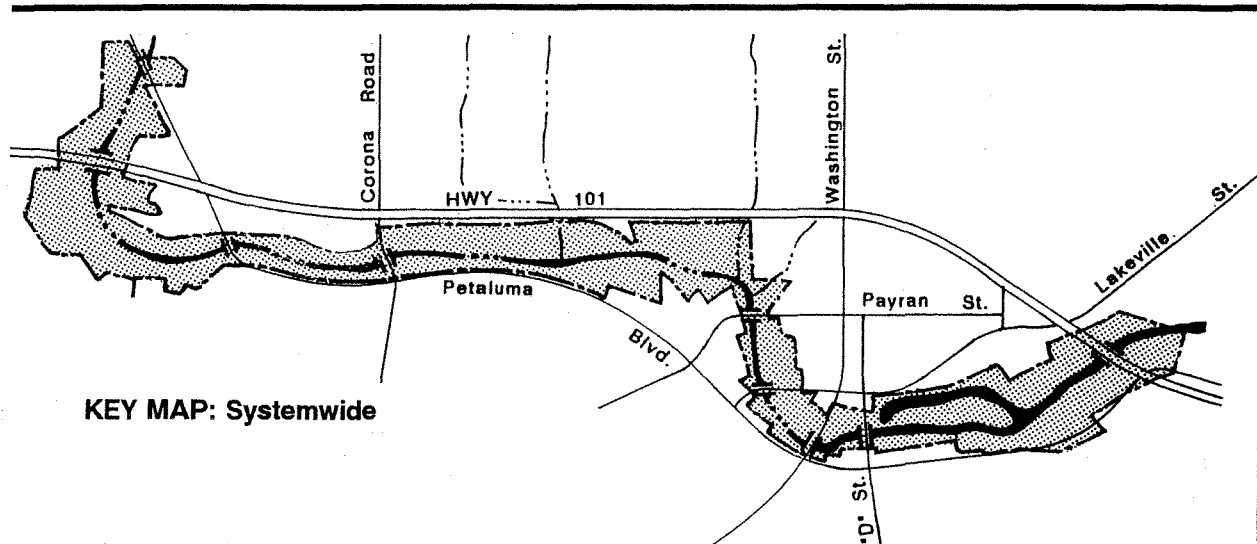
River-related goals contained in the General Plan are reaffirmed and the means of achieving those goals clarified by the river plan. Similarly, the land uses defined by the General Plan for the properties located within the river corridor have been accepted as a given. This plan, however, adds new requirements to the development of properties to improve their relationship to the river.

### 3.1.1 CITIZEN'S ADVISORY COMMITTEE GOALS FOR THE RIVER CORRIDOR

At the beginning of the river planning process, the Citizen's Advisory Committee (CAC) established a clear set of directives to guide the formulation of the comprehensive plan. As the plan took form and related data and community input was gathered, these directives were refined and ultimately adopted as goals for the area covered by this plan. These goals are listed below. Immediately following this list is a discussion of the objectives and policies which can be applied throughout the river corridor.

#### GOALS FOR THE RIVER CORRIDOR

1. *MAINTAIN THE NAVIGABILITY OF THE PETALUMA RIVER.*
2. *IMPROVE FLOOD CONTROL.*
3. *PROMOTE BALANCED USE OF THE RIVER CORRIDOR.*
4. *RESTORE, CREATE AND PROTECT NATURAL HABITATS, AND ENHANCE NATIVE VEGETATION ALONG THE RIVER CORRIDOR.*
5. *EXPAND PUBLIC ACCESS TO AND AWARENESS OF THE RIVER.*
6. *ASSURE PERMANENT MAINTENANCE AND PROMOTE PUBLIC SAFETY ALONG THE RIVER.*
7. *CREATE GUIDELINES TO INTEGRATE DEVELOPMENT INTO THE RIVER CORRIDOR.*
8. *PRESERVE THE ECONOMIC VIABILITY OF PROPERTY WITHIN THE RIVER CORRIDOR.*
9. *IDENTIFY SOURCES AND STRATEGIES FOR FUNDING AND IMPLEMENTING THE PETALUMA RIVER ACCESS AND ENHANCEMENT PLAN.*



**"The Petaluma River should be a place of activity and a source of open space and vistas for all Petalumans. The City should provide public access to the river and open up views along its full length."**

Petaluma General Plan 1987-2005

**"Linear public access to the river should be perhaps the major focus of the River Plan."**

Participant in Community Workshop, 1992

## 3.2 SYSTEMWIDE DIRECTIVES

The following objectives, policies, and programs apply to the entire River Corridor. They are grouped according to themes represented by the goals listed above.

### 3.2.1 NAVIGABILITY

Navigability is essential to the continued viability of the river as a commercial and recreational transportation route. Periodic dredging of silt and debris from the downtown to the San Francisco Bay is required in order to maintain navigability. The cost of dredging has so far been borne by the U.S. Army Corps of Engineers since the high commercial tonnage of goods shipped along the river is enough to justify the federal expenditure. Without this shipping activity, the city must find other justification for the federal expenditure or create a method of paying locally for this expensive work. River dependent businesses also help supply the city with a more varied workforce and economy, support services for other industries, and an interesting active waterfront reminiscent of the early days of the city. Therefore, support of the riverfront industries that ship and/or depend on shipping is a high priority.

**NAVIGABILITY OBJECTIVES**

- (1.1) CONTINUE TO SUPPORT MAINTENANCE OF THE PETALUMA RIVER AS A NAVIGABLE CHANNEL FROM THE TURNING BASIN TO SAN FRANCISCO BAY FOR COMMERCIAL AND RECREATIONAL PURPOSES.***
- (1.2) SUPPORT AND ENCOURAGE CONTINUATION AND EXPANSION OF RIVER-DEPENDENT ACTIVITIES AS AN IMPORTANT ECONOMIC BASE FOR THE CITY AND TO HELP JUSTIFY CONTINUED U.S. ARMY CORPS OF ENGINEERS DREDGING OF THE RIVER.***
- (1.3) PLAN PUBLIC ACCESS IMPROVEMENTS IN WAYS THAT DO NOT CONFLICT WITH R I V E R - D E P E N D E N T INDUSTRIAL/COMMERCIAL OPERATIONS.***
- (1.4) PRESERVE AND EXPAND UPON THE CITY'S CULTURAL AND ECONOMIC HERITAGE OF WATERBORNE TRANSPORT.***

**NAVIGABILITY POLICIES**

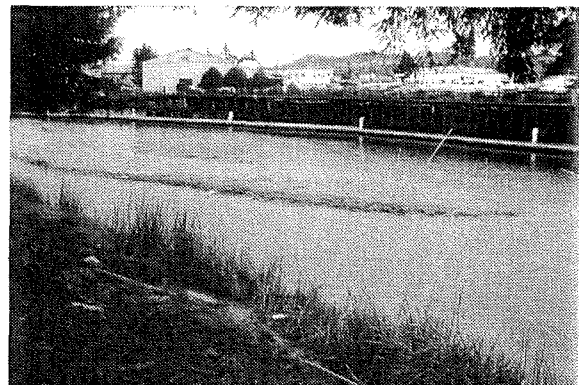
- 1. The City should use its land use and development review authority to support and encourage continued and expanded activities dependent upon river navigation.***

The methods of supporting river-dependent activities include appropriate zoning regulations, reservation of waterfront industrial land use designations, site design to allow future shipping access on the water, and favoring long-term industrial commercial uses over immediate opportunities for public access.

**3.2.2 FLOOD REDUCTION**

This plan is not a flood control plan; rather it acknowledges that flood protection measures are recommended by the General Plan, assumes these measures will proceed, and provides policy direction on how flood protection could better meet the community's multiple goals and objectives for the waterfront.

Flooding is a significant factor to be reckoned with, particularly in the reaches upstream of the historic downtown. Flooding constrains potential development of many riverfront properties, and is a hazard to existing homes and businesses located near the river in low-lying areas. There is general consensus within



*Siltation in the Turning Basin, in this case after the 1994-95 storms, required dredging to maintain a clear channel.*

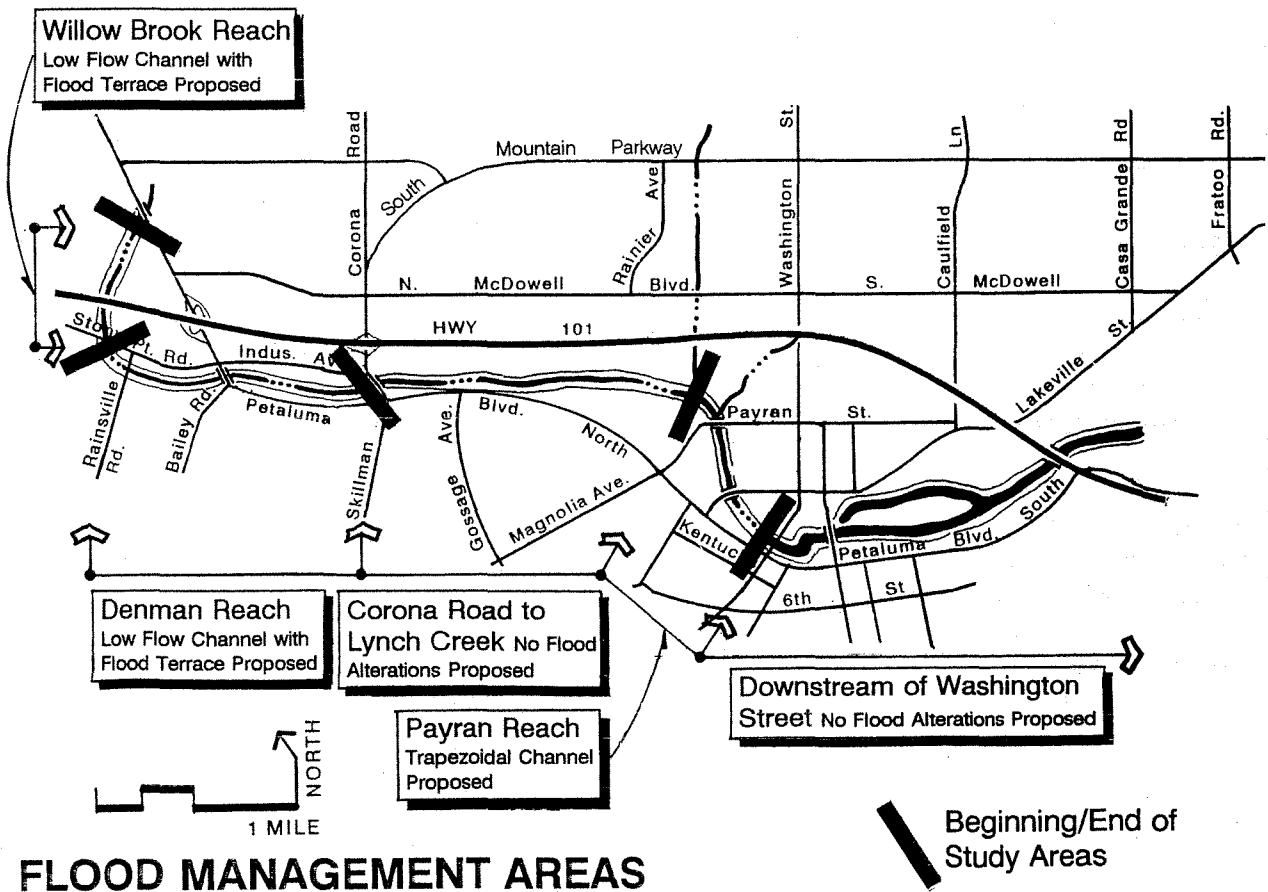


*Jerico Products, which is responsible for most of the commercial barge traffic on the river, and other riverfront industries require a navigable channel to the Bay.*

the City to improve the level of flood protection, and to do so in as environmentally sensitive a manner as possible. City policies regarding flood protection are described in the General Plan. Prior to initiation of the River Plan, investigation and design of flood protection projects were begun by the City with assistance by the Sonoma County Water Agency and the U.S. Army Corps of Engineers. In 1986, the Water Agency's Petaluma Watershed Master Drainage Plan and subsequent studies suggested that the most cost effective, environmentally responsible method to provide flood protection was the channelization of certain sections of the river. The Corps of Engineers, with City assistance, developed a plan for the Payran Reach while the City independently

continued pursuit of increased flood protection in the Denman and Willow Brook Reaches of the river.

Although proceeding on different planning tracks, policy and design information has been shared between the flood control and river planning parties. Preliminary designs for flood control channels were reviewed by the Citizen Advisory Committee and Technical Advisory Committee and incorporated into this plan.





FLOOD MANAGEMENT OBJECTIVES

- (2.1) *ENCOURAGE THE DESIGN OF FLOOD PROTECTION ALTERATIONS IN AS ENVIRONMENTALLY SENSITIVE AND AESTHETICALLY PLEASING A MANNER AS POSSIBLE.*
- (2.2) *FLOOD PROTECTION MEASURES SHOULD ACCOMMODATE THE ENHANCEMENT AND/OR RESTORATION OF A CONTINUOUS RIPARIAN HABITAT, REPAIR AND PREVENT BANK EROSION, AND PROVIDE SEGMENTS OF THE TRAIL SYSTEM WITH MAINTENANCE ROADS, MAXIMUM REPAIR AND UTILITY OF THE CHANNEL SHOULD BE INCORPORATED INTO PROJECT DESIGNS WHEREVER FEASIBLE.*
- (2.3) *ENCOURAGE THE USE OF FLOOD CHANNEL MAINTENANCE RIGHTS-OF-WAY AS PUBLIC ACCESS TRAILS, DESIGNED TO THE STANDARDS AND LOCATIONS DESIGNATED IN THE RIVER PLAN.*
- (2.4) *ENCOURAGE THE DEVELOPMENT OF PROGRAMS IN WHICH CITIZENS CAN PARTICIPATE IN CHANNEL MAINTENANCE.*

Local residents and businesses can provide valuable assistance through the regular clean-up of debris, tree limbs and other material that may block channels, cause flooding or bank erosion, or degrade habitat. Many environmentally sensitive maintenance techniques are labor intensive. Public participation will help make these activities possible for larger areas, reduce costs, and promote community stewardship of the river corridor.

FLOOD MANAGEMENT AND BANK STABILIZATION POLICIES

1. *In-channel and channel bank public access structures should not increase flood elevations.*
2. *Remove old pier pilings from the channel where they obstruct navigation, or interfere with channel maintenance or construction of public use structures.*
3. *Replace older, failing wooden or sheet pile bulkheads when they obstruct navigation, interfere with channel maintenance or construction of public use structures, and pose a safety hazard.*
4. *Inter-plant rip-rap or replace rip-rap with planted erosion control blocks or other vegetative/structural means of bank stabilization. Use of new rip-rap for bank slope protection is discouraged in favor of biogeotechnical approaches outlined in Chapter 5.*

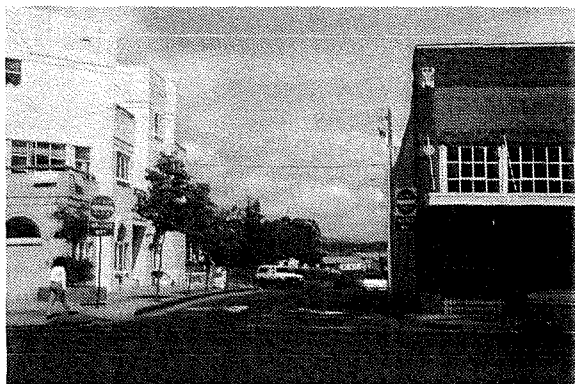
FLOOD MANAGEMENT AND BANK STABILIZATION PROGRAMS

- Ia. *Maintain river channel capacity whenever new structures or fill are added by excavation or removal of other channel constraints.*
- Ib. *Coordinate removal of old pier pilings and bulkheads with construction of new public access and bank protection structures to streamline permit process and incorporate mitigation into the project design.*

### 3.2.3 BALANCED USE

Petalumans value the diversity of activities that occur along the river. As encouraged by the city's General Plan, new and existing waterfront residential, commercial, industrial, agricultural, and mixed use developments, as well as stretches of mature riparian habitat and open spaces, add to the interest and vitality of the river corridor. Along the corridor one can find the history of Petaluma, witness our future unfolding, and discover a sense of place.

The downtown riverfront, already an attractive destination, should become an even more inviting draw to residents and visitors alike, while quiet natural areas and riverfront commerce can still be protected and expanded. The River Plan seeks to maintain the balanced variety of experiences and activities within the river corridor and yet provide a unifying theme and sense of place that is still uniquely Petaluma. The recommendations contained in this plan are based on General Plan policy and land use designations, and data collected throughout the planning process from field surveys, citizen and property owner input, and regulatory agencies.



The river, visible from the heart of downtown at the intersection of Western Avenue and Petaluma Blvd., is the focus of Petaluma's diverse activities.

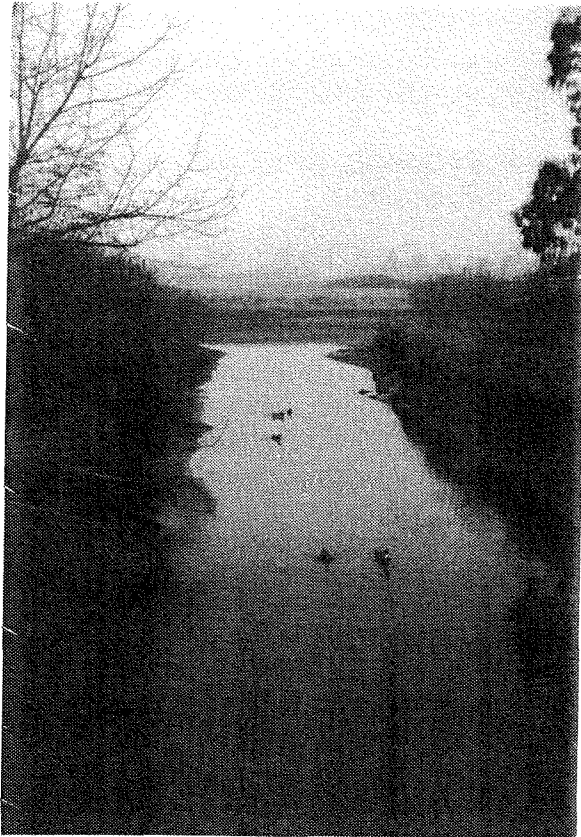
### BALANCED USE OBJECTIVES

- (3.1) *ENCOURAGE THE DEVELOPMENT OF PROPERTIES ALONG THE RIVER CORRIDOR IN A MANNER THAT RESPONDS TO THE RIVERFRONT LOCATION, ENHANCES THE RIVERFRONT ENVIRONMENT, AND PROVIDES PUBLIC ACCESS, AND IS CONSISTENT WITH THE GENERAL PLAN, AS FURTHER DEFINED BY THIS PLAN.*
- (3.2) *ENCOURAGE THE RENOVATION AND RE-USE OF EXISTING FACILITIES ALONG THE RIVER TO REFLECT THE TRADITIONAL WATERFRONT HERITAGE OF THE COMMUNITY.*
- (3.3) *SUPPORT THE CONTINUATION AND EXPANSION OF RIVER-DEPENDENT ACTIVITIES TO MAINTAIN AN AUTHENTIC WORKING WATERFRONT.*
- (3.4) *ENCOURAGE AND SUPPORT RIVER-RELATED ACTIVITIES THAT BENEFIT LOCAL AGRICULTURE.*
- (3.5) *ENCOURAGE RIVERFRONT PUBLIC RECREATIONAL ACCESS AND USES.*

For instance, flexibility could be built into zoning regulations, fees lessened, or public land made available for lease to support small recreational enterprises, like kayak rentals or rowing clubs.

- (3.6) *ENCOURAGE PRESERVATION, RESTORATION AND ENHANCEMENT OF THE RIVER'S NATURAL HABITATS, IN ORDER TO REESTABLISH THE RIPARIAN LANDSCAPE AS AN INTEGRAL AND PROMINENT PART OF THE CITY.*

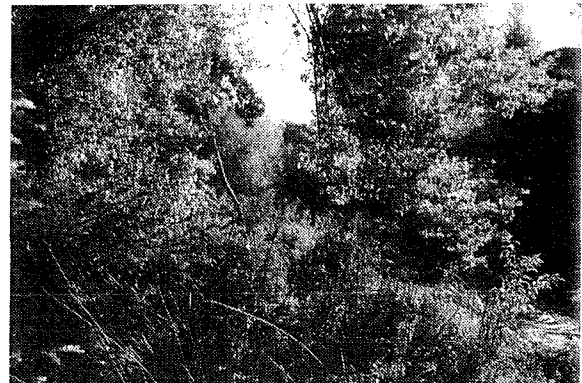
### 3.2.4 NATURAL HABITATS AND NATIVE VEGETATION



*Thompson Creek, at the end of 'F' Street, is a rich brackish water habitat within the densely urbanized downtown warehouse areas.*

The Petaluma River is arguably the City's most important natural resource. Integration of the natural and built environment is a central feature of the River Plan. A healthy natural system along the river is inextricably linked to the health of the community and supports Petaluma's charming rural image. A thriving riparian corridor with clean water, mature shade trees, and healthy birds and fish will benefit everybody!

Developments and public access along the river must be balanced with the protection of the few remaining natural areas and the enhancement of the continuous natural system of the entire river corridor. In the early stages of this planning process, especially high value features and areas of opportunity for improvement to the river corridor were identified (see Existing Conditions Report, 1992 and Alternatives Report, 1992). This plan presents a thoughtful, comprehensive approach to achieving the desired balance of new development/economic vitality and protection of our natural amenities. Recommendations differ by each river segment, described in Sections 3.3 - 3.8 of this plan, to better reflect the variety of circumstances, features and historic conditions encountered along the 6.5-mile river corridor.



*Dense riparian habitat near Corona Reach will be expanded as development occurs.*

**HABITAT AND VEGETATION OBJECTIVES**

**(4.1) PROTECT AND RESTORE HABITAT AREAS, INCLUDING SEASONAL AND PERENNIAL TRIBUTARIES AND WETLANDS, ALONG AND ADJACENT TO THE RIVER AS IDENTIFIED IN THE INDIVIDUAL RIVER SEGMENT DESCRIPTIONS.**

**(4.2) ENCOURAGE CONTINUOUS NATIVE RIPARIAN AND AQUATIC VEGETATION ALONG THE LOW-FLOW CHANNEL, CHANNEL BANKS AND TERRACES TO PROVIDE NATURAL HABITAT FOR LAND AND WATER ANIMALS.**

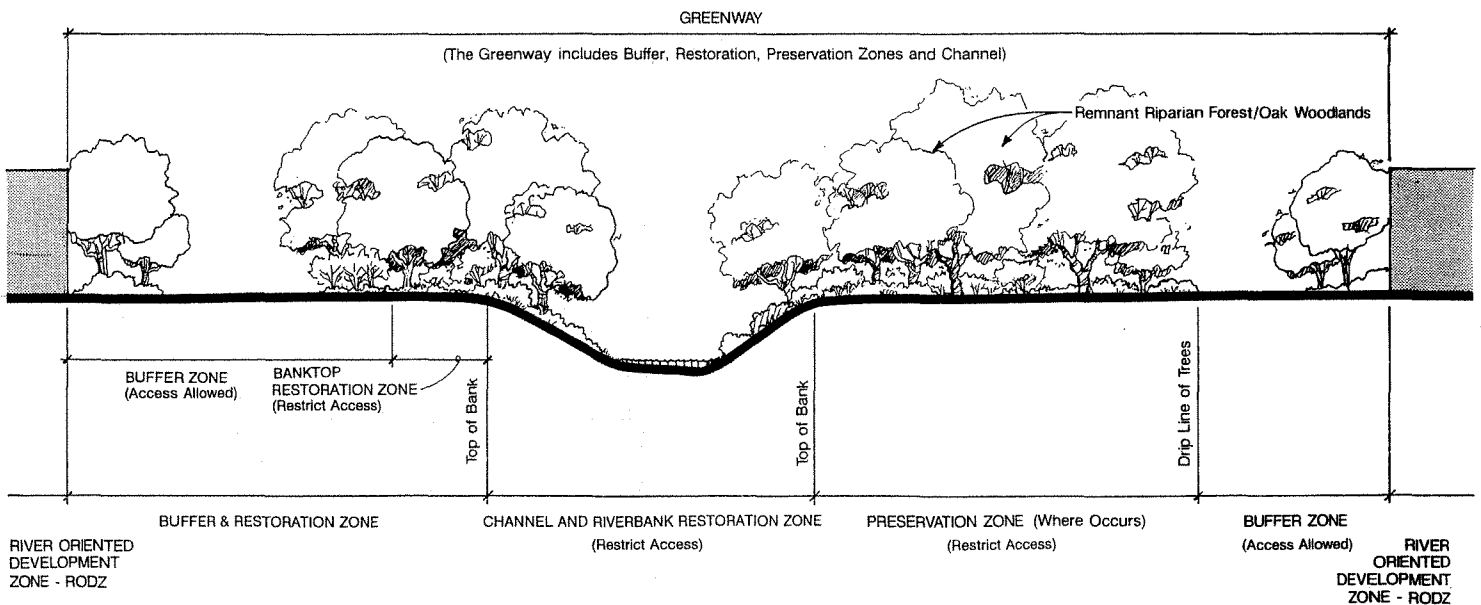
**(4.3) ESTABLISH AND MAINTAIN HABITAT MANAGEMENT ZONES WITHIN THE RIVER CORRIDOR.**

Recommended management guidelines are set forth in Chapter 5: Natural Habitat Management Program for the Channel Bottom, Restoration Zone, Preservation Zone, Buffer Zone and River Oriented Development Zone, defined in the Glossary.

**(4.4) ESTABLISH LOCATIONS FOR HABITAT MITIGATION.**

Areas within the Restoration Zone, Preservation Zone and portions of the Buffer Zone may provide opportunities for restoration through required mitigation in other areas where removal of habitat was necessitated by flood protection measures, new development, or other construction. Money for such restoration may be available from state and federal agencies for construction activities that occurred in other jurisdictions. Mitigation Guidelines are contained in Chapter 8.

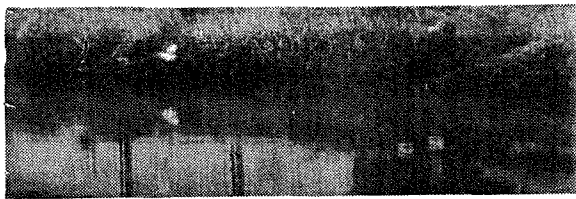
**TYPICAL SECTION - ZONES WITHIN GREENWAY**



**HABITAT AND VEGETATION POLICIES**

1. Encourage habitat continuity linkages to enable "safe passage" for wildlife between the downstream salt marshes and the upstream freshwater riparian areas.

It is important for the overall health of both aquatic and terrestrial areas to promote continuous and effective riparian habitat.



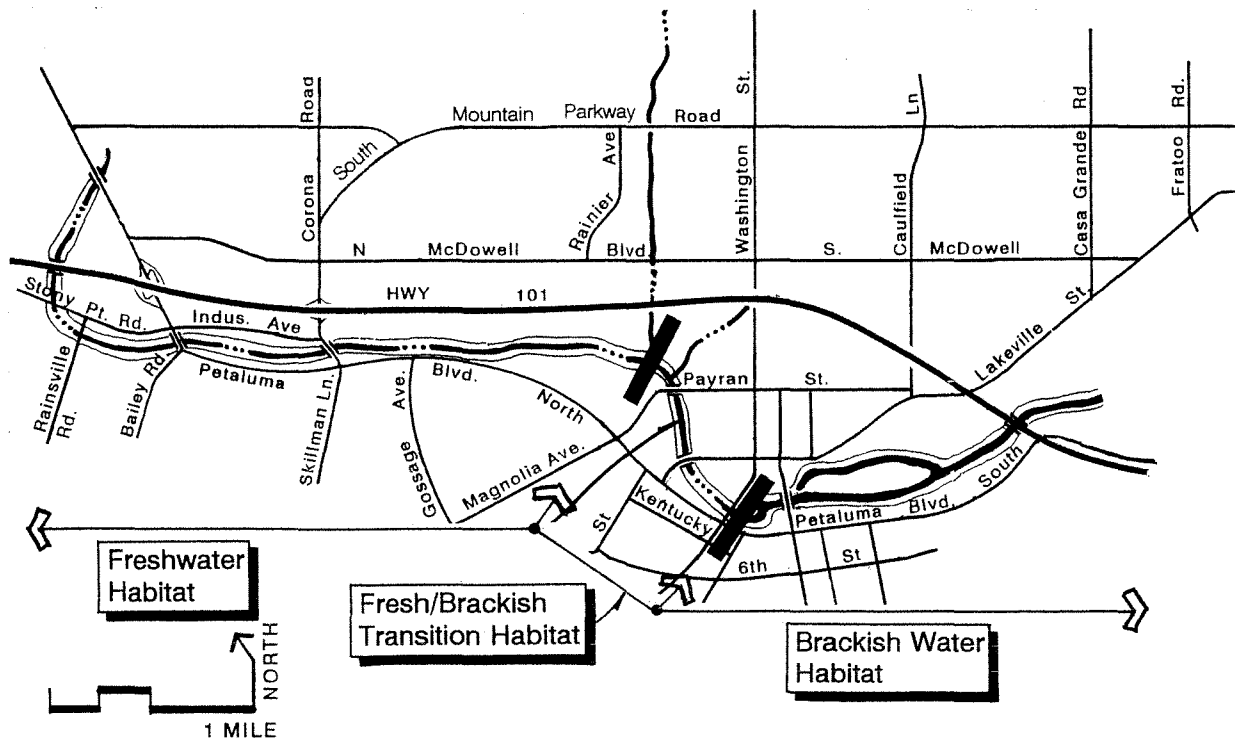
A small ribbon of salt marsh along the downstream reaches provides important habitat linkages.

2. Replace invasive exotic plants of limited habitat value with native or compatible species and plant communities.


Chapter 5 contains recommendations for actions, maintenance and plant species appropriate for different habitat zones (i.e., river channel, channel banks, and upland buffers).

3. Stabilize eroding and erosion-prone banks through the use of biogeotechnical techniques, whenever possible.

Bio-engineering, utilizing native species with good habitat values is preferred over traditional engineered bank stabilization techniques that have minimal habitat values. Examples of preferred techniques are shown in Chapter 5 with supplemental guidelines in Chapter 7.



**GENERAL HABITAT TYPES**

 Approx. End of Habitat Type

***4. Encourage habitat enhancement with flood management alterations.***

Flood control channel alterations may include a shaded low-flow channel, vegetated terraces and banks, and shaded banktops. Post-construction maintenance regimes should discourage indiscriminate use of herbicides and pruning techniques that prevent mature shade-producing vegetation.

***5. Follow maintenance and vegetation management practices which nurture native species, plant communities and are consistent with public safety requirements for flood protection and trail use.***

***6. The City should consider the adoption of local mitigation policies that apply in those circumstances where other agencies have not exercised their jurisdictional authority.***

***7. Confine public access to the least sensitive habitat zones, such as the buffer areas and flood terraces, with only occasional limited intrusions into habitat restoration zones for overlooks and interpretive uses.***

***8. Encourage the establishment and implementation of an urban runoff control program consistent with state and federal goals in order to maintain or improve the quality of the water discharged into the river.***

*Establishment or maintenance of cat and dog colonies within the river greenway are prohibited.*

**WATER QUALITY PROGRAMS**

***8a. Stabilize river banks to minimize erosion and siltation of the river.***

***8b. Maintain a regular street-sweeping and culvert inlet maintenance program, particularly in the months preceding the rainy season.***

***8c. Encourage the use of passive methods of cleaning urban runoff, such as bioremediation in new freshwater wetlands and other forms of natural filtration, where there is sufficient space within the buffers or flood terraces before runoff reaches the river.***

***8d. Riverfront development shall conform to local, state and federal mandates for water quality control and storm water discharge.***

***8e. Encourage "best management practices" in agricultural areas and large paved surfaces to reduce the amount of water contamination and siltation in the tributaries of the river.***

### 3.2.5 RIVER ACCESS AND AWARENESS

**"PEDESTRIAN AND BICYCLE PATHS SHALL BE ESTABLISHED ALONG AND ACROSS THE RIVER AND ALONG MAJOR STREAMS."**

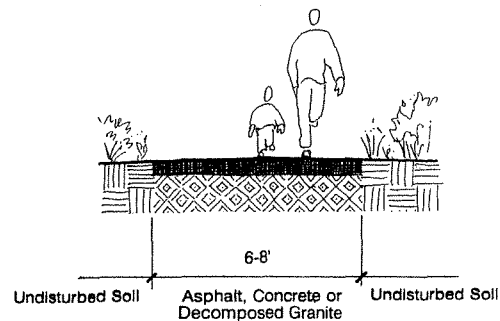
(General Plan Policy #4 of Chapter 5: The River).

Public access is of primary importance in encouraging the public to learn about and experience the rich historical, cultural and ecological values of the river. After much study and public input, the River Plan identifies feasible methods of expanding pedestrian, bicycle and boat access in ways that are balanced with habitat protection, river-dependent industrial and commercial uses, privacy, and security.

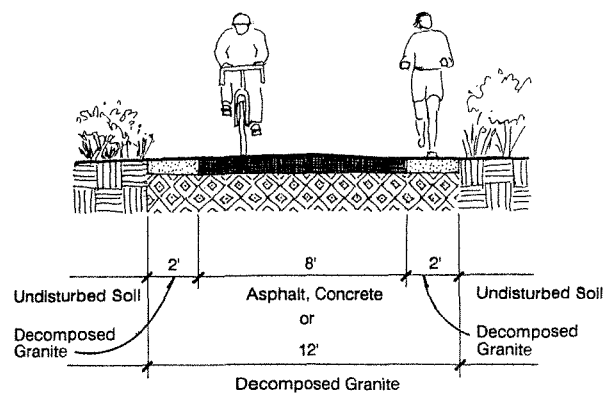
The plan promotes both a near-term access route that is not ideal but provides a continuous trail system within the foreseeable future, and a long-term access route that is closer to the river. The short term route diverges from the river banks in many places to limit potential conflicts between trail users and sensitive natural features, active industrial operations, busy road crossings, and residential areas. Trail diversions from the river should be designed to enhance awareness of the very riverfront activities that cause the diversion. The long term trail should be implemented only as businesses and bank-top structures change to less sensitive uses or locations.

Property owners and developers should take advantage of riverfront access as a local transportation route and a fabulous amenity for tenants and customers. A properly improved river corridor will increase property values, heighten public awareness and stewardship of the river, enable natural functioning of the riparian system, improve safety, and generally make the riverfront a healthier attraction for this community.

Using the trail system will provide a unique way to experience the city from locations not yet available to the public. The trail will be integrated to the natural landscape and to individual site designs, and will impart a favorable sense of place. Trail users will gain a better sense of how the city fits into its geographic location, learn the town's history and develop a better knowledge of how riparian systems work, all while enjoying a pleasant recreational experience, shopping, or merely travelling from one place to the other.

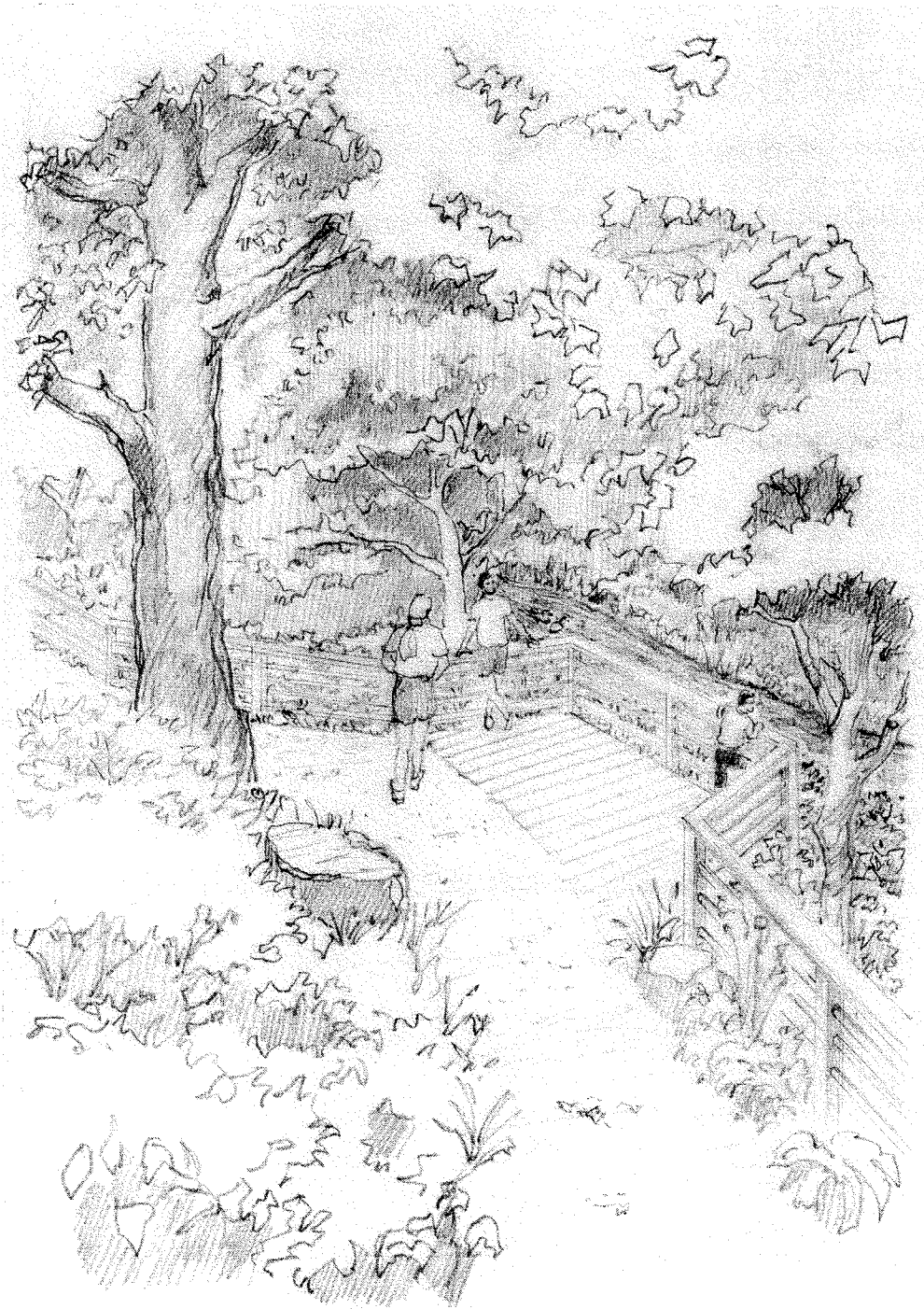


**SECONDARY TRAIL - Pedestrian Only**



**MAIN TRAIL - Multi-Use**

### TYPICAL TRAIL CROSS-SECTIONS



**AN UPSTREAM RIVER OVERLOOK**

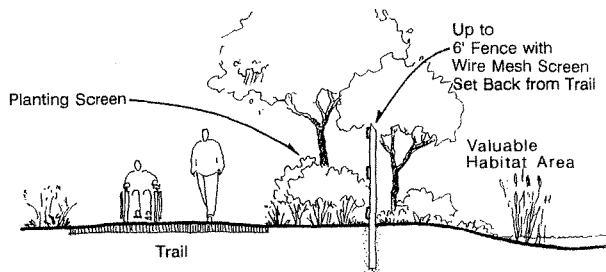
*An overlook of the river's edge offers an opportunity to learn about the freshwater riparian ecosystem and to experience the unique qualities of the densely forested habitat. Overlooks will also provide emergency access to the river.*



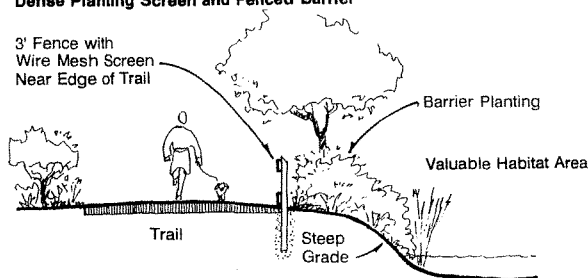
**ACCESS AND AWARENESS OBJECTIVES**

**(5.1) ESTABLISH A CONTINUOUS PEDESTRIAN AND BICYCLE TRAIL SYSTEM AS DESIGNATED IN THIS PLAN.**

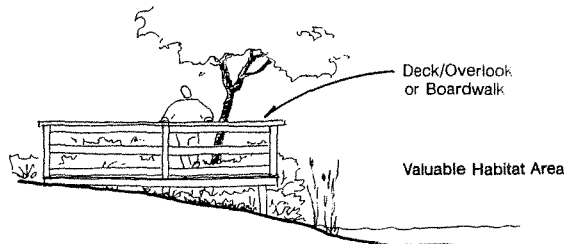
This plan takes a very long-term view towards ultimate completion of the ideal access network. It identifies opportunities for future riverfront access and relies heavily on new development or redevelopment to provide necessary improvements. Short- and longer-term access routes are more clearly identified in the discussions of each river segment.



**TYPE I: FULLY PROTECTED AREAS (no intrusions allowed)**  
Dense Planting Screen and Fenced Barrier



**TYPE II: PROTECTED AREAS (some visual intrusions allowed)**  
Fence, Barrier Plants and Grade Change Where Possible



**TYPE III: CONTROLLED ACCESS, at SELECT LOCATIONS**  
Deck/Overlook or Boardwalk

**TRAIL EDGE TREATMENTS: For Use When Valuable Habitat Is To Be Protected**

**(5.2) CREATE A CONTINUOUS TRAIL AS SOON AS POSSIBLE.**

The city should strive, and developers should plan, to connect trail segments at the earliest possible date to encourage its use. Interim improvements can be allowed, even if they do not meet the standards suggested in this plan.

**TRAIL DESIGN POLICIES**

**1. The following trail design criteria should be implemented whenever feasible:**

- *The trail system shall be accessible to people of all physical abilities and shall conform to the requirements of the Americans with Disabilities Act of 1992.*
- *The main multi-use bicycle and pedestrian trail shall conform to the minimum right-of-way standards set by Caltrans for Class 1 bicycle trails (12 foot overall width, with a minimum eight feet of hard paved surface (such as asphalt or concrete) and two-foot shoulders on each side), but discourage use of the trail by unwarranted motorized vehicles.*

The trail may be wider in areas of particularly heavy traffic. Where there is inadequate space for a multi-use trail or where a combination of uses is undesirable, bicycle and pedestrian uses could be split into separate trails. Main pedestrian-only trails should have at least a six-foot-wide space. Spur trails to overlooks may be only four feet wide.

- *Trails will be hard paved (concrete or asphalt), wood, or paved with crushed rock as appropriate to the context. Where bike trails are combined with a street, Caltrans Class 2 criteria should be met.*
- *Trail bridge design should allow emergency vehicle passage, yet be consistent in design with the character of the river segment.*
- *The trail should meander gently where the space is available to provide a varied open space experience, more visual interest, and more natural appearance.*
- *Provide bicycle parking along the trail at or near major destinations, particularly in the downtown area, at businesses with many employees, and other developments that serve the travelling public.*
- *Maintain design continuity throughout the public trail system.*

Aesthetic continuity can be achieved through a consistent program of integrated signage, interpretive and educational materials, surface materials, light fixtures, railings, trash receptacles, benches and other trail features.

**(5.3) AS OPPORTUNITIES ARISE, ESTABLISH PUBLIC "TRAIL STAGING AREAS" AT CONVENIENT LOCATIONS FOR PEOPLE TO PARK THEIR VEHICLES AND ENTER THE TRAIL SYSTEM.**

Staging areas should include interpretive and informational material about the trail and river corridor, such as regulations and

directions to special features and destinations. Additional facilities, such as restrooms and picnic tables can be provided. Wherever possible, staging areas should be combined with private parking lots in high use areas (e.g. at restaurants or retail areas).

**(5.4) CREATE TRAIL ACCESS POINTS AT THE ENDS OF PUBLIC STREETS THAT TERMINATE AT THE RIVER WHEREVER FEASIBLE. SEATING, PEDESTRIAN LIGHTING, BICYCLE PARKING SIGNS, PLANTING, WATER ACCESS, AND OTHER AMENITIES SHALL BE ENCOURAGED.**

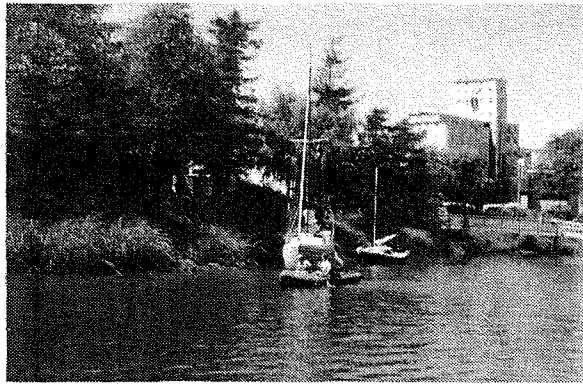
**(5.5) THE TRAIL ALIGNMENT SHALL AVOID NEIGHBORING PROPERTIES ON WHICH THERE ARE CONFLICTS OR POTENTIAL DANGERS TO TRAIL USERS (SUCH AS INDUSTRIAL SHIPPING DOCKS AND PROCESSING FACILITIES).**

Interim trails should be created around conflicting land uses until such time as the land use changes and the desired long-term river trail alignment can be established.

**(5.6) THE TRAIL ALIGNMENT SHALL MAXIMIZE OPPORTUNITIES FOR ACCESS TO COMPLEMENTARY LAND USES (SUCH AS COMMERCIAL, RETAIL, OFFICES, PARKS AND RECREATIONAL USES).**

A well used trail will provide a viable source of customers as well as an amenity for tenants. The economic benefits of having a section of trail on the property can be gained through proper site design, building orientation, and cordial atmosphere.

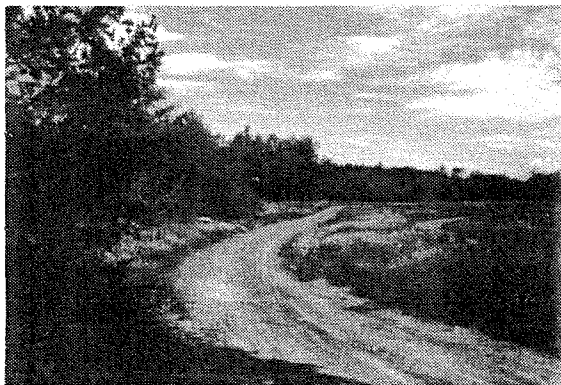
**(5.7) ENCOURAGE CONNECTIONS BETWEEN THE RIVER TRAIL, ACTIVITY AND CULTURAL CENTERS, AND OTHER TRAIL NETWORKS, SUCH AS COUNTYWIDE TRAIL SYSTEMS, BAY AREA RIDGE TRAILS, AND BAY TRAIL.**



Access points to the water and short term docking facilities will encourage a mix of recreational use of the water like this in the Turning Basin.



Access to the riverfront trail will be provided at public streets that terminate at the river wherever feasible, such as at the end of "G" Street, in addition to the staging areas.



The combined bicycle and pedestrian trail will gently meander through the Greenway similar to this service road in the Upstream Segment.

**(5.8) VEHICULAR BRIDGES WHICH CROSS THE RIVER SHOULD BE DESIGNED TO ACCOMMODATE PEDESTRIANS AND BICYCLES.**

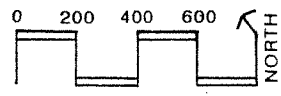
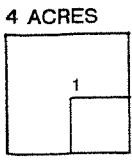
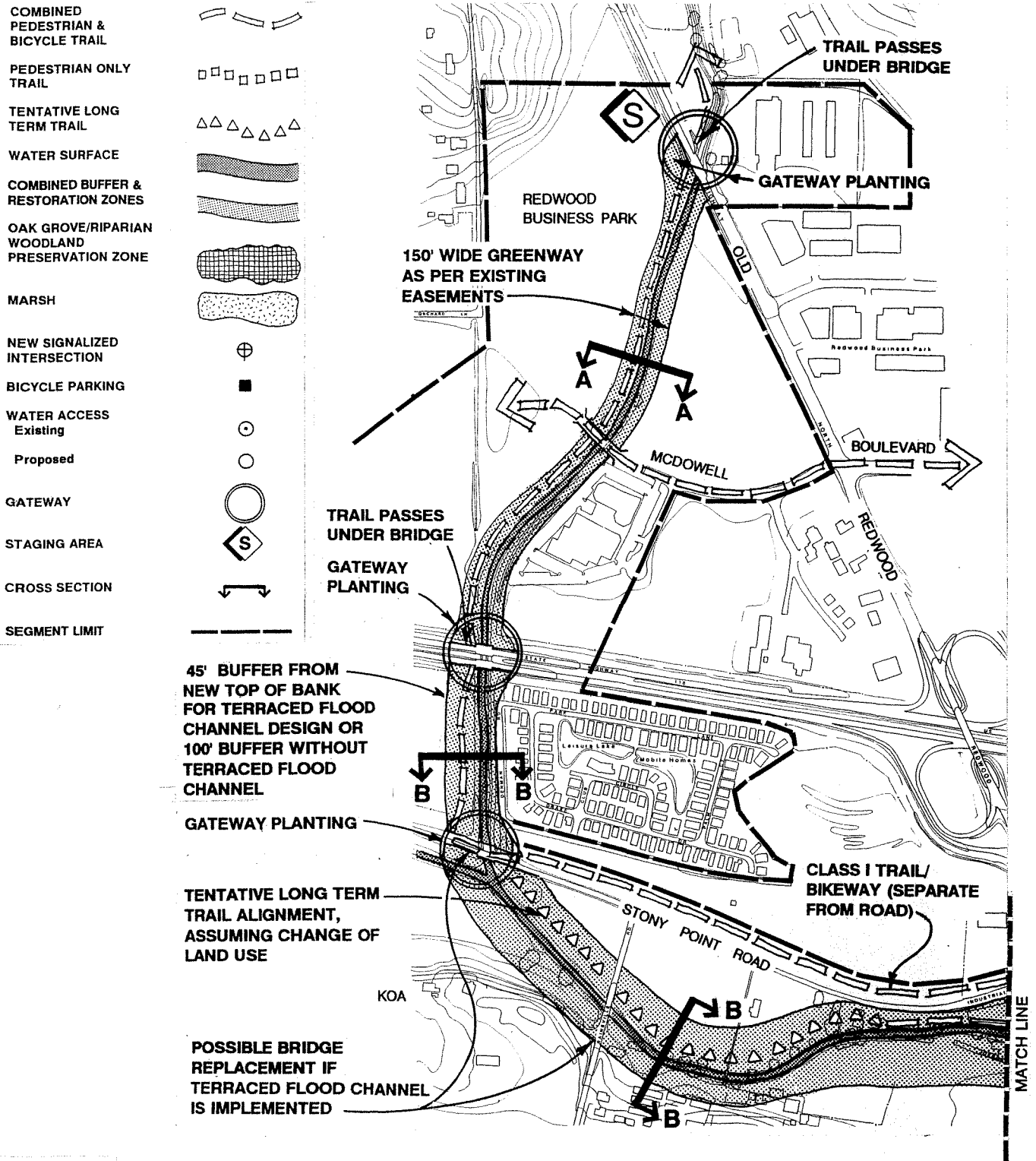
The trails may cross the river on bridges shared with vehicles, and they may also pass under bridges along the river banks. In both instances, bridges should be designed to accommodate the needs of the trail system.

**(5.9) CREATE ACCESS POINTS TO THE WATER'S EDGE TO ENCOURAGE ACCESS BY BOAT AND OTHER WATER CRAFT. SHORT-TERM DOCKING FACILITIES, RIVER-RELATED RECREATIONAL FACILITIES, AND OTHER WATERFRONT AMENITIES SHALL BE ENCOURAGED.**

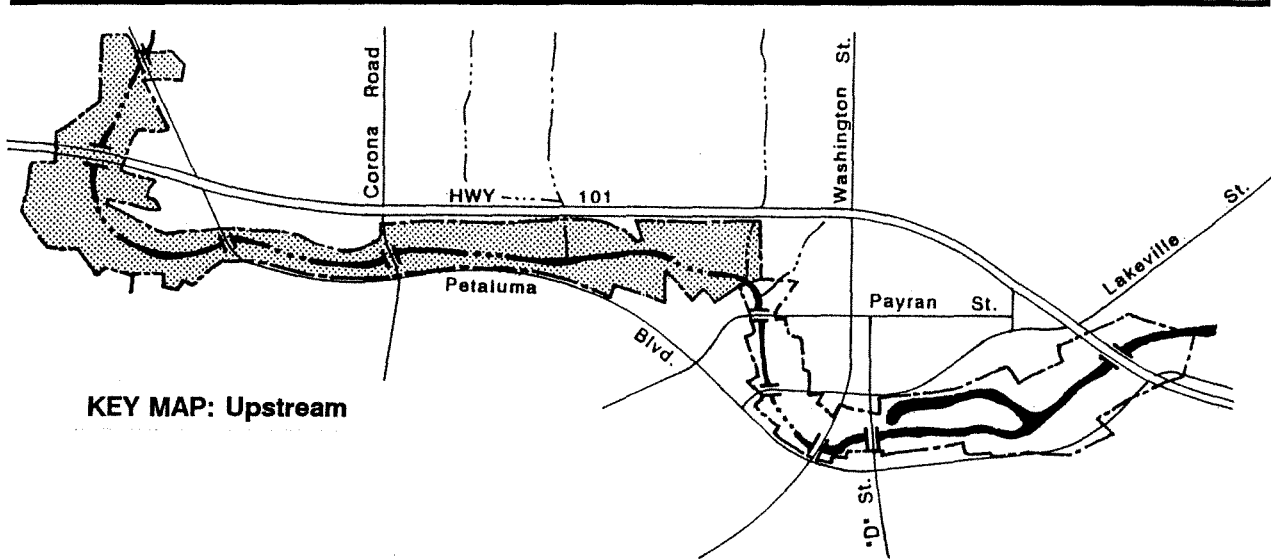
**(5.10) PROVIDE INFORMAL RESTING AREAS WITH SEATING AND VIEWS OF SIGNIFICANT FEATURES ALONG THE RIVER.**

**(5.11) INTERPRET THE RIVER CORRIDOR'S NATURAL AND CULTURAL HERITAGE IN AN INTEGRATED, VARIED AND ENGAGING MANNER.**

The continuous trail and habitat system envisioned by this plan provides an excellent opportunity to educate in a thoroughly entertaining manner. No where else are the town's history and natural systems so apparent as along the river. Because of its location, the river itself will attract visitors who are interested in the surrounding natural, pleasant recreation areas and other tourist destinations. Simple signs and directories can alert trail users to items of special interest. Local stores and offices can easily incorporate historical material in their displays. Even public improvements and habitat restoration work can involve local residents and school groups in hands-on educational experience.



**RIVER GREENWAY & ACCESS PLAN:  
Upstream Segment  
(Old Redwood Hwy. to Corona Rd.)**

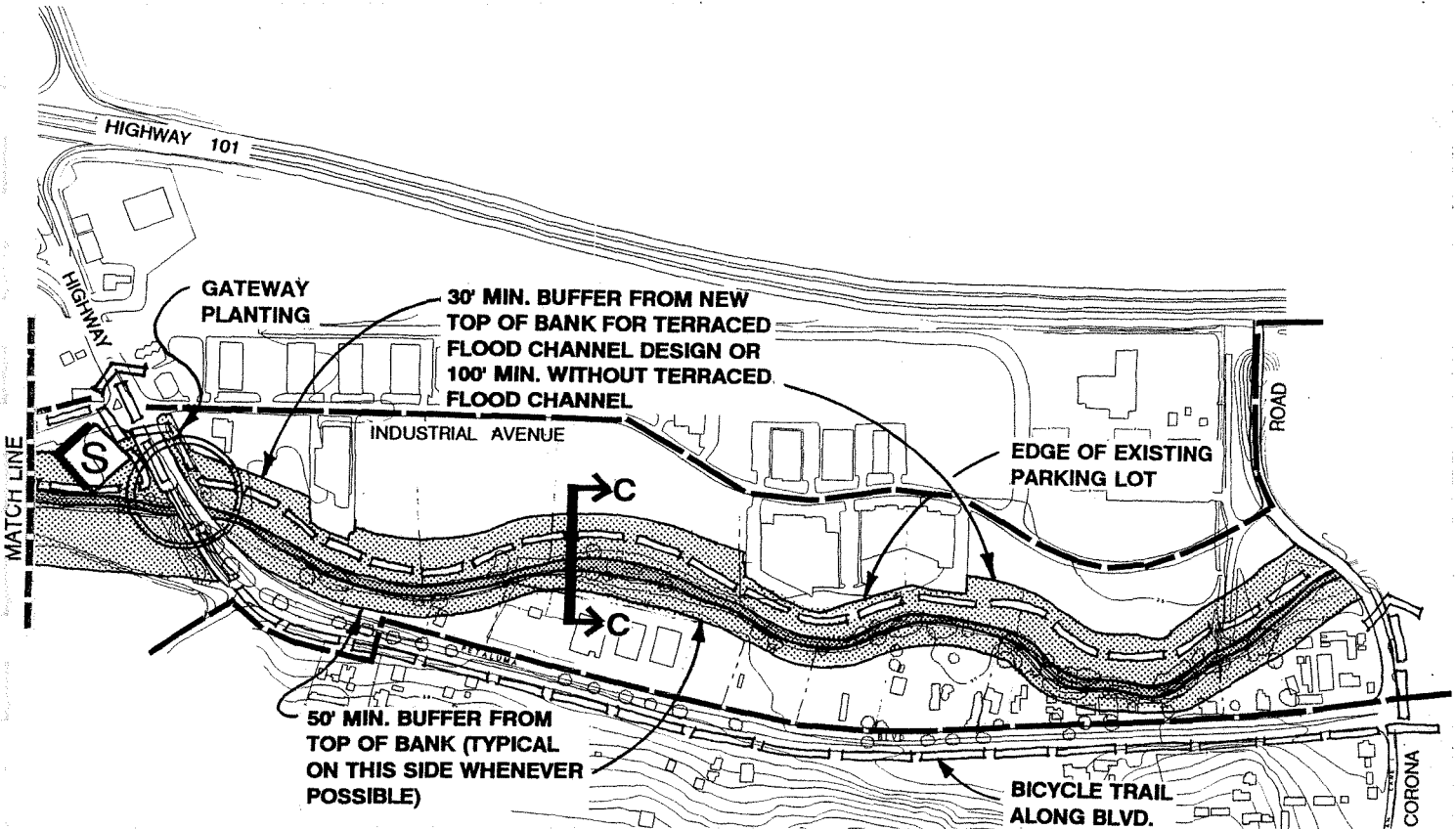


KEY MAP: Upstream

### 3.3 UPSTREAM SEGMENT

"Existing oaks, riparian habitat must be preserved and supplemented."

Participant in Community Workshop, 1992



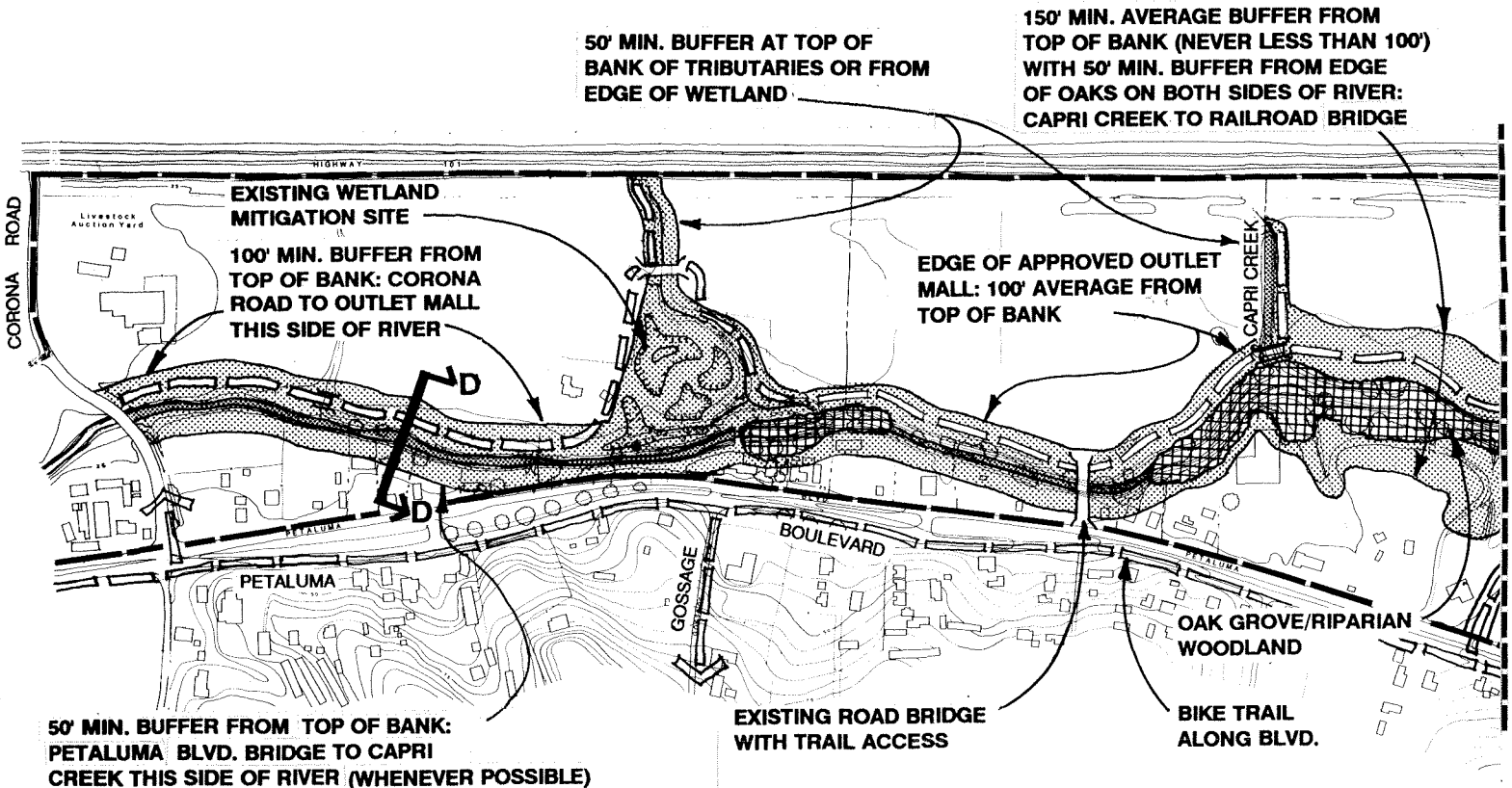
**3.3.1 EXISTING SETTING**

The Upstream Segment is the largest of the six segments in this plan, the most environmentally sensitive, and the segment most likely to change significantly. It extends from Willow Brook Creek at the crossing of Old Redwood Highway (near Redwood Business Park) to the confluence of Lynch Creek and the Petaluma River. The largest remaining stands of native riparian trees along the Petaluma River occur in this segment. This riparian grove is recognized as a unique resource to be protected and enhanced.

Flooding is a major concern on many properties. Alterations to the river are expected for flood management purposes, are expected to be designed in a manner that improves habitat value and recreational opportunities.

The properties within the river corridor in this area are in transition from open rural and agricultural lands to high density centers of employment, commerce, and, at the southern end, residential growth. Many of these properties are squeezed between heavily travelled roads (such as Highway 101 or Petaluma Boulevard North) and the last vestiges of a healthy and mature riparian habitat. The River Plan provides the opportunity to balance the conflicting pressures on this new development.

This plan envisions the Upstream Segment as an area where a healthy business and living environment happily co-exists with communities of mature riparian trees, where people will enjoy and respect the natural surroundings. This vision is achievable given the area's under-developed large parcels, freeway frontage, and natural attributes.



**RIVER GREENWAY & ACCESS PLAN: Upstream Segment**  
(Corona Road to Lynch Creek)

### 3.3.2 ISSUES AND OPPORTUNITIES

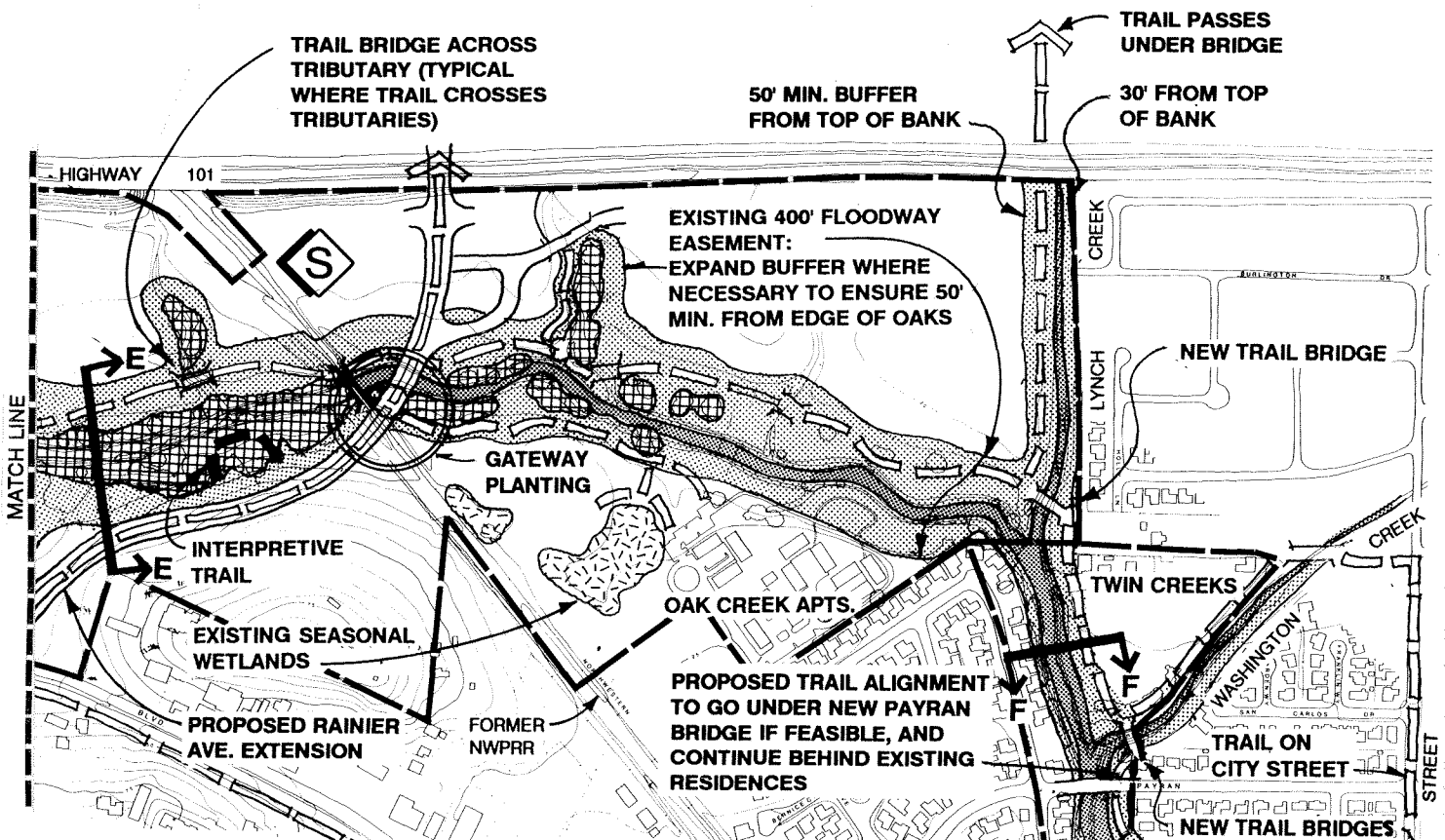
The General Plan and the River Plan both emphasize a balance of uses within this river segment. Property owners are encouraged to respond to the river setting and integrate flood management needs, the public use of the greenway, and natural habitat protection and enhancement into future development plans. Development that accomplishes this balance will provide multiple benefits to owners, tenants, the public, and the river system. In this segment, as in others, development of properties adjacent to the river will provide many of the resources to implement the plan.

#### General Plan Provisions

The General Plan includes a special policy calling for the area between the river and the freeway, from Corona Road to the railroad

right-of-way, to "...be developed in a manner that strikes a balance between the industrial uses allowed and the desirability of keeping freeway frontage lands open" (Chapter 3, Community Character, Policy 7). It is also a stated objective to preserve the rural backdrop of the community and to maintain views of important natural features, including the Sonoma Mountains and the Petaluma River.

Development in this reach provides opportunities to accomplish several significant transportation objectives: provide a new east-west connector at Rainier Avenue, a transit stop along the freeway, and encourage alternate modes of transportation (other than the automobile). The riverfront trail, coupled with the intensity of proposed development in this segment, will be an integral component to the city's overall transportation strategy.





### Oak Preservation

The last remaining vestige of the Petaluma River's oak woodlands and other mature riparian trees can be found in this reach. Clusters of mature Coast live oak, willow, California box elder, and Oregon ash are visible from Highway 101, marking the location of the river in contrast to the adjacent grassy fields. These are considered a local treasure to be enjoyed, but protected, for generations to come.

The high tree canopy, found nowhere else in such abundance along the river, provides important habitat, helps keep the river channel clear of weeds and brush that choke flood waters, and provides a visual reference of the river's existence throughout much of the valley. Because of the habitat's sensitivity to disturbance, this plan recommends large preservation zones and limited public access to better protect the important plants and animals, allow natural re-growth of these magnificent trees, and recreate a bit of local natural history.

### Re-established Riparian Forest

The Corona Reach of the greenway offers an unusual opportunity to extend the existing riparian woodland and to re-establish a natural riparian forest ecosystem with high aesthetic and biological values through the entire reach. Modeled on nearby self-sustaining natural areas within the Petaluma River Watershed, such as Upper Lynch Creek and Ellis Creek, the restoration of this ecosystem will include impenetrable forested areas rich with wildlife, as well as more open settings appropriate for trails and interpretive access. The created forest will be natural in appearance and include a wide range of habitat conditions with a mix of native trees, shrubs, and ground covers planted and managed to encourage the evolution of a naturally layered forest with varying density and type of cover.

The natural riparian forest is not uniform, but contains openings with seasonal wet meadows, dense willow thickets on the banks, mature stands of trees such as ash and box elder on the stable landforms, and fringe areas which graduate from oak woodlands and buckeye groves to oak scattered grasslands containing seasonal wetlands. Wet meadow openings within the forested areas are usually less than 1/4 acre in size, and seasonal wetlands at the fringes of the oak woodlands can cover up to 10% of the width of the corridor. In combination, these sub-types constitute the deciduous riparian community historically common to the Petaluma River valley, with variations throughout the valley based upon the particular soil, hydrologic, micro-climatic, and other conditions of the individual sites.



*The naturally diverse riparian forest, which is re-establishing itself between Corona Road and Capri Creek, will be preserved and enhanced.*



### Continuous Trail System

Access in this segment is envisioned as a continuous riverside trail system, with amenities such as overlooks and benches. The trail will meander through the greenway, at times along the top of the river bank, and at other times along the outer edges of the densely forested habitat areas and meadows with connections to the riverfront development. The trail will likely be installed incrementally as part of new development and flood channel alterations. Connections between the riverfront trail and the east side of the freeway may be possible along Willow Brook and Lynch Creeks, Rainier Avenue, and future widenings of Old Redwood Highway and Corona Road.

Businesses located in the Upstream Segment should provide bicycle facilities, in a manner appropriate for the size and nature of that business, to encourage use of the trail as a transportation route for employees and customers.

### West Side Parcels

A number of narrow parcels along Petaluma Boulevard North are squeezed between the river and the Roadway. Many of these parcels are developed to the top of the river bank with residential or commercial uses, while several are undeveloped. Establishing the banktop habitat buffer recommended in this plan narrows the developable portion of these properties, perhaps in some cases excessively. This plan encourages flexibility when applying regulatory authority on these properties in order to balance the long-term vision of the plan against the rights of the owner. Acquisition of an entire property, where appropriate, would allow the creation of riparian open spaces, public access points, and views of the river from the Petaluma Boulevard. With the goal of maintaining the economic viability of riverfront land, decisions regarding these properties must be approached on a case-by-case basis.

### Flood Reduction

Properties along the river upstream of Corona Road are subject to frequent flooding. Large areas fall within the FEMA floodway limits. Flood control alterations are required in order for these properties to develop safely. Where the river channel is altered to reduce the frequency or intensity of flood events, the channel and/or adjacent area should be designed to maintain or improve habitat values.

Although the final approach to flood management in this reach of the river has not yet been determined, the preferred approach incorporated into this plan for certain areas upstream of Corona Road and east of U.S. 101 includes the creation of a low-flow channel and a grassy flood terrace, both with well vegetated banks and banktops to shade the stream and screen the trail. Trail access and overlooks can be incorporated into the flood terraces. For purposes of this plan, it is assumed that new channel configurations, where installed, will be sized for 100-year protection (as defined by FEMA). The assumptions about channel modification locations and sizes may change as the flood control studies move forward.

Preliminary hydraulic analyses indicate that no significant flood alterations will be required between Corona Road and Lynch Creek.

Erosion is a problem along steep banks. The stability of existing banks and vegetation should be addressed as part of habitat restoration activities and site improvements. All plantings should be evaluated for their potential to increase flood levels. However, flood protection measures should be designed where possible to accommodate adequate amounts of vegetation.

### Water Quality

The proposed integration of new development and habitat improvements in this area offer an opportunity to explore effective, creative, and beneficial new ways of cleaning and filtering the runoff that discharges into the river. A variety of mechanical filtering, settling processes, and bioremediation techniques with visual and ecological benefits are allowed within this segment. For instance, the Buffer Zone and flood terraces could be designed to contain a series of small, newly created seasonal wetlands that filter runoff before it reaches the river. Biologically rich soils and plant material would decompose the undesirable organics in the runoff. This may occur in conjunction with other private on-site measures to control runoff.

### Economic Development

Higher density businesses, employment centers, and commerce will co-exist with the river and its drainage network. The river is a visual and recreational amenity that will attract businesses and employees, and provide the visual - transportation - recreation link between the entire segment and other parts of town.

Areas of high activity, like retail shops, restaurants, hotels, and other areas of public congregation, should be oriented to take full advantage of the river's amenities and provide services to trail users. Proper location and orientation toward the river (to capitalize on the scores of trail users and the views) will encourage even more use of the trail.

It is equally clear that businesses can benefit from the river's amenities and that the trail will be a more interesting and safer draw if it is well used by employees and residents of the area. Businesses that do not benefit from the natural backdrop or proximity to this recreational corridor should not locate adjacent to the river. Work places should relate to the river setting and provide places of interest along the greenway. They should not detract from trail users' experiences within this natural system.

Parking lots, loading areas, and other utilitarian areas lacking visual interest should be oriented away from the trail or, at least, screened from view. Buildings and parking lots may be separated into smaller, dispersed components, such as a "campus-style" development, to better fit with the landscape and habitat.

Even though intensity of development and human activity is encouraged in this segment, care has been taken to limit human access in the special habitat preservation areas to protect these treasures and insure a healthy natural environment.



*The River Plan clarifies the intentions of the General Plan with respect to future development of properties within the river corridor, such as this parcel near Rancho Veal Corporation. The plan encourages complementary development of high activity areas, oriented to take advantage of the river's amenities, trail, and natural setting.*

**3.3.3 ACCESS AND ENHANCEMENT OBJECTIVES**

- (1) *EMPHASIZE THE NATURAL FEATURES OF THE GREENWAY AND LANDSCAPE SETTING THROUGHOUT THE UPSTREAM RIVER SEGMENT, INTEGRATING THE RIPARIAN CORRIDOR INTO THE SITE DESIGN OF NEW DEVELOPMENT.*
- (2) *PRESERVE SIGNIFICANT VIEWS TO THE MOUNTAINS FROM THE RIVER AND TO THE RIVER FROM ADJACENT ROADS.*
- (3) *PROTECT AND PRESERVE THE EXISTING COMMUNITIES OF MATURE RIPARIAN VEGETATION AND RESTORE AND ENHANCE NATIVE RIPARIAN AND UPLAND HABITATS.*
- (4) *PROVIDE A CONTINUOUS PEDESTRIAN AND BICYCLE TRAIL SYSTEM FROM WHICH THE TRAIL USERS SHOULD BE AWARE PRIMARILY OF THE RIVER AND ITS VEGETATION.*

- (5) *ENCOURAGE DEVELOPMENT THAT WILL RESULT IN MORE ACTIVE, INTERESTING, AND SAFE TRAIL USE AND IN WHICH A BUSINESS STEWARDSHIP OF THE GREENWAY WILL NATURALLY EVOLVE.*

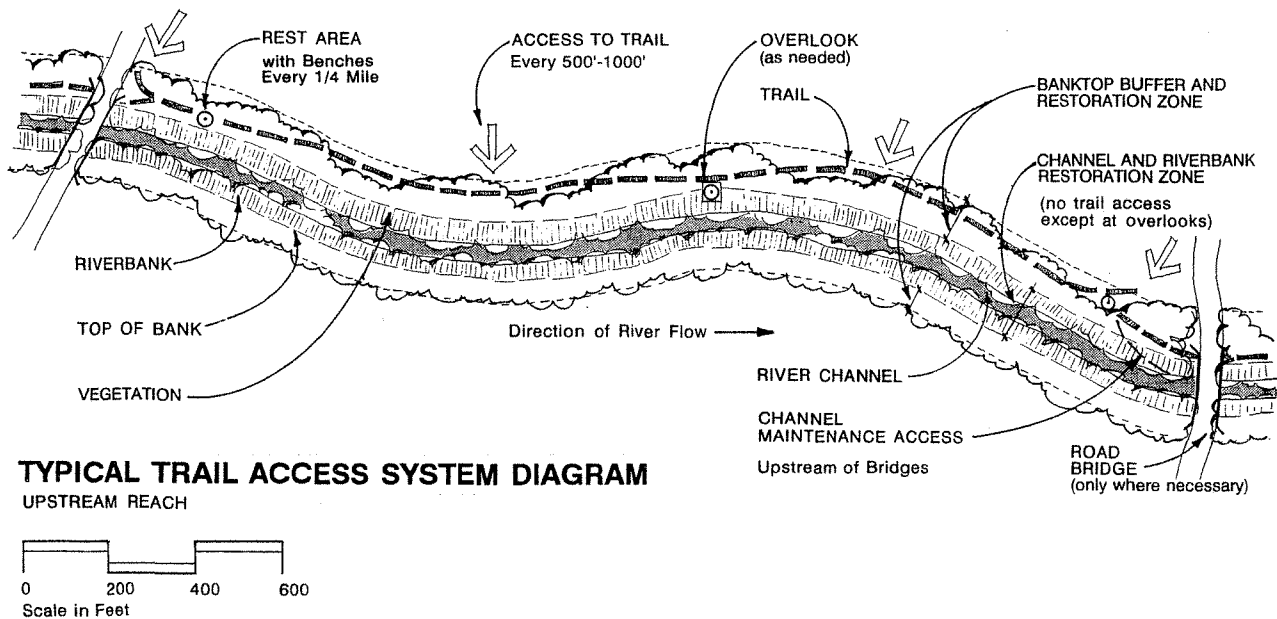
**3.3.4 POLICIES AND PROGRAMS**

ACCESS AND LANDSCAPE CHARACTER POLICIES

Trail Alignment

- 1. *Provide a continuous river and creekside trail system that accommodates both hikers and bicyclists.*

A Caltrans Class I trail is proposed. However, in sensitive areas, bicycle access may be limited due to reduced width of the path.



**PROGRAMS**

*1a. At Redwood Business Park, provide a trail on the north side of the river on the flood terrace to accommodate bicycles and pedestrians.*

*1b. Allow the trail to pass under Highway 101 if funding is available.*

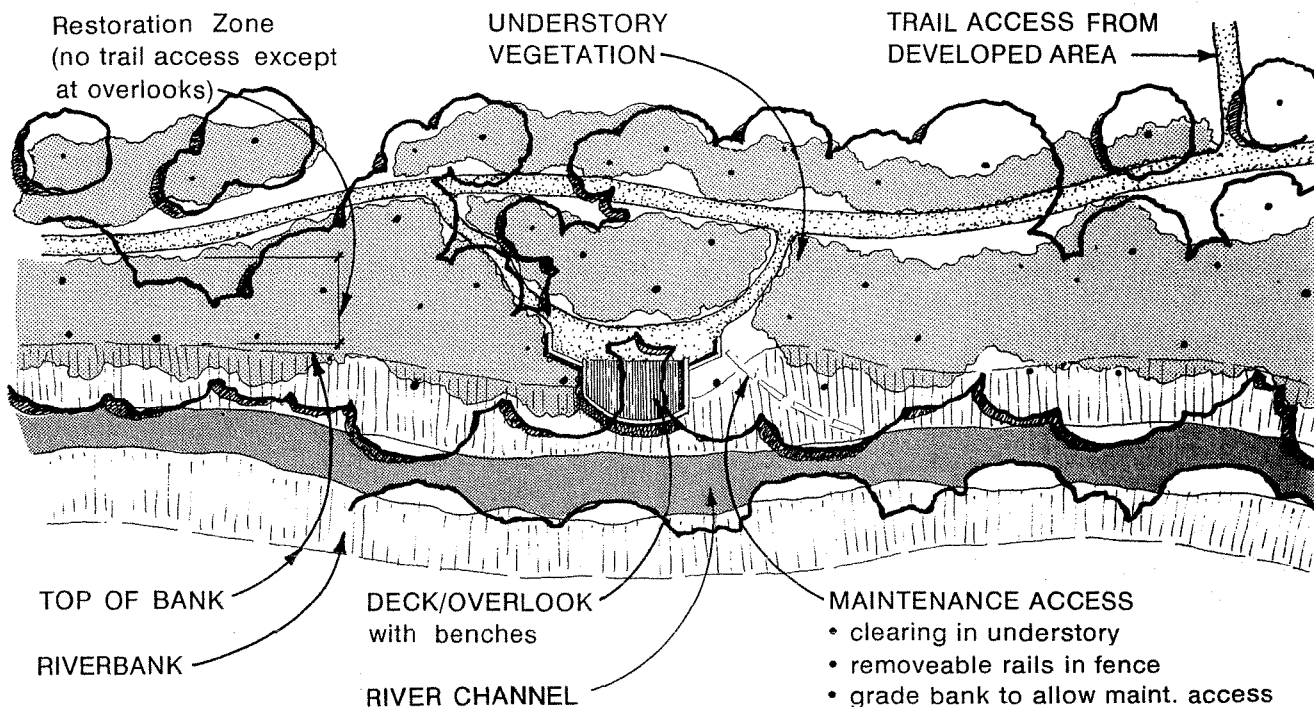
Undercrossings to connect the river trail system to the east side of town are most feasible at Lynch and Willow Brook Creeks.

*1c. Between Highway 101 and Stony Point Road, provide a trail on the north side of the river to accommodate bicycles and pedestrians.*

*1d. Provide a Caltrans Class I bicycle trail along Stony Point Road between Denman Road and Petaluma Boulevard North, as an interim measure, while access to the river is not available because of existing land uses. If and when land use changes occur, or as land owners consent, add a new trail along the creek.*

*1e. Between the Petaluma Boulevard North crossing of the river and Lynch Creek, the main pedestrian/bicycle trail shall follow the river on the eastern side. On the west side of the river, a bicycle trail shall be provided along Petaluma Blvd., with occasional views to the river.*

Upstream of Corona Road, assuming channel modifications are to be made for flood mitigation, the preferred trail location is in an artificially created flood terrace to create the sense of a "nature



**TYPICAL LAYOUT OF TRAIL AND OVERLOOK - Upstream Area**

trail". Between Corona Road and Lynch Creek, the trail will generally be at banktop, gently meandering to avoid sensitive habitat areas and to provide access to businesses and residential areas. Bridges will be necessary across tributaries.

*If. Where possible, the trail and maintenance road should be combined.*

2. *To the extent possible, the trail should take advantage of the different landscapes in this segment.*

The trail should move from flood terrace meadow to banktop riparian woods, to maintain focus on the natural landscape.

3. *The trail should be kept out of the Preservation and Restoration Zones and should avoid impacts to wetlands.*

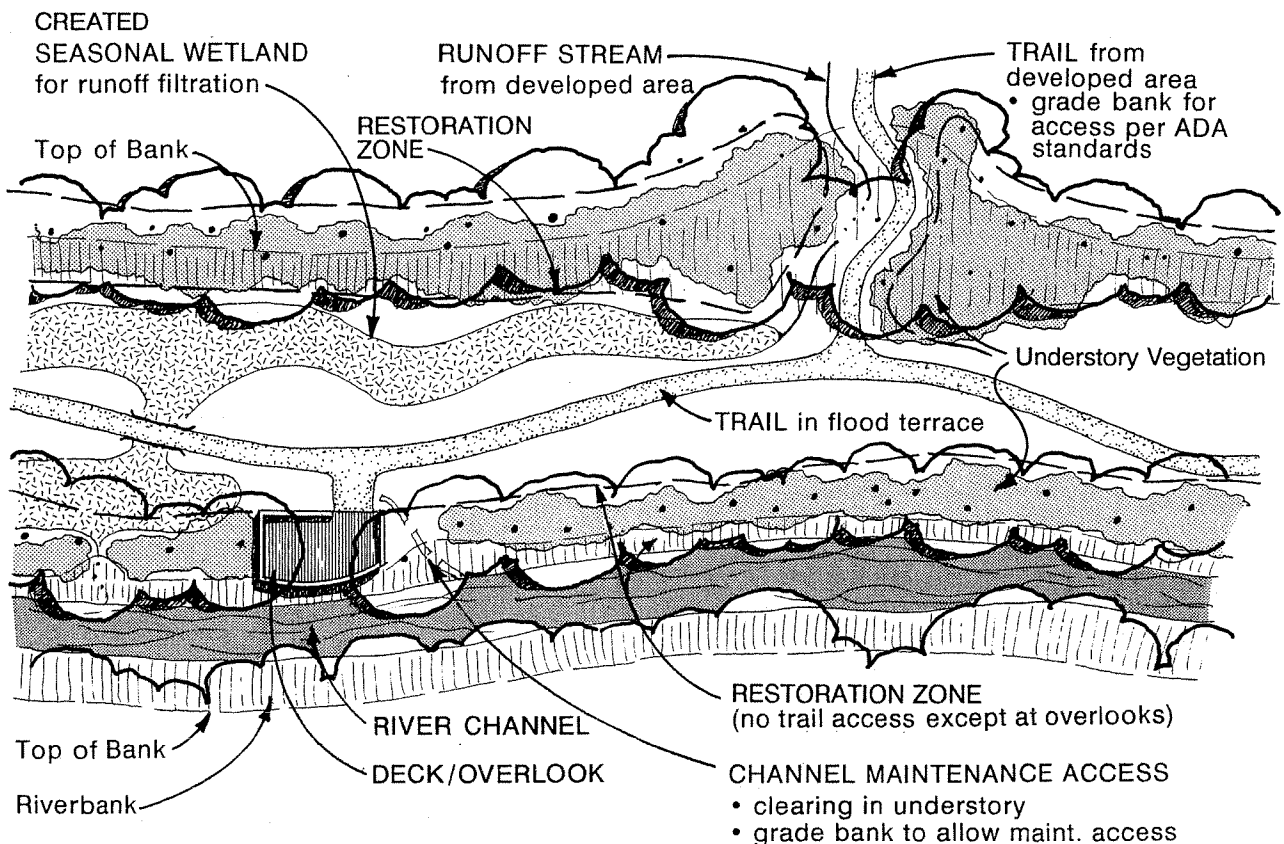
A short interpretive trail may go through a portion of the Oak Grove/Riparian Woodland, and occasionally to overlooks in the Restoration Zones, and should avoid impacts to existing wetlands (see Chapter 5 and Technical Appendix).

4. *Provide periodic overlooks and resting areas.*

**PROGRAMS**

- 4a. *Overlooks with benches should be provided at appropriate locations.*

Interpretive facilities are encouraged at points of interest, rest, and staging areas.



**TYPICAL LAYOUT OF TRAIL AND OVERLOOK - On Flood Terrace**

Overlooks can provide good views of important features while controlling access to sensitive areas.

- 4b. Provide informal rest areas with seating at comfortable intervals.*

Benches may be incorporated into the landscape of development adjacent to the greenway to further integrate the development with the greenway landscape. Materials used for greenway resting places and overlooks should be consistent with the natural character of this area. Seating may be as simple as logs with seat cut-outs, or large rocks with flat tops.

#### Small Park

- 5. Incorporate adequate provisions for public access in the greenway in residential areas to implement the public park programs contained in the General Plan.*

#### PROGRAM

- 5a. The park, located in the greenway, should be minimally developed with picnic facilities, interpretive features, and a nature trail, and should avoid sensitive habitat.*



*The existing oak grove will be preserved, allowed to expand, and interpreted.*

#### Gateways

- 6. Provide significant plantings to increase public awareness of the waterway at each of the following major road crossings:*

- \* Redwood Highway over Willow Brook Creek*
- \* Highway 101 over Willow Brook Creek*
- \* Stony Point Road over Willow Brook Creek*
- \* Petaluma Blvd. North over the Petaluma River (near Industrial Ave).*
- \* Corona Road over the Petaluma River*
- \* Factory Outlet Village entry from Petaluma Blvd. North*
- \* Rainier Avenue extension*
- \* All future public river crossings*

#### PROGRAMS

- 6a. Integrate within each gateway special identification or directional signs with stands of riparian vegetation to announce the presence of the river and location within the City.*
- 6b. Provide signs that identify creeks and waterways.*

Signs at river or creek crossings must be appropriately sized and located to impart information without detracting from the natural attributes of the gateway landscape. Examples of appropriate signs may include small bronze plaques or engraving on bridges with the name of the waterbody, year of bridge construction, or other relevant information, or freestanding signs locating for public access, restrooms, or trail entry.



**INTERPRETIVE TRAIL THROUGH THE OAK WOODLAND PRESERVATION ZONE**

*The natural riparian forests, including the remnant oak woodlands at the top of the river banks in the upstream reaches, at one time extended for several hundred feet into the flood plain on each side of the river. Preservation of the remaining woodlands, restoration of additional forest and teaching about this ecosystem are important objectives of the River Plan.*

### Staging Areas and Transit Terminal

7. *Provide at a minimum staging areas near Redwood Business Park, near the corner of Stony Point Road and Petaluma Boulevard North, and at the proposed transit stop (near the proposed Rainier Ave. extension) to accommodate trail users.*

Staging areas should include: parking, trail information, access to the trail, access controls where necessary, and, only where practical, restrooms.

### PROGRAMS

- 7a. *The Rainier/US 101 transit terminal should be designed to allow "shared use" of parking for trail system users during non-peak periods (evenings, weekends and holidays).*
- 7b. *Provide at the earliest, most practical opportunity, pedestrian and bicycle access between transit terminals and the greenway trail system.*
- 7c. *Encourage use of extra business parking spaces for trail users.*

Office parks, particularly, may have parking available on weekends or evenings that may be used as a drop-off for cyclists or joggers. Off-peak use of these lots by trail visitors may also have a beneficial effect on restaurants or other support services found in areas of higher density employment.

### Regional Hiking and Bicycle Trail Linkages

8. *Connect the river trail with nearby regional hiking and bicycle trails.*

Trail connections should be made with the planned bicycle routes along Stony Point Road, Old Redwood Highway, Rainier Avenue extension, the planned trail along Lynch Creek, and Bay Area Ridge Trail routes.

### Interpretive Facilities

9. *Provide interpretive facilities in this river segment to inform the visitor of the natural and cultural features of the river.*

Simple signs or graphics can point out features such as natural habitat, causes and effects of flooding, significant vegetation, erosion, soils, valley geomorphology, agricultural and historic sites, flood control and habitat restoration efforts. Information should be presented in a lively manner that does not detract from the features being highlighted.



*Willows are once again colonizing the disturbed channel banks, an example of an early stage of ecological succession.*



**NATURAL HABITAT RESTORATION, CREATION AND PROTECTION POLICIES**

10. Establish zones within the greenway to identify the degree of habitat restoration, creation and protection required within the channel and banktop habitat areas.

See Chapter 5: Natural Habitat Management Program for habitat restoration, protection, maintenance and management recommendations.

11. Allow mitigations for habitat damage caused by development activities to occur within the greenway.

12. Dense, multi-storied stands of riparian vegetation should be established along the tops of the banks.

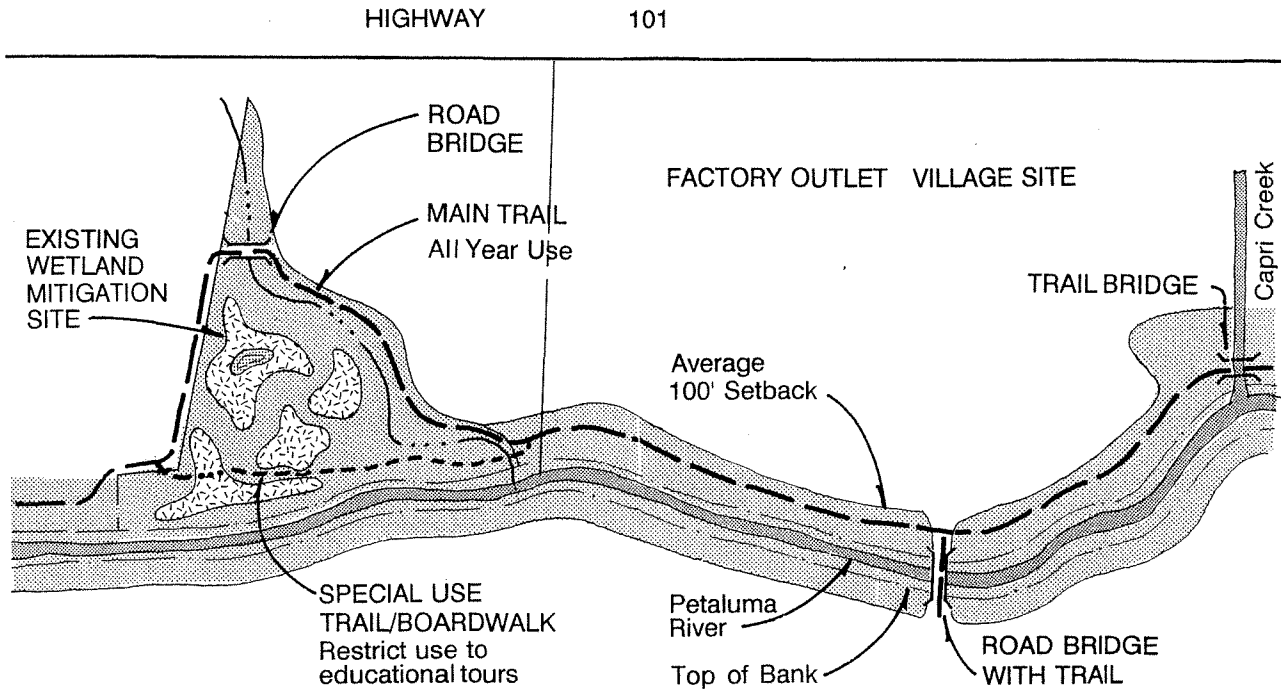
**PROGRAMS**

12a. Establish a continuous planting of native riparian and upland vegetation along the river.

12b. Limit public access into the Restoration Zones, allowing only overlooks at appropriate intervals.

12c. Provide openings in the riverbank understory vegetation only where absolutely necessary for maintenance access.

12d. Establish meadows and/or wetlands in the flood terraces.



**TRAIL ALIGNMENT - Factory Outlet and Wetland Mitigation Site**

NOTE: Special Use Trail and Road Bridge through Mitigation Site are proposed by this plan and are subject to review and approval by appropriate parties.

*12e. Native vegetation planted as natural communities is preferred.*

Suggested guidelines for removal of invasive and undesirable exotic plants are included in Chapter 5 with supplemental guidelines in Chapter 7 of the Technical Appendix.

*12f. Allow trail and maintenance access into the flood terrace.*

*12g. Discourage use of disruptive and damaging mechanical means of maintenance and clearing.*

#### **Buffer Zone**

*13. Create Buffer Zones on both sides of the river, measured from the top of the bank, (at time of development) to protect habitats along the river, and to provide an undeveloped area in which a trail and amenities can be located. A buffer zone setback, if and to the extent allowed by law, other than that prescribed in the followings programs may be allowed where the City finds, based on substantial evidence, that the habitat and other environmental impacts of the proposed development can be mitigated, and the intent and goals of this Plan can be met, by this alternative setback.*

#### **PROGRAMS**

*13a. Provide public access and amenities within the Buffer Zone (except as noted elsewhere in the River Plan), but exclude parking lots, buildings and similar urban activities.*

Where the Restoration Zone overlaps with the Buffer Zone, access restrictions for Restoration Zones should be followed.

*13b. At Redwood Business Park, the Buffer Zone is established in the zone district and flood channel easement.*

*13c. Between US 101 and Petaluma Boulevard North, the Buffer Zone should extend 45' from top of new bank, assuming a terraced flood control channel has been installed. If a trapezoidal channel is necessary, or no flood control work commences, the Buffer Zone will extend 100' from the top of the new bank. Between Highway 101 and Stony Point Road, the width of the buffer is limited by the location of Denman Road on the south side.*

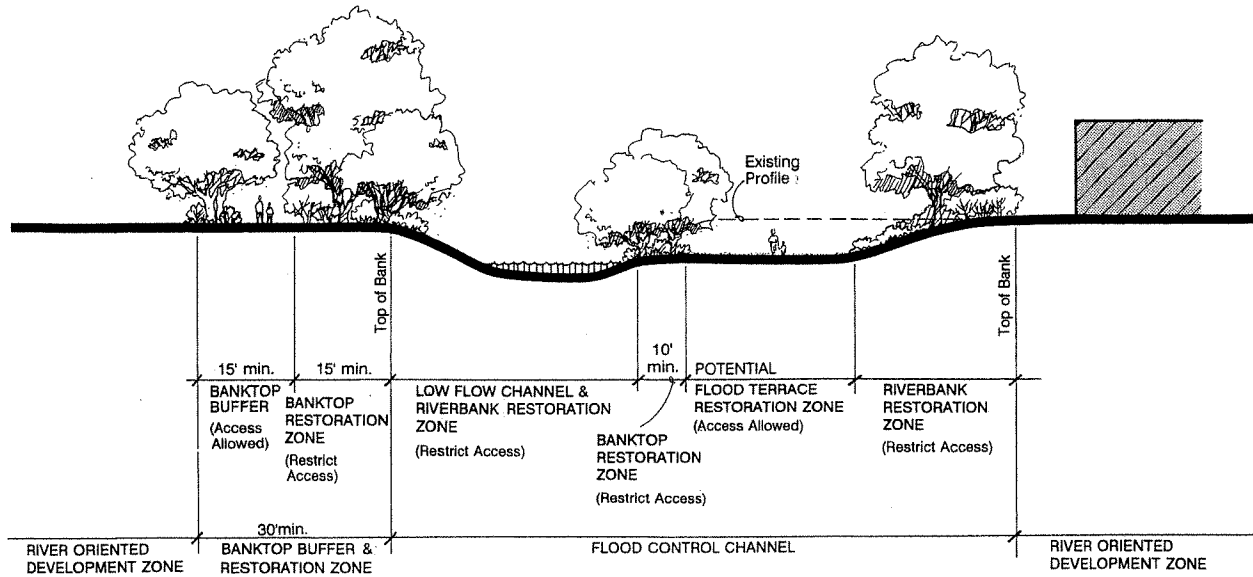
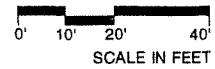
*13d. Along Industrial Avenue, the Buffer Zone should be a minimum 30' from top of new bank, assuming a terraced flood control channel. Buffers along Petaluma Boulevard North are a minimum 50' from top of bank. If no terraced flood control channel is installed, the Industrial Avenue Buffer Zone is minimum 100' from top of bank.*

*13e. From Corona Road to, but not including, the Petaluma Factory Outlet Village site on the Highway 101 side of the river, the Buffer Zone is a minimum 100' from top of bank. The Factory Outlet Village Buffer Zone is established by its zoning district.*

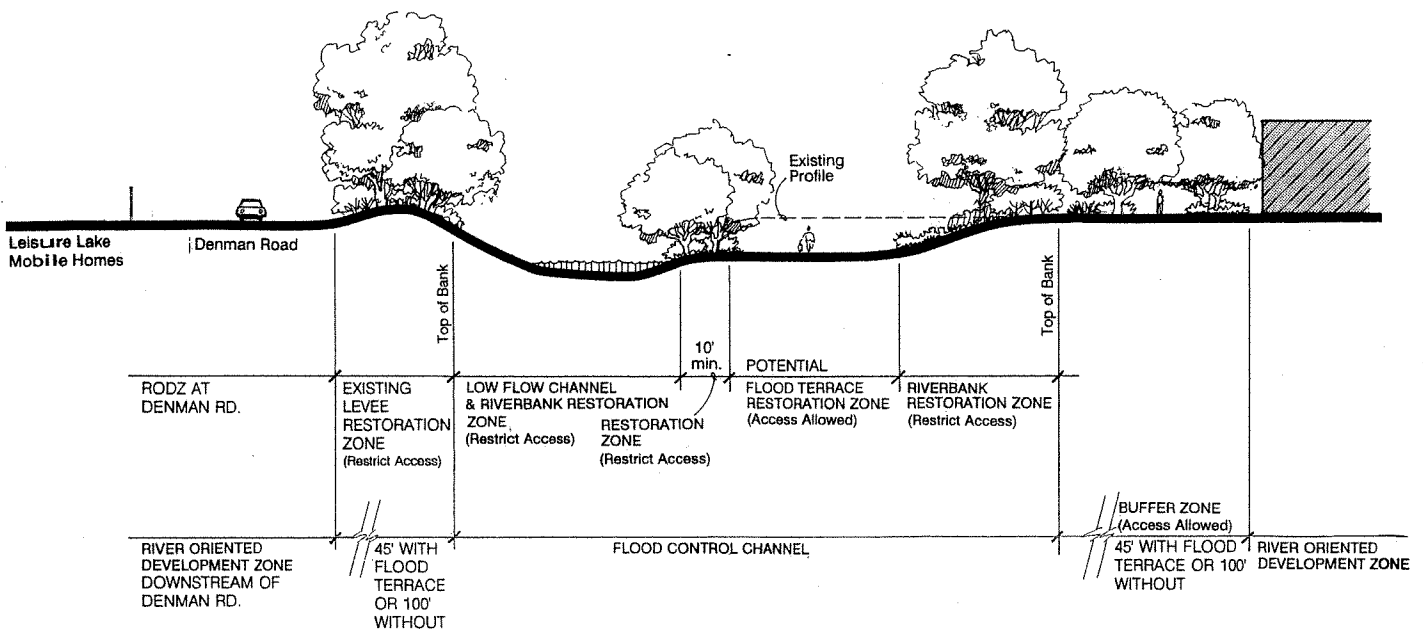
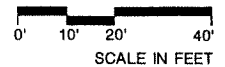
*13f. On the Petaluma Boulevard side of the river, from Corona Road to the confluence of Capri Creek, the Buffer Zone is 50' from top of bank.*

**SECTION A-A GREENWAY AT REDWOOD BUSINESS PARK**

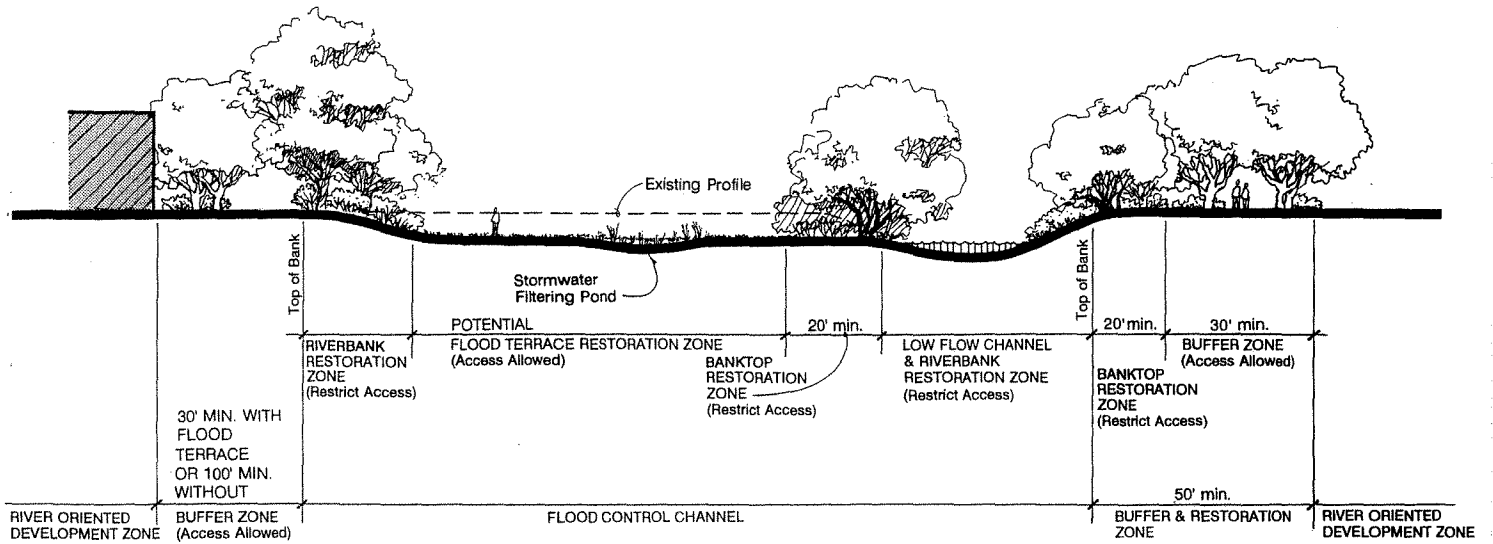
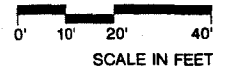
(Revegetation/Restoration Should Be Concentrated On Southerly Bank)



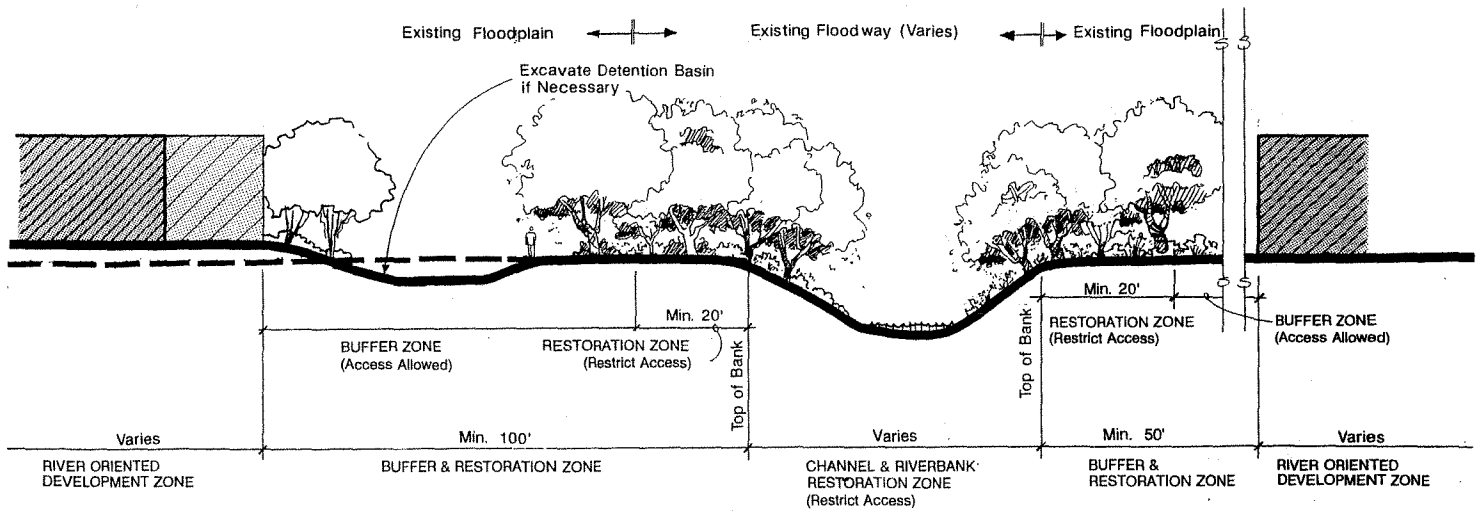
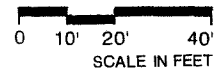
**SECTION B-B GREENWAY AT DENMAN ROAD**



**SECTION C-C DENMAN REACH - Between Old Redwood Highway and Corona Road**



**SECTION D-D CORONA REACH - Standard Greenway Corridor**  
Looking Downstream (No Planned Flood Control Alterations)



13g. Because the nature and size of the parcels on the west side of the river between Petaluma Boulevard bridge and Capri Creek vary greatly, flexibility in the enforcement of this program is encouraged to balance the needs of the river corridor and private property rights.

13h. On both sides of the river from Capri Creek to the railroad tracks the Buffer Zone is a minimum average of 150' from top of bank to preserve and protect the riparian and Oak woodland. In no case should the Buffer Zone be less than 100 feet.

13i. From the railroad bridge to the Payran Residential Segment, the Buffer Zone is co-terminus with the existing access easement (approximately 400' centered on the river) or an extension of that easement.

13j. Development shall not encroach within 50' from the drip line of existing mature oak trees.

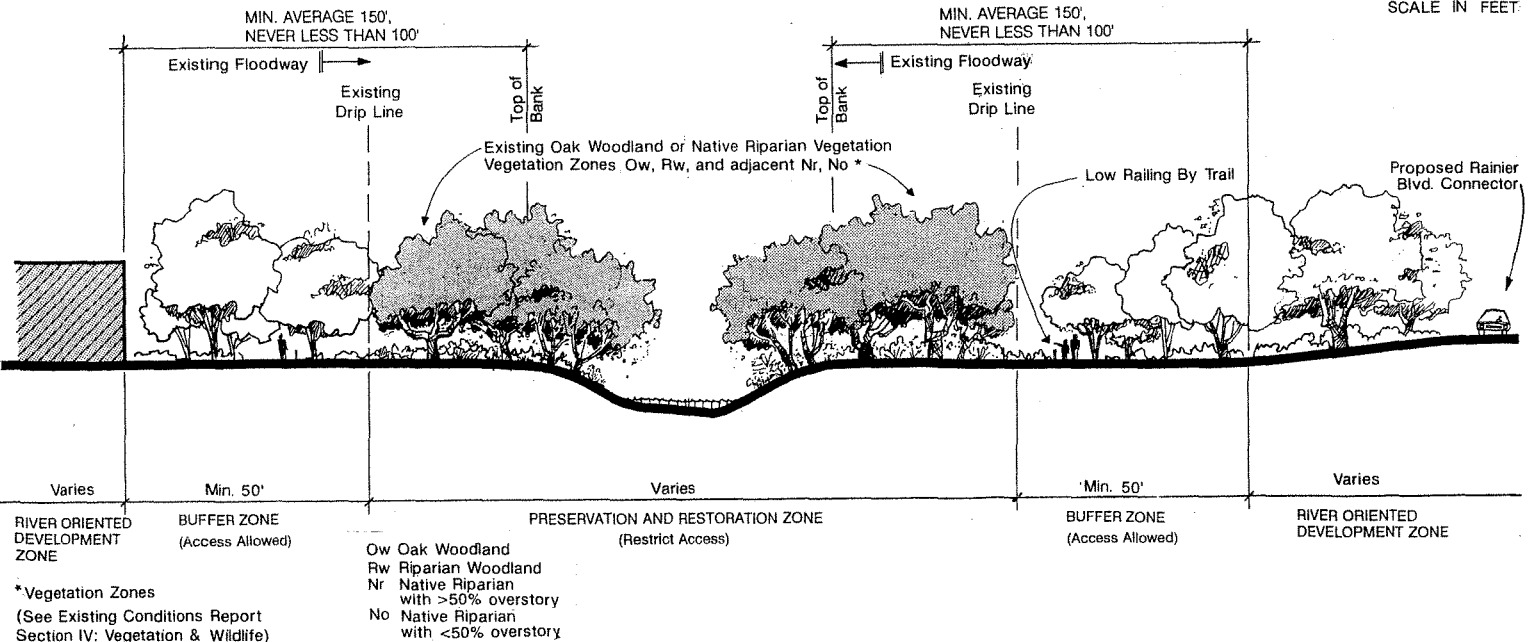
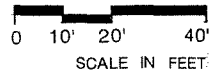
13k. Tributary streams and seasonal wetlands shall have a minimum 50'-buffer from the top of the bank or edge of the wetland.

**Preservation Zones**

14. Establish a Preservation Zone for the remnant Oak Grove/Riparian Woodlands upstream of Lynch Creek.

Areas qualifying for this zone were designated in the Existing Conditions Report as Oak Woodland (OW), Riparian Woodland (RW), Native Riparian with more than 50% overstory (NR), and Native Riparian with less than 50% overstory (NO). The extent of this zone is shown in the map entitled "River Greenway and Access Plan".

**SECTION E-E CORONA REACH - OAK WOODLAND/RIPARIAN VEGETATION AREA**



**PROGRAMS**

**14a.** *Prohibit development of any kind in the Preservation Zone, allowing only a short, low-impact interpretive trail.*

Inappropriate access can be discouraged with fences, signs, and barrier plantings of native vegetation.

**14b.** *Restore the habitat in the Preservation Zone, with appropriate native riparian and upland vegetation.*

Chapter 5 and the Chapter 7 contain much information about restoration techniques and special needs of maintaining mature oaks.

**Enhancement and Water Quality**

**15.** *Integrate biotic enhancement and management proposals with flood control alterations where feasible to improve the overall habitat characteristics of channel modifications.*



*The left bank, near the Factory Outlet Mall, has been stabilized using a variety of bioengineering techniques, including willow wattling, seeded slopes, and coir matting at the toe.*

**16.** *Use bioengineering techniques, wherever feasible, to stabilize eroding banks.*

*Chapters 5 and 7 contain supplemental specific recommendations and or bank stabilization techniques.*

Possible bioengineering techniques for bank stabilization include:

- \* Willow wattling
- \* Planted rip rap
- \* Planted cabled erosion control blocks
- \* Planted crib walls and other walls with constructed terraces
- \* Coir Matting and rolls with seeded slopes

**17.** *Runoff should not flow directly from developed areas into the river without some filtration.*

Development applicants should establish special mechanisms to clean and modulate the volume and rate of runoff from newly developed properties adjacent to the river or streams. Passive methods such as bioremediation, use of detention basins, and creation of new freshwater wetlands are encouraged to slow and filter urban runoff before it enters the river. Active methods, such as oil separators and sweeping parking lots in October and May should also be considered. Ideally, both passive and active mechanisms will be used, especially for large developments.

**RIVER ORIENTED DEVELOPMENT ZONE (RODZ) POLICIES**

**River Orientation**

- 18. *New development should emphasize its location on the greenway, and encourage awareness and enjoyment of the river and use of the trail system.*
- 19. *Place particular emphasis on the integration of river access and river-oriented activity areas in city review of future river-side developments.*

**PROGRAMS**

- 19a. *Integrate new development with the natural landscape and river features by limiting building scale and coverage; encouraging building separation and clustering; and requiring adequate river setbacks, appropriate materials and colors, and appropriate, compatible landscaping.*
- 19b. *Avoid or minimize location of parking, loading, and warehouse space along the river frontage.*

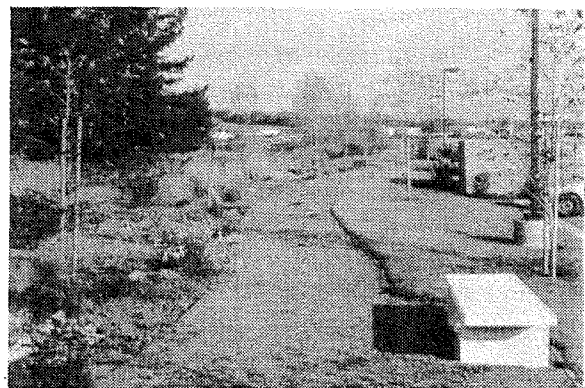
Where parking near the greenway is necessary, lots should be screened (or the views softened) by landscaping, berms, or differences in grade between the river trail and the parking lot.

- 19c. *Provide clear pathways from buildings and outdoor areas to the trail system.*
- 19d. *Encourage the location of private open space features such as outdoor courtyards, activity areas, and other landscape amenities adjacent to the greenway.*

- 19e. *Encourage architectural interest, articulation, and detailing in building facades facing the river as well as the street.*
- 19f. *Encourage the location of indoor and outdoor "people spaces" in RODZ building designs to take maximum advantage of river overlook.*

Facilities such as offices, reception areas, conference rooms, courtyards, recreation and relaxation areas can benefit from the beauty of the river corridor, thus enhancing the building's value. Also, trail safety will be increased by having more people viewing the area regularly.

- 19g. *Coordinate new development plans with adjacent properties to integrate physical and visual access along the greenway.*
- 19h. *Landscaping in the RODZ should appear to be an extension of the riparian and upland habit, especially in the areas closest to the river.*



*Redwood Business Park II provides setbacks, pathways, plantings, benches, outdoor activity areas, and other amenities along its river frontage.*

- 20. *Protect, restore and enhance areas of fragile habitat isolated in the RODZ, such as oaks and seasonal wetlands, whenever feasible.***

See Chapter 5 for detailed management recommendations.

**PROGRAM**

- 20a. *Where possible, provide habitat corridors of native vegetation to connect isolated habitat areas to the greenway.***

- 21. *Where possible or necessary, the City or other entity should purchase all or parts of parcels along Petaluma Boulevard North that are too narrow to support the recommended buffer and retain development potential.***

**PROGRAMS**

- 21a. *Use flexibility in determining the buffer width, where appropriate, to maintain the economic viability of the property where there is no viable means to otherwise establish the recommended buffer.***

- 21b. *The city should consider alternate methods of establishing the recommended buffer on marginal properties, such as grants for acquisition, transfer of development rights, and assessment districts.***

**View Corridors**

- 22. *Future improvements within the Upstream Segment shall place special emphasis on the protection of existing view corridors between the greenway and the Sonoma Mountains.***

**PROGRAMS**

- 22a. *Identify and maintain specific permanent view corridors from the river toward the Sonoma Mountains through design and alignment of the trail and adjacent development.***

- 22b. *View corridors should be established along tributary stream corridors reaching from the river to Highway 101.***

- 22c. *Provide periodic breaks of sufficient size between buildings where views are good, such as near special resting places and interpretive stations.***

- 22d. *Tree planting patterns should frame, rather than obstruct, views between the river greenway and Sonoma Mountains.***

- 22e. *Plant dense native vegetation along tributary streams between the river and the highway to establish visual, physical and biological connections to the river.***

**Public and Private Trail Connections**

- 23. *Physical points of connection between the trail and adjacent developments or public streets should occur at approximately 500'-1,000' intervals on average.***

The intent of this objective is to integrate the linear trail system with the workplaces and other high activity areas, provide a convenient alternate means of getting around, adequate emergency access, and to increase trail use through ease of access. Seek a balance between the need for convenient access and the desire for a sense of continuity in the natural landscape.



**PROGRAMS**

- 23a. *Locate some connector trails along tributaries.*
- 23b. *As development occurs, use future road crossings of the river to provide bicycle/pedestrian access to Petaluma Boulevard North.*
- 23c. *Provide a short spur trail to points of special interest, such as the wetland north of the Oak Creek Apartments, taking care not to disturb sensitive habitat.*
- 23d. *Allow emergency and maintenance vehicle access on the trail.*
- 23e. *Incorporate periodic emergency and maintenance access points to the river greenway in future development along Petaluma Boulevard North.*

**Road Crossings of River**

- 24. *Minimize the number of roads and bridges across the river and its tributaries.*

In the river reach between Corona Road and Lynch Creek, future development is likely to require bridges across the Petaluma River and across tributaries. These roads must pass through Restoration, Preservation and Buffer Zones.

**PROGRAMS**

- 24a. *Locate road bridges in places of least habitat sensitivity.*
- 24b. *Where damage to existing habitat is unavoidable due to bridge construction, mitigate the damage to the extent feasible in adjacent areas within the greenway.*

**FLOOD PROTECTION POLICIES**

- 25. *In flood channel design, balance the needs for habitat restoration and natural channel configuration with the goals of flood protection and maintaining the economic viability of properties.*

Where modifications to the river channel are recommended, the preferred channel configuration is the schematic terraced/low flow channel (aka WESCO/PWA design). This design maximizes habitat restoration opportunities and provides a grade differential between the trail on the flood terrace and banktop development.


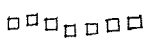
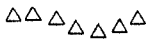

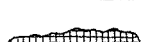










**PROGRAM**

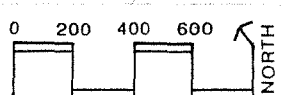
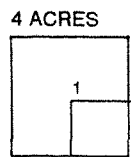
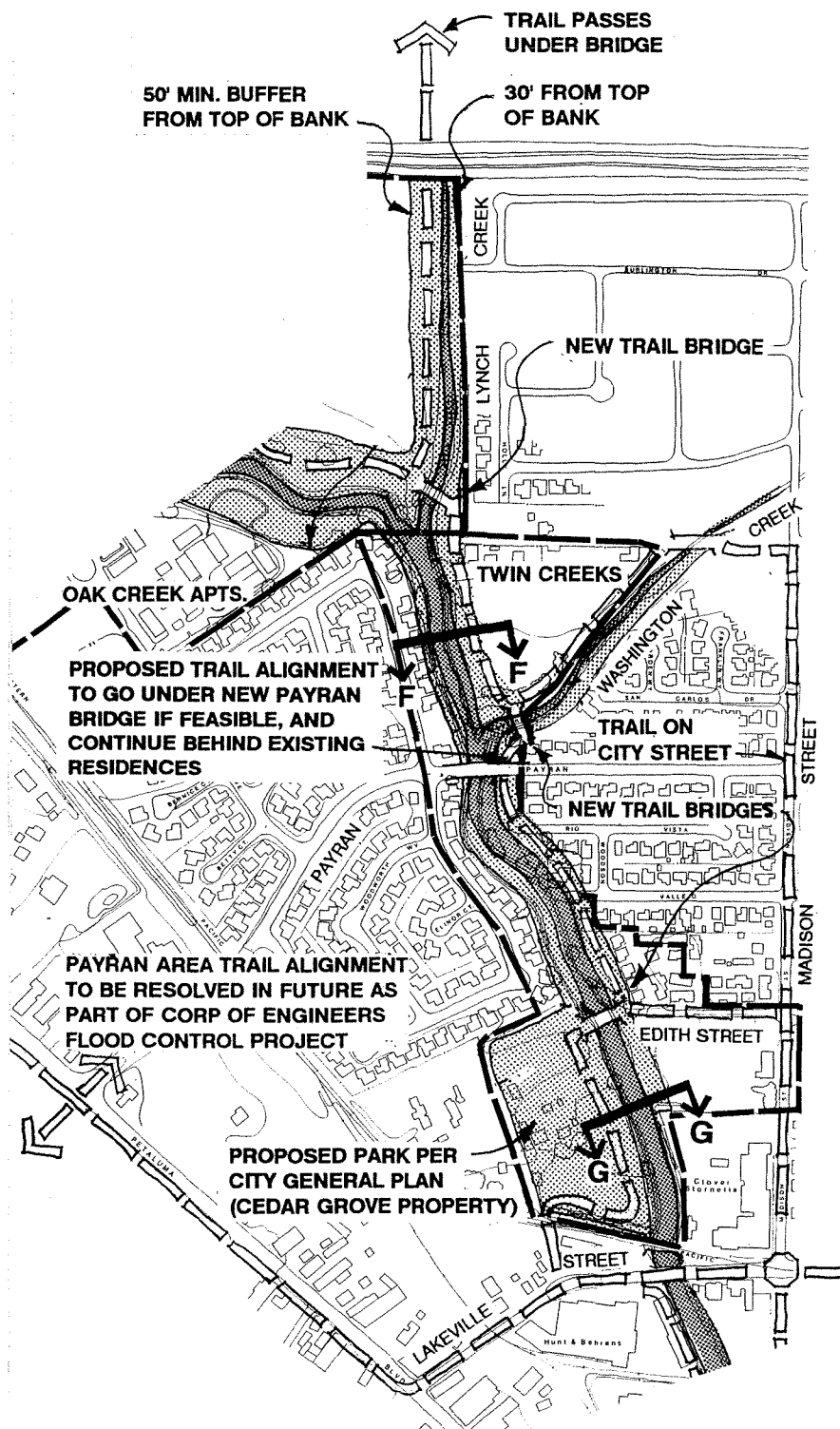
- 25a. *Where installation of the preferred flood control channel might jeopardize the economic viability of the property, consider alternate channel designs that still accommodate habitat restoration, the continuous trail, and other objectives for this segment.*

- 26. *Accommodate flood protection alterations, such as modifications to the river channel, within the greenway.*

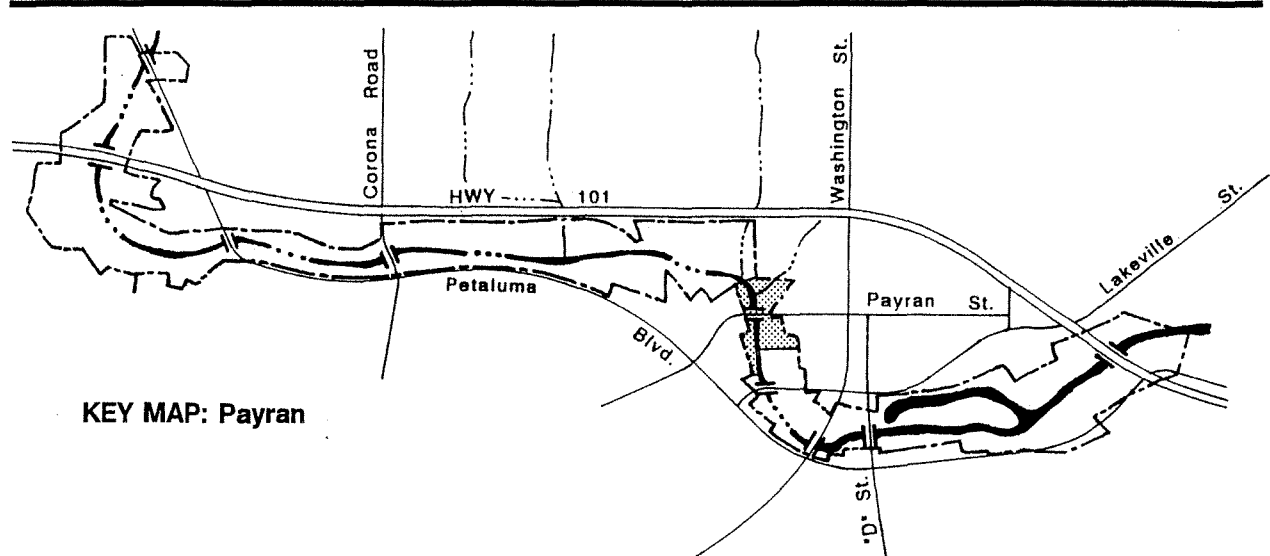


*Flood protection alterations above Corona Road will integrate habitat restoration and trails, and is designed to protect this existing vegetation on the Petaluma Blvd. North frontage.*

- COMBINED PEDESTRIAN & BICYCLE TRAIL 
- PEDESTRIAN ONLY TRAIL 
- TENTATIVE LONG TERM TRAIL 
- WATER SURFACE 
- COMBINED BUFFER & RESTORATION ZONES 
- OAK GROVE/RIPARIAN WOODLAND PRESERVATION ZONE 
- MARSH 
- NEW SIGNALIZED INTERSECTION 
- BICYCLE PARKING 
- WATER ACCESS Existing 
- Proposed 
- GATEWAY 
- STAGING AREA 
- CROSS SECTION 
- SEGMENT LIMIT 



**RIVER GREENWAY & ACCESS PLAN:  
Payran Residential Segment  
(Lynch Creek to RR Bridge)**



KEY MAP: Payran

### 3.4 PAYRAN RESIDENTIAL SEGMENT

**"The Corps project should be designed to allow access to the river...and to preserve wildlife/scenic values."**

Participant in Neighborhood Meeting, 1992

#### 3.4.1 EXISTING SETTING

The mostly residential Payran Segment extends from the confluence of Lynch Creek and the Petaluma River, downstream to the first railroad bridge crossing, excluding the Clover Stornetta Creamery on the east bank, and including the historic Cedar Grove property on the west. The 5-acre Cedar Grove property has been designated in the Petaluma General Plan as a future public park. The river corridor is more developed in this stretch than upstream, with houses, yards, and fences close to the top of bank. The area is subject to frequent and severe flooding.

The Payran reach of the river has previously been modified, straightened, and, in some places, lined with rip rap in unsuccessful attempts to save low-lying properties from further flood damages. Consequently, virtually all of the native vegetation has been removed and replaced over time by grasses and brush. Flood channel modifications now being studied by the City and the U.S. Army Corps of Engineers will again create massive changes to the size and character of the stream in this reach. However, both this flood control project and the new Twin Creeks residential subdivision will provide opportunities for habitat enhancements and a crucial connection in the riverfront trail system.

### 3.4.2 ISSUES AND OPPORTUNITIES

Changes triggered by the City's need to reduce flood damages offer opportunities to provide additional amenities suggested in the General Plan, such as a banktop trail, habitat enhancements, trail links to public parks, and increased access to the river in an area traditionally fenced off and ignored. Improved property values, restored creek frontages, and increased recreational opportunities will spur a general reformation of this central portion of town.

#### Flood Protection

The City and Corps of Engineers' proposed flood control solution along the Payran reach, will result in a significantly widened channel from Lynch Creek to the granary tower at Copeland Street, with banktop maintenance access roads on both sides. Protection from the 100-year flood event may require flood walls along parts of the river. It is the goal of the city that, despite massive changes, flood management techniques will result in a control channel in which habitat values will be improved after construction, and maintenance roads will be safely used as trails by the public. This river plan will provide guidance to city decision makers, but will not supersede the on-going technical design and approval process of the City/Corps project.

#### Trail

The location of the main trail will depend on the final design of the river channel and other flood control alterations. The height of the new Payran Street bridge, for instance, or the height of the flood walls will ultimately influence the decision of whether a banktop trail is appropriate. Flood walls may conflict with safe public access by blocking views of the trail and restricting surveillance. An unused maintenance road could be a greater security and maintenance concern than one that is a well used part of the public trail system. Trail design guidelines for this

segment must remain open-ended until the public discussion of flood management options comes to a close. It is imperative, however, that a trail be created in this neighborhood to allow resident access to the Upstream and Downtown Segments. Therefore, this plan recommends an interim trail route along Madison Street to connect Twin Creeks' riverfront path to Lakeville Street.

#### Historic Features

The Cedar Grove property contains a unique collection of evidence of the long history of settlement in the river valley. The site was a significant location for the Coast Miwok and served as a way-station for travelling 19th Century settlers as well. The small but intact complex of old farm buildings on the site is a rarity within an increasingly urbanized city. Although not architecturally unique, the buildings are representative of the 19th and early 20th century river valley farmsteads and are of local historic interest.

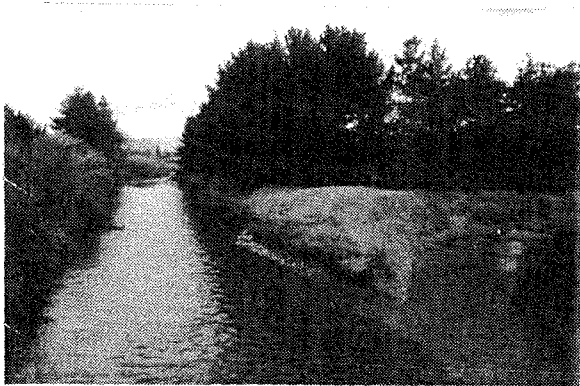


*The old farm complex, significant archeological site, and open riverfront park land makes the Cedar Grove property an unusual and important feature of the greenway.*

Other special opportunities of the Cedar Grove property include an extensive open river frontage and proximity to downtown Petaluma. The combination of these resources offers a unique opportunity to provide public access to the river in a more natural setting (once restored), allow visitors to interpret human settlement along the river, and to create a major destination within the greenway.

**Habitat**

The Army Corps of Engineers' proposed channel widening project includes biotic mitigation measures within the channel design. Despite the short-term disturbance by the construction activities, the City and Corps of Engineers intend to provide more (and more valuable) habitat with the flood control project. This river plan provides a forum in which this goal is stated and provides guidelines on how it can be reached.



*A bank top trail and habitat enhancement, in conjunction with flood protection, will be provided at the proposed Twin Creeks development.*

**3.4.3 OBJECTIVES**

- (1) CREATE A BANKTOP TRAIL, MAINTAINING THE SAFETY OF USERS AND THE PRIVACY AND SECURITY OF ADJACENT PROPERTIES.*
- (2) ENHANCE THE RIPARIAN HABITAT.*

**3.4.4 POLICIES AND PROGRAMS**

ACCESS AND LANDSCAPE CHARACTER POLICIES

**Trail Alignment**

- 1. Provide a bank-top pedestrian and bicycle trail on the east side of the river.*

Until the banktop trail can be established, an interim trail route can be created on Madison Street to connect Lakeville Street to the Twin Creeks subdivision's waterfront trail.

PROGRAMS

- 1a. Keep the waterfront at Twin Creeks available for public access, as part of the main trail system.*
- 1b. Provide signs along Madison Street to direct pedestrians and bicyclists between Twin Creeks and Lakeville Street until a waterfront trail is created.*
- 1c. If compatible with the ultimate design of the Army Corps of Engineers' flood control project, provide a trail on the east bank of the river.*

Wherever feasible, the trail should be on the maintenance road, if one is required.

- 1d. If possible, provide a new trail bridge across Washington Creek between the Twin Creeks development and the riverfront trail.*

- 1e. *Direct the trail under the new Payran Street bridge, if possible.*
- 1f. *Improve surveillance of the banktop trail by removing or providing easy access around visual obstacles, such as walls and fences.*
- 1g. *Maximize opportunities to provide shade, screen walls, and beautify the flood project with landscaping while still meeting flood carrying capacities of the channel.*
- 2. *Develop city-owned vacant riverfront parcels as components of the greenway and trail system, i.e., as landscaped public pedestrian and visual access points, trailheads, sitting areas and overlooks, recreational opportunities, etc.*
- 3. *After a public park and/or access has been established at Cedar Grove, provide a trail bridge across the river at this site.*

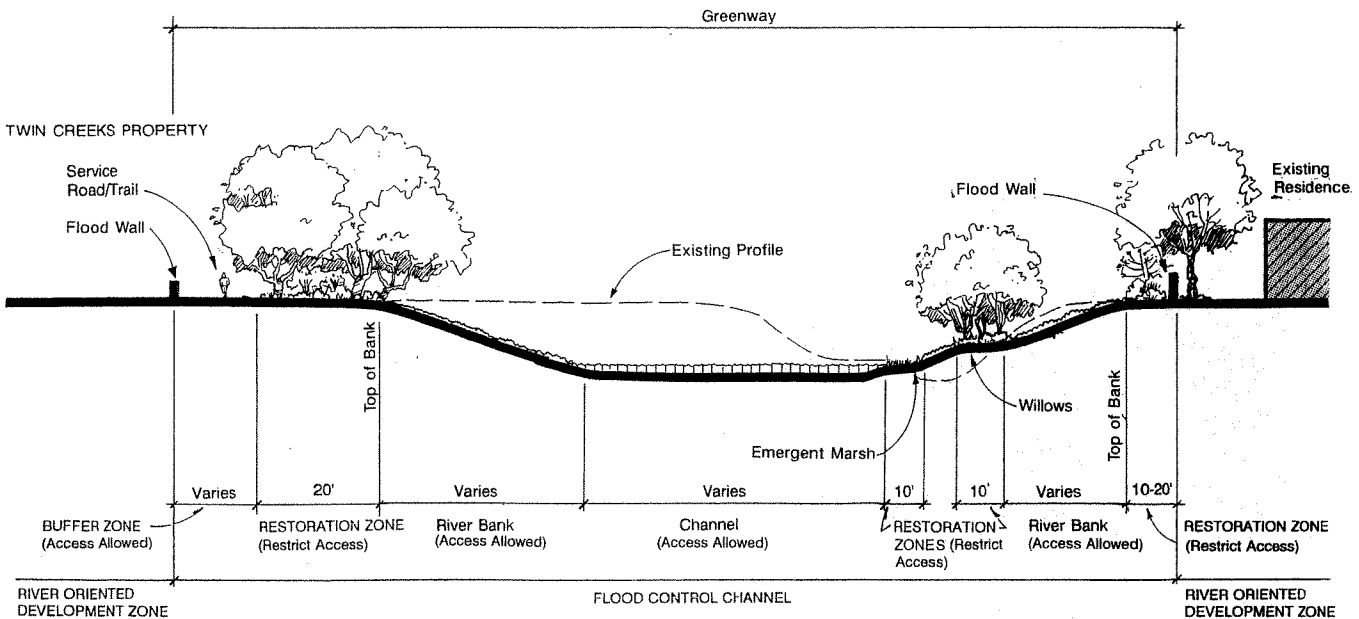
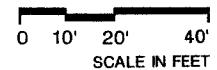
Simple techniques such as clinging vines, canopy trees planted just outside flood walls, and hanging plants can vastly improve the appearance of an altered flood channel.

**Park Development**

- 4. *Develop the Cedar Grove property into a public park as indicated in the General Plan.*

**SECTION F-F PAYRAN REACH - LYNCH CREEK TO PAYRAN ST. BRIDGE**

Looking Downstream  
(From Army Corps of Engineers 8/7/92)



Set back the service road from top of bank, where possible, and establish a minimum 10' to 20' wide restoration zone.

As one of the important open space and cultural resources along the greenway, the City should take advantage of the unique features recognized in the Existing Conditions Report in the development of the park.

**PROGRAMS**

- 4a. *Include provisions in the park design to preserve and interpret elements of the scenic farmstead, archeological site, flood alterations, and habitat improvements.*
- 4b. *Encourage direct river access and a haul-out zone for small, non-motorized water craft such as canoes and kayaks.*

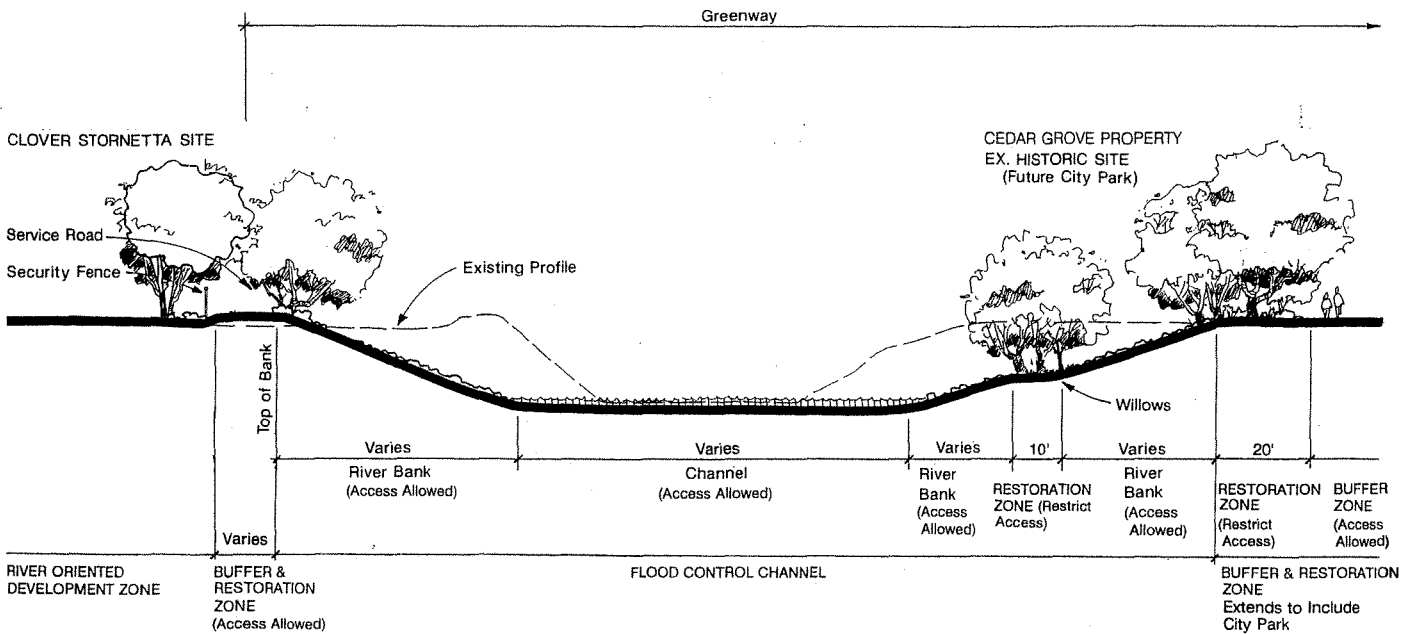
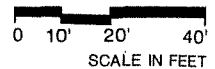
If possible, these facilities should be installed with the COE flood protection project.

- 4c. *Allow public access and limited recreational activities in habitat restoration zones.*

After the river channel is widened for flood protection, it is likely that the Cedar Grove waterfront will be used for habitat restoration. To insure survival of the new landscaping, the restoration area will likely be fenced to preclude access and damage. After the vegetation is established, however, limited use of the restoration area would be consistent with the General Plan's intended park use of the site.

**SECTION G-G PAYRAN REACH - EDITH ST. TO LAKEVILLE**

Looking Downstream  
(From Army Corps of Engineers 8/7/92)



Set back the service road from top of bank, where possible, and establish a minimum 10' to 20' wide restoration zone.

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**NATURAL HABITAT RESTORATION, CREATION  
AND PROTECTION POLICIES**

5. *Include wildlife habitat as an integral part of channel alterations.*
6. *Setbacks from top of bank for new development should leave room for dense plantings of native plants for habitat value and for screening.*
7. *Develop a channel and vegetation management plan in coordination with the flood mitigating alterations.*

Techniques for habitat management, planting guidelines, and other pertinent information are suggested in Chapter 5 and the Technical Appendix Chapter 7 of this plan. Mitigation measures adopted as part of the flood project will also have management requirements.

**PROGRAMS**

- 7a. *Use native plants within the channel and at banktop where possible.*
- 7b. *Encourage clustered groves of trees at the top of the bank in a manner that balances periodic maintenance access to the banktop and channel with habitat enhancement objectives.*
- 7c. *Herbicide and pesticide use should be minimal, highly selective, or eliminated altogether.*

**RIVER ORIENTED DEVELOPMENT ZONE  
POLICIES**

8. *Place particular emphasis on the importance of the river and the need for visual and pedestrian relationships to the greenway in future development and redevelopment of the riverfront properties.*
9. *New development and redevelopment on the Cedar Grove property should preserve the site's archaeological and historical values.*

When public access is provided to this site, interpretive facilities can educate visitors about the community's history and evolution. The Cedar Grove property is unique in the blend of historic artifacts found at this site, and future use of the site should celebrate this uniqueness.

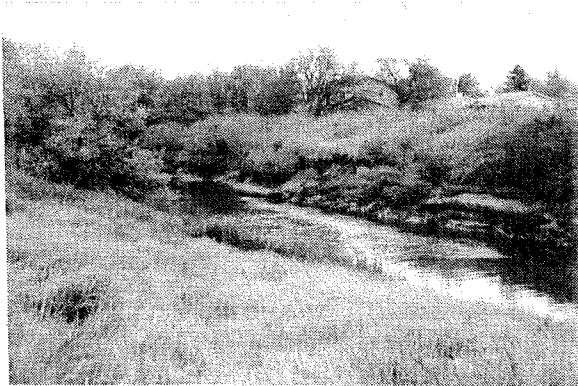
**FLOOD PROTECTION POLICIES**

10. *Any modifications to the channel configuration should incorporate habitat and aesthetic objectives as much as possible.*

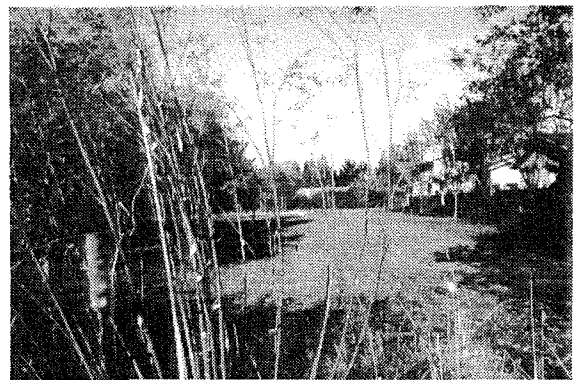
The City will continue to work with the Corps of Engineers in the development of a combined flood control and habitat restoration plan. Biogeotechnical methods of construction can not only replace damaged habitat, but provide beautiful surroundings, reduce bank erosion, and improve the overall health of the river corridor.

11. *Secure necessary approvals to use the eastern maintenance road as a public trail.*


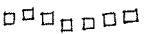
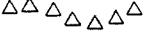



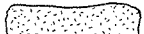










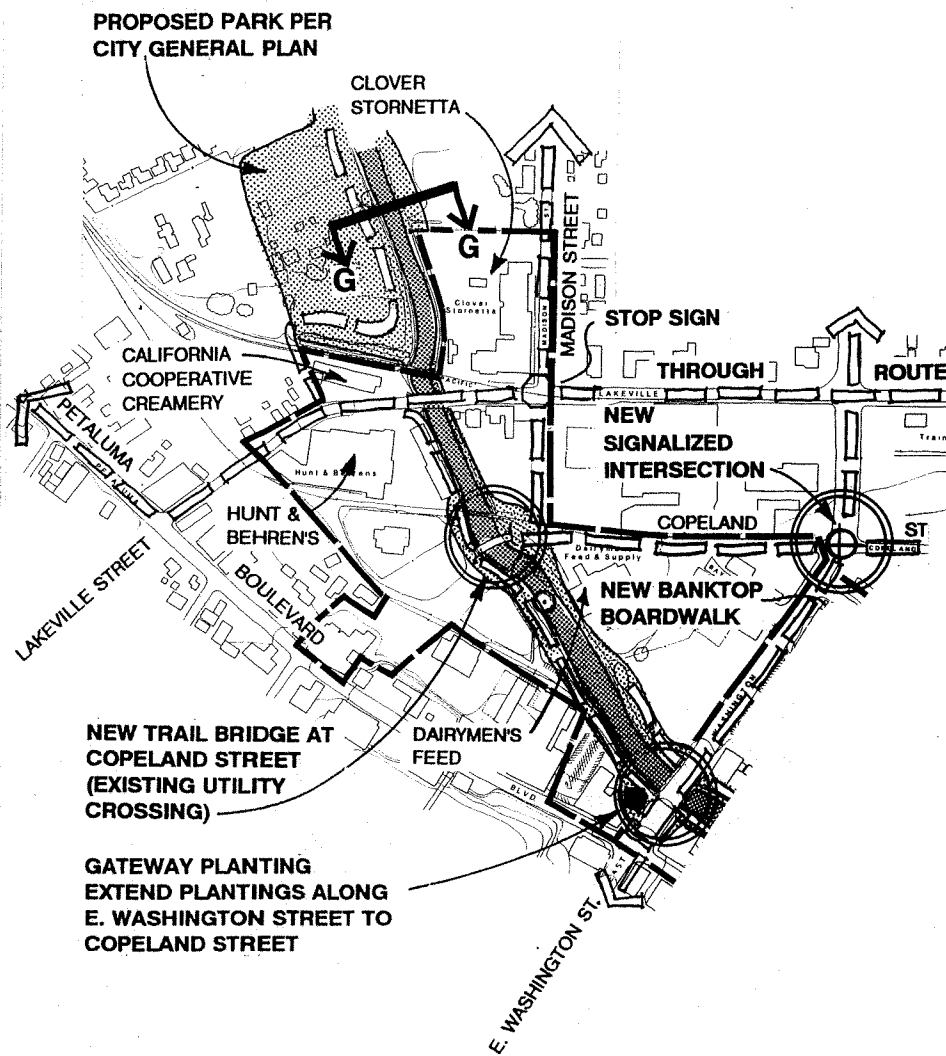


*The flood protection proposal at the Cedar Grove property is to widen the channel, ease the banks, restore habitat, and enable limited recreational access to the river.*

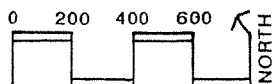
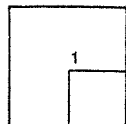


*A widened flood channel is planned along the river frontage for this residential area upstream of Edith Street.*

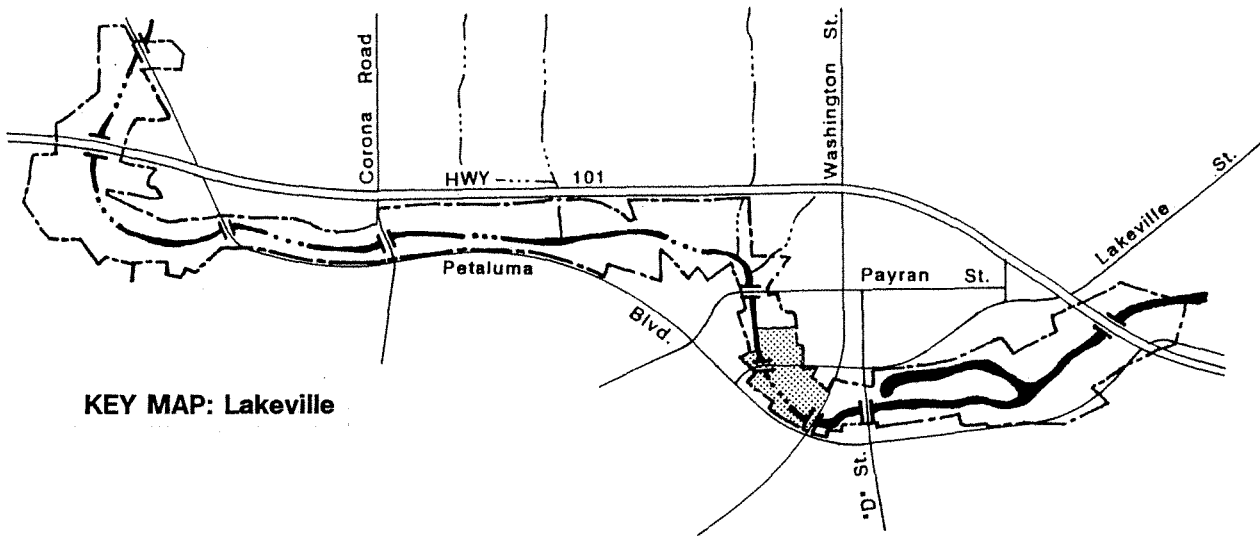
- COMBINED PEDESTRIAN & BICYCLE TRAIL 
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- TENTATIVE LONG TERM TRAIL 
- WATER SURFACE 
- COMBINED BUFFER & RESTORATION ZONES 
- OAK GROVE/RIPARIAN WOODLAND PRESERVATION ZONE 
- MARSH 
- NEW SIGNALIZED INTERSECTION 
- BICYCLE PARKING 
- WATER ACCESS Existing 
- Proposed 
- GATEWAY 
- STAGING AREA 
- CROSS SECTION 
- SEGMENT LIMIT 



4 ACRES



**RIVER GREENWAY & ACCESS PLAN:  
Lakeville Industrial Segment  
(RR Bridge to E. Washington St.)**



### 3.5 LAKEVILLE INDUSTRIAL SEGMENT

**"Multi-use, diversity is essential, both locally and along the 7-mile reach."**

Participant in Community Workshop, 1992

#### 3.5.1 EXISTING SETTING

The Lakeville Industrial Segment is a transition area between the relatively natural upstream area and the intensively developed urban downtown. The segment's northern portion is occupied by large agriculture-related industries including two feed mills (Dairymen's Feed and Hunt & Behren's), the Clover Stornetta Farms creamery operation, and the smaller California Cooperative Creamery. The mills are the two most prominent buildings in the area with tall grain towers dominating the downtown skyline, reminders of Petaluma's agrarian heritage. The southern boundary of the Segment is the Washington Street Bridge, a downtown gateway.

Several undeveloped and under-utilized riverfront properties offer the potential for future infill development with an active river orientation. This plan envisions and encourages infill construction with an urban character, high density pedestrian-oriented commercial, residential activities, and a landscaped edge along the river. The area will draw pedestrians from the downtown by its colorful mix of activities, tree-lined river top pathway, and historic architecture. The Lakeville Industrial Segment encourages apartments and live-work units to support businesses in the downtown area.

### 3.5.2 ISSUES AND OPPORTUNITIES

#### General Plan

The predominant General Plan land use designation of Mixed Use provides the potential for the Lakeville Segment to redevelop into a mix of higher intensity retail, office, restaurant, and residential uses. Mixed use development would provide opportunities to increase pedestrian activity and access to the river. The Dairymen's Feed, Hunt & Behren's, Clover Stornetta and the California Creamery agricultural-support operations are expected to continue as viable commercial operations for the foreseeable future, and the City, through its General Plan, is encouraging them to do so.

#### Trail Alignment

In general, this plan proposes to use the eastern maintenance access road as the banktop trail, where available. Lakeville Street, however, acts as a bottleneck to the continuous banktop trail alignment, and the current schematic flood control designs do not accommodate the trail under the bridge. A non-vehicular crossing of Lakeville Street would not be convenient at the bridge, either. Therefore, accommodations should be made to provide a safe trail crossing at Madison Street. As the Corps of Engineers project progresses, the opportunities to align the trail under the bridge should still be sought.

The railroad spur line presents another possible obstacle to riverfront pedestrian access, yet safe at-grade crossings may be possible.

The small structures that carry utilities (sewer, telephone) across the river in this area have long been used as a pedestrian crossings, primarily by school age children within the McKinley Elementary School area. These crossings will be modified to reduce the potential for damage during flood events. If the utilities remain above ground, their reconstruction will provide an opportunity for a safe, official pedestrian route across the river. Relocation of the utilities will also improve access for shallow water craft, which are now often blocked by the low lying pipes.

Any riverside improvements must take into account the special concerns of the food and grain-processing businesses of this area, including:

- \* Fences to separate the trail users from the trucking or food-processing activities.
- \* Revegetation of the riverbanks in a way that does not encourage an increase in vermin, which could infest the food-processing areas.

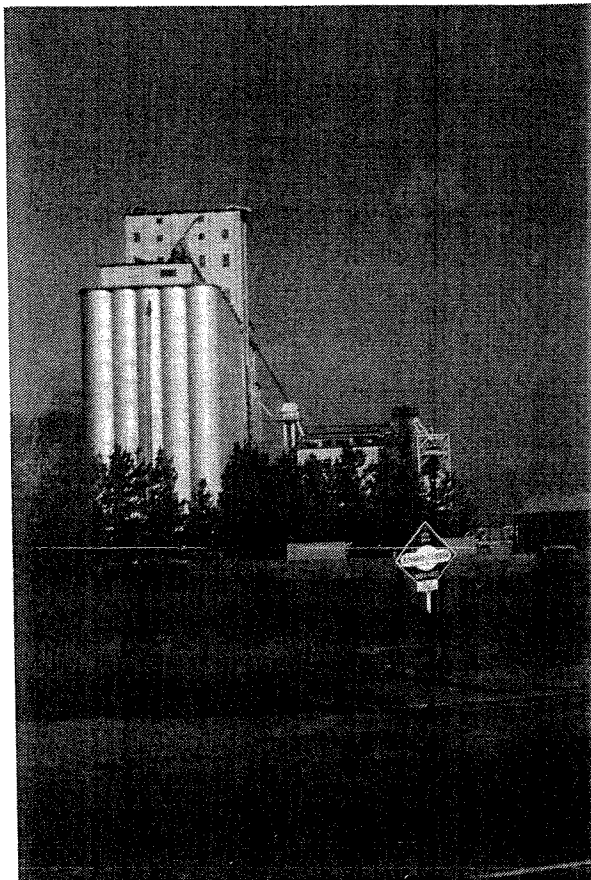
#### Historic Features

The forms and prominent locations of the two feed mills and other agriculture-related structures provide distinctive and valued character to the city. They serve as a reminder of Petaluma's past as a center for farming and commerce, and the important role played by the river in the town's evolution. These buildings, as well as the brick buildings lining Petaluma Boulevard, constitute important historical and visual landmarks which should be preserved.

New development in this area should respect and further the historic ambiance of this neighborhood.

**Habitat**

The Corps' proposed channel modification project would substantially widen the existing river channel upstream of the Dairyman's Feed building. Because of existing building locations, only a narrow strip at the top of bank will be available in this area for maintenance access and planting with riparian trees and shrubs. Clusters of riparian vegetation may be planted along the upper bank in the portions where the right-of-way permits.



*Dairyman's feed and other prominent features of this segment are highly visible from the Washington Street bridge gateway to downtown, creating a strong initial impression of the river and the historic character of this place.*

**3.5.3 OBJECTIVES**

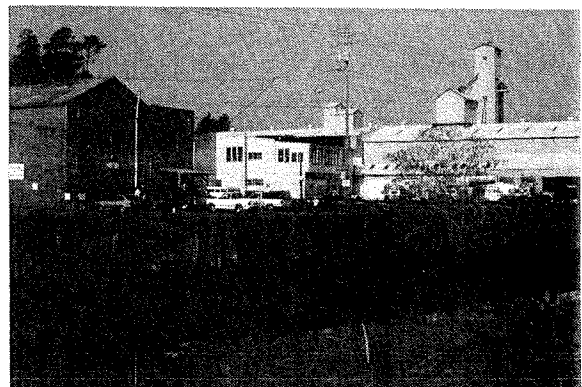
- (1) *MAINTAIN A BALANCE BETWEEN THE URBAN AND INDUSTRIAL NATURE OF THIS SEGMENT, THE REQUIREMENTS FOR FLOOD CONTROL MODIFICATIONS, VEGETATION APPROPRIATE FOR WILDLIFE HABITAT, PUBLIC ACCESS, PRIVACY AND SECURITY, AND VIEWS OF THE RIVER AND INDUSTRIAL AREAS.*
- (2) *NEW DEVELOPMENT ALONG THE RIVER SHOULD REFLECT EXISTING INDUSTRIAL FORMS AND MATERIALS, AND PROVIDE AN ACTIVE URBAN, PEDESTRIAN-ORIENTED EDGE TO THE HISTORIC DOWNTOWN.*

**3.5.4 POLICIES AND PROGRAMS**

ACCESS AND LANDSCAPE CHARACTER POLICIES

**Trail Alignment and Design**

- 1. *Provide safe pedestrian and bicycle access along the river as much as possible, within the constraints of the industrial uses, flood mitigation needs and the narrowness of the right-of-way.*



*The properties along Water Street above the Washington Street bridge offer an opportunity for river-oriented redevelopment, complementary to the old buildings with a waterfront promenade, open spaces, stabilized banks, and trees.*

**PROGRAMS**

- 1a. Provide access from Lakeville Street to the Cedar Grove property at the property's existing driveway.*
- 1b. Provide a sidewalk trail connection along Lakeville Street from Madison Street to Petaluma Boulevard North.*

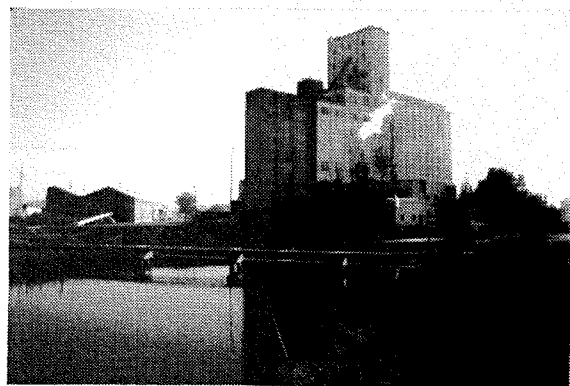
A sidewalk trail refers to a simple posted route using existing streets and sidewalks.

- 1c. Provide a trail crossing of Lakeville Street at a new stop sign or stop light at Madison Street.*
- 1d. Provide a sidewalk trail and, if room permits, bike lanes along Madison Street between Lakeville Street and the Ellis Street bridge to Twin Creeks.*
- 1e. Provide a trail south/west of Lakeville Street along the Madison Street right-of-way (currently unimproved) to the Copeland Street right-of-way near the utility crossing of the river.*
- 1f. Provide a new trail bridge where the utilities presently cross the river.*
- 1g. Develop a special stopping place for trail users in the vicinity of the Copeland Street trail bridge.*

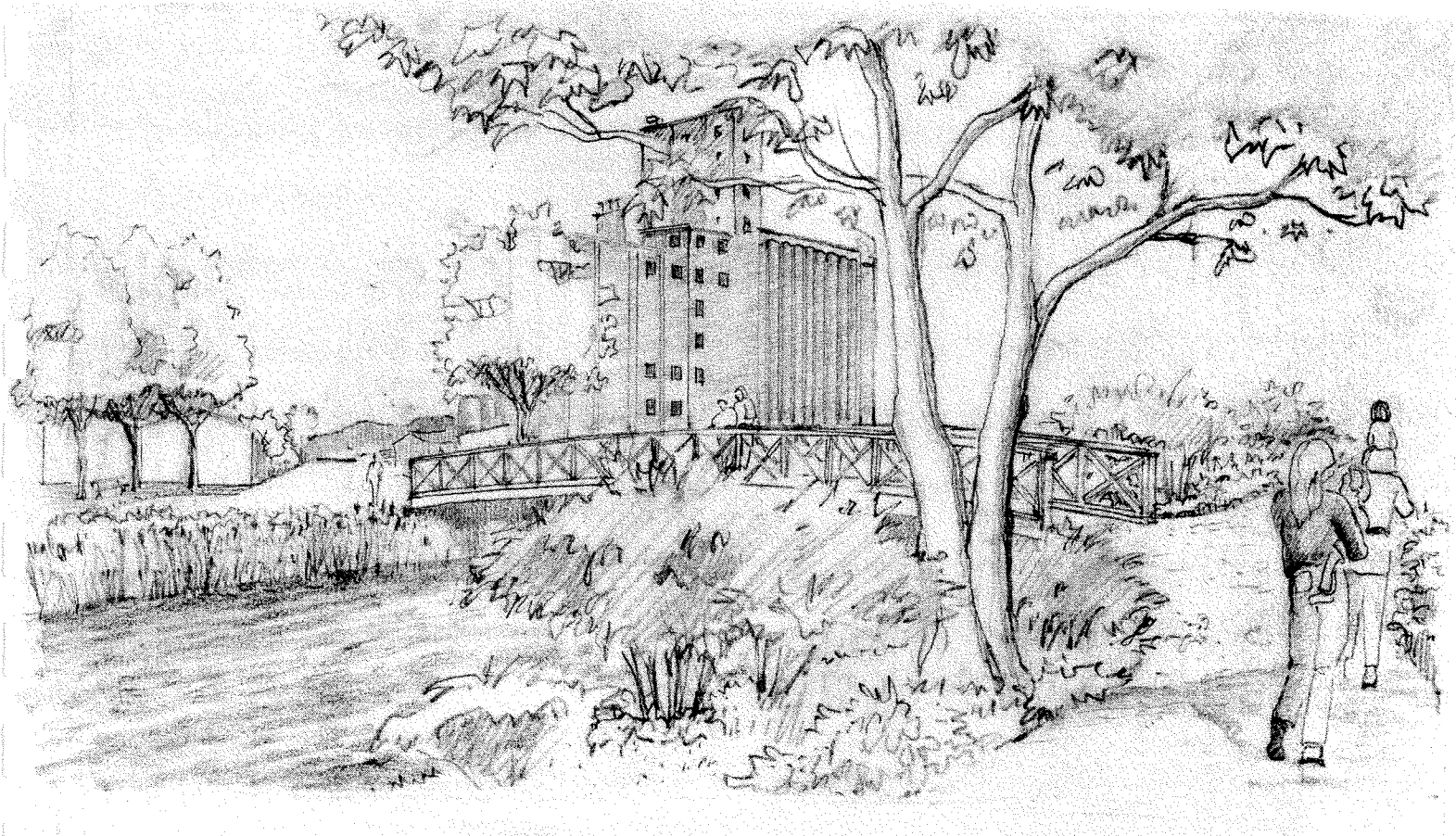
From this vantage point, the visitor can see Dairyman's Feed towers, other industrial facilities, the river, the historic downtown, and the long views toward McNear Peninsula between Copeland Street's agri-businesses.

- 1h. Provide a trail along Water Street between the utility crossing bridge and Washington Street.*

- 1i. Provide a downtown bypass trail route along Copeland Street, from the Lakeville Segment to the McNear Peninsula, past the downtown transit station, with trail and/or sidewalk improvements as necessary.*
- 1j. Provide a bicycle route along both sides of Lakeville Street to bypass the downtown area for bicyclists headed for the Bay Trail or Highway 116.*
- 1k. If the Lakeville Street bridge is reconstructed for flood control improvements, provide adequate width for sidewalks and bike lanes on both sides.*
- 1l. Utilize the flood protection maintenance road along the west bank of the river, if possible as an additional trail connection between Lakeville and Copeland Streets.*



*Dairyman's Feed is behind the existing utility crossing in this view looking toward downtown at the right. The utilities will be raised as part of the flood protection work, and carried beneath a new trail bridge.*

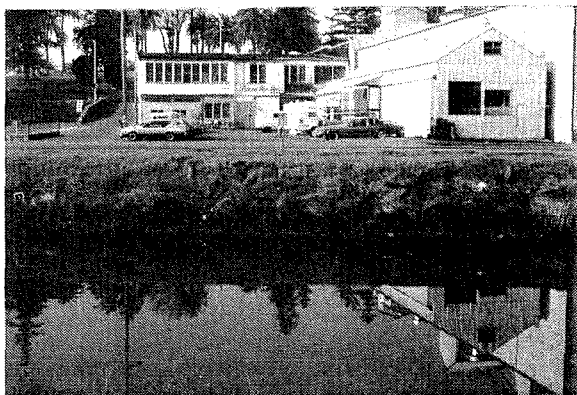


**TRAIL BRIDGE AT DAIRYMEN'S FEED** (conceptual drawing)

The trail proceeds directly to downtown, on the right, or crosses the river at Dairyman's Feed, bypassing downtown and leading directly to McNear Peninsula Park at the end of Copeland Street in the distance on the left. The riverfront's agri-industrial heritage is accentuated at this place to pause along the trail.

**NATURAL HABITAT RESTORATION, CREATION  
AND PROTECTION POLICIES**

2. *Work with the Corps of Engineers in preparation of habitat mitigation plans and development of an environmentally sensitive maintenance and management plan.*
3. *Especially between Copeland and Washington Streets, create a tree-lined riverfront (both sides) with large canopies to provide shade for users of the trail and to enhance the image of the river from Washington Street.*
4. *Except where vertical retaining walls are absolutely necessary to shore up the river bank, biogeotechnical methods should be used to visually "soften" the bank and to increase the amount of habitat.*



The old riverfront warehouses and other structures along Water Street north of Washington Street presently support a rich diversity of uses near the heart of downtown. Improvements to the greenway will further enliven this area.

**RIVER ORIENTED DEVELOPMENT ZONE  
POLICIES**

River Orientation

5. *Emphasize the need for a strong river orientation and outdoor activities, such as outdoor cafes or art displays, in the design of any new development or redevelopment in this river segment.*
6. *Give precedence to the privacy and security needs of existing riverfront agricultural-supporting industrial activity over access goals in this river segment .*
7. *Respect the historic industrial development patterns and architecture of this reach.*

**PROGRAMS**

- 7a. *For any new development or redevelopment in this river segment, incorporate site, building, landscape, parking, and pedestrian design features which serve to create an active, urban, pedestrian-oriented edge along the riverfront.*
- 7b. *Provide points of public pedestrian access to the river at select locations to encourage fishing and boating.*
- 7c. *Provide public vantage points to highlight views.*
- 7d. *Locate new public access to provide adequate separation, security, privacy, and reduced liability to existing industrial uses.*
- 7e. *Repair riverbank sheet walls and, if possible, replace them with a landscaped slope to the river.*



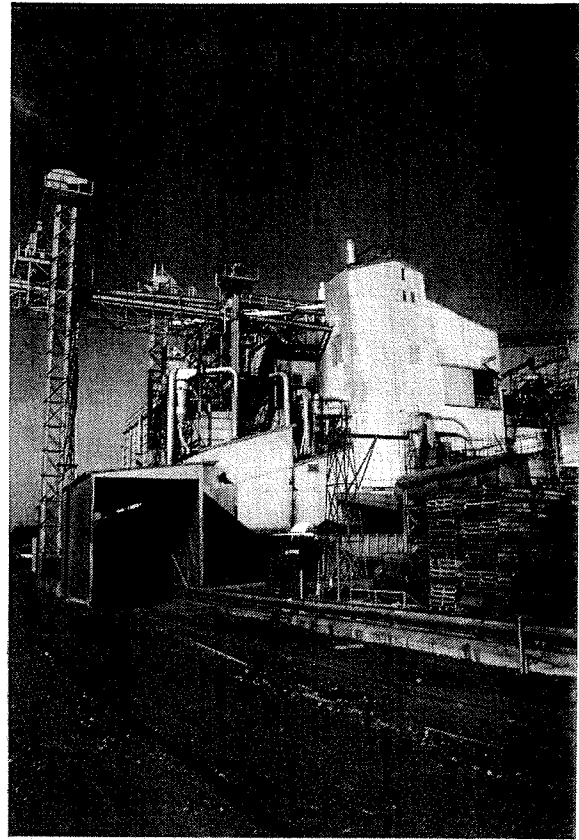
### Sensitivity to Historic Resources

8. *Preserve the historical and visual values reflected in the architectural forms and materials of the Dairymen's Feed and the Hunt & Behren's mill complexes.*

Good examples of appropriate architecture are found at the metal additions behind 256 Petaluma Boulevard North and at the Foundry Wharf complex in the Warehouse Segment.

#### PROGRAMS

- 8a. *In any future conversion of the Hunt & Behren's or Dairymen's Feed & Supply properties, place special emphasis on the preservation of these structures through adaptive reuse wherever possible.*
- 8b. *Reflect existing industrial forms and materials in new infill development and redevelopment.*
- 8c. *Consider retention and use of the rail lines for, at least, historic reference and, if possible, for bus or trolley service between the greater downtown area and the factory outlet village.*



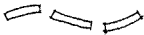
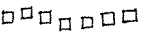
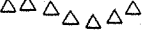












*Hunt & Behren's is part of the active agri-industrial complex in this segment. Public access is designed to avoid conflicts with the operations, but allow views.*

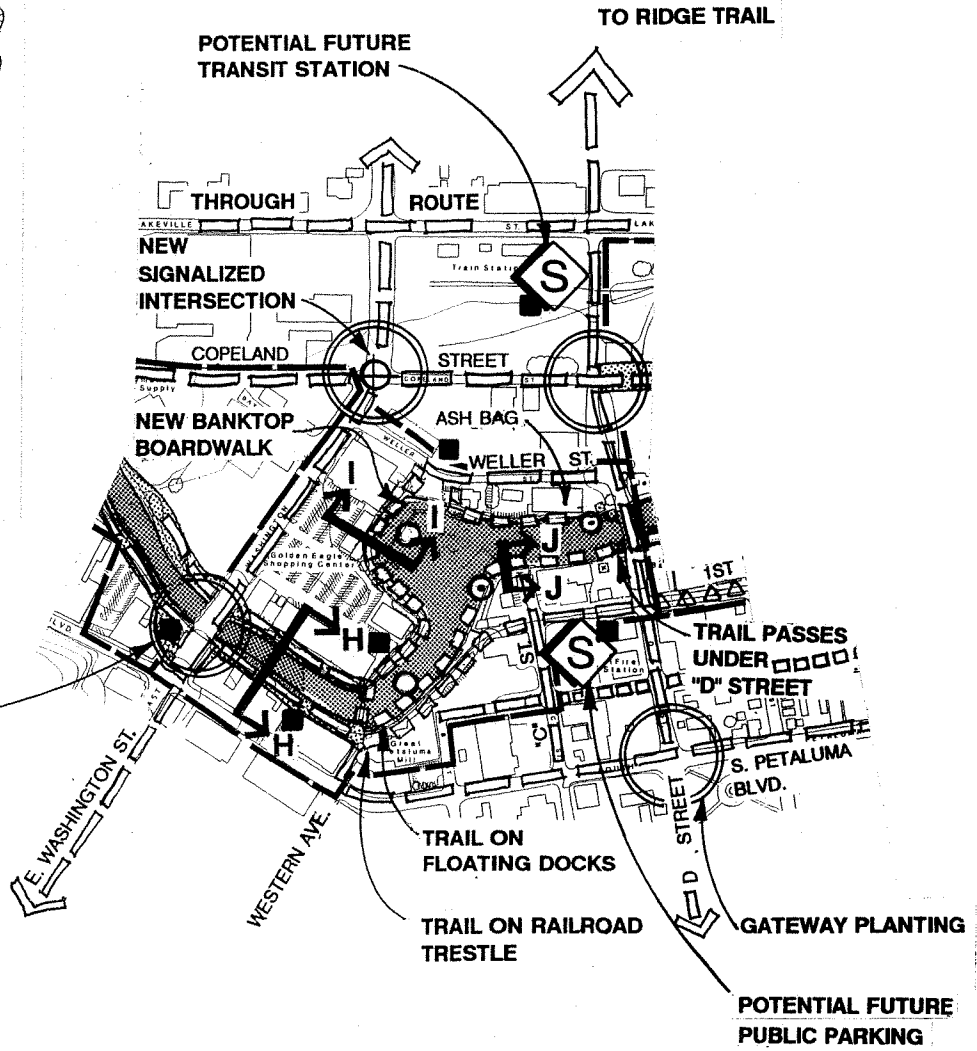
### FLOOD PROTECTION POLICIES

9. *Provide flood protection satisfactory to the City and to the property owners.*

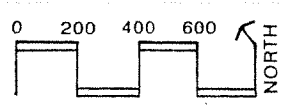
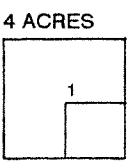
#### PROGRAMS

- 9a. *Use maintenance roads for public access.*
- 9b. *Channel design and planting should fulfill habitat enhancement objectives as much as possible, and result in stable banks.*

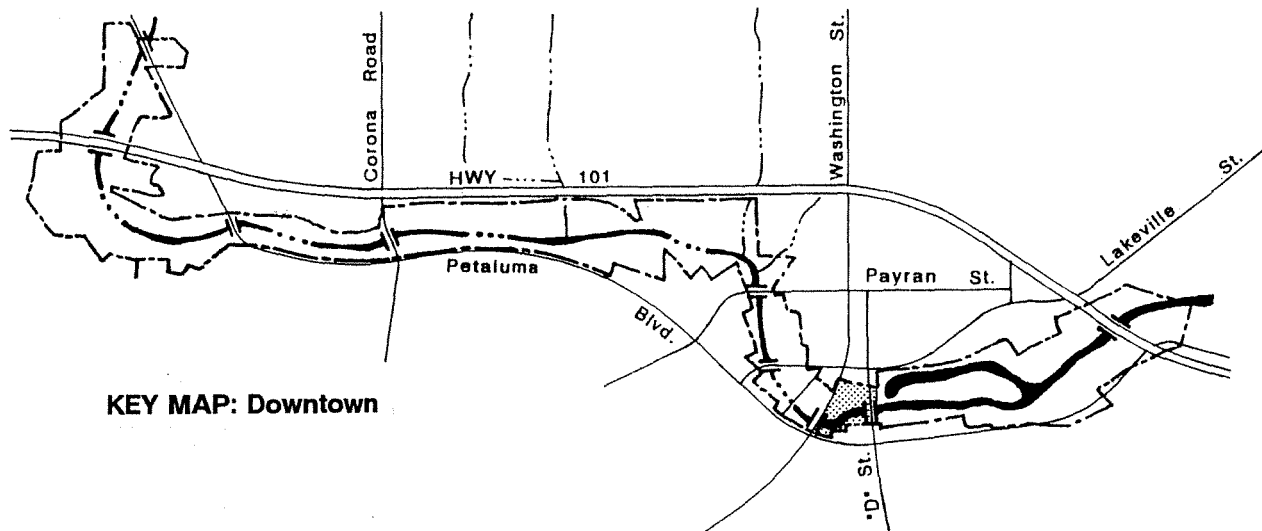
- COMBINED PEDESTRIAN & BICYCLE TRAIL 
- PEDESTRIAN ONLY TRAIL 
- TENTATIVE LONG TERM TRAIL 
- WATER SURFACE 
- COMBINED BUFFER & RESTORATION ZONES 
- OAK GROVE/RIPARIAN WOODLAND PRESERVATION ZONE 
- MARSH 
- NEW SIGNALIZED INTERSECTION 
- BICYCLE PARKING 
- WATER ACCESS Existing 
- Proposed 
- GATEWAY 
- STAGING AREA 
- CROSS SECTION 
- SEGMENT LIMIT 



GATEWAY PLANTING  
EXTEND PLANTINGS ALONG  
E. WASHINGTON STREET TO  
COPELAND STREET



**RIVER GREENWAY & ACCESS PLAN:  
Downtown Segment  
(E. Washington to "D" Street)**



### 3.6 DOWNTOWN SEGMENT

**"(Downtown) is a great place for a fully developed waterfront promenade."**

**"It should be the showplace of the city."**

Participants in Neighborhood Meeting and Community Workshop, 1992

#### 3.6.1 EXISTING SETTING

The centerpiece of the river plan, the Downtown Segment, extends from Washington Street to the "D" Street Bridge. It includes the river edge of the city's central business district, the heart of historic Petaluma. The river frontage includes lively gathering places and commercial enterprises, the Balshaw Bridge, the Golden Eagle Shopping Center, the Petaluma Queen, the Great Petaluma Mill, the River Inn, and the Yacht Club.

Petaluma's unique character and charm, the basis of a growing tourist industry, are founded on its river heritage. The Turning Basin, the central open space, is the destination of boats from around the world, whose owners tie up at the docks to enjoy downtown Petaluma's restaurants, shops and historic waterfront. Visitors and locals gather here to celebrate the river.

Historic buildings define the river's character. Cargo was unloaded from ships and stored here. Many buildings have been renovated with new, river-oriented uses that enliven the waterfront, but other structures and open spaces remain to be improved. Water Street, for instance, is lined with handsome old buildings that can be opened to pedestrians. Downtown's future depends on the river.

### 3.6.2 ISSUES AND OPPORTUNITIES

Expanding on the historic downtown development patterns, providing more commercial activities by the river, extending the existing docks and overlooks to complete the pedestrian experience along the waterfront, and stabilizing the eroding riverbanks with vegetation are easily achieved opportunities in the Downtown Segment. With additional walkways, boardwalks, outdoor cafes, and public plazas in key locations, and re-orientation of buildings towards the water, the entire waterfront will become an outdoor gathering place -- an appropriate central space for this "River Town"- and regional attraction. These improvements should be the earliest phase of this river plan to spark interest and generate further investment in the entire river corridor.

#### General Plan

The General Plan calls for strengthening and broadening the relationship between the river and the downtown. Also suggested is consideration of "an outdoor music or cultural facility at or near the Turning Basin" and a riverfront park downtown. The River Plan recommends that the entire Turning Basin be treated as the outdoor facility, with no specific spot designated for amphitheater-like activities. McNear Peninsula should be the primary riverfront park in the downtown area.

#### Historic Riverfront and Its Buildings

New development should follow the pattern already established by the Great Petaluma Mill, the Yacht Club and other downtown developments that respect the heritage of their location. New uses of old buildings must respond to this setting by following historic development patterns, architectural styles and materials, providing access, and encouraging entry along the waterfront. "Vacant lots should be transformed into retail spaces or inviting public gathering areas.



*The Turning Basin (above) is the heart of the picturesque downtown waterfront, the centerpiece of the River Plan.*

Important tasks that must be completed to enliven the downtown waterfront include:

- \* Restore buildings along Water Street.
- \* Introduce additional retail uses on the ground floor.
- \* Re-orient buildings to allow entry from the river side.
- \* Encourage outdoor eating areas.
- \* Improve pedestrian access along Water Street, preferably over the water.
- \* Complete pedestrian access system around the entire Turning Basin.
- \* Revegetate steep and eroding river banks.
- \* Plant between rip rap with appropriate vegetation.
- \* Restore pockets of salt marsh.
- \* Replace deteriorated wood retaining walls.
- \* Retain vestiges of the historic "working waterfront".

**River Orientation**

Recognizing the universal attraction of water, downtown Petaluma has taken advantage of its waterfront location with numerous riverfront activities (docks, fishing piers, restaurants) directly connected to the water. Yet many opportunities remain to re-orient buildings to the water by adding windows, entrances, or other features on the river side. Increasing numbers of people walking along the waterfront will prompt store owners to open up the river side of their buildings to better serve those potential customers. Therefore, every opportunity to allow people to walk by or near the water is encouraged by the plan.

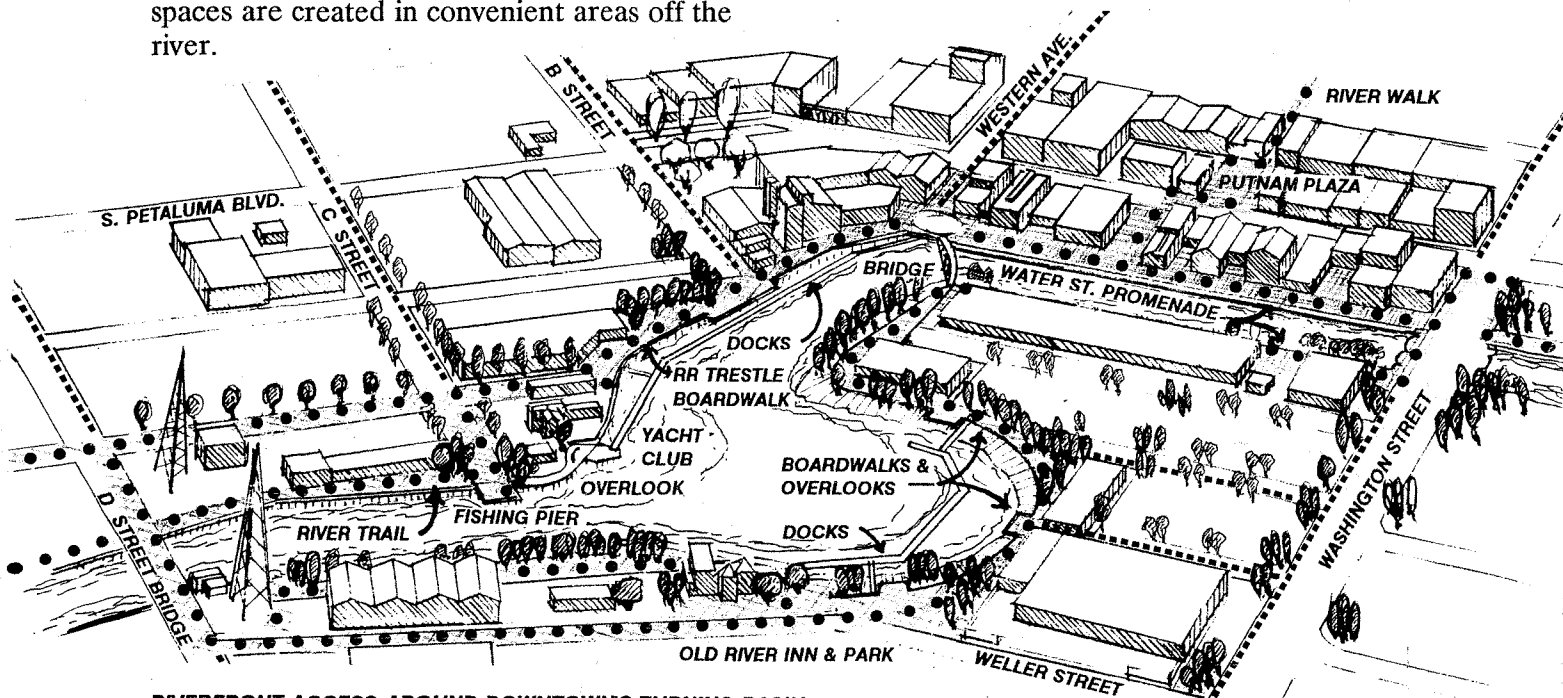
Existing parking along the riverfront occupies prime waterfront space that should be open for pedestrians or businesses. While easy vehicular access to the waterfront retail areas is needed, existing parking areas should be shifted further from the water's edge to provide pedestrian passage until new parking spaces are created in convenient areas off the river.

**Riverwalk Master Plan**

The Riverwalk Master Plan (Johnson, Guthrie Associates, 1986) provides the conceptual basis for a new pedestrian system in the Water Street/Turning Basin area and connections to the rest of downtown. Although only partially implemented, the plan has had a significant enlivening influence on the waterfront, achieving the important goal of encouraging riverfront pedestrian activity. Activity itself tends to be an attraction. The River Plan incorporates and expands upon the concepts contained in that plan.

**Interpretation**

Information about the history of Petaluma should be available throughout the downtown area to foster an understanding of the character of our community (many examples abound, especially in the Great Petaluma Mill and McNear Building, train tracks, Water Street, and remains of the old wharves).

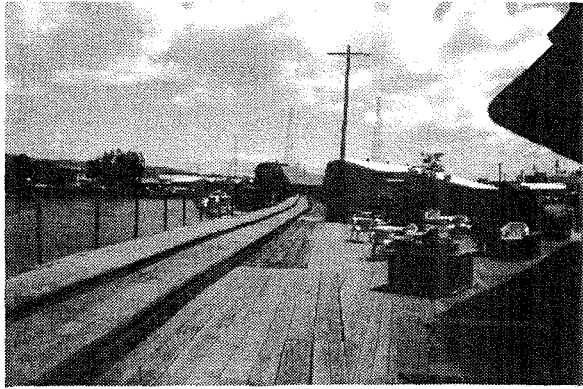


**RIVERFRONT ACCESS AROUND DOWNTOWN'S TURNING BASIN**

A continuous pedestrian walkway around the Turning Basin will help stimulate riverfront commercial activities such as restaurants, outdoor cafes, boat rentals, and specialty retail shops. The trail will provide waterfront recreational and cultural opportunities with places to stroll and rest, overlooks, fishing access, ramps to the boat docks, landscaped and natural park-like settings, terraced seating, river trail connections, and interpretive displays. This will become the activity center of the greenway.

### Railroad Trestle

The wooden railroad trestle which fronts the river at The Great Petaluma Mill contains a "drill track" owned by Southern Pacific Railroad. It was in use, until very recently, delivering feed to the Bar-Ale granary at First and "D" Streets. Rail traffic has been an obstacle to public access and use of this significant waterfront feature. Now that rail



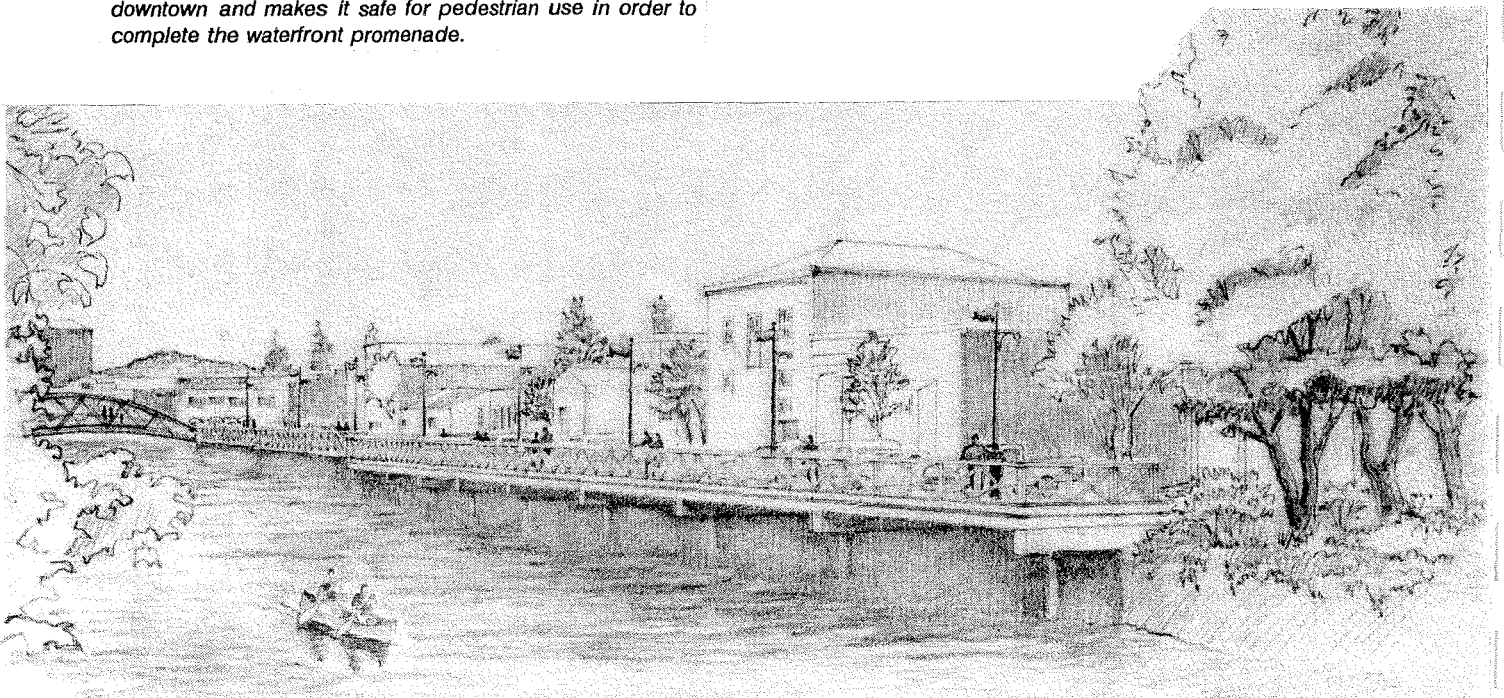
*The City must try to secure use of this railroad trestle through downtown and make it safe for pedestrian use in order to complete the waterfront promenade.*

activity has been discontinued, the City must try to secure use of the trestle to complete the waterfront promenade. Alternate trail routes will be needed if public use of the trestle is not feasible.

Some interest has been expressed in keeping the rail line operating for public transit.

### Gateways

There are two significant gateways to downtown Petaluma that can be developed in this river segment. One gateway begins at the corner of East Washington and Copeland Streets and extends to the river. The other occurs at the corner of Petaluma Boulevard and extends to Lakeville Street along "D" Street. Both gateways occur along major streets where the traveller is first aware of entering downtown Petaluma, and where the river can play a larger role enhancing the image of the city.



### **WATER STREET** (conceptual drawing)

*Riverfront pedestrian activity along Water Street will be increased by shifting the parking and vehicular access away from the water's edge and encouraging river orientation of the businesses. This view is looking downstream from East Washington Street bridge.*

These gateways must emphasize entry to the city and the significance of the river. The following methods will accentuate the connection between the street and the river landscape:

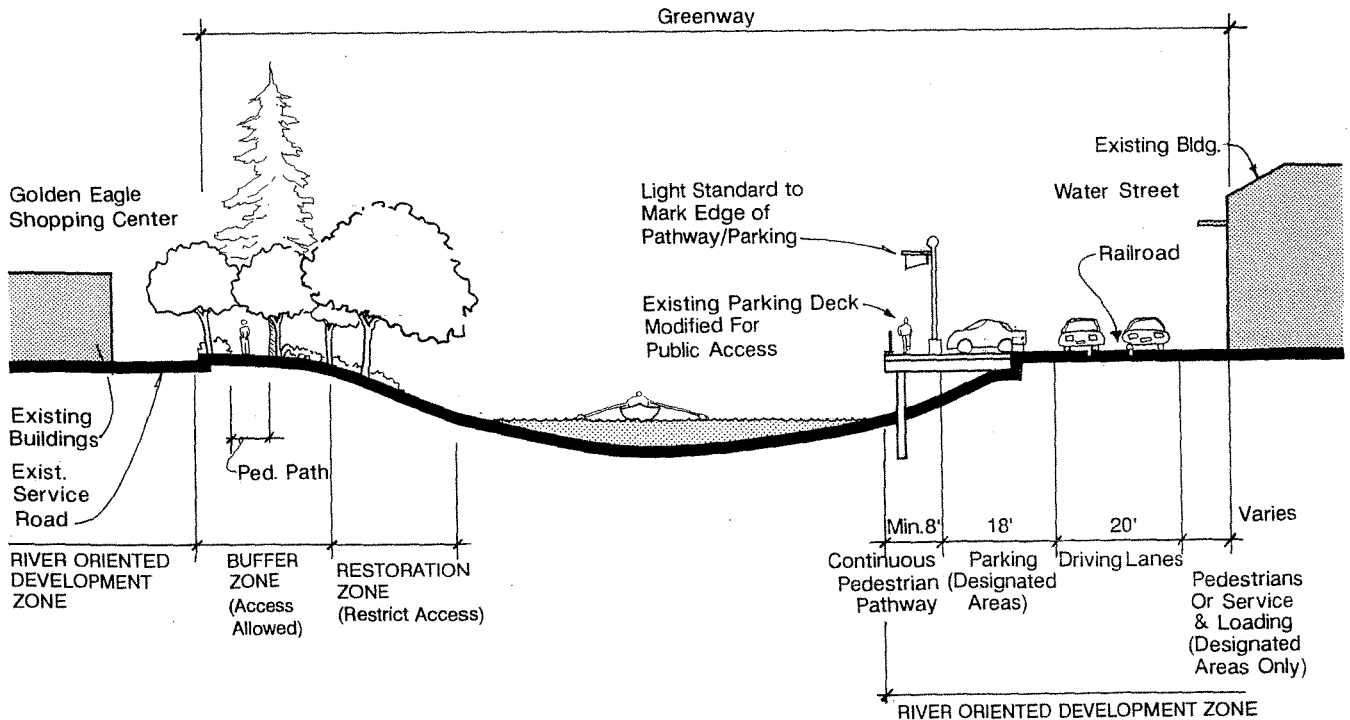
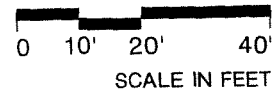
- \* Plant tall, emphatic trees around the Turning Basin to draw the eye toward the river.
- \* Plant trees along Washington Street to direct views downtown and to shade the street, but keeping views of the Golden Eagle commercial area.
- \* Shade the Golden Eagle parking lot with riparian and upland trees.
- \* Emphasize views to the Turning Basin from Petaluma Boulevard intersection with "D" Street.

- \* Orient new structures to direct and enhance views of the river.

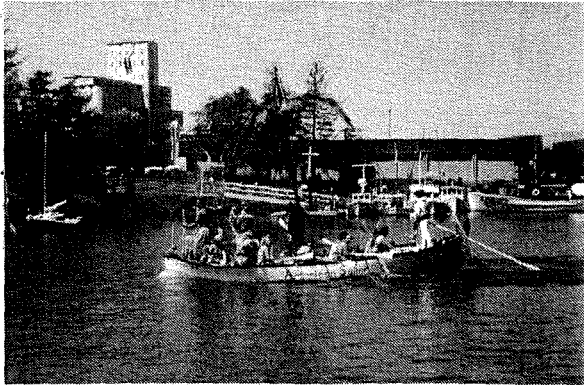


The Riverwalk Master Plan recommends a pedestrian promenade along the existing Water Street parking deck. The first step will be to move cars away from this water's edge in favor of a pedestrian pathway.

**SECTION H-H WATER STREET & GOLDEN EAGLE SHOPPING CENTER**  
Interim Treatment





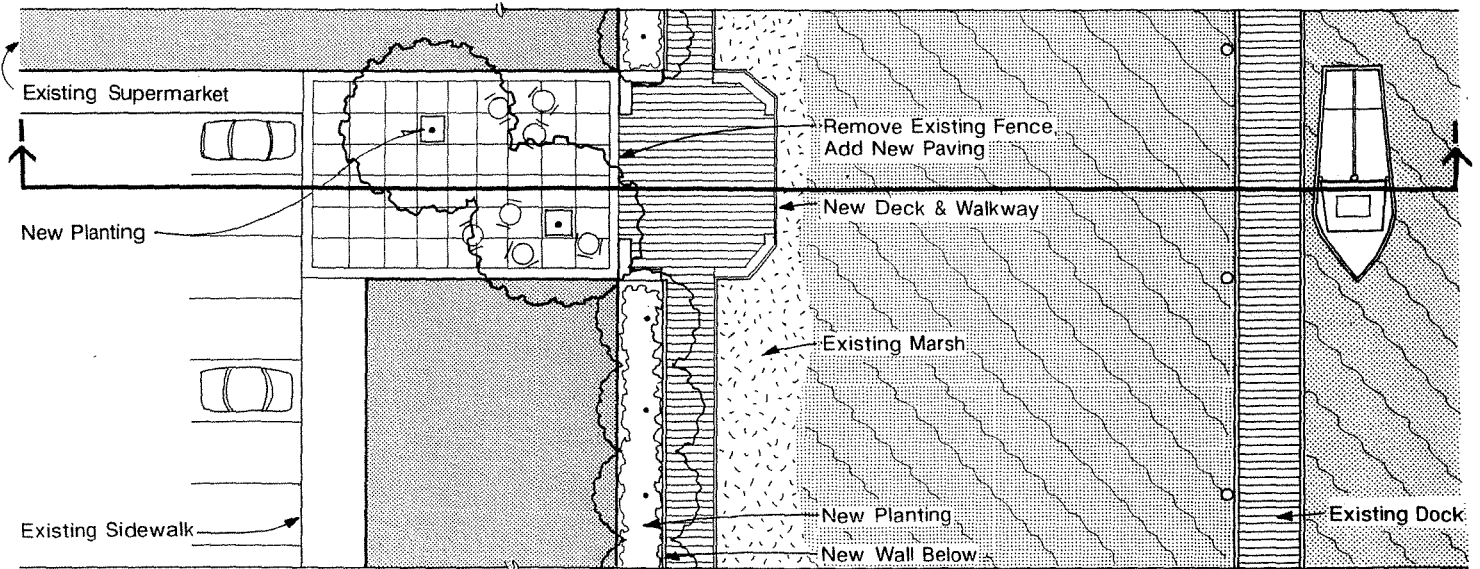
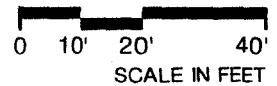


The downtown waterfront is full of recreational water activities, particularly during the annual River Festival. The economic health of downtown is directly linked to the health & vitality of the river.

**Water Access**

The downtown waterfront is a primary place along the river (besides the Marina) for recreational access to the water. Active use of the river and Turning Basin enliven the downtown and make it a more interesting and desirable place to be. There are a number of facilities which currently support short-term boat docking and direct access to the water, and there are opportunities to expand them further. Additional boardwalks, docks, benches, interpretive signs, and landscaping encircling the Turning Basin will create a large outdoor gathering place with the Turning Basin as a central stage: boats, water activities, and visitors would all participate in the "performances". The annual River Festival, which draws tens of thousands of visitors, proves the attraction of the Turning Basin.

**GOLDEN EAGLE SHOPPING CENTER - PUBLIC ACCESS AT EXISTING SUPERMARKET**



**PLAN**



**Habitat Enhancement**

Biological enhancement in this segment, such as pocket wetlands and vegetated banks, would provide greater habitat linkage between the downstream salt marshes and upstream riparian areas. Wildlife and fisheries can be a wonderful attraction within an urban environment. Increased greenery also contributes to the urban design, encourages tourism and pedestrian activity, and enhances the whole city's image by improving the appearance of its central feature.

Because the Turning Basin is Petaluma's central feature and is frequently photographed, landscaping may be permitted more for its visual appearance than for habitat values. As shown in the Chapter 5, however, many native and non-native plant species are encouraged by this plan to provide both beauty and habitat function.

**3.6.3 ACCESS AND ENHANCEMENT OBJECTIVES**

- (1) *FULLY CAPITALIZE ON THE EXISTING DENSE URBAN ACTIVITY AND HISTORIC ARCHITECTURAL CHARACTER ALONG THE RIVER BY EMPHASIZING RIVER ORIENTATION OF NEW AND EXISTING BUILDINGS, AND PEDESTRIAN AND BOATING ACTIVITIES AT THE WATER'S EDGE.*

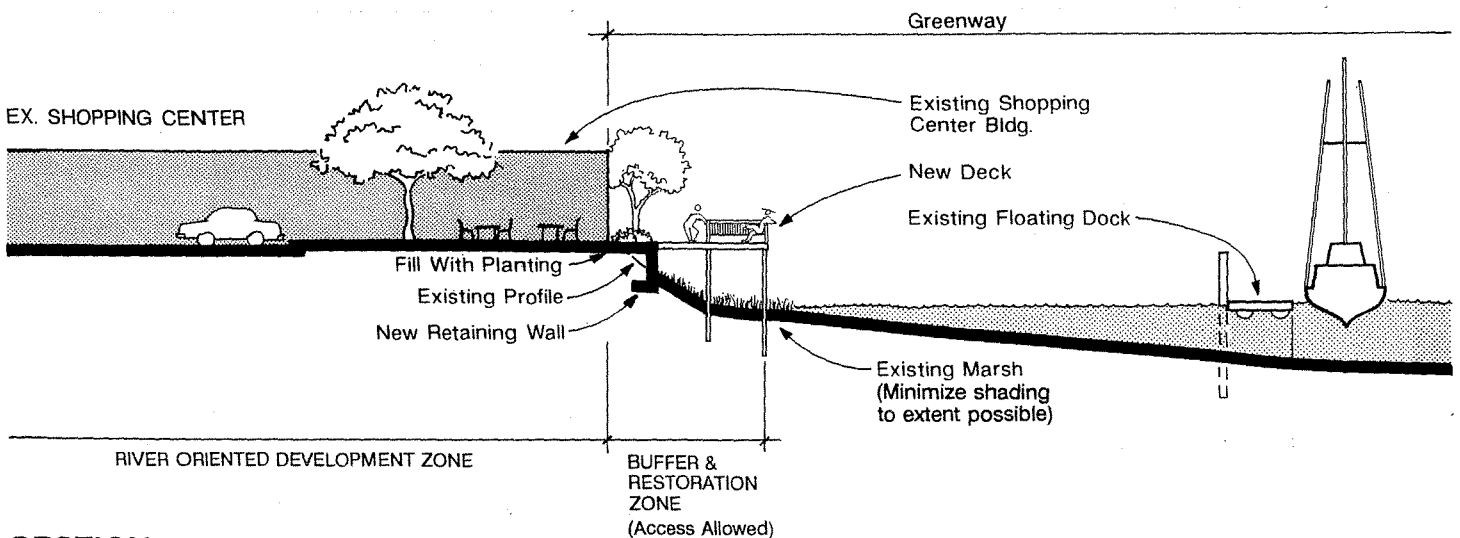
**3.6.4 SPECIFIC POLICIES AND PROGRAMS**

ACCESS AND LANDSCAPE CHARACTER POLICIES

**Trail Design and Alignment**

- 1. *Provide a continuous banktop loop trail around the Turning Basin with pedestrian amenities such as benches and interpretive signage.*

A short-term alignment that responds to existing conditions should be provided until a longer term alignment can be implemented when the rights of way and/or funding is available.



**SECTION I-I**

**PROGRAMS**

*1a. Route the trail to cross Washington Street at the Petaluma Blvd. intersection and return to Water Street, using existing sidewalks.*

Special treatment at the crossing of Water and Washington Streets will be needed to steer pedestrian traffic to the safe crossing at Petaluma Boulevard. Special paving, signs, and landscaping can enhance this dual riverfront-downtown gateway.

*1b. In the short term, shift parking on Water Street to allow a trail along the water's edge with minimal loss of parking spaces (change to diagonal parking if necessary).*

If feasible, new paving, a specially designed rail at the water's edge, new seating, and lighting can be provided to delineate the pedestrian area.

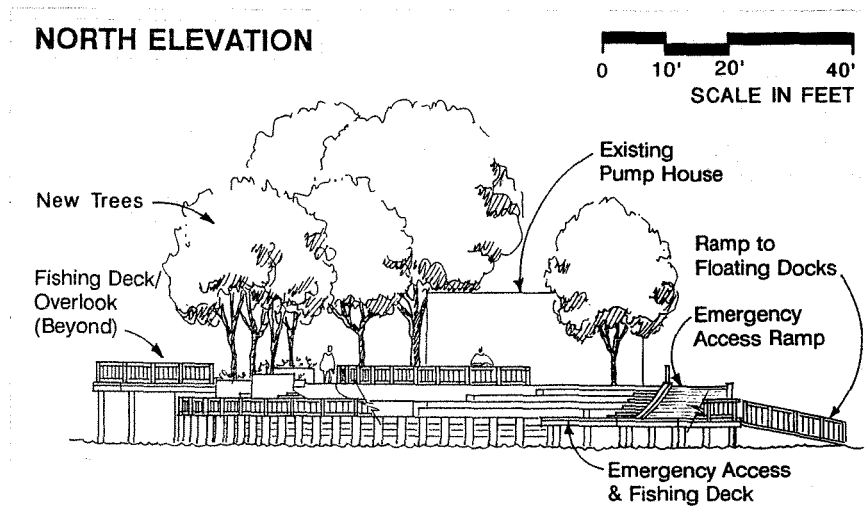
*1c. In the long term, carry out the concepts of the previously approved Johnson, Guthrie & Assoc. Riverwalk Master Plan.*

*1d. Provide a short-term, continuous loop trail around the Turning Basin along the following linkages:*

- *Water Street past the Great Petaluma Mill (with permission to use the railroad trestle) to 2nd Street,*
- *"C" Street, between 1st & 2nd,*
- *1st Street, between "C" & "D",*
- *Across the river at the "D" Street bridge,*
- *Weller Street, from "D" Street to the floating docks by the River Inn/Cavanagh Landing, and*
- *Return to the Balshaw Bridge through the Golden Eagle Shopping Center.*

*1e. In the longer term expand the loop trail by:*

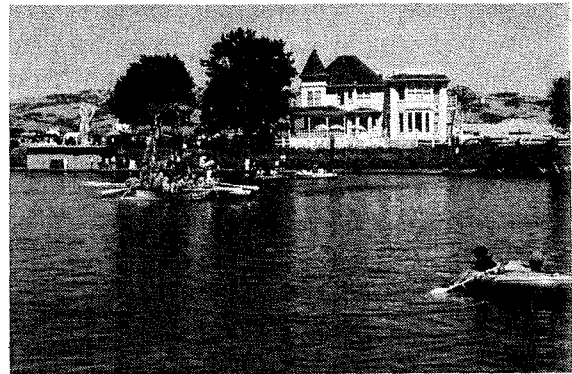
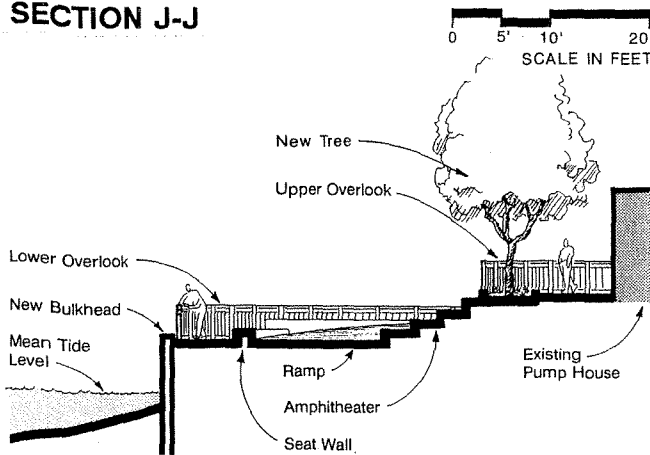
- *Constructing a riverside boardwalk that connects the fishing dock at the end of "C" Street to the Industrial Warehouse Segment (past the PG&E Electrical substation to the other side of "D" Street,*
- *Constructing or allowing banktop access on the eastern side of the Turning Basin between "D" Street and the Old River Inn,*



- *Constructing banktop access to connect Cavanagh Landing to the Balshaw Bridge.*

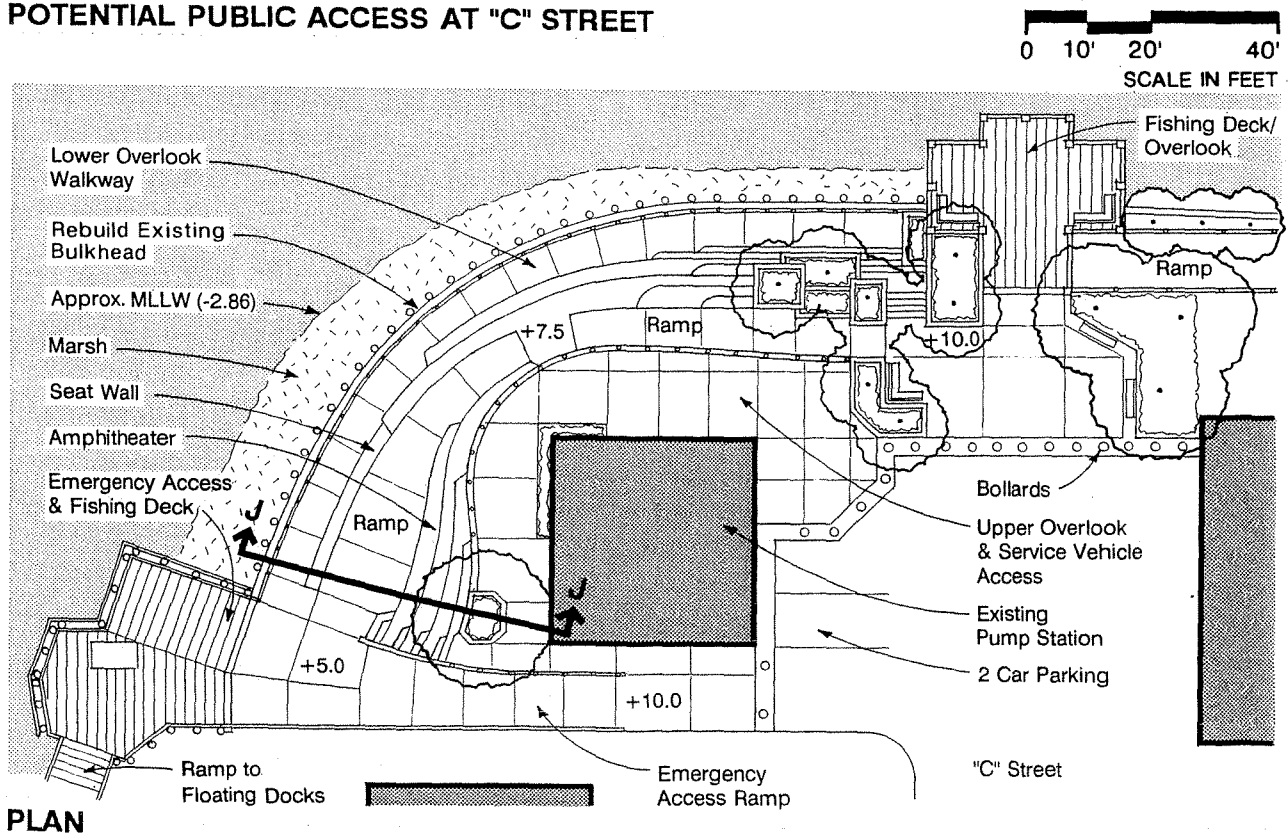
The ultimate trail system will include access at water level (typically on the city's floating docks), on raised boardwalks that look down upon the water scene, and connections to private terraces overlooking the water in nearby commercial areas.

**SECTION J-J**



*The Old River Inn, with its park-like open space on the Turning Basin as seen from 'C' Street, will be connected to the waterfront trail network.*

**POTENTIAL PUBLIC ACCESS AT "C" STREET**



2. *Provide the following trail connections in the downtown area:*

- *Along the east bank of the river, south of the Washington Street bridge (behind the Golden Eagle Shopping Center).*

This should be a banktop pathway for pedestrians only among the trees, adjacent to the existing service road. Businesses in the shopping center are encouraged to open their river facing facades to serve pedestrian clientele.

- *Through the Golden Eagle Shopping Center (with planting and sidewalk improvements where necessary).*
- *From the river (at the utility crossing) to McNear Canal near or along Copeland Street through a new signalized intersection at Washington Street. This route should be designed for both bicycles and pedestrians.*
- *A pedestrian and bicycle route along East Washington and "D" Streets according to the Petaluma General Plan.*
- *Continue the floating docks below the Great Petaluma Mill to a ramp that connects with a new overlook around the point near the Kiwanis dock at "C" Street.*

3. *Designate all trails bordering the Turning Basin (i.e. new boardwalks, floating docks, and wooden bridge) for pedestrians only.*

4. *Convert all rail corridors to trail use wherever possible.*

### Bicycle Parking

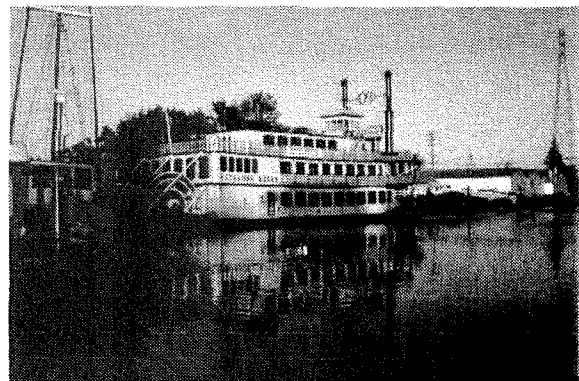
5. *Provide at least the following five bicycle parking areas to encourage the bicyclist to walk and shop in the downtown:*

- *At Water Street north of Washington Street*
- *In the Golden Eagle Shopping Center near the Turning Basin*
- *On Weller Street near the Old River Inn*
- *At the proposed rail depot near "D" Street and Lakeville Street*
- *Near 1st and "D" Streets*

### Gateways

6. *Establish plantings suitable for gateway status along Washington Street between the Washington Street Bridge and Copeland Street and along "D" Street between Petaluma Boulevard South and Lakeville.*

Statuesque trees, color, and riparian species will enhance one's sense of entry into the downtown and highlight the river's presence.



*The Petaluma Queen has called attention to Petaluma's waterfront and nautical history, and has also enlivened the downtown waterfront.*

**Water Access Points**

**7. Provide new water access points in the following areas:**

- On the west bank across from the Dairyman's Feed granary tower,
- On the east bank, just north of the Washington Street bridge, and
- On the east bank just north of the "D" Street bridge.
- Around the pump station at the terminous of C Street.

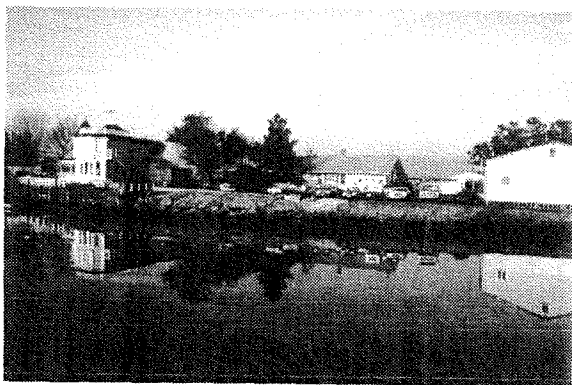
**8. Extend the floating docks in the Turning Basin wherever room allows.**

**NATURAL HABITAT RESTORATION, CREATION AND PROTECTION POLICIES**

**Restoration Zone**

**9. Provide a "safe passage" zone for wildlife between downstream salt marsh and upstream riparian habitat by creating and enhancing pockets of wetland and clusters of dense bank side vegetation.**

**10. Replace deteriorating wood retaining walls.**



Bare, rip-rapped banks can be interplanted to improve the habitat without obstructing views or waterfront uses.

Where room allows, vertical walls should be replaced with sloped, vegetated banks. There are many products on the market, such as geotextiles, interlocking concrete blocks, and coconut coirs that provide bank stability and allow vegetation to flourish.

**11. Improve the habitat value of existing rip-rapped or unvegetated earthen slopes.**

**RESTORATION PROGRAMS**

**11a. Establish lower bank planting with native riparian/estuarine species.**

**11b. Protect, enhance, and expand existing "pockets" of salt marsh vegetation.**

**11c. In the short term, plant native shrubs and groundcover among the rip-rap.**

**11d. In the long term, remove the rip-rap and replace with erosion-resistant structures, such as plantable concrete block or others that allow vegetation to grow through the material.**

**11e. Plant barren or lightly landscaped earthen banks with native plants.**

**11f. Plant banktop areas with natives or compatible non-native landscaping to blend with existing vegetation.**

The use of aggressive exotic vegetation should be avoided. Populations of existing exotic plants should be controlled to avoid their spread. Chapter 5 contains technical information and lists of suggested species.

**12. Maintain open views of the historic buildings rather than screening with dense trees.**

**13. Landscape plans must consider public safety by providing defensible spaces.**

In the downtown area, where people congregate at all hours, it is important that dense landscaping not create cover for criminal activities.

- 14. Allow non-aggressive, non-native vegetation where it will beautify a scene, provide a splash of color, or create a desired aesthetic effect.**

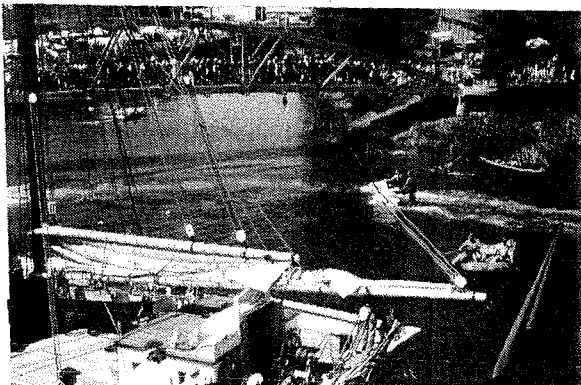
Although many native riparian species may meet these requirements, flexibility is allowed in the downtown area in order to maintain visual interest and to allow integration with the existing urban landscape.

#### RIVER ORIENTED DEVELOPMENT ZONE POLICIES

##### **Strengthening the Downtown-River Relationship**

- 15. Place a strong emphasis on river orientation in all future development and redevelopment along this river segment.**

- 16. Strengthen and broaden physical relationships between the river and the downtown.**



The Balshaw Bridge, a pedestrian improvement recommended as part of the Riverwalk Master Plan, serves as part of the continuous theatrical space encompassing the Turning Basin.

#### PROGRAMS

- 16a. To the extent possible, require all future riverfront development and redevelopment to have entrances, windows, balconies, patios, and other exterior features that relate directly to the waterfront and areas of public access.**

- 16b. To the extent possible, require that all future riverfront development and redevelopment on this river segment include active interior areas which are oriented to the river, such as overlooks, offices, conference rooms, entrance areas, etc.**

- 16c. Promote new development, redevelopment and activities that will add vitality and pedestrian activity along the river.**

- 16d. Encourage future new development or redevelopment of riverfront properties to provide pedestrian and visual connections between the street and the river.**

- 16e. Encourage mixed use development (e.g., ground floor commercial combined with upper story residential).**

- 16f. Encourage development of a small riverfront, river-oriented hotel or bed and breakfast type facility in the downtown area, to complement downtown activities and strengthen the area's acknowledgement of the river.**

#### **Adaptive Reuse of Historic Buildings**

- 17. Protect historic buildings along the riverfront and encourage new river-oriented uses within these structures.**

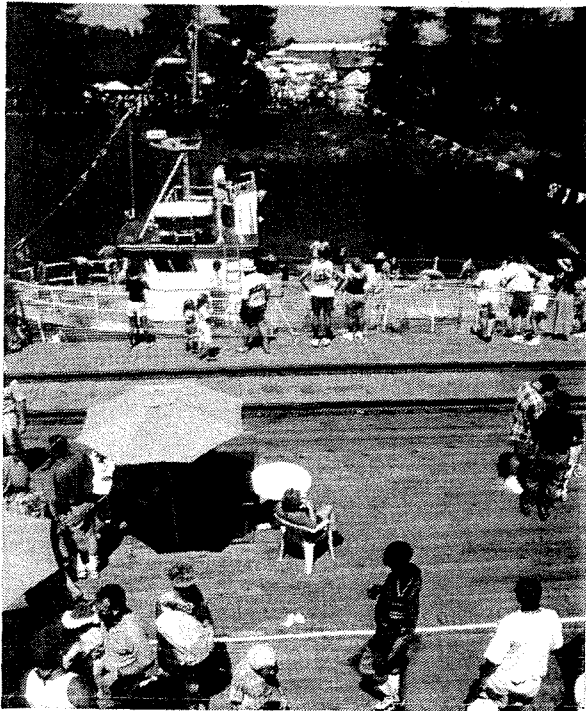
**PROGRAM**

*17a. Provide flexibility in zoning regulations to allow creative re-use of old structures.*

On a case-by-case basis, parking requirements, building setbacks, and other standard zoning regulations should be relaxed if the alternative is non-use or demolition of significant waterfront structures. Flexibility should also be provided to allow redevelopment or construction of new buildings in historic style or locations.

**Riverwalk Implementation**

*18. Give precedence to pedestrian and visual access over parking needs along the Turning Basin periphery as recommended in the Riverwalk Master Plan.*



Access along the top of the bank at the Golden Eagle Shopping Center, seen across the river, will help activate both sides of the Turning Basin. The existing trees can be integrated with the pedestrian walk.

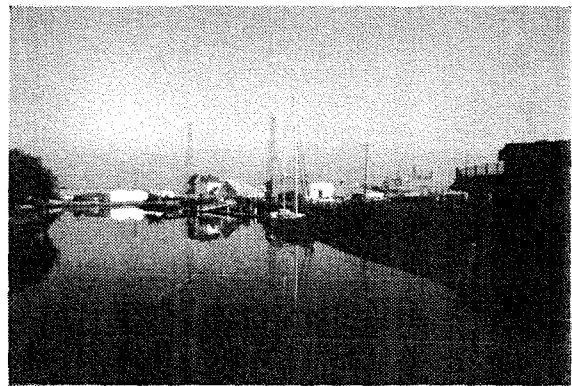
**PROGRAMS**

*18a. In the short term (until new convenient parking is provided) adjust parking along Water Street by shifting it further from the railing where possible to provide pedestrian access along the river.*


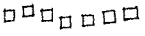
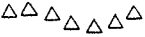












*18b. In the long term replace some or all of the existing riverfront parking spaces along Water Street with a more appropriate riverwalk and associated river-related amenities.*

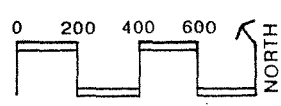
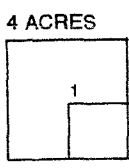
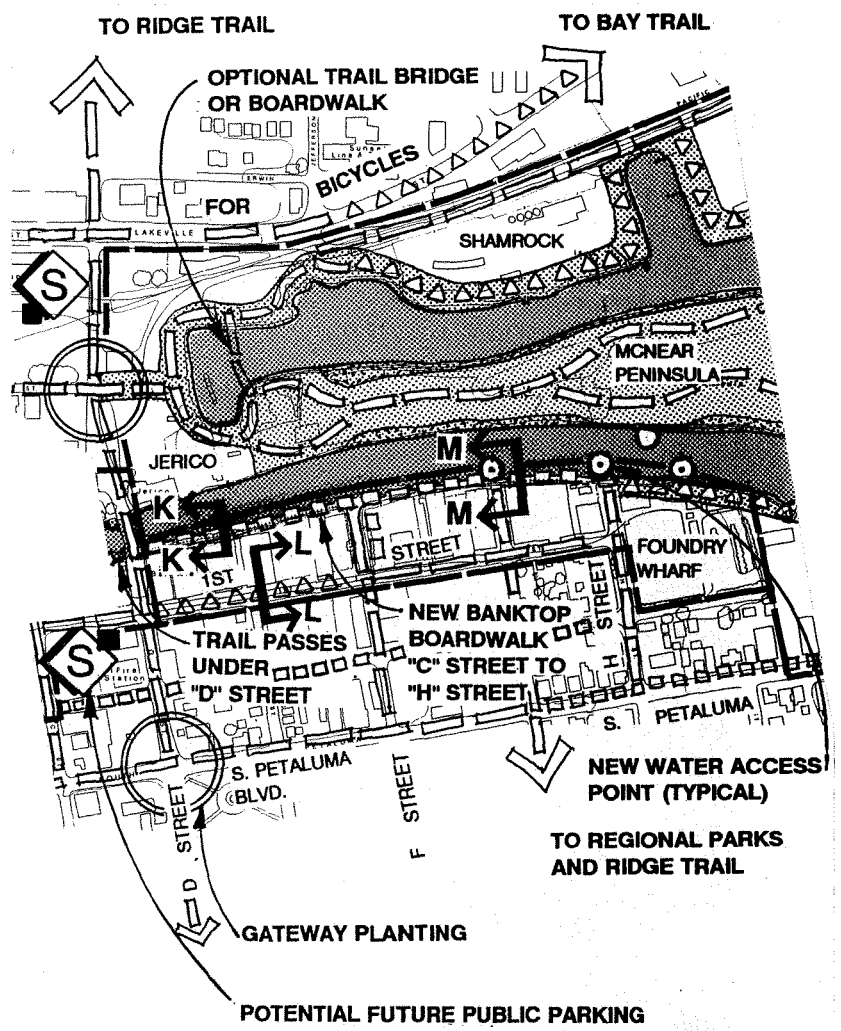
*18c. In the long term, replace some or all of the existing riverfront parking spaces along the western waterfront between "B" Street and "C" Street with a more appropriate riverwalk, river-oriented structures, and river-related amenities.*

*18d. In the long term, replace some or all of the existing riverfront parking spaces along the eastern waterfront south of the Old River Inn restaurant with more appropriate riverwalk and river-related amenities.*



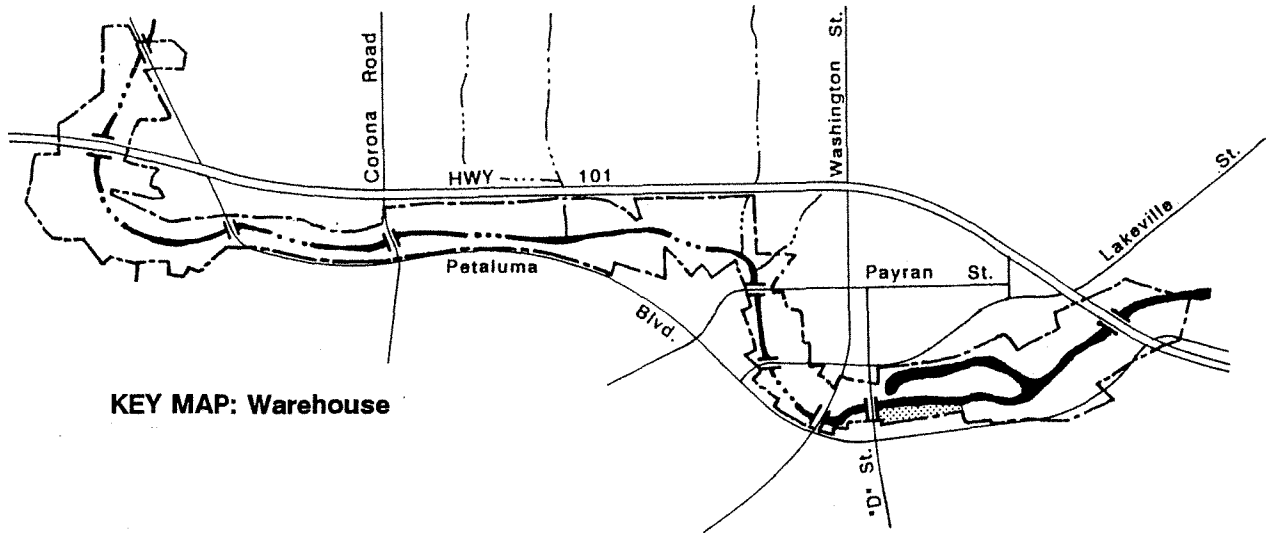
The waterfront areas in the vicinity of downtown will be the focus of the first phase public improvements.

- COMBINED PEDESTRIAN & BICYCLE TRAIL 
- PEDESTRIAN ONLY TRAIL 
- TENTATIVE LONG TERM TRAIL 
- WATER SURFACE 
- COMBINED BUFFER & RESTORATION ZONES 
- OAK GROVE/RIPARIAN WOODLAND PRESERVATION ZONE 
- MARSH 
- NEW SIGNALIZED INTERSECTION 
- BICYCLE PARKING 
- WATER ACCESS Existing 
- Proposed 
- GATEWAY 
- STAGING AREA 
- CROSS SECTION 
- SEGMENT LIMIT 



**RIVER GREENWAY & ACCESS PLAN:  
Warehouse Segment  
(West Bank "D" to "H" Street)**





### 3.7 WAREHOUSE SEGMENT

**"Historic industrial features should be preserved...adapting to other uses or simply maintaining outside facades."**

**"Encourage low-impact boating."**

Participants in Community Workshop, 1992

#### 3.7.1 EXISTING SETTING

A picturesque relic of an active commercial past, the Warehouse Segment extends along the west bank of the river from the "D" Street bridge to and including the Foundry Wharf complex at the end of First Street. The river is lined with decaying wharves and peak-roofed metal buildings clinging to the water's edge. In years past these wharves were alive with barges, often several across, unloading their cargo into factories or for storage in the warehouses. This plan encourages a rebirth of the bustling working waterfront in a way that augments downtown's pedestrian-oriented trade.

The unified facade of warehouses along the river bank creates a sharp constructed edge that contrasts with the expanse of water and the open landscape of McNear Peninsula across the river. This plan encourages the continuation of this riverfront development pattern, reminiscent of Petaluma's infancy.

The mix of businesses in this segment include a large feed and grain complex, warehousing, offices, manufacturing, printing, and other commercial activities. The neighborhood is also sprinkled with single family houses. Continuation of the spirited mix of uses is encouraged.

### 3.7.2 ISSUES AND OPPORTUNITIES

The Warehouse Segment is a logical place for enterprises that will benefit from this neighborhood's easy river access, old feed mills, historic architecture, and proximity to downtown. Waterfront development in particular can benefit from the views of the river and McNear Peninsula, and the ability to serve or use boat traffic.

A special **Riverfront Warehouse** zone was set up, as requested by a neighborhood group, to protect and encourage the mixed, varied character of the area. A key component to this zone district is the requirement that manufacturing activities be compatible with their surroundings.

New uses along the river that are particularly encouraged include:

- Restaurants
- Sundry retail & boat supplies
- Antiques (especially nautical themes)
- Bed and Breakfast/hotel
- Artist studios
- Small boat rental/boat tours
- Nautical clubs
- Tourist-oriented retail
- Residential units above the first floor
- Specialty foods or other locally produced items that can be shipped

#### River Orientation

An important objective of the River Plan is to reestablish the historic flavor and vitality of the waterfront. Reestablishment of the wharves for public access and commercial uses will help revitalize the area by:

- \* Providing a catalyst for orienting businesses towards the river
- \* Offering increased options for use/reuse of

the waterfront buildings,

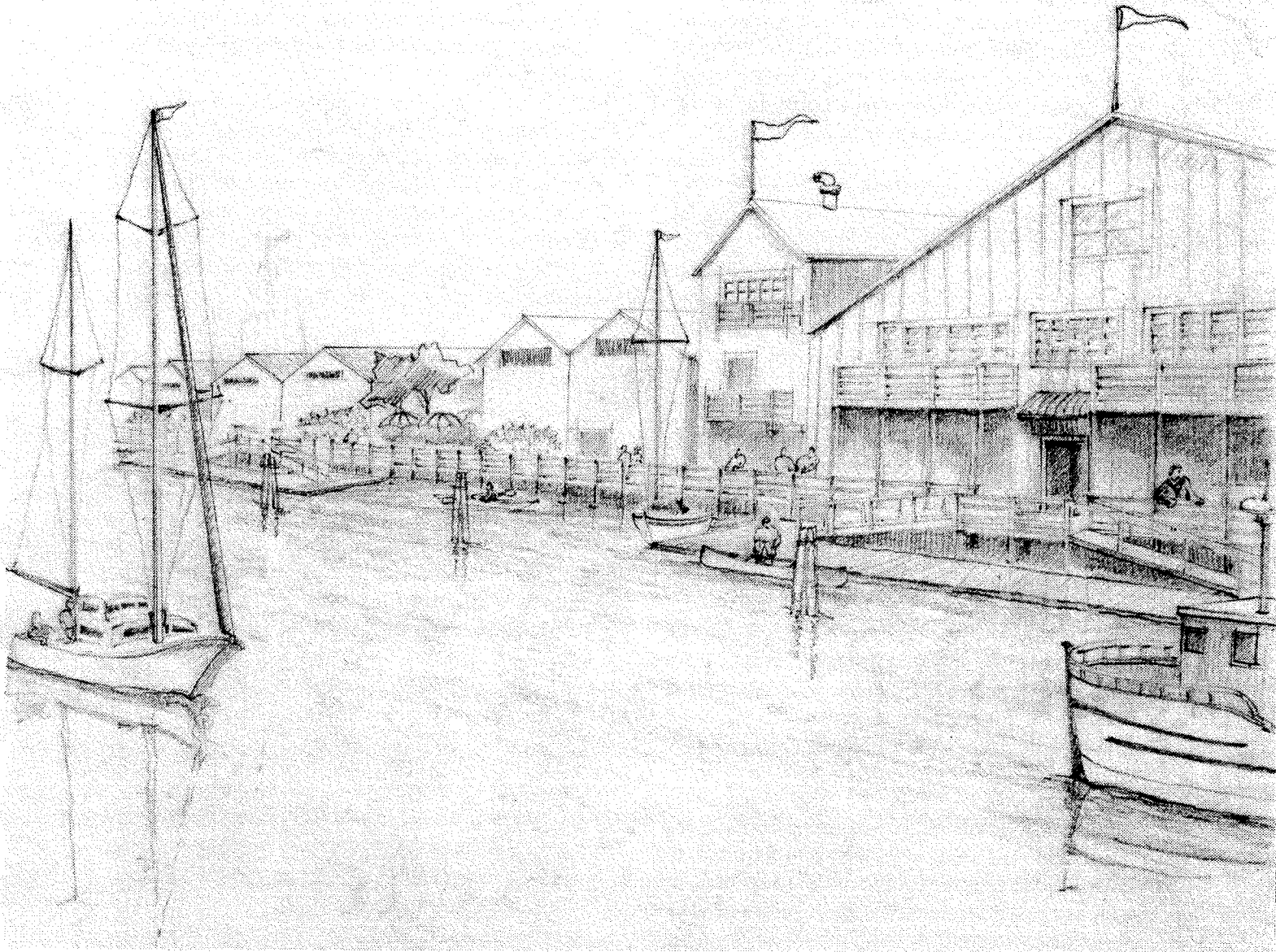
- \* Allowing pedestrian-oriented openings onto the river, and
- \* Allowing commercial access to the water for shipping.

The old wood pilings, metal buildings, and railroad tracks, should remain as visual reminders of this neighborhood's river-oriented agricultural history, so long as they do not pose a threat to the safety of new activities.

#### First Street

Although largely industrial now, First Street is the edge of an increasingly well populated residential and mixed-use neighborhood. This area has the rare opportunity to convert both its interesting river and street frontages into a more lively mixed-use area. First Street should become pedestrian friendly while retaining its historic charm.

One impediment to the conversion of First Street into an active pedestrian area is the lack of automobile parking spaces in this segment. Parking on the streets is limited due to this industrial area's heavy truck traffic, need for many loading zones, and frequent driveways that break up the length of curb. In order for a greater number of people to arrive, pedestrian access and/or transit must be improved from the downtown area, or additional parking spaces must be provided. Parking lots should not create long gaps between buildings along streets where pedestrian traffic is encouraged.



**RIVERFRONT WAREHOUSES** (conceptual drawing)

*New boardwalks, reminiscent of the historic wharves that used to serve these old warehouses, will extend the trail along the river's edge and help to activate the river frontage of these commercial establishments. Renovation and adaptive re-use of the buildings, or construction of compatible new structures, is encouraged to preserve the historic integrity of this area.*

### Water Access

"F", "G", and "H" Streets run perpendicular to the river and end at its banks. This offers a unique opportunity to develop direct public access to the river for small water craft, fishing, walking, and wildlife viewing. The roads also function as view corridors with unparalleled vistas across the water to McNear Peninsula, to the industrial structures on Lakeville Street, and to the mountains beyond. Reconstructed wharves or boardwalks also expand the potential for water access along the private properties. This segment of the river should be as active as a public street.

A pedestrian connection between the Warehouse Segment and Downtown may be possible by extending the boardwalk under the "D" Street bridge. Although this passage may occasionally be flooded, it will avoid pedestrian conflicts with the heavy vehicular traffic at street level.

### Habitat

Riverfront development along this segment is characterized by hard, constructed edges with engineered structures, such as vertical retaining walls, which are consistent with a commercial working waterfront. Such river edges are expected to remain in this segment.

Apart from the mouth of Thompson Creek ("F" Street) and scattered willow clumps at top of bank, herbaceous weeds, and occasional pockets of marsh grasses, much of the west side of the river currently has little wildlife value.

Opportunities for biological enhancement are limited in this area, yet much can be done to improve the habitat values of this segment, as well as the urban design, with vegetation. The short open stretch of Thompson Creek at the terminus of "F" Street can be heavily planted and protected as a welcome pocket of greenery amid the warehouses. An ambitious street tree program should be implemented

along First Street. Bank stabilization alternatives for areas where buildings are adequately set back should include gabion box revetments set in a way to trap sediment for colonization of marsh plants, or the use of advanced biotechnical approaches.

### Historic Character

This segment's metal warehouse architecture, river orientation, and mix of uses creates a unique and attractive character that should be preserved.

The architectural framework already exists for renewal of this waterfront. Adaptive new uses of the historic buildings and the addition of a new banktop boardwalk, docks and water access for the public will create a vibrant, exciting neighborhood in which the river is a central feature.

The renovated Foundry Wharf complex, has provided a model for future growth in the Warehouse Segment by using new and adaptive construction to create a successful commercial, office, retail, manufacturing, and studio space. This development visually reflects the historic riverfront heritage, provides strong visual, pedestrian, and building orientations toward the river, and gains from the visual amenities of the river. New projects of this nature are encouraged by the river plan.



*New construction at Foundry Wharf is complementary to the nearby warehouses without being an identical repetition.*

**3.7.3 ACCESS AND ENHANCEMENT OBJECTIVE**

*(1) RE-ESTABLISH THE VITALITY OF THIS HISTORIC DISTRICT WITH PUBLIC ACCESS ALONG THE WATER'S EDGE, PEDESTRIAN ACTIVITY ALONG 1ST STREET, AND DIRECT ACCESS TO THE WATER FOR BOATING AND FISHING.*

**3.7.4 SPECIFIC POLICIES AND PROGRAMS**

ACCESS AND LANDSCAPE CHARACTER POLICIES

**Boardwalk**

*1. Provide public access along the river, connecting to the downtown area under the "D" Street bridge.*

PROGRAMS

*1a. Construct a riverfront boardwalk at least 10-feet wide, on pilings, along the west bank with a separation from adjacent buildings, to ensure the security of those properties.*

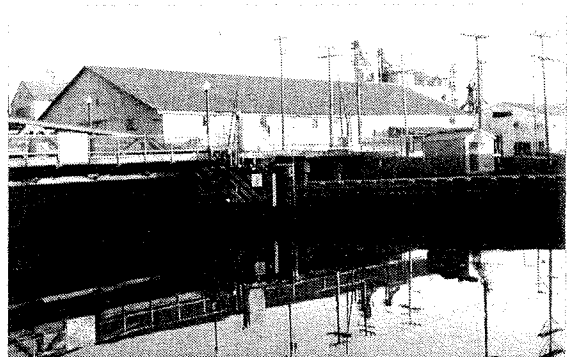
With the boardwalk separated from the top of the bank, property owners along the boardwalk will have the option to connect their properties to the boardwalk or not, depending on the compatibility of their use with public access. It is hoped that over time the buildings will be filled with pedestrian-oriented uses and that connections will be made to the riverfront which encourage activity along the boardwalk.

*1b. The boardwalk may be designed with gates at public access points to close off access when necessary for maintenance, for protection of private property, to allow short term loading and unloading between the buildings and boats, or for protection during flood events.*

*1c. The boardwalk should accommodate at least two facilities for temporary docking of small boats, with ramps leading to the boardwalks and buildings.*

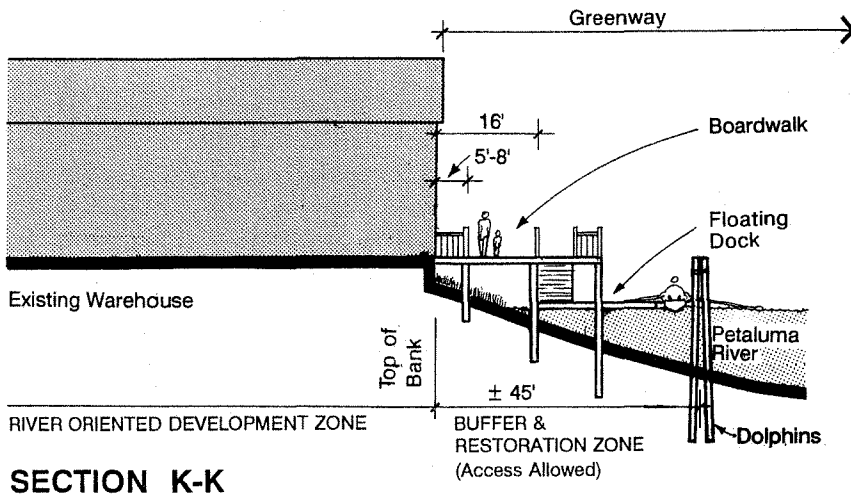
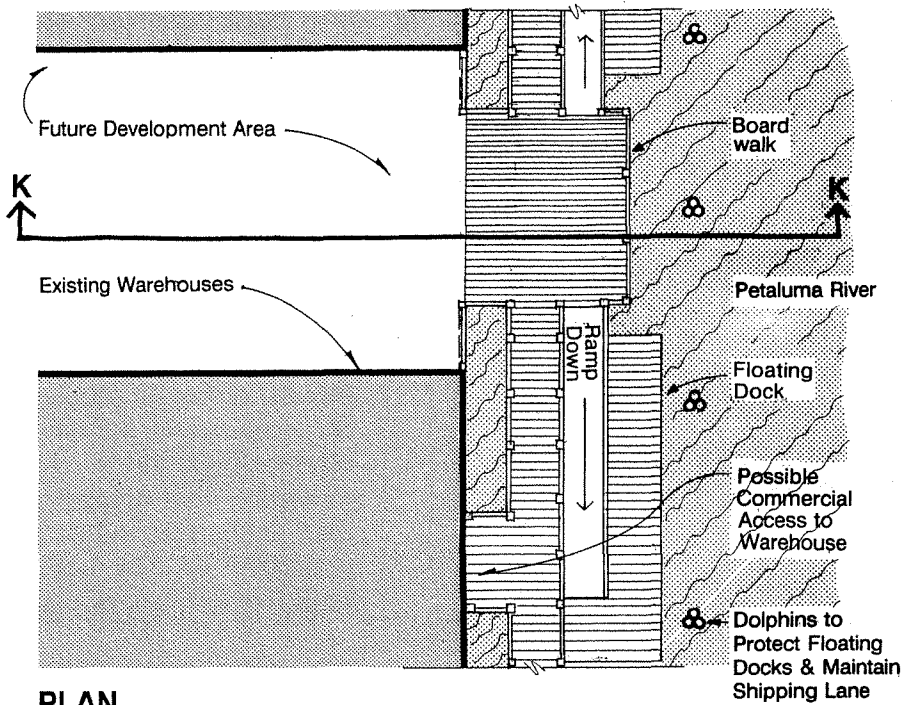
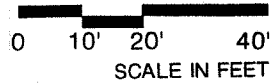
Perhaps the easiest and most logical locations are at the ends of "G" and "H" Streets, although other docking facilities are encouraged behind buildings which cater to boat traffic. It is important to recognize that shipping activities from river-dependent industries must not be precluded by new improvements along navigable sections of the river.

*1d. Encourage public access on all docks, but allow owners of private docks to secure them from public access for security.*



*There is sufficient clearance at the 'D' Street bridge's southerly abutment for the river trail to pass under the bridge and make a direct waterfront connection between the Downtown and Warehouse Segments.*

**BOARDWALK & WATER ACCESS  
 AT WAREHOUSES**



**Trail Along Street**

**2. Provide pedestrian access and encourage pedestrian activity along the street.**

Offer an opportunity to view the adjacent grain processing operations and other industrial activities without interrupting or interfering with those uses.

**PROGRAMS**

2a. Create a near-term sidewalk trail that follows Petaluma Boulevard South from the downtown area across "D" Street, turns towards the river on "F" Street to the Thompson Creek outlet, follows First Street south to "H" Street and then back to Petaluma Boulevard South.

2b. Create a long-term pedestrian route that follows First Street from the downtown area on city sidewalks, crosses "D" Street and extends to "F" Street.

This trail alignment would be dependent on a change or reorganization of use at Bar Ale and traffic controls at "D" Street to provide for pedestrian safety. An alternate crossing at Second Street will be allowed if it proves to be safer.

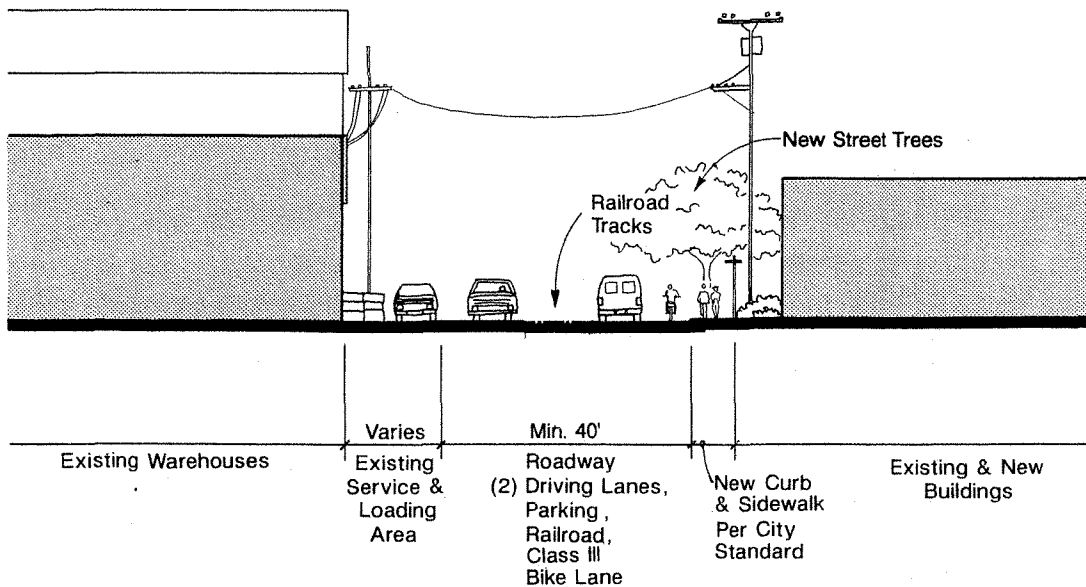
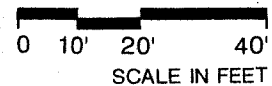
2c. Construct sidewalks per City standard as needed for pedestrian access.

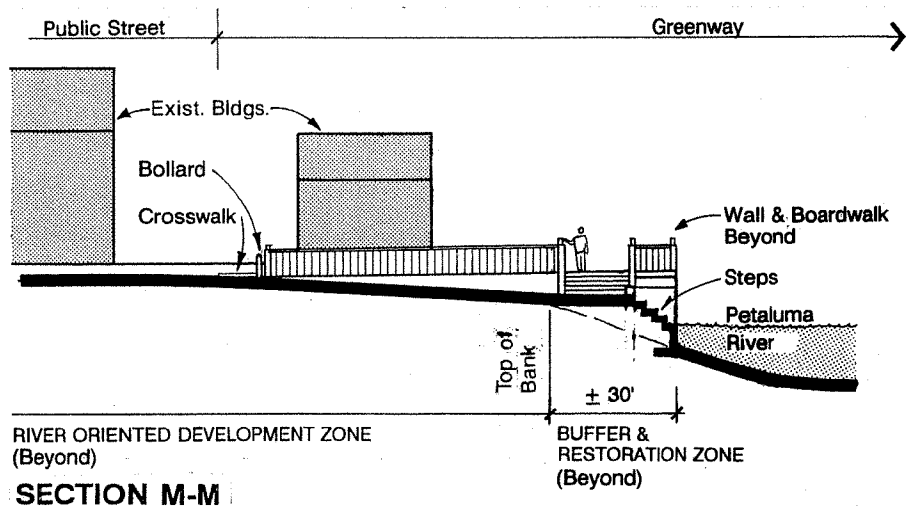
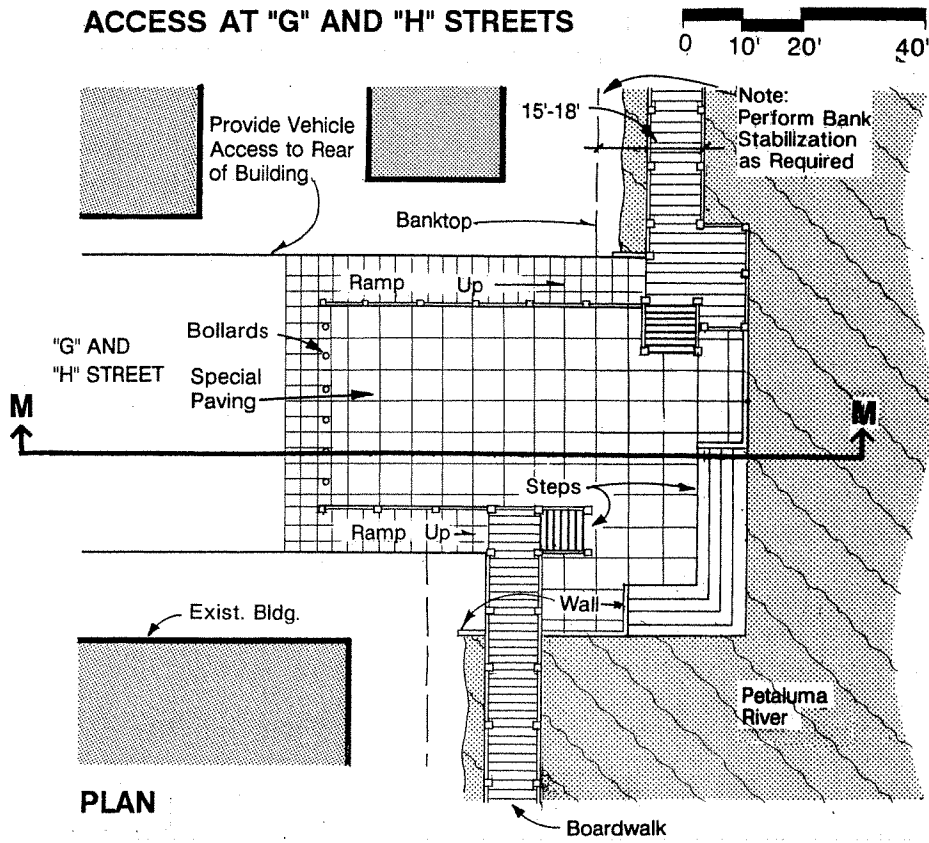
2d. Encourage the planting of street trees along the trail route.

3. Bicycle access should be provided as detailed on the City's General Plan Circulation Map.

**SECTION L-L  
FIRST STREET BICYCLE & PEDESTRIAN ACCESS**

Looking South





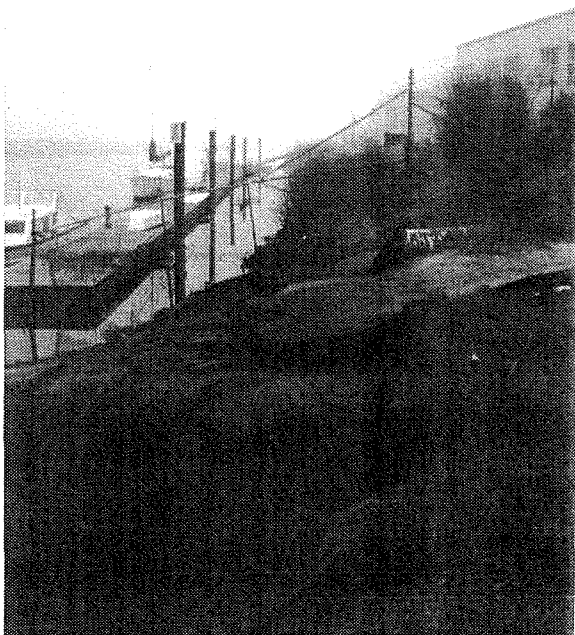


**Water Access**

- 4. *Enhance the water's edge and encourage pedestrians and boaters to enjoy this segment of the river.*
- 5. *Provide improved access to the water at "G" and "H" Streets.*

PROGRAMS

- 5a. *At the ends of "G" and "H" Streets, provide steps down to the water, new paving, bollards for traffic control, lighting and benches to encourage safe waterfront activities in an attractive setting.*



*The end of 'H' Street, currently in poor condition, offers an opportunity for well designed direct public access to the river.*

NATURAL HABITAT RESTORATION, CREATION AND PROTECTION POLICIES

- 6. *Provide islands of emergent marsh and riparian vegetation wherever possible on the bank slopes to provide a "safe passage" or linkage between upstream riparian habitat and downstream tidal marsh habitat.*
- 7. *Improve the habitat value of Thompson Creek between 1st Street and the river.*

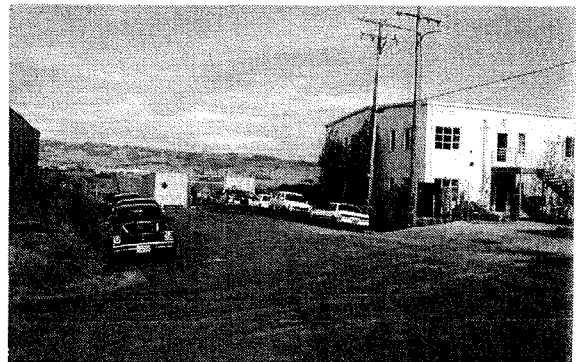
PROGRAM

- 7a. *Where buildings are adequately removed from the top of bank, consider replacing retaining walls with landscaped structural stabilization treatments to increase habitat.*

RIVER ORIENTED DEVELOPMENT ZONE POLICIES

**River Orientation**

- 8. *Encourage new development or reuse of buildings that is compatible with the existing historic/warehouse character, and which is both river and pedestrian oriented.*



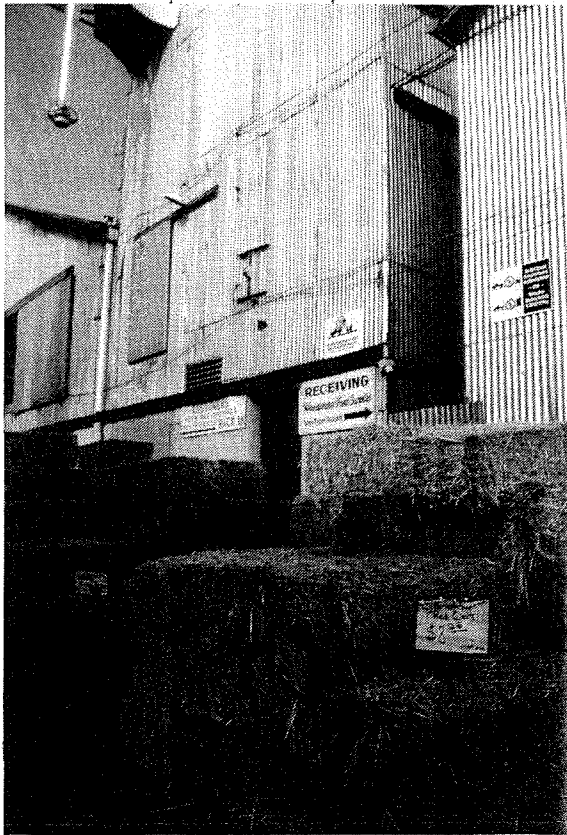
*Improved public access at the end of 'H' Street (and others in this Segment) will take advantage of the unparalleled views and riverfront setting.*

**9. Encourage interaction between street activities and the river.**

PROGRAMS

- 9a. Allow for periodic visual and pedestrian access to the river edge from 1st Street.
- 9b. Encourage uses that interact with the river, and building designs that provide openings to the river, such as windows, balconies and doors.

**10. Reinforce and perpetuate the hard warehouse "wall" character that has historically existed along this river segment.**



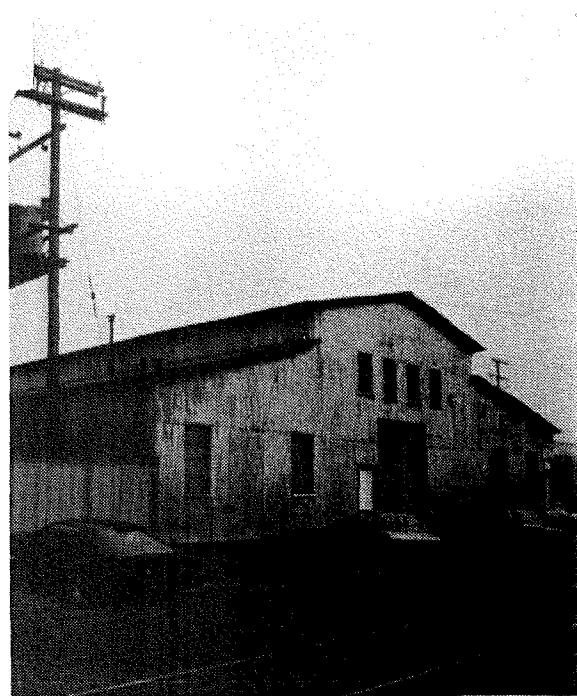
Existing uses, like this commercial feed operation on First Street, give this area the feeling of an authentic working warehouse district, an important ingredient in the mix of uses encouraged by this plan.

PROGRAMS

- 10a. Incorporate the same street and river zero-lot-line setback characteristics that currently distinguish the area between First Street and the river.
- 11. Provide pedestrian access points to the river at the ends of "F", "G", and "H" Streets.

PROGRAMS

- 11a. Improve visual and pedestrian access at the ends of "G," and "H" Streets with new paving treatments, benches, lighting, and docks or steps that allow direct access to the water.
- 11b. Encourage recreational boating and fishing at these locations.



Old warehouses along First Street provide the architectural context for this mixed use neighborhood.

**12. Encourage the development of riverfront commercial activities.**

PROGRAMS

*12a. Encourage more intensive uses along the waterfront, such as retail, restaurants, offices, and residential uses above the ground floor.*

**13. Include facilities for public access and river recreation (e.g. boating and fishing) as part of any future larger scale development or redevelopment projects along this river segment.**

**Historic Character**

**14. Preserve the historic and aesthetic character of the First Street warehouse area.**

PROGRAMS

*14a. To the extent possible, preserve existing old warehouse structures along First Street, accommodating future development or redevelopment plans through adaptive re-use.*

*14b. Require new buildings to be multi-level, similar to the older warehouses and granaries in bulk and style.*

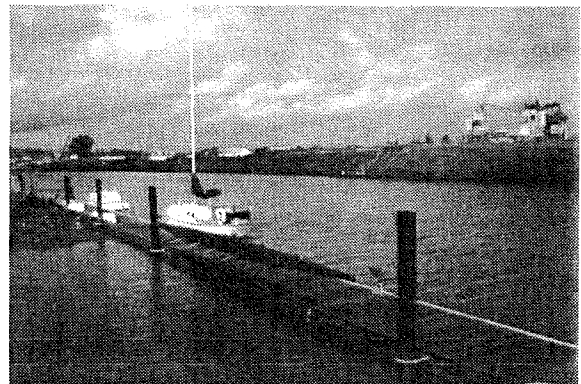
The City should encourage design approaches similar to the Foundry Wharf project; i.e., the incorporation of both new and adaptive construction and use of design features which reflect the historic, river-oriented, warehouse character of this river segment.

*14c. Retain old wood pilings and bulkheads unless they pose a safety hazard, interfere with navigation or channel maintenance, or prevent the construction of new boardwalks.*

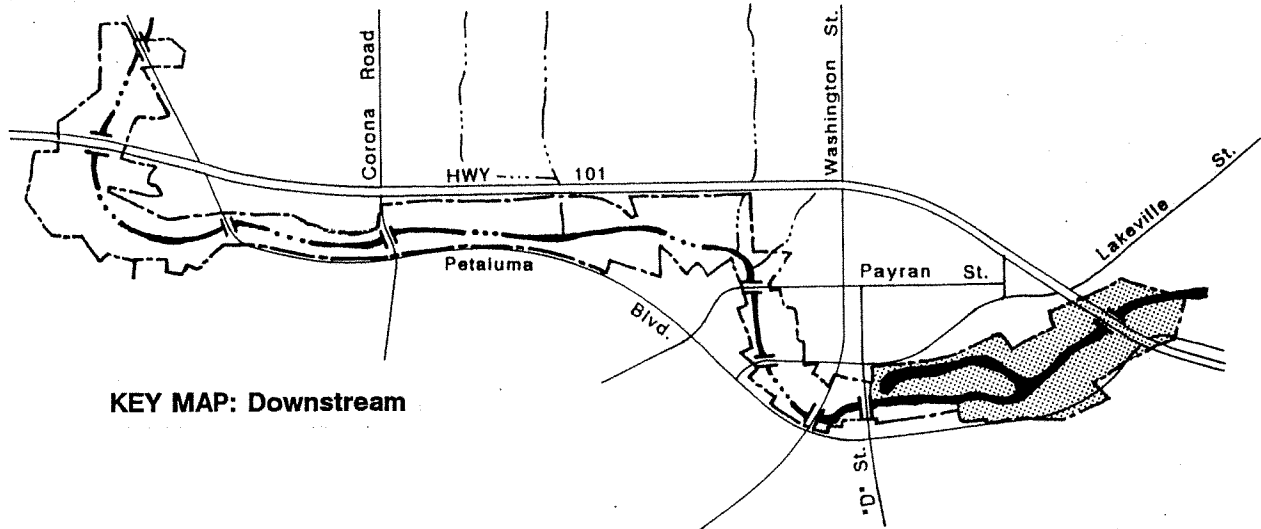
FLOOD PROTECTION AND BANK STABILIZATION POLICIES

*15. Coordinate removal of old pier pilings with permitting of new piers and floating docks so that their removal serves as mitigation compensation for new structures in navigable waters.*

*16. Excavate to create marsh on McNear Peninsula (see discussion that follows in Section 3.8), to compensate for any loss of flood channel capacity that may result from docks and floating boardwalks constructed along the west side of the river behind the warehouses.*



Recreational boating access is provided at this private development. McNear Peninsula is in the background.

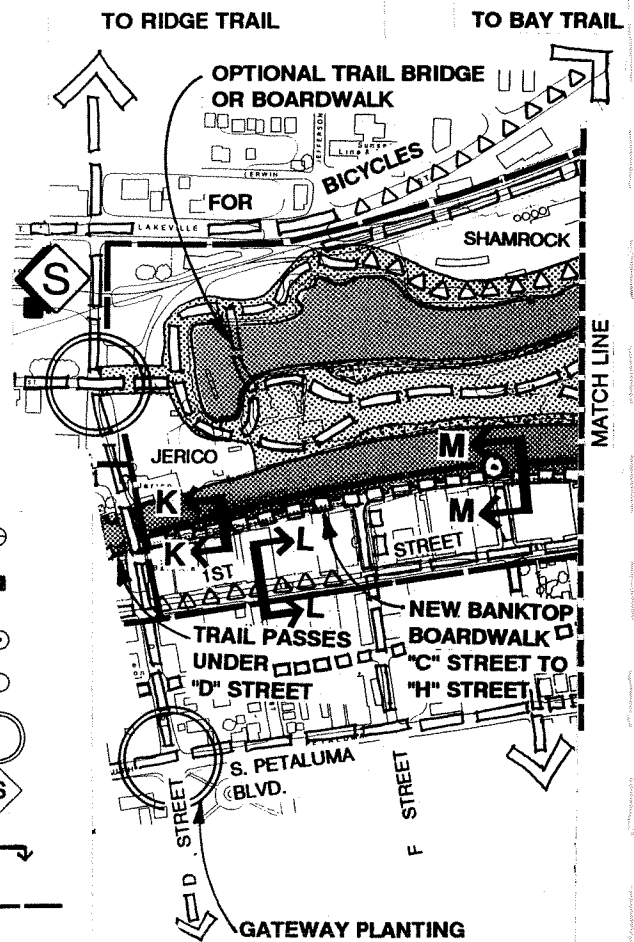
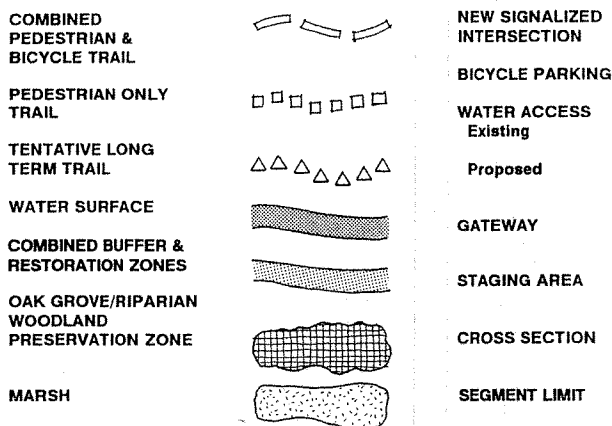


### 3.8 DOWNSTREAM SEGMENT

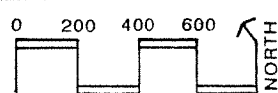
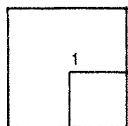
"McNear Peninsula is ideal for an urban riverfront park - great potential for marshland development..."

"Provide expanded access on both east and west sides of the river in order that people understand the significance of river industries."

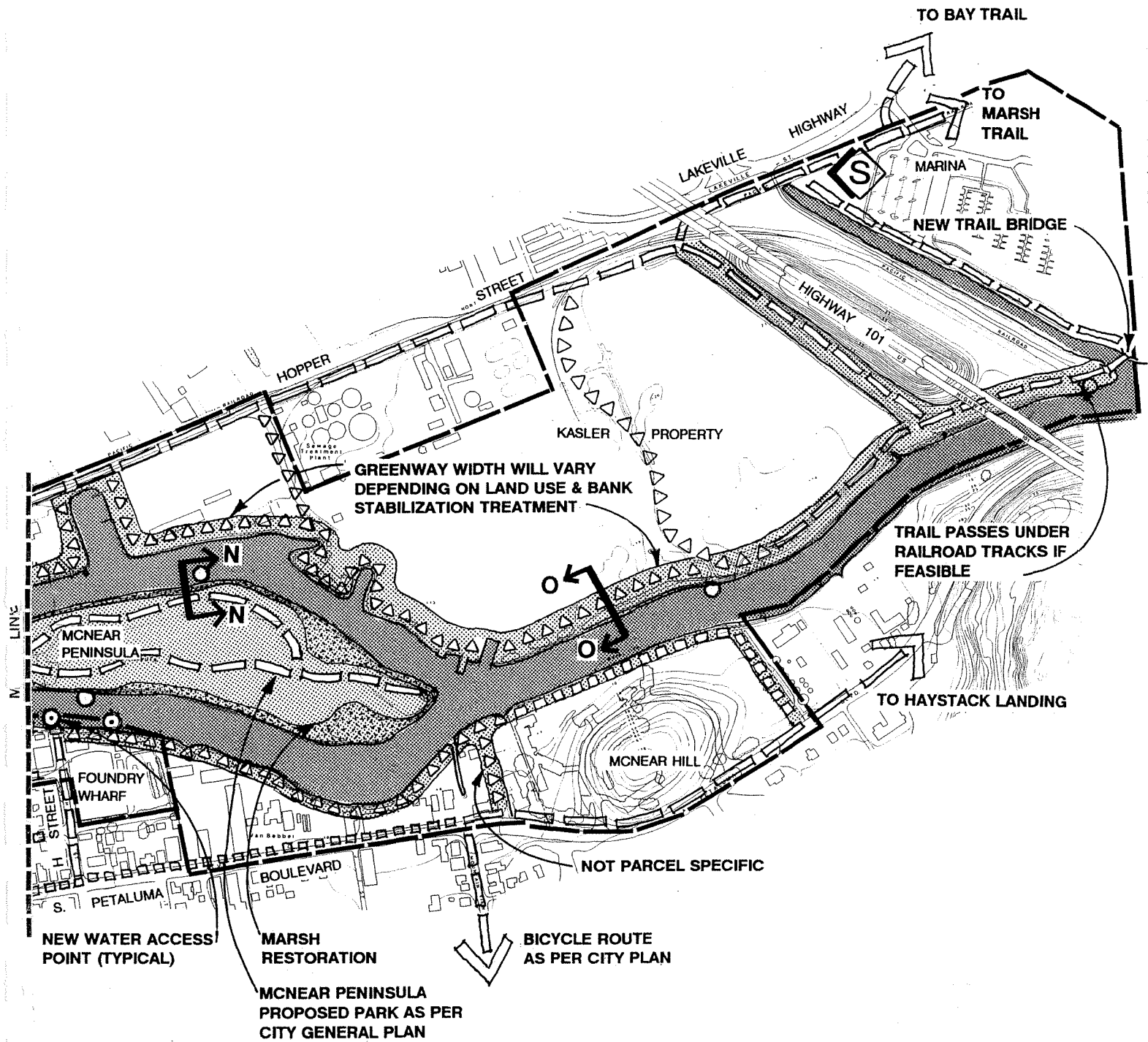
Participants in Community Workshop, 1992



4 ACRES



### RIVER GREENWAY & ACCESS PLAN: Downstream Segment (East Bank "D" St. to Hwy 101)



### 3.8.1 EXISTING SETTING

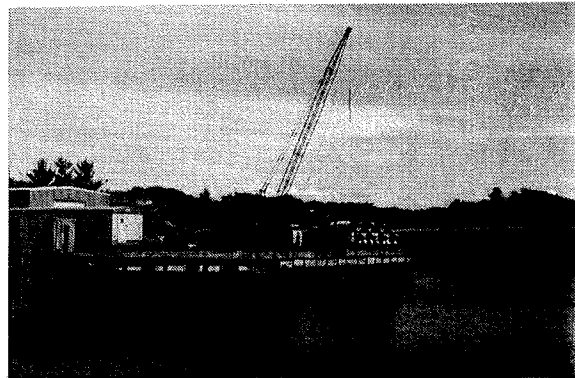
The Downstream Segment extends from "D" Street to the Highway 101 overcrossing on the east side of the river and from the Warehouse Segment to McNear Hill on the west, including McNear Peninsula and Canal. This segment contains the largest, most active vestige of Petaluma's working industrial waterfront. These industries bring numerous benefits to the community and should be retained. Protection of the riverfront industries takes precedence on industrial parcels, whereas, habitat restoration and public access will be emphasized on other properties such as McNear Peninsula.

The river in the Downstream Segment is a broad tidal slough maintained by dredging. It flows between steep banks through a landscape of commercial and industrial uses and broad expanses of undeveloped land on the Kasler property. Larger industrial operations, such as Shamrock Materials, Jerico Products and Kasler Constructors (formerly J.H. Pomeroy, Inc.) still barge products and materials on the river. Buildings and loading areas extend right to the bank-top. Public access to the river is available only at the Petaluma Marina, at the downstream end of the Segment.

The 31.5-acre McNear Peninsula is a unique property in all the City. Long used for livestock grazing, it thrusts a flat 3,200-foot long treeless landform into the heart of the river. Visitors to the peninsula are treated with striking panoramic views of the downstream industrial activity, river shorelines, central Petaluma, and its hills to the west, and the Sonoma Mountains to the east. The Petaluma General Plan 1987-2005 identifies the McNear Peninsula as the site for a future public park.

There are several pending and anticipated development proposals within this river segment, including:

- PETALUMA MARINA AND OFFICE PARK COMPLEX - additional office space and a hotel are planned within the next few years.
- MCNEAR HILL - an 18-acre, higher density townhouse residential subdivision has been approved on this hill overlooking the river. The site is already partially improved with utilities and roads.
- KASLER CONSTRUCTORS - approximately 35 acres of this large industrial complex is vacant and subject to future development proposals. The vacant portion of this site affects about 1,500-feet of river frontage.



*Looking west from Hopper Street is an industrial dock used by Kasler Constructors, with McNear Peninsula beyond, and the Petaluma hills in the distance - typical of the conditions in the Downstream Segment.*

### 3.8.2 ISSUES AND OPPORTUNITIES

#### River-Dependent Land Uses

River-dependent heavy industrial businesses dominate this river segment. These activities historically required large, riverfront sites to accommodate their major transport needs. Still dependent on riverfront transport, they provide continuity with the historic uses of the river and generate enough shipping tonnage on the river to justify continued dredging by the Corps of Engineers.

These businesses not only provide an economic benefit to the city, they are also an attraction for the community. Their operations and structures are interesting to look at and are educational. The experience of watching gravel and oyster shells climb a conveyor belt, or a ship being built can not be matched by a theme park.

This plan recognizes the importance of these industries and provides flexibility in the trail alignment and habitat improvements to avoid interference with these industrial operations or shipping activity. River-dependent businesses are encouraged to remain and expand in Petaluma. Public views of the ships and wharves will be provided from McNear Peninsula and other appropriate locations.



*Jerico Products, as seen from the 'D' Street Bridge, receives oyster shells by barge and ships out high quality bird and poultry feed and other calcium products.*

#### Dredging Maintenance

Navigability of the channel from the river mouth at San Pablo Bay to the Turning Basin is currently maintained by U.S. Army Corps of Engineers (COE) dredging on a four year cycle. The COE has justified this sediment disposal program because of the relatively high volume of tonnage shipped by the various riverfront businesses in Petaluma. The Jerico Products operation currently ships the highest volume of material, but Shamrock, Kasler Constructors/Pomeroy, American Rock and Gravel Quarry, and other operations contribute substantially as well. Reduction in the commercial tonnage shipped on this channel could affect COE dredging priorities. While City plans and policies, including the River Plan, strive to retain river-dependent industries, the community may need to plan for alternative funding for dredging, should local shipping activities drop below the COE's minimum threshold.

#### McNear Peninsula

McNear Peninsula presents an extraordinary opportunity for development of a distinctive community recreational facility and visual focal point. This land's unique attributes -- its open landscape, extensive river frontage, proximity to downtown, and views of riverfront industries and hills surrounding the valley -- are very special and will become a regional draw. In addition to developing upland and waterfront recreational facilities, this plan recommends creating a salt marsh habitat around the perimeter of the peninsula, as an educational feature. Development of a distinctive river park in the heart of the city would also stimulate increased development of river-oriented commercial activities, especially on the river banks nearest to First Street.

For all these reasons, public investment should be concentrated in the McNear Peninsula -- Turning Basin areas to kindle interest and further improvements along the Petaluma waterfront.

### Kasler Constructors/Pomeroy and Potential Changes In Use

Kasler Constructors owns the approximately 84-acre property occupied by Pomeroy Corporation. The land, much of which is undeveloped or under-utilized, is the largest single riverfront ownership in the city. The Kasler and Shamrock properties on McNear Canal are the only properties in the whole city zoned for Heavy Industrial uses.

The vacant portion of the Kasler property offers great potential for future development. This plan identifies desired improvements for the waterfront, including public access, habitat enhancement, and preservation of river-dependent industries. But, because development of this site involves issues outside of the scope of this plan (such as traffic impacts on Lakeville Street), the City Council has recommended that development of this site (or a significant change of use) be coordinated with surrounding properties through preparation of a master plan. These types of master plans are typically prepared by the City at the developers' expense.

### Habitat Enhancement

Historically, this segment was the site of extensive marshland which has since been diked and filled. In selected areas, such as portions of McNear Peninsula and McNear Canal, there are ideal opportunities to excavate and restore a significant portion to tidal marsh. Such a natural feature is unusual so close to the center of a city. Excavated material may be used to re-contour the upland landscape in aesthetically pleasing ways, perhaps within the park at McNear Peninsula. The natural marsh creation process can be encouraged and interpreted along the shore, at the head of the McNear Canal, and other locations where marsh vegetation has begun to emerge.

### Interpretation

Public access within the Downstream Segment can be augmented by providing interpretive facilities. There are many unique aspects to this historic area, such as:

- \* Wreckage of the steamer Petaluma
- \* Habitat restoration techniques
- \* Marsh inhabitants and the importance of the ecosystem
- \* Transportation history (e.g. the convergence of water, rail, & highway for shipping)
- \* Historic architecture
- \* Industrial operations, products created, and their destination

The historical richness combined with the interpretive exhibits around McNear Peninsula, will provide visitors with interesting, enriching information about this segment and the entire river experience.

### Flood Control

Excavations within the channel may be necessary to increase the capacity of the river channel to offset the potential "fill" created by the new boardwalks in the Warehouse Segment. The excavation proposed along McNear Peninsula will also stabilize banks and create tidal marsh habitat.



*McNear Peninsula and McNear Canal, as seen from the Kasler Dock, seem remote and wild even though they are near the center of the city.*



**3.8.3 ACCESS AND ENHANCEMENT OBJECTIVES**

- (1) *GIVE RIVER-DEPENDENT COMMERCIAL AND INDUSTRIAL USES PRIORITY OVER PUBLIC ACCESS.*
- (2) *PROVIDE PUBLIC ACCESS ALONG THE BANK TOP AS DESIGNATED BY THIS PLAN WHERE FEASIBLE.*
- (3) *DEVELOP MCNEAR PENINSULA AS A PARK WITH INFORMAL, PASSIVE USES.*

**ACCESS AND LANDSCAPE CHARACTER POLICIES****General**

1. *Use of the waterfront by river-dependent industries should have priority over public access.*

When access is provided at the time of development or redevelopment, trails should be routed around river-dependent uses to avoid interference with the industrial activity.

2. *A variety of riverbank, access, buffer and structural setback treatments are desired throughout the area. A hard urban or industrial edge is equally acceptable as a soft edge with marsh (see Section O-O).*

**PROGRAMS**

- 2a. *Provide smooth transitions between different riverbank treatments.*
- 2b. *Where riverfront public access is provided, a minimum building setback of 30-60 feet from top of bank is recommended depending upon the circumstances pertaining to the site.*

The narrower setback may be appropriate for very short distances where the site is constrained. Larger setbacks are generally preferred so that more planting can be provided to enhance the access and the amount of habitat. Long, monotonous building frontages should be avoided. The overall effect should be one of variation and visual interest.

3. *Provide space along the trail to watch industrial activities.*

The working industrial waterfront with its loading and barging activities at the river's edge is interesting to watch and is an important component of the Downstream Segment experience. Although McNear Peninsula will provide the central viewing area, additional locations may be appropriate, such as along Hopper Street.

4. *Preserve public access points to the water on both sides of the river to allow crossings by ferry or private boat.*
5. *Provide a public access trail as designated in this plan when properties develop or change from river-dependent uses.*

**Trail Alignment**

6. *Allow and encourage connections from the river trail system to regional ridge trail and bay trail systems.*
7. *Provide a continuous pedestrian trail following the waterfront, but avoiding river-dependent uses as necessary.*

**PROGRAMS**

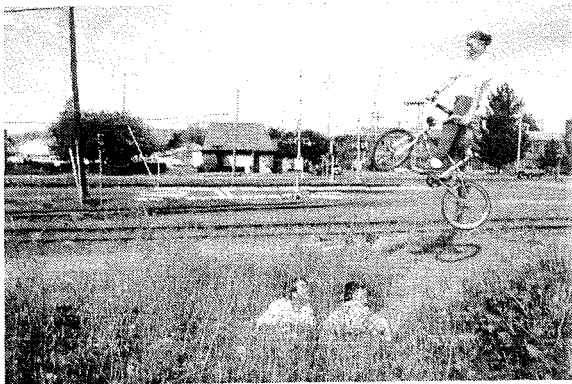
- 7a. *Provide a continuous trail in the short term until changes in use and redevelopment make a waterfront trail more feasible.*

An interim sidewalk trail alignment (for pedestrians) on the west side of the river can follow Petaluma Boulevard South from "H" Street to McNear Hill, where a waterfront public access easement has already been provided. Bicycle access should follow designated routes off Petaluma Boulevard because of the narrow right-of-way.

On the east side of the river, trail connections between "D" Street and the Petaluma Marina should be pursued along Lakeville Street, Hopper Street, or the railroad right-of-way. Access past the railroad may be most feasible at the rotating bridge, where the tracks are separated while the bridge is open.

*7b. Provide a banktop trail in the McNear Hill development with a connection to Petaluma Boulevard South, preferably near the south end of the site.*

A second connection could occur to the north of McNear Hill, creating a loop trail.



*Hopper Street (behind) already provides access to the greenway for these adventurous young boys.*

*7c. Provide a loop trail around McNear Peninsula.*

Access should be provided by land on the eastern edge of the Jerico Products operation. Secondary access could be provided across McNear Canal on a possible bridge or boardwalk, if the Canal ceases to be used for shipping access. When the park is developed, access by small boats should be accommodated as well.

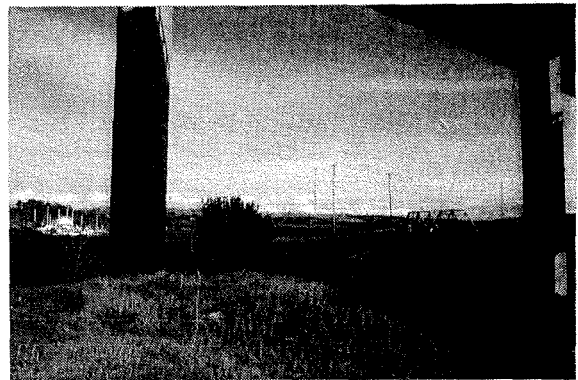
*7d. Encourage pedestrian access across the river, possibly at the US 101 bridge, railroad bridge, or any new roadway crossings.*

#### McNear Peninsula

*8. Create a distinctive, river-oriented community park on McNear Peninsula.*

#### PROGRAMS

*8a. Place implementation priority on the near-term acquisition and improvement of McNear Peninsula.*



*The proposed trail through the Kasler property from Hopper Street can easily pass under Highway 101 to connect with the Marina, Marsh Trail, and Bay Trail.*

8b. *Public use of the peninsula should be of a passive character which does not require structures, bright lights, or other improvements that would destroy the Peninsula's unique sense of openness and remoteness or distract from the dramatic views.*

8c. *Investigate the desirability and appropriateness of creating a small, informal outdoor amphitheater or gathering place on the peninsula.*

8d. *Slope back the margins of the Peninsula for marsh habitat, using the excavated material to contour the upland areas for park uses.*

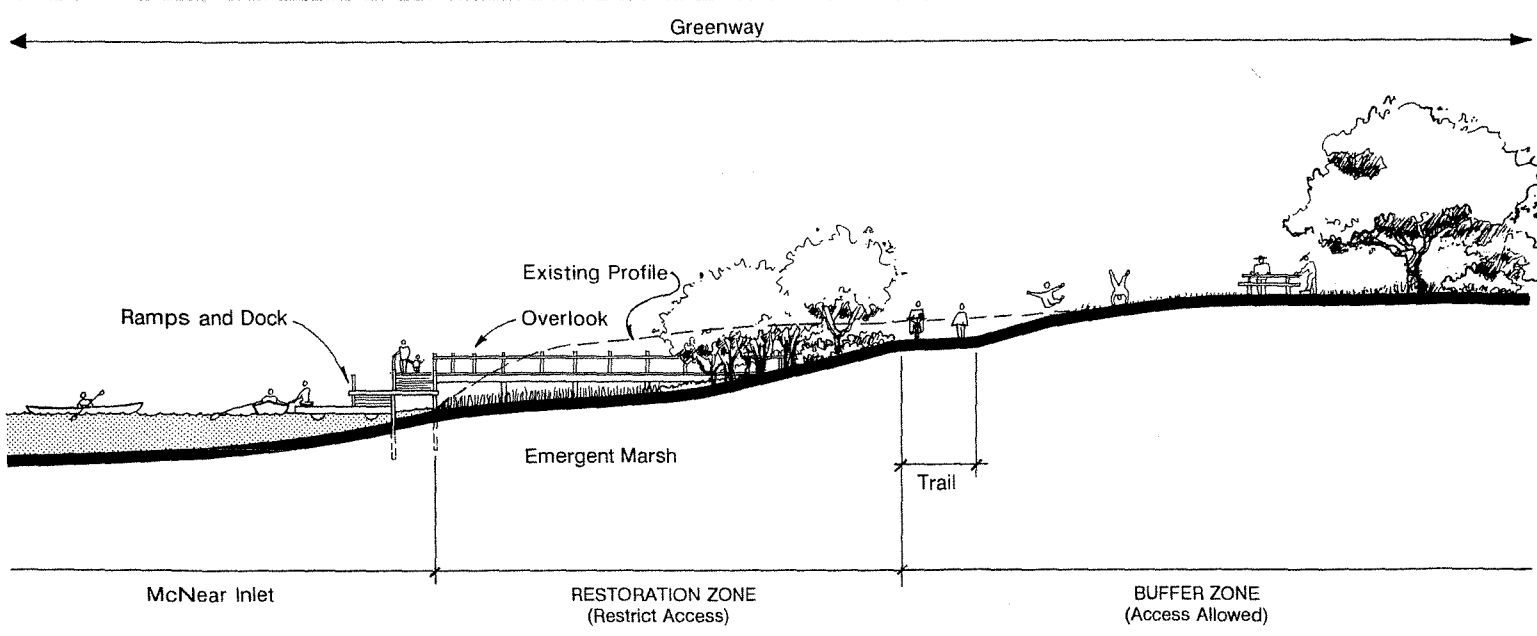
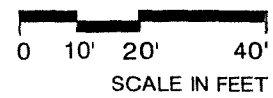
8e. *Trees planted on the peninsula should not block views across the peninsula to the mountains, particularly from "G" and "H" Streets, and should be appropriate for the riparian location.*

9. *Provide docking facilities for small water craft on both sides of McNear Peninsula.*

Passive recreational activities appropriate for McNear Peninsula include:

- Strolling & jogging
- Kite flying
- Picnicking
- Nature observation
- Public education
- Public gathering & special events
- Informal field games
- Temporary small craft docking
- Dog walking

SECTION N-N WATER ACCESS AT MCNEAR PENINSULA



Staging Area

10. Provide a staging area in the vicinity of the Marina.

Possible locations include the Marina parking lot, Shollenberger Park, or the planned transit stop/park-and-ride near Lakeville Street. The staging areas could be combined with the parking lots at these locations.

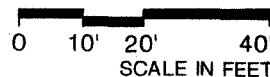


A potential staging area near the Marina, combined with the existing parking lots, would provide easy trail and river access.

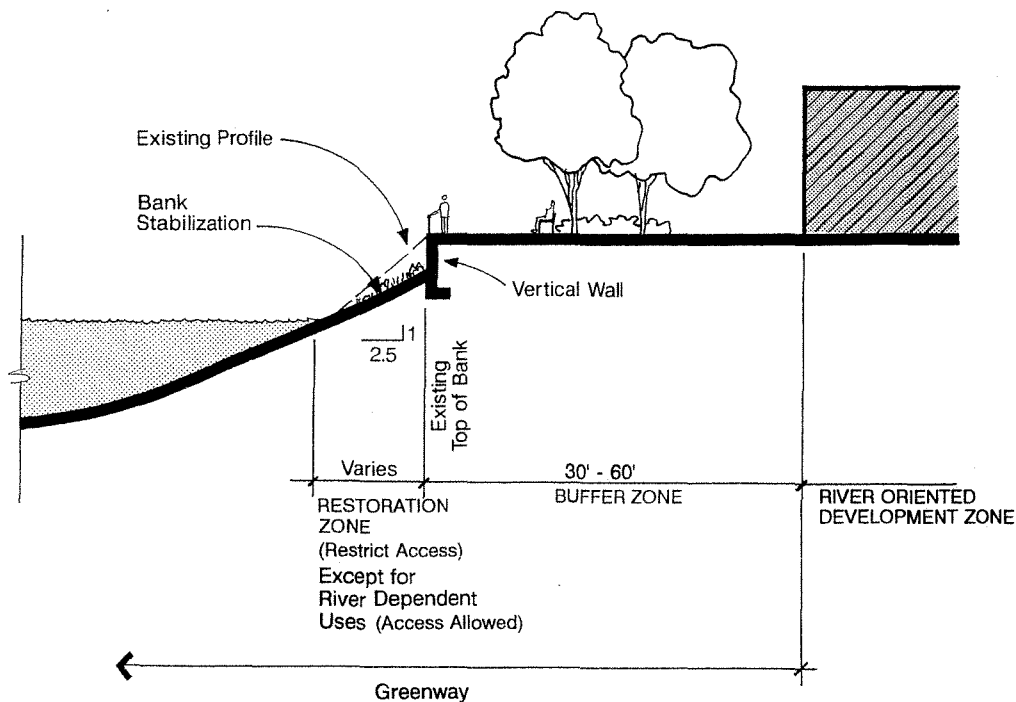
Interpretation

11. Interpret the remains of the steamer Petaluma in the McNear channel, other historic landmarks, and natural features visible in the area.

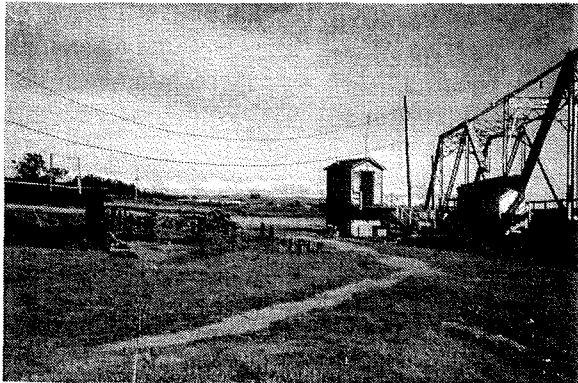
SECTION O-O KASLER PROPERTY -  
Bank Stabilization,  
Restoration & Access



O-1 ALTERNATE #1 - HARD EDGE, URBAN or INDUSTRIAL CHARACTER



Trail Design



The proposed trail connector between the Marina and the Kasper property continues around this interesting railroad swing bridge, which is usually open to allow ships to pass.

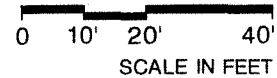
- 12. "Hard edged" materials, such as concrete or special pavers, may be allowed because of the unique commercial and industrial nature of the landscape except on McNear Peninsula.

PROGRAM

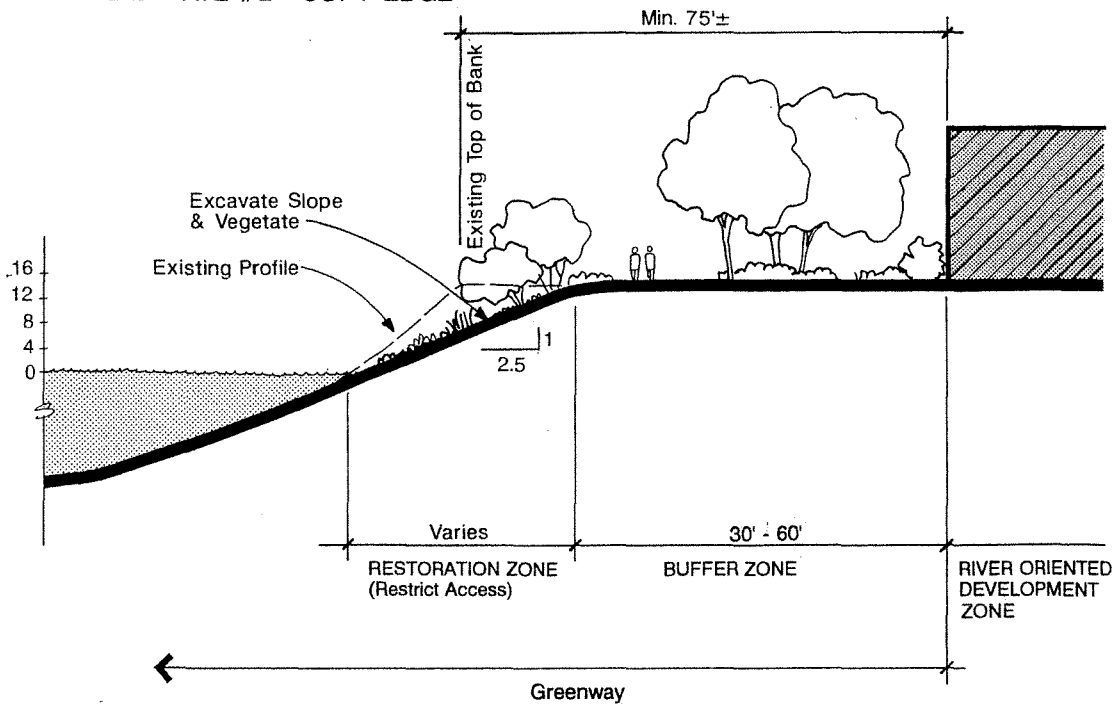
- 12a. Avoid abrupt and frequent changes in trail surface and character.

Maintain continuity throughout the Downstream Segment, in signage, interpretive material, planting, surface materials, or lighting.

**SECTION O-O KASLER PROPERTY -  
Bank Stabilization,  
Restoration & Access**



**O-2 ALTERNATE #2 - SOFT EDGE**



**NATURAL HABITAT RESTORATION, CREATION AND PROTECTION POLICIES**

**13. Provide the longest possible continuous corridor of salt marsh and associated native vegetation.**

The marsh corridor may alternate from bank to bank but should average at least 10 feet in width. Refer to Chapter 5: Natural Habitat Management Program and the Technical Appendix, for further details on habitat restoration measures and plant lists.

**PROGRAMS**

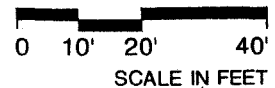
**13a. Restore larger, available areas for marsh enhancement wherever possible.**

Marsh width in larger zones should average 25 feet or more, and should include associated native estuarine/riparian vegetation on the bank slopes, selected from the Recommended Plant List in Chapter 5. Creating marsh habitat may require stabilization of the existing narrow sediment shelf and protection from wave erosion using advanced biogeotechnical approaches.

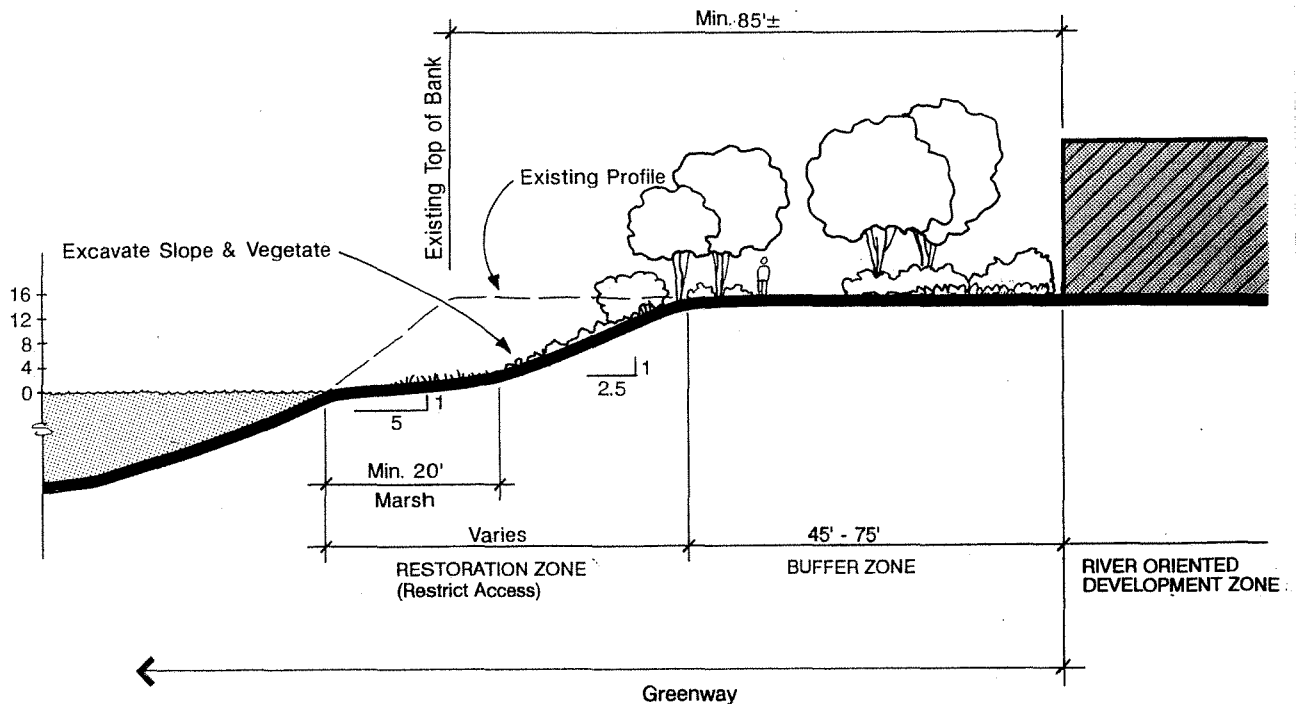
**13b. Establish native salt marsh and associated vegetation along lower banks where possible.**

**13c. Create enough salt marsh along the river banks to link the downstream marshes to the upstream riparian zones.**

**SECTION O-O KASLER PROPERTY -  
Bank Stabilization,  
Restoration & Access**



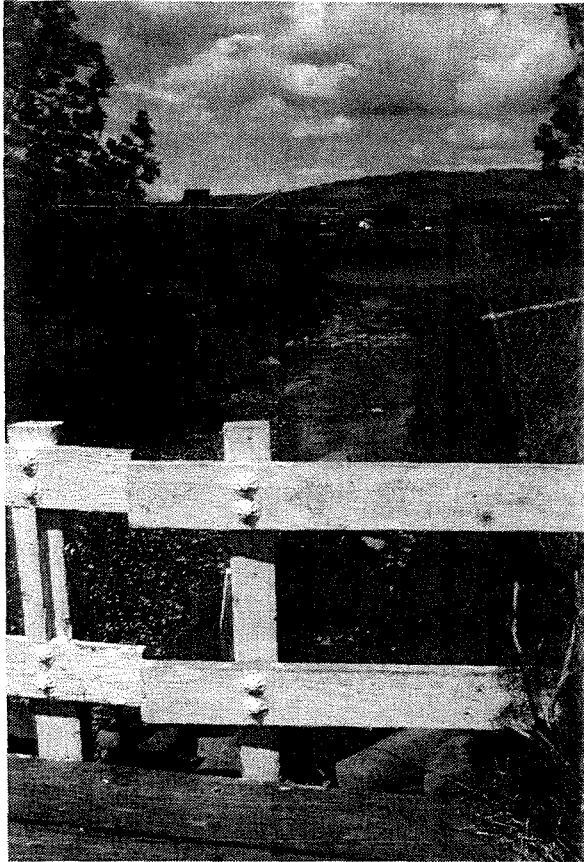
**O-3 ALTERNATE #3 - SOFT EDGE WITH MARSH**



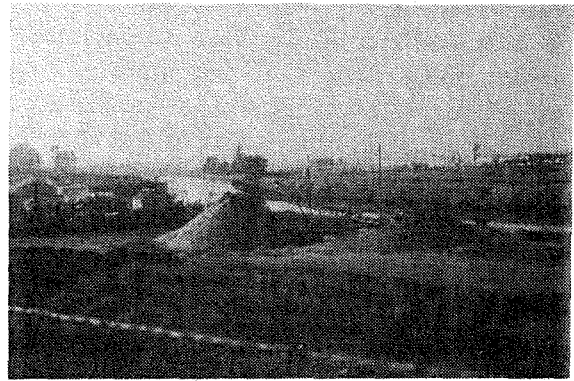
**14. Vegetate the banks with appropriate native plants, and allow native or compatible non-native plants on the top of the bank.**

*A Recommended Plant List is located in Chapter 5.*

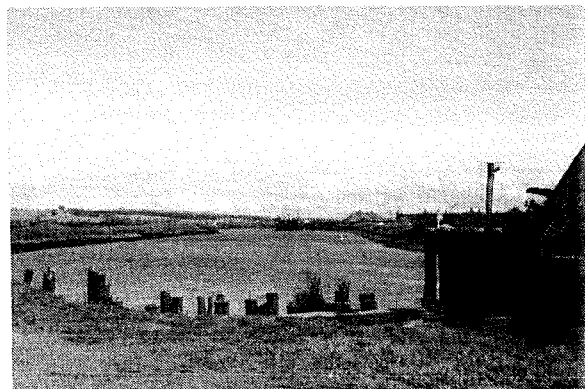
**15. Control the use and spread of aggressive exotics.**



*Major salt marsh restoration at McNear Peninsula at the edge of the channel would complement nearby pockets of marsh restoration, like the outlet of Thompson Creek at 'F' Street shown here.*



*River-dependent commercial and industrial facilities along the downstream reaches require a dredged channel, but pockets of salt marsh can also be restored through this area to make the critical habitat linkages necessary for a healthy river.*



*The Petaluma River is a navigable channel to San Pablo Bay, 14-miles in the distance through extensive salt marshes. The River Plan intends to maintain and extend these natural and commercial linkages to downtown and beyond.*

**RIVER ORIENTED DEVELOPMENT ZONE  
POLICIES**

**Heavy Commercial/Industrial Activities**

- 16. Promote and support continued use of lands for river-dependent commercial and industrial activities.**
- 17. Encourage the development of new river-dependent commercial and industrial uses.**

It is the intent of this plan to maintain a working waterfront. Other improvements suggested by this plan, such as public access and habitat restoration, should not interfere with the operations of existing river-dependent businesses nor preclude new ones from location in this river segment.

**PROGRAMS**

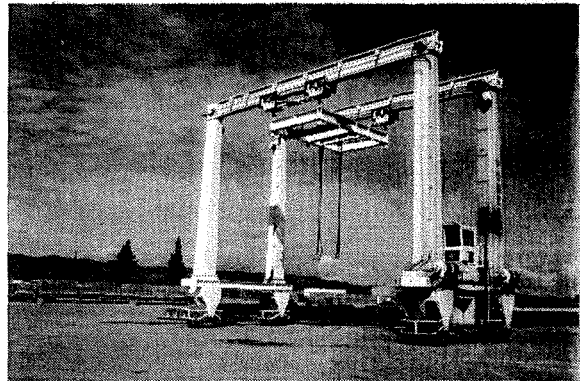
- 17a. Avoid construction of new structures or land use changes that are incompatible with existing or future river-dependent land uses.**
- 17b. Encourage river-dependent commercial uses to move into vacant or under-utilized riverfront space.**
- 18. Protect and maintain the viability of continued dredging of the river channel.**

**PROGRAMS**

- 18a. If future levels of river traffic tonnage substantially decrease, investigate alternative means to continue dredging, such as new funding mechanisms or legislative support for continued COE dredging.**

- 18b. Prior to any City approval of any future General Plan land use change for the Kasler/Pomeroy, Jerico, or Shamrock properties, require a comprehensive master plan that incorporates and implements the River Plan's access and enhancement provisions.**

A master plan will likely only be required for a significant proposed land use change that will displace one or more industries supporting the Corps of Engineers' dredging program. A master plan can include alternate methods of continuing the dredging, implementing improvements to the river's edge, and encouraging future industrial/commercial use along the waterfront in addition to the more typical topics of such plans (i.e., traffic, aesthetics, infrastructure, etc.).



Heavy industrial activities in the Downstream Segment, as evidenced by this heavy-duty crane at the Pomeroy/Kasler operation, are incompatible with recreational trail access. The trail will be routed away from such conflicts in order to maintain the working waterfront.



**River-Oriented Design Sensitivity**

**19. *Require sensitive, river-orientated design of all riverfront development.***

PROGRAMS

*19a. Limit new riverfront development between Foundry Wharf and McNear Hill to river-related or river-dependent uses.*

*19b. To the extent possible, require new development/redevelopment on riverfront properties between Foundry Wharf and McNear Hill to include interior and exterior river-oriented features.*

Physical and visual access to the river are important features for any new construction in this area. Site plan and architectural review should pay particular attention to placement of buildings and parking lots, pedestrian orientation and amenities, view corridors, and riparian-compatible planting.

*19c. Discourage location of parking and other non-river-oriented uses on the river side in future development and/or redevelopment.*

Where parking or other unsightly areas must be located near the public riverfront, landscape screening techniques should be employed to preserve the character and ambiance of the river trail experience.

*19d. Implement the riverfront public access provisions in a manner that will enhance, rather than constrain, opportunities for the development of new riverfront commercial activities.*

FLOOD PROTECTION AND BANK STABILIZATION POLICIES

*20. Stabilize riverbanks to lessen erosion and siltation of the river utilizing biogeotechnical approaches whenever possible.*

PROGRAMS

*20a. Encourage strict enforcement of No Wake Zones.*

*21. Bank stabilization measures should be completed with installation of access improvements since the top of bank may change depending on the bank stabilization method chosen.*

*22. Remove deteriorating wood piling and failing bulkheads and replace with concrete and wood engineered retaining walls where needed.*

*23. Stabilize channel banks in ways that integrate vegetation with any required engineering structures. Biogeotechnical techniques are the preferred bank stabilization methods.*

Where rip-rap bank protection exists, pack the rip-rap blocks with dirt and vegetate, if possible, or replace with alternative slope protection measures that increase habitat. Grouted rock is to be considered the least preferred method of bank protection and its use should be restricted to repairs and emergency stabilization measures. Acceptable practices for stabilizing channel banks in the Downstream Segment include:

- \* Excavation and wattling
- \* Wired brush matting
- \* Planted crib walls and/or gabion walls
- \* Retaining walls with planted terraces
- \* Planted erosion control blocks

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## CHAPTER 4.0

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**"I worry that I might not live to see these ideas implemented...Establish some short-term changes that will allow immediate enjoyment of the river."**

Participant (age 13) in Community Workshop, 1992

**"...Petaluma's strongest long term economic development strategy is the detailed master planning and staged construction of a first class river park along the banks of the Petaluma River, including McNear (Peninsula)...It should become Petaluma's central amenity and a focal point for future commercial, tourist retail, office, and multi-family development."**

Market Outlook and Economic Development Plan,  
Economic Research Associates, 1991

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# IMPLEMENTATION ELEMENT

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The River Plan provides feasible direction and achievable goals for the creation of a river greenway with complementary riverfront development. This chapter identifies measures available to the City of Petaluma, its citizens, and other agencies to implement this plan's goals, objectives, policies and programs. It identifies sources of funds, prioritizes public expenditures, and demonstrates an implementation process that is realistic under current and projected circumstances.

Following a discussion of the general approach to implementation, this chapter describes state and local regulatory tools available for implementing of General Plan elements, financing measures, and associated phasing recommendations.

**"It takes more than providing shopping opportunities to make a downtown "work". Recreational and cultural activities are needed, too. The turning basin can be a lively complement to downtown activity."**

**-Petaluma General Plan**

## 4.1 GENERAL APPROACH: A PUBLIC-PRIVATE PARTNERSHIP

### A Balance of Uses

Two basic aspects of the river corridor recognized by this plan are:

- \* The river is a natural resource of local and regional significance to be protected and enhanced.
- \* The river is equally an urban design feature and transportation route to be improved as an amenity for the property owners and community at large.

The Petaluma General Plan 1987-2005 provides a list of actions that must occur in order to balance these dual aspects of the river corridor:

- Allow development
- Secure areas for public access
- Reduce flood damages
- Restore and protect riparian biota
- Maintain navigability

Performance will take many years and, of course, maintenance of the improvements will go on forever. Funding for these improvements will come from a variety of sources, some of which are not even invented yet, and will depend upon cooperative arrangements made between the public and private sectors.

### Public - Private Partnership

Property owners, users of the river, the community at large, and many local, state, and federal agencies all have significant interest in river resources. Each entity has a role to play in implementing this plan. Motivation to

participate comes from a realistic understanding of the direct benefits to be derived. This plan balances all the various interests so that the entire community benefits from the improved environment and quality of life, increased recreational opportunities, an economic boost from increased tourism, and greater value of lands both inside and outside the river corridor. The greatest financial benefits will be gained by riverfront properties that fully embrace the principles embodied in this plan.

A key goal of the River Plan is the continued economic viability of the riverfront properties. Not only does this plan support sustained river-oriented and river-related activities, including industrial and commercial businesses, it is a community-wide strategy for long term economic growth. Economic studies have documented the contribution that greenways, habitat, and public access typically make to increased property values. For instance, in their 1991 report to the City, Economic Research Associates identified development of a high quality river park as Petaluma's strongest long-term economic development strategy.

#### Development Obligations

Approximately half the properties in the river corridor ( 75% of the land area) have the potential for development or redevelopment. New construction is already obligated to conform to the City's General Plan, zoning ordinance, and a myriad of other regulations to insure compatability with the adjacent neighborhoods, community goals, and protection of the environment. For instance, to mitigate its effects to the transportation infrastructure and surrounding properties, development provides street frontage improvements (including public sidewalks), landscaped setbacks from property lines, and protection of special natural features.

Examples of thriving smaller communities that are identified in large part by their pedestrian-friendly waterfronts include:

- SAN LUIS OBISPO, CA
  - FOSTER CITY, CA
  - ALAMEDA, CA
  - BOULDER, CO
  - ASHLAND, OR
  - CORVALLIS AND SALEM, OR
- to name just a few.

Economic returns typically associated with waterfront improvements include:

- INCREASED REAL PROPERTY VALUES
- INCREASED PATRONAGE BY LOCAL RESIDENTS
- CONCESSIONS AND SPECIAL EVENTS
- TOURISM
- INCREASED LOCAL EXPENDITURES BY PUBLIC AGENCIES
- RETENTION OF CORPORATE BUSINESSES
- REDUCED FLOOD DAMAGES
- REDUCED LOCAL EXPENDITURES FOR POLLUTION CONTROL, ROADWAYS, AND HEALTH CARE

For purposes of implementing this plan, the river will be regulated similarly to a street corridor. Just like those located along a planned street right-of-way, new development on riverfront properties is expected to provide its fair share of dedicated rights-of-way and improvements for public access, safety, and habitat protection. The City encourages river corridor development that benefits from an improved river frontage and contributes to a positive riverfront character, and discourages those that won't. It is imperative for the success of this plan that the entire community, including development interests, considers riverfront improvements as rightful pre-conditions of development equal or greater in value to streets, sewers, water lines, and other essential infrastructure.

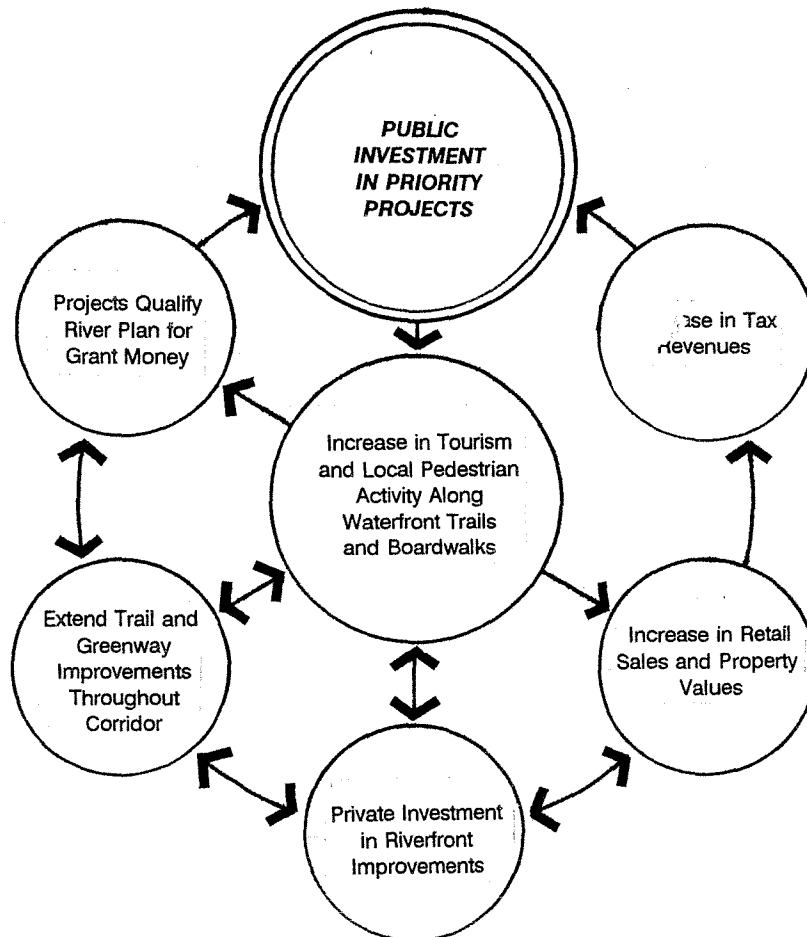
**Maintenance**

Property owners are asked to maintain the river corridor trails, landscape, and other amenities (benches, lights, etc.) just as they are now required to maintain yards, sidewalks, and landscaping along the streets. Assessment districts should be formed to provide back-up funding for municipal maintenance in case a few property owners fail to keep their areas to acceptable levels.

Increases to municipal costs for patrol and maintenance of public areas will be offset by higher property values and sales tax revenues.

**Public Obligations**

Development and maintenance of publicly owned lands will be accomplished through a variety of funding mechanisms over a number of years. The River Plan recommends a prioritized implementation process, the first priority being highly visible public improvements in and around the downtown riverfront area. Success of these early phase improvements, selected for their maximum effect, will encourage others to follow suit, broaden public support, and stimulate investment elsewhere in the river corridor.



**EFFECTS OF PUBLIC INVESTMENT IN PRIORITY PROJECTS**

*This simple diagram shows the anticipated results of public funding of selected, high visibility projects in the early phases of plan implementation. Both the public and private sectors will participate and benefit from these investments.*

"Many studies have revealed increases in property values in instances where the property is located near or adjacent to open spaces. Most studies have addressed traditional parks or greenbelts (large open space areas), though a few studies are available for greenways.

- A study of property values near greenbelts in Boulder, Colorado, noted that housing prices declined an average of \$4.20 for each foot of distance from a greenbelt up to 3,200 feet. In one neighborhood, this figure was \$10.20 for each foot of distance. The same study determined that, other variables being equal, the average value of property adjacent to the greenbelt would be 32 percent higher than those 3,200 feet away (Correll, Lillydahl, and Singell, 1978).
- In the neighborhood of Cox Arboretum, Dayton, Ohio, the proximity of the park and arboretum accounted for an estimated 5 percent of the average residential selling price. In the Whetstone Park area of Columbus, Ohio, the nearby park and river were estimated to account for 7.35 percent of selling prices (Kimmel, 1985).

Source: Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors, National Park Service, 1992.



*Early phase public investments are proposed for the Downtown Segment, such as acquisition and repair of the railroad ROW and completion of the Turning Basin trails.*



*First priority public/private efforts in the Warehouse Segment will be directed toward the riverfront wharves and public river access points along city streets.*



*Acquisition of McNear Peninsula for a public park, a high priority, is being sought through Sonoma County Agricultural Preservation and Open Space District.*

## 4.2 IMPLEMENTATION REQUIREMENTS

The California Government Code, Public Resources Code, and the City of Petaluma General Plan, allow local planning agencies to implement their Area Plans in ways which are tailored to local conditions and circumstances. The City General Plan requires that certain specific actions be consistent with this Area Plan.

- All subdivisions
- All zoning regulations
- All Specific Plans
- City Capital Improvement Plans
- Dedication and disposal of public land

To reinforce these laws, the following policy is included in this plan:

### Plan Conformance Policy

- 1. No subdivision, use permit, design review application, or other entitlement for land use, and no public improvement shall be authorized for construction in the designated river corridor if that proposed action is not in substantial compliance with the Petaluma River Access and Enhancement Plan.***

Greenway setbacks and habitat improvements will help mitigate the adverse effects of developing properties in the sensitive river corridor. The greenway helps riverfront development satisfy the California Environmental Quality Act (CEQA), non-point source water pollution standards set by the state's Regional Water Quality Control Board, and cumulative effects of urbanization.

## 4.3 LOCAL REGULATORY TOOLS

Zoning is often the primary instrument for implementing the land use element of a General Plan, but other regulatory measures available to local communities include: subdivision law, building and other safety codes, site plan and architectural review, historic preservation ordinances, local environmental guidelines, redevelopment area funds, Capital Improvement Plan (CIP) funding allocations, and special assessment districts.

The zoning ordinance, however, is too often the only set of land use regulations reviewed by property owners, developers, and real estate agents. To insure that the zoning ordinance and other local regulatory measures adequately represent the importance of the River Plan, the following programs shall be implemented by the city:

### Local Zoning Programs

- 1a. Revise the city's zoning map and/or text to reference the River Plan and its special regulations for the river corridor.***
- 1b. Consider the creation of a River Corridor Overlay/Combining Zone district.***

Overlay, Combination, or Planned Unit Development zones are used to reflect special conditions for a geographically-defined area. The City of Petaluma already uses combination zones to regulate flood hazard areas and historic districts.

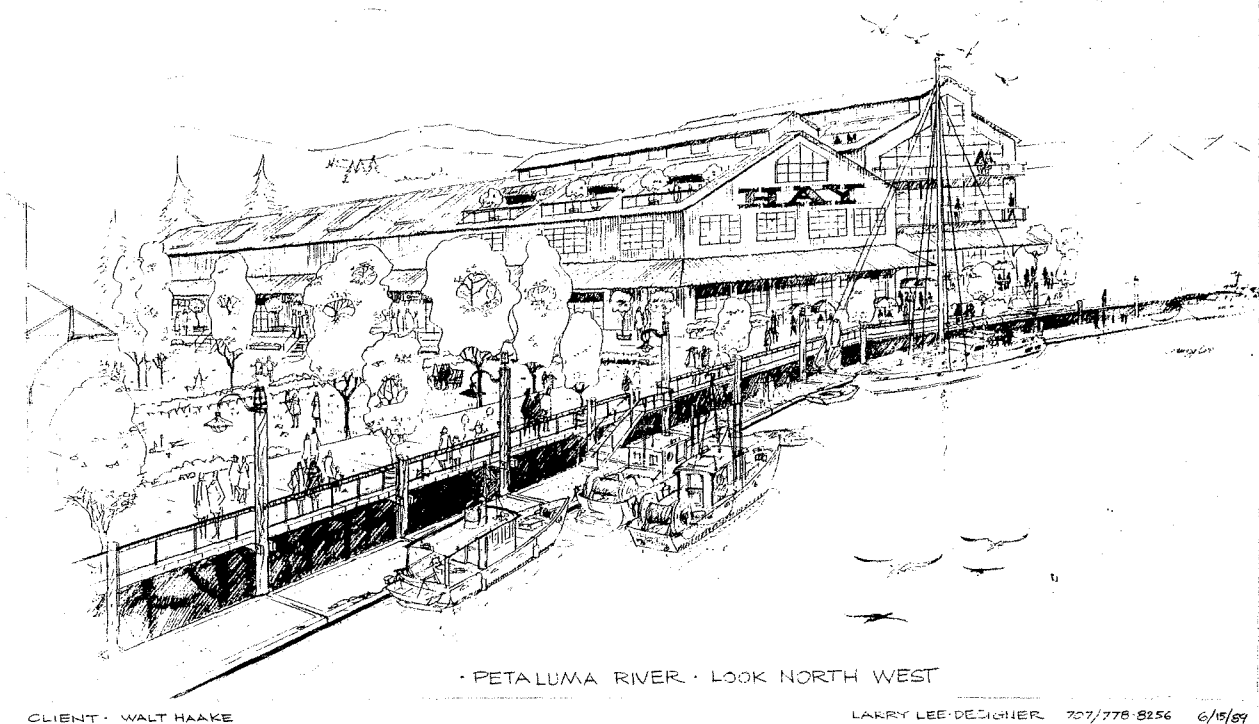
### General Regulatory Programs

The following programs shall be implemented in the river corridor except where findings are made that such measures would be incompatible with existing and future river-dependent uses, or where other special conditions render the program infeasible for a particular site:

*1c. All development and/or redevelopment of lands containing portions of the designated greenway, shall perform the following tasks:*

- *Dedicate to the city fee title in the land, or easement for permanent public access and maintenance, as set forth in this plan, and*
  - *Complete landscape and trail improvements as specified in this plan (or pay in-lieu fees sufficient to allow city implementation of these improvements).*
- 1d. For properties within the Downtown and Warehouse Segments, where existing buildings at the river edge preclude greenway or banktop trails, establish a river trail assessment district or in-lieu fee equal to each property's "fair share" of the walkway system costs to be paid at time of development and/or redevelopment.*

This mechanism will collect funds as opportunities arise for construction of public boardwalks, docking facilities, and other improvements that benefit the property.



*This sketch shows a proposal for a private waterfront commercial development in the Warehouse Segment, done independently of this plan, that reflects the recommendations of the River Plan in terms of architectural style, riverfront open space, and public access.*



### Capital Improvement Planning Programs

Capital Improvement Plans (CIP) are budgetary projections for publicly funded improvements and acquisitions. During the City's annual CIP review, riverfront improvements advocated by this plan should be given due consideration and funded when possible. The following programs will facilitate that process:

*1e. As funding becomes available, incorporate in the appropriate CIP's river corridor improvements advocated by the River Plan, including but not limited to the following:*

- *Trail and boardwalk design and construction.*
- *Right-of-way acquisition.*
- *Landscaping, lighting, and other improvements within the Greenway.*
- *Park site acquisition, design, and construction.*
- *Habitat enhancement.*
- *Bank stabilization.*

Capital improvement funds are usually in short supply and very competitive. This source of funds will be only one component in the implementation of the entire plan and should be used for highest priority improvements first. Adequate money should be budgeted so that the city can quickly react to unforeseen opportunities.

"A greenway, which provides local opportunities and enhances tourist draw, can be an important asset to your community. Recent trend analyses show that weekend trips to nearby areas are on the increase, while the traditional two-week summer vacation is on the decline for today's travellers.

Travelers are also increasingly attracted to educational-oriented experiences provided by cultural and historic sites. One of the fastest growing areas of tourism includes cultural and historic community festivals, events, and competitions.

A poll commissioned by the President's Commission on Americans Outdoors found that natural beauty was the single most important criterion for tourists in selecting a site for outdoor recreation (*Scenic America, 1987*).

More than 600,000 Americans took a bicycle vacation in 1985. Touring cyclists, when travelling in a group, spent \$17 per day (camping), and \$50 per day (staying in motels). Cyclists travelling alone spent an average of \$22 per day (camping) and \$60 per day (motels) (Moran, Wilkinson, and Fremont, 1988)."

Source: Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors, National Park Service, 1992.

*1f. Search other financing programs to fund, as necessary:*

- *Trail design, right-of-way acquisition, and construction; and*
- *Ongoing greenway maintenance.*

"Special events not only generate revenues to sponsors and the community, but promote the greenway itself to residents and visitors.

- Eppie's Great Race consists of a 6 mile run, 12.5 mile bike ride, and 6.35 mile paddle down the American River in California. The Sacramento County Department of Parks, Recreation and Open Space sponsors this annual event, held along the American River Parkway. All proceeds are donated to Adaptive Leisure Services (ALS). The 1989 Great Race raised \$40,000 and race donations to date total over \$260,000. These proceeds have allowed ALS to expand programs to meet the leisure interests and needs of persons with disabilities (County of Sacramento, 1989)

Source: Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors, National Park Service, 1992.

#### Ongoing Maintenance Programs

Maintenance of all riverfront improvements is as important as initial construction to this plan's overall success. Proper maintenance is necessary to keep the trail system safe and inviting to avoid trash accumulation in sensitive habitat areas, and preserve habitat vegetation. The river corridor must remain the blessing that this town envisions, not a liability. Maintenance is best done in constant, smaller doses so that its costs never outstrip the community's ability to afford it.

- 1g. Wherever feasible, require property owner maintenance of all trail, landscaping, and incidental improvements (benches, lighting, etc.) within the adjoining greenway.*

- 1h. Establish one or more assessment districts to do one or more of the following:*

- *Fund ongoing maintenance of common public areas and improvements*
- *Fund private patrol activities, and/or*
- *Provide back-up funding mechanism for use only where property owners fail to adequately maintain greenway improvements on or adjacent to their property.*

Only at the time of new development or substantial re-development, the same time riverfront improvements are required will properties become part of an assessment district. Some properties may voluntarily join one or more assessment districts to hasten certain improvements, to insure adequate maintenance, or to share maintenance costs more equitably throughout a larger area. These greenway maintenance requirements are not aimed at existing river-dependent or industrial uses.

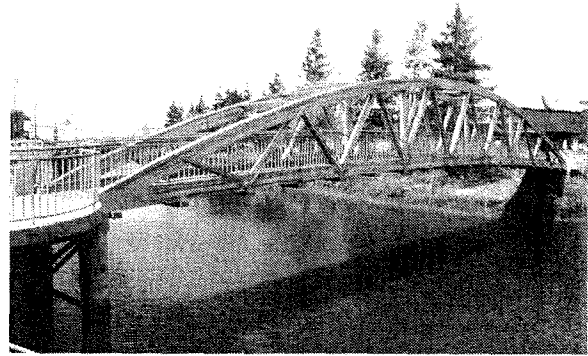
- 1i. Encourage a citizen participation program of regular trail clean-up.*

Voluntary citizen programs can be used to remove debris and fallen tree limbs, water and weed select plantings, report damages, and generally keep an eye on the greenway. Neighborhood watch organizations can be expanded to include trails and river greenway areas.

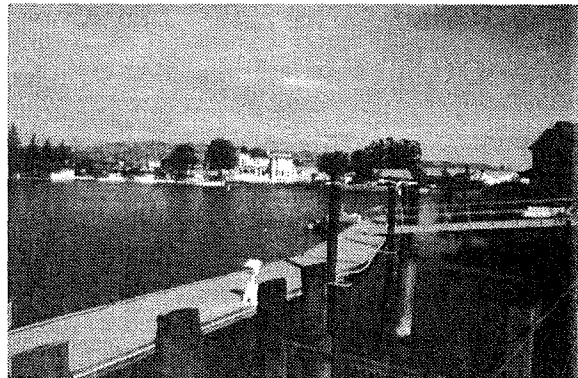
Petaluma has a long history of active citizen participation and volunteerism. Civic interest and pride in all sorts of social, political, recreational, and environmental issues have made Petaluma a very special place to live and work. This volunteer spirit may be used to help maintain the river corridor as a safe and healthy environment, as an educational tool for our schools, and as the principal image of our community.

#### TYPICAL VOLUNTEER ORGANIZATIONS

- **BUSINESSES & CORPORATIONS**
- **PROFESSIONAL ORGANIZATIONS**
- **SERVICE & SOCIAL CLUBS**
- **EDUCATIONAL GROUPS & CLASSES:** (e.g., United Anglers of Casa Grande, Youth for Environmental Action - YEA, Youth for Environmental Service - YES, Adopt a Watershed, Montessori School, and others)
- **ENVIRONMENTAL GROUPS:** (e.g., Sierra Club, Trout Unlimited, Audubon Society, Urban Creeks Council, Ducks Unlimited, Petaluma River Council, and others)
- **NEIGHBORHOOD ASSOCIATIONS:** (e.g., People Who Care - Thompson Creek, and others)
- **RECREATION & SPORTS ORGANIZATIONS:** (e.g., Petaluma Yacht Club, Northbay Rowing Club, Sea Scouts, Petaluma River Festival, and others)



*The Balshaw Bridge, which connects both sides of the Turning Basin, was publicly funded but came into being as a result of creative and diligent citizen activism.*



*The floating docks in the Turning Basin were funded by civic donations and the city.*

## 4.4 FINANCING MEASURES

Adopting new regulatory programs will not implement this plan by itself. Substantial public funding and investment by property owners will be required.

Public funds will first be focussed on high visibility projects in the vicinity of downtown with the greatest potential for success. Local funds can be leveraged to attract outside resources. Private interests will participate by implementing portions of this plan on their own properties, which have increased in value from the public investments. Most private investment will occur at the time of new development or redevelopment.

The following policies are the principal elements to the financial strategy:

### *2. Aggressively pursue outside funding.*

Likely sources include the California Coastal Conservancy, the Sonoma County Agricultural and Open Space District, state and federal transportation and enhancement funds, and miscellaneous grant sources for habitat restoration, tree planing, recreation, and economic revitalization. The City should also monitor statewide bond initiatives and strive to have riverfront improvements included as a beneficiary.

### *3. Require river improvements as a condition of development approval.*

Development fees and/or exactions should be used wherever possible to insure that river improvements and public access are incorporated into future development's site planning, environmental impact mitigation measures, and maintenance activities.

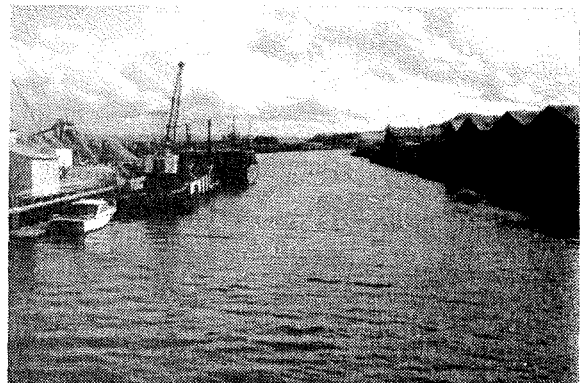
### *4. Direct local funds as regularly as possible towards river plan implementation.*

Monies can be budgeted for river-related improvements in CIP's, Redevelopment Agency tax increment funding, general funds, or other annually budgeted local sources whenever possible.

### *5. Consider assessment district(s) to fund specific improvements.*

Smaller districts can be formed to finance, maintain, and patrol specific improvements. Larger district(s) should be formed as an equitable method to provide back-up financing for greenway maintenance, replacement of large items, or repair of damages from disasters.

If federal dredging of the river becomes threatened, the City should consider utilizing the state-sanctioned methods of financing waterfront improvements, such as the Municipal Harbors Act, a Small Craft Harbor District, or other such improvement district.



*The commercial tonnage of goods barged along the river by Jerico Products (above) and others is sufficient to qualify for federally financed river dredging. Since regulations and economic circumstances can change, however, back-up strategies are needed.*

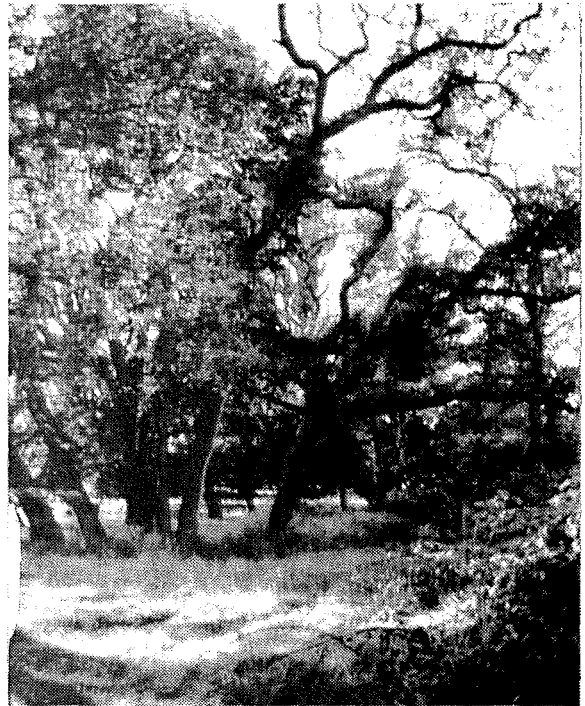
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## CHAPTER 5.0

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**"Native plants/riparian restoration  
wherever possible."**

Participant in Community Workshop, 1992



*The native oak woodland in the upstream preservation area will be protected under the conditions of the River Plan. In addition, this valuable threatened habitat will be expanded, using these magnificent trees as seed sources.*

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# NATURAL HABITAT MANAGEMENT PROGRAM

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## 5.1 INTRODUCTION

This Natural Habitat Management Program for the Petaluma River is provided as an informational source and guideline for anyone considering installation or maintenance of riverside vegetation. It describes the overall biological restoration and enhancement component of the River Plan, but is not binding or an official regulatory document. It clarifies the approach to natural habitat management envisioned in the goals, objectives, policies and programs, with the understanding that the science and technology of habitat restoration may change. The program addresses various considerations for successful revegetation and enhancement along the 6.5 mile River Corridor, from the upstream freshwater reaches of the intermittent Willow Brook Creek to the downstream tidally influenced Petaluma River at the Highway 101 crossing. The management program reflects the input and advice from local citizens, the CAC, the TAC, City Staff, and local, state, and federal regulatory agencies. It is hoped that its inclusion with the River Plan enables better, more effective management of our vital natural resources.

## 5.2. BIOLOGICAL RESTORATION GUIDELINES

### The Context for Restoration

One of the principal components of the River Plan is the restoration and preservation of the natural resources of the river corridor. Valuable remnant habitat areas are part of what was once a healthy and diverse river-related natural system linking fresh water and tidal zones into an ecological continuum from the hills to the San Pablo Bay. The rich natural setting has been a critical factor in the history of settlement in the Petaluma valley, and the river has been the identifying feature of the places that have developed. Downtown Petaluma, for instance, grew in the transition area where both fresh and salt water resources were readily available, and the town has thrived largely as a result of this location. Similar considerations were also important for the early Coast Miwok settlers whose village was in roughly the same location as downtown.

Degradation and loss of the natural habitats, and abandonment of the city's connection to the river have coincided with a sense that Petaluma may be losing its unique identity. The natural processes are still in-tact, however, and enough remains of the natural habitat that, over time, the natural setting could be re-established comfortably within the context of the new built environment. Acknowledgement of the supporting ecological system as a "form determinant" for the future built environment, and restoration of the degraded components will serve to re-establish the unique identity of this particular place.

Restoration of valuable habitat in or near to urban environments has significant benefits to humans and wildlife alike, particularly since widespread environmental damage is frequently associated with urbanization. Urbanization typically creates gaps in wildlife travel corridors, alters stream flow characteristics, and replaces high value habitat with imported vegetation and other features with little or no local habitat values. Native vegetation, adapted over the eons to the specific conditions of this location is well suited as a source of food and shelter for creatures that live along the river. The restoration of native habitats, in combination with environmentally sensitive engineering and urban design, can effect a major improvement in the overall health of the river system, in the local habitat, and in the relationship of our built and natural environments.

#### **Restoration Activities**

Restoration includes activities such as removal of exotic species; erosion control; bank stabilization; excavation and grading; local source seed collection and propagation; planting of native trees, shrubs, groundcovers and emergent marsh species from the local gene pool when feasible; and maintenance. The work will occur within the river channel, on the terraces and banks, and in adjacent upland areas. It will require close coordination with water quality management activities, flood protection work, public access improvements and with adjacent developments.

#### **Response to Existing Conditions**

This riparian and estuarine (tidally influenced) restoration and management program was prepared based on analysis of historic and current river conditions, the natural processes, the immediate site environment, probable flood channel alterations in the reaches upstream of downtown, and adjacent land uses. Hydrologic and hydraulic modeling and analysis have been utilized to determine the general location, species, and density of the vegetation that can be established along the river corridor consistent with environmentally sensitive flood protection (HEC-2 Model runs were completed for this project from the Petaluma Boulevard North bridge at Willow Brook to downstream of the Lakeville Highway bridge by Questa Engineers in 1993 and 1994).

#### **Management Zones**

The River Plan has divided the length of the river into six (6) river segments with specific planning and habitat management objectives for each (see Chapter 3). In addition, there are four management zones that run the length of the river: (1) Restoration Zone; (2) Buffer Zone; (3) Preservation Zone; and, (4) River Oriented Development Zone. Minimum recommended widths of the zones are shown on the corresponding cross-sections for each river segment in Chapter 3.

Cross-sections on the following pages show the general planting locations for native plant materials that are recommended for restoration and enhancement. These reflect differing environmental conditions with respect to moisture supply, substrate, and period of tidal and flood water inundation that will dictate the choice and method of establishment of native plants along the River Corridor.

### 5.2.1 OVERALL RESTORATION DESIGN CONCEPTS

The design intent is to recreate a self-sustaining native landscape, consistent with the natural processes of the site and its environs, with minimal maintenance requirements.

To the extent feasible, the restoration plan for the greenway strives to re-establish the dense native riparian forests with associated meadows and wetlands in the upper reaches of the river corridor, and to re-establish salt marsh environments in the lower reaches. In addition, tree cover and wetland improvements are recommended through the middle reaches in order to re-establish linear habitat linkages that have been lost through the center of the city. The combination of freshwater and brackish/salt water habitat as a nearly continuous linear system is a unique restoration opportunity that can be fulfilled by implementation of the comprehensive River Plan.

Restoration design, including species composition, planting location and planting density should be based on an analysis of relatively undisturbed habitats within the restoration area and within the Petaluma River Watershed. Unfortunately, much of the riparian habitat along the Petaluma River upstream of Corona Road, in the vicinity downstream, and through the industrial areas has been altered or substantially degraded and narrowed by clearing for urban, agricultural, and industrial activities.

The restoration design for the riparian areas upstream of Lynch Creek is based on botanical studies completed for the proposed Petaluma Factory Outlet Village and Rainier Avenue Interchange EIRs. The design for estuarine reaches downstream of Lynch Creek is based on botanical studies completed for the Petaluma River Marsh Enhancement Plan. The restoration design also includes other plant species known to occur in similar habitats in Southern Sonoma and Northern Marin Counties in order to increase species diversity.

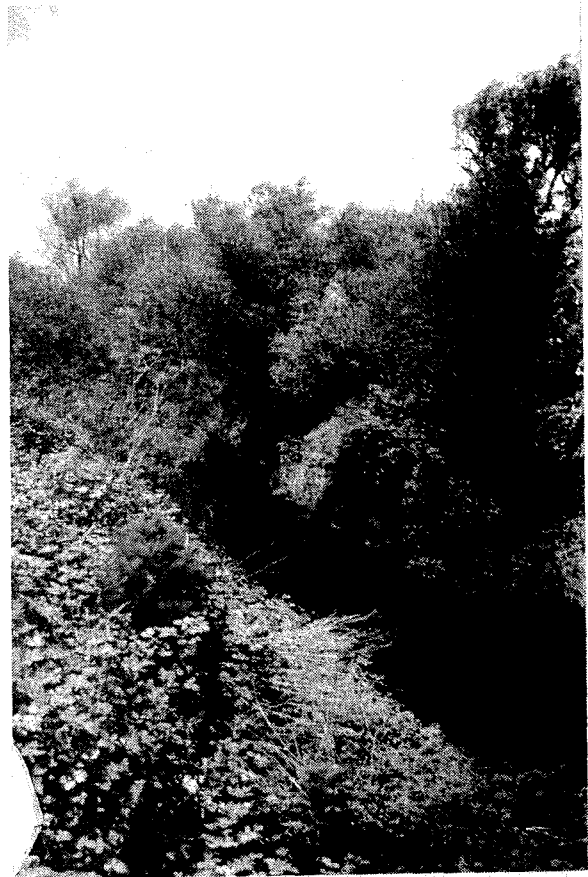
Because of constraints imposed by existing land uses and flood channel design requirements, the enhancement of the River Corridor, in its entirety, will actually consist of islands of habitat, and patches and clusters of native streamside vegetation established and protected in opportunistic locations dictated by the constraints. Some of the habitat islands will be quite large, such as the proposed marsh at McNear Peninsula and the enhanced riparian forest between Lynch Creek and the Corona Bridge. Linking these islands of significant wildlife habitat will be a narrow, near continuous corridor of native plants along the bank slopes and immediate banktop in the Restoration and Buffer Zones, with native and compatible tree and shrub plantings in the River Oriented Development Zone. The enhanced corridor may alternate from one bank of the river to the other, broken in places by piers, bulkheads, areas with buildings close to the banktop, and hardscape bank slopes. In many areas, eroding bank slopes will require stabilization, with a combined vegetative-structural approach (termed biogeotechnical stabilization), the preferred method.



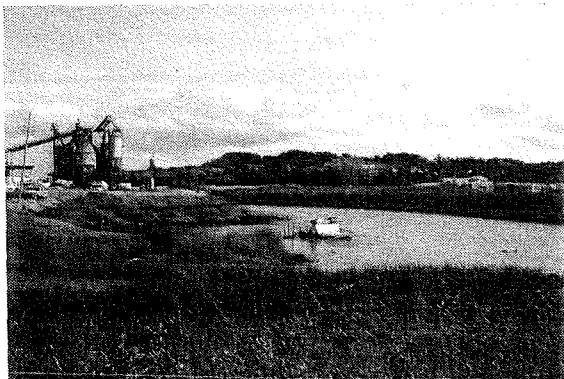
Three distinct habitats, defined by salinity level, occur sequentially along the river and can be related to the various river segments. These are:

- Brackish emergent marsh habitat with an associated peripheral halophyte shrub zone on the river banks;
- Transition fresh/brackish water habitat between the brackish downstream reaches and the upstream freshwater reaches with emergent marsh and patches of riparian shrubs on the banks; and
- Freshwater, multi-layered deciduous riparian forest.

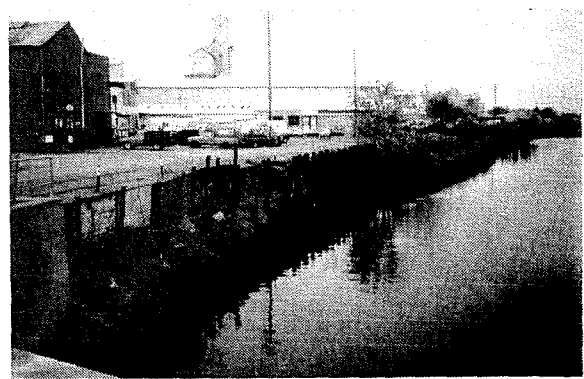
The Downtown, Warehouse and Downstream Segments are brackish water habitats. The Lakeville and Payran Segments are in the transition fresh/brackish water habitat. The Upstream Segment is primarily freshwater habitat. The following Restoration Design Concepts are organized according to these habitats, beginning with the downstream reaches and moving upstream.



*The upstream freshwater habitat in a relatively healthy state contains a diverse mix of canopy trees, understory shrubs, and wetlands, as seen in this area near Oak Creek Apartments.*



*McNear Canal is an example of the typical open brackish water habitat of the downstream reaches with emergent marsh and low growing salt tolerant upland species above the normal water level.*



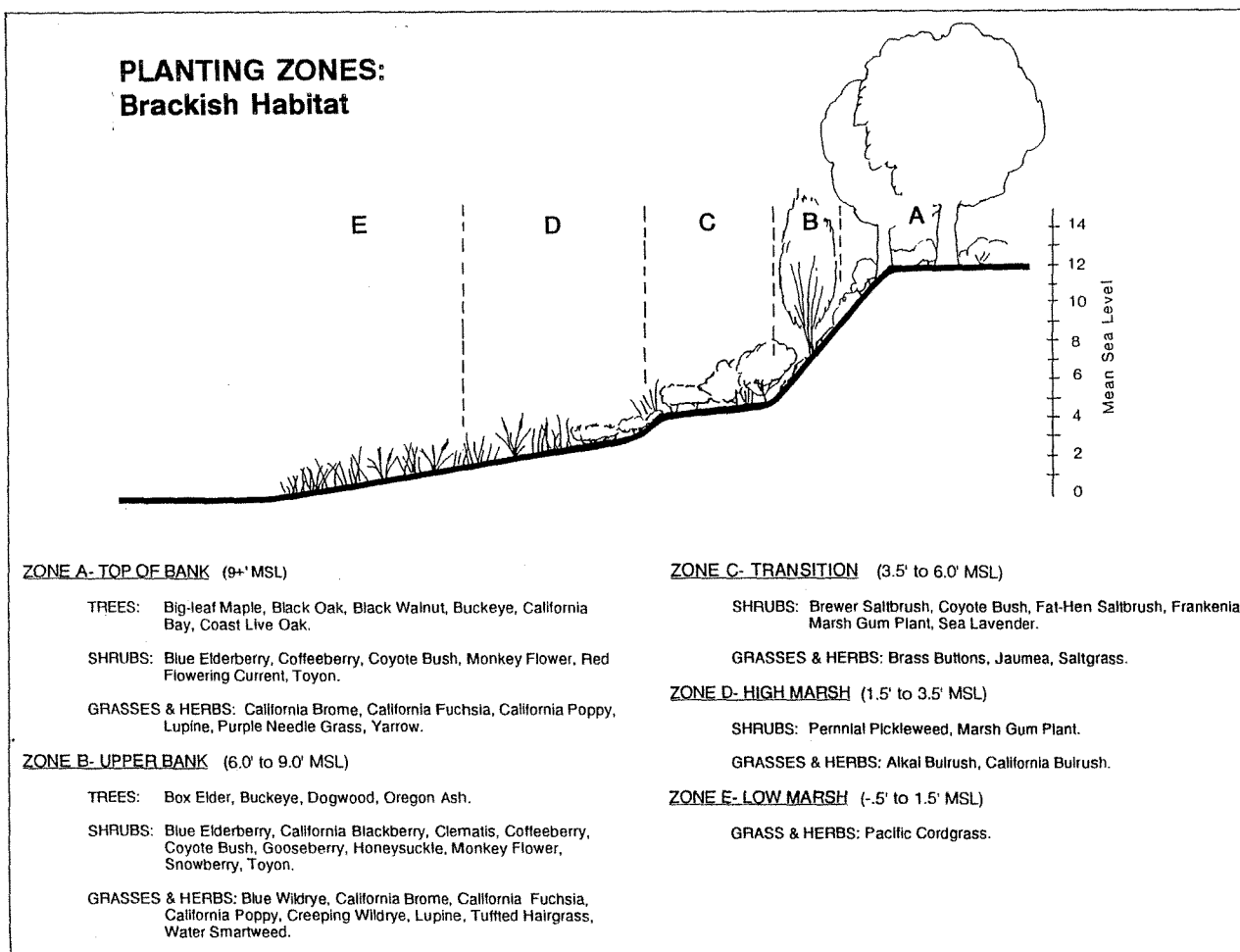
*The reaches above downtown contain the transitional fresh/brackish water habitat, most of which has been heavily impacted by urban encroachments.*

**Brackish Water Habitat**

In general, restoration in this habitat will consist of a 5- to 10-foot-wide emergent marsh zone where possible in the reaches below "D" Street, with shrubs along the bank slopes, and the top of bank planted with native trees, shrubs and groundcovers. The emergent marsh may be as wide as 20 to 25 feet in certain locations such as along the Kasler parcel (formerly the J.H. Pomeroy property) and at McNear Peninsula. The emergent marsh along the Warehouse Segment and in the downtown area will be 5 to 10 feet wide where it can be established. Pockets of existing tules should be protected, such as in the Turning Basin by the floating docks behind the Golden Eagle Shopping Center.

Typically, the brackish water reaches of the river will be planted with such emergent marsh species as cordgrass and alkali bulrush at water's edge, transitioning upland through pickleweed and saltgrass to such streamside shrub species as gum plant, quailbush, fat hen, coyote bush, and California rose. In many areas the slopes must be flattened or laid back and special biogeotechnical methods utilized to reduce wave erosion problems and permit establishment of the native marsh vegetation (see 5.3 Bank Stabilization).

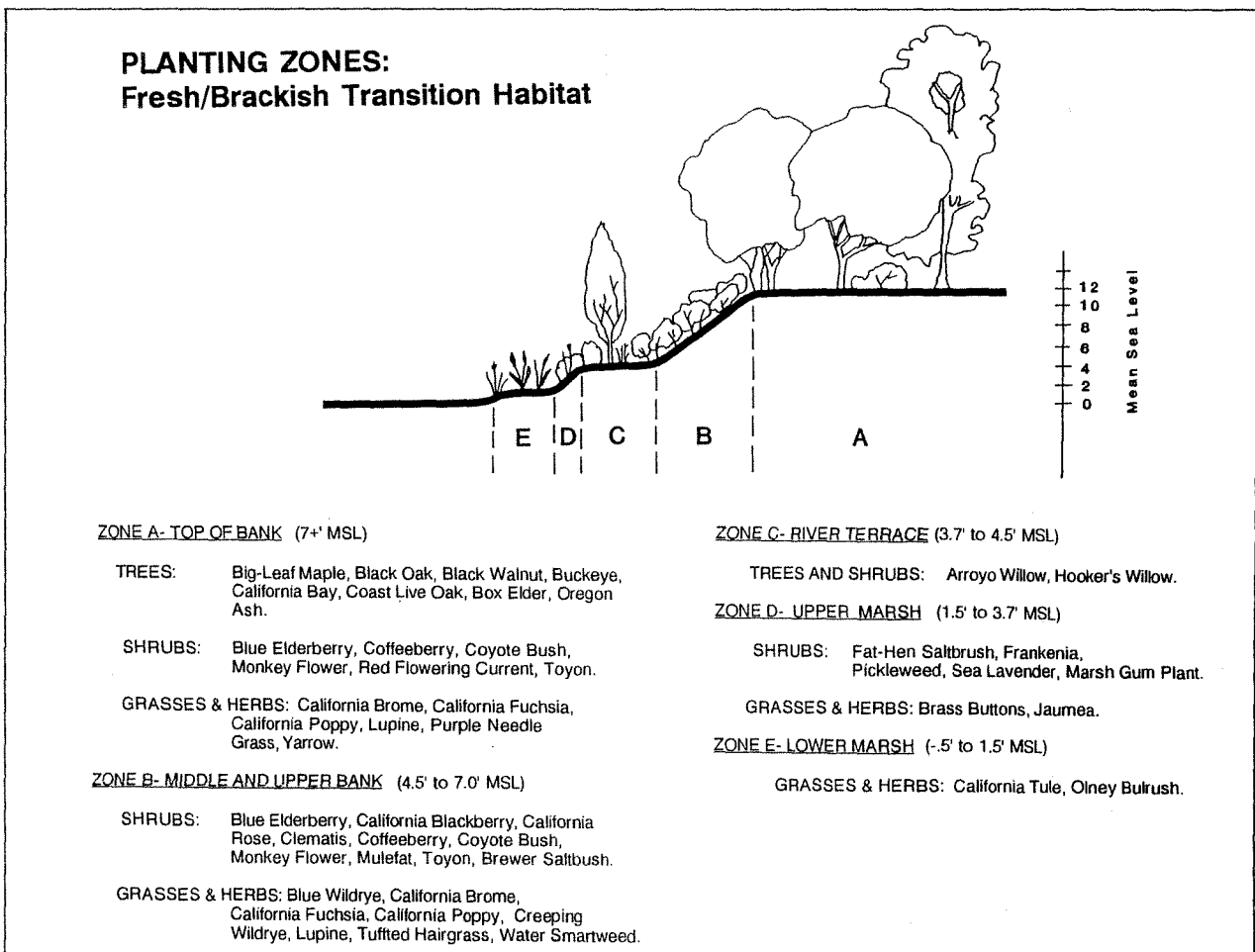
Bank slope and top of bank plantings should be established where possible upstream of the D Street Bridge, including replacement or interplanting of rip-rap.



**Fresh/Brackish Transition Habitat**

Beginning in the vicinity of Washington Street and continuing to Lynch Creek is the transitional habitat between the downstream brackish marsh and the upstream freshwater riparian area. In the transition area, the brackish emergent marsh community gives way to tules and taller bulrush, plants which are less salt tolerant than brackish community plants. Shrub willows and mulefat mixed with coyote bush, rose and native blackberry can be established on the bank slopes. Typical native banktop trees will include Oregon ash, Box elder, Black walnut, Live oak, and tree willows. Final restoration plans for this reach must be coordinated with the Corps of Engineers proposed flood control project.

According to the latest Corps of Engineers plans, the emergent marsh above the Lakeville Bridge would be established along a 5-foot-wide bench at about mean sea level (msl). Shrub willows, such as arroyo willow, collected from sources native to the river, would be planted on a second 10-foot-wide bench at about 3.7' msl. The shrubs can be clustered on the upper banks wherever there is adequate freeboard along the floodwall. Shrubs can be established by such methods as brush layering, wired brush matting, and willow wattling. Annual pruning will likely be required to control hydraulic roughness and to keep the shrubs in a non-woody condition until a mature canopy develops.



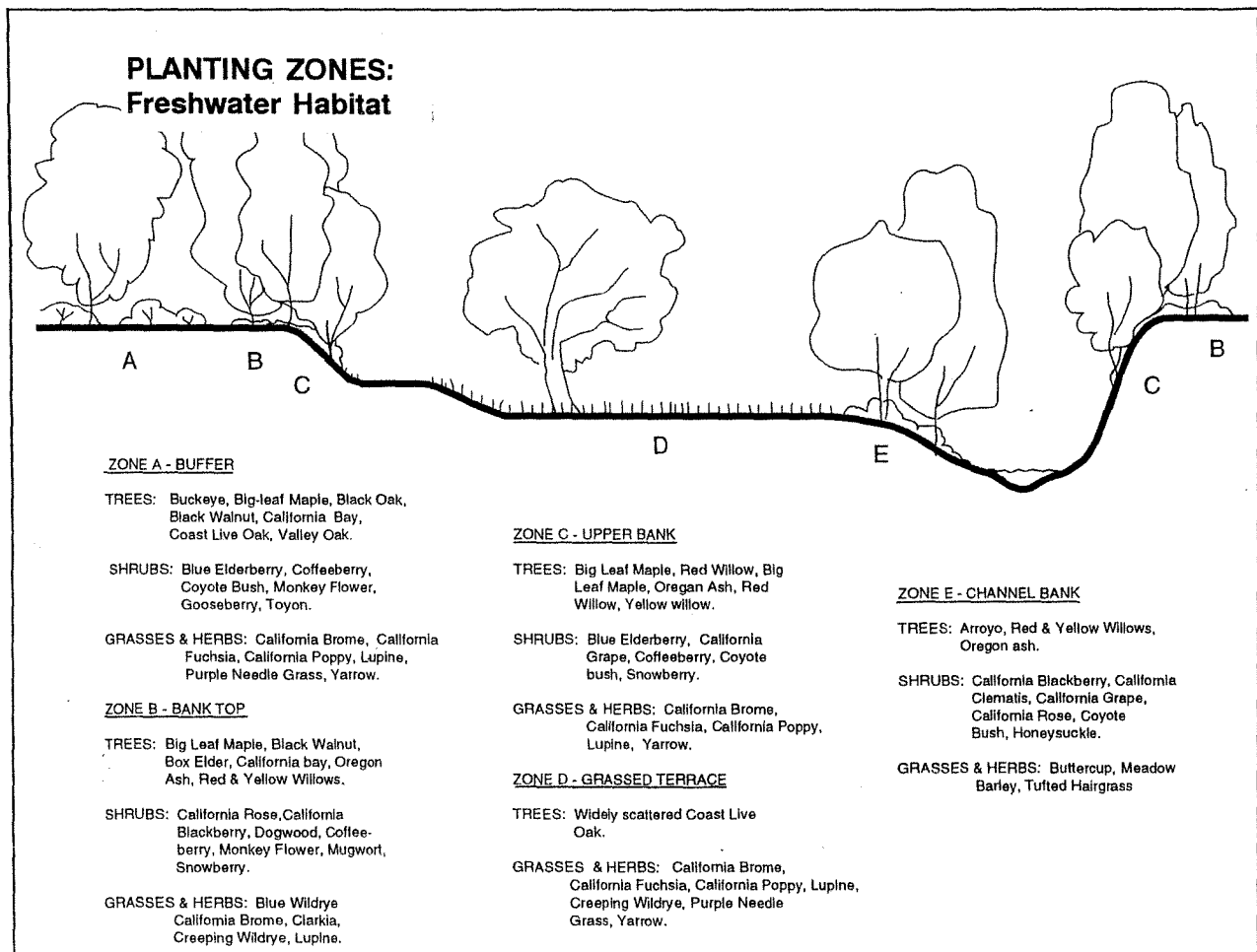
**Freshwater Habitat**

**Riparian Forests:** To enhance the freshwater riparian habitats upstream of Lynch Creek, riverbanks and banktops should be restored with a wide variety of native shrubs and trees. Enhancement would largely consist of removal of exotic trees and shrub species and planting more open areas with riparian trees and shrubs to close the canopy and create a more diverse and dense multi-story riparian habitat. Minor modifications to the streambed should also be made to improve fish habitat.

At banktop, dense plantings of willows can be included with the native Box elder, Oregon ash and Black walnut, with Big leaf maple close to the stream. The riparian forest

should gradually open to woodland then savannah areas of Live oak, Buckeye and scattered Valley oak where width of the buffer allows. Establishment of a complex mosaic of understory and overstory species of deciduous and evergreen plants is desirable in this area to provide a rich wildlife habitat with diverse food and cover sources throughout the year.

**Planting Density:** Riparian area planting density should result in a community with a range of about 50 to 100 trees per acre and 500 to 700 shrubs per acre. The trees should be most dense along the creek and decrease outward in wider portions of the corridor. Areas of Oak woodland should have a density of about 30 to 50 trees per acre. The overall



design should strive for a plant composition of approximately 70 to 75% deciduous species and 20 to 25% evergreen plants. This is thought to be similar to an undisturbed riparian corridor with the broad species composition providing the optimum balance of habitat including seasonal food sources, nesting, and cover for maximum wildlife utilization.

Planting in the remote open spaces in this reach will require special devices for protection from insects, rodents, deer, weeds, and for conservation/retention of water. Bank stabilization may require some minor grading without modification to the hydrologic regime.

Hydraulic Considerations: Restoration planting, particularly along the river banks, will change the roughness of the channel in hydraulic terms, which may in turn affect the water level of the river.

These general recommended planting densities have been established based on preliminary hydraulic modelling and should not significantly change the flood levels. However, site specific modelling should be done at the time of development in flood prone areas of natural channels, such as in the reach between Lynch Creek and Corona Road, to establish actual planting densities that will not significantly raise flood levels.

Extent of the Riparian corridor: The enhanced riparian corridor includes the restoration, preservation, and buffer zones on both sides of the creek. The overall width will vary in different reaches of the river.

The riparian habitat in the upstream segment of the river (Denman, Willow Brook, and Corona reaches) will be nearly continuous. The width, density, and diversity of the plant community may vary as constrained by existing buildings, flood channel improvements, and highway crossings. Final restoration design

must be coordinated with the Sonoma County Water Agency flood control channel modifications in this reach.

Wetlands and Meadows: In the riparian habitat there are opportunities to create new and enhance existing seasonal wetlands and upland meadows. Provision of wetlands and meadows along the riparian corridor can enrich the overall functioning of the enhanced ecosystem by further increasing the habitat diversity and edge effects between riparian forest, oak woodland and savannah and seasonal ponds.

Areas of seasonal wetlands and surrounding meadows can be created within the buffer zone and on the terraces of the bi-level flood control projects upstream of the Corona bridge, and within openings in the Riparian Forest. The wetlands may be created as mitigation projects required for filling of poor quality seasonal wetlands elsewhere within the enhancement plan area. Stormwater runoff from adjacent urban areas can be routed through newly constructed treatment wetlands to reduce pollutant loads prior to discharge to the river. Several native rushes, sedges, and vernal wildflowers can be utilized in the filtering and bioremediation process. Meadows of native grasses and wildflowers should be planted in the upland buffer zone where trees and shrubs are not required for riparian habitat enhancement or screening of development, and on the flood terraces where an open channel is required for flood conveyance.

### 5.2.2 PLANT MATERIALS AND PLANTING CONCEPTS

Plant materials that are considered appropriate for use in restoration, stabilization and landscaping within the enhancement plan area are listed in the Recommended Native Plant List, Table 1, page 181. The list is intended to be representative, but not comprehensive or exclusionary.

The plant list is subdivided into the following sections: trees, shrubs, vines, ground covers, and herbaceous plants. Information is also presented about appropriate river reach and habitat type for each plant, channel planting location, and recommended planting density. Nearly all of the plants are native to the Petaluma Valley area and are typical of North Bay or Sonoma County riparian or estuarine communities. Two species on the list, mulefat and Brewers saltbush are native to riparian systems of Central or Southern California, and have been selected because of their desirable hardiness in harsh conditions, or superior bank slope stabilization characteristics.

Table 2, page 188, presents a representative list of Recommended Compatible Plants. This list is also neither comprehensive nor exclusionary. These plants, although not native to riparian areas of Northern California, were selected to provide a broader range of plant materials for landscaping in the River Oriented Development Zone. These plants may also be used for top of bank planting around the downtown Turning Basin area. Many of these plants are from riparian environments from other areas of California or the eastern United States. They have been selected because of their desirable growth habit, shading ability, leaf colors, and flowers. They are compatible in that they present the desired landscape character of a riverine setting, some habitat value, and will not readily invade the restored areas or cross-pollinate with native species, if properly

located. Although generally compatible with the natural setting, plants on this list are best used near Buffer Zones rather than adjacent to Restoration and Protection Zones to reduce the possibility that the plants might escape into the natural areas, or cross-pollinate with the native genetic stock.



*An example of a beautiful mature box elder tree (Acer negundo) can be found near the top of the bank in its natural riparian setting along the river near Capri Creek. This is one of the recommended trees on Table 1.*

### 5.2.3 LOCAL SOURCES OF SEEDS AND PLANT MATERIALS

Use of local seed collection and cuttings from woody plants for enhancement planting in the restoration, protection, and buffer zones is strongly preferred. The order of preference is for plant materials collection and propagation from:

- (1) The immediate restoration site or adjacent areas;
- (2) Other reaches of the Petaluma River and its tributaries (Lynch Creek, Adobe Creek, Ellis Creek, Kelly Creek, Deer Creek and Thompson Creek);
- (3) Other similar estuarine/riparian environments in Sonoma, Marin, and Napa Counties; and
- (4) Other riparian areas from Northern and Central California.

Plants obtained from local sources are considered to be genetically well adapted to local climate and soil conditions and thus the chances of mortality from periods of drought, hard freezes, or disease are reduced. In addition, out-crossing or hybridization of local plants with related species from non-local sources can compromise the genetic integrity of the local populations, changing such characteristics as growth habitat, flower color, and drought or disease resistance.

### 5.2.4 EXOTIC PLANT REMOVAL AND RESTRICTED SPECIES

An important element of biological restoration along the Petaluma River is the removal of exotic tree and brush species and control of noxious weeds. Exotic plants and noxious weeds can invade natural areas and grow to dominate the mix of vegetation. They often crowd out native species that have greater habitat value, thereby diminishing the overall biotic potential of an area. Some invasive exotics can cause additional problems such as fire ladders, soil poisoning, or other hazards.

Decisions about exotic plant removal must be carefully made based on their location, habitat value, ornamental value and invasiveness. Certain plants are restricted in the enhancement plan area (listed in Table 3, Plants Restricted from Enhancement Plan Area, page 191). These plants should be removed as soon as possible from the Buffer, Preservation and Restoration Zones. In some cases, exotics not listed on Table 3 may remain if they provide important habitat or aesthetic benefits. Others are less threatening, and can be phased out over time. In general, biological restoration of the Buffer, Preservation and Restoration Zones will require the removal of exotic vegetation and replacement with native species, while more flexibility will be allowed in planting of the River Oriented Development Zone.

Several particularly invasive, non-native exotic plants included on Table 3 have become established along unmanaged areas of the river and tributary creeks, including Lombardy poplar, Eucalyptus, and giant reed. Although these plants do provide some cover, perching and nesting sites, and food resources, they aggressively displace more valuable native plants. These exotic plants are considered to be aggressive invaders of natural areas, and once established can spread rapidly and displace native species. Their habitat values

are often less than native plants, providing poorer quality food and cover than comparable native species. They are associated with difficult management problems such as fire hazard, unsightly or unwelcome screening, and the attraction of vermin. Other plants, such as non-native oaks and buckeye, are likely to cross-pollinate with native existing trees, change the genetic architecture of the population and perhaps even inhibit natural regeneration. For these reasons, a short list of species shown on Table 3 has been designated as restricted from use in the Enhancement Plan area. Not only are these species restricted, but if found they should be removed as soon as possible.



*Selective removal of invasive exotics, like these acacias, is recommended along the river banks.*



*Lombardy poplars along the river banks have proven to be an invasive exotic with little habitat value. They are not recommended for use along the greenway, but would be acceptable in the RODZ in the downstream areas.*

A non-native blackberry, Himalaya berry, belongs in a special class. Although it has escaped to become well-established and endemic along the Petaluma River, it does provide valuable wildlife habitat and, where growing along the riverbank, an important measure of bank stability. It also serves to restrict intrusive access to the river in some areas. Removal, control, and replacement of this non-native berry with its native counterpart or other vines such as wild grape or creek clematis should be approached cautiously in preparing site specific Biological Restoration Plans. In particular, restoration plans should insure that important sources of wildlife habitat and food and cover are not lost in key areas, and that banks are not left unprotected during winter months, due to removal of the berry.

Other ornamental, less invasive non-native species have been planted historically as part of previous site landscaping programs. These have included Monterey pines and Cypress. Although non-invasive, these plants are also not considered to be compatible with the native vegetation. These plants should be removed from the enhancement plan area as they die, or phased out, and be replaced by approved native species in the Restoration, Preservation and Buffer Zones, or with compatible species in the River Oriented Development Zone.

In some instances, it may be desirable to gradually phase out and remove the mature exotic trees as interplanted, native and compatible trees grow. Removal or phased replacement of mature non-compatible exotic species must be included in the landscape planting and maintenance plans for development projects in the enhancement plan area.



### 5.2.5 RESTORATION PLANT ESTABLISHMENT AND TECHNIQUES

With the exception of laying back steep banks, the removal of fill for emergent marsh establishment, and flood channel work, no grading or alteration of hydrologic regimes or installation of water control structures should be necessary to prepare the sites for planting. Site preparation will largely consist of removing exotic trees and weedy species, loosening the soil for native tree planting, and installing erosion control netting or weed control fabric and protective screens. Generally for restoration planting in a low maintenance environment, the use of special plant containers such as leach tubes, liners, or dee pots are preferred. Although planting should be scheduled to take advantage of the fall rains, provision of supplemental irrigation for two to three years is also desirable where possible.

Several plant propagation and establishment techniques are suggested below for restoration of the natural habitat of the enhancement plan area. These include the following:

1. Transplanting of container grown woody plants from seeds or cuttings of locally collected native plants.
2. Planting of nursery grown container stock (from the recommended plant list).
3. Direct seeding of woody plants such as oaks and buckeyes.
4. Planting of poles, canes, and rooted cuttings, such as for willows, cotton woods, native rose, and wild grape.
5. Transplanting of wild harvested plugs and cuttings from cordgrass, bulrush, tules, and pickleweed.

6. Planting roll-outs or seedling blankets grown in jute or coir fiber (used in high wave energy emergent marsh zone).
7. Use of advanced biogeotechnical approaches, such as willow wattling, brush layering, or wire brush matting.
8. Broadcast or hydro-seeding of grasses and herbaceous plants.
9. Stabilization and protection of lower banks and channel toe slopes to allow natural recruitment of emergent marsh species.
10. Control and removal of undesirable plants and selected exotic species.

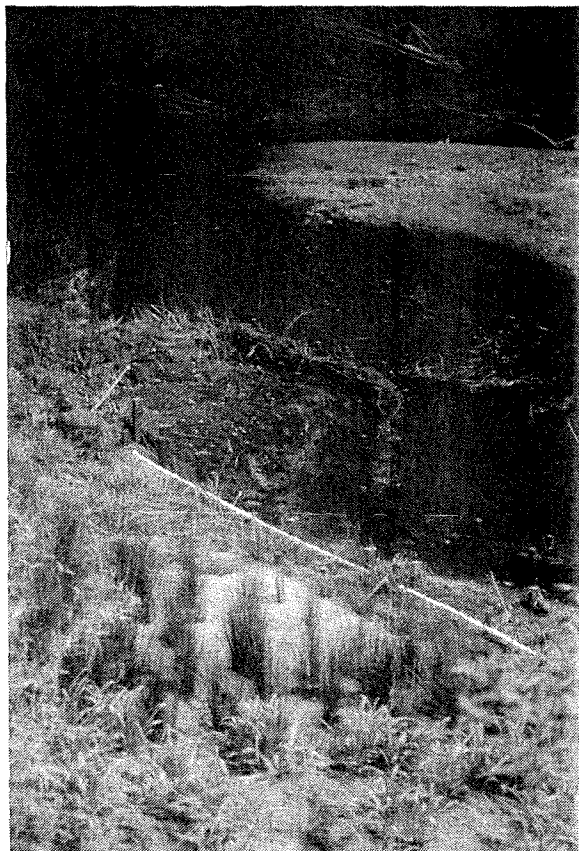
Similar to specification of plant species, size, and planting density, the selection of the appropriate method of plant establishment is a site specific decision that must be based on site conditions and constraints and project objectives. Preferred planting locations, sizes, and propagation methods are included in Tables 1 and 2.



*An example of a form of bio-engineering called willow wattling (a dense bundling and direct planting of willow cuttings) successfully protected this river bank at the Factory Outlet Mall during the 1994-95 storms.*

### 5.2.6 MAINTENANCE AND PROTECTION

High quality maintenance of the Petaluma River Riparian Corridor is essential for the long-term success of the River Plan. Maintenance and management are particularly important when balancing the needs of flood channel capacity, bank stabilization and riparian habitats. To that end, close coordination and consultation with the Sonoma County Water Agency and Corps of Engineers are necessary to insure that maintenance and management are carried-out in a technically sound, but environmentally sensitive fashion. Optimum management techniques for the riparian corridor and floodway should:



*Coir matting at the toe of this slope helps to stabilize the toe and allow natural recruitment of emergent marsh species before decomposing. Once established, the root systems hold the slope and wetland habitat is restored.*

- Protect it into perpetuity for the natural values of the riparian and wetland habitats,
- Encourage natural regeneration and establishment of desirable native plant communities, and
- Provide for continued flood conveyance.

Regular maintenance of the planted riparian vegetation for successful plant establishment includes:

- (1) Weed control and plant replacement;
- (2) Irrigation system maintenance for the first two to three years in more highly managed areas in which transplants of container stock have been utilized;
- (3) Trash removal;
- (4) Erosion control;
- (5) Fence repair;
- (6) Pruning and tree maintenance; and,
- (7) In-channel vegetation management.

Protection measures will also be necessary to safeguard the Greenway from uses and activities incompatible with long-term preservation of the riparian species. Protective measures include:

- (1) Designating areas to avoid during construction,
- (2) Providing physical protection during construction,
- (3) Permanently fencing sensitive areas,
- (4) Directing public access along designated areas only, and
- (5) Posting educational signs describing the sensitive resources.

Restoration maintenance and protection measures should be accomplished by a qualified individual familiar with both native plant materials and management techniques for natural systems. Specialty assistance, where needed, should be provided by a Registered Professional Forester (RPF) with experience in urban forestry, a Certified Arborist (CA), or others.

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### 5.3 BANK STABILIZATION

Moderate bank instability problems exist throughout the enhancement plan area, including along the Kasler parcel, at Foundry Wharf, the McNear Peninsula, portions of the Payran residential area, and downstream of the Corona Bridge. In addition, portions of the riverbanks are inadequately protected against high velocity flood events by placement of non-engineered rip-rap or old and failing wood and sheet piling bulkheads. The riverbank structures immediately upstream of the "D" Street and Washington Street bridges are failing or are inadequately protected.

In many areas along the river, the banks are near-vertical and unvegetated. Unvegetated or unprotected banks are at risk during high flow events. In places this may be a natural condition resultant from channel erosion processes or the difficulty of vegetation establishment in the fluctuating tidal zone. Bank erosion and failure of native vegetation to become naturally established can also be attributed locally to stormwater discharge points and changed flow conditions, and more generally along the lower tidal zone to constant undermining of the bank toe by wave erosion from boat wakes. Protection of banktop improvements, reduction in sediment contributions to the river from eroding banks, and establishment of the estuarine/riparian corridor along the river will require innovative bank stabilization solutions, including biogeotechnical approaches. Alternative approaches, including example cross-sections are shown on the following pages.

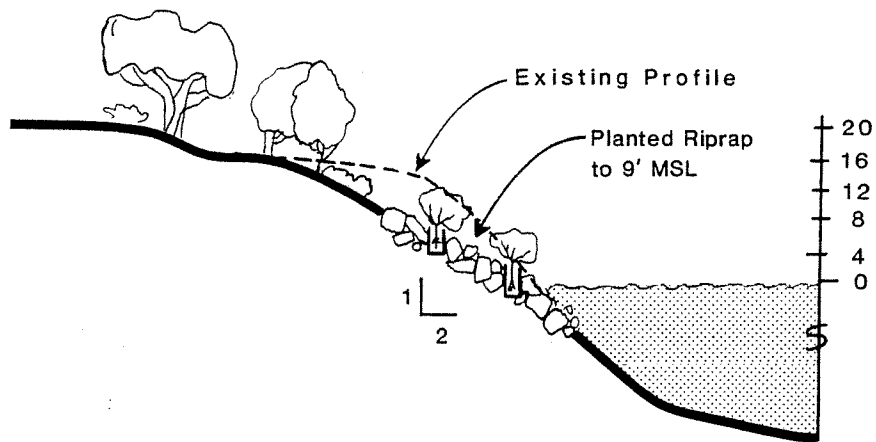
In general, for vegetation establishment to be successful, near-vertical earthen banks need to be laid back to a maximum of 2.5H:1V to allow vegetation establishment by normal planting methods. For areas with steeper banks and areas that are subject to higher velocity flows (greater than 6 fps) or serious wave attack, advanced planting techniques and

combined vegetative-structural approaches are preferred. For instance, areas with moderate slopes of 2:1 to 3:1, including areas with some velocity and wave erosion problems can be stabilized and planted to natives by such methods as wired brush, wattling, or planted geotextile blankets including wattling synthetics, burlap weave, or coir materials (coconut fiber that slowly biodegrades). Combinations of these approaches such as planted rock slope or coir rolls and pre-seeded coir blankets at toe slopes with wattling, brush layering and brush matting can also be utilized. In areas of very high floodwater velocities (greater than 8 fps), hardscape structures such as bulkheads, planted gabions or live cribwalls can be utilized to stabilize vertical banks. Slopes as steep as 1.5:1 or 2:1 can be protected in high velocity and high wave energy environments using planted, cabled concrete erosion blocks, planted gabions or planted rip-rap. These steeper slopes may require internal stabilization using structures such as wraparound geosynthetic blankets and geogrids. Supplemental guidelines for bank stabilization are included in Technical Appendix Section 7.5.

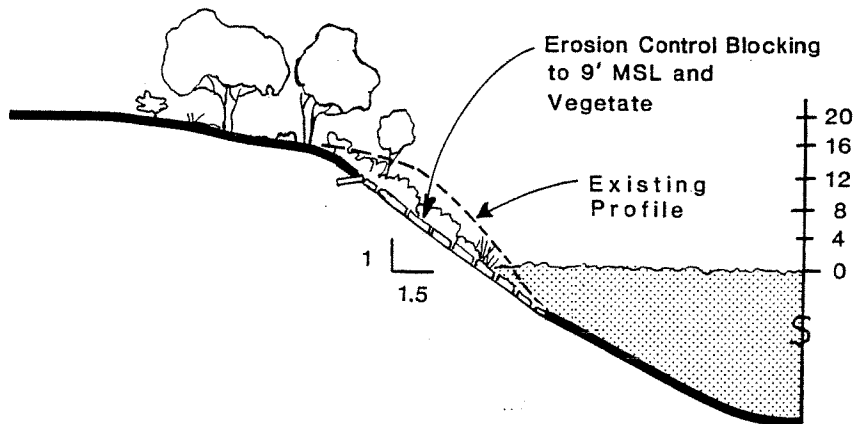
All of the above approaches are applicable and useful in solving bank stabilization problems along the Petaluma River and in achieving the goals of sediment reduction, flood management, and estuarine/riparian vegetation establishment. Selection of the appropriate stabilization method, and treatment prescription and design must be accomplished on a site specific basis. Creek bank stabilization and erosion control measures should be accomplished by a team consisting of a licensed civil engineer (hydrologist), engineering geologist, and a Certified Professional Soil Erosion Control Specialist experienced in biogeotechnical slope stabilization.

**BANK STABILIZATION AND RESTORATION**

**ALTERNATIVE #1 - PLANTED RIPRAP**

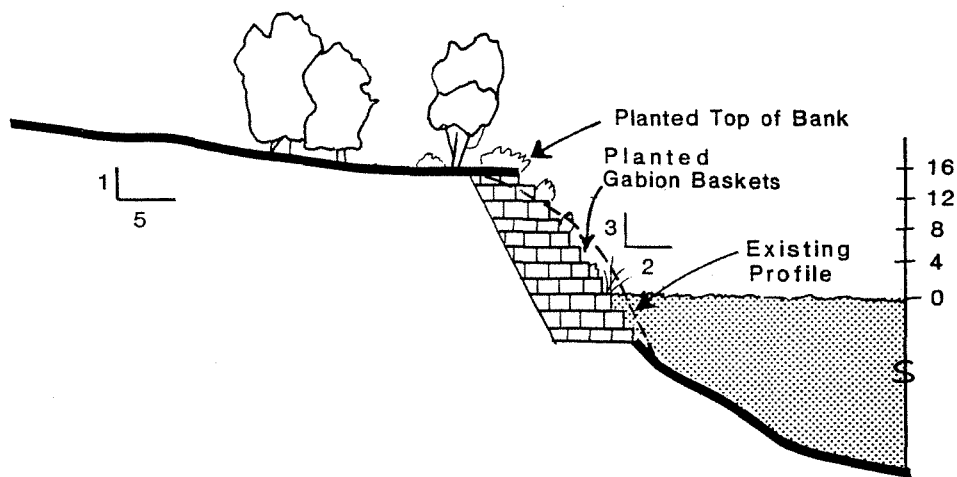


**ALTERNATIVE #2 - PLANTED CABLED EROSION CONTROL BLOCKS**

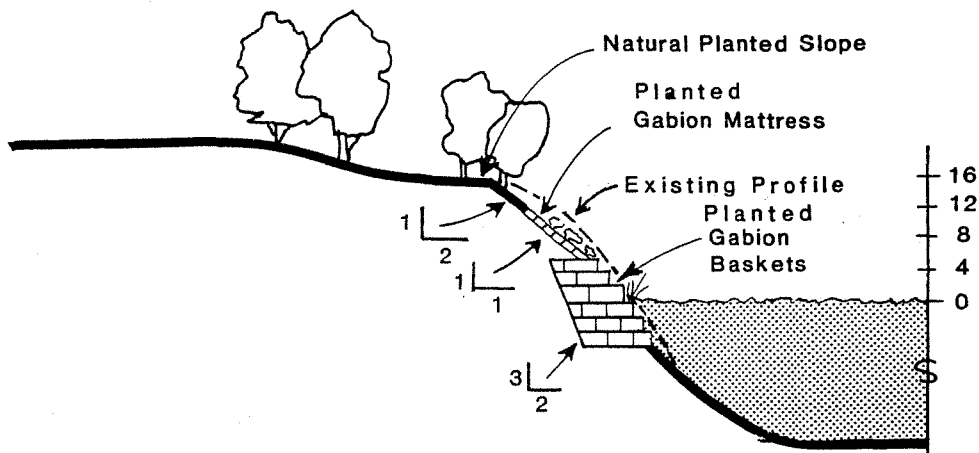


### BANK STABILIZATION AND RESTORATION

#### ALTERNATIVE #3 - ROCK/GABIONS, 3:2 SLOPE

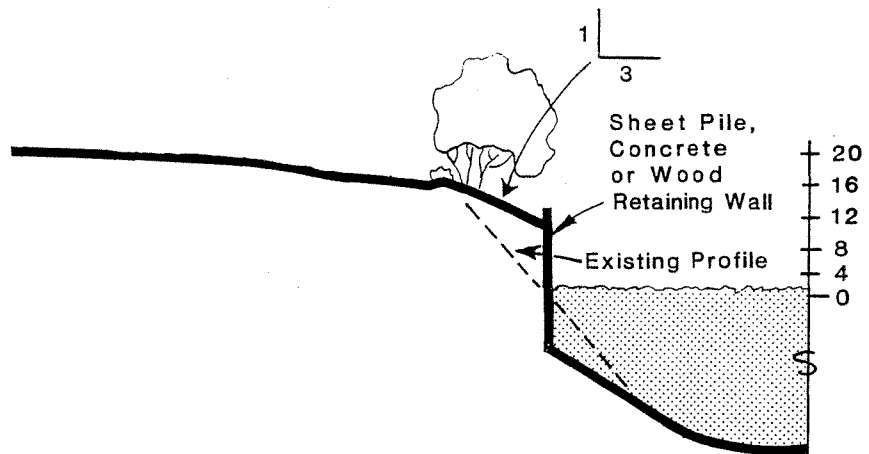


#### ALTERNATIVE #4 - ROCK / GABION COMBINATION

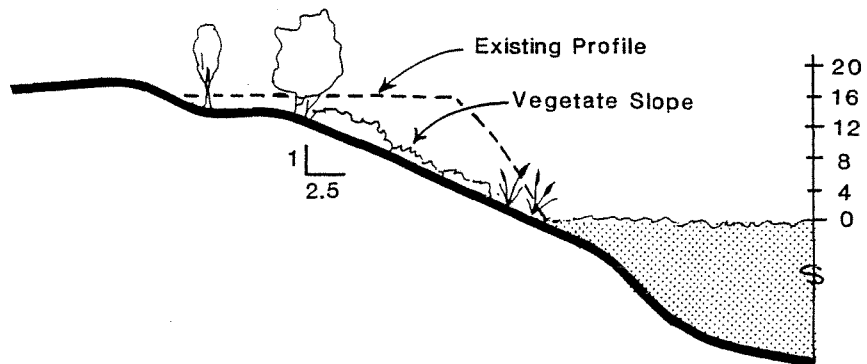


**BANK STABILIZATION AND RESTORATION**

**ALTERNATIVE #5 - RETAINING WALL & 3:1 SLOPE**

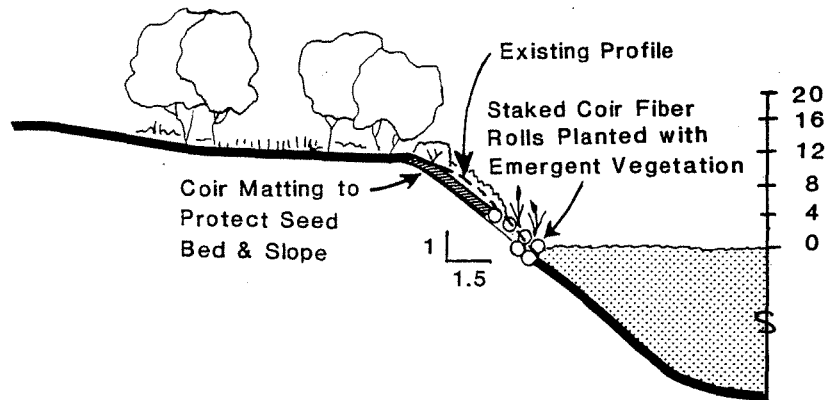


**ALTERNATIVE #6 - NATURAL 2.5:1 SLOPE**

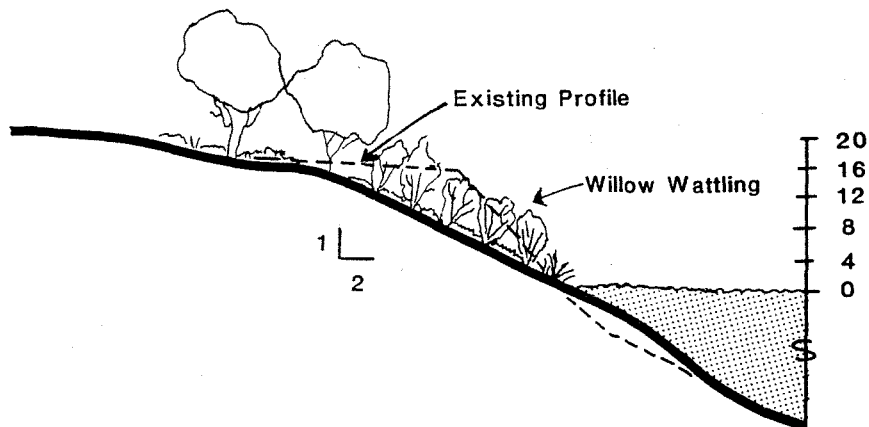


**BANK STABILIZATION AND RESTORATION**

**ALTERNATIVE #7 - COIR MATTING & ROLLS**



**ALTERNATIVE #8 - NATURAL 2:1 SLOPE WITH WILLOW WATTLING**



## 5.4 FLOOD MANAGEMENT AND REDUCTION PROGRAM COORDINATION

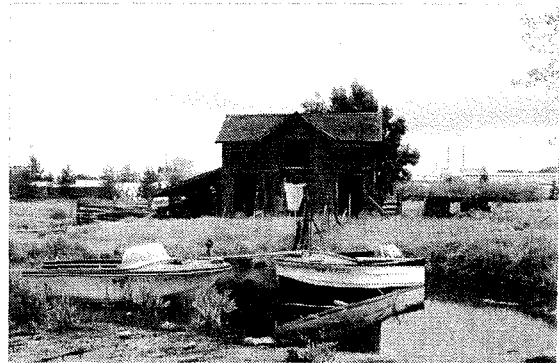
The City of Petaluma has an established, ongoing flood management and flood risk reduction program, including:

- (1) Participation in the FEMA Flood Insurance Program;
- (2) Innovative Land-Use Controls and Zoning Ordinances to prohibit floodway fill, construction in high flood-risk areas, and control of runoff to eliminate downstream flooding from new development; and,
- (3) Participation in flood control projects for the Payran area with the Army Corps of Engineers and in the Willow Brook/Denman reaches upstream of the Corona Bridge with the Sonoma County Water Agency.

The access and enhancement planning was coordinated with these projects, including designation of public access ways along the reconstructed channels, and channel revegetation. The scope of work included:

- peer review of the hydraulic modeling for both projects,
- modeling and analysis of proposed instream public access structures (floating boardwalks), and
- proposals for bank revegetation along natural channel reaches to ensure that enhancement plan projects do not increase flood water surface elevations.

Each biological restoration, bank stabilization and floodway channel modification project will, however, require site specific engineering analysis. Environmental and habitat restoration/enhancement features must be considered in the engineering design for flood channels.



*The storms of 1994-95 were disruptive throughout the Payran Residential Segment, but not as much as in years past. The effects could still be seen in the fields weeks afterwards.*



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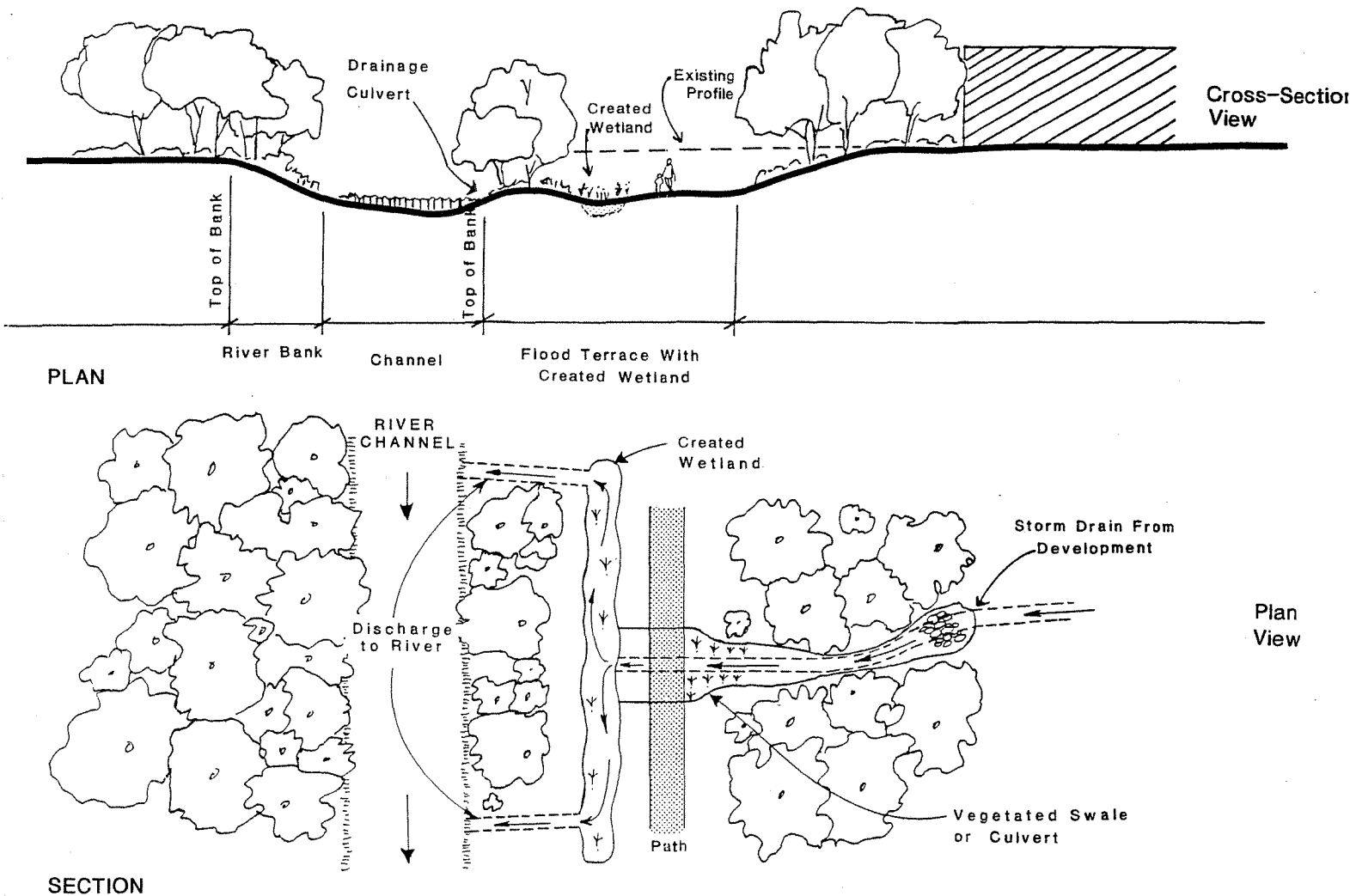
## 5.5 WATER QUALITY MANAGEMENT

The Regional Water Quality Control Board Basin Plan considers the Petaluma River water quality impaired. The river has problems of periodic low dissolved oxygen levels and high nutrient levels. These conditions stimulate nuisance summer algal blooms, elevated summer temperatures, and high turbidity. Some of the features detract from the appearance of high water quality to the casual visitor, while other aspects, particularly low dissolved oxygen levels and high temperatures from lack of shade, have adverse effects on the fisheries and other aquatic biota.

Most of these water quality problems emanate from runoff sources in the watershed outside of the immediate enhancement plan area, or are imported with the tides from sources well downstream of the City. However, important improvements to the river water quality can be made by reducing streambank sources of sediment, and controlling urban runoff from larger commercial and industrial sites along the river. Shading of the creek by riparian planting, bank stabilization, creation of emergent marsh, and in-stream work will improve fish habitat.

Substantial improvement of the river's water quality must be approached on a watershed basis, with development and implementation of appropriate control measures. This is beyond the scope of this enhancement plan (the incorporated City area is only 9% of the local river watershed). However, coordination with other watershed water quality planning and enforcement efforts should occur through the Clean Water Act Sub-Section 205j Water Quality Management Planning Program, aggressive discharge requirements, and the Southern Sonoma County Resource Conservation District.

**FLOOD TERRACE WITH SEASONAL WETLANDS FOR WATER QUALITY CONTROL**



*This conceptual diagram shows how a natural appearing created wetland might be integrated into a flood terrace in the upstream reaches to aid in filtering and cleaning urban runoff while providing aesthetic and biotic benefits.*

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## 5.6 PLAN IMPLEMENTATION

Implementation of the Natural Habitat Management Program will depend in large part on construction of site improvements, including natural habitat restoration, by riverfront property owners as part of their development process. Site specific Environmental Restoration and Management Plans will be required for submittal along with development proposals.

Restoration and enhancement of some segments may be completed as part of an environmental mitigation program (See Chapter 8 for mitigation guidelines). Other enhancement projects on publicly owned parcels may be completed with grant funding or by public-spirited volunteer conservationists seeking to improve the natural habitat value and aesthetics and of the River Corridor.

Each of the restoration, enhancement, and mitigation projects will require the preparation of detailed plans and specifications prior to their construction. In many cases, the required plans will be a part of the City/Agency review and permitting process, including CEQA review and wetlands permitting by the Corps under Section 404 of the Clean Water Act. Guidelines are provided in Chapter 7, for preparation of the various environmental restoration and management Plan elements that may be required.

The enhancement plan will also require the commitment of city and other public resources for the public improvements and for ongoing, environmentally sensitive maintenance. Compliance review, inspection of restoration installations, and maintenance of the creek corridor are examples of the kind of personnel and funding demands that will be made on city resources to ensure necessary proper development of the plan. At full build-out, a small full-time crew may be needed for vegetation management of public areas,

pathway maintenance, and trash removal. Much of the vegetative management work (plant replacement, weeding and irrigation) for the first several years could be carried out by contractors. Bank stabilization and sediment removal should be coordinated with the Public Works Department and the Flood Control District.

Implementing the enhancement plan and coordinating the flood control projects with the Sonoma County Water Agency and Corps will become an important task that may require the attention of a full-time staff person. The City may consider hiring a "Greenway Project Manager", or forming a non-profit agency whose purpose is implementing and maintaining the Greenway in a manner consistent with this plan. The "Greenway Project Manager" could be responsible for:

1. Coordinating with the Corps of Engineers, Sonoma County Water Agency and private property owners on flood channel designs, habitat restoration and management.
2. Providing information on habitat, flood management and water quality issues important to local decision makers.
3. Investigating and applying for grants.
4. Managing plan grants and projects.
5. Coordinating maintenance activities with various City and SCWA crews.
6. Coordinating the City review process of development projects within the enhancement plan area.
7. Coordinating and permitting the enhancement plan projects with regulatory agencies.
8. Coordinating the volunteer activities and interpretive programs.

**TABLE 1**  
**RECOMMENDED NATIVE PLANTS**  
 (Not necessarily complete or exclusionary)

COMMON NAME	SCIENTIFIC NAME	HABITAT ZONE	PLANTING LOCATION	PROPAGULE
<b>Large Trees</b>				
Big-leaf maple	<i>Acer macrophyllum</i>	Freshwater Transition	Riparian; upper to top bank; dry, sun/p. shade	5-15 gal.
Black oak	<i>Quercus kelloggii</i>	Freshwater	Outer riparian & oak woodland; sun, dry slopes	5-15 gal.
Box elder	<i>Acer negundo californicum</i>	Freshwater Transition	Riparian; upper bank to outer edge; p. shade	5-15 gal.
California bay	<i>Umbellularia californica</i>	Freshwater Transition	Riparian; top of bank; w. drained, p.shade	5-15 gal.
California black walnut*	<i>Juglans hindsii</i>	Freshwater Transition	Riparian; top of bank; moist, sun	5-15 gal.
California buckeye	<i>Aesculus californica</i>	Freshwater Transition	Riparian; upper to mid bank; dry, sun/p. shade	5-15 gal.
Coast live oak	<i>Quercus agrifolia</i>	Freshwater Transition	Oak woodland; top bank; w. drained, sun/p.shade	5-15 gal.
Oregon ash	<i>Fraxinus latifolia</i>	Freshwater Transition	Riparian; mid to upper bank; moist, p.shade	5-15 gal.
Valley oak	<i>Quercus lobata</i>	Freshwater	Oak woodland; top of bank; riparian; full sun	5-15 gal.
White alder*	<i>Alnus rhombifolia</i>	Freshwater	Riparian; lower and channel bank; moist, p. shade	Cuttings
<b>Large Shrubs and Small Trees</b>				
Arroyo willow	<i>Salix lasiolepis</i>	Transition Brackish	Riparian; lower bank and channel bank; moist	Cuttings
Blue elderberry*	<i>Sambucus caerulea</i>	Freshwater Transition	Riparian woodland; mid to top bank; moist, sun/p. shade	Seed, 1-5 gal.
Coffeeberry	<i>Rhamnus californica</i>	Freshwater Transition	Riparian & oak woodland; upper & top bank	D-pot, 1-5 gal. cuttings

Coyote bush	<i>Baccharis pilularis</i> var. <i>consanguinea</i>	All	Oak & riparian woodland; top of bank; sun/p.shade	Cuttings, 1-5 gal., layering
Hazelnut	<i>Corylus cornuta</i> var. <i>californica</i>	Freshwater	Riparian; mid to lower bank; damp, p. shade	Cuttings, 5-15 gal.
Hookers willow	<i>Salix hookeriana</i>	Freshwater Transition	Riparian; lower bank; moist p. shade	Cuttings, 5-15 gal.
Pacific dogwood	<i>Cornus nuttallii</i>	Freshwater	Riparian; upper to lower bank; sun, p. shade	5-15 gal.
Spice-bush	<i>Calycanthus occidentalis</i>	Freshwater	Riparian; mid to lower bank; sun, p. shade	5-15 gal.
Red elderberry	<i>Sambucus racemosa</i>	Freshwater	Riparian; upper to lower bank; sun, p. shade	Cuttings, 5-15 gal.
Red willow	<i>Salix laevigata</i>	Freshwater Transition	Riparian; lower bank; moist, p. shade	Cuttings, 5-15 gal.
Sandbar willow*	<i>Salix hindsiana</i>	Freshwater Transition	Riparian; lower bank; moist, p. shade	Cuttings, 5-15 gal.
Snowberry	<i>Symphoricarpos rivularis</i>	Freshwater	Riparian; mid to lower bank; shade	Cuttings, 1-5 gal.
Toyon	<i>Heteromeles arbutifolia</i>	Freshwater Transition	Riparian, mid and top bank	Seed, cuttings 1-5 gal.
Yellow willow	<i>Salix lasiandra</i>	Freshwater Transition	Riparian; lower bank; moist	Cuttings, 5-15 gal.
Western dogwood	<i>Cornus occidentalis</i>	Freshwater	Riparian; mid to top bank; moist, p. shade	Cuttings, 5-15 gal.
<b>Small Shrubs and Vines</b>				
Brewer saltbush	<i>Atriplex lentiformis</i> var. <i>Breweri</i>	Transition Brackish	Upper salt marsh	Cuttings, layering, seed
California blackberry	<i>Rubus ursinus</i>	Freshwater Transition	Riparian; mid to lower bank; moist, p. shade	Seed, cuttings, 1-5 gal.
California clematis	<i>Clematis ligusticifolia</i>	Freshwater Transition	Riparian; mid to lower bank; moist, shade	D-pot
California grape	<i>Vitis californicus</i>	Freshwater	Riparian; mid to lower bank; moist, shade	D-pot, 1-5 gal.
California rose	<i>Rosa californica</i>	Freshwater Transition	Riparian; mid to lower bank; moist, sun	Seed, cuttings, d-pot

Dutchman's pipe	<i>Aristolochia californica</i>	All	Riparian; top of bank; p. shade	Seeds, rooted shoots
Fat-hen saltbrush*	<i>Atriplex patula</i>	Brackish Transition	Upper salt marsh; moist, saline, full sun	Seed, d-pot
Frankenia	<i>Frankenia grandifolia</i>	Brackish	Upper salt marsh; moist, saline, full sun	plug
Gooseberry	<i>Ribes divaricatum</i>	Freshwater Transition	Riparian; mid to upper bank; moist, p. shade	Seed, cuttings, 1-5 gal.
Gum plant	<i>Grindelia stricta</i>	Brackish Transition	Upper marsh	D-pot, 1-5 gal.
Hedge nettle	<i>Stachys chamissonis</i>	Freshwater Transition	Wet, swampy, seepy areas	Seed
Honeysuckle	<i>Lonicera hispidula</i> var. <i>vacillans</i>	Freshwater Transition	Riparian; mid to lower bank; moist, p. shade	Cuttings, 1-5 gal.
Marsh gum plant	<i>Grindelia humilis</i>	Transition & Brackish	High salt marsh	Seed
Mugwort	<i>Artemisa douglasiana</i>	Freshwater Transition	Outer riparian & inner oak woodland; p. shade	Seed, cutting
Mulefat	<i>Baccaris glutinosa</i>	Transition Freshwater	Riparian; mid to top of bank	Seed, cuttings, layering
Oregon grape	<i>Berberis aquifolium</i>	Freshwater Transition	Riparian; mid to upper bank; moist, p. shade	Seed, cuttings, 1-5 gal.
Perennial pickleweed	<i>Salicornia Virgomoca</i>	Brackish Transition	Middle marsh (lower end)	plug
Red flowering current	<i>Ribes sanguineum</i>	Freshwater	Riparian; mid to top bank; moist, p. shade	Seed, cuttings, 1-5 gal.
Red huckleberry	<i>Vaccinium parvifolium</i>	Freshwater	Woodland; top of bank; damp, shade	Cuttings, 1-5 gal.
Salmonberry	<i>Rubus spectabilis</i> var. <i>sr</i>	Freshwater Transition	Top of bank to edge of riparian	Seed, cuttings, 1-5 gal.
Scarlet monkeyflower	<i>Mimulus cardinalis</i>	Riparian Transition	Riparian; mid to top of bank; sun/p. shade	D-pot, 1-5 gal.
Sea lavender	<i>Limonium californicum</i>	Brackish	Wet areas	Seed
Slender cinquefoil	<i>Potentilla gracilis</i>	Freshwater Transition	Moist meadows; partial shade	D-pot, 1-5 gal.

**Bioremediation:** An approach to pollution control that uses microorganisms to break down toxic compounds into non-toxic forms.

**Buffer Zone:** The buffer zone is a zone within the greenway which is intended to provide a degree of protection to the restored and preserved habitats along the river. In some areas, particularly the Upstream and Downstream Industrial Segments, the Buffer Zone and Restoration Zone will overlap along the banktop. In the area of overlap the Restoration Zone restrictions to access will apply. This zone shall provide a transitional setback from the riverbanks to the adjacent River Oriented Development Zone. Public access and amenities shall be allowed within the zone (except in areas of existing sensitive habitat, where access shall be kept to the outer edge, and the banktop Restoration Zone, as mentioned above), but parking and buildings shall be excluded. Enhancement shall include planting with native (genetically local) riparian and upland vegetation. Compatible non-natives shall be allowed in the urbanized areas. A range of minimum setback widths of 30' to 200' from the top of bank shall be required, depending upon the segment specific conditions. Refer to the policies for each river segment for specific requirements.

**Central Goals:** The seven key goals of the Petaluma General Plan 1987 - 2005. Most of the Central Goals are directly relevant to the Petaluma River.

**Emergent Marsh Community:** Plant community which grows in a flooded environment for prolonged periods of time.

**Environmental Restoration and Management Plans (ERMP):** This is a "catch all" phrase referring to the various plans that may have to be prepared in support of a riverfront project proposal as required by the various environmental review and regulatory agencies. These plans are normal requirements for certain riverfront project applications under the CEQA environmental review process. The actual plans required for each project will vary on a case-by-case basis depending upon site location, local conditions, and the nature of the proposed development. A list of the type of plans that might be required and general guidelines for their preparation are included in Chapter 7.

**Exotic Vegetation:** Exotic vegetation generally refers to vegetation that was introduced to the California landscape after the arrival of European explorers on this continent at the end of the 15th Century. Plants from other parts of the world as well as other parts of North America qualify as "exotic" by this definition. In terms of natural habitat restoration in this area, it is desirable to plant vegetation that is native to California and, if possible, indigenous to the specific local ecosystem being restored.

**Goal:** A general, overall, and ultimate purpose, aim, or end toward which the City will direct effort.

**Guidelines:** Nonbinding, nonregulatory information provided to assist those attempting to implement components of the River Plan.

**Greenway:** The area within the river corridor where flood waters are accommodated and where riverfront public access and habitat enhancement are recommended. The greenway includes the river channel and its banks, flood management alterations, the trail and access amenities, habitat protection and enhancement zones, public parks as designated on the General Plan, and a buffer zone between the top of the bank and the adjacent development. Development is not allowed in the greenway, other than flood protection improvements, the creation of trails, and other recreational access, overlooks, city park amenities, habitat enhancement, and commercial water access. Several different habitat management zones lie within the greenway which are defined elsewhere in the glossary.

**HEC-2:** Mathematical model used by engineers to predict flood levels.

**Manning's 'n' value:** Mathematical values denoting relative roughness of a channel surface for use in predicting flood levels.

**Neighborhood Meeting:** Meetings and site visits held according to river segment with riverfront property owners affected by the river plan.

**Objective:** A specific statement of desired future conditions toward which the City will expend effort in the context of striving to achieve a broader goal.

**Policy:** A specific statement of principle or of guiding actions which implies clear commitment but is not mandatory. A general direction that the City will follow in order to meet its goals and objectives by undertaking specific action programs. (See "Program").

**Preservation Zone:** This zone within the greenway applies to the critical habitat areas with valuable remnants of riparian and oak woodland, wetlands and other unique or threatened habitats as identified in the Existing Conditions Report, project EIR's and other documents. This zone is located in the Upstream Segment, but upon further investigation, other critical habitats may be discovered along the river corridor. The designated areas contain a greater diversity of species with older specimen trees than other areas which contain only scattered, remnant trees. All development, including trails, grading and flood control alterations shall be severely restricted in this zone. Minimal intrusions in carefully selected locations will be allowed for interpretive purposes only. Special measures to protect the specimen trees, such as temporary fencing, shall be required for construction activities at the periphery of the zone. Grading alterations shall be kept a minimum of 50' away from the drip lines of the trees. The width of the zone varies, as measured from the banktop, as it is defined by the occurrence of significant vegetation.

**Program:** An action, activity, or strategy carried out in response to adopted policy to achieve a specific objective. Policies and programs establish the "who" "how" and "when" for carrying out the "what" and "where" of goals and objectives.



**Restoration Zone:** The riverbank and top of bank areas within the greenway that require restoration are included in this zone. These are generally areas that have disturbed vegetation and which, if stabilized and restored, would contribute significantly to the wildlife and fishery habitat values and water quality of the greenway. In addition, the new flood terraces which occur in some reaches between these two restoration areas are included within this habitat zone. Access and use restrictions are less severe for the flood terrace than the bank and banktop restoration areas. The width of the river banks varies depending upon the depth of the channel and the gradient of the bank. The width of the flood terraces varies depending upon the flood control alteration design. The top of bank restoration areas vary between 10 and 30 feet depending upon the extent of the existing habitat to be restored and the extent of land available for restoration. Restoration treatments may include re-grading, slope stabilization, and planting with genetically local native riparian and upland species. Access shall be generally restricted from the banks and bank-top areas in this zone except at carefully selected and controlled points. Almost all river banks in the river corridor are candidates for restoration treatments. Some grassy banks created by the proposed flood control alterations may be available for public access as shall the flood terraces and select overlooks and interpretive areas.

**Riparian:** Of, on, or pertaining to the bank of a river, stream, lake, pond, or other freshwater wetland.

**River Channel or Channel Bottom:** The existing channel bottom, including the low-flow channel, and any new channel (including low-flow) and flood terrace created by the flood control alterations up to the top of the bank. Wetlands are also included in this zone. The channel bottom carries the low-flow and moderate volume flood waters and should be kept clear of significant vegetation and debris. The width of the channel will depend upon the flood protection approach that is selected.

**River-dependent:** Land uses which must utilize the river in order to conduct business. Such uses are typically commercial operations that require water transportation, such as Jerico Dredging, and tend to occur in the downstream part of the river.

**River Goals:** Three goals of the Petaluma General Plan 1987 - 2005, in addition to the Central Goals and the Goals for the River Corridor of this plan, that have been established specifically for the Petaluma River.

**River Oriented Development Zone (RODZ):** Development will be allowed and encouraged in this zone which lies just outside the Buffer Zone. Developments may include, but not be limited to, existing and new buildings, roads, parking, service yards, drainage features, planting and private open space. Appropriate plants will include native riparian and upland species as well as appropriate non-native species that have some habitat values.

**River Plan:** When used in this report, this term refers to the Petaluma River Access and Enhancement Plan.

**River-related:** Land uses for which the river is an amenity but not a necessity. These include public or private uses such as a restaurant or office building with a patio facing the river or residential developments in which access to the greenway is encouraged.

**River Segment:** A discrete length of river and the adjacent properties along its banks within the River Plan area, identified in the plan as having characteristics that define it as an separate unit for planning purposes. The river plan area is divided into six individual river segments, each of which has its own river plan objectives, policies, and programs, reflecting the unique characteristics and potentials within the context of the systemwide goals.

**Staging Area:** A trail head with public use facilities which can include interpretive and informational materials about the trail, restrooms, parking, picnic facilities, trail access, and access controls.

**Systemwide:** Characteristics of the entire river corridor for which overall goals, objectives, policies, and/or programs apply. Projects proposed along the river corridor will be subject to systemwide directives as well as those of individual river segments.

**Top of Bank:** The top of the river channel as defined at the time a development proposal is approved.

**Workshops:** Public meetings held by the city staff and planning consultants, sponsored by the Citizens Advisory Committee, during development of the River Plan to present information and gather input from interested citizens.



*Adherence to the intent of the River Plan and its Guidelines will enable competing forces to be balanced while serving both public and private interests.*

Conformance to the intent and spirit of the River Plan is necessary to reap all its benefits. The River Plan recommends specific methodology and design criteria to strike the appropriate balance between the natural and built environments, and to preserve the unique small town character that is cherished by Petaluma

These Technical Appendices were created to provide guidance and assistance for property owners, developers, decision makers, and others interested in riverfront improvement. Though nonbinding, they present the desired approach to waterfront development and habitat restoration, recognizing that individual circumstances will vary and adherence to these guidelines may not always be possible.

## **TECHNICAL APPENDICES**

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## CHAPTER 7.0

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*A typical oak woodland with a canopy of live oaks and valley oaks often has grasses beneath. Closer to the river, shrubby understory becomes more dense and impenetrable. Further away from the river, the oaks diminish in number, giving way to a scattered oak savannah and then to grassland.*

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# SUPPLEMENTAL NATURAL HABITAT MANAGEMENT GUIDELINES

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## 7.1 INTRODUCTION

In order to assist staff and the potential applicants, this Technical Appendix has been developed to provide guidance for the preparation of the following types of environmental restoration and management plans. These guidelines may not contain all the requirements of the various regulatory bodies, but they will provide a useful frame of reference for the work to be done.

- Biological Restoration Plan
- Tree Protection Plan
- Exotic Vegetation Removal and Control Plan
- Bank Stabilization and Erosion Control Plan
- Storm Water Pollution Prevention Plan
- Channel Maintenance Guidelines
- Landscape Maintenance Guidelines
- Native Oak Establishment Guidelines
- Flood Control Channel Design Guidelines

The preparation and submittal of environmental restoration and management plans (ERMP) may be required as a part of the project application and CEQA review process for certain riverfront projects. This chapter provides comprehensive guidelines for the types and contents of these plans. The requirements for each parcel will be determined on a case-by-case basis and will depend on specific site location, local conditions, and the nature of the proposed development. It will be the responsibility of the applicant to work closely with City staff and other regulatory agencies to determine which ERMP's, if any, must be prepared and to prepare the ERMPs.

It is the intent of this chapter to facilitate the project review process by providing both the applicant and staff the data necessary for comprehensive restoration and management techniques. These plans can draw from and serve as portions of Mitigation and Monitoring Plans associated with the City's CEQA review as well as Section 404 permit applications to the U.S. Army COE. The plans should be consistent with the River Plan, including the Natural Habitat Management Program, and other local regulations. Plans should be brief, utilizing "bullets" and lists wherever possible, but still contain a clear description of existing site conditions to inform the casual reader.

## 7.2 BIOLOGICAL RESTORATION PLANS

### GENERAL

A Biological Restoration Plan will likely be required for all riverfront projects except those in the Downtown or Warehouse segments. All landscaping and biological restoration plans should be prepared and signed by a licensed landscape architect either experienced in environmental restoration, or with appropriate consultation and input from wetlands biologists, soil scientists and hydrologists. Goals and objectives for the plans must be clearly stated and the plans must be developed based on a thorough analysis of existing biologic, soils, and hydrologic conditions, including a consideration of the historic plant community. The goals and objectives for submitted plans must be consistent with the goals and objectives for each reach or segment as described in the River Plan and conditions of project approval, or the justification for deviation clearly explained and stated. Restoration of native plant communities in the restoration, protection, and buffer zones should use plants native to the Petaluma Valley to the greatest extent possible, while the RODZ can include use of "compatible" plants (see Chapter 5, Tables 1 and 2).

The Biological Restoration Plan should be developed following the steps outlined below.

1. Determine pre-existing species composition, density and pattern for the species and communities on the natural landscape at both the restoration site and model site. Select a nearby existing high quality community as a model, or use historic air photos and scientific references. Develop detailed project restoration goals.
2. Based on field investigations, determine the site conditions and limiting factors likely to constrain natural regeneration or reduce the success of the enhancement plantings. These include climate, soil, hydrologic conditions wildlife and domestic animals, project size, location, relation to adjacent uses, and public access from adjacent areas. These factors must be taken into account in both the restoration design and maintenance and management practices. Changes to site conditions (fill removal and drainage alterations) should be considered.
3. Based on 1 and 2 above and guidance presented in the Natural Habitat Management Program (chapter 5), determine the appropriate species composition and planting density.
4. Determine the optimum size for the planting. Generally smaller stock are preferred and out-perform larger specimen plantings in areas of low management and maintenance.
5. Determine the appropriate plant establishment technique (direct seeding, transplanting) including optimum planting dates based on species, environmental factors, and maintenance/management opportunities.
6. Determine the appropriate level of protection and maintenance of the planting based on species characteristics, pest/rodent impacts, and environmental and management constraints. Plant additional seeds or seedlings to allow for expected mortality and to meet restoration goals or build into the plan a replacement schedule. Determine the appropriate duration of the monitoring period based upon the type of mitigation, site characteristics, and the success of other similar mitigation projects.

7. Implement the plan and prepare an as-built plan.
8. Monitor the results for the period designated in no. 6, above, and use the information for ongoing maintenance and management. Use photographs to document progress.

The plan should be prepared and signed by a recognized professional experienced in riparian and/or wetland restoration, perhaps in consultation with experts in bank stabilization, erosion, and sediment control methods, wetland biology, hydrology, open space design, or other specialties as necessary. The following topics should be included in the restoration plan.

- 1.) **Text** that explains the following:
  - a. **Goals of Restoration Plan.** A discussion of the goals of the plan, including the habitats to be restored, enhanced, or created; their relationship to adjacent areas; and their functions and values should be included as the basis for the plan design. The goals should be consistent with the Natural Habitat Management Program.
  - b. **Existing Site Conditions.** A detailed discussion should be presented of the existing site conditions, including soils, hydrology (groundwaters, seasonal moisture conditions, tidal and flood elevations and periods of inundation) and plant communities, including discussion of existing and potential rare and endangered species habitat.
  - c. **Site Preparation.** Grading to include final elevations, water conveyance and management structures, as necessary.
  - d. **Proposed Plant Materials.** Plant materials should be selected from the Recommended List of Plants (Table 1, Chapter 5) for the Restoration, Protection and Buffer Zones. Compatible plants may be selected from Tables 1 and 2, Chapter 5, for the RODZ. Indicate and explain all proposed exceptions or additions to the plant palette.
  - e. **Sources of Plant Materials and Seeds.** Woody plant materials and seeds for transplanting and direct seeding within the Restoration, Protection, and Buffer Zones should be obtained from as near to the proposed project site as possible and/or from within the Petaluma River Valley. All project plans should explain the proposed sources of native plant materials (see Chapter 5).
  - f. **Planting Design.** The selection, placement, and density of planting of all trees and shrubs should be shown diagrammatically and discussed. In general, the planting design should be based on site conditions, including existing canopy, and soil and drainage conditions, as well as an evaluation of historic conditions or conditions at nearby less-disturbed sites.
  - g. **Plant Establishment Techniques.** Specify plant establishment techniques (direct seeding, transplanting, broadcast seeding, poles or canes, etc.). Indicate size of planting holes, augering, weed, and rodent protection devices, etc.

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- h. **Exotic Vegetation Removal and Control.** The plans should discuss removal and control of all exotic vegetation, particularly noxious weeds, aggressive plants, or hybrid plants that might cross with particularly desirable and sensitive plants (see also Section 7.3 and 7.4, Tree Protection and Exotic Vegetation Control).
- i. **Irrigation Plan.** Where irrigation is proposed, describe irrigation method(s), appropriateness, and estimated frequency and quantities of irrigation by season. Indicate water source(s) for restoration areas. For wetlands, also describe the water balance for the area (without irrigation). Show planned irrigation system and/or water flow on map. For many areas, it is appropriate to explain the limited duration or lack of proposed irrigation altogether. Where appropriate, use of reclaimed water is encouraged.
- j. **Implementation Schedule.** Provide a schedule in the form of a bar chart or other graphic presentation showing intended timing of site preparation and plantings.
- k. **Maintenance Plan.** Describe planned maintenance activities, including irrigation system inspection, plant replacement, weeding, water structure inspection, fertilization, erosion control, herbivore protection, trash removal, etc. and the responsible party for each activity.
- l. **Performance Criteria.** Applicant is to propose specific performance criteria for the restoration techniques envisioned, subject to review and approval by City staff. The criteria must meet the restoration goals stated in chapters 3 and 5. Applicant must provide yearly target criteria to be met, as appropriate, based on reasonably-paced progress. Measures of vegetative success, such as % survivals, % cover, height, health, and vigor will be completed by the applicant and compared to the performance criteria. Adjustments will be made, if necessary, after consultation with staff.
- m. **Contingencies.** The applicant is to include proposed remedial measures (i.e. replanting of failed plants, installation of an irrigation system, more frequent weed control, or plant substitutions) to remedy problems in meeting performance criteria. The applicant will be responsible for implementation of the contingencies.
- n. **Monitoring Methods.** Describe monitoring methods. If using sampling methods, include samples sizes, statistical justification for sampling regime, and data analyses to be performed. If appropriate, include assessment of natural population growth by target species.

2.) A Site Diagram showing:

- a. Plan view on base topographic map dividing site into planting zones and showing location of proposed large trees and planting clusters.
- b. Representative cross sections and plant materials by planting zone.



- c. Table insert on plan or attached sheets showing plant species, quantities, sizes, and spacing.
  - d. All plans and maps must be legible with title and dates of preparation and submission.
  - e. A legend should be provided.
  - f. Indicate North and provide a scale and vertical/horizontal datum.
  - g. Scale and orientation shall be the same for all maps, except for detail sections.
  - h. Topographic maps should be 1 inch = 50 feet or less ( or equivalent metric scale).
- 3.) **Design Details** (hole size and planting detail, preparation and installation of poles and wattles, seedling protection devices, etc.).

### 7.3 TREE PROTECTION PLAN FOR DEVELOPMENT AROUND OAKS AND NATIVE RIPARIAN SPECIES

#### GENERAL

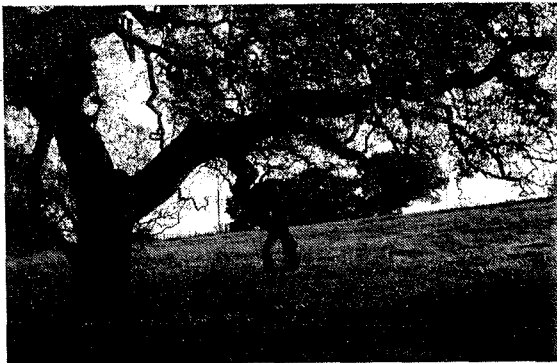
Certain locations along the river have a wealth of oak trees and other native riparian species. Some of these trees are quite old, having developed under natural conditions of summer drought and winter rains, or are dependent upon specific soil moisture regimes created by their proximity to the river and tributary creeks. The health of these beautiful old specimen trees is often compromised by environmental changes which accompany construction and landscaping activities. This section provides guidance for the protection of these valuable community resources within the river greenway.

The portion of the tree considered most sensitive to disturbance is the root zone and root crown. The root crown is the area at the base of the trunk, and extends out about six feet in a mature specimen. The actual rooting area may be quite variable from tree to tree; however, the "root zone", including the area within the drip line of the tree is considered the most sensitive. In order to minimize damage to the tree and to maintain it in a healthy state, it is important to keep the root zone and crown area in as natural a condition as possible.

Although most of these trees are located within the Restoration and Protection Zones, and are generally protected by required setbacks, some mature trees and seedlings (which will someday be mature trees) are located within the Buffer Zone or RODZ and are potentially subject to construction or landscape maintenance activities which may be detrimental to their health. In some areas, paths and trails or other unforeseen future activities (such as emergency flood maintenance, utility crossings, roads, or future flood control projects) may intrude into restoration or protection zones in these areas. For these reasons, these guidelines have been established for development, including construction, building and landscaping setbacks and operating requirements for mature native riparian species. A Tree Protection Plan incorporating these guidelines are recommended for all riverfront development projects.

#### MATURE NATIVE RIPARIAN SPECIES

For purposes of these guidelines, native tree species subject to special protection will consist of any of the following species considered mature; that is, having a height more than five feet and/or a diameter of over six inches measured at three feet above the grade.



The River Plan recommends that development be kept a minimum of 50' away from the drip line of oaks (the outermost limit of the branches).

<u>Common Name</u>	<u>Scientific Name</u>
Big leaf maple	<i>Acer macrophyllum</i>
California box elder	<i>Acer negundo</i> ssp. <i>californium</i>
Oregon ash	<i>Fraxinus oregona</i>
Black walnut	<i>Juglans hindsii</i>
Coast live oak	<i>Quercus agrifolia</i>
Valley oak	<i>Quercus lobata</i>
Red willow	<i>Salix laevigata</i>
Yellow willow	<i>Salix lasiandra</i>
California bay	<i>Umbellularia californica</i>
California buckeye	<i>Aesculus californica</i>

#### RECOMMENDED ELEMENTS OF TREE PROTECTION PLAN

Tree protection plan must be prepared by or approved in writing by an Licensed Landscape Architect, Arborist, or Certified Forester.

1. All trees over five feet tall, or with a diameter over six inches measured at 4.5 feet height over ground level must be drawn to scale on plans, including species, approximate age and height, diameter at three feet and drip line. Also, show trees on adjacent property if the property line abuts or goes under drip line. Oaks to 4" in diameter, within 50' of the property line should be called out separately.
2. Plans shall indicate clearing, stripping, and grading limits. Clearing and stripping limits must be staked on-site by the project engineer.

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3. All utility plans must be included and their location relative to trees shown on plans.
  4. Specific trees to be saved must be noted on the grading plans and shall be clearly marked on all plans and in the field.
  5. Trees within the clearing areas (including exotics) noted to be removed shall be clearly marked on plans and in the field.
  6. Applicants are encouraged to work closely with City staff to decide which trees, if any, must be removed. Convincing and compelling reasons must be provided for the removal of any native species.
  7. Bulkheads or tree wells may be used around trees where grading may be detrimental to the tree's preservation.
  8. No grading shall be done within the drip line of trees to be saved except where noted on approved grading or landscaping plan.
  9. Construction equipment is prohibited from areas of the site where no grading will occur. Storage of equipment, vehicles, topsoil or materials shall not be permitted within the drip line of trees to be saved. Areas of natural vegetation shall be protected as necessary.
  10. Trees to be saved shall be fenced or protected to the satisfaction of the Planning Director prior to start of construction, and maintained throughout the construction period.
  11. If grading is permitted under a drip line, once grade has been established, a temporary six-foot tall chain link fence should be installed around the tree at a distance of six feet minimum (or at a distance to be determined by arborist), from the trunk. This fence is to remain until construction is complete. Nothing may be stored inside this fence.
  12. All excavation within a tree's drip line should be done by hand with a shovel and pick. If a woody root is encountered, care should be taken not to split the root, as this would create an entrance site for disease that can destroy the root and grow into the tree via the root. The roots should be wrapped in wet burlap to protect them from drying out while they are out of the soil. If a root needs to be cut, a very sharp hand pruning saw should be used. Again, be careful not to split or twist the root or allow it to dry out.
  13. If a utility line must be installed within a drip line, drill or bore the conduit through the soil rather than digging a trench. Less root damage will occur. Place all utility lines in the same passage, if possible, to avoid disruptions to the root zone.
  14. There should be no trenching, drilling, or boring within six feet of the trunk. In parking lots, irrigation and airification devices must be installed.
  15. If paving is necessary within the drip line, use porous materials such as gravel, cobbles, brick with sand joints, wood chips or bark mulch.
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16. Non-oak trees should be irrigated before construction starts. Oak trees should be irrigated prior to August 1. This will ensure that the trees can better withstand the stress of construction. Irrigation is extremely important during spring and summer for stressed, mature non-oak native species.
17. After construction, do not fertilize the native oak trees until the following season's leaf is matured. This prevents a construction stressed tree from further decline by over-expending its energy reserves in response to the fertilizer.
18. During the course of construction operations, any pruning of trees designated on plans as to be saved, shall be performed under the supervision of a qualified arborist. No pruning by construction personnel is permitted. Care shall be taken to ensure that proper pruning, thinning and treatment for disease prevention shall be employed.
19. Any additional tree removals necessitated during the course of construction operations, but not shown for removal on approved plans, shall be inspected and approved by the Planning Department prior to such removals. Planting of specimen trees (36 inch box) at a compensation rate of at least 3:1, or as determined by the City will likely be required to replace trees damaged or removed during construction.
20. On-site inspections by the project engineer and landscape architect shall ensure that there is no encroachment into the areas beyond the "limits of grading" shown. Trees outside the grading area, or designated to be saved, are to be adequately protected during construction operations.
21. Landscaping under native oak trees should consist of drought tolerant plants or California native plants that are drought tolerant in nature and must not require supplemental water so as to be detrimental to the trees. There is to be no landscaping within the drip line. Chipped bark, mulch, or cobblestones are suitable for this area. No lawns should be planted within the drip line.
22. Permanent irrigation systems should be bubbler, drip, or sub-terrain only. No sprinkler systems should be allowed within six feet of trees, except for Oaks. Oaks may have a temporary drip only.
23. A manually operated drip system is the preferable method of irrigation within the drip line, although irrigation is not recommended under established native oaks at all, and especially not in the summer. Never allow irrigation water to seep into the six-foot radius or pool around the root crown.

#### REFERENCES

- Brown, L.R., R.W. Harris, C.S. Koehler, 1984. Oaks on Home Grounds. Div. Agric. Sci., Berkeley, Leaflet 2783.
- Johnson, S.G., 1988. Living Among Oaks: A Management Guide for Landowners. Univ. of California Cooperative Extension, Natural Resource Program, Univ. of California, Berkeley.
- Hagen, B.W., B.D. Coates, K. Oldham, 1991. Compatible Plants Under and Around Oaks. Calif. Oak Foundation, Oakland, CA, 69 p.
- Guisti, G. and P. Tinnin, ed. 1993. A Planner's Guide for Oak Woodlands. Berkeley, Integrated Hardwood Range Management Program.

## 7.4 EXOTIC VEGETATION REMOVAL AND CONTROL PLANS

### GENERAL

The intent of this section is to provide guidelines for the removal of all exotic trees, shrubs, and groundcover (exclusive of naturalized grasses and forbs) within the Restoration, Buffer, and Preservation Zones (Management Zones). The objectives are to establish, maintain and promote healthy, mature, and naturally regenerating stands of native riparian vegetation in the riparian corridor along the Petaluma River. Native vegetation generally has higher habitat values than does exotic vegetation. Exotic vegetation removal and control plans may be required of riverfront property owners as an element of their, "Environmental Restoration and Management Plan" or as a mitigation measure for new development. See Chapter 5 for additional discussion of exotic removal.

Exotics are defined for purposes of these guidelines as all woody plants and non-herbaceous weedy growth not native to California. References for determination of plant status (native vs. exotic) include the following:

Munz, P.A. and D.D. Keck, 1973. A California Flora and Supplement. Univ. of California Press, Berkeley, CA.

Mason, H.L., 1975. A Flora of the Marshes of California. Univ. of California Press, Berkeley, CA.

Howell, J.H., 1958. Flora of Marin County, California. Univ. of California Press, Berkeley, CA.

Hickman, J.C. ed., 1992. The Jepson Manual, Higher Plants of California. Univ. of California Press, Berkeley, CA.

### REQUIRED ELEMENTS OF PLANS

Exotic vegetation removal plan should be prepared by a Licensed Landscape Architect, Certified Arborist, Restorationist, or Certified Forester. The following list are components of a successful exotic vegetation removal plan and should be included whenever applicable to the project sites.

1. All trees must be drawn to scale on plans, and relevant data provided including species, approximate age, diameter at three feet, and outline of drip line.
2. All exotic trees to be removed and native trees to be retained must be shown on the plans.
3. Trees to be removed must be clearly marked in the field. Native trees to be saved shall also be clearly marked (to prevent accidental removal).
4. All plant material to remain on the site shall be inspected by a qualified professional for disease and pest damage, and recommendations for necessary treatment shall be made and followed.
5. Clearing and exotic removal shall consist of cutting, removing, and disposing of non-native trees, shrubs, brush, and other weedy vegetation growth and shall be inclusive of sticks and branches greater than two inches in diameter or thickness or two feet in length. Clearing shall also include the removal and disposal of trash piles and rubbish. Wherever feasible, hand or mechanical clearing is preferred over chemical removal.
6. All tree removal work should be completed under the direct on-site supervision of a Registered Professional Forester (RPF) or Certified Professional Arborist (CPA).

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7. All chemical applications must be applied under the strict direction of a California licensed and qualified pest control applicator per the manufacturer's recommended label application procedures. Special care must be taken in working around the river to prevent spillage, drainage, or application to water in the river. Only herbicides approved for use around wetlands, such as glyphosphosphate without surfactant (i.e., trade name "Rodeo") may be used in the spraying program. No spraying shall be allowed if winds exceed four miles per hour. Spraying equipment shall be limited to backpack sprayers or wick applicators. Spent containers must be disposed of according to state law.
  8. Individual trees which are to remain, shall be protected with the placement of an approved temporary fencing barrier at the drip line of the tree, or further removed if recommended by an arborist or staff. Groups of trees or shrubs which are to remain shall be protected with approved temporary fencing barriers firmly anchored to the ground at an adequate distance to protect the planting. No material may be stockpiled; no equipment parked, repaired, or refueled; and no oil, gasoline, paint, or other contaminants dumped or stored within 25 feet of the drip line of trees and shrubs which are to remain. Protected trees shall be flagged with red surveyors tape.
  9. All tree cutting and removal shall be made in such a way that trees are felled into the area to be cleared or other natural openings, to the maximum extent possible. Care must be taken to avoid damage to existing native trees, vegetation, structures, or utilities which are outside of the clearing limits. This may require top-down removal and cabling. All hung-up trees and limbs are to be removed. All stumps greater than 12 inches shall be removed with the use of a stump grinder to a depth of 24 inches beneath grade unless otherwise specified/directed by the project arborist.
  10. All smaller trees are to be cut flush to the ground. Tree stumps with ground level trunk diameters less than 12 inches shall have one-inch holes drilled in the top of the stump, four inches o.c. to depths of six inches to promote natural degradation. Stumps of all sprouting species (Eucalyptus, etc.) are to have their surface painted within two hours of felling with concentrated Glyphosphosphate (trade name Roundup or equivalent). Following drying of the herbicide, the stumps can be back covered with local soil to promote biodegradation.
  11. All limbs and branches of native trees to be preserved that are inadvertently damaged during exotic tree removal shall be pruned at the break point or at the direction of an arborist.
  12. Bucked trunks and slash within the protection and restoration zones shall be removed by hand, small mechanized vehicles (small tractors with trailer carts of 1/2 yard capacity), or cable and winch systems to designated areas for loading or chipping. Trim major branches and winch snags out butt first to minimize damage in preservation and restoration zones.
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13. All tree trunks, branches, limbs, etc. are to be removed and disposed of in a legal manner. Chipped material may be spread in buffer zones or further upland. The only exception to this is clippings from Eucalyptus which cannot be utilized as they contain natural plant toxins. Maximum allowable thickness of the chip mulch is four inches. No mulch is to be placed within 12 inches of the base of the tree.
14. Patches of exotic ground cover (e.g., ice plant, german ivy, vinca, perry winkle) in the restoration, preservation and buffer zones should also be removed. Target populations for removal shall be identified by the project restoration consultant. First, exotics shall be attacked and scarified with a wire weed trimmer. Next, an approved herbicide, such as Rodeo shall be sprayed on the leaves in accordance with the manufacturer's directions. Following die-back, the decayed material shall be then removed by hand. Two separate sprayings are typically required.
15. Each tree over six inches diameter at four feet above ground removed on the upper half of the bank and bank top shall be replaced by at least two 15-gallon specimen native trees, as determined by city staff. The planting location and tree species shall be determined by the RPF or project arborist.

## 7.5 BANK STABILIZATION AND EROSION CONTROL PLANS (BSECP)

### GENERAL

Bank protection and bank stabilization is required along much of the Enhancement Plan Area either in response to current bank erosion and sloughing problems, or to correct and prevent problems which may otherwise develop in future years. The replacement of decaying old retaining walls and bulkheads also needs to be planned for. Bank stabilization, and the achievement of a stable, non-erosive channel is an important design element of the current flood improvements being planned for the Payran and Denman/Willow Brook reaches. These channel designs typically include moderate (2H:1V slopes) grassed bank slopes with channel lining (rip-rap, gabions, or concrete) in critical areas around bridges, or where steep bank sections are required to minimize channel widths. The unprotected steep banks upstream and downstream, however, will also require stabilization treatments to protect property, to maintain water quality, to control river sedimentation, and to allow establishment of vegetation.

A variety of approaches to bank stabilization and erosion control can be considered, depending on such factors as; size of area and physical dimensions, cause of risk factors involved in the failure, bank slope length and steepness, water velocity, and tidal conditions. Bank stabilization approaches also vary considerably in costs, appearance, habitat enhancement benefits, and the amount of land utilized in laying the slopes back.

In addition to bank stabilization, a program to control surface runoff and erosion along riverfront parcels is necessary to reduce sediment input into the river, to protect the banks from failing and prevent gully erosion from concentrated flow.

Preparation, submittal, and review of Bank Stabilization and Erosion Control Plans (BSECP) will be a part of the project plan and CEQA review and will be the responsibility of the project applicant.

Section 404 of the Clean Water Act requires a U.S. Army Corps of Engineers permit for placement of fill material in waters of the United States. "Waters of the United States" includes navigable water under Section 10 permits, as well as tributaries and wetlands adjacent to navigable waters of the United States. Jurisdiction extends to the high water line, except that where wetlands are present they are included also. Most bank stabilization projects, including placement of rip-rap and structural elements will require a Corps permit.

A standard application form can be obtained from the Corps San Francisco district office. The application must include a description of the proposed construction, including necessary drawings, sketches, or plans, the location, purpose, and intended use of the proposed activity; scheduling of the activity; the names and addresses of adjoining property owners; the location and dimensions of adjacent structures; and the approvals required by other federal, interstate, state or local agencies for the work.

#### **REQUIRED ELEMENTS OF BANK STABILIZATION AND EROSION CONTROL PLAN**

In general, combined structural-vegetation approaches (also call bio-engineered or biogeotechnical approaches) are preferred. All approaches must be based on sound engineering analysis and design; and must include consideration of water velocity, tidal fluctuations, soil characteristics, and water salinity.

The plan shall be prepared and signed by a person or firm qualified by training and experience to have expert knowledge of bank stabilization, erosion and sediment control methods. The Bank Stabilization and Erosion Control Plan (BSECP) must be prepared by a civil engineer, engineering geologist, landscape architect, or certified professional soil erosion and sediment control specialist, all trained and experienced in biogeotechnical slope stabilization.

The following information should be included in the BSECP:

- (1.) A Narrative, containing:
  - a. A brief description of the project needs and objectives, proposed land-disturbing activities, existing site conditions and adjacent areas;
  - b. A description of critical areas on the site - areas that have potential for serious erosion problems, including an analysis of all existing and proposed riverfront banks;
  - c. The date grading will begin and expected date of stabilization;



- d. A description and discussion of the alternative biogeotechnical measures evaluated;
- e. A brief description of the selected measures that will be used for bank stabilization and erosion control, including both temporary and permanent structures; and,

(Note: Measures must meet or exceed all requirements in the City grading ordinance and other similar standards and specifications. Biogeotechnical methods, including those illustrated in the cross sections in Chapter 5, must be specifically considered in the required evaluation of alternative stabilization methods. If grading is scheduled to be completed before the rainy season, the plan should specify contingency actions to winterize the site if construction should fall behind schedule.)

- f. A maintenance program that includes provisions for frequency of inspection, reseeding and replanting of vegetated areas, repair or reconstruction of damaged structures, clean-out method and frequency, disposal of waste materials and disposition of temporary control measures after they have served their purpose.

This narrative is intended to summarize for the plan reviewer the site conditions and project aspects important for bank stabilization and erosion control. It is not intended to duplicate the requirements of project Section 404 applications and Environmental Impact Reports. Applicable portions of those documents should be referenced in the narrative to avoid unnecessary duplication.

(2.) A Map and Cross Sections showing:

- a. Existing site contours at an interval and scale sufficient for distinguishing runoff patterns before and after disturbance;
- b. Limits of clearing and grading;
- c. Final contours;
- d. Location of the project features relative to roads, buildings, stream bank top or other identifiable landmarks;
- e. Existing vegetation (grassy areas, major groups of trees and unique species);
- f. Surface extent of each soil type and relative erodibility;
- g. Critical areas within or near the project area, such as wetland and riparian vegetation;
- h. Location and types of both temporary and permanent control measures; and,
- i. Dimensional details of drainage and stabilization structures and control measures.

(3.) Plan Details

- a. Detailed design drawings of bank stabilization and erosion and sediment control structures, showing key dimensions and other important details;
- b. Design assumptions and calculations (for structural measures such as sediment basins, channels and outlet protection);
- c. Planting plan and seeding specifications; and,

## d. Maintenance notes.

(see cross sections in Chapter 5 for recommended biogeotechnical solutions)

**REFERENCES**

The following references can be consulted in preparation of the detailed plans:

Association of Bay Area Governments, 1981. Manual of Standards for Erosion and Sediment Control Measures. Oakland, CA.

Goldman, S.J., K. Jackson, and T.A. Bursztynsky, 1986. Erosion and Sediment Control Handbook. McGraw-Hill.

Gray, D.H., and A.T. Leiser, 1982. Biotechnical Slope Protection and Erosion Control. Van Nostrand Reinhold, New York, New York.

Keowin, M.P., 1983. Stream Bank Protection Guidelines for Landowners and Local Governments. U.S. Army Corp of Engineers Waterways Experiment Station, Vicksburg, MS.

Margolin, Malcolm, 2nd Edition 1986. The Earth Manual. Houghton Mifflin, Boston, MA.

Prunuske, L., 1987. Groundwork: A Handbook for Erosion Control in North Coastal California. Marin County Resources Conservation District, CA.

Schiechtl, 1980. Bioengineering for Land Reclamation and Conservation. University of Alberta Press, Edmonston, Alberta.

**7.6 STORM WATER POLLUTION PREVENTION PLANS****GENERAL**

A Storm Water Pollution Prevention Plans (SWPPP) are required for all riverfront construction projects with cumulative impervious or disturbed surface areas over five acres plus targeted industries as defined by the Regional Water Quality Control Board (i.e., NPDES permit). Plans to evaluate and mitigate storm water or urban runoff pollution may be required for riverfront projects to 20,000 square feet of impervious surfaces. Preparation, submittal and review of these plans will typically be a part of the environmental review for all applicable projects within the enhancement plan area. A large number of water quality investigations have found that non-point storm water runoff, or runoff from urban areas, especially large commercial and industrial complexes, is at least as significant a contributor of pollutant loads to surface water bodies as are point source discharges from industrial plants. Great steps have been taken to reduce and control waste discharges from such point sources over the last several decades. New state and federal water quality control regulations are now aimed at storm water pollutant control, at certain target industries and land uses. The vehicle for implementation of EPA's urban runoff water quality control program is a Storm Water Pollution Prevention Plan (SWPPP) as cited in 40 CFR 122.26(b)(14).

Currently, SWPPP's are generally required under Federal and State water quality protection programs (Clean Water Act) for communities with populations over 100,000. Thus, the Petaluma River area does not now fall under Storm Water Management Regulations. However, the Petaluma River is considered in the S.F. Bay Regional Water Quality Control Board's Basin Plan as an "impaired water body" because of such water quality problems as high nutrient levels, high turbidity, and seasonally low dissolved oxygen levels (Existing Conditions Report). Improvement of water quality conditions in the Petaluma River within the Enhancement Plan area is part of Goal # 4, and is integral to improving the aquatic habitat and aesthetic appeal of the river system.

Federal guidelines for preparation and presentation of SWPPP's are detailed and specify elements for identifying and mapping pollutant sources, kinds of pollutants, and affected water bodies. Storm water management controls are typically more site specific, but contain generic elements, including storage and disposal practices and spill prevention and response. Since implementation of the plan relies to a very high degree on the responsiveness of on-site employees, emphasis must be placed on practical, pragmatic solutions, that do not interfere with worker efficiency and avoid nuisance activities that do not make sense. Employee education and training in the necessity and merits of water pollution reduction is critical in carrying out the plan successfully.

## REQUIRED ELEMENTS OF STORMWATER MANAGEMENT PLAN

Required storm water management plans for larger projects must be prepared in accordance with Storm Water Pollution Prevention Plan (SWPPP), 40 CFR 122.26(b)(14) and 122.44(i). These criteria should be applied, at least for reference, to review of all smaller projects, too. Evaluations will include recommendations for Best Management Practices ("BMP"), Best Available Technology ("BAT"), and Best Conventional Pollutant Control Technology (BCT) for containing and controlling storm water discharge.

The following information should be included in all water pollution prevention plans:

### 1. Site Map

- Storm water conveyance system/ structures;
- Watershed/drainage area for each discharge;
- Location of paved areas and buildings;
- Pollutant contact locations;
- Storm water structural control measures;
- Surface water locations;
- Existing/potential soil erosion areas; and,
- Vehicle service areas/outdoor work areas.

### 2. Narrative Report

- Facility size and percent of impervious area;
- Identification of materials that have been treated, stored, disposed, spilled or leaked in significant quantity since November 19, 1988;
- Materials, equipment, and vehicle management practices which minimize contact with storm water;
- Materials handling areas;

- Structural/non-structural pollutant reduction measures;
- Storm water discharge treatment facilities;
- Materials storage/disposal methods;
- Outdoor storage location, materials, containment;
- Manufacturing and processing activities, including dust generating activities.

### 3. Pollutant Listing

- List of pollutants having reasonable potential to be present in storm water;
- Estimate of annual quantities of pollutants in discharge;
- List of significant toxic chemicals, oils, or hazardous substances discharged in excess of reportable quantities occurring after November 19, 1988.

### 4. Storm Water Management Controls

- Storm water prevention personnel;
- Preventive maintenance practices;
- Housekeeping/maintenance practices;
- Spill prevention/response measures;
- Storm water management practices;
- Erosion/sediment prevention measures;
- Employee training for SWPPP practices;
- Inspections and follow-up procedures;
- Quality controls and practices;
- Sampling practices and procedures;
- Quality assurance/control methods and procedures;
- Spill prevention control and countermeasures (s. 311, CWA); and,
- Best Management Programs (40 CRF 125).
- Person (address & telephone number) who is responsible for implementation and monitoring

### REFERENCES

Camp Dresser & McKee, Larry Walker Associates, Uribe and Associates, and Resources Planning Associates, March 1993. California Storm Water Best Management Practices Handbooks. Prepared for Storm Water Quality Task Force (separate handbooks available for Construction Activity, Industrial Commercial, and Municipal Use Activities). Handbooks formatted to allow preparation of plans directly by business owners.

Department of Environmental Programs, Metropolitan Washington Council of Government, July 1987. Controlling Urban Runoff: A Practical Manual for Planning and Designing BMPs. (Contains extensive information on use of on-site detention basins, oil and grease trap, and pocket wetlands for storm water treatment.)

Kennedy, G.M., and H.T. Shogren, 1977. Handbook of Best Management Practices for the 9 Bay Area Counties. Council of Bay Area Resource Conservation Districts, 5552 Clayton Road, Concord, California (415) 672-6522.

## 7.7 CHANNEL MAINTENANCE GUIDELINES

Any riparian restoration plan represents an optimized density of vegetation balanced against channel capacity requirements for flood minimization. This density is typically determined by standard engineering methods that model channel roughness and flow resistance imposed by vegetation through the use of Mannings "n" values in HEC-2 model runs. Selective channel maintenance is required to maintain the vegetation at the densities for which the channel was designed to provide a certain level of floodwater conveyance through the channel section until an established canopy adequately shades out weeds from the channel bottom. Channel maintenance will also be required to prevent the development of localized erosion and flooding problems from fallen snag deflectors and jams. However, occasional flood flows (usually above the 20-year storm) will be allowed to flow out-of-bank within the floodway, and be confined by natural topography or floodwalls in some reaches. Any sediment debris or erosion caused by the flooding should be cleaned up and restored.

The maintenance standards for flood conveyance are to achieve a channel roughness co-efficient (Mannings "n" value) of between .035 and .045. Existing channel sections were modeled using "n" values ranging from 0.035 in very lightly vegetated areas to 0.10 in more densely vegetated areas. By way of comparison grassed channels typically are considered to have "n" values of 0.030 - 0.035, constructed natural waterways of 0.050, and heavily vegetated natural streams with choked channels 0.075 to 0.15.

Normally, until a mature riparian overhead canopy is established, removal of all woody vegetation and thick cat-tails and tules from the channel bed and bank toe slopes is required prior to the on-set of winter stormwater runoff to achieve this maintenance standard. Densely vegetated bank areas may also require some thinning in select flood prone areas, until channels are improved, while other lightly vegetated areas can be planted to prevent erosion.

Recommended maintenance practices are more clearly outlined below:

1. Remove all vegetation occurring on the lower 1/4 bank and channel bottom that is greater than 4 inches diameter and 6 feet in height by cutting at ground level. Leave ground cover for soil protection and to reduce erosion. Individual native trees may be selected for retention in the middle and upper bank zone to achieve a density of one mature stem (greater than four inches diameter at three feet) at 10-foot spacings. All exotics can be removed and replaced with native species in restoration areas. In conducting the thinning and removal, strive for structural diversity with respect to aesthetics or appearance, age, size, canopy position, and species. Select trees that overhang the creek to provide shade and cover. Further reduction in flow resistance may be obtained by pruning limbs that protrude below normal flood height (limbing up to three to four feet height).
2. Leave stumps on the bank in place except when badly under cut. Occasionally, sprouts may require trimming if they become woody. The stump's roots provide important bank support.
3. Remove fallen trees and trees that rely on adjacent vegetation for support.

4. Remove trees likely to fall into the channel within a year. Experience and professional judgement are required to decide which trees constitute an immediate hazard, but generally this requires removal of all trees leaning at an angle of 30 degrees or greater from vertical, and trees with serious undercut banks. Dead trees that are valuable as den and nesting sites should not be removed if located far enough from the channel that they will not fall in. Determination of the hazard potential of a given leaning or dead tree should consider the overall condition of the tree, amount of undercutting, current, wind loading, and tree species.
5. Remove only those snags that are major flow obstructions or which are likely to be trapped during flood discharges. Small snags may be positioned parallel to eroding banks and anchored in place to create a brush pile revetment, if channel capacity permits. Leave embedded logs that are aligned with the flow, and minor debris.
6. Excavate major sediment deposits that have formed upstream or downstream of jams if it appears that jam removal will not be sufficient to flush them out. Leave larger cobbles and rocks in place that provide natural pool/riffle sequences.
7. All dead material should be removed by limbing, bucking, hand carrying and winching through natural openings to yarding/chipping areas. Vehicular access is limited to approved access routes, except in emergency situations.

## 7.8 GUIDELINES FOR LANDSCAPE MAINTENANCE OF NATIVE PLANTS

### GENERAL

In general, natural forms and shapes of the native plant species should be maintained. Pruning and removal of native tree and shrub species should occur within the restoration, protection, and buffer zones along the river only when limbs interfere with public access, structures, or utilities, pose a potential flood maintenance hazard, or to correct a tree "structural" problem. Poor tree structure may weaken a tree and make it susceptible to windfall, disease, or other hazards. A brief landscape maintenance plan should be prepared as part of any plan.

For the care and maintenance of native oaks, it is especially important to insure proper pruning practices. A Valley oak should not be pruned except when dead wood is present, or when there is an eminent hazard or safety problem.

Tree survival is dependent on food manufactured in its leaves, and therefore, no more than 20-percent of the leaf surface should be removed. There may be situations where diseased wood is present and heavier pruning is required. This should be done by a professional arborist who is experienced in making these decisions.

An annual inspection of the greenway should be conducted by a Registered Professional Forester (RPF) or Certified Arborist (CA) recognized by the Western Chapter International Society of Arboriculture (WCISA) to identify trees requiring safety pruning, or removal. Only dead or dying native trees that are a hazard, and exotics, should be removed and only under the supervision of a RPF or CA. Non hazardous dead or dying native oak trees in particular should be left as snags for wildlife habitat.

The W.C.I.S.A. Pruning Standards describe the various techniques that should be utilized in pruning and maintenance all species of trees, both native and ornamental. All pruning work shall follow the latest edition of Pruning Standards published by WCISA. However, the use of a "heading cut" or a "stubbing cut", described in Section I-B of the Standards are not acceptable and should never be used on Valley oaks. The preferred types of pruning are described in Section II-A, crown cleaning and II-B, crown thinning.

Two types of pruning will be permitted: (1) a "Medium Prune" for planted trees along the creek walks; and, (2) a "Safety Prune" of trees in the riparian corridor contiguous to the creek. Guidelines for pruning as drawn from WCISA are as follows:

Guidelines for "Medium Prune":

- a. Properly remove all dead and dying branches of 1/4 inch and over in diameter.
- b. Remove all broken branches or any loose branches lodged in the tree.
- c. Remove all dead and live stubs of previously broken or poorly cut branches.

d. Remove any live branches which interfere with the tree's structural strength and healthful development. This shall include the following:

- Branches that rub and abrade a more important branch;
- Branches of weak structure that are not important to the framework of the tree;
- Branches that, if allowed to grow, would wedge apart the junction of more important branches;
- Branches with twigs and foliage obstructing development of more important branches;
- Branches forming multiple leaders in a single leader type tree;
- Branches near the end of a limb which will produce more weight or offer more resistance to wind that the limb is likely to support;
- Undesirable sucker and sprout growths;
- Selective removal to one or more developing leaders where multiple branch growth exists near the end of broken or stubbed limbs;
- Removal of branches that project too far beyond an otherwise symmetrical form;
- Removal or severance of any exposed roots that restrict or act in a girdling manner and prevent proper expansion and growth of other major roots, or restrict the base of the tree trunk; and,
- All final cuts shall be made just outside the branch collar. Extremely deep cuts which produce excessively wide wounds or weaken the tree shall not be made.

Guidelines for "Minimum" or "Safety Prune"

Safety prune, tree trimming shall consist of the minimum performance necessary to correct one or more extreme and undesirable conditions existing within a tree which may be hazardous to persons or property.

- a. Remove all dead and dying branches of two inches or more in diameter.
- b. Remove all broken or loose branches of two inches or more in diameter.
- c. Reduce the length of branches which extend excessively beyond the perimeter of an otherwise symmetrical form.
- d. Cut back ends of branches and reduce weight where excessive overburden appears likely to result in breakage of supporting limbs (too much bulk). Such cutting back shall not include the removal of any live, healthy branches in excess of six inches in diameter unless a specific consent is given by the RPF.

#### REFERENCES

International Society of Arboriculture, April, 1990. Municipal Tree Manual. Urbana, Ill., 42 p.

Western Chapter International Society of Arboriculture, 1990. Pruning Standards. WCISA, St. Helena, CA.

## 7.9 NATIVE OAK ESTABLISHMENT GUIDELINES

### GENERAL

Native oak trees hold an honored position in the traditional California landscape. They are noted for their natural beauty and valued in the native ecosystem. Restoration of areas of native oaks will include programs to protect resident oaks from loss or damage during construction, and from inappropriate landscape maintenance (irrigation, pruning, etc.). Separate guidelines are provided for protection of oaks from construction damage and inappropriate maintenance and pruning. In some cases, however, there may be occasions of accidental damage to or loss of native oaks which will require compensatory replacement as mitigation. In other instances, expansion of oak woodland within a buffer zone or protection zone may be warranted as part of a required site-specific restoration plan. Although planting of larger specimen oak trees from sources collected and grown in Sonoma and surrounding counties may be considered, the preferred approach for oak establishment is "protected direct seeding", using acorns and seeds collected from genetic stock obtained within or immediately adjacent to the restoration site.

The protected direct seeding approach can be used for oaks (Valley, Coast live oak, Black oak) as well as California buckeye and perhaps Oregon ash, Box elder, and several woody shrub species resident to the Enhancement Plan area.

### ESTABLISHMENT GUIDELINES

1. Collect seeds for restoration from the area, preferably from trees nearest the area to be planted.



2. Collect seeds in the fall as they ripen (September - November).
3. Seeds and acorns showing evidence of damage, such as emergence holes, dark spots, or splits should be discarded,
4. Rinse seeds and acorns in water (discard those that float), air dry, and store/refrigerate in labeled plastic bags one to five months for winter/early spring planting.
5. Select sites for seeding establishment carefully, considering existing canopy cover and shading, moisture, likely foot traffic, and apparent presence of rodents, ground squirrels, etc. Generally plant oak seedlings 2-inches deep in clusters of 3 to 5 (to allow for mortality), 20 to 25 feet apart and near the edge or drip line of the tree canopy. Typically Valley oaks will grow as single trees near the outer edge of the restoration zone, some 25 to 50 feet or more from the river bank, while Coast live oak and California buckeye will grow in groups within 25 feet, and Oregon ash, Box elder, Big leaf maple, Cottonwood, and Willow species along the upper river bank or immediate top of bank zone.
6. Prepare planting sites after rain has moistened the upper 10 to 12 inches (2 1/2 to 3 inches of rain) by removing weeds in a 4-foot x 4-foot square and augering or digging down to a depth of at least 2 feet.
7. Install a 3-foot x 3-foot polypropylene weed control fabric, a collar and wire mesh netting to protect the seedling from insect and rodent predation.
8. As seedlings grow (generally after 3 to 5 years) the protective screens can be removed. Weed and irrigate the oak seedlings the first two years about four times during the dry summer months.

## MAINTENANCE GUIDELINES

1. After the end of the rainy season the seedlings should be deeply watered every four to six weeks for the first two summers after planting. This can be by hand or with a manually operated drip system.
2. The planting area should be weeded by hand periodically during this time period and the protective screens checked and repaired/replaced.
3. Failed seedlings should be replanted to obtain the desired number of replacement trees.



*This existing stand of oak trees is a prime candidate for supplying seed stock for restoration.*

## 7.10 FLOOD CONTROL CHANNEL DESIGN GUIDELINES

### GENERAL

Channel improvements will be needed along the Petaluma River to lower water surface elevations and consequently reduce the extent of flooding along certain flood prone reaches. This can be achieved by such channel modifications as widening, deepening and removal or replacement of constrictions such as bridges and utility crossings. While improvements to any reach will alter water surface elevations, the design and construction constraints for each reach are unique. Each reach of the river being considered for improvement must therefore be analyzed for engineering and environmental feasibility.

Altering river channel sections is a complex process involving major grading and impacting streamside vegetation. Proposed projects must meet accepted City of Petaluma and Sonoma County Water Agency (SCWA) policies for land use, environmental impact and floodplain management. It is imperative that channel modifications be based on the most recent hydrologic modelling and the channel design be acceptable from a land use and environmental design and hydraulic perspective. Hydraulic efficiency of the channel modification is important but consideration must also be given to designs which maintain or improve existing water quality, wildlife habitat, and wetlands.

### DESIGN GUIDELINES

The first priority in channel design is to create stable channels with riparian vegetation and natural appearing configurations. Properly managed "natural waterways" as defined by SCWA are strongly preferred. In areas of minor flooding, top of bank planted berms and flood walls at the edge of the buffer zone along natural channel sections should be considered in-lieu of in-channel modifications.

When channel sections must be significantly modified to provide for increased flood conveyance, landscaped constructed waterways as defined by SCWA must be considered, including the design of two stage channels with a separate low flow channel within the flood channel. Hard lined or grassed trapezoidal channels should only be used where there are significant right-of-way constraints from valuable or historic top of bank improvements. All channel designs should conform to the SCWA Flood Control Design Criteria Manual (revised 1983).

#### Low Flow Channel Design

1. The low flow channel should have a capacity capable of containing the two year flood.
2. The low flow channel should have a meander pattern and riffles designed to be stable in a two year flood.
3. Create or maintain the stream beds with natural features for stream stability, water quality, habitat enhancement, and visual interest, including meanders, pools, riffles, and where necessary, small stone drop structures.

4. Design a maintainable channel bed. If rocks are used, anchor them to the bottom for flood flow stability and use natural river boulders. Wherever possible, use natural processes such as sediment deposition and vegetative root growth to armor the channel.
5. Retain the natural channel bottom wherever possible to maintain the interaction and hydrologic connection between groundwater and surface water. Low drop structures, meanders, or rocks and vegetation can be used to reduce bank erosion by controlling velocity and stabilizing the banks.
6. Restrict the use of rip-rap on channel banks in favor of such structures as live crib walls, and log deflectors. If rip-rap is used, it should be covered with soil and planted, or be interplanted, with native species whenever feasible.

#### Flood Channel Design

1. The new top of bank of the flood channel should be designed to contain the projected 100-year flow at General Plan build-out with a minimum 1-foot freeboard to meet General Plan goals.
2. If a top bank berm or levee, or floodwall is used to contain the flow, a 2-foot freeboard must be utilized to meet Federal Emergency Management Agency criteria.
3. Wherever possible, in-channel flood terraces should include provisions for creation of wetlands and vegetated swales that route adjacent urban stormwater prior to discharge to the river for pollution reduction.

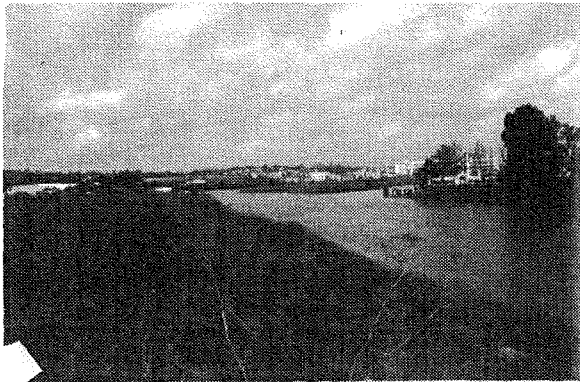
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- Army Corps of Engineers, June 1987. Incorporation of Environmental Features in Flood Control Channel Projects. Waterways EXP. Stn, Vicksburg, Miss., Tech. Report E85-3.
- Federal Emergency Management Agency, December 1991. Design Guidelines for Flood Damage Reduction FEMA-12. AIA Research, Washington, D.C.
- Sonoma County Water Agency. 1983 Flood Control Design Criteria, Santa Rosa, California.

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## CHAPTER 8.0

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*The greenway offers potential mitigation sites upstream and downstream (including the expansion of both salt marsh and freshwater wetland habitats) to offset impacts on natural resources elsewhere in the Petaluma River watershed.*

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# NATURAL RESOURCES MITIGATION GUIDELINES FOR THE PETALUMA RIVER CORRIDOR

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## 8.1 SCOPE AND INTENT OF MITIGATION POLICY

These guidelines outline the policy recommended by the River Plan, Citizen's Advisory Committee with respect to use of the Petaluma River greenway, as potential mitigation site(s) for offsetting impacts to the natural resources of the Petaluma River Watershed. Technical definitions are provided in the Glossary in Chapter 6.

Guidance is provided with respect to the following circumstances:

- Acceptable conditions for use of the greenway for mitigation of impacts on natural resources originating on the same site within the Petaluma River Corridor (hereafter "on-site" mitigation); and
- Acceptable conditions for use of the greenway for mitigation of impacts originating elsewhere either within the Petaluma River Corridor planning area or elsewhere within the City (hereafter "off-site" mitigation).

It is not the intent of the City that these guidelines replace mitigation policies adopted by such agencies as the U.S. Army Corps of Engineers, California Department of Fish and Game, the U.S. Fish and Wildlife Service, or other regulatory agencies with responsibility for enforcing wildlife or water quality regulations applicable to the Petaluma area. It is also not the intent of the City that the

City assume any jurisdictional authority for natural resources beyond that currently held through existing City ordinances and its environmental review procedures.

Rather, it is the intent that these guidelines provide advisory notice to the appropriate regulatory agencies for their use in review of proposed mitigation and monitoring plans for projects within the greater Petaluma area, and for use by the City in review of projects pertaining directly or indirectly to the River Plan area.

Further, it is the intent that these guidelines provide policy for mitigation of significant impacts to natural resources within the Petaluma area, and use of the greenway for such mitigation by specifying conditions for use of the greenway, acceptable kinds of mitigation, and submittal standards and requirements. By using these guidelines, it is hoped that one carefully written mitigation document should suffice for all agencies. But since compliance with these guidelines does not guarantee success, direct consultation with other regulatory agencies is recommended.

City staff is encouraged to incorporate these guidelines into the project review process for all projects which occur within the River Corridor planning area and when they propose to address/mitigate impacts within the area, should follow these guidelines.

## 8.2 WETLAND MITIGATION GOALS AND POLICIES

In order to successfully implement a program which seeks to mitigate impacts on natural resources, it is necessary to clearly state the intended goals of such a program. These guidelines seek to establish a comprehensive set of goals and policies for the mitigation of impacts on wetland habitats and their values, functionally related riparian areas, oak woodland, and other sensitive habitat.

**GOAL I.** Protect Wetlands, Related Riparian Areas, and Oak Woodland as Valuable Resources Throughout the Petaluma River Watershed

### Policies:

1. Wetlands, riparian habitat, and oak woodlands are significant resources in the Petaluma area which should be protected, preserved, restored, and enhanced throughout the watershed.
2. Properties which contain natural resources and which are to be impacted by activities occurring on-site or off-site which have the potential to affect habitat acreage and values, shall seek to : (1) avoid all impacts on the significantly valuable habitat; (2) where avoidance is not feasible, minimize impacts on the resource; and (3) where impacts are inevitable and all feasible project alternatives have been examined, the impact may be mitigated by the creation, restoration, and enhancement of compensatory habitat acreage and/or values within appropriate places in the greenway.
3. If avoidance of impacts is not feasible, mitigate the loss of acreage and value for all significant impacts to these resources, subject to the provisions of CEQA and the Clean Water Act.

4. The City shall require wetland mitigation which compensates for the loss of wetland acreage and wetland habitat values throughout all areas over which it has jurisdiction. Impacts on wetlands should be mitigated such that there is no net loss of wetland acreage and values.
5. Where significant high quality riparian or tidal marsh areas and oak woodlands are impacted, compensatory mitigation shall be required for losses for both acreage and value.
6. Mitigation measures implemented for one specific impact shall not be counted as a mitigation for other unrelated impacts.

**GOAL II.** Allow Mitigation of Natural Resource Impacts, Where Necessary, Through Use of the Greenway

### Policies:

1. The use of the river greenway shall be considered acceptable mitigation site(s) for natural resource impacts when all other feasible efforts of avoiding the impact have been exhausted. At a minimum, prior to the off-site use of the greenway as a mitigation site, it must be demonstrated that no feasible, less damaging design alternatives to the proposed project exist and that on-site compensation is determined to be infeasible, impracticable, or unacceptable to the City.
2. All activities which seek to mitigate impacts within the greenway shall compensate for acreage and values at ratios which reflect the significance and quality of the impacted resources. It may also be necessary to establish mitigation areas within the greenway at a ratio greater than 1:1 for the acreage lost in order to compensate for lost

values through time (temporal losses), unless the establishment is completed successfully in advance of the impacts.

3. Emphasis shall be given to establishing mitigation sites in areas where opportunities exist to protect existing habitat, establish, enhance, or protect the linkage of wildlife corridors, or enhance existing riparian and wetland habitat, through consolidation and expansion of habitat quantity and diversity, and separation from intensive urban uses.
4. The mitigations must conform to the River Plan.

**GOAL III.** Provide Within the Greenway the Opportunity for the Mitigation of Impacts to Rare, Threatened and Endangered Species and/or Their Habitat in the Petaluma River Watershed.

**Policies:**

1. Properties which contain sensitive plant, animal, or habitat resources shall seek to:
  - (1) avoid all impacts on the species and its habitat;
  - (2) where avoidance is not feasible, to minimize impacts on the resource;
  - (3) where impacts are inevitable and all project alternatives have been examined, the impact may be mitigated by the creation of compensatory habitat acreage and values within the greenway providing that said habitat can fully mitigate the impact on the affected species.
2. The City of Petaluma shall coordinate with the California Department of Fish and Game prior to approving a mitigation program for the affected species.

## 8.3 TECHNIQUES FOR HABITAT EVALUATIONS

### 1. VALUE SURVEYS.

Habitat evaluation methods can be used to classify and quantify the habitat values that occur at the impact site. Once quantified, these habitat values will constitute the mitigation obligation for which compensation will be required or offset through creation, restoration, or enhancement of other areas. Impacted resources will be classified into high, moderate, or low classes for subsequent use in determining the amount of required mitigation. These are defined as follows:

■ **High Value** - Prime resource providing exceptional public value by virtue of its near original native condition considering density of cover, richness of species, lack of exotic plants, and location with respect to intensive urban land-use.

■ **Moderate Value** - Defined as being neither prime (high value) or compromised (low value).

■ **Low Value** - Compromised, deteriorated, highly disturbed and impacted habitat, which by virtue of its location, surrounding land-use, chemical contamination, or structural composition no longer meets functional characteristics typical of the habitat.

Habitat values can be determined using the Habitat Evaluation Procedure (HEP) established by the U.S. Fish and Wildlife Service; the Wetland Evaluation Technique (WET), developed by P. R. Adamus for the Federal Highway Administration; or an equivalent method. HEP is a species-specific method developed to rate habitat quality and quantity in order to quantify the impacts of changes made through land and water development projects. It has been used as a tool to document baseline information on habitats as a gauge for future habitat alteration (HEP Manual, U.S. Fish and Wildlife Service).

The advantage of HEP is that it is well-known among biologists and has been widely used. A disadvantage of using this method is that HEP requires intensive training. It is also both time consuming and costly, and is not very flexible to modification or adaptive information. Using HEP for the evaluation of small wetlands may not be cost effective. Additionally, HEP analyses are not comprehensive measures of wetland functions and value.

WET is a comprehensive assessment of function and value, but it lacks quantitative rigor. The functions and values of most wetlands fall into the "moderate" category, making it difficult to compare wetlands. WET also lacks regional specificity and doesn't account for Petaluma's wet season/dry season climate.

For projects with small impacted acreages (less than two acres - one acre for wetlands), a qualitative classification by a professional biologist or wetlands scientist will suffice for the City's role as lead agency if the classification considers such factors as native species composition and density, presence of exotics, and disturbance factors, and provided further that the rationale for the resource classification is given.

## 2. PHYSICAL CONDITIONS SURVEYS.

A detailed inventory and analysis of the physical conditions of mitigation sites are often required to describe the conditions of the existing site and likelihood of success for the mitigation. These surveys typically include a study of topography, soils, geomorphic features, and hydrology. Topographic mapping, if necessary, should include at a minimum 50-scale mapping with two-foot contour intervals. For wetlands mitigation sites, soils information should include field verified soils maps with at least one representative soil profile described and sampled for each soil map unit and with map units defined and delineated to portray differing landscape/geomorphic positions. Soil pH, texture, and salinity information may be required for each major soil layer. Mitigation site surveys must also list special habitats at that site that may be adversely affected by the mitigation.



## 8.4 MITIGATION ALTERNATIVES

Significant adverse impacts on natural resources must be mitigated wherever feasible. Mitigation measures are defined in the National Environmental Policy Act and listed in order of preference as follows:

1. Avoiding the impact altogether by not taking a certain action or parts of an action;
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and,
5. Compensating for the impact by replacing or providing substitute resources or environments (at mitigation sites).

Mitigation measures, in descending order of general acceptability, are the following:

1. **In-Kind, On-Site.** This form of mitigation would seek to duplicate the physical nature of the resource area to be negatively impacted within or adjacent to a project site. This mitigation technique, if properly applied, would tend to assure that the habitat value derived from resource creation is essentially identical to that which was lost to development; would concentrate on benefiting those fish and wildlife species and local populations

adversely impacted by development; and would tend to provide a greater degree of certainty that the benefits provided by the impacted wetland are retained.

2. **In-Kind, Off-Site.** This form of mitigation would be selected when "in-kind, on-site" mitigation would result in the creation of natural areas of demonstrably inferior quality to those which could be created elsewhere or where on-site mitigation is infeasible. In general, "in-kind, off-site" mitigation should be located as near to the impact site as is feasible. The advantage of in-kind, off-site mitigation is that it would, through duplication of the physical nature of the area to be negatively impacted, tend to benefit those fish and wildlife species which would be adversely impacted at the project site and would also tend to maintain their population levels. This form of mitigation, though, does not necessarily assure retention of the local fish and wildlife populations affected by the project.
3. **Out-of-Kind, On-Site.** It is conceivable that situations could exist where fish and wildlife resources would be better served from a regional standpoint if creation of wetlands of a different type than those adversely impacted through development were selected as mitigation. For example, it could be that, from a management perspective, a freshwater marsh is more valuable to fish and wildlife resources in a given region than an equivalent area of vernal pools. The converse could be true as well. Also, in cases where the resources to be impacted are already degraded or of minimal value, replacement by other resources that benefit species of concern can be a desirable alternative. In such a situation, the City believes that an alternative to mandatory in-kind mitigation can be desirable. However, out-of-kind mitigation is generally inferior to in-kind

mitigation for significant resources since it does little to provide assured benefit to those species which would be negatively impacted as a result of development. Therefore, only if a compelling biological-based rationale exists for acceptance of out-of-kind mitigation should such a form of mitigation be employed.

4. **Out-of-Kind, Off-Site.** This form of mitigation would least likely result in the maintenance of those habitat values lost through development. "Out-of-kind, off-site" mitigation is a less acceptable means of compensating for adverse impacts. However, if mitigation approaches 1, 2, and 3 cannot be employed, and if the choice is, for example, retention of wetland acreage through out-of-kind, off-site compensation or a net loss of wetland acreage, then, and only then, should the City allow out-of-kind, off-site compensation within the greenway.

These Mitigation Guidelines are intended to insure the appropriateness of implementation of mitigation measure (2), (3), and (4) above. These measures can be implemented either through the environmental document (i.e., Negative Declaration or Environmental Impact Report), through the City's discretionary permit approvals, or through the necessary permit procedures mandated by regulatory agencies other than the city.

## 8.5 TYPES OF COMPENSATORY ACTIONS

There are three major compensatory mitigation options: restoration, enhancement, and creation. These may be defined as follows:

1. **Restoration** entails returning a wetland or natural area from a disturbed condition. For instance, under extreme circumstances, particularly disturbed areas may no longer be classified as wetlands. Typically there is a need to alter the hydrologic environment for successful restoration.
2. **Enhancement** means to increase one or more functions or values that an existing wetland or natural area possesses. Examples of functions and values that could be increased include flood management, water quality improvement, habitat, and passive recreational opportunities. Typically, enhancement entails removal of exotic plants and replanting with native species, as appropriate soils and hydrologic conditions already exist on site.
3. **Creation** of a wetland involves the conversion of a persistent upland (usually grassland) area into a wetland or riparian area, commonly through grading and alteration of the hydrologic regime. This presumes that the area has not recently been a wetland; otherwise, such actions would be considered a restoration.

Restoration projects for wetlands and riparian corridors have been successful where the requisite hydrologic characteristics were preserved or returned to the disturbed site. This often requires removing fill material, breaching dikes, reopening tide gates, breaking drain tiles, or allowing abandoned water courses to flow once again. A frequent problem in wetland restoration is the intrusion of unwanted plant species which became established while the mitigation site was upland, but which may persist in or about wetlands. Typical nuisance species in the Petaluma area include giant reed, French broom, Himalayan blackberry, acacia trees, lombardy poplar, and weeping willow. Restoration plans for wetlands should address this issue.

Like restoration, enhancement generally has a better chance for success when designed properly since physical conditions, such as soil moisture regime, soils conditions, and wetlands hydrology already exists. Enhancement is only appropriate as mitigation, however, for seriously degraded areas which possess few or limited functions or values. It is important to recognize that existing, difficult to replicate functions (e.g., riparian wildlife habitat and water quality protection) may be more valuable than easy to replicate functions (ponded waterfowl habitat).

Generally speaking, artificial creation of high quality wetland has been only partially successful. The limited success of wetland creation has been attributed to a number of factors, including inadequate criteria by which to evaluate success, failure of regulators to provide sufficient enforcement and monitoring of mitigation measures, and loss of habitat diversity. Frequently, inadequate consideration of soil conditions or inadequate design of the altered hydrologic environment are the root causes of technical failure.

Since restoration and enhancement of the greenway are major goals of the River Plan, and the Plan provides reliable methods of increasing habitat value and function, properly designed restoration and enhancement projects can count toward meeting mitigation obligations. However, there should be no net loss in the total acreage of wetland, riparian, or oak woodland habitat within the river corridor.

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## 8.6 RESTORATION DESIGN GUIDELINES

The Habitat Restoration Design Guidelines outlined in Chapter 5 should be used in planning mitigation designs for the greenway to insure that the specified plant communities are created, restored, or enhanced properly, transitions between communities are achieved within the greenway (i.e., riparian woodland to oak grassland) and that habitat diversity is maximized. Inclusion of vernal pools and seasonal wetlands within the zone prescribed for oak woodland is an example of an acceptable design that provides additional habitat diversity, while at the same time it is recognized that placement of seasonal wetlands within the "willow zone" or their use to the subsequent total exclusion of the oak woodland zone is not desirable. The mitigation design must therefore be carefully integrated with the enhancement and restoration of the surrounding greenway, considering existing and potential site resources, physical conditions and constraints. In particular, the mitigation design must consider the existing natural geographic features or landscape position (as expressed in the site soils and topography) in selecting and siting proposed plant communities and habitat.

It is important that personnel within the City's regulatory functions are familiar with current restoration practices. They should try to insure optimum design and compliance with the restoration goals of the River Plan, as well as assist the development community to understand their intent.

## 8.7 REQUIRED MITIGATION PLAN

When a significant natural resource is destroyed or substantially altered, an acceptable mitigation plan must be prepared which includes consideration of mitigation through replacement or compensation on a proportionate basis. Ratios at greater than a 1:1 replacement represent the risks and uncertainties associated with successfully recreating fully functional, self-sustaining ecosystems. Losses in value from habitat fragmentation and reduction in diversity are also considered, along with temporal losses.

Mitigation ratios may vary if it is demonstrated that there are overriding biological or ecological reasons to increase or reduce the ratio, and/or if use of a different ratio is approved by all permitting agencies. In all cases, the ratio for mitigation must be determined by the appropriate responsible agency prior to the impact occurring.

Typically, a buffer (commonly 40-50 feet in width) is required surrounding formally designated Section 404 wetland mitigation sites. Depending on the location of the created wetland, a portion of the greenway can be considered as meeting the mitigation buffer requirement.

Although it is a City preference that impacts within the river planning corridor are mitigated within this corridor, the greenway is also available for use as a mitigation site for appropriate off-setting impacts from other unrelated projects in the watershed. For projects in the Petaluma River watershed outside the jurisdiction of the City for which it is desired to create new wetlands and other natural area within the greenway, the mitigation ratio will be determined by the appropriate lead agency in consultation with the regulatory agencies and the City.

### **Use of Resource Restoration and Enhancement Actions as Compensatory Mitigation Credits**

Resource restoration and enhancement, including such actions as removal of exotic species and interplanting of native trees and shrubs, can be used to partially satisfy mitigation ratios required by the City or other responsible agencies, provided that there is no net loss in wetland acreage, function, and value.

### **Recognition of In-Advance Mitigation Banking**

Typically, mitigation ratios required by responsible agencies have assumed mitigation construction contemporaneously with project impacts and thus have factored in a 2:1 compensation to reflect temporal losses (see Section 8.2, Goal II, Policy #2).

The City encourages mitigation in advance of the impact and will therefore consider waiving temporal loss compensation requirement for all restoration/enhancement/creation projects successfully completed within the greenway in advance of project construction initiation (groundbreaking or grading activities). Mitigation ratios can thus be reduced through in-advance mitigation, and also factoring in restoration/enhancement credits.

The greenway can also be utilized as an "informal mitigation bank" for offsetting impacts from other projects within the River Corridor, provided that for the parcel to be impacted, a rough estimate of impacted acreage is presented, project proponents are identified in advance, appropriate mitigation alternatives analysis are presented, other provisions of these guidelines are met, and approval is granted by all responsible agencies. All this information should be detailed in the proposed Mitigation Plan. It is not the City's intent that the greenway serve routinely as a "formal mitigation bank" in which mitigation credits are created, and bought and sold abstractly, without specific identification of projects and impacted parcels. Specific proposals for establishment of "mitigation banks" may, however, be formulated in coordination with appropriate resource and regulatory agencies.

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## 8.8 COMPONENTS OF MITIGATION PLANS

Mitigation plans should perform the following tasks and in a manner appropriate for the nature of the resource, the impact and the sites involved:

1. Define the site location, kind, amount, and value of habitats to be lost and created. Specify the proposed compensatory ratio, considering kind and quality of habitat to be impacted, and present information on mitigation alternatives considered, as outlined in Section 8.5.
2. Identify and evaluate existing site conditions, particularly hydrology and soils.
3. For wetland sites, document the provision of seasonally adequate water (of a quality that meets appropriate regulatory standards) to maintain wetland hydrologic conditions in perpetuity.
4. Formulate detailed plans on plant sources, planting density, plant tolerances and requirements, soil amendments and plant establishment techniques, and proper grading of slopes.
5. Integrate bank stabilization and erosion control plans, where appropriate.
6. Develop detailed site maintenance program for pest control, weeding, fertilizing, supplemental watering, and where necessary, plant replacement.
7. Identify specific criteria which will be used to measure ecological success of the project, for example, plant survival, species composition, bio-mass, hydrology, soil biochemistry, and wildlife usage.
8. Establish natural reference site to evaluate success in achieving functional equivalency.
9. Establish specific procedures to evaluate success, monitoring and contingency plans, and implementation and enforcement of permit conditions (e.g., consider bonding requirements).
10. Consideration of methods to increase resource value through a combination of restoration, enhancement, and creation of greenway resources.
11. Include contingency plans in mitigation program. The most likely types of site failure should be identified, and appropriate remedial actions should be specified.

## 8.9 IMPLEMENTATION AND COORDINATION

These guidelines in general, and the approval of use of the Petaluma River corridor as a natural resources mitigation site for a project would be administered through the CEQA process with approval of the Mitigation Monitoring Plan prepared for the project. The City or other lead agency will circulate the CEQA document and Mitigation and Monitoring Plan for review and comment.

Staff is encouraged to work with the Southern Sonoma Resource Conservation District, Sonoma County Water Agency, Sonoma County Open Space District, Department of Fish and Game, U.S. Corps of Engineers, U.S. Fish and Wildlife Service, and the development community to insure protection, restoration, and enhancement of the river greenway. Future planning efforts and individual project review may identify areas within the greenway which could be used for mitigation in accordance with these guidelines, and identify unique parcels which could either be: (1) acquired and set aside for the permanent restoration and protection of resources; (2) enhanced with the cooperation of the land owner by community volunteer groups; (3) or public lands which can be enhanced through grant funding.

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# CHAPTER 9.0

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This chapter contains recommendations for site planning, building and open space relationships, architecture, and landscape design within the area covered by the River Plan. These should be used as criteria for preparing and reviewing development proposals, including expansions to existing uses, within the plan area.



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# DESIGN GUIDELINES

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These guidelines are intended to create an integrated development pattern and themes while allowing design flexibility. Design specifics are left up to individual architects, landscape architects, and developers who are encouraged to design creative projects within these general guidelines.

There are six segments of the river identified in the River Plan. Each segment has unique attributes that will help govern the relationship between the natural and built environments. In order to meet the overall goals of the river plan, new development in the River Oriented Development Zone should observe the following four design principles:

1. Site and building design should recognize and complement the unique character of each river segment.

2. Site and building design should maximize visual and physical access to the river greenway while respecting the riparian corridor's integrity and sensitivity.
3. Views of the river greenway and its tributaries should be ever-present from the developed areas, and be the focus of building and site design.
4. Site landscaping should be consistent in character with the natural landscape of the river greenway of that particular segment.

Typical landscape design concepts that screen and separate buildings from the natural landscape should be avoided. Planting design around buildings and developed areas should instead extend and complement the natural river landscape. Site development such as parking, storage, loading, and outdoor plazas or patios should be designed as an integral part of the site and located appropriately. All activity areas should be designed as "respectful guests" within the natural landscape.

It is important that the development of riverfront properties respect and take full advantage of the river setting. Whether capitalizing on the historic urban development patterns and architectural styles within the downtown and warehouse districts or using the scenic wonder of a protected oak woodland as an attraction to an office environment, benefits can and should be derived by the site's proximity to the river. Where properties are situated between a road and the river, the river must be treated with the same or better design considerations as the street frontage.

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## 9.1 GUIDELINES FOR SPECIFIC AREAS AND DESIGN ELEMENTS

### 1. SITE PLANNING AND BUILDING DESIGN.

- a. **Lot Coverage.** Building coverage and paved areas should be minimized and fragmented to the extent possible to reduce the potential for direct runoff into adjacent wetland areas. Building and paved areas should be sited in clusters to provide suitable light and space between them.
- b. **View Corridors.** Buildings should be sited in clusters or tiered to protect and maximize view corridors to the river and Sonoma Mountains.
- c. **Building Heights.** Buildings and structures should be reviewed for their compatibility with the surrounding natural area and should not adversely affect the visual quality of these features. Buildings over one story in height should be stepped back from the public access corridor, especially near the preservation areas in order to minimize the mass of the building and the sense of encroachment into open space and natural areas.
- d. **Relationship to Streets.** In areas where a lot has frontage adjacent to both a street and natural conservation area, the building design should take advantage of its river setting with equal facade treatment, windows, and other design features which create interaction with the natural setting. Service areas should be screened from streets and from the river trail to the greatest extent feasible.
- e. **Internal Open Space.** On-site open space can be used as a unifying element, especially in large parcel development. Open spaces should be continuous through any one development and should logically connect individual developments or parcels with neighboring parcels and with the proposed trail network. Location of open space areas should consider sun exposure, wind protection, and offer seating areas with opportunities to view adjacent natural areas.
- f. **Parking Areas.** Parking areas need not be consolidated in one area of a particular lot, but may be separated by landscaping and building elements. Landscaped areas should be provided in and around parking areas to the greatest extent feasible for visual relief and to the "heat sink" of large expanses of pavement. Trees should be selected and located so as to connect the "natural" riparian system and the "urban" landscaping.
- g. **Entry/Gateways.** Buildings at gateways designated in the river plan should be oriented and designed to reinforce the gateway concept. These buildings will be highly visible and will set the tone for future development in the area. Special landscape paving and signage treatments should also be utilized to reinforce the gateway concept.

- h. Construction and Materials.** Building designs should be innovative and reflect the unique environment of each river segment. Typical industrial developments utilizing box-like concrete tilt-up buildings with minimal architectural interest are discouraged. Where tilt-up construction is used, appropriate texture and form should be required. Facades of high quality, architectural-grade steel, masonry, corrugated iron and concrete, relieved with reveals, moldings, and punched openings are encouraged in most river segments. The use of durable natural and traditional materials, such as sandblasted concrete, smooth stucco, corrugated steel and unfinished masonry, should be encouraged if designed to fit the natural setting. Prefabricated metal buildings should not be permitted unless an exception is made by the Site Plan and Architectural Review Committee based on exceptional building detailing, compatibility with its surroundings (e.g., in the Warehouse District), and site design.

## 2. LIGHTING

Lighting guidance is provided to protect the naturalness or the river greenway, some portions of which may remain lit. The following recommendations pertain to RODZ development.

- a. **Site Lighting.** All outdoor lighting should be directed down and screened away from adjacent properties, streets and habitat restoration areas unless such spillover is desirable to illuminate a public area. Lights should not cause glare or excessive light spillage to adjacent sites. Intensity should be no greater than is required for vehicle and pedestrian safety. The heights of light standards should be the minimum required to efficiently light parking areas, building entries, and walkways. Lights should be kept to a scale comfortable to humans (e.g., 10'-12' heights).
- b. **Accent Lighting.** Exterior architectural and site lighting should be used to highlight the facility's entrances and architectural and landscape features. Lighting directed upward should be concealed or otherwise positioned in such a manner that the light source cannot be seen from any property line of the site on which the light is located. Lighting of architecture, graphics, or natural features should not spill light onto adjacent properties or natural areas. Lighting should double-function as much as possible to reduce the number of lights (e.g., building lights also illuminate walkways).

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- c. **Walkway Lighting.** Standard, pole, bollard and wall-mounted fixtures should be allowed. Pole and wall-mounted fixtures mounted above six feet (6') should be of down-light or cut-off type.
  - d. **Parking Area Lighting.** Light standard heights should not exceed the height of the eaves of the building(s) which the parking area serve unless necessary to accommodate special vehicles. All lighting fixtures should be restricted to down-light or cut-off types. Sodium, or mercury vapor, or other lighting of a similar white glare color should not be used.
  - c. A limited palette of major plant species can effectively create a strong, clear image of the corridor and reinforce the identity of each river segment. Plant species should be visually compatible with each segment's riverfront conditions. Native species adapted to the climate and region are preferred.
  - d. Use of natural paving materials, textures and colors can enhance the character of pedestrian areas and relate them to the natural setting.
  - e. Maintenance programs should be developed for landscaped areas that recognize the special nature of the area. On-going or heavy use of fertilizers, herbicides, and pesticides should be limited in areas that drain directly to the river.

### 3. LANDSCAPE DESIGN

Although landscape for individual site developments may vary in character, materials and design, the natural riparian landscape (as described for each river segment) should be the unifying design concept for the River Oriented Development Zone.

- a. Landscape design should respond to the natural conditions found near the river. The use of native grasses, appropriate trees, and other indigenous plant materials is encouraged.
- b. All landscape design should be designed to minimize negative impacts on natural restoration areas.
- f. **Irrigation.** Low water-use plant materials and well-controlled irrigation systems should be used. Automatic irrigation systems should be installed in all landscaped areas unless otherwise noted for a particular river segment. Plants with similar irrigation needs should be grouped together and automatic irrigation systems separated into zones accordingly. The irrigation systems should be designed to avoid overspray and runoff into natural areas and under native oaks.

- g. Gateway Planting.** Where roadways cross the river, views of the river should be framed and maintained. These gateways can be emphasized with planting, signage appropriate to the area, and special paving treatments. The planting should be consistent with that along the greenway, but further strengthened to incorporate the planting theme if any of the adjacent roadway. If not consistent, landscaping should accentuate its river location.
- h. Public Access Design Elements.** Design elements in public access areas such as benches, information kiosks, and bicycle racks should be few and simply designed, consistent with either the natural riverfront environment or historic urban riverfront. Natural or recycled materials should be used wherever possible.
- i. Handicapped Access.** All public access facilities, including but not limited to telephones, paths, trails, restrooms, drinking fountains, parking, gates, signing and seating, should be designed to be accessible to people with mobility handicaps and safe for use by people with visual and auditory handicaps. All features of every plan containing public access facilities should be reviewed to ensure that the intended accessibility and safety have in fact been provided for.

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## CHAPTER 10.0

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Shown in this chapter are the estimated total costs of access and enhancement improvements within each segment of the greenway that may be the responsibility of public agencies. Public costs, except for the high priority projects in the vicinity of downtown, are expected to occur over a long period of time. Likely sources of public funding are listed in Chapter 4. Those features which may require total or partial public funding are noted by an asterisk (\*).

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# COST ANALYSIS

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The costs delineated in this chapter are generalized, of necessity, but consistent with the level of detail shown in a conceptual plan of this type. They provide an "order-of-magnitude" budget for the major elements of the river plan, and a framework for the implementation strategy. They are not a site by site determination of the possibility for mitigation and improvement.

The estimates are based upon the Preferred Plan which was presented to the Citizen Advisory Committee in April, 1993, with select alterations to reflect revisions made for the Draft Area Plan. Costs have been upgraded to 1995 levels by the Consumer Price Index multiplier, and additional project features requested by the CAC have been included.

Omitted from these costs are improvements that would likely happen whether or not the River Plan were adopted. However, cost allowances are made in this analysis for certain incremental expansions of these improvements to accommodate River Plan recommendations.

Public costs omitted from this analysis include:

- Public roadway improvements such as Petaluma Boulevard North, Stony Point Road, Rainier Avenue Extension, Washington Street, Copeland Street, Weller Street, Lakeville Street.
- City Sidewalk Improvements
- Bridge improvements such as Payran Street Bridge, Lakeville Street Bridge, Railroad Bridge at Lakeville, Utility bridge crossing at Copeland, "D" Street Bridge.
- Flood Protection
- Downtown Parking Lot\Structure
- Future Transit Structure
- C.O.E. Dredging
- Mitigations for these and other public projects.

Also omitted from this cost element are those costs borne by the private sector because they are impossible to separate from site development expenses. Since private contributions will occur on a property-by-property basis over several decades, their calculation in sum at this time makes little sense. A discussion of the projected ability of properties to absorb improvements recommended by the River Plan is found in Chapter 4, Implementation.

## SUMMARY:

## TOTAL POTENTIAL PUBLIC COSTS

LOCATION	TRAIL & AMENITIES	PARK IMPROVEMENTS	HABITAT ENHANCEMENT	BANK STABILIZATION	TOTAL
Upstream	\$841,000	\$632,000	\$972,000	\$50,000	\$2,495,000
Payran	\$796,000	\$372,000	\$0	\$0	\$1,168,000
Lakeville	\$265,000	\$0	\$17,000	\$113,000	\$395,000
Downtown	\$2,935,000	\$22,000	\$168,000	\$249,000	\$3,374,000
Warehouse	\$3,030,000	\$0	\$41,000	\$0	\$3,071,000
Downstream	\$1,545,000	\$2,476,000	\$1,410,000	\$225,000	\$5,656,000
	\$9,412,000	\$3,502,000	\$2,608,000	\$637,000	\$16,159,000



ITEM	QUANT	UNIT	PRICE	PUBLIC COST	TOTAL PUBLIC COST
<b>UPSTREAM SEGMENT</b>					
<b>I. CONSTRUCTION</b>					
<b>A. TRAIL</b>					
1. Standard 8' asph. w/ 4' shldr. & grading					
* Stony Point Road	3,075	LF	\$20.00	\$61,500	
Private Property					
Tentative (Parcels 75 & 76)	2,100	LF			
Proposed	23,035	LF			\$61,500
2. Trail bridges					
a. Long span (over Lynch Creek) (150')	1	EA	\$250,000.00	\$250,000	
b. Short span (tributaries) (50')	5	EA			
* c. Road bridge enlargement (Stony Point Road and Rainesville, for terraced channel)	2	EA	\$50,000.00	\$100,000	\$350,000
* 3. Gateway improvements			allow	\$60,000	\$60,000
4. Amenities					
a. Benches (2 per 1/2 mile)	20	EA			
b. Lighting (trail only)	25,135	LF			
c. Trash encl. (1 per 1/2 mile)	10	EA			
* d. Interp. facilities			allow	\$15,000	
e. Security fence (1/2 private trail length)	12,568	LF			
f. Access control					
g. Bicycle parking (2 per mile on river)	10	EA			
* h. Staging area (1/2 acre)	2	EA	\$50,000.00	\$100,000	\$115,000
Total Trail & Amenities					\$586,500
Construction Contingency - 20%					\$117,300
Total					\$703,800
Design, Specifications, Proj. Admin - 10%					\$70,380
City Administration - 10%					\$70,380
SUBTOTAL - Trail Construction (Potential Public Cost)					\$844,560
* B. PARK (4 acres, neighborhood)	173,056	SF	\$2.50	\$432,640	\$432,640
Construction Contingency - 20%					\$86,528
Total					\$519,168
Design, Specifications, Proj. Admin - 10%					\$51,917
City Administration - 10%					\$51,917
SUBTOTAL - Park Construction (Potential Public Cost)					\$623,002

\* Project may require all or partial public funding.

10.0 Cost Analysis

ITEM	QUANT	UNIT	PRICE	PUBLIC COST	TOTAL PUBLIC COST
<b>UPSTREAM SEGMENT</b>					
<b>C. HABITAT ENHANCEMENT</b>					
Willowbrook & Denman Reaches (additional to Flood Control Mitigation)					
1. Riparian restoration (.60/sf @ 20' wide each side 50% of banks)					
Riparian Restoration					
Total	21600	LF			
* Public: assume up to 10%	2160	LF	\$12.00	\$25,920	
Total Riparian Restoration - W/B Denman Reach					\$25,920
2. Buffer landscape					
Total	1,213,000	SF			
* Public: assume up to 50%	606,500	SF	\$0.60	\$363,900	
Total Buffer - W/B Denman Reach					\$363,900
3. Channel and aquatic improvement (1/2 total length)					
Total Habitat Enhancement - W/B Denman Reach	5,400	LF			\$389,820
Corona Reach					
1. Riparian restoration					
a. River (.60/sf @ 20' wide each side)					
Total	17,000	LF			
* Public: assume up to 10%	1,700	LF	\$12.00	\$20,400	
Riparian Restoration (River) - Corona Reach					\$20,400
b. Tributaries (.60/sf @ 30' includes both sides)					
Total	3,800	LF			
c. Lynch Creek (.60/sf @ 20' wide each side)					
Total	2,400	LF			
* Public: assume up to 50%	1,200	LF	\$12.00	\$14,400	
Riparian Restoration (Lynch Creek) - Corona Reach					\$14,400
Total Riparian Restoration - Corona Reach					\$34,800
2. Buffer landscape					
Total	1,894,000	SF			
* Public: assume up to 20%	378,800	SF	\$0.60	\$227,280	
Buffer (River) - Corona Reach					\$227,280
b. Tributaries (1900 lf @ 100' wide)					
Total	190,000	SF			
c. Lynch Creek					
Total	96,000	SF			
* Public (south side @ 30' wide): assume up to 40%	38,400	SF	\$0.60	\$23,040	
Buffer (Lynch Creek) - Corona Reach					\$23,040
Total Buffer - Corona Reach					\$250,320
3. Channel and aquatic habitat					
Total Habitat Enhancement - Corona Reach	12,300	LF			\$285,120
Total Upstream Habitat Enhancement					
Construction Contingency - 20%					\$674,940
Total					\$134,988
Design, Specs., Proj. Admin - 10%					\$809,928
City Administration - 10%					\$80,993
SUBTOTAL - Habitat Enhance. Construction (Potential Public Cost)					\$80,993
					\$971,914

Project may require all or partial public funding.

ITEM	QUANT	UNIT	PRICE	PUBLIC COST	TOTAL PUBLIC COST
<b>UPSTREAM SEGMENT</b>					
<b>D. BANK STABILIZATION</b>					
Willowbrook & Denman Reaches (included in Flood Protection figures)					
Corona Reach					
1. Natural bank @ 2.5:1 (1/8 length)	3,075	LF			
2. Protected slope @ 1.5:1 (w/ riprap or bioengineered assume 1/8 length)	3,075	LF			
3. Public: assume up to 10% of total reach				allow	\$35,000
Total Bank Stabilization					\$35,000
Construction Contingency - 20%					\$7,000
Total					\$42,000
Design, Specifications, Proj. Admin. - 10%					\$4,200
City Administration - 10%					\$4,200
SUBTOTAL - Bank Stabilization (Potential Public Cost)					\$50,400
<b>II. FLOOD PROTECTION</b>					
Privately funded					
<b>III. APPROXIMATE TOTAL BUFFERS</b>					
A. Trail & Amenity R.O.W. (not in flood channel)	10.0	acres			
B. Non-Trail Buffer (Does not include Buffer in Parcels 73, 188, 189, 192, 199, 202-205, 216, 217, 218)	67.8	acres			
C. Entire Parcels 188, 189, 192, 199, 202-205, & 216, See Supporting Figures)	6.5	acres			
D. Gateways	2.0	acres			
E. Staging Areas (2) (1 additional coincides w/ Park & Ride)	1.0	acre			
Total					87.3 acres
<b>IV. MAINTENANCE</b>					
A. Total 20' wide Trail R.O.W. (includes trail in flood channel)	13.0	acres			
B. Non-Trail Buffer	67.8	acres			
C. Entire Parcels 73, 188, 189, 192, 199, 202-205, 216, 217, 218	6.5	acres			
D. Gateway	2.0	acres			
E. Staging	1.0	acres			
F. Flood Control R.O.W.					
Willow Brook & Denman Reach	40.0	acres			
Corona Reach	11.0	acres			
Total Maintenance					141.3 acres

\* Project may require all or partial public funding.

10.0 Cost Analysis

ITEM	QUANT	UNIT	PRICE	PUBLIC COST	TOTAL PUBLIC COST
<b>PAYRAN RESIDENTIAL SEGMENT</b>					
<b>I. CONSTRUCTION</b>					
<b>A. TRAIL</b>					
1. Standard 8' asph. w/ 4' shldr. & grading					
COE flood maintenance., road - paving only	2,600	LF	\$18.00	\$46,800	
Private (Twin Creeks)	750	LF			\$46,800
* 2. Madison Street sidewalk upgrade for trail	2,400	LF	\$13.00	\$31,200	\$31,200
* 3. Trail bridges					
a. Long span (Edith Street)	1	EA	\$250,000.00	\$250,000	
b. Short span (Washington Creek)	1	EA	\$75,000.00	\$75,000	
					\$325,000
* 4. Bridge underpass (Payran) (EST)			allow	\$50,000	\$50,000
* 5. Amenities					
a. Benches/picnic tables (2) per mi.	2	EA	\$800.00	\$1,600	
b. Lighting (trail only)	3,350	LF	\$25.00	\$83,750	
c. Trash enclosures (1) per 1/2 mi.	1	EA	\$800.00	\$800	
d. Interpretive facilities			allow	\$8,500	
e. Access control			allow	\$5,000	
					\$99,650
					\$552,650
					\$110,530
					\$663,180
					\$66,318
					\$66,318
					\$795,816
<b>B. PARK (add'l. park improvements by other jurisdictions)</b>					
<b>Archaeological/Historic Site</b>					
* 1. Site improvements (informal, unstructured incl. access	103,400	SF	\$2.50	\$258,500	\$258,500
Construction Contingency - 20%					\$51,700
					\$310,200
					\$31,020
					\$31,020
					\$372,240

\* Project may require all or partial public funding.

ITEM	QUANT	UNIT	PRICE	PUBLIC COST	TOTAL PUBLIC COST
<b>PAYRAN RESIDENTIAL SEGMENT</b>					
C. HABITAT ENHANCEMENT (COE project)					
D. BANK STABILIZATION & FLOOD CONTROL (COE project)					
II. FLOOD PROTECTION (Payran & Lakeville COE project)					
III. APPROXIMATE TOTAL BUFFERS					
A. Trail & Amenity R.O.W. (non-COE along Wash. Creek)	0.5	acres			
B. Non-Trail Buffer (non-COE along Wash. Creek)	0.36	acres			
C. Park Site (City)	2.5	acres			
D. Park Site (COE)	2.5	acres			
E. Maintenance Road R.O.W. (COE)	1.8	acres			
Total	7.66	acres			
IV. MAINTENANCE					
A. Trail & Amenity R.O.W. (non-COE along Wash. Creek)	0.5	acres			
B. Non-Trail Buffer (non-COE along Wash. Creek)	0.36	acres			
C. Park Site (City)	2.5	acres			
D. Park Site (COE)	2.5	acres			
E. Maintenance Road R.O.W. (COE)	1.8	acres			
F. Floodway R.O.W. (COE)	9.8	acres			
Total Acreage	17.46	acres			
Trail on City sidewalks	2,800	LF			

10.0 Cost Analysis

ITEM	QUANT	UNIT	PRICE	PUBLIC COST	TOTAL PUBLIC COST
<b>LAKEVILLE INDUSTRIAL SEGMENT</b>					
<b>I. CONSTRUCTION</b>					
<b>A. TRAIL</b>					
1. Standard 8' asph. w/ 4' shldr. & grading					
* Madison Street extension	450	LF	\$20.00	\$9,000	
* Access to proposed future park	225	LF	\$20.00	\$4,500	
* Water Street upstream of Washington	960	LF	\$20.00	\$19,200	
East Bank upstream of Washington	450	LF			\$32,700
* 2. Lakeville Street sidewalk upgrade for trail	1,770	LF	\$13.00	\$23,010	\$23,010
* 3. Trail bridges					
a. Long span (improved access @ exist. utility crossing)			allow	\$75,000	\$75,000
* 4. Amenities					
a. Lighting	1,725	LF	\$25.00	\$43,125	
b. Interpretive facilities			allow	\$5,000	
c. Security fence			allow	\$5,000	
					\$53,125
Total Trail & Amenities					\$183,835
Construction Contingency - 20%					\$36,767
Total					\$220,602
Design, Specifications, Proj. Admin - 10%					\$22,060
City Administration - 10%					\$22,060
SUBTOTAL - Trail Construction (Potential Public Cost)					\$264,722
<b>B. HABITAT ENHANCEMENT (beyond limits of COE Flood Protection Project)</b>					
1. Riparian Restoration - Plant Banks (.60sf @ 20' wide-1side)					
a. Upstream of Washington St.					
East Bank (1/2 total, remainder in Bank Stabilization)	480	LF			
* West Bank (1/2 total, remainder in Bank Stabilization)	480	LF	\$12.00	\$5,760	
2. Buffer Landscape					
a. Upstream of Washington St. (20' average width)					
East Bank	19,200	SF			
* West Bank	9,600	SF	\$0.60	\$5,760	
Total Habitat Enhancement					\$11,520
Construction Contingency - 20%					\$2,304
Total					\$13,824
Design, Specs, Project Administration - 10%					\$1,382
City Administration - 10%					\$1,382
Sub-Total Habitat Enhancement (Potential Public Cost)					\$16,588
<b>C. BANK STABILIZATION (beyond limits of COE Flood Protection Project)</b>					
1. Protected slope @ 1.5:1 w/ riprap & vegetation					
a. Upstream of Washington St.					
* West Bank (1/2 total, remainder in Habitat Enhancem	480	LF	\$38.00	\$18,240	
East Bank (1.2 total, remainder in Habitat Enhancem	480	LF			

Project may require all or partial public funding.

ITEM	QUANT	UNIT	PRICE	PUBLIC COST	TOTAL PUBLIC COST
<b>LAKEVILLE INDUSTRIAL SEGMENT</b>					
2 Seawall Repair					
a. Upstream of Washington St.					
West Bank	200	LF	\$300.00	\$60,000	
East Bank	200	LF			
Total Bank Stabilization					\$78,240
Construction Contingency - 20%					\$15,648
Total					\$93,888
Design, Specs, Project Administration - 10%					\$9,389
City Administration - 10%					\$9,389
Sub-Total Bank Stabilization (Potential Public Cost)					\$112,666
II. FLOOD PROTECTION (COE Project Protection)					
III. APPROXIMATE TOTAL BUFFERS					
A. Non-trail buffer	0.5	acres			
B. Maintenance Road R.O.W. (COE)	1.1	acres			
Total	1.6	acres			
IV. MAINTENANCE					
A. Non-trail buffer	0.49	acres			
B. Maintenance road R.O.W. (COE)	1.1	acres			
C. Floodway R.O.W. (COE)	3	acres			
Total acreage	4.6	acres			
D. Trail on city sidewalks (Madison & Lakeville St.)	2,800	LF			

\* Project may require all or partial public funding.

10.0 Cost Analysis

ITEM	QUANT	UNIT	PRICE	PUBLIC COST	TOTAL PUBLIC COST
<b>DOWNTOWN SEGMENT</b>					
<b>I. DOWNTOWN TRAIL</b>					
<b>A. TRAIL</b>					
1. Standard 8' asph. w/ 4' shldr. & grading					
a. Greenway Trail					
* Golden Eagle	525	LF	\$20.00	\$10,500	\$10,500
Ash Bag	600	LF			
* 2. Amphitheater (@ end of 'C' Street)			allow	\$125,000	\$125,000
3. Boardwalks					
* Golden Eagle	1,080	LF	\$800.00	\$864,000	
* South Bank	525	LF	\$800.00	\$420,000	
					\$1,284,000
* 4. Floating Docks			allow	\$20,000	\$20,000
* 5. Special Paving (Water Street)	5,200	SF	\$15.00	\$78,000	\$78,000
* 6. Stabilized & Repaired Railroad Trestle (for trail use)	500	LF	\$400.00	\$200,000	\$200,000
* 7. Gateway improvements			allow	\$50,000	\$50,000
* 8. Amenities					
a. Benches (4 per .5 mile, trail only)	4	EA	\$800.00	\$3,200	
b. Lighting (trail only)	5,205	LF	\$25.00	\$130,125	
c. Trash encl. (4 per 1/2 mile)	12	EA	\$800.00	\$9,600	
d. Interp. facilities			allow	\$20,000	
e. Access control			allow	\$5,000	
f. Bicycle parking	12	EA	\$250.00	\$3,000	
h. Staging area (1/2 acre)	2	EA	\$50,000.00	\$100,000	
(incorporate one in new downtown parking garage)					\$270,925
					\$2,038,425
					\$407,685
					\$2,446,110
					\$244,611
					\$244,611
SUBTOTAL - Trail Construction (Potential Public Cost)					\$2,935,332

\* Project may require all or partial public funding.



ITEM	QUANT	UNIT	PRICE	PUBLIC COST	TOTAL PUBLIC COST
<b>DOWNTOWN SEGMENT</b>					
<b>B. PARK</b>					
* Existing City Property @ Turning Basin Site Improvements	5,192	SF	\$3.00	\$15,576	\$15,576
Total Park Construction					\$15,576
Construction Contingency - 20%					\$3,115
Total					\$18,691
Design, Specs., Proj. Admin. - 10%					\$1,869
City Administration - 10%					\$1,869
SUBTOTAL - Park Construction (Potential Public Cost)					\$22,429
<b>C. HABITAT ENHANCEMENT</b>					
1. Riparian restor. - plant exist. banks (.60/sf @ 20' wide - 1 side)					
* a. Golden Eagle (Non-fixed dock areas)	1,125	LF	\$12.00	\$13,500	
Total Riparian Restoration					\$13,500
2. Buffer landscape					
* a. Golden Eagle (10' aver. width)	11,250	SF	\$0.60	\$6,750	
b. Ash Bag (10' aver. width)	6,000	SF			
Total Buffer					\$6,750
* 3. Channel and aquatic improvement (1/2 total length)	800	SF	\$3.00	\$2,400	\$2,400
* 4. Marsh Restoration (10' wide strip 1/4 total length of banks, and existing marsh @ Turning Basin)	25000	SF	\$3.75	\$93,750	\$93,750
Total Habitat Enhancement					\$116,400
Construction Contingency - 20%					\$23,280
Total					\$139,680
Design, Specs., Proj. Admin - 10%					\$13,968
City Administration - 10%					\$13,968
SUBTOTAL - Habitat Enhancement (Potential Public Cost)					\$167,616

\* Project may require all or partial public funding.

10.0 Cost Analysis

ITEM	QUANT	UNIT	PRICE	PUBLIC COST	TOTAL PUBLIC COST
<b>DOWNTOWN SEGMENT</b>					
<b>D. BANK STABILIZATION</b>					
1. Rework Protected Slope with Riprap & Vegetation					
a. Ash Bag	600	LF	\$38	\$22,800	
2. Seawall Repair					
* a. Kiwanis Dock & Downstream to 'D' St.	500	LF	\$300	\$150,000	
Total Bank Stabilization					\$172,800
Construction Contingency - 20%					\$34,560
Total					\$207,360
Design, Specs., Proj. Admin - 10%					\$20,736
City Administration - 10%					\$20,736
SUBTOTAL - Bank Stabilization (Potential Public Cost)					\$248,832
<b>II. FLOOD PROTECTION</b>					
	NONE				
<b>III. APPROXIMATE TOTAL BUFFERS</b>					
A. Trail & Amenity R.O.W. (not in floodway)	1.50	acres			
B. Non-Trail Buffer (upstream of Washington St.)	0.50	acres			
C. Gateways	0.50	acres			
Total	2.50	acres			
<b>IV. MAINTENANCE</b>					
A. Trail & Amenity R.O.W. (not in Floodway)	1.50	acres			
B. Non-trail Buffer	0.47	acres			
C. Gateways	0.50	acres			
D. Trail in Floodway (Fixed Docks)	1.17	acres			
E. Water Surface (Mean High Tide)	7.70	acres			
F. Channel Banks	2.68	acres			
Total	14.02	acres			
G. Trail on City Sidewalks, outside of Greenway	6,550	LF			

\* Project may require all or partial public funding.

ITEM	QUANT	UNIT	PRICE	PUBLIC COST	TOTAL PUBLIC COST
<b>WAREHOUSE SEGMENT</b>					
<b>I. CONSTRUCTION</b>					
<b>* A. TRAIL</b>					
1. Std. 8' asph. w/ 4' shldr. & grading (Thompson Creek)	200	LF	\$20.00	\$4,000	\$4,000
2. Sidewalk upgrade for trail	3,800	LF	\$13.00	\$49,400	\$49,400
3. Trail bridges - across Thompson Creek	1	EA	\$150,000.00	\$150,000	\$150,000
4. Boardwalks	1,600	LF	\$800.00	\$1,280,000	\$1,280,000
5. "G" and "H" street improvements	2	EA	\$200,000.00	\$400,000	\$400,000
6. Floating docks			allow	\$30,000	\$30,000
7. Dolphins	20	EA	\$5,000.00	\$100,000	\$100,000
<b>8. Amenities</b>					
a. Benches	12	EA	\$800.00	\$9,600	
b. Lighting	1,975	LF	\$25.00	\$49,375	
c. Trash enclosures	8	EA	\$800.00	\$6,400	
d. Interpretive facilities			allow	\$10,000	
e. Security fence (1/2 private property)	987	LF	\$10.00	\$9,870	
f. Access control			allow	\$5,000	
g. Bicycle parking	2	EA	\$200.00	\$400	
					Subtotal - Amenities
					\$90,645
					Total Trail & Amenities
					\$2,104,045
					Construction Contingency - 20%
					\$420,809
					Total
					\$2,524,854
					Design, Specifications, Proj. Admin - 10%
					\$252,485
					City Administration - 10%
					\$252,485
					<b>SUBTOTAL - Trail Construction (Potential Public Cost)</b>
					<b>\$3,029,825</b>
<b>B. HABITAT ENHANCEMENT</b>					
1. Buffer landscape (1/4 bank length @ 25' average)	12,500	SF			
* 2. Marsh Restoration (Thompson Creek)	7,500	SF	\$3.75	\$28,125	\$28,125
					Total Habitat Enhancement
					\$28,125
					Construction Contingency - 20%
					\$5,625
					Total
					\$33,750
					Design, Specifications, Proj. Admin - 10%
					\$3,375
					City Administration - 10%
					\$3,375
					<b>SUBTOTAL - Habitat Enhancement (Potential Public Cost)</b>
					<b>\$40,500</b>
<b>C. BANK STABILIZATION</b>					
1. Protected slope - 1.5:1 (w/ riprap and veg. where appropriate)	2,000	LF			
2. Seawall repair	700	LF			

\* Project may require all or partial public funding.

10.0 Cost Analysis

ITEM	QUANT	UNIT	PRICE	PUBLIC COST	TOTAL PUBLIC COST
<b>WAREHOUSE SEGMENT</b>					
II. FLOOD PROTECTION	None				
III. APPROXIMATE TOTAL BUFFERS					
A. Trail and amenity R.O.W. (Thompson Creek top-of-bank)	0.1	acres			
B. Non-trail buffer (Thompson Creek top-of-bank)	0.05	acres			
D. 'G' and 'H' street improvements (City Property)	0.1	acres			
Total	0.25	acres			
IV. MAINTENANCE					
A. Trail and amenity R.O.W. (Thompson Creek top-of-bank)	0.1	acres			
B. Non-trail buffer (Thompson Creek top-of-bank)	0.05	acres			
C. Trail R.O.W. in floodway (Boardwalks)	0.9	acres			
D. G' and 'H' street improvements	0.1	acres			
Total acreage	1.15	acres			
E. Trail on city sidewalks	3,800	LF			

\* Project may require all or partial public funding.

ITEM	QUANT	UNIT	PRICE	PUBLIC COST	TOTAL PUBLIC COST
<b>DOWNSTREAM SEGMENT</b>					
<b>I. CONSTRUCTION</b>					
<b>A. TRAIL</b>					
1. Standard 8' asph. w/ 4' shldr. & grading					
a. Greenway Trail					
* McNear Peninsula	5,340	LF	\$20.00	\$106,800	
* Kasler -proposed property to be dedicated to public agency prior to development	1,980	LF	\$20.00	\$39,600	
McNear Hill - Proposed	1,575	LF			
* SPRR - Proposed	1,200	LF	\$20.00	\$24,000	
* Marina Trail - Proposed	1,725	LF	\$20.00	\$34,500	
Kasler - Tentative	2,250	LF			
Shamrock - Tentative	2,700	LF			
West Bank (Van Bebber etc.) - Tentative	2,100	LF			
Total Greenway Trail				\$204,900	
b. Non-Greenway Trail					
Chinese Mission Connector - proposed	450	LF			
* Hopper Street - Proposed upgrade for trail	3,900	LF	\$20.00	\$78,000	
Kasler Connector East - Tentative	1,350	LF			
Kasler Connector Central - Tentative	1,500	LF			
Shamrock Connector - Tentative	600	LF			
Total Non-Greenway Trail				\$78,000	
* c. Allowance for Railroad Crossing near Marina			allow	\$10,000	
Total Trail					\$292,900
2. Sidewalk upgrade for trail					
* Petaluma Blvd.	3,440	LF	\$13.00	\$44,720	\$44,720
3. Trail Bridge					
* a. Long Span @ Marina & @ McNear Penin.	2	EA	\$250,000.00		\$500,000
* 4. Floating Docks @ McNear			allow		\$150,000
5. Dolphins @ McNear	5	EA	\$5,000.00	\$25,000	\$25,000
6. Amenities					
a. Benches (2 per .5 mile, trail only)	24	EA			
b. Lighting (trail only)	21,330	LF			
c. Trash encl. (1 per 1/2 mile)	10	EA			
* d. Interp. facilities			allow	\$10,000	
e. Access control					
f. Bicycle parking (2 per mile)	6	EA			
* g. Staging area (1/2 acre)	1	EA	\$50,000.00	\$50,000	
h. Security Fence (1/4 trail length)	6,668	LF			
Total					\$60,000
Total Trail & Amenities					\$1,072,620
Construction Contingency - 20%					\$214,524
Total					\$1,287,144
Design, Specs., Proj. Admin. - 10%					\$128,714
City Administration - 10%					\$128,714
SUBTOTAL - Trail Construction (Potential Public Cost)					\$1,544,573

\* Project may require all or partial public funding.

10.0 Cost Analysis

ITEM	QUANT	UNIT	PRICE	PUBLIC COST	TOTAL PUBLIC COST
<b>DOWNSTREAM SEGMENT</b>					
<b>B. PARK @ MCNEAR PENINSULA</b>					
* Natualistic with min. development	1,146,496	SF	\$1.50		\$1,719,744
Construction Contingency - 20%					\$343,949
Total					\$2,063,693
Design, Specs., Proj. Admin. - 10%					\$206,369
City Administration - 10%					\$206,369
SUBTOTAL - Park (Potential Public Cost)					\$2,476,431
<b>C. HABITAT ENHANCEMENT</b>					
1. Riparian restor. - see bank stabilization					
2. Buffer landscape					
a. Proposed					
* Kasler (1980lf @ 60' wide aver. in property to be dedicated to public agency prior to development)	118,800	SF	\$0.60	\$71,280	
McNear Hill (1575lf @ 30' aver.)	47,250	SF			
* SPRR (1200lf @ 30' wide aver.)	36,000	SF	\$0.60	\$21,600	
Proposed Buffer					\$92,880
b. Tentative					
Shamrock (2700lf @ 60' wide aver.)	162,000	SF			
Van Bebber etc. (2100lf @ 30' wide aver.)	63,000	SF			
Kasler (2250lf @ 60' wide aver.)	135,000	SF			
3. Marsh Restoration					
a. Downstream Banks					
20' wide (3,000lf)	60,000	SF			
* b. McNear Peninsula	216,320	SF	\$3.75	\$811,200	
* c. Kasler (Property to be dedicated to public agency prior to development) (1,000lf)	20,000	SF	\$3.75	\$75,000	
Total Marsh Restoration					\$886,200
Total Habitat Enhancement					\$979,080
Construction Contingency - 20%					\$195,816
Total					\$1,174,896
Design, Specs., Proj. Admin - 10%					\$117,490
City Administration - 10%					\$117,490
SUBTOTAL Habitat Enhancement (Potential Public Cost)					\$1,409,875

ITEM	QUANT	UNIT	PRICE	PUBLIC COST	TOTAL PUBLIC COST
<b>DOWNSTREAM SEGMENT</b>					
<b>D. BANK STABILIZATION</b>					
1. Natural Slope @ 2.5:1 w/ vegetation					
a. Downstream Banks	2,595	LF			
* b. McNear Peninsula	4,575	LF	\$7.00	\$32,025	
* c. Kasler (Property to be dedicated to public agency prior to development)	1,980	LF	\$7.00	\$13,860	
2. Rework Protected Slope					
a. Downstream Banks	4,575	LF			
* b. McNear Peninsula	800	LF	\$38	\$30,400	
3. Gabions					
a. Downstream	1,500	LF			
* b. McNear Peninsula	800	LF	\$100	\$80,000	
					\$156,285
					\$31,257
					\$187,542
					\$18,754
					\$18,754
					\$225,050
SUBTOTAL - Bank Stabilization (Potential Public Cost)					

\* Project may require all or partial public funding.

10.0 Cost Analysis

ITEM	QUANT	UNIT	PRICE	PUBLIC COST	TOTAL PUBLIC COST
<b>DOWNSTREAM SEGMENT</b>					
II. FLOOD PROTECTION					none
III. APPROXIMATE TOTAL BUFFERS					
A. Trail & Amenity R.O.W. (20' wide R.O.W.)					
1. Greenway					
a. Proposed	5.5	acres			
b. Tentative	3.2	acres			
2. Non-Greenway					
a. Proposed	3.3	acres			
b. Tentative	0.3	acres			
B. Non-Trail Buffer					
1. Proposed	2.5	acres			
2. Tentative	5.1	acres			
C. Park at McNear Peninsula	31.5	acres			
D. Staging Areas (coincide w/ Park & Ride)					none
	Total				51.4 acres
IV. MAINTENANCE					
A. Trail & Amenity R.O.W.					
1. Greenway (proposed & tentative)					
	8.70	acres			
2. Non-Greenway (Proposed & Tentative)					
	3.60	acres			
B. Non-Trail Buffer (Proposed & Tentative)					
	7.60	acres			
C. Park at McNear Peninsula					
	31.50	acres			
D. Water Surface					
	41.30	acres			
E. Marsh, Banks					
	16.70	acres			
	Total Acreage				109.40 acres
F. Trail on City Sidewalks (Petaluma Blvd.)					
	3,440	LF			



Resolution No. 96-138 N.C.S.  
of the City of Petaluma, California

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**ADOPTING THE PETALUMA RIVER ACCESS AND  
ENHANCEMENT PLAN  
AND APPROVING CERTAIN AMENDMENTS TO THE  
GENERAL PLAN TEXT, RIVER CHAPTER.**

WHEREAS, the City Council adopted the Petaluma General Plan in March 1987, and

WHEREAS, the adopted General Plan includes a program which called for the preparation of a comprehensive plan for the Petaluma River that addresses water quality, public access, habitat preservation, development review procedures, and riverfront bike and pedestrian routes.

NOW, THEREFORE, BE IT RESOLVED that in light of all information presented to the City Council, both verbal and in writing, regarding the efforts put into the preparation and public hearings for the Draft Petaluma River Access and Enhancement Plan, the Petaluma City Council hereby makes the following findings of fact:

1. The City of Petaluma General Plan, as adopted in 1987 and maintained thereafter, promotes an orderly system of growth and environmental protection within an Urban Limit Line.
2. The preparation of a River Access and Enhancement Plan is timely and appropriate given the following facts:

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a. The General Plan emphasizes the Petaluma River as a significant cultural, economic, environmental, and historic resource to be planned and reclaimed.

b. The General Plan includes many river-related goals, objectives, policies, and programs including directives to prepare a comprehensive plan for the Petaluma River.

c. The River Plan was prepared to clarify, uphold and implement General Plan directives, not to alter the Plan's basic tenets.

d. The appointed Citizens Advisory Committee aggressively solicited and considered public input, especially that of the owners of riverfront property, Technical Advisory Committee, consultants, and staff while preparing the River Plan.

e. The committee carefully considered all the issues that comprise the plan, and crafted the River Plan to maximize agreement among the committeemembers.

f. The River Plan was prepared to address specific Petaluma concerns and respond to specific site conditions.

g. The River Plan recommends a certain amount of flexibility in its implementation to best meet directives yet respond to site specific conditions.

3. The expanded Initial Study contains conditions for approval of a Negative Declaration, pages VI-1 through VI-6, which are referenced and incorporated herein.

1 NOW, THEREFORE, BE IT FURTHER RESOLVED that the Petaluma City Council,  
2 hereby approves and adopts the River Access and Enhancement Plan, as amended herein,  
3 and further approves and adopts the proposed amendments to the General Plan text, River  
4 Chapter, as follows:

5

6 Add Goal 4. Improve the waterfront in a manner consistent with the Petaluma River  
7 Access and Enhancement Plan.

8

9 Objectives:

10

11 (c) Create a riverfront route for pedestrians and bicyclists ~~on both sides of the river, at~~  
12 ~~the river's edge for its whole length in Petaluma, where feasible~~ as recommended in the  
13 Petaluma River Access and Enhancement Plan.

14

15 (f) Develop a riverfront park and cultural facilities ~~(e.g., a music shell adjacent to the~~  
16 ~~river) in downtown Petaluma~~ as recommended in the Petaluma River Access and  
17 Enhancement Plan.

18

19 (i) Preserve and protect the Petaluma River as open space, resource and habitat as  
20 shown in the Petaluma River Access and Enhancement Plan.

21

22 **Policy 1:** As development and redevelopment occur, the City shall require, if and to the  
23 extent allowed by law, ~~public access to the Petaluma River from the nearest public street~~  
24 ~~and walkways~~ riverfront improvements and maintenance as specified in the Petaluma  
25 River Access and Enhancement Plan. "Development" includes the subdivision of land.

26

27 **Policy 2:** The City shall enhance the Petaluma River and its banks as a scenic resource  
28 consistent with ~~water-related recreation~~ the policies and programs of the Petaluma River  
29 Access and Enhancement Plan.

30

1 **Policy 3:** ~~The City will designate and map specific areas along the river to be redeveloped~~  
2 ~~for public enjoyment and private use.~~ Delete.

3  
4 **Policy 6:** The City shall work with the Petaluma Music, Parks and Recreation  
5 Commission, the Chamber of Commerce, local school districts, and the Sonoma County  
6 Convention and Visitor's Bureau to identify and define the need for an outdoor cultural  
7 facility with a downtown riverfront location.

8  
9 Add Narrative to Follow Policy 6: The Petaluma River Access and Enhancement Plan  
10 suggests that the Turning Basin should act as a general gathering place to view scenery,  
11 people, and activities on the water. Larger gathering places for concerts, speeches, or  
12 other cultural events should be located off the Turning Basin, perhaps on McNear  
13 Peninsula or other downtown location.

14  
15 **Program (1):** If and to the extent allowed by law, require dedication of an easement for  
16 public access to the river for all new development or redevelopment ~~between Petaluma~~  
17 ~~Boulevard (or First Street) and the river on the west side, and between the nearest public~~  
18 ~~street and the river on the east side~~ as specified by the Petaluma River Access and  
19 Enhancement Plan.

20  
21 **Program (4):** Develop public parks and access to the water adjacent to the Petaluma  
22 River as specified in the Petaluma River Access and Enhancement Plan.

23  
24 **Program (5):** ~~Develop a marina on the river.~~ Delete

25  
26 **Program (7):** Acquire land for, and design a riverfront park ~~downtown~~ on McNear  
27 Peninsula. Develop ~~an outdoor music or cultural facility at or near~~ public access,  
28 boardwalks, and seating around the turning basin.

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30 **Program (8):** ~~Develop a~~ Implement the "River Walk" project.

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**Program (10):** ~~Establish a Citizens' Advisory Committee for~~ Encourage citizen stewardship of the river.

~~Amend following paragraph: The advisory committee or sub-committee would be responsible for working with City staff to prepare a comprehensive plan for the river, including locations of parks, pathways, and visitor amenities. The committee would select~~  
Citizens could help City staff identify desirable recreation opportunities and seek providers, and ~~The committee could~~ coordinate volunteer work for clean-up of the river banks.

**Program (12):** ~~Prepare a comprehensive plan for the Petaluma River that addresses water quality, public access, habitat preservation, development review procedures, flooding, and riverfront bike and pedestrian access. Delete~~

BE IT FURTHER RESOLVED, THAT said River Access and Enhancement Plan shall be amended to reflect the above intent and further amended to include the following text addition:

Goal *Policy* 13, page 74, add:

.....can be located. "A buffer zone setback, if and to the extent allowed by law, other than that prescribed in the following programs may be allowed where the City finds, based on substantial evidence, that the habitat and other environmental impacts of the proposed development can be mitigated, and the intent and goals of this Plan can be met, by this alternative setback."

1 BE IT FURTHER RESOLVED, that the City Council hereby finds, as to the future  
2 required dedication, easements and/or improvements, it is the intent of the City Council  
3 that these provisions shall be implemented unless specifically prohibited by law.

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Under the power and authority conferred upon this Council by the Charter of said City.

REFERENCE:

I hereby certify the foregoing Resolution was introduced and adopted by the Council of the City of Petaluma at a (Regular) ~~(Adjourned)~~ ~~(Special)~~ meeting on the 20th day of May, 1996, by the following vote:

Approved as to form




City Attorney

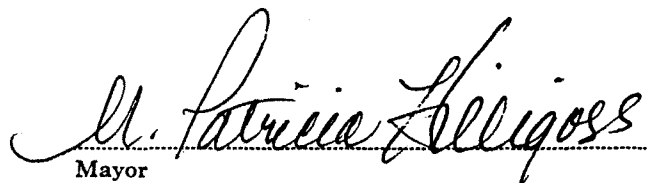
AYES: Maguire, Hamilton, Stompe, Read, Shea, Vice Mayor Barlas, Mayor Hilligoss

NOES: None

ABSENT: None

ATTEST:

  
City Clerk

  
Mayor

Council File 6  
Res. No. 96-138 N.C.S.