Santa Clara Valley Water District
And
U.S. Army Corps of Engineers, San Francisco District

UPPER GUADALUPE RIVER

FINAL FEASIBILITY REPORT
and
ENVIRONMENTAL IMPACT STATEMENT/REPORT

JANUARY 1998

UPPER GUADALUPE RIVER
FEASIBILITY STUDY FOR FLOOD CONTROL

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INTRODUCTION

This report summarizes the study process and results of the Upper Guadalupe River Flood Control Feasibility Study. The purpose of the study is to evaluate potential Federal interest in providing flood protection along five miles of the Guadalupe River between the Southern Pacific Railroad (SPRR) and Blossom Hill Road in Santa Clara County, California. Over 7,500 residential and commercial structures lie within the 100-year floodplain within the study area. Average annual flood damages in this area exceed $19,000,000. The non-Federal sponsor is the Santa Clara Valley Water District (SCVWD).

MEASURES AND ALTERNATIVES CONSIDERED

Flood protection measures which were considered included storage on upstream reservoirs, channel widening, bypass channels, levees, floodwalls, and nonstructural measures. These measures were combined to create several alternatives. The major considerations in plan development were high real estate costs and preservation of the existing riparian habitat. Those alternatives which survived the screening process are summarized below.

No Action: Under the No Action Plan, it is assumed that a Federal project would not be constructed to reduce the flood hazard in the study area boundaries.

Willow Glen Plan: This plan would increase the minimum main stem capacity downstream of Canoas Creek to 9,000 cubic feet per second (cfs). Improvements on the main stem would be limited to the lower one-mile reach of the Guadalupe River immediately upstream of the SPRR bridge. Improvements would include the replacement of two bridges and a combination of low floodwalls and bank widening. The downstream reach of Ross Creek would be channelized, and new culverts and floodwalls would be placed along Canoas Creek to address backwater effects from the mainstem Guadalupe. No recreation features are included with this plan. The net benefits for this alternative average $11,094,000 per year over the life of the project.

Valley View Plan: This plan would increase the minimum main stem capacity downstream of Canoas Creek to 12,000 cfs. Improvements on the main stem would include the replacement of four bridges and a combination of low floodwalls and bank widening. The downstream reach of Ross Creek would be channelized, and new culverts and floodwalls would be placed along Canoas Creek to address backwater effects from the mainstem Guadalupe. No recreation features are included with this plan. The net benefits for this alternative average $11,195,000 per year over the life of the project.

Bypass Channel Plan: This plan would increase the minimum main stem capacity downstream of Canoas Creek to 14,600 cfs. Unlike the other plans considered, this plan would utilize bypass channels to convey flood flows. Additional improvements on the main stem would include the replacement of five bridges and a combination of low floodwalls and bank widening. The downstream reach of Ross Creek would be channelized, and new culverts and floodwalls would be placed along Canoas Creek to address backwater effects from the mainstem Guadalupe. A multi-purpose recreational trail would be incorporated on access roads and other flood control structures of this plan. The net benefits for this alternative average $10,454,000 per year over the life of the project. This figure does not include any costs or benefits associated with the recreation features of this plan.

Each of the action alternatives would include features to mitigate adverse environmental impacts.

RECOMMENDED PLAN

The Valley View Plan has been identified as the National Economic Development (NED) plan since it maximizes the net benefits. However, the Santa Clara Valley Water District has identified the Bypass Channel Plan as the Locally Preferred Plan (LPP) since it efficiently maximizes protection with a benefit-to-cost ratio of 1.9. Providing maximum protection is particularly important given that the study area is highly urbanized and already fully developed. In addition to being very effective, the Bypass Channel Plan fully meets the Federal flood protection objectives. Therefore, the San Francisco District recommends that the Bypass Channel Plan be constructed as the Recommended Plan. However, the Federal share of the cost of the Recommended Plan will be limited to the Federal share of the cost of the NED Plan.

The first project cost of the NED Plan is $83,154,000, which is equivalent to $7,188,000 on an average annual basis at October 1997 price level. The first project cost of the Recommended Plan is $132,298,000, which is equivalent to $11,452,000 on an average annual basis at October 1997 price levels. The benefit-to-cost ratio for the Recommended Plan is 1.9 to 1. The Federal share of the first cost would be $54,050,000, and the non-Federal share would be $78,248,000. The non-Federal sponsor would be responsible for an additional payment of $2,685,000 for betterments associated with project construction.

The Recommended Plan would remove over 6,600 structures from the 100-year floodplain. Mitigation would include the replacement of approximately 30 acres of riparian forest, urban forest, wetland, and shaded riverine habitat within the study area. The mitigation plan has been coordinated with the U.S. Fish and Wildlife Service during the course of this study.

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ACRONYMS AND ABBREVIATIONS
Main Report

APN	assessor's parcel number
BAAQMD	Bay Area Air Quality Management District
BCR	benefit-to-cost ratio
CERCLA	Comprehensive Environmental Response, Compensation, & Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
DFG	California Department of Fish and Game
EIS/R	environmental impact statement/report
EQ	environmental quality (account)
FEMA	Federal Emergency Management Agency
FWS	U.S. Fish and Wildlife Service
HTRW	hazardous, toxic, and radiological waste
IDC	interest during construction
LERRD	lands, easements, relocations, rights-of-way, and disposal
MCACES	micro-computer aided cost estimating system
NAP	normal annual precipitation
NED	national economic development
NFIP	National Flood Insurance Program
O&M	operation and maintenance
OMRR&R	operation, maintenance, repair, replacement, and rehabilitation
OSE	other social effects (account)
PCA	project cost-sharing agreement
PED	preconstruction engineering and design
PSA	preliminary site assessment
RBA	risk-based analysis
RED	regional economic development (account)
SCVWD	Santa Clara Valley Water District
SPRR	Southern Pacific Railroad
SRA	shaded riverine aquatic (habitat)
UPRR	Union Pacific Railroad
USEPA	U.S. Environmental Agency

UPPER GUADALUPE RIVER FLOOD CONTROL FEASIBILITY STUDY
SAN JOSE, CALIFORNIA
FINAL REPORT

1.0 INTRODUCTION

1.1 Purpose and Scope

This report summarizes the study process and results of the Upper Guadalupe River Flood Control Feasibility Study. The purpose of the study is to evaluate potential Federal interest in providing flood protection along the Guadalupe River upstream of the Southern Pacific Railroad (SPRR) in Santa Clara County, California (see Figure 1), and to identify a feasible project which fulfills the Federal interest requirements and meets the needs of the non-Federal sponsor. Project feasibility is assessed in terms of physical, environmental, economic, and political considerations. The study area extends over five miles between the SPRR at the downstream end to Blossom Hill Road at the upstream end. Federal interest requires that a proposed project be in accordance with Federal principles and guidance, comply with applicable environmental laws and statutes, and have the support of a non-Federal sponsor who is willing and able to participate in the cost-sharing requirements for project implementation.

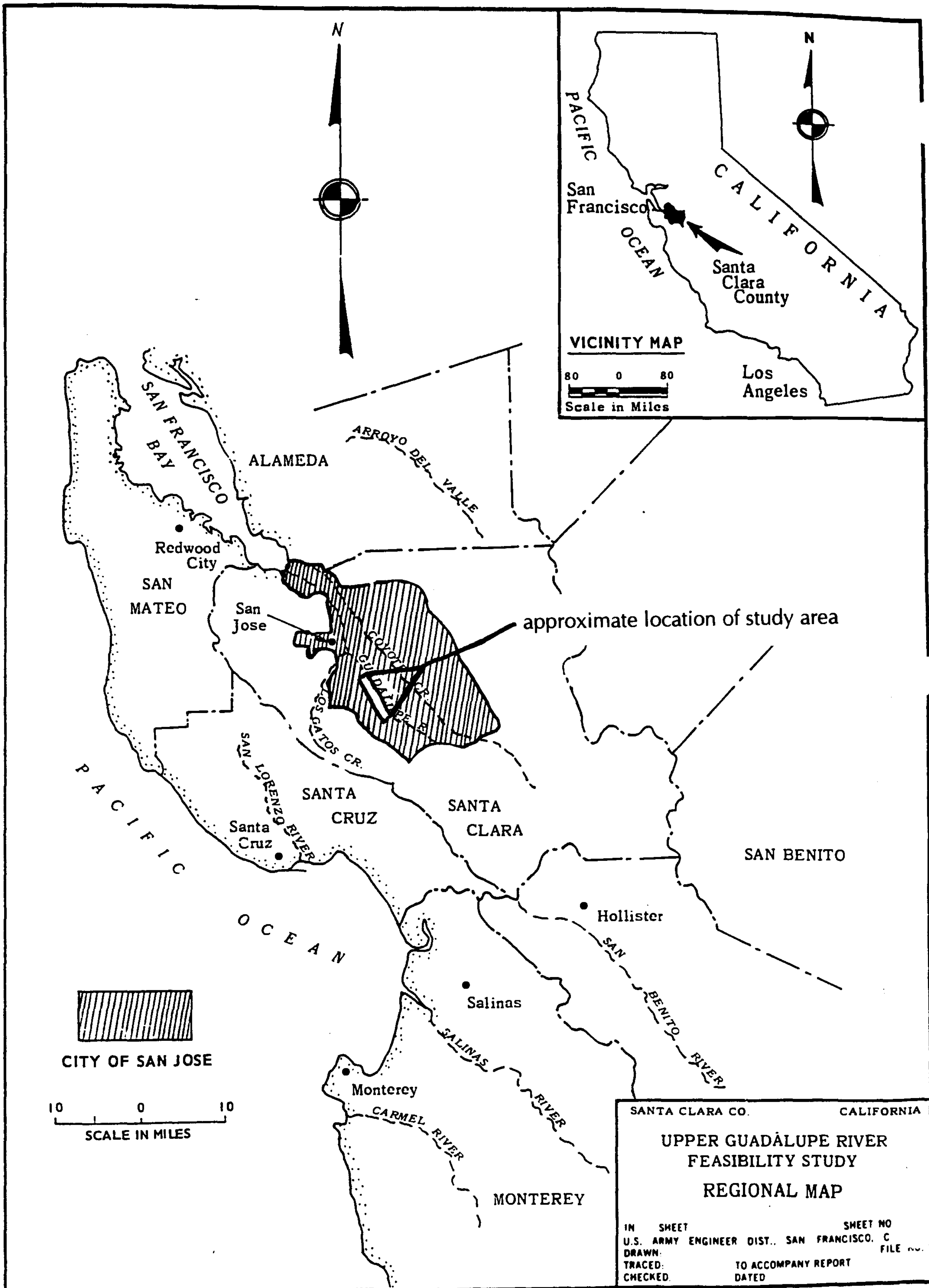
1.2 Study Authority

Section 4 of the Flood Control Act of 18 August 1941 authorized a preliminary examination of the Guadalupe River, its tributaries and adjacent streams. The authorization reads as follows:

> *"The Secretary of War is hereby authorized and directed to cause preliminary examinations and surveys for flood control, to be made under the direction of the Chief of Engineers, in drainage areas, the United States and its territorial possessions, which include the following named localities: Coyote River and tributaries, California; San Francisquito Creek, San Mateo and Santa Clara Counties, California; Matadero Creek, Santa Clara County, California; and Guadalupe River and tributaries."*

Note that the authorization refers to Coyote Creek as "Coyote River".

On 6 June 1945, the Chief of Engineers endorsed the Preliminary Examination Report of Guadalupe River and Tributaries (dated 28 February 1945). This endorsement authorized a flood control investigation of Guadalupe River, Coyote Creek, San Francisquito Creek and numerous other creeks which continued to be studied under the 1941 Guadalupe River and Adjacent Streams authorization.


N
PACIFIC
San Francisco
OCEAN
CALIFORNIA
Santa Clara County
VICINITY MAP
80 0 80
Scale in Miles
Los Angeles
SAN FRANCISCO BAY
ALAMEDA
ARROYO DEL VALLE
Redwood City
SAN MATEO
San Jose
approximate location of study area
COYOTE CR.
GUADALUPE R.
LOS GATOS CR.
SAN LORENZO RIVER
SANTA CRUZ
Santa Cruz
SANTA CLARA
SAN BENITO
PACIFIC
OCEAN
Hollister
SAN BENITO RIVER
Salinas
SALINAS RIVER
Monterey
CARMEL RIVER
MONTEREY
CITY OF SAN JOSE
10 0 10
SCALE IN MILES
SANTA CLARA CO. CALIFORNIA
UPPER GUADALUPE RIVER
FEASIBILITY STUDY
REGIONAL MAP
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CHECKED DATED

Figure 1

1.3 Study Participation and Coordination

The reconnaissance phase of this study was initiated in 1987 in response to a request from the non-Federal sponsor, the Santa Clara Valley Water District (SCVWD). Upon completion of the reconnaissance phase, the feasibility phase was initiated in 1989. The Santa Clara Valley Water District has provided continuous financial and technical support while serving as an active member of the study team. Because Federal funding is not guaranteed, or may not be timely, the SCVWD has moved forward with their own studies and design of a project. Thus, there are two studies being conducted for the same purpose - the Federal study (Corps/SCVWD), and the local study (SCVWD).

The Corps is required to investigate several different alternatives for providing flood protection. In order to optimize the size of a project (from an economical point of view) the Corps investigates several different levels of flood protection. The Corps has included a modified version of the SCVWD design as one of several alternatives under investigation. This plan is called the Bypass Channel Plan. It differs from the SCVWD plan in that it does not include any features between Highway 280 and the Southern Pacific Railroad near Willow Street. Nor does it include any features south of Blossom Hill Road. These areas were excluded from the Federal studies because they were unlikely to be economically justified.

The SCVWD studies include an Environmental Impact Report (EIR), while the Corps study includes a combined Environmental Impact Statement (EIS) and EIR. Note that an EIR is required to comply with state law, while and EIS is required to comply with Federal law. To reduce the amount of paper required to publish the Corps EIS/EIR, studies and data presented in the SCVWD EIR have been incorporated into the EIS/EIR by reference. Any reader wishing to obtain a copy of the SCVWD EIR executive summary may contact Dennis Cheong (SCVWD) to receive a copy.

The remainder of this report deals with the Corps/SCVWD study. Coordination of this study was established with the U.S. Fish and Wildlife Service (FWS), the California Department of Fish and Game (DFG), the City of San Jose, and other appropriate regional and local agencies. The FWS provided assistance in plan formulation, impact evaluation, and the development of mitigation measures.

Public Workshops and Meetings

The Santa Clara Valley Water District sponsored three public meetings in March 1989. The meetings were part of the sponsor's own planning process and were designed to solicit public comments on flood problems in the study area and possible solutions. Two of the meetings included a presentation of the Corps of Engineers planning process. Public comment forms were provided at the meetings. Over 260 people attended and 80 public comment forms were submitted. In December 1991, the local sponsor also provided the public an opportunity to review their preliminary flood control plans, and they sponsored a public hearing in April 1997, subsequent to the release of their draft Environmental Impact Report.

In January and February 1989, the Corps of Engineers chaired two meetings to announce the future study activities, and to allow other local and state agencies to aid in scoping the needs of the Environmental Impact Statement. In March and April 1991, the Corps held two public workshops to describe the ongoing flood control studies and to receive additional input from the community. A total of 70 people attended the workshops. Public concerns were raised regarding the length of the study process, the removal of homes as proposed by one of the alternatives, potential losses in environmental resources, and the potential decrease in property values due to the loss of the natural appearance of the channel. The Corps sponsored a final public meeting in October 1997.

1.4 Prior Study Reports

The Guadalupe River has a long, documented history of floods as evidenced by the number of studies and projects that have been conducted along the river. A summary of the studies pertaining to the upper Guadalupe River is provided below.

U.S. Army Corps of Engineers, San Francisco District

The following reports were prepared by the San Francisco District Office under the Guadalupe River and Adjacent Streams study authority.

1. *Phase I Report and Environmental Evaluation of Flood Control Alternatives, Guadalupe River and Adjacent Streams.* The Corps of Engineers completed this report in 1975, and circulated the document as an environmental working paper to other federal, state and local agencies; environmental organizations; and the general public. The report recommended that the hydrologic information be reviewed and corrected in subsequent efforts to reflect physical changes in the drainage basins of the study area.

2. *Progress Report on the Guadalupe River and Adjacent Streams.* This document served as an interim report and presented the findings of the investigation up to 1976. Channelization alternatives were developed for the Guadalupe River. Flood control alternatives were also identified for the "Baylands Area", where the Guadalupe River and Coyote Creek floodplains merge near San Francisco Bay.

3. *Information Brochure on Guadalupe River and Adjacent Streams Survey Investigation.* This public information brochure was released in 1976, with cooperation from the Santa Clara Valley Water District. The brochure solicited public comments on six water resource management measures developed for the river channel between Interstate 880 (formerly Highway 17) and Curtner Avenue. A questionnaire was included to help identify public preferences for proposed flood control alternatives.

4. *Hydrologic Engineering Office Report, Guadalupe River and Coyote Creek, Santa Clara County, California.* This report was completed in 1977 and serves as the basis for all subsequent hydrologic studies.

5. *Stage 2 Report on Guadalupe River and Adjacent Streams Survey Investigation.* This report (completed in 1980) presented study findings since 1972. The report found that Federal participation in a flood control project was economically justified for Guadalupe River between Interstate 880 and Park Avenue.

6. *Final Guadalupe River Interim Feasibility Report and Environmental Impact Statement.* This report (completed in 1985) presented the preliminary studies of two structural plans and the No Action plan. Two flood control alternatives for a project between Interstates 880 and 280 were determined to be economically justified for Federal participation. One alternative was identified as the National Economic Development plan and recommended for implementation. Proposed channel modifications upstream of Interstate 280 were not economically justified, due to the shallow depth of potential flooding and predominance of residential development in the floodplain.

7. *Reconnaissance Report, Upper Guadalupe River, California.* This office report (completed in November 1989) presented the findings of the reconnaissance phase of this feasibility study for providing flood protection along the upper Guadalupe River from Interstate 280 to Blossom Hill Road. The reconnaissance study focused on reevaluating two preliminary channel modification plans that had previously been considered in the 1985 Guadalupe River Interim Feasibility Report. The study resulted in carrying forward both structural alternatives, the Widened Channel Plan and the Bypass and Widened Channel Plan, for further consideration during this feasibility phase of the study. The Widened Channel plan was determined to be the most efficient alternative for providing flood control protection. The No Action plan was also carried forward as a baseline condition against which to measure the impacts of the two structural plans.

Santa Clara Valley Water District

The Santa Clara Valley Water District (SCVWD) also provided reports which were used during the various Corps of Engineers' studies.

1. *"Environmental Setting of the Watershed and Floodplains of Guadalupe River, Coyote Creek, and Their Tributaries" and "Potential Flood Damages on Guadalupe River and Coyote Creek and Adjacent Streams".* These two reports (published in 1974) constitute the SCVWD's first direct input to the Corps of Engineers investigations.

2. *Study Report for the Guadalupe River from State Route 17 to Curtner Avenue.* The report (issued in 1976) presented the SCVWD's portion of a cooperative study conducted with the San Francisco District Corps of Engineers. The report examined channelization alternatives that were previously screened in the Corps of Engineers Phase I study. The document presents design

guidelines and describes both flood control features and recreational elements. No preference for a specific plan was indicated.

3. *Guadalupe River Flood Control Planning Study.* The SCVWD's flood control planning program issued several reports in the late 1970s and early 1980s that addressed separate areas of the river. The study investigated flood control alternatives for the areas of Hillsdale Avenue to Blossom Hill Road in 1977, Coleman Avenue and Old West Julian Street in 1981, and Alviso to U.S. Highway 101 in 1982.

4. *SCVWD Draft EIR/EIS for the Upper Guadalupe River, Interstate 280 to Blossom Hill Road, February 1997.* This document analyzes impacts associated with two local flood control projects proposed to be built by SCVWD near the study area.

U.S. Army Corps of Engineers, Sacramento District

The Corps' Sacramento District Office is currently constructing portions of the downtown Guadalupe River Flood Control Project located in the vicinity of downtown San Jose, downstream of the area studied in this report. The alternatives studied in this Upper Guadalupe River Feasibility Study would pass flows through the downtown Guadalupe River Flood Control Project. The following report was prepared by the Sacramento District.

Guadalupe River General Design Memorandum. The Sacramento District Office completed this report in December 1991. Final developmental studies are presented for the Recommended Plan along Guadalupe River, between Interstates 880 and 280. The document serves as the basis for final construction plans and specifications. The project is authorized under Section 401(b) of the Water Resources Development Act of 1986 (Public Law 99-662), as amended by the Energy and Water Development Appropriations Act for Fiscal Year 1990 (Public Law 101-101).

2.0 STUDY AREA DESCRIPTION

2.1 Setting

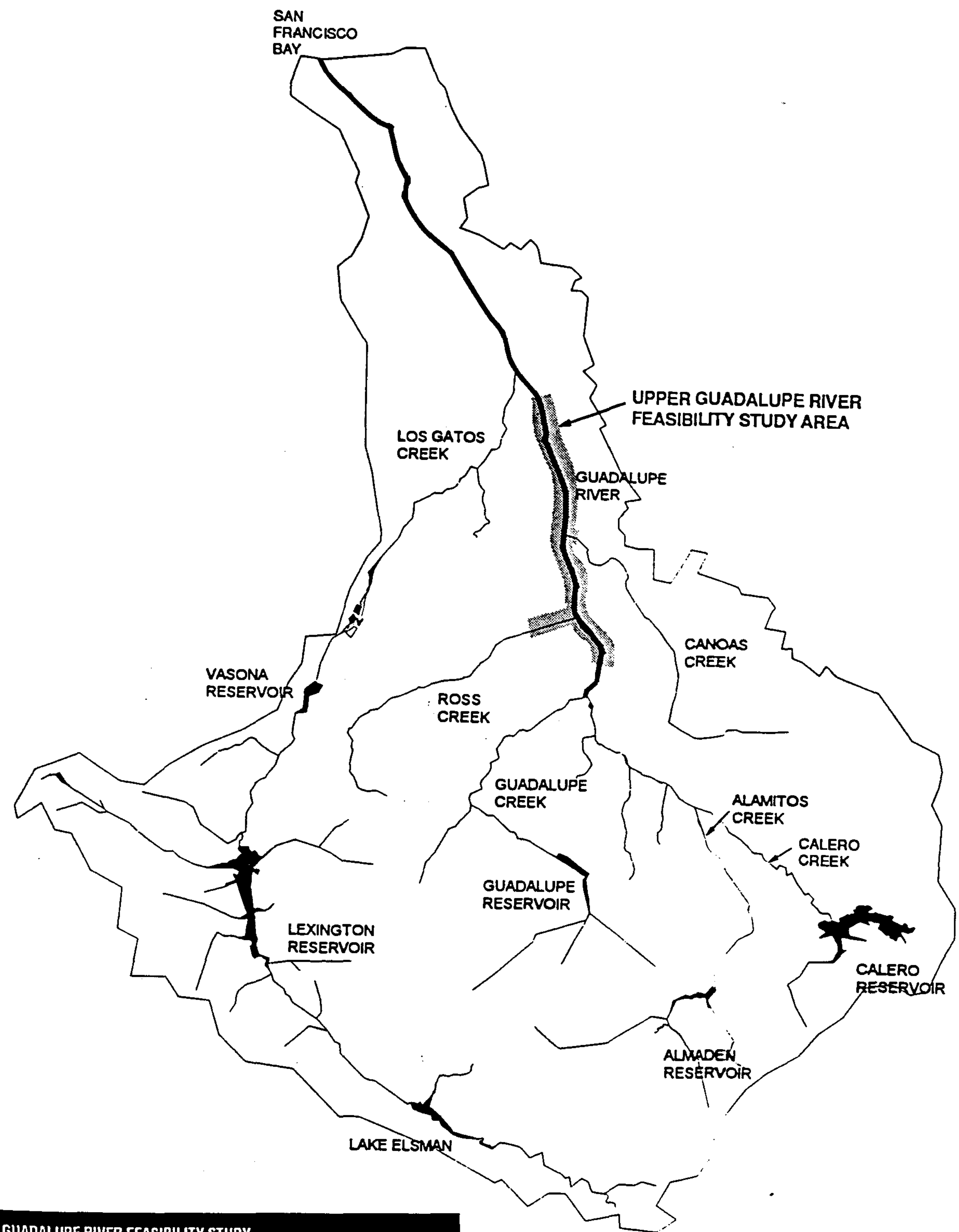
The local study area is situated in an urban area of southwestern San Jose, in the extreme southern area of the highly urbanized Santa Clara Valley. Santa Clara Valley lies in the center of Santa Clara County in west central California, immediately south of San Francisco Bay. The county is bounded on the northeast by Alameda County, on the northwest by San Mateo County and the southwest by Santa Cruz County (See Figure 1, Regional Map).

The Guadalupe River watershed (See Figure 2) is bounded on the south and southwest by the east side of the Santa Cruz Mountains, on the west by the San Tomas and Saratoga Creeks basin, on the north by the San Francisco Bay, and on the east by the Coyote Creek basin. The Guadalupe River is the second largest stream in Santa Clara County discharging into the South San Francisco Bay, draining an area of approximately 170 square miles. The river corridor passes through a region of the valley that is predominantly residential and commercial. The river flows from south to north for approximately 20 miles before emptying into San Francisco Bay. Its upstream terminus is located one-quarter mile south of Blossom Hill Road, at the confluence of Guadalupe Creek and Alamitos Creek. The upstream 5-1/2 miles of the river comprise the study area which is bounded by the Southern Pacific Railroad bridge crossing and the Blossom Hill Road Bridge (see Figure 3). The study reach has two tributaries, Ross Creek and Canoas Creek. The Guadalupe, Almaden and Calero Reservoirs are located upstream of Blossom Hill Road.

For descriptive purposes, the study area has been divided into "river reaches" and "economic areas" corresponding to the major bridge crossings and floodplain areas, respectively. River reaches are defined in Table 1 and Figure 3, and economic areas are shown in Plate 1.

Table 1: Upper Guadalupe Study River Reaches

River Reach Number	Approximate Project Station	From	To
7	740 - 781	SPRR river crossing	Union Pacific Railroad (UPRR) river crossing
8	781 - 797	UPRR river crossing	Willow Glen Way
9	797 - 843	Willow Glen Way	Curtner Avenue
10	843 - 909	Curtner Avenue	Capitol Expressway
11	909 - 940	Capitol Expressway	Branham Lane
12	940 - 1016	Branham Lane	Blossom Hill Road

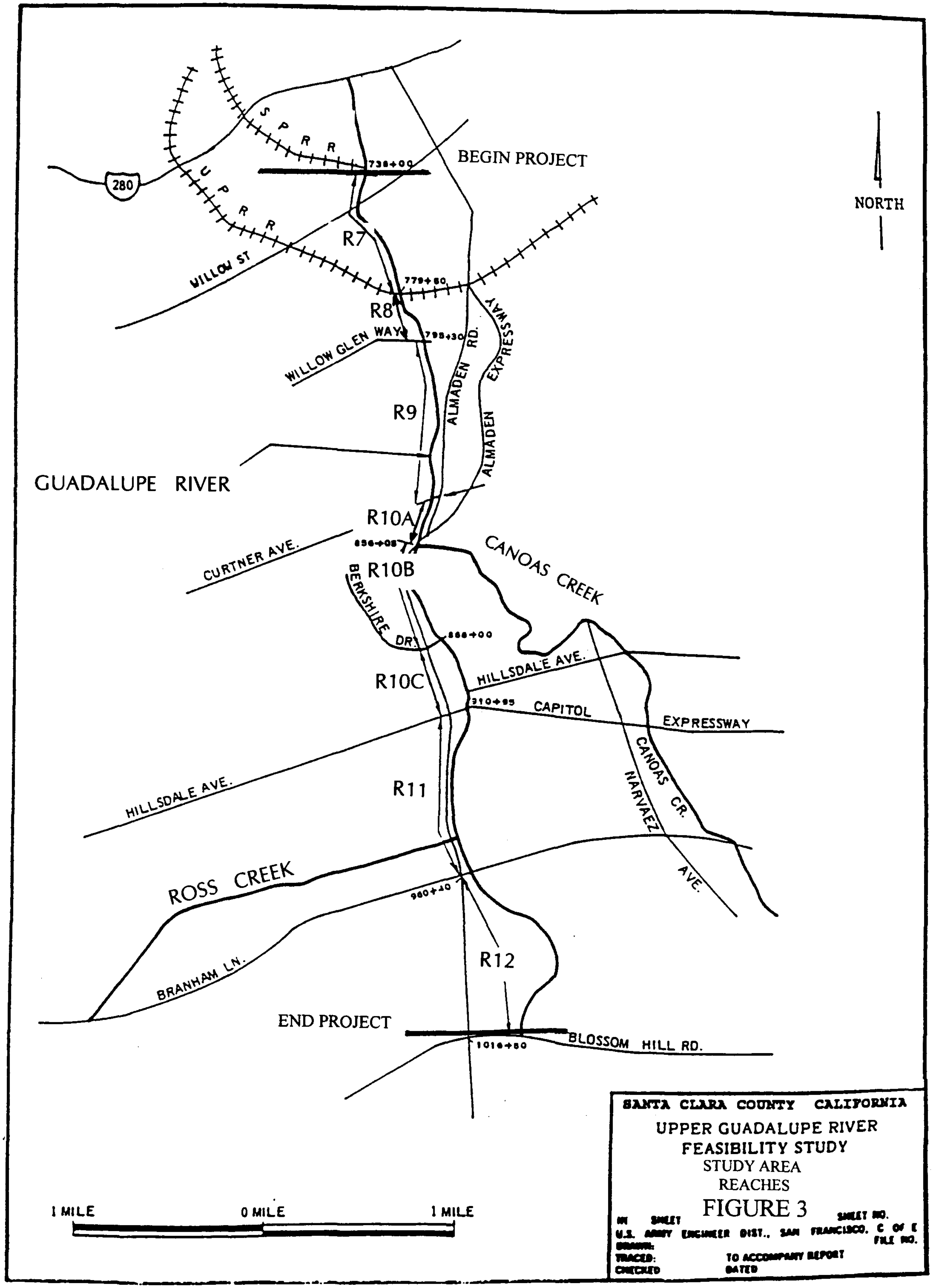


UPPER GUADALUPE RIVER FEASIBILITY STUDY

Figure 2 The Guadalupe River Watershed.

Source: Santa Clara Valley Water District, 1994

BioSystems Analysis, Inc./1995



BEGIN PROJECT
NORTH
280
S P R R
U P R R
738+00
R7
WILLOW ST
779+50
R8
WILLOW GLEN WAY
795+30
EXPRESSWAY
ALMADEN RD.
ALMADEN EXPRESSWAY
R9
GUADALUPE RIVER
R10A
CURTNER AVE.
856+08
R10B
CANOAS CREEK
BERKSHIRE DR.
886+00
HILLSDALE AVE.
R10C
910+95
CAPITOL EXPRESSWAY
CANOAS CR.
NARVAEZ AVE.
HILLSDALE AVE.
R11
ROSS CREEK
960+40
R12
BRANHAM LN.
END PROJECT
BLOSSOM HILL RD.
1016+50
1 MILE
0 MILE
1 MILE
SANTA CLARA COUNTY CALIFORNIA
UPPER GUADALUPE RIVER
FEASIBILITY STUDY
STUDY AREA
REACHES
FIGURE 3
SHEET NO.
U.S. ARMY ENGINEER DIST., SAN FRANCISCO. C OF E
FILE NO.
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TO ACCOMPANY REPORT
CHECKED
DATED

2.2 Existing Conditions

Land Use

The study area is highly urbanized. The Guadalupe River and its tributaries are flanked by widespread residential subdivisions, which are interspersed with commercial shopping centers, light industrial development, and scattered open spaces. Property improvements adjacent to the river typically encroach onto the channel banks. Figure 4 shows the approximate locations of major commercial developments and open spaces. Areas which are not identified with a specific land use are generally residential.

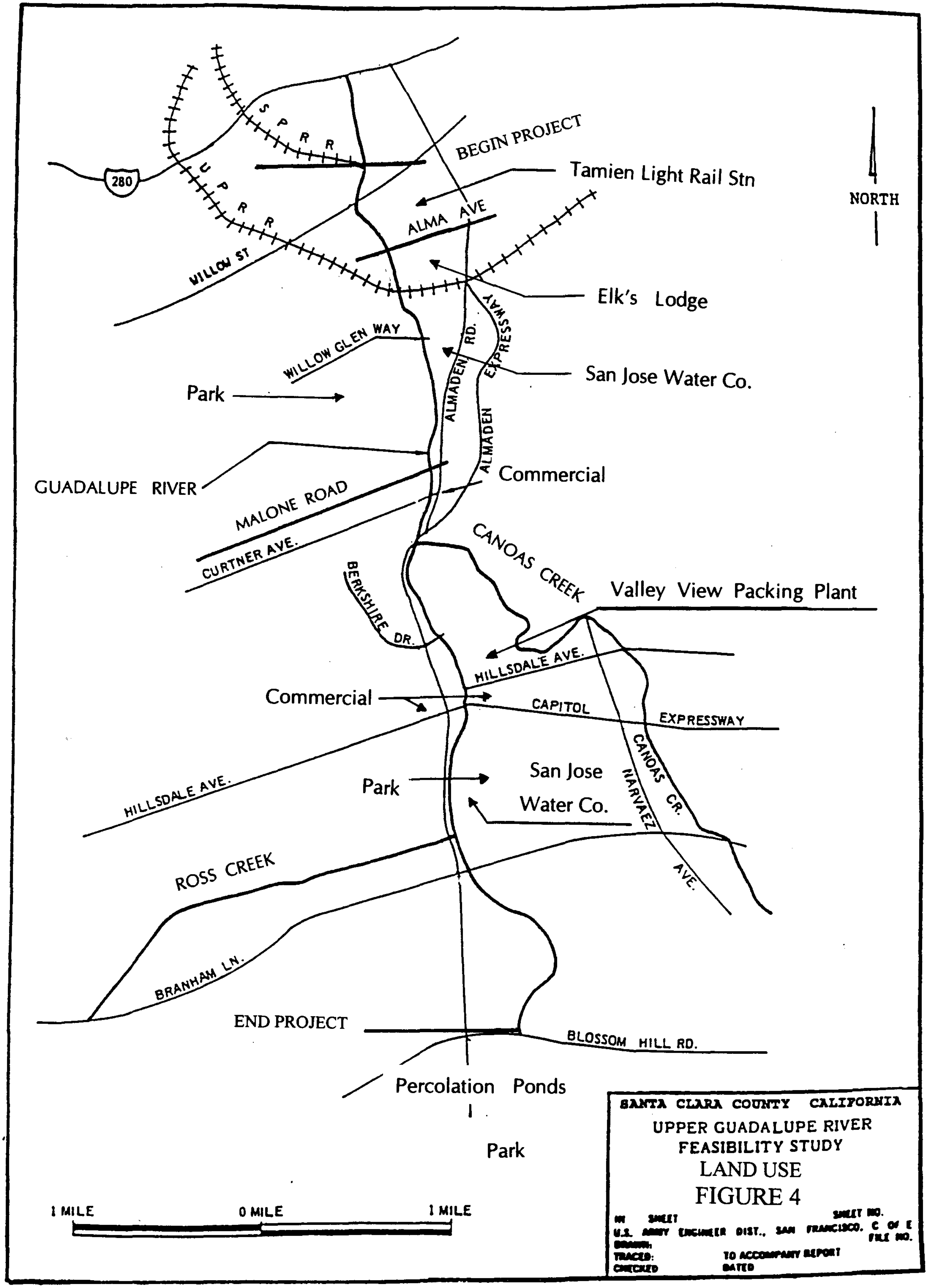
Open spaces in the study area include three city-operated neighborhood parks adjacent to the project corridor. Additional open space exists on both river banks near Blossom Hill Road where the Santa Clara Valley Water District maintains percolation ponds. These ponds are operated for groundwater recharge purposes. The Santa Clara Valley Water District also owns a half-acre parcel of property near Alma Street which is actively used as a community garden. The San Jose Water Company owns water well fields adjacent to the river in Reaches 9 and 11; both well fields are surrounded by residential development. Santa Clara County, the State of California and the Santa Clara Valley Water District all own maintenance easements along the river's banks.

Socioeconomic Conditions

Employment and Income

Prior to World War II the Santa Clara Valley supported chiefly agricultural activities and related industries. The primary produce was fruit, primarily prunes and apricots, which supported a canning industry. After the war, expansion of existing industrial facilities and an increase in new manufacturing plants began to replace agricultural activities, and many agricultural lands were lost to residential developments. Currently, only one agricultural parcel remains within the study area. In the early 1970s the invention of the silicon microchip spurred a boom in light industry, and the computer software and hardware industry has since become the dominant employment industry. This dominance has earned the region the nickname "Silicon Valley".

The industrial transformation in Santa Clara County has made the city of San Jose the center of economic activity in the San Francisco Bay Area's South Bay region. Approximately 45 percent of San Jose's total population is employed. The high technology and manufacturing industries lead the city's employment sector, accounting for 34 percent of total employment. The next largest employers are the service and the retail trade sectors which provide 26 percent and 14 percent of available jobs, respectively. Other employment sectors include government, wholesale trade, mining, construction, finance, insurance, real estate, transportation and public utilities.


S P R R
280
U P R R
BEGIN PROJECT
Tamien Light Rail Stn
NORTH
ALMA AVE
WILLOW ST
Elk's Lodge
EXPRESSWAY
WILLOW GLEN WAY
ALMADEN RD.
San Jose Water Co.
Park
ALMADEN
Commercial
GUADALUPE RIVER
MALONE ROAD
CURTNER AVE.
CANOAS CREEK
Valley View Packing Plant
BERKSHIRE DR.
HILLSDALE AVE.
Commercial
CAPITOL
EXPRESSWAY
CANOAS CR.
NARVAEZ AVE.
San Jose
Water Co.
Park
HILLSDALE AVE.
ROSS CREEK
BRANHAM LN.
END PROJECT
BLOSSOM HILL RD.
Percolation Ponds
Park
1 MILE
0 MILE
1 MILE
SANTA CLARA COUNTY CALIFORNIA
UPPER GUADALUPE RIVER
FEASIBILITY STUDY
LAND USE
FIGURE 4
U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E
TO ACCOMPANY REPORT

The high paying jobs in the "Silicon Valley" area contribute to the relatively high median incomes of Santa Clara County and San Jose, both of which are greater than the state median income. In 1990, the median household income in San Jose was $46,200, which is 14% higher than the state median of $40,500 and only 4% below the Santa Clara County median of $48,100.

Population

The city of San Jose is the largest community in Santa Clara County, accounting for more than half of the County's population. The post-war population boom increased urbanization and led to the widespread residential and commercial development of a large portion of the Santa Clara Valley. Table 2 summarizes historical population growth in Santa Clara County and San Jose. The 1993 population estimate for the city of San Jose is 822,000. Due to existing build-out, future population growth within the study area is expected to be minimal.

Table 2: Population Growth in Santa Clara County

YEAR	SANTA CLARA COUNTY POPULATION	AVERAGE ANNUAL % INCREASE OVER PRECEDING DECADE	CITY OF SAN JOSE POPULATION	AVERAGE ANNUAL % INCREASE OVER PRECEDING DECADE	PORTION OF COUNTY POPULATION IN SAN JOSE
1950	290,600	N/A	95,300	N/A	33%
1960	658,700	8.5%	204,200	7.9%	31%
1970	1,064,700	4.9%	445,800	8.1%	42%
1980	1,295,100	2.0%	628,300	3.5%	49%
1990	1,497,600	1.4%	782,200	2.2%	52%
1993	1,563,800	1.5%	822,000	1.7%	52%

Property Values

The majority of dwellings in the study area were constructed during the 20-year period following World War II. In 1990, San Jose had nearly 259,400 housing units. Recent conversion of single family units to multi-family units and increasing encroachment of businesses into the project area borders indicate that changes in usage are occurring.

The median value of homes in Santa Clara County and San Jose reflect the relatively high incomes in the area. In 1990, the median value of an owner occupied household in Santa Clara County was $289,400, and the median value in San Jose was $259,000. The average value of the homes in the study area are typical of the county average.

Recreation

There are a number of small community parks near the upper Guadalupe River. Sixteen parks are located within one mile of the study reaches. Eight of these parks are under two acres in size or are undeveloped. At present, the major recreational resources in and near the study area are the Almaden Lake Park along the Guadalupe River south of Blossom Hill Road, the Guadalupe River Park downstream of Interstate 280 (downstream of the study area), and the upstream part of reach 12 and the adjacent percolation ponds. The latter is property owned by the SCVWD which is available for undeveloped recreation.

Recreational trails are currently limited in the vicinity of the study area. There are several segments of bicycle path along the State Route 87 freeway. The Alamitos/Calero Creek Trail runs along Los Alamitos Creek upstream of the Almaden Lake Park. The Coyote Creek park chain, located several miles east of the Guadalupe River, has recreational trails. The Los Gatos Creek Trail runs from Leigh Avenue to Lexington Reservoir. The City of San Jose has planned an extensive trail network in and around the study area. Most of these planned trails are either: (1) dependent upon acquisition of a flood control right of way along the upper Guadalupe River, or (2) proposed bicycle lanes on city streets.

Public Infrastructure

Public Utilities. Water mains which serve residences and commercial establishments are located along the project route. Storm and sewer drain lines, underground telephone and television cables, and gas and electric lines also exist along the project route. Utility services are provided and operated by the San Jose Water Company, the City of San Jose Municipal Water System, the City of San Jose, Pacific Bell Company, American Telephone and Telegraph Company, Pacific Gas and Electric Company and cable television companies.

Transportation. Santa Clara County Transit provides seven bus lines in the study area and operates the southern portion of the Guadalupe Corridor Light Rail line, which is located in the median of State Highway 87. The existing use and relative location of the major streets, bridge crossings, and transportation systems within the upper Guadalupe River study area corridor are summarized in Table 3.

Table 3: Major Streets, Bridge Crossings, and Transportation Systems

Street/Railroad Name	General Orientation	River Reach	Description & Existing Use
Willow St	E-W	R7	Bridge crossing 200' D/S of local bypass terminus
Alma St	E-W	R7	Extends east of Guadalupe River. A light rail station is nearby.
UPRR	E-W	R7/R8	Railroad Bridge crossing
Willow Glen Way	E-W	R8/R9	Bridge crossing
Malone Rd	E-W	R9	New bridge crossing, designed & constructed for 100-year flood event
Curtner Ave	E-W	R9/ R10	Bridge crossing near a light rail station
Almaden Expwy	N-S	R10	Main N-S thoroughfare in study area, providing ramp access to both Interstate 280 and U/S segment of Highway 87
Hillsdale Ave	E-W	R10/ R11	Bridge crossing
Capitol Expwy	E-W	R10/ R11	Bridge crossing, near a light rail station
Branham Ln	E-W	R11/ R12	Bridge crossing, near a light rail station
Blossom Hill Rd	E-W	R12	U/S terminus of proposed project on Guadalupe River

NOTE: Many of the above streets are used by the County Transit bus system.

Water Supply

The Santa Clara Valley Water District operates three reservoirs which are located on tributaries to the Guadalupe River upstream of the study area. These reservoirs are operated for water supply and groundwater recharge purposes. Although they do not serve a flood control purpose, they provide incidental flood control storage. Groundwater is also a major water supply source within the study area. To reduce the threat of land subsidence that would be caused by excessive net withdrawal from groundwater pumping, the SCVWD operates groundwater recharge systems within the Guadalupe River watershed. These systems are based on instream and offstream percolation facilities which are operated in conjunction with the reservoirs and imported water.

2.3 Environmental Conditions

Precipitation

Precipitation data is collected from numerous stations within the study area. Data from the Los Gatos, San Jose and Santa Clara University stations were used to develop the distribution of monthly average precipitation in the basin. The periods of record for the three stations are 92, 103, and 95 years, respectively.

Normal annual precipitation (NAP) in Santa Clara County varies from 14 inches near the San Francisco Bay to 50 inches near the crest of the Santa Cruz Mountains. Virtually all of this precipitation falls as rain, and snowfalls are infrequent events. The normal annual precipitation in the Guadalupe River basin is 26 inches. Ninety percent of the rainfall occurs during the winter, in the six-month period between November and April, with January having the highest average rainfall. Refer to the Hydrology and Hydraulics Appendix for the distribution of monthly average precipitation.

Runoff

Floods on the upper Guadalupe River are primarily due to winter rain flows. Gaging station records on the Guadalupe River in San Jose for the period of 1931 to 1960 indicate that the natural average annual runoff is approximately 35,500 acre-feet. The record shows runoff ranging from zero in 1931 to over 123,000 acre-feet in 1938, which is believed to be the wettest year of record. Nearly 99% of all natural runoff occurs during the five-month period of December through April. Refer to the Hydrology and Hydraulics Appendix for the distribution of monthly average runoff.

Air Quality

The study area is located within the Bay Area Air Quality Management District (BAAQMD), which has been designated by the United State Environmental Protection Agency (USEPA) as a non-attainment area for ozone and carbon monoxide. The study area has also been designated as a non-attainment area on the State level for ozone, carbon monoxide, and inhalable particulates (PM_{10}).

Water Quality

Nonpoint source pollution is a threat to water quality in the Guadalupe River. Urban stormwater runoff typically introduces contaminants such as oil, grease, pesticides, and herbicides to the receiving river. There is sufficient mercury contamination in the river sediments for fishing to be banned by health authorities.

Increases in water temperature are attributable to the lack of shade along the riverbank due to the degradation of the riparian forest. Salmon may be less impacted than trout since salmon may migrate out of the river in the spring before water temperatures reach their summer peaks. In general, the upper reaches of the river (Reaches 10-12) provide less shade cover than the lower reaches, thus providing poor habitat for anadromous fish.

Sedimentation

A sediment study for the Guadalupe River basin was completed by a consultant, Philip Williams and Associates, in February 1996. The study found that under existing conditions, the upper Guadalupe River appears to have a fairly stable sediment transport regime. A scouring trend observed in the lower reaches of the river may be indicative of the generally sediment-starved state of the river. Upstream dams and the increased urbanization in the watershed have reduced the instream sediment transport and natural runoff sediment load of the upper Guadalupe River.

Natural Environment

Terrestrial Habitats and Wetlands. The most important wildlife habitat in the study area is riparian (streamside) forest. This habitat type is found along much of the river's length, and is the most visually distinctive feature of the river corridor in most locations. However, the portions of Canoas Creek and Ross Creek within the study area have been channelized and relocated, and do not support riparian forest.

The riparian forests in the study area have generally been degraded and fragmented. However, these riparian forests are still characterized as unusually extensive when compared to those in most other urban stream environments in the San Francisco Bay area and are still very important to wildlife. Riparian areas lacking forest provide an opportunity for mitigation of project impacts by creating new riparian forest in these areas.

Riparian forests normally support a high diversity and abundance of wildlife, due to its typically high levels of biological productivity and structural diversity. Field studies confirm a high diversity and abundance of bird life in this habitat type within the study area, but also show a low diversity and abundance of terrestrial vertebrates (Engineering-Science, Inc., 1994, Appendices WA and WB). Other terrestrial habitats in the study area, such as scrub, ruderal, and urban forest, are of lesser value to wildlife.

The local sponsor has completed a delineation of jurisdictional wetlands and other waters of the U.S. (Engineering-Science, 1995 Update, Appendix V-B). Within the study area, these categories are generally limited to the bottom parts of river and creek channels and percolation ponds. Small areas of freshwater marsh habitat found at some locations in the river channel bottom provide comparatively high habitat values for fish and wildlife.

Plates showing the existing vegetation types within the study area by river reach are contained in the accompanying Environmental Impact Statement/Report (EIS/R) and are summarized in Table 4. This table clearly illustrates that Ross and Canoas Creeks have minimal terrestrial habitat value, while Reach 9 has the greatest riparian forest acreages. Freshwater marsh habitat is limited within the study area. Reach 12, with 2.75 acres, has the only significant amount of such habitat.

Wildlife Resources. Terrestrial vertebrates have relatively low population and limited diversity in the study area. Field studies revealed sixteen mammal species, including nine native species. Six species of reptiles and amphibians have been noted, of which five are native.

Although terrestrial vertebrates are not abundant, a diverse variety of birds exist, and many species are abundant. Ninety species have been observed along the study reaches (Engineering-Science, Inc., 1994, Appendices WA and WB). Birds are most abundant in the river corridor areas that have multi-layered canopies of tall trees. The presence of old cottonwood trees, commonly having heart rot and trunk cavities, increases the availability of habitat for cavity-nesting birds.

Aquatic Habitat. Within the aquatic ecosystem of the Guadalupe River, the primary area of concern is shaded riverine aquatic (SRA) cover, which is associated with riparian forest along the river banks. In the Santa Clara Valley, SRA cover is essential for the maintenance of self-sustaining populations of cold-water fish species such as salmonids.

The SRA cover in the Guadalupe River has been considerably degraded and reduced in extent. This situation primarily affects salmonids, which are a sensitive resource of significant public and regulatory concern. There is considerable potential for improvement of SRA cover along the river. This potential represents an opportunity for mitigating the impacts of structural alternatives.

Fishery Resources. The non-estuarine portions of the Guadalupe River system are currently inhabited by a total of 28 fish species, 10 of which are native. Table 5 lists the native and non-native fish within the study area. The only salmonids present are Chinook (or king) salmon and rainbow/steelhead trout. Steelhead trout are the same species as rainbow trout, but are anadromous (they spawn in fresh water but spend their adult lives in the ocean).

Chinook salmon and their redds (nests) have been observed at various locations along the Guadalupe River, especially in the downtown reach of the river. Overall aquatic habitat conditions in the Guadalupe River are generally marginal for salmon; it is not known to what extent the salmon observed in the river are the result of *successful* local reproduction, as opposed to being strays from other streams.

Unconfirmed observations of steelhead trout redds have been made in the study area, but summer water temperatures within this portion of the river system are generally too high for rainbow trout and for steelhead trout, whose young spend their summers in fresh water. As a result, rainbow trout are not normally found in the study area, and it is doubtful that the steelhead trout observed here represent a self-sustaining population.

TABLE 4 Acreage of existing vegetated habitats within the Upper Guadalupe River Feasibility Study Area.

	Acres Per Reach									
Habitat Type	**7**	**8**	**9**	**10**	**11**	**12**	**Ross Creek**	**Canoas Creek**	**Total Acres**	**Percent of Total**
Riparian Forest	4.43	1.66	8.97	7.34	7.41	2.28	0.00	0.00	34.96	36%
Freshwater Marsh	0.00	0.00	0.00	0.68	0.04	2.75	0.00	0.00	3.72	4%
Ruderal Herbaceous	0.21	0.02	0.08	4.29	2.64	15.36	2.63	0.97	26.36	27%
Ruderal Scrub	1.29	0.00	0.48	3.90	3.59	4.17	0.00	0.00	14.00	14%
Upland Landscaping	0.35	0.05	0.00	4.55	1.01	1.51	0.00	0.03	8.50	9%
Urban Forest	0.00	1.97	0.80	0.00	0.00	0.00	1.11	0.79	9.23	10%
Total	6.28	3.70	10.33	20.76	14.69	26.07	3.74	1.79	96.77	100%

Source: SCVWD and CE 1994.

Notes: The three other habitat types in the study area (unvegetated, revetment, and river) are not included in this table.
The accuracy of measurements is within approximately 5% of the stated values.
The percentage values have been rounded.

Table 5: Fish Species of the Guadalupe River

Type	Common Name	Scientific Name
Anadromous	Chinook (king) salmon	*Oncorhynchus tshawytscha*
Anadromous	Steelhead trout	*Oncorhynchus mykiss*
Anadromous	Pacific lamprey	*Lampetera tridentata*
Resident	Resident Rainbow trout	*Oncorhynchus mykiss*
Resident	Sacramento sucker	*Catostomus occidentalis*
Resident	Three-spined stickleback	*Gasterosteus aculeatus*
Resident	Hitch	*Lavinia exilicauda*
Resident	California roach	*Lavinia symmetricus*
Resident	Prickly sculpin	*Cottus asper*
Resident	Riffle sculpin	*Cottus gulosus*
Resident	Brown bullhead*	*Ameiurus nebulosus*
Resident	Smallmouth bass*	*Micropterus dolomieu*
Resident	Largemouth bass*	*Micropterus salmoides*
Resident	Black bullhead*	*Ameiurus melas*
Resident	Black crappie*	*Pomoxis nigromaculatus*
Resident	White crappie*	*Pomoxis annularis*
Resident	Green sunfish*	*Lepomis cyanellus*
Resident	Pumpkinseed*	*Lepomis gibbosus*
Resident	Bluegill*	*Lepomis macrochirus*
Resident	Redear sunfish*	*Lepomis microlophus*
Resident	Mosquitofish*	*Gambusia affinis*
Resident	Goldfish*	*Carassius auratus*
Resident	Carp*	*Cyprinus carpio*
Resident	Threadfin shad*	*Dorosoma petenense*
Resident	Channel catfish*	*Ictalurus punctatus*
Resident	Rainwater killfish*	*Lucania parva*
Resident	Inland silverside*	*Menidia beryllina*
Resident	Golden shiner*	*Notemigonus crysoleucas*

* Non-native species.

The highest quality salmonid habitat in the Guadalupe River watershed is found upstream of the study area (above Blossom Hill Road) in several tributaries. However, there are several obstacles to fish passage that limit (to varying degrees) the ability of fish to move up the river. The most significant of these is a 13.5-foot-high drop-structure located above Blossom Hill Road, which prevents anadromous fish from reaching habitat farther upstream. The SCVWD plans to provide a ladder at the drop structure prior to the year 2000. Other obstacles are located in Reach 10/11 at Hillsdale Avenue, upstream of the confluence of Canoas Creek and the Guadalupe River in Reach 10, and downstream of the confluence of Ross Creek and the Guadalupe River in Reach 11 (see Figure 5). These lesser obstacles hinder the upstream movement of fish primarily at low flows.

Endangered and Threatened Species. No federally listed endangered species are known to exist in the study area. However, one sighting of an endangered peregrine falcon was recorded in 1987. One recently listed threatened species, the California red-legged frog, could exist in the study area, although SCVWD surveys have failed to find any. A second species, the steelhead trout, has recently been listed as a threatened species. This species is known to exist in the area. Six candidate species, listed in Table 6 may exist in the study area.

Cultural Resources. The Santa Clara Valley is abundant in cultural resources from the prehistoric and historic periods. The current project area of potential effect has been investigated through archaeological survey, and an inventory of surface sites has been completed. One of the identified sites within the area of potential effect has been determined to be eligible for the National Register of Historic Places as a result of consultation with the California State Historic Preservation Officer. However, it is not expected that this site will be disturbed during construction. A second site, where early tools have been found within forty feet of the river along the east bank of Reach 11, may be eligible for the National Register. It is expected that proposed widening in this area will expose further resources. A site survey must be performed in order to determine whether this recently identified site may be eligible for the National Register. Known cultural resources within the study area are summarized in Table 7.

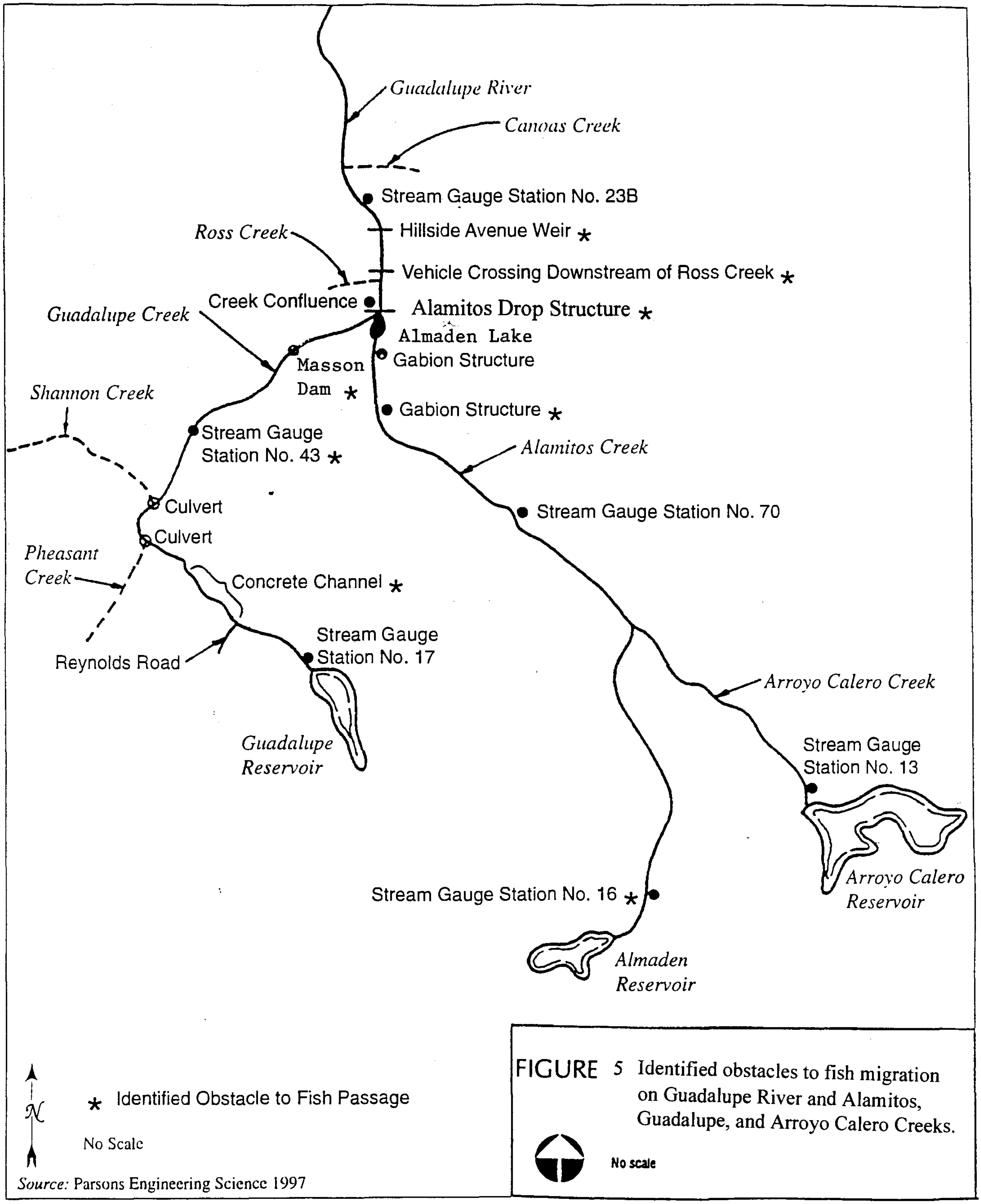


FIGURE 5 Identified obstacles to fish migration on Guadalupe River and Alamitos, Guadalupe, and Arroyo Calero Creeks.

No scale

TABLE 6 Special-status wildlife species observed or potentially occurring within the Upper Guadalupe River Feasibility Study Area.

Common Name	Scientific Name	Status	O/P
Mammals			
Pacific western big-eared bat	*Plecotus townsendii townsendii*	FC2, SSC	P
Greater western mastiff bat	*Eumops perotis californicus*	FC2, SSC	P
Birds			
Double-crested cormorant	*Phalacrocorax auritus*	SSC	O
Osprey	*Pandion haliaetus*	SSC	O
Black-shouldered kite	*Elanus caeruleus*	SFP	O
Sharp-shinned hawk	*Accipiter striatus*	SSC	O
Cooper's hawk	*Accipiter cooperii*	SSC	O
Merlin	*Falco columbarius*	SSC	O
Peregrine falcon	*Falco peregrinus*	FE, SE	P
Prairie falcon	*Falco mexicanus*	SSC	P
California gull	*Larus californicus*	SSC	O
Burrowing owl	*Athene cunicularia*	SSC	O
Black swift	*Cypseloides niger*	SSC	P
Willow flycatcher	*Empidonax traillii*	ST	P
Yellow warbler	*Dendroica petechia*	SSC	O
Yellow-breasted chat	*Incteria virens*	SSC	P
Reptiles			
Southwestern pond turtle	*Clemmys marmorata pallida*	FT, ST	P
Alameda striped racer (whipsnake)	*Masticophis lateralis euryxanthus*	FC, ST	P
Amphibians			
California red-legged frog	*Rana aurora draytoni*	FC1, SSC	P
Foothill yellow-legged frog	*Rana boylei*	FC2, SSC	P
California tiger salamander	*Ambystoma tigrinum californiense*	FC2, CSC	P
Invertebrates			
San Francisco forktail damselfly	*Ischnura gemina*	FC2	P
Edgewood blind harvestman	*Calicina minor*	FC2	P
Ricksecker's water scavenger beetle	*Hydrochara rickseckeri*	FC2	P
Fish			
Steelhead trout	*Oncorhynchus mykiss*		

Sources: SCVWD and CE 1994; USFWS 1993; SCVWD and CE 1993.

Notes:

Federal Status

FE Federally Endangered: taxa in danger of extinction throughout all or a significant portion of its range.
FT Federally Threatened: taxa likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
FPE/T Federal Proposed Endangered/Threatened: taxa proposed for listing as endangered or threatened.
FC1 Federal Candidate Species, Category 1: taxa under review. Sufficient biological information exists to support a proposal listing as an endangered or threatened species.
FC2 Federal Candidate Species, Category 2: taxa which may warrant listing, but for which substantial biological information to support a proposal is not currently available.
FC3c Federal Candidate Species, Category 3: taxa that are too widespread and/or are not seriously threatened enough to support listing.
1R Recommended for Federal Candidate Species, Category 1 status.
2R Recommended for Federal Candidate Species, Category 2 status.

State Status

SE California Endangered: a native species or subspecies of animal in serious danger of extinction throughout all or a significant portion of its range.
ST California Threatened: a native species or subspecies likely to become an endangered species in the foreseeable future, although not presently threatened with extinction.
SSC California Species of Special Concern: species not officially state listed, but vulnerable to extirpation given population declines or restricted geographic ranges.
SFP California Fully Protected.
O/P = Observed/Potential occurrence within the Upper Guadalupe River project study area.

Table 7 Significant Cultural Resources

Resource	Description	River Reach	Eligible for National Register
Lewis Canal excavated between 1866 and 1871	May be situated in existing channel	R7	No
Valley View Cannery constructed in 1930s	Still in operation	R10, east side	No
A mid-twentieth century prune-drying plant and farmstead site	Located on Valley View Cannery property. All but the foundation has been demolished.	R10, east side	No
Prehistoric archaeological sites CA-SCL-674, * CA-SCL-690	lithic scatter (midden), village/cemetery	west of Canoas Creek R7, east bank	No Yes
Historic archaeological site CA-SCL-635H	Redwood retaining wall circa 1860-1870	R10	No
Archaeological site CA-SCL-636	exposed fire-cracked rocks and lithics	R11, east bank	Unknown

*NOTE: This site was excavated during a previous construction project. Data recovery was performed, and the potential for further disturbance is anticipated to be minimal.

Hazardous, Toxic and Radiological Waste. A project area review and preliminary site assessment (PSA) of the study area was conducted in two phases by Kleinfelder, Inc., as described in their January and August 1992 reports. The purpose of the studies was to (1) identify potential sources of surface and subsurface contamination, (2) evaluate potential impacts of existing contamination sources, (3) identify potential impacts of contamination, and (4) provide recommendations for additional investigation, as necessary to evaluate the extent and impacts of contamination to the project design and construction.

The PSA identified twenty-four properties, located between Interstate 280 and Blossom Hill Road, as having a high potential for contamination impact. A high potential means that the properties are known or suspected to be contaminated, based on the following criteria:

1. Existing or former presence of underground or aboveground storage tanks;
2. Storage and use of hazardous materials, including agricultural pesticides; and
3. Site located adjacent to a property with known contamination.

Subsequent to the PSA, the Santa Clara Valley Water District conducted a Level II HTRW investigation, which was documented in April 1995. The results of the Level II investigation indicate that there are several areas of concern along the project alignment. These areas are described below, summarized in Table 8 and located in Figure 6.

(1) Two small areas of stained soil on parcel APN-264-48-005, Bennett's Automotive, are impacted with elevated concentrations of mercury. A total of 20 cubic yards of impacted soil should be excavated and removed prior to property acquisition.

(2) Approximately 89 cubic yards of soil below a storm drain outflow pipe and near the west gate on parcel APN 434-04-002. This soil may contain elevated concentrations of chlordane and DDT and dinoseb. In addition, this soil also contains petroleum hydrocarbon concentrations. Removal of this soil from the property is recommended prior to property acquisition. If the soil removal is not completed prior to construction, the soil will have to be excavated and properly disposed of during construction activities.

(3) Petroleum hydrocarbons have impacted soil and groundwater at a site at the corner of Willow Street and Lelong Avenue. The hydrocarbon plume appears to have impacted at least three parcels (APN 434-04-006, -011 and -066). The estimated volume of impacted soil is 16,400 cubic yards.

(4) Parcel 434-20-023 (Elks Lodge) was investigated as part of the bypass channel/island bank assessment. The upper 5 feet of soil at the Elks Lodge site appears to contain mercury concentrations at elevated levels. Either additional characterization should be performed to show that the soil is not hazardous with respect to mercury, or the upper 5 feet of soil should be excavated and properly disposed.

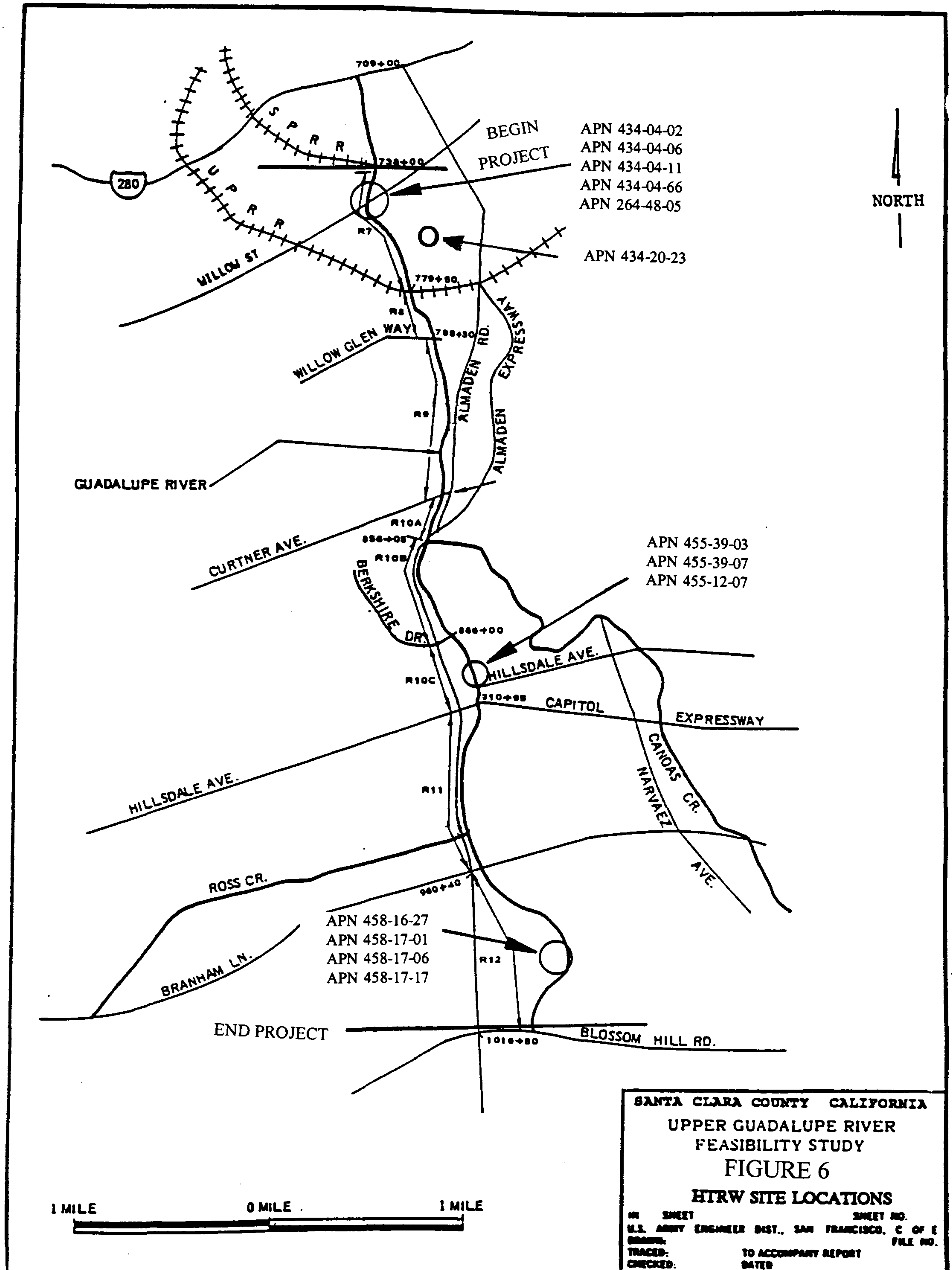
(5) The Valley View Packing Facility (APN 455-12-007, 39-003, 39-007) is the site of a documented fuel release and some pesticide impact in shallow soil. The volume of pesticide impacted soil is estimated to be 4,720 cubic yards. The volume of petroleum hydrocarbon impacted soil is estimated to be 5,000 cubic yards.

(6) Soil on parcels 458-17-001, -006, -017 and 458-16-027 were proposed for use as wetland construction material. Nickel and silver exceeded the guidelines for cover and non-cover soil. Mercury and pesticides exceed the guidelines for cover soils but not non-cover soils.

Table 8 Potential HTRW Sites

Assessors Number	**Address**	**Contaminants of Concern**
264-48-005	384 McLellan Ave	Mercury
434-04-002	Undeveloped	Chlordane, DDT, Dinoseb
434-04-006	450 Willow St	Petroleum Hydrocarbons
434-04-011	1127 Lelong St	Petroleum Hydrocarbons
434-04-066	456-458 Willow St	Petroleum Hydrocarbons
434-20-023	Elks Lodge	Mercury in top 5' of soil
455-12-007, 455-39-003, & 455-39-007	Valley View Packing Plant	Petroleum Hydrocarbons
458-16-027, 458-17-001, 458-17-006, & 458-17-017	Vacant	Nickel and Silver

NOTE: All of the contaminants of concern listed above are regulated by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). However, none of the above sites are designated as Superfund sites.



SANTA CLARA COUNTY CALIFORNIA

UPPER GUADALUPE RIVER
FEASIBILITY STUDY

FIGURE 6

HTRW SITE LOCATIONS

SHEET NO.
U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E
FILE NO.
TRACED: TO ACCOMPANY REPORT
CHECKED: DATED

2.4 Existing Water Resources Projects

Santa Clara County currently has several water resource development projects in and around the study area, including small and large reservoirs for recreation, irrigation, water supply, and conservation. In addition, numerous flood control structures have been or are being constructed on the Guadalupe River. By widening the river corridor and constructing levees, the channel capacity between San Francisco Bay and U.S. Highway 101 was increased to convey a 100-year flood event. Although, the reach between U.S. Highway 101 and Interstate 880 can convey 100-year flood flows, it does not meet the standards of the Federal Emergency Management Agency's (FEMA) flood insurance program. The Santa Clara Valley Water District is developing plans to meet FEMA standards.

Downtown Guadalupe River Project

On March 30, 1992, the Santa Clara Valley Water District and the Corps of Engineers, Sacramento District Office, signed a Local Cooperation Agreement to implement the downtown Guadalupe River Flood Control Project located in downtown San Jose. The project consists of channel modifications between Interstate 880 and Interstate 280 (downstream of the current study area) and includes recreation features. The project is expected to be constructed at a total cost of $138 million. As co-sponsors of the project, the Santa Clara Valley Water District, the San Jose Redevelopment Agency, and the State of California will share approximately $78 million of the total cost. Construction began in late September 1992 and is currently ongoing.

SCVWD Flood Control Projects

The Santa Clara Valley Water District is undertaking two local flood control projects near the study area, independently and without Federal contribution. The first local project is a 4,800-foot long bypass channel which is designed to join the downtown Guadalupe River Project and the proposed upper Guadalupe River Project. The bypass will be aligned adjacent to the east bank of the Guadalupe River and will tie into the downtown Guadalupe River Project at Interstate 280 and extend to the Southern Pacific Railroad bridge (which separates the independent SCVWD project from the joint Corps/SCVWD project) where it would tie into the upper Guadalupe River Project. These plans are currently being developed. Also, during 1997 flood control planning studies will begin for a second local project along the Canoas Creek tributary. Project construction is expected to begin after 2000.

Existing Reservoirs

The Santa Clara Valley Water District has constructed dams and reservoirs since 1933 and now operates ten facilities. Table 9 lists the storage capacities of the three reservoirs located upstream of the study area on tributaries to the Guadalupe River. These reservoirs are operated for water supply and groundwater recharge purposes. Although they were not constructed for flood control purposes, they provide incidental flood control. Lake Elsman and Vasona and Lexington

Reservoirs are also within the Guadalupe River watershed, but the discharges from these reservoirs enter Guadalupe River downstream of the study area.

TABLE 9: Santa Clara Valley Reservoir Capacities

Reservoir	Storage Capacity (acre-ft)
Almaden	1,780
Calero	10,160
Guadalupe	3,740

Groundwater Recharge System

In order to reduce the threat of land subsidence that would be caused by excessive net withdrawal from groundwater pumping, the SCVWD operates groundwater recharge systems within the Guadalupe River watershed. Several measures are employed to impound water for eventual gradual percolation into the groundwater basin during the dry season. One method used is to divert water from the river and impound it in percolation ponds adjacent to the river. Percolation ponds are located on either side of Reach 12 of the upper Guadalupe River. A second method is the construction of temporary dams which impound water in the stream channel. Water is stored in the three permanent reservoirs listed in Table 9. During the dry season, water is released from the various reservoirs in the watershed, and the percolation ponds facilitate the recharge of water into the groundwater basin.

3.0 PROBLEMS, NEEDS AND OPPORTUNITIES

3.1 Flooding

Historical Flooding

The history of flooding along the Guadalupe River dates back to the founding of Mission Santa Clara and pueblo San Jose de Guadalupe by Mexican settlers in 1777. Soon after their establishment both settlements were forced to move from their original location on the bank of the river to higher ground. Very little factual data is available from the floods prior to 1930 when the first stream gauges were installed. The table below presents a summary of the major historical flood events on the Guadalupe River system along with the estimated area of inundation and basin-wide or county-wide damages in terms of historical dollars. One of the highest discharges on record was produced by the flood of 1958 when floodwaters overbanked in downtown San Jose and covered a two square block area to depths of up to four feet. During the February 1980 event, the river overtopped its east bank upstream of Alma Street and flooded the Elks Lodge and surrounding area. In March 1982, the River's east bank was again overtopped inundating about 15 acres between the Union Pacific Railroad crossing and W. Virginia Street. The under crossing of the Southern Pacific Railroad at Willow Street and Alma Street filled with flood waters to a depth of ten feet. This approximately 15-acre area was again flooded in January 1983. More recently, during 1995 Santa Clara County was twice declared a national disaster area by President Clinton due to flooding along the Guadalupe River. The areas inundated during the storms in the study area are shown in the Hydrology and Hydraulics Appendix, (also see photograph next page).

TABLE 10 - Historical Flooding On The Guadalupe River In Santa Clara County

HISTORICAL FLOOD (1)	MAGNITUDE OF EVENT		DAMAGE ESTIMATE
	Flow (cfs)	Freq. (yrs)	(Historical $)
December 1955	-	-	$753,500 (2)
April 1958	9,150 @ St. John Street	5	$1,348,000 (2)
March 1982	5,642 @ Almaden Exp	8	$14,740,000 (3)
January 1983*	8,400 @ Almaden Exp	18	Not Available
January 1995*	8,470 @ Almaden Exp	14	$3,000,000 (3)
March 1995*	5,590 @ Almaden Exp	6	$6,000,000 (3)

(1) Anecdotal evidence also suggests flooding in 1862, 1867, 1895, 1911, 1917, 1950 and 1963
(2) Damages along entire mainstem, including areas beyond study area boundaries
(3) County-wide damages which may include areas beyond Guadalupe basin.
*Santa Clara County declared a National Disaster Area

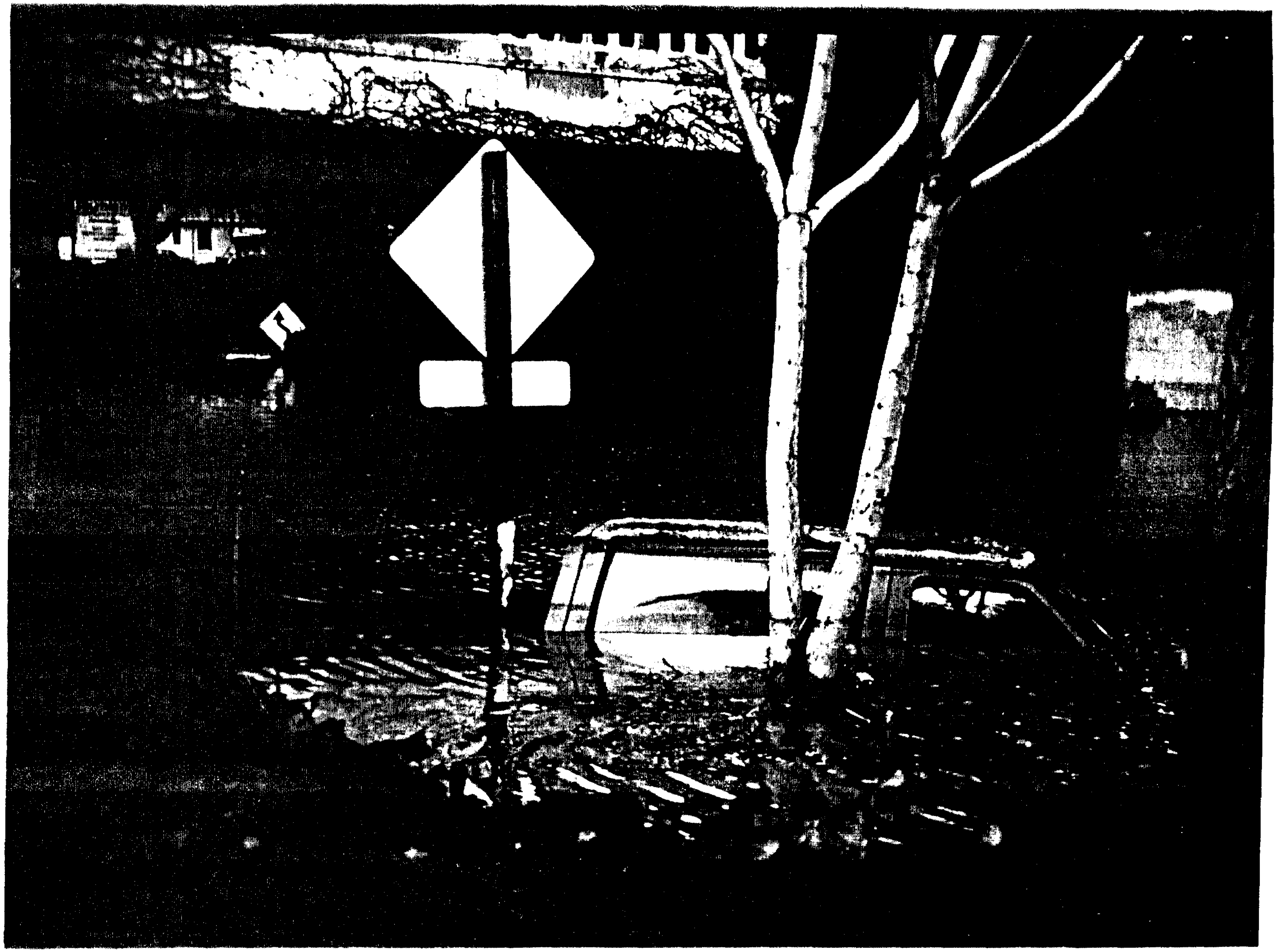


FIGURE 7: FLOODING FROM GUADALUPE RIVER AT WILLOW ST 3/10/95

Existing Floodplains

Under current conditions, the Guadalupe River's channel capacity within the study area varies from as little as 6,000 cubic feet per second (cfs) (a 6-year mean event) to more than 12,000cfs (a 60-year mean event). The table below lists the approximate existing channel and bridge flow capacities. The flows shown for the bridge sections represent channel capacities which would be safely passed unobstructed by the low bridge chord.

Table 11: Existing Capacities of Channels and Bridges

River Reach and Bridges	Capacity (cfs)	Mean Exceedence Interval (Years)
Main Channel Reach 7	6,000	6.5
Willow Street Bridge	6,420	7-8
Alma Street Bridge	6,300	7-8
Main Channel Reach 8	8,000	15
UPRR Bridge	11,300	50
Main Channel Reach 9	12,000	60
Willow Glen Way Bridge	11,630	55
Malone Road Bridge	12,000	70
Main Channel Reach 10	11,000	50
Curtner Ave Bridge	11,340	50
S. Almaden Exprwy- Canoas Bridge	10,000	33
N. Almaden Exprwy Bridge	24,000	500+
Hillsdale Ave Bridge	9,680	50
Main Channel Reach 11	10,000	60
Capitol Exprwy Bridge	8,200	33
Branham Lane Bridge	7,200	25
Main Channel Reach 12	8,000	37
Ross Creek Channel Capacity	930	5.5
Canoas Creek Capacity	2,100	9

Note from the table that river reaches 7 and 8, and the Willow Street and Alma Street bridges have the least capacity. Although Ross and Canoas Creeks have greater capacity in their upstream reaches, they have minimal capacity near their confluences with the Guadalupe River due to backwater effects and low capacity culverts and cross sections. The 20-, 50-, 100- and 500-year floodplain maps were developed for the study area and are shown as Plates 2, 3, and 4.

Within the study area, the Guadalupe River channel resembles a perched channel on an alluvial fan. When breakouts of the existing channel occur, the flow leaves the channel and enters a floodplain that flows parallel with the existing channel. Once the flows leave the channel there is no transfer of flows back into the channel until the floodwaters pond at the downstream end of the study area. During a mean 20-year event floodwaters break out from the west bank between the Union Pacific Railroad and Willow Glen Way, then flow downstream towards Interstate 280. Floodwaters also break out from the east bank downstream of the Union Pacific Railroad, and flow downstream between Highway 87 and the Guadalupe River channel, and then reenter the channel at Virginia Avenue.

Likewise, for the mean 50-year event, floodwaters break out from the east bank downstream of Alma Street and flow towards Interstate 280. Floodwaters also break out from the west bank at Willow Street and between the Union Pacific Railroad and Willow Glen Way, then flow downstream to Interstate 280.

Finally, flows from the mean 100-year flood event break out from the Guadalupe River's east bank downstream of Alma Street, and from 1000 feet on either side of Branham Lane. Floodwaters flow downstream through the floodplain towards Interstate 280. Canoas Creek and Ross Creek also overtop their downstream banks and contribute to the flooding within the Guadalupe River floodplain. Flooding along the west bank is similar to that which occurs in the 50-year floodplain. The 500-yr floodplain is similar to the 100-year floodplain, but with a greater volume of floodwater. The 100-year floodplain and the 500-year floodplain inundate approximately 2,310 and 2,960 acres, respectively.

For events greater than the mean 5-year event on Ross Creek, backwater effects from Guadalupe River cause Ross Creek to overflow, resulting in breakouts from both banks that either flow downstream through the Guadalupe River floodplain towards Interstate 280 or pond to the south of the creek. Similarly, for events greater than the mean 9-year event on Canoas Creek, backwater effects cause Canoas Creek to overflow its downstream levees. The overflow floods subdivisions from Blue Jay Road to the intersection of Almaden Expressway and Highway 87.

3.2 Existing Flood Damages

Economic areas were developed from the floodplain maps and are shown in Plate 1. The economic areas are generally formed from specific breakout points. For example, Economic Area 2 is formed by the breakout from the low flow channel section of Ross Creek, and Economic Area 3 is formed by the breakout on the east side of the main channel near the Willow Street Bridge.

Table 12 presents the approximate without-project flood damages by Economic Area and event. An examination of this table reveals that most of the damages from a 20-year event occur in Economic Areas 1 and 2. These damages occur at the low channel capacities on Ross Creek and the east bank breakout on Reach 7 below the UPRR bridge adjacent to the Elks Lodge parking lot. The total damages from a 50-year event are more than double those of a 20-year event and about half of the total damages for a 100-year event. The major 100-year flood damages occur in economic areas 2 and 4.

Table 12 - Approximate Expected Without-Project Flood Damages By Economic Area (Future Conditions)

Economic Area	20-Year Event	50-Year Event	100-Year Event	500-Year Event
1	$9,741,000	$13,232,000	$20,189,000	$27,334,000
2	$45,147,000	$66,526,000	$83,732,000	$134,515,000
3	$895,000	$9,529,000	$13,104,000	$30,949,000
4	$3,318,000	$63,013,000	$132,440,000	$263,303,000
5	negligible	negligible	$30,986,000	$55,805,000
Total	$59,101,000	$152,300,000	$280,451,000	$511,906,000

NOTE: These damages correspond to the without-project future conditions.

3.3 Fish and Wildlife Habitat Needs

Over the years, degradation and loss of fish and wildlife habitats has occurred within the study area. Both Canoas and Ross Creeks currently have minimal habitat value. Due to the heavily-urbanized nature of the Santa Clara Valley and the ecological value of riparian forest and shaded riverine aquatic (SRA) cover, these habitats are considered to be significant resources and are of concern to both resource agencies and the public. Human actions have caused severe cumulative losses of riparian forest and SRA cover in the San Francisco Bay Area and the state of California in the past century. These losses have negative impacts on wildlife and fisheries; thus, further net losses of these habitats would be strongly contested by regulatory agencies and the public.

Current habitat conditions are marginal for anadromous fish, and the implementation of a flood protection project may offer opportunities to enhance aquatic habitat. Opportunities exist to remove obstacles to fish migration beyond Blossom Hill Road, where the highest quality salmonid habitat in the Guadalupe River watershed is found. Removal of obstacles may result in increased spawning success for the sensitive steelhead trout and king salmon. Furthermore, opportunities exist to increase the total number of acres of SRA habitat. Shade provided by SRA cools the water within the creek. By preserving existing SRA and increasing the total number of SRA acreage, it is believed that the water temperature can be reduced sufficiently to provide improved habitat for steelhead trout and king salmon.

3.4 Recreation Opportunities

Due to rapid urbanization, there is a definite need in the study area for open space recreation opportunities. The Santa Clara Valley Water District and the City of San Jose recognize the need to coordinate park master planning with flood control planning. The objective of coordinating the two planning activities is to balance the need to reduce flood damage from the Guadalupe River with the need to optimize public access and use of the river corridor. The Santa Clara Valley Water District prefers that flood control projects be designed to accommodate any identified future recreation use. For example, to comply with the American Disabilities Act of 1990, flatter slopes on access ramps would allow planned maintenance roads, when developed as a recreation trail, to be more accessible to the disabled.

The study area corridor receives limited recreation use by the public due to lack of public access. The City of San Jose is interested in developing recreational opportunities and is coordinating their efforts with the Corps of Engineers' and Santa Clara Valley Water District's flood control planning process. The City of San Jose Department of Parks and Recreation has developed an Interim Report of the Park Master Plan for the Guadalupe River South Corridor. The city's goals include: preserving and restoring a natural creek environment; providing bicycle, pedestrian and equestrian access for neighborhood recreational use; integrating existing and proposed trails and parks within the city's planning area; and providing a continuous park and trails network. The city's interim report for the south corridor includes conceptual plans for trails and park development which give consideration to the flood control alternatives already being developed for the study area. A continuous trail along the Guadalupe River is part of Santa Clara County's trail and pathways Master Plan.

Corps policy directives and physical constraints severely limit the type and extent of recreational facilities that could be provided on a cost-shared basis. The recreational facility with the greatest potential recreational benefits and which the local sponsors are most interested in cost-sharing is a multi-use recreation trail linking the study area with the existing trails along the Guadalupe River in downtown San Jose and upstream of Blossom Hill Road. This trail would be built upon project features such as maintenance access roads and mitigation benches. The trail would provide a critical link in a planned regional trail network, which would enhance its economic value. The economic benefits of such a trail are highly dependent on its degree of continuity, which in turn is dependent upon the continuity of flood control improvements from I-280 to Blossom Hill Road.

4.0 PLAN FORMULATION

4.1 Planning Process

Plan formulation is an iterative process that establishes planning objectives, develops potential alternatives that meet the objectives, screens out plans based on comparison criteria, and identifies plans for implementation. This process is consistent with the planning requirements of the Water Resources Council Principles and Guidelines, the National Environmental Policy Act of 1969, and the U.S. Army Corps of Engineers Planning Guidance Notebook. The process requires systematic development and evaluation of alternatives for alleviating water resources problems and realizing potential opportunities.

During the planning process, study efforts involved the non-Federal sponsor, the public, and other agencies to properly identify and address the water resource problems and opportunities. This coordination also helped to identify all possible potential plans for achieving the planning objectives.

4.2 Planning Objectives and Constraints

Planning Objectives

The national objective of water resources planning is to contribute to the national economic development (NED) consistent with protecting the nations' environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Contributions to NED are considered to be increases in the net value of the national output of goods and services, expressed in monetary units and are defined as the direct net benefits that accrue in the planning area and the rest of the nation. In the case of this study, net benefits are related to the reduction of flood damages and other costs associated with flood protection and response.

The national objective to contribute to the NED is not specific enough for direct use in plan formulation. The specific objectives of this study reflect the problems and opportunities which were identified within the study area. The primary objective of this feasibility study is to present a plan to reduce damages to surrounding communities due to flooding from the upper Guadalupe River and its tributaries, Canoas Creek and Ross Creek. After formulating each alternative on the basis of providing flood protection, opportunities to include recreation features were considered as a secondary study objective. Federal policy allows full consideration of recreation as a project purpose, as legislated by Section 4 of the Flood Control Act of 1944, as amended; the Federal Water Project Act of 1965, Public Law 89-72, as amended; and the Water Resources Act of 1986.

Planning Constraints

Constraints are overriding concerns that must be considered in the formulation of a plan. These concerns may be of such importance that to violate them would compromise the validity of the planning effort. Avoidance of negative impacts to habitat was a major constraint for all plans considered. One method of achieving this was to limit channel widening to only one side of the river in order to preserve existing riparian and fishery habitats on the unaltered bank. In order to meet this constraint, complete channelization of the river was excluded from consideration in order to preserve the existing riparian corridor on at least one bank of the river. Additional planning constraints for this study are discussed below.

Riparian Vegetation. The existing riparian forest habitat in the study area is generally degraded relative to an undisturbed riparian forest, but still offers valuable habitat for a very diverse bird population as well as important shade for anadromous fish. While a variety of past occurrences such as agricultural development, urbanization, gravel mining, and freeway development appear to have reduced the extent, continuity, and habitat quality of the forest, this forest is still the second best riparian forest corridor in the northern Santa Clara Valley. Because of its regional scarcity, the remaining riparian corridor is considered to be a significant resource and important for providing habitat for fish and wildlife. Attempts to avoid removal of additional riparian forest were stressed in the development of each alternative.

Endangered Species. Alternatives were developed to avoid, to the maximum extent practicable, negative impacts on federally listed endangered or threatened species. The recently listed threatened species, the California red-legged frog, may exist in the study area, although surveys have failed to find it. The recently listed threatened steelhead trout is known to exist in the study area.expected to become a listed species in the near future.

Fishery Resources. To protect the remaining king salmon and steelhead trout, attempts to preserve riparian vegetation were made to reduce any further loss of shade. Increased sediment loads associated with construction activities should be minimized to avoid negative impacts on water quality and spawning areas. Finally, whenever practicable, obstacles which prevent upstream migration to potential spawning areas should be removed or modified to allow easier fish passage, and the introduction of barriers associated with any proposed project were avoided.

Aesthetics. The existing riparian corridor provides visual relief from the surrounding urban development. Attempts to preserve this urban buffer should be made, particularly in residential areas that border the upper Guadalupe River.

Hazardous and Toxic Wastes. Numerous HTRW sites exist along the channel in the study area, and every effort was made to avoid incorporating these lands in the project.

Real Estate. The highly urbanized nature of the study area and the vigorous economy makes the acquisition of real estate for project lands very expensive. The alternative designs were aligned to avoid as many buildings as possible. An effort was made to align the alternatives within the rights-of-way and properties owned by the sponsor.

4.3 Description of Preliminary Flood Protection Measures

A number of flood reduction measures were considered during the early phases of study on the upper Guadalupe River. These measures are summarized in the Table 13, and the preliminary flood protection alternatives which were first formulated during the 1989 Corps of Engineers Upper Guadalupe River Reconnaissance Study are described in Attachment A. Each measure in Table 13 is a stand alone feature which can be combined with other measures to constitute a comprehensive flood reduction alternative. Some of these measures are "nonstructural", and others are "structural".

"Structural" measures are designed to prevent flood damages by altering the flow patterns (the water surface profile) of the river itself. Structural measures include dams, levees and floodwalls, and channel modifications which increase the capacity of the existing channel in order to contain flows in the channel.

"Nonstructural" measures are designed to prevent flood damages by modifying the buildings and structures within the floodplain. Nonstructural measures include evacuation, relocation, and may involve modifications to existing structures within the floodplain.

Only those measures in Table 13 which are labeled "Retained for Alternatives" were included in the plan formulation process described below. In areas where channelization was appropriate, the choice between channel widening and bypass channel measures was evaluated based on trade-offs between habitat and real estate impacts. Similar trade-offs were evaluated for aesthetics and interior drainage when determining whether to use floodwalls or levees.

4.4 Plan Formulation Rationale

The proposed plans in this study were formulated by combining the preliminary measures discussed above. An array of plans was developed based upon significant break points in the cost curve. These break points correspond to physical barriers such as bridges, homes, valuable habitat, or expensive property which would significantly increase the cost of implementing the measure being considered. All of the alternatives have been formulated to reduce losses of riparian forest. Benches have been included in the design to provide opportunities to revegetate disturbed areas with native species.

The plan formulation process begins by identifying where flows break out of the existing channel for various magnitudes of flood events. These "breakout areas" are often located in channel reaches where the capacity is lower than that for upstream reaches. Capacity may be restricted by the existing channel configuration or by an obstacle such as a bridge. Once restricted reaches are identified, flood control measures are developed to increase the capacity of

Table 13: Summary of Flood Damage Prevention Measures Considered

INITIAL FLOOD CONTROL MEASURES	RETAINED FOR ALTERNATIVES	REMARKS
Upstream Reservoirs	No	No effective sites for flood control reservoirs. 3 existing water supply reservoirs provide incidental flood control benefits.
Modify Existing Reservoirs	No	Existing reservoirs do not have sufficient capacity for both water supply and flood control purposes.
Channel Widening	Yes	Increasing flow capacity of existing channels may be cost effective, but requires mitigation for lost riparian habitat.
Bypass Channel	Yes	A bypass channel may be effective and may preserve existing riparian habitat, but real estate costs may be expensive.
Levees	Yes	High real estate values may preclude the construction of new levees. However, existing levees may be raised in an economical manner. New levees may impact local drainage systems.
Floodwalls	Yes	Low floodwalls of less than five feet were retained; high floodwalls would have excessive safety, local drainage and aesthetic impacts.
Channel Clearing	No	Removal of existing channel vegetation has high negative impacts. Requires very expensive offsite mitigation. Does not provide adequate capacity.
Floodplain Regulation	Yes	The floodplain is currently regulated and flood insurance is required.
Relocation of existing structures in the floodplain	No	Relocation is not cost effective as numerous residences and business are located in the floodplains.
Flood Warning System	No	Floodplains are large and dispersed and lead time is very short due to the relatively small watershed.
Floodplain Management (non-structural)	Yes	Continue to publicize floodplain information and coordinate with zoning and other regulatory agencies to prevent unwise future development in the floodplain.

each restricted reach. The least costly measure which is environmentally and socially acceptable is sought for each reach. Greater flood protection can be achieved by providing successively larger flood protection structures for a single reach or by providing flood reduction measures on multiple reaches.

A basic strategy used for the plan formulation rationale is to examine the low flow constraint locations. From these, a low cost structural measure is developed which increases the flow at that constraint point, going from the lower channel capacities upward to the higher level channel capacities. The extent of the measure is bounded by physical limitations, such as bridges, roads, or buildings, which correspond to breaks in the cost curve.

Flows generally increase as you move downstream (toward the lower reaches, in this case). In cases where the capacity of the channel does not also increase as you move downstream, breakouts occur. The locations of diminished channel capacity are flow constraint points. Figure 8 can be used to illustrate the locations and relationships of the flow constraint points in the study area. This figure displays the existing capacities and corresponding mean exceedence intervals for each river reach. The major bridge crossings, along with their associated capacities and mean exceedence intervals, are also shown. The economic areas, which are used to define damages due to flooding, are also shown in Figure 8. Note that the minimum capacities are in river reaches 7 and 8 and in Ross and Canoas Creeks.

For the upper Guadalupe River, there are three major points to consider during the formulation of flood reduction alternatives. First, Figure 8 indicates that the upper Guadalupe River capacity increases as you move from Reach 12 down through Reach 9. However, the capacity is greatly reduced as you move from Reach 9 to Reach 8. The capacity is reduced again as you move from Reach 8 to Reach 7. Thus, Reaches 7 and 8 are clearly constraint locations.

Second, a significant portion of benefits which accrue to any alternative plan are realized by reducing flooding from Ross Creek. Ross Creek has the minimum capacity both in volume and mean exceedence interval, and an examination of the Economic Areas (see Table 12, Without-Project Damages By Economic Area, page 33) also reveals that much of the flood damages occur in Economic Area 2. Therefore, increasing the capacity of Ross Creek results in significant benefits.

And finally, the flow in Ross Creek is mostly constrained by the backwater effects related to the water surface level in the main channel and by a culvert underneath the Almaden Expressway. Thus, beyond a minimal level, improvements made to Ross Creek will be ineffective unless the capacity in the main channel and the culverts underneath the expressway are modified.

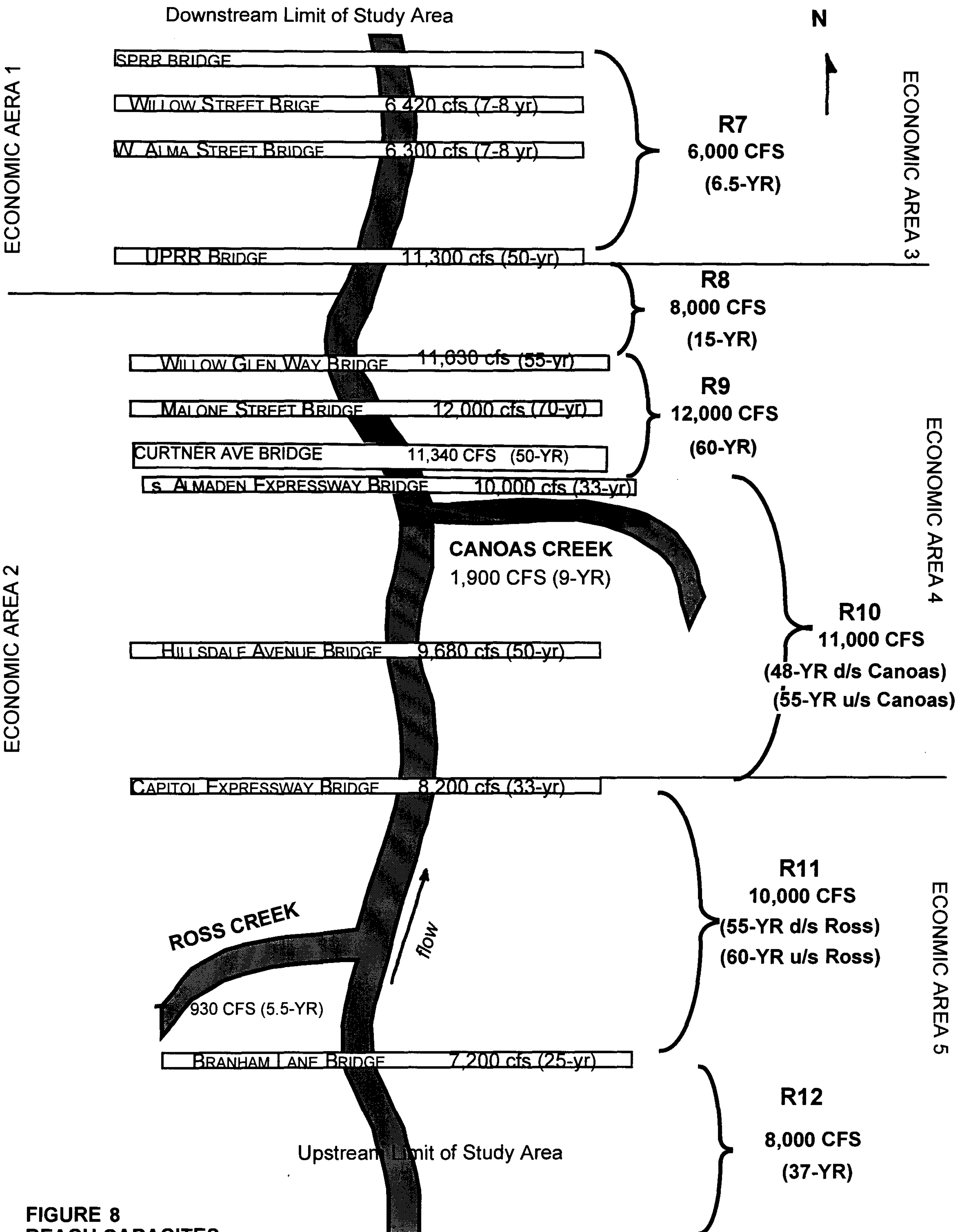


FIGURE 8
REACH CAPACITES

Alternative plans were formulated by combining least cost measures in order to increase the capacities of Ross and Canoas Creeks, while also reducing the water surface level of the main stem Guadalupe River. Two plans were formulated, the Willow Glen and Valley View Alternatives, which widen the existing channel to accommodate 9,000 cfs and 12,000 cfs, respectively. Jumps in the cost curve were associated with channel widening in Reach 8 for the Willow Glen Plan and channel widening in Reach 9 for the Valley View Plan. For flows greater than 12,000 cfs, it was determined that widening the existing main channel was not a cost effective means to increase the channel capacity. Therefore, a third alternative which uses bypass channels, the Bypass Channel Plan, was formulated combining the least cost measures to provide approximately 14,600 cfs of channel capacity throughout the study area. The factors which were considered during the formulation of the two major tributaries are described below. The structural plans are described in more detail in the following paragraphs.

Canoas Creek

Flooding on Canoas Creek results from two different mechanisms; the runoff contribution from Canoas Creek's watershed and backwater flows from the Guadalupe River. The SCVWD has indicated that they intend to manage the peak runoff flows from the Canoas Creek watershed through local measures. Thus, for plan formulation purposes, improvements to Canoas Creek were limited to backwater effects, which occur in the lower reach of Canoas Creek. Each of the plans described below include identical improvements to Canoas Creek. These include the replacement of culverts beneath Almaden Expressway and Nightingale Drive and low floodwalls along both banks of the creek. The SCVWD has indicated that any additional improvements undertaken to manage peak flows on Canoas Creek would be undertaken as a local project.

For the purposes of sizing improvements on the main stem Guadalupe River, it was assumed that the main stem channel directly downstream of the confluence with Canoas Creek would accommodate flows associated with any event from Canoas Creek. This assumption was made to be consistent with the SCVWD's intention to manage peak runoff on Canoas Creek through local measures. Note that because peak flows on Canoas and the main stem are not coincident, the additional peak flows from Canoas are incidental when compared with flows in the main channel.

Ross Creek

Backwater effects from Guadalupe River cause Ross Creek to overflow, resulting in breakouts from both banks that either flow downstream through the Guadalupe River floodplain towards Interstate 280 or pond to the south of the creek. A significant portion of the total study area damages are associated with the overtopping of the north bank of Ross Creek. Improvements on Ross Creek were formulated to correspond to the same level of protection that was proposed for the mainstem Guadalupe River.

No Action Plan

The No Action plan is the "without-project" condition that serves as the basis for developing and comparing the impacts of other plans. Under the No Action Plan, it is assumed that a Federal project would not be constructed to reduce the flood hazard in the study area boundaries. The flood damages outlined in Table 12, page 33, would occur unabated in the future. The "without-project" condition assumes that flood control projects which are proposed downstream (north) of the study area would be completed. Specifically, it is assumed that the flood control project currently under construction in downtown San Jose and the SCVWD flood control bypass channel between the Southern Pacific Railroad and Interstate 280 would both be completed prior to completion of a project upstream (south) of the Southern Pacific Railroad.

Willow Glen Plan (9,000 cfs)

As noted earlier in Table 12, most of the flood damages occur in economic areas 2 and 4, which are the floodplains represented by breakouts from Ross and Canoas Creeks, respectively. The Willow Glen Alternative was formulated to increase capacity on Ross and Canoas Creeks and to increase the Guadalupe River channel capacity as much as possible without widening the main channel in Reach 8. Figure 8, page 40, shows that Reach 8 has a channel capacity that is capable of conveying the mean 15-year event, and Reach 7 has a channel capacity that is capable of conveying the mean 6-year event. The minimum Guadalupe River channel capacity downstream of Canoas Creek can be increased to 9,000 cfs by increasing the capacity of Reaches 7 and 8 and improving the downstream reaches of Ross and Canoas Creeks. The increased channel capacity would be capable of passing flows associated with the mean 20-year event. The extent of the improvements were limited to the point where the backwater effects from the main channel had a noted effect on the tributary capacity.

All of the channel sections and bridge openings which constrained flow below 9,000 cfs, as well as improvements to Canoas and Ross Creeks, were included in the alternative and are summarized in Table 14. Low floodwalls were included in Reach 8 to increase the flow capacity at the low bank locations. Low floodwalls also provide a cost effective means of adding additional capacity to Reach 8 without increasing the costs of the other measures. These low floodwalls will not increase the water surface level in other channel reaches. The major components of the Willow Glen Plan are illustrated in Plate 7.

Several measures for increasing the capacity of the channel in Reach 7 were initially considered. The major considerations were the high real estate costs and preservation of the existing riparian habitat. The least costly and most hydraulically efficient measure, a rectangular concrete channel, was not possible due to the impacts to the existing riparian habitat and the resulting excessively high mitigation costs. West bank widening was investigated, but due to the residential development, real estate costs would be prohibitive in most areas. Additionally, consequential environmental impacts would occur to riparian vegetation on the west bank Although commercial/industrial property would be impacted on the east bank, east bank widening was chosen as the least cost measure in this reach. The top width of the half trapezoidal shaped channel will vary from 80 to 110 feet wide with a side slope of 1V to 1.5H. The channel excavation will begin at a point three feet above the existing channel invert in order to preserve the existing channel bottom and provide for fish passage during low flows. A low floodwall will be needed on the east bank upstream of the West Alma Street Bridge adjacent to the Elks Lodge parking lot since the riverbank is particularly low and the channel is perched. Improvements to Ross Creek would include increasing the bottom width of the channel to 25 feet; construction of floodwalls from Almaden Expressway to a point 300 feet upstream of Cherry Avenue; and adding culverts at Almaden Expressway and Jarvis Avenue. Habitat impacts associated with this plan would require that approximately 3.6 acres of riparian forest habitat be replaced. Impacts to shaded riverine aquatic habitat and wetlands can be fully mitigated as a by-product of this riparian forest habitat mitigation.

Table 14 - Willow Glen Alternative Summary of Measures

River Reach	Approximate Project Station	Description of Measures
7	740 - 781 744 750 773 773 - 781	East bank widening Improvements to Hwy 87 Bridge Replace Willow Street Bridge Replace W. Alma Street Bridge 2 - 4 foot high floodwall on the east bank
8	781-793	1 - 3 foot high floodwalls on the east and west banks
Canoas Creek	856	Add culverts under Nightingale Drive and Almaden Expressway. Floodwalls both banks.
Ross Creek	950	Trapezoidal channelization increasing channel bottom width to 25 feet from the confluence with the main channel to Jarvis Avenue. Additional culverts under the Almaden Expressway and Jarvis Avenue and 2,800 feet of floodwall (1 to 3 feet high) on both banks.

Note: Interior drainage features will be included in Reaches 7 and 8 and on Canoas and Ross Creeks to prevent locally induced flooding due to the floodwalls.

Valley View Plan (12,000 cfs)

The Valley View Plan increases the minimum main stem capacity downstream of Canoas Creek to 12,000 cfs (providing sufficient channel capacity to convey the mean 50-year event.) As discussed above, improvements along Canoas Creek are limited to correspond to a mean 20-year storm event. In the absence of additional improvements along Canoas Creek, approximately 2,800 of nearly 4,900 structures within the 50-year floodplain would remain within the 50-year floodplain. Figure 8 indicates that Reach 9 has a capacity of 12,000 cfs. However, many flow constraints exist upstream of Reach 9. Many of these flow constraints are located at bridge crossings. The Capitol Expressway and South Almaden Expressway bridges support major throughways which would be prohibitively expensive to replace. However, the flow capacity of these bridges may be increased sufficiently to pass the required flow without replacing either bridge. The Valley View alternative was formulated by combining the least cost measures to increase the channel capacities at these flow constraints. The measures included in this alternative are summarized in Table 15 and illustrated in Plate 8.

Table 15 - Valley View Alternative Summary of Measures

River Reach	Approx. Station	Description of Measures
7	740 - 781 744 750 773 773 - 781 781	East bank widening Improvements to Hwy 87 Bridge Replace Willow Street Bridge Replace W. Alma Street Bridge 2 - 4 foot high floodwall on the east bank Improvements to SPRR Bridge
8	781-793 795	1 - 3 foot high floodwalls on the east and west banks (same as Willow Glen Plan) Replace the Willow Glen Way Bridge
9	None	None
10a	843 - 855	East Bank widening
10c	895 - 897.5 897.5 - 906 906 - 912 906	East Bank widening West Bank widening East and West Bank widening Replace Hillsdale Bridge
11	935 - 938 938 - 942 942 - 960	East Bank widening West Bank widening East Bank widening
Canoas Creek	856	Add culverts under Nightingale Drive and Almaden Expressway. Floodwalls both banks.
Ross Creek	950	27-ft wide trapezoidal channel from main channel to 750 feet upstream of Jarvis Ave. New culverts under Almaden Expwy and Jarvis Ave. 2,800 feet of floodwall (1 to 3 ft high) on both banks.

Note: Interior drainage features will be included in Reaches 7 and 8 and on Canoas and Ross Creeks to prevent locally induced flooding due to the floodwalls.

The improvements to Reach 7 are very similar to the Willow Glen Alternative but are slightly larger. An additional feature is the replacement of the UPRR bridge. Low floodwalls from 1 - 3 feet in height would be provided on the east and west banks of Reach 8. In Reach 10, the east bank would be widened near the Curtner Avenue Bridge. The Hillsdale bridge would be replaced. All of the channel widening in this reach and upstream would be contained between the top of banks of the existing channel. Farther upstream, in Reaches 10 and 11, the channel would be widened on the appropriate banks given the specific flow constraints at that location.

Improvements to Ross Creek would include increasing the bottom width of the channel to 27 feet; construction of a 600-foot long section of floodwall which would begin at Jarvis Avenue; and adding culverts at Almaden Expressway and Jarvis Avenue. Impacts to shaded riverine aquatic habitat and wetlands can be fully mitigated as a by-product of riparian forest habitat mitigation. Approximately 12.1 acres of riparian forest habitat must be replaced to achieve full habitat mitigation.

Bypass Channel Plan (14,600 cfs)

Finally, the Bypass Channel plan was formulated to provide approximately 100-year channel capacity to all the reaches. However, as discussed above, improvements along Canoas Creek are limited to provide protection for a 20-year storm event. In the absence of additional improvements along Canoas Creek, approximately 880 of roughly 7,500 structures within the 100-year floodplain would remain within the 100-year floodplain. The use of bypass channels was found to be the most cost effective means of providing protection against the mean 100-year event, particularly in areas of channel constraints, due in large part to the high cost of real estate and impacts to riparian habitat. The bypass channel provides a means of conveying the excess flows above the existing channel capacity with the least amount of disruption to the existing river channel. The least cost measures for each river reach were formulated and are summarized in Table 16 and illustrated in Plate 9.

Each bypass channel is located immediately east of the existing channel. The largest bypass channel is located in Reaches 7 and 8 between Willow Street and Willow Glen Way. The portion of the bypass between Willow Street and Alma Street is located in the existing floodway. This alignment preserves the existing banks of the river and allows for the transfer of high flows between the existing channel and the bypass. Upstream of Alma Street in Reach 7, and downstream of Willow Glen Way, the bypass is offset from the existing channel. A low floodwall on the east side of the bypass is required for the channel upstream of Alma Street and downstream of the UPRR bridge. A total of 13 residential and 16 commercial structures will be impacted by the bypass channel alignment in Reaches 8 and 9. Impact to these residential structures in Reach 8 is unavoidable for any plan which provides more capacity than the Valley View alternative. Channel widening and a bypass channel are the least cost alternative measures in Reach 9 depending on the existing channel topography. Where possible, a bypass channel in this reach is preferred over the channel widening to lessen the impacts to the existing riparian habitat. The least cost measures in Reach 10 consist of east bank widening where necessary and replacement of the Curtner and Hillsdale Avenue bridges. Low floodwalls and a levee are also provided on the west bank from the Almaden Expressway southbound bridge to the Almaden Expressway northbound bridge. Finally, the least cost measures in Reach 11 consist of channel widening and a bypass channel, where the preferred measure is a bypass channel. Improvements to Ross Creek would include increasing the bottom width of the channel to 35 feet and adding culverts at Almaden Expressway and Jarvis Avenue. Approximately 22.4 acres of riparian forest, 3.6 acres of urban forest, and 1.5 acres of wetland habitat (27.5 acres in total) will be replanted to mitigate for impacts to these habitat types.

Table 16 - Bypass Channel Alternative Summary of Measures

River Reach	Approx Station	Description of Measures
7	740 740 - 773 750 770 - 773 773 773 - 781 773 - 781 781	Four 20 x 17-foot RCB culverts under SPRR bridge Bypass channel with 1:1 slopes and a variable width 30-85 feet Replace Willow Street Bridge East bank floodwall Replace Alma Street Bridge Bypass channel with 1:1 slopes and a 60 foot wide bottom 2 - 4 foot high floodwall on the east bank Three 20 x 17-foot RCB culverts under the UPRR bridge
8	781 - 795 795 795 795 - 797	Bypass channel with 1:1 slopes and a 85 foot wide bottom Bypass inlet weir 190 feet long Replace Willow Glen Way Bridge East bank widening
9	797 - 817 817 - 825 822 825 - 830 830 - 843	Bypass channel with variable slopes and width East bank widening Malone Road Bridge Modification Bypass channel 1:1 slopes and 40 foot bottom width East bank widening
10a	843 843 - 855	Replace Curtner Avenue Bridge east bank widening
10b	856 - 860 860 - 868 868 - 871	4 foot high floodwall on west bank 4 foot high levee on the west bank 4 foot high floodwall on west bank
10c	887-911 906	Widen east bank Replace Hillsdale Avenue Bridge
11a	909 - 915 915 - 922 922 - 940	East bank widening Bypass channel with 2:1 slopes and 50 foot bottom width East bank widening
11b	940 - 950	West bank widening
11c	950 - 960	West bank widening
12	960 - 969	2 - 4 foot high floodwall on east bank.
mitigation		1.29 acres riparian forest mitigation immediately upstream of Blossom Hill Rd
Canoas Creek	856	Add culverts under Nightingale Drive, Almaden Expressway. Floodwalls both banks.
Ross Creek	950	35-ft wide trapezoidal channel from Guad River to 750 ft upstream of Jarvis Ave. New culverts under Almaden Expwy & Jarvis Ave.

Note: Interior drainage features will be included in Reaches 7, 10B, and 12 and on Canoas and Ross Creeks to prevent locally induced flooding due to the floodwalls and levees.

5.0 EVALUATION OF CANDIDATE PLANS

5.1 Introduction

Three alternative plans were formulated in addition to the no-action alternative for analysis in the final array of plans. These plans are compared against the base case (no-action plan) as well as against each other (see Table 17 below). As noted in the preceding chapter, the plans represent a cost effective means of increasing the flow capacity in the main channel up to a point where a major "break in the cost curve" occurs. The Willow Glen Plan provides the least amount of additional flow capacity and likewise removes the least amount of land, approximately 400 acres, from the 100-year floodplain. It also has the least amount of negative impacts associated with the construction and land acquisition activities. Only one residential structure needs to be relocated and 2 acres of riparian habitat are impacted. The Bypass Channel Plan, on the other hand, provides the most additional channel capacity and removes 2,000 acres from the 100-year floodplain, five times as much as the Willow Glen Plan. But it also impacts the most riparian habitat and requires that 13 residences and 16 commercial businesses be relocated.

These results are not surprising in that providing much needed flood control protection in a heavily urbanized area will be costly and have some negative impacts. Furthermore, negative impacts generally tend to increase with the level of flood protection. It should be noted that the Bypass Channel Plan was formulated to minimize the impacts to the riparian habitat. Thus, when the incremental negative impacts are weighed against the incremental additional protection, the Bypass Channel Plan has the least amount of negative impacts on riparian habitat per acre of land removed from the floodplain.

5.2 NED Analysis

Federal policy directs the Corps of Engineers to evaluate a range of plans and to determine which plan maximizes the economic benefits of public investment in a project. The cost-effectiveness of public investment is measured by comparing average annual economic benefits and costs. The plan with the greatest net benefits (difference between annual costs and benefits) is defined as the plan which maximizes national economic development (NED). This plan is defined as the NED plan, and is the plan which is normally recommended for construction in the absence of overriding considerations. The following sections present the NED analysis for the three alternatives.

NED Economic Benefits. The economic areas shown in Plate 1 are consistent with the floodplain maps and represent where the flood damages occur. Table 18 indicates the flood damages which are prevented by each alternative plan. Note that much of the flood damages prevented occur in economic area 2, which is the breakout from Ross Creek. Additional benefits include reduction in flood insurance administration costs, emergency costs during floods, advance replacement of bridges and current maintenance costs.

Table 17 - Summary of Major Impacts

Impact	No-Action Plan	Willow Glen Plan (9,000 cfs)	Valley View Plan (12,000 cfs)	Bypass Channel Plan (14,600 cfs)
Real Estate Impacts Total Lands Impacted	None	17 acres	42 acres	165 acres
Relocations of Residences Relocations of Businesses	None None	1 0	1 0	13 16
Riparian Habitat	None	2 acres	7 acres	9 acres
Cultural Resources	None	None known	None known	One potential site in Reach 11
Land Removed from 100-year Floodplain	0 acres	400 acres	1,300 acres	2,000 acres
Number of Structures **Protected** from Flooding (100-year Floodplain)	0	1,150	2,060	6,620

Average annual benefits were computed based on a discount rate of 7-1/8% over a 50-year project life. Annual benefits are summarized in Table 19 and are explained in more detail in the Economics Appendix. Note that the vast majority of the benefits are due to flood damage reduction.

Table 18 - Average Annual Flood Damages Prevented by Economic Area ($1,000) - Based on Future Hydraulic Conditions at Oct 1995 Price Levels

Economic Area	Willow Glen Plan (9,000 cfs)	Valley View Plan (12,000 cfs)	Bypass Channel (14,600 cfs)
1	1,676	1,946	2,202
2	8,947	10,146	11,201
3	1,742	1,870	1,928
4	1,313	2,213	3,113
5	0	230	863
Total	13,678	16,405	19,307
Total at 1997 Price Level	14,460	17,343	20,411

Table 19 - Summary of Total Annual NED Benefits Based on Expected Damages ($1,000) **at 1997 Price Levels**

Benefit Category	Willow Glen Plan (9,000 cfs)	Valley View Plan (12,000 cfs)	Bypass Channel (14,600 cfs)
Flood Damage Reduction	14,460	17,343	20,411
Emergency Flood Costs	282	293	328
Flood Insurance Savings	36	65	208
Traffic Impact Reduction	74	136	179
Current Maintenance	126	126	210
Bridge Replacement	156	350	570
Total NED Benefits	15,134	18,313	21,906

NED Cost Estimates. Cost estimates for the three candidate plans were prepared. Construction costs (including utility relocations) for the three plans are \$23.7, \$48.8 and \$77.8 million, respectively and are summarized in Table 20. Major cost features for each of the plans include channel widening, bridge replacements and real estate acquisition (see Table 21) costs. Mitigation costs have been estimated based on anticipated habitat replacement requirements.

MCACES cost estimates were prepared for all three plans in March 1995. An additional MCACES estimate was prepared for the Bypass Channel Plan in December 1996 and updated in December 1997 at the October 1997 price level. The figures for the Bypass Channel Plan in Table 20 are based on the December 1997 estimate. The March 1995 estimates for the two smaller plans were adjusted to be consistent with the December 1997 estimate.

Table 20 - Major Construction Costs (October 1997 Price Level, \$1,000)

Project Feature	Willow Glen Plan (9,000 cfs)	Valley View Plan (12,000 cfs)	Bypass Channel Plan (14,600 cfs)
Channel Work and Grade Control	8,662	24,672	37,318
Flood Walls	250	308	136
Bridge Modifications and Culverts	1,211	1,950	4,147
Misc. (local drainage, gates, fencing, etc)	184	297	300
RR Culverts @ Elks Lodge	112	0	0
Utility Relocations			
Public utilities	26	137	2,328
Bridge replacements	4,045	6,868	9,178
Roadway replacements	60	154	890
Subtotal	4,131	7,159	12,396
Recreation Features	0	0	1,676
Canoas Creek	1,356	1,356	1,356
Ross Creek	3,803	3,887	4,866
Mob and Demob	106	106	778
Mitigation	197	1,449	2,594
Subtotal	20,012	41,184	65,567
Contingency @ avg of 18.6%	3,729	7,673	12,203
Total Construction Costs*	23,741	48,857	77,770

*Subtotal costs include contract O/H @ 15%, contact profit @ 8%, and contract bond @ 1%.

Traffic Re-routing and Delay Costs: Each of the final alternatives includes bridge relocations and modifications. Bridge modifications may be accomplished without disruption to traffic. However, bridge replacements will result in temporary traffic detours. Each alternative has been designed to minimize disturbance of major traffic arteries and bridges. To reduce traffic disruption during construction, adjacent bridges will not be replaced simultaneously. Costs associated with traffic detours are summarized in the Economics Appendix.

Lands, Easements, Rights of Way, Relocations, and Disposal (LERRD) Costs: LERRD costs for the three plans include land costs, relocations assistance for residential and commercial relocations, and utility relocation costs. Costs for utility relocations were included in the major construction cost estimates as shown in Table 20. The Willow Glen Plan will require 47 acres, 15 of which are required for flowage easements in unimproved reaches. The Valley View Plan will require 58 acres, 10 of which are required for flowage easements in unimproved reaches, and the Bypass Channel Plan will require approximately 170 acres, none of which are required for flowage easements in unimproved reaches. LERRD costs are approximately $30.8 million ($25.9 million for lands and relocations assistance for a single residential building, and $4.9 million for utility relocations) for the Willow Glen Plan, $38.8 million ($30.3 million for lands and relocations assistance for a single residential building, and $8.5 million for utility relocations) for the Valley View Plan and $64.2 million ($49.5 million for lands and relocations assistance for 13 residential buildings and 16 businesses, and $14.7 million for utility relocations) for the Bypass Channel Plan. Therefore, LERRD costs are equivalent to approximately 56 percent, 41 percent and 42 percent, of the estimated total NED project costs for each of the respective plans.

Interest During Construction Costs: Interest during construction (IDC) is an opportunity cost of the money used for project construction prior to completion of the project. IDC includes costs for construction, land, relocations, mitigation, and other elements. IDC was computed over the construction period for each alternative. Because the Willow Glen Plan is the smallest plan, its construction period is the shortest at only one year. The Valley View and Bypass Channel Plans are more complicated and would both require approximately three years for construction. The major NED cost features, including IDC, are summarized in Table 21 and are described below.

Operation and Maintenance Costs: Operation and Maintenance (O&M) is an expense which is incurred on an annual basis. The O&M requirements for each plan include annual inspections and routine maintenance of bridges, maintenance roads, floodwalls, channel slopes, and rock weirs. Vegetation, sediment, trash and debris removal are also included in the annual maintenance costs. The Bypass Channel Plan O&M requirements also include routine repairs associated with recreation features, including daily maintenance of restrooms.

.Average annual O&M costs are estimated to be $100,000 for the Willow Glen Plan, $221,000 for the Valley View Plan, and $482,000 for the Bypass Channel Plan. Because there is no first cost associated with O&M, these costs are not reflected in Table 21. They are, however, included in the average annual costs which appear in Table 22.

Table 21 - Summary of the Major NED Cost Features - First Costs (October 1997 Price Level, $1,000)

Project Feature	Account	Willow Glen Plan (9,000 cfs)	Valley View Plan (12,000 cfs)	Bypass Channel Plan (14,600 cfs)
Lands & Damages	1	25,848	30,299	49,496
Utility Relocations 1/	2	4,899	8,491	14,685
Subtotal LERRD		30,747	38,790	64,181
Fish & Wildlife Facilities 1/	6	234	1,719	3,076
Recreation Facilities 1/	14	0	0	2,000
Floodway Control & Diversion Structures 2/	15	18,608	38,648	58,008
E&D	30	2,000	2,800	3,500
S&I	31	399	1,196	1,533
Traffic Re-routing/delay		793	2,613	2,699
Interest During Construction		1,640	8,826	18,865
TOTAL COSTS		54,421	94,592	153,862

1/ These figures reflect those individual items shown in Table 20 with an18.5% contingency.
2/ These figures reflect the total shown in Table 20 less the utility relocations.

Net NED Benefits and Benefit-to-Cost Ratios. Net benefits and Benefit-to-Cost Ratios (BCRs) are presented in Table 22. Average annual costs and benefits were computed based on a discount rate of 7-1/8% over a 50-year project life. Average annual benefits are based on an analysis of a reduction of flood damages and other associated costs. The Economics Appendix summarizes the benefits analysis. The difference between average annual benefits and costs yields annual net benefits. Table 22 indicates that the Valley View Plan maximizes net benefits. The benefit to cost ratios are shown in Table 22 below.

Table 22: NED Benefit-to-Cost Ratios Based on Expected Damages ($1,000)

	Willow Glen Plan (9,000 cfs)	Valley View Plan (12,000 cfs)	Bypass Channel (14,600 cfs)
Avg Annual Benefits	15,134	18,313	21,906
Avg Annual Costs 1/	4,040	7,118	11,452
Net Benefits	11,094	11,195	10,454
Benefit-to-Cost Ratio 2/	3.7	2.6	1.9

1/ Average annual costs include annual O&M estimates and exclude the costs associated with relocations assistance.
2/ In order to quantify the sensitivity of the benefits to the upstream build-out assumptions, average annual benefits and BCRs associated with current hydraulic flows (present damages) were computed, as discussed in the Economics Appendix. Using present damages, the BCR for the Bypass Channel Plan drops from 1.9 to 1.8, and is therefore not sensitive to the upstream build-out assumption.

5.3 Recreation Cost Analysis.

The City of San Jose is interested in developing recreational opportunities within the highly urbanized study area. The city is coordinating their efforts with the Corps of Engineers' and the Santa Clara Valley Water District's flood control planning process. Recreation opportunities were not considered during the formulation of flood protection alternatives, but once formulated, the addition of recreation features was considered for each alternative.

The City of San Jose has planned a comprehensive recreation network in and around the study area; see Figure 9. Most of the planned trails are either: (1) dependent upon acquisition of a flood control right of way along the upper Guadalupe River, or (2) proposed bicycle lanes on city streets. Neither the Willow Glen Plan nor the Valley View Plan would provide sufficient property acquisition for an uninterrupted recreation trail. However, implementation of the Bypass Channel Plan would enable San Jose to develop a continuous recreation trail within the study reaches.

Recreation costs and benefits were not included in the NED analysis above. However, Federal policy allows full consideration of recreation as a project purpose, as legislated by Section 4 of the Flood Control Act of 1944, as amended; the Federal Water Project Act of 1965, Public Law 89-72, as amended; and the Water Resources Act of 1986. Therefore, recreation was included in the planning process, and the costs and benefits associated with recreation are presented below. A description of the recreation features is provided in Section 7.2.

Recreation Economic Benefits. In addition to benefits associated with flood damage reduction, reduction in flood insurance costs, reduction in emergency costs during floods, advance replacement of bridges and reduction in current maintenance costs, recreation benefits were developed for the Bypass Channel Plan. For modest added costs, the Bypass Channel Plan can provide substantial recreational benefits of approximately $3.0 million per year. These benefits are based on anticipated use of the proposed recreational facilities. The Economics Appendix presents the recreation benefits analysis. Average annual benefits were computed based on a discount rate of 7-1/8% over a 50-year project life. Annual benefits including recreation are summarized in Table 23.

Recreation Cost Estimates. In addition to the major cost features including channel widening, bridge replacements and real estate acquisition costs, the cost increment associated with recreation for the Bypass Channel Plan was computed to be $2.0 million (including contingencies), or $147,200 per year. No additional real estate or mitigation is required for the implementation of the recreation features; therefore, the only increase in costs is realized in the construction cost subtotal. Inclusion of recreation features increases the construction cost of the Bypass Channel Plan from $75.8 million to $77.8 million.

Table 23 - Summary of Total Annual Benefits *Including Recreation* ($1,000)

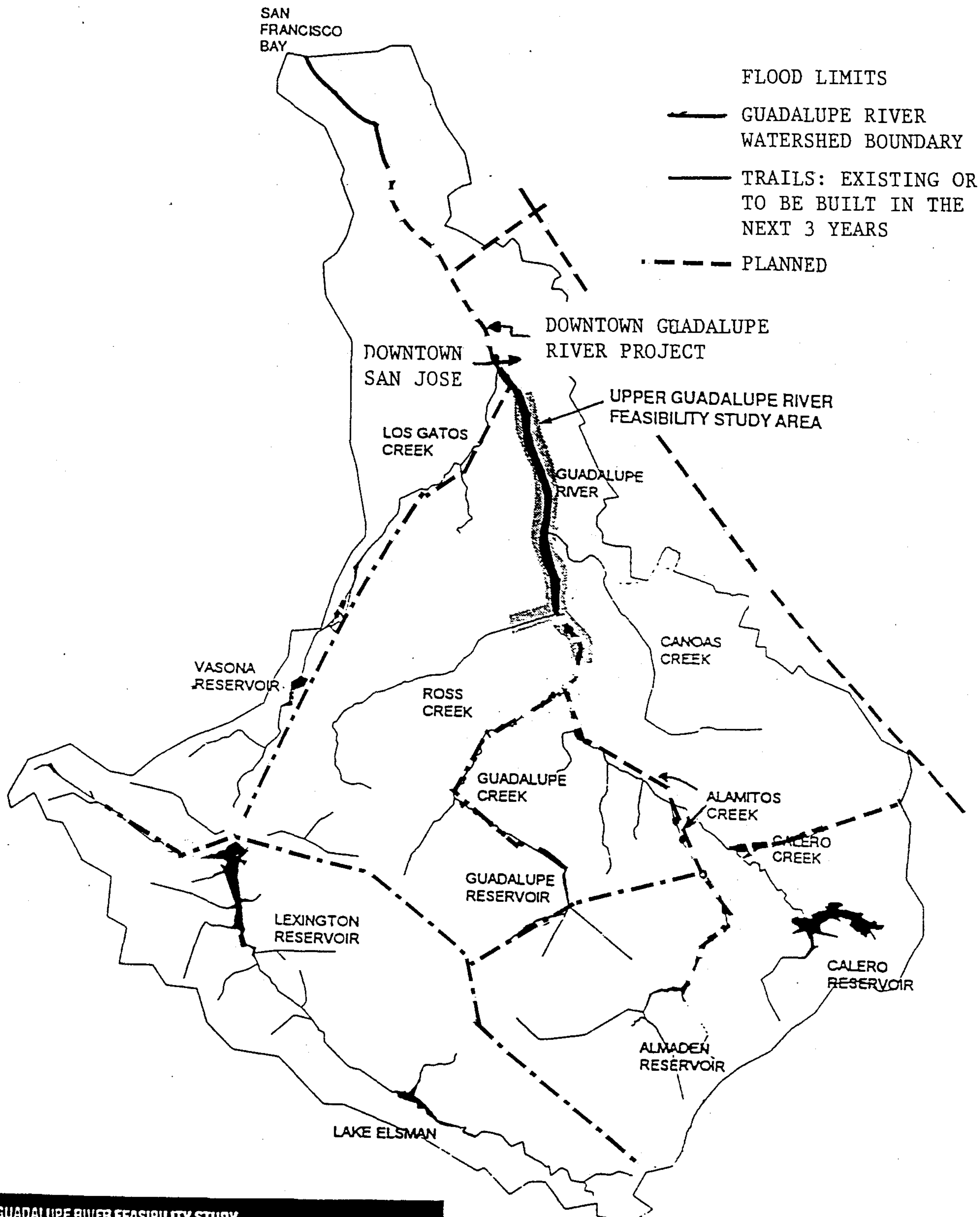
Benefit Category	Willow Glen Plan (9,000 cfs)	Valley View Plan (12,000 cfs)	Bypass Channel (14,600 cfs)
Flood Damage Reduction	14,460	17,343	20,411
Recreation	0	0	3,018
Emergency Flood Costs	282	293	328
Flood Insurance Savings	36	65	208
Traffic Impact Reduction	74	136	179
Current Maintenance	126	126	210
Bridge Replacement	156	350	570
Total NED Benefits	15,134	18,313	24,924

Net Recreation Benefits and Benefit-to-Cost Ratio. Net benefits and Benefit-to-Cost Ratios (BCRs) associated with the recreation features of the Bypass Channel Plan are presented in Table 24. Average annual costs and benefits were computed based on a discount rate of 7-1/8% over a 50-year project life. The benefit to cost ratios are shown in Table 24 below.

Table 24: Benefit-to-Cost Ratios *Including Recreation* ($1,000)

	Willow Glen Plan (9,000 cfs)	Valley View Plan (12,000 cfs)	Bypass Channel (14,600 cfs)
Avg Annual Benefits	15,134	18,313	24,924
Avg Annual Costs 1/	4,040	7,118	11,599
Net Benefits	11,094	11,195	13,325
Benefit-to-Cost Ratio 2/	3.7	2.6	2.1

1/ Note that average annual costs include O&M, but exclude the costs associated with relocations assistance.



UPPER GUADALUPE RIVER FEASIBILITY STUDY

Figure 9 The Guadalupe River Watershed. Recreation Trail Network

6.0 TRADE-OFF ANALYSIS

6.1 Introduction

This section compares the candidate plans described above. The major elements of the plans are summarized and compared in terms of their contributions to the four accounts of National Economic Development (NED), Environmental Quality (EQ), Regional Economic Development (RED), and Other Social Effects (OSE). The alternative plans are then tested against four specific evaluation criteria described below. The plan(s) that establishes Federal interest is also identified.

System of Accounts

Four accounts are established to facilitate evaluation and display the effects of the alternative plans. These accounts are described below.

National Economic Development (NED): The NED account shows the effects on the national economy. Project cost comparisons and benefit-to-cost comparisons are included under this account.

Environmental Quality (EQ): The EQ account shows the effects on ecological, cultural, and aesthetic attributes of significant natural and cultural resources that cannot be measured in monetary terms.

Regional Economic Development (RED): The RED account shows the effects the proposed plans could have on regional economic activity.

Other Social Effects (OSE): The OSE account shows the project's urban and community impacts and effects on life, health, and safety.

Associated Evaluation Criteria

During plan evaluation, the alternative plans are tested against four specific criteria. These criteria are defined in the following paragraphs.

Acceptability. The acceptability of a plan is determined by evaluating its acceptance by the concerned public. A plan is acceptable if it is, or would likely be, supported by a significant segment of the public.

Completeness. Plan completeness is determined by analyzing whether all necessary investments or other actions necessary to attain the full plan have been included.

Effectiveness. Plan effectiveness is determined by analyzing how well it satisfies the planning objective(s) and contributes to the System of Accounts.

Efficiency. The efficiency of a plan is its ability to achieve the planning objective(s) and the NED outputs in the least costly manner.

6.2 Trade-offs Among Final Alternatives

The trade-off analysis compares how the implementation of each alternative is distinguished from all other alternatives. The trade-offs considered include the achievement of the study planning objective(s), the economic benefits versus the costs associated with implementation, and the environmental and other social effects associated with each alternative. Table 25 summarizes the trade-offs considered using the System of Accounts.

The No-Action Alternative would not meet the planning objectives to reduce flood damages or provide recreation opportunities along the upper Guadalupe River. No construction costs, economic benefits, or environmental impacts would result from this alternative.

While all three action alternatives would meet the objective to reduce flood damages, only the Bypass Channel Plan meets the second objective of providing recreation opportunities in the study area.

As one might expect, the impacts, benefits, and costs increase with the size of the project. The short-term disruptions to individuals due to construction noise, inconvenience, and relocations are greatest for the Bypass Channel Plan. Conversely, the extent of flood protection associated with this plan provides significantly greater long-term protection of life, health and safety than either of the other two plans.

Because the Bypass Channel Plan is the largest plan considered, it would impact more total acres of riparian habitat than either of the other two plans. However, the use of bypass channels throughout the study area successfully preserves the existing riparian habitat by avoiding any disturbance to it wherever possible. Through careful mitigation planning, the Bypass Channel Plan provides an opportunity to restore the riparian habitat to a continuous condition. Neither the Willow Glen nor the Valley View Plan provide that opportunity. Over the short-term, the construction activities and removal of vegetation associated with the Bypass Channel Plan will have the greatest negative aesthetic impacts within the study area. However, the restored riparian habitat associated with the Bypass Channel Plan will provide long-term aesthetic improvements which neither of the other plans could provide.

The local community is very sensitive to the environment and has provided comments on the Bypass Channel Plan through numerous public meetings/workshops. Public comments have indicated that bypass channels are preferred to channel widening measures. Such public comments were responsible, in part, for the incorporation of the bypass feature in the design. By using bypass structures rather than widening the existing channel, impacts to the riparian habitat are avoided altogether in portions of Reaches 7-9 and 11. Therefore, the public prefers the Bypass Channel Plan as the plan that would least impact the existing riparian habitat. Also, given the two significant floods in 1995, the local community is very supportive of a flood protection project.

In addition to environmental considerations, the local sponsor finds the Bypass Channel Plan to be more acceptable than either the Willow Glen or Valley View plans. Neither of the smaller plans provide satisfactory levels of flood protection, recreation opportunities, or continuous maintenance access to the channel.

6.3 NED Plan

By definition, the plan which maximizes the net benefits is identified as the National Economic Development (NED) Plan. The plans were formulated to minimize the costs of providing additional channel capacity below a major flow constraint. Table 25 presents the net benefits for all plans, which range from a low of $10,454,000 to a high of $11;195,000. Total NED costs are approximately $54.4 million, $94.6 million and $153.9 million, for the Willow Glen, Valley View and Bypass Channel Plans, respectively.

Guidance provided during review of this report indicates that recreation outputs associated with this project are a low priority and are not to be considered in the determination of the NED Plan. If the NED plan is to be determined based solely on the purpose of flood control, the Valley View Plan maximizes net NED benefits. Thus, the Valley View Plan is the NED Plan.

6.4 Locally Preferred Plan (LPP)

The NED Plan would be very efficient with a benefit-to-cost ratio estimated at 2.6 to 1.0. However, the NED Plan would not be very effective, removing only 1,300 acres and 27 percent of existing structures from the 100-year floodplain, when compared with the Bypass Channel Plan which would remove 2,000 acres and 88 percent of the existing structures from the floodplain (see Table 17). Although the NED Plan is efficient, it is not very effective in removing the flood threat from larger storm events. This is particularly important given that the study area is highly urbanized and already fully developed. The local sponsor wishes to implement a plan which would maximize protection. The Bypass Channel Plan is an efficient plan, with a benefit-to-cost ratio estimated at 1.9 to 1.0. Because it maximizes protection while also being efficient, the Santa Clara Valley Water District has identified the Bypass Channel Plan as the Locally Preferred Plan (LPP).

TABLE 25
SYSTEM OF ACCOUNTS COMPARISON

	Willow Glen Plan	Valley View Plan	Bypass Channel Plan	No Action
NATIONAL ECONOMIC DEVELOPMENT				
Total Avg Annual Benefits	$15,134,000	$18,313,000	$21,906,000	N/A
Total Avg Annual Costs	$4,040,000	$7,118,000	$11,452,000	N/A
Total Net Benefits	$11,094,000	$11,195,000	$10,454,000	N/A
Benefit-To-Cost Ratio	3.7	2.6	1.9	N/A
ENVIRONMENTAL QUALITY				
PHYSICAL ENVIRONMENT	Temporary noise/air pollution during construction. Moderate traffic disruption. Limited use of floodwalls.	Temporary noise/air pollution during construction. Moderate traffic disruption. Limited use of floodwalls.	Temporary noise/air pollution during construction. Greatest traffic disruption. Moderate use of floodwalls.	No change from existing conditions.
BIOLOGICAL ENVIRONMENT	Minor short-term negative impacts. Minor long-term positive impacts. Loss of 1.8 acres riparian forest. Replace 2.7 acres. Minimal improv ment to degraded riparian habitat.	Moderate short-term negative impacts Moderate long-term positive impacts. Loss of 8 acres riparian forest. Replace 12.1 acres. Moderate impro ment to degraded riparian habitat.	Greatest short-term negative impacts & long-term positive impacts. Loss o 11.3 acres riparian forest. Replace 22. Greatest improvement to degraded habitat and removal of fish barriers.	No change from existing degraded conditions.
CULTURAL RESOURCES	Some potential disturbance to cultural resources expected.	Moderate potential disturbance to cultural resources expected.	Highest potential for disturbance to cultural resources expected.	No change from existing conditions.

TABLE 25 (Continued)
SYSTEM OF ACCOUNTS COMPARISON

	Willow Glen Plan	Valley View Plan	Bypass Channel Plan	No Action
REGIONAL ECONOMIC DEVELOPMENT				
Local Government Finance	SCVWD to provide non-Federal share of funds.	SCVWD to provide non-Federal share of funds.	SCVWD to provide non-Federal share of funds.	N/A
Economic Development	Some additional employment during construction.	Some additional employment during construction.	More additional employment during construction.	No change from existing conditions.
Industrial Growth	No significant impact.	No significant impact.	No significant impact.	No change from existing conditions.
Population Growth	No significant impact.	No significant impact.	No significant impact.	No significant impact.
OTHER SOCIAL IMPACTS				
Public Health and Safety	Least reduction to risk of injury or loss of life related to floods.	Moderate reduction to risk of injury or loss of life related to floods.	Greatest reduction to risk of injury or loss of life related to floods.	No change from existing conditions.
Aesthetics	Permanent floodwalls in Reaches 7 & 8 and Ross Creek. Riprap along parts of channel. Removal of least vegetation.	Permanent floodwalls in Reaches 7 & 8 and Ross Creek. Riprap along parts of channel. Removal of more vegetation.	Permanent floodwalls in Reaches 7 & 10b and Ross Creek. Riprap minimized due to bypasses. Removal of more vegetation.	No change from existing conditions.
Recreation	No significant opportunities for recreation.	No significant opportunities for recreation.	Greatest opportunities for recreation w/ continous riverside recreation trail.	No change from existing conditions.
EVALUATION CRITERIA				
Acceptability	No issues.	No issues.	No issues.	N/A
Completeness	No issues.	No issues.	No issues.	N/A
Effectiveness	Meets flood protection objective. Does not meet recreation objective. Satisfies NED Account.	Meets flood protection objective. Does not meet recreation objective. Satisfies NED Account.	Meets flood protection objective. Meets recreation objective. Satisfies NED Account.	N/A
Efficiency	Least efficient plan.	Most efficient plan.	Moderatly efficient plan.	N/A

6.5 Selection of the Recommended Plan

The Santa Clara Valley Water District supports the arguments that there is a substantial justification for the construction of the Bypass Channel Plan and has selected the Bypass Channel Plan as the Locally Preferred Plan. In addition to being very effective, the Bypass Channel Plan fully meets the Federal flood protection objectives. Therefore, the San Francisco District recommends that the Locally Preferred Plan, the Bypass Channel Plan, be constructed. However, the Federal share of the cost of the Recommended Plan would be limited to the Federal share of the cost of the NED Plan. Table 26 summarizes the performance of the NED and the LPP plans.

Table 26 - Comparison of the NED (Valley View) and LPP (Bypass Channel) Plans ($1,000)

Condition	Valley View (NED)	Bypass Channel (LPP)	Increment Provided By Bypass Channel Plan
Land removed from 100-yr floodplain (2,300 acres)	1,300 acres removed	2,000 acres removed	700 additional acres removed
Structures removed from 100-yr floodplain (7,500 total)	2,060 removed	6,620 removed	4,560 additional removed
Total Cost-Shared Costs	$83,154	$132,298	$49,144
Federal	$54,050	$66,149	$12,099
Non-Federal	$29,104	$66,149	$37,045
Average Annual Cost	$7,118	$11,599	$4,481
Flood Control	$7,118	$11,452	$4,334
Recreation	$0	$ 147	$ 147
Average Annual Benefits	$18,313	$24,924	$6,611
Flood Control	$18,313	$21,906	$3,593
Recreation	-	$3,020	$3,020
Net Benefit w/rec.	$11,195	$13,325	$2,130
Total Residual Damages ($1995)	$8,319	$5,417	$2,902
Economic Area 1	$364	$108	$ 256
Economic Area 2	$1,617	$562	$1,055
Economic Area 3	$181	$123	$ 58
Economic Area 4	$5,100	$4,200	$ 900
Economic Area 5	$1,057	$424	$ 633

A review of Table 26 indicates that implementation of the NED plan would leave significant portions of an urban area within the post-project floodplain, while the LPP would minimize the acreage and number of structures left within the floodplain. As compared with the NED plan, the LPP would have a more significant impact on the local planning environment and would result in a greater reduction of the overall risk from flooding to the urban area. The details of these comparisons are discussed below.

Limit of Protection Provided by NED Plan: The 100-year floodplain within the study area encompasses approximately 2,300 acres of fully developed land. Approximately 7,500 structures are located within this floodplain. Over 90% of these structures (6,900) are residential. Residual floodplains for the Valley View and the Bypass Channel Plans are shown as Plates 5 and 6. These plates indicate that if the Valley View Plan were implemented, a significant portion of the 100-year floodplain would be left unprotected. The Valley View Plan would remove 1,300 acres of land and 2,060 structures from the floodplain, leaving approximately 1,000 acres and over 5,400 structures within the post-project floodplain. Implementation of the Bypass Channel Plan would remove 2,000 acres and 6,620 structures from the post-project floodplain, leaving about 880 structures in the floodplain. Thus, the Bypass Channel Plan would remove three times as many buildings from the floodplain as the Valley View Plan.

Changes to Local Planning Environment: Implementation of the Bypass Channel Plan would reduce total expected damages by 78%, which is a 12% increase over the protection offered by the Valley View Plan. The Bypass Channel Plan significantly reduces the residual flooding in all of the study reaches. Implementation of the Bypass Channel Plan would reduce the extent of the 100-year floodplain and may encourage proper redevelopment in sections of the eastern floodplain. Furthermore, implementation of the Bypass Channel Plan improves critical habitat for the threatened steelhead trout; protects government facilities and transportation structures which are critical to the local, regional, and national economy; and provides a link in the overall flood control system for the Guadalupe River which is compatible with other Federal projects in the watershed. Implementation of the NED plan would not result in these same benefits.

Finally, implementation of the NED Plan would be incongruous with the Corps' Downtown San Jose project, which is located approximately one mile downstream of the proposed Upper Guadalupe project. The downtown project, which is currently under construction, will provide "100-year" protection, while the NED Plan would provide only "50-year" protection. Implementation of the Bypass Channel Plan would eliminate the appearance of inequitable protection for residents of a single municipality.

Risk Reduction: Both the LPP and the NED Plans are essentially incised channel projects with limited use of floodwalls. Although incised channels may be overtopped if design flows are exceeded, the risk of catastrophic failure, such as a levee breach, is negligible. The LPP design meets the FEMA requirements for certification since the floodwalls have at least a 90 percent chance of containing flows associated with a 100-year event. However, because the NED Plan's capacity is less than that of the LPP, the NED Plan would not meet the FEMA requirements for certification.

Residual flooding associated with both the LPP and the NED Plan occurs due to flows in the upstream portion of Canoas Creek. In order to minimize the risk associated with the residual flooding, the sponsor must continue to comply with the National Flood Insurance Program. To further minimize this risk, it is recommended that the sponsor implement floodplain management and zoning measures where feasible, and prepare a flood warning and evacuation plan.

7.0 THE RECOMMENDED PLAN

7.1 General

The recommended plan (Bypass Channel Plan) is designed to carry 11,400 cfs between Blossom Hill Road and Ross Creek; 12,400 cfs between Ross Creek and Canoas Creek; and 14,600 cfs below Canoas Creek. This plan emphasizes preservation of existing riparian vegetation. Plate 9 illustrates all of the proposed features, which are described below.

7.2 Plan Description

The Bypass Channel Plan is the plan recommended to alleviate the damages associated with flooding along upper Guadalupe River. The features of this plan are described below.

Bypass Channel Plan (14,600 cfs)

The Bypass Channel Plan features a bypass channel, channel widening, levee and floodwalls designed to contain the 100-year discharge on the upper Guadalupe River and Ross Creek. Channel widening will be limited to one bank in most cases to preserve as much as possible of the existing riparian habitat. A schematic of the Bypass Channel Plan is shown in Plate 9. The plan is described below.

<u>SPRR Bridge to 500' upstream of Willow Street:</u> Improvements to this project section will include an 18'-deep bypass channel with an 85'-wide floodway and 1:1 side slopes.

<u>500' upstream of Willow Street to Alma Street:</u> Improvements to this project section will consist of a combined natural and bypass channel. An 18'-deep bypass will be combined with a 30'-wide floodway, each with 1:1 side slopes. The surface elevation of the embankment between the bypass and natural channel would allow transfer of floodwaters between the two alignments during high flows.

<u>Alma Street to UPRR Bridge:</u> A gabion-lined bypass channel will be built through the existing Elks Lodge parking lot.

<u>UPRR Bridge to Willow Glen Way:</u> An 18'-deep bypass with 85'-wide channel floodway with 1:1 side slopes will be built between the railroad bridge and Willow Glen Way.

<u>Willow Glen Way to Blossom Hill Road:</u> Improvements to this project section will include channel widening, a bypass channel, limited levees/floodwalls, and bridge replacements. The bank to bank width of the project will range from 75 feet to 200 feet, 4-10 feet above the invert.

Canoas Creek: Canoas Creek will be improved to alleviate flooding associated with backwater effects from the mainstem Guadalupe River. Culverts will be added to the Nightingale Drive and Almaden Expressway bridges, and floodwalls will be added between those two streets.

Ross Creek: Improvements to Ross Creek will include new culverts and channel widening. The channel bottom width will be excavated to 35 feet from Almaden Expressway to a point 750 feet upstream of Jarvis Avenue. The existing 12'W x 10'H x 210'-long box culvert at Almaden Expressway will be replaced with a 20'W x 10'H x 210'-long culvert. At Jarvis Avenue two12'W x 9.5'H culverts will be installed in addition to the existing 12'W x 9.5'H culvert.

Betterments: The project requires that the Hillsdale Avenue bridge be replaced by a bridge with a larger opening. The SCVWD desires to eliminate the Hillsdale bridge altogether and replace it with a bridge with a larger traffic capacity at a location several hundred feet downstream from the existing Hillsdale Avenue bridge location. The new bridge would be located at the planned extension of Pearl Avenue. The new Pearl Avenue bridge will be an improvement over the existing Hillsdale Avenue bridge, and is therefore considered to be a betterment.

The replacement of the Hillsdale Avenue bridge is a utility relocation which is a local LERRD responsibility for which the SCVWD will receive credit toward their contribution. However, since the Pearl Avenue bridge is a betterment, the local sponsor will not receive credit for the cost increment over the cost of an in-kind replacement of the Hillsdale Avenue bridge. All costs reflected in the NED analysis correspond to an in-kind replacement of the Hillsdale Avenue bridge. A separate cost estimate was developed for the construction of the larger Pearl Avenue bridge. This cost was used to determine the cost apportionment for the proposed project.

Recreation: A recreation trail will be paved on the surface of gravel based maintenance access roads which are required for the proposed project. The trail will follow the maintenance road and portions of the bypass channels and levees within the project area. In order to provide a continuous pathway, portions of the trail will leave the project lands and will be provided off-site on city streets by the City of San Jose. Additional recreation features, such as picnic areas and bathrooms, will be included in the overall recreation plan. These additional features are to be provided on lands which are required for channel access, mitigation, and flowage areas between proposed bypass channels and the existing channel.

The major features of the recreation plan include 4.3 miles of paved trail,1620 feet of railing, and 3800 feet of chain-link fencing. Two picnic areas with a total of 6 picnic tables and two restrooms with drinking fountains will be provided on project lands. Two pedestrian / bicycle bridges will be constructed to cross the river. Additional features will include exercise stations; safety lighting; call boxes; vehicle barriers; trash cans; various directional, rule and interpretive signs; additional picnic tables; and benches.

7.3 Risk and Uncertainty

The uncertainty and variability associated with the upper Guadalupe River project is similar to that associated with many flood control projects. Due to the complexity of factors associated with a storm, the flow for a particular storm cannot be known with certainty. Likewise, the stage for a given flow can vary. For these reasons, no project can ever provide guaranteed full protection against all events. While the project will reduce the risk of flooding, it will not eliminate it. Technology now available allows us to identify the probability of experiencing flood damages with the project in place. For example, with the Bypass Channel Plan design in place, it is still possible to experience some flooding associated with a "100-year event". The Hydrology and Hydraulics Analysis appendix tabulates the probability of overtopping the project at various locations for a variety of storm magnitudes.

Without this project in place, a "100-year" event is expected to cause approximately $280 million in damages, which translates to $24.7 million on an average annual basis. With the project in place, the expected damages for a "100-year" event will be reduced from $24.7 million to approximately $5.4 million per event. The Economic Analysis Appendix describes the risk-based analysis (RBA) used to evaluate project benefits.

7.4 Project Impacts and Mitigation

The impacts of the recommended plan are discussed in the Environmental Impact Statement/Report (EIS/R). These impacts and appropriate mitigations are summarized below.

a. <u>Erosion</u>. Short-term impacts are expected to be less than significant as long as major earthwork is performed between May and October and exposed soils are stabilized during construction. Gabions or cribwalls will be used in areas with steep slopes in order to ensure that the long-term impacts are less than significant.

b. <u>Habitat</u>. In response to the draft Coordination Act Report submitted by the USFWS, approximately 27.5 acres (22.4 acres of riparian forest, 3.6 acres of urban forest, and 1.5 acres of wetland habitat) will be replanted in order to mitigate for impacts to these habitat types. An additional 0.95 acres of wetland will be restored by the SCVWD at local expense. Refer to the EIS for a full description of habitat impacts.

c. <u>Cultural Resources</u>. One site within the area of potential effect has been identified as eligible for the National Register of Historic Places. This site was disturbed during a previous construction activity, therefore, disturbance is expected to be minimal. Early tools have been recently discovered in Reach 11, but it is not yet known whether it is eligible for the National Register. This site is located beneath a building which is going to be removed from the project area during construction. A site survey will be performed at the time the building is removed in order to determine whether or not the site is eligible for the National Register.

Construction sites near the study area such as the joint Corps Sacramento District/SCVWD downtown Guadalupe River Project, the CalTrans Tamien Light Rail Station, and some State Highways projects, have encountered buried cultural resources. It is reasonable to expect that cultural resources will be encountered during construction, therefore, a cultural resources plan is being developed and will be implemented during the preconstruction engineering and design project (PED) and construction phases, as appropriate. This plan includes a site survey of a site in Reach 11 where early tools have been discovered.

d. Utility Replacements. Water and sewer lines will be disturbed during the construction of the bypass culvert. All utility lines that are affected will be replaced by lines of the same size as those existing prior to construction. Residents living in the vicinity of the construction will be provided with temporary utility hook-ups during construction in order to avoid any long-term disruptions to utility service. Table 27 lists the relocation and replacement requirements by reach for roads, bridges, and utilities.

e. Relocations of Residents. The Bypass Channel Plan will permanently displace 13 residential buildings and 16 commercial buildings. Costs associated with relocation assistance are included in the real estate costs associated with this plan.

f. Traffic Disruptions. The Bypass Channel Plan was formulated to avoid impacts to major thoroughfares and bridges. However, implementation of the plan will require that five neighborhood bridges be removed and replaced. No bridge is more than a fraction of a mile from an alternate bridge, and adjacent bridges will not be out of service simultaneously. Traffic re-routing will be conducted with the assistance of a traffic controller.

g. HTRW. HTRW sites are expected to be encountered in Reaches 7, 10, and 12. A project-specific remediation plan will be developed to reduce the contaminant concentrations to acceptable levels. The local sponsor will be responsible for implementing the plan prior to initiation of construction.

7.5 Real Estate Requirements

Approximately 170 acres of land are required for implementation of the Recommended Plan. About 160 acre have been appraised as tantamount to fee, while temporary work area easements are required for the remaining 10 acres. Relocations of utilities and residents are discussed above under Project Impacts. An attorney's opinion of compensibility has been prepared which states that there is a compensable interest in utilities to be relocated.

No new lands are required for the recreation features of the Bypass Channel Plan. The design of the recreation trail has been coordinated with the City of San Jose, and brief stretches of the trail will be located off-site, but will be the sole responsibility of the City of San Jose. These stretches are limited to striping of existing city streets and the placement of signs along the trail. All of the recreation features proposed for the Bypass Channel Plan will be constructed on project lands which are required for flood control purposes. Similarly, all mitigation features are located on project lands which are required for flood control purposes. Therefore, real estate costs associated with recreation and mitigation features are nominal.

Table 27: Utility Replacements & Modifications

Reach	Type	Approx. Location
7A	Willow Street Bridge removal & replacement	Willow Street
	Utility relocation - sanitary sewer, water lines, stormwater outfalls	Willow Street
	Temporary railroad relocation for culvert	SPRR Bridge
7B	Utility relocation - water lines, stormwater outfalls	Alma Ave. bridge
	Alma Avenue Bridge removal and replacement	Alma Ave. & Elks Lodge
8	Utility relocation - stormwater outfalls	Bypass channel
	Willow Glen Way Bridge removal and replacement	Willow Glen Way
	Temporary railroad relocation for culvert	UPRR Bridge
9	Utility relocation - SJWC booster pumps, 2 SJWC wells, stormwater outfalls	Willow Glen Way
10A	Curtner Avenue Bridge removal & replacement	Curtner Avenue
	Utility relocation - stormwater outfalls	Curtner Avenue
10C & D	Hillsdale Avenue Bridge removal & replacement	Hillsdale Avenue
	Utility relocation - sanitary sewer, stormwater outfalls	Sta. 889+20
11	Utility relocation/mod. - stormwater outfalls, SJWC pumping station improvements	Bryan Ave. Station
Canoas Creek	Roadway replacement for culvert addition/enlargement at two locations	Almaden Expwy. and Nightingale Drive
Ross Creek	Utility relocation - stormwater outfalls	N. bank only
	Roadway replacement for culvert addition/enlargement at two locations	Almaden Expwy. and Jarvis Avenue

7.6 Design and Construction Considerations

Following report approval, it is anticipated that the Preconstruction Engineering and Design, including preparation of plans and specifications, could be accomplished within two years. Upon subsequent negotiation of a Project Cooperation Agreement, acquisition of real estate, and receipt of construction funds, it is estimated that construction could be completed within 3 years. Major construction items would include rock-lined bypass channels, channel excavation, concrete floodwalls, the removal and replacement of five neighborhood bridges, the removal and replacement of underground utilities (water and sewer lines), and mitigation planting.

During the construction period, measures cited in Engineering Pamphlet 1165-2-501, "Environmental Policies, Objectives, and Guidelines for the Civil Works Program of the Corps of Engineers", would be followed to maintain public dialogue, minimize disturbance to environmental and cultural resources, ensure proper debris disposal methods, and restore the site. Safety measures would be taken to protect individuals present at the site or living in the vicinity of the construction area.

7.7 Operation, Maintenance, Repair, Replacement and Rehabilitation Requirements

Operation, maintenance, repair, replacement and rehabilitation (OMRR&R) of the flood control project is the non-Federal sponsor's responsibility, in accordance with provisions contained in the Water Resources Development Act of 1986 (PL 99-662). The OMRR&R requirements will be described in the Operations and Maintenance (O&M) Manual to be prepared by the Corps during the Preconstruction Engineering Design phase of study. SCVWD has prepared a preliminary maintenance plan which was used as the basis for estimating the total annual OMRR&R cost, currently estimated to be $482,000. The OMRR&R requirements for the selected plan include annual inspections and routine maintenance of bridges, maintenance roads, floodwalls, channel slopes, and rock weirs. Surveillance of project performance, to be accomplished by measures such as the periodic production of stage and discharge records, will also be required. Routine repairs for gabions, cribwalls, fencing, and recreation features (including daily maintenance of restrooms) are also included. Vegetation, sediment, trash and debris removal are also included in the annual maintenance costs.

7.8 Economic Considerations

Economic benefits and costs for the Bypass Channel Plan are summarized below.

A. <u>Summary of Benefits</u>. The flood control benefits associated with the selected plan are based on the following categories: 1) flood damage reduction to structures and their contents; 2) emergency flood response savings; 3) flood insurance administrative cost savings; 4) savings associated with current channel maintenance activities; 5) advanced bridge replacement benefits; and 6) reduction of transportation delays. The benefits for the Bypass Channel Plan are based on a 7-1/8 percent discount rate, and a 50-year period of economic evaluation. The methodology for the development of the benefits is presented in the Economics Appendix.

B. Summary of Costs: Construction costs for the selected plan were developed using the Corps of Engineers Micro-Computer Aided Cost Estimating System (MCACES). The MCACES summary report is presented in the Cost Estimates Appendix. Real estate costs were based on an appraisal of the current cost of acquisition. Details of the real estate cost estimate are included in the Real Estate Appendix. The price level of the MCACES cost estimate is October 1997.

A Fully Funded Estimate was developed based on the construction costs. The Fully Funded Estimate adjusts the construction costs for budget purposes to better anticipate the actual future costs recognizing the impact of future price levels. The Fully Funded Estimate is escalated to the mid-point of construction using OMB designated inflation rates.

Interest During Construction (IDC) is calculated using an 7-1/8% discount rate over an estimated construction period of three years. Costs included in the calculation of IDC include construction costs, the development of plans and specifications, engineering during construction, supervision and administration of construction, and economic real estate costs. The total IDC is $18.9 million at the October 1997 price level, or $1.4 million on an average annual basis using a capital recovery factor equal to 0.07361, which is based on a 7-1/8% discount rate and a 50-year period of economic evaluation.

C. Cost Allocation and Apportionment: All costs associated with the Valley View Plan are allocated to the flood control purpose. The Bypass Channel Plan allocates costs to flood control, recreation, and local betterments. All project features, except the features associated with recreation and betterments, are subject to a five-percent up-front cash contribution by the local sponsor. The sponsor is then responsible for all Lands, Easements, Rights of Way, Relocations, and Disposal (LERRD) and any cash contributions that may be required to bring the local share up to 35% of the total project cost. If the cash contribution plus the costs of LERRD are less than 35% of the project first costs, the local sponsor will pay the difference in cash. If the cash contribution plus the LERRD is greater than 50% of the project first costs, the project will be cost-shared at a rate of 50% Federal and 50% non-Federal. Recreation features associated with the Bypass Channel Plan will be cost-shared at a rate of 50% Federal and 50% non-Federal, and betterments are 100% non-Federally funded.

Normally, the Federal government participates in cost-sharing based on the cost of the NED Plan. However, since the Recommended Plan is different from the NED Plan, both are included in the cost allocation and apportionment summary. Table 28 itemizes the cost for the Valley View and the Bypass Channel Plans. Federal and non-Federal cost apportionment summaries are presented for both plans in Table 29. The Federal share of the cost of the Recommended Plan will be limited to the Federal share of the cost of the NED Plan.

TABLE 28
PROJECT COST SUMMARY
VALLEY VIEW AND BYPASS CHANNEL PLANS
($1,000)

		Valley View Plan (NED)		Bypass Channel Plan (LPP)	
Account	Item	Oct 97 Price Level	Fully Funded Estimate	Oct 97 Price Level	Fully Funded Estimate
1	Lands & Damages	30,300	36,179	49,496	59,100
2	Relocations	8,491	10,139	14,685	17,534
6	Fish & Wildlife Facilities	1,719	2,053	3,076	3,673
15	Floodway Control & Diversion Structures	38,648	46,147	58,008	69,264
14	Recreation Facilities	0	0	2,000	2,388
	Subtotal	79,158	94,518	127,265	151,959
30	E&D	2,800	3,343	3,500	4,179
31	S&A	1,196	1,428	1,533	1,830
	Total	83,154	99,289	132,298	157,968

* Valley View figures pro-rated from Mar 95 estimates as described in Sect. 5.2, NED Analysis.
* Lands and Damages associated with recreation and mitigation are nominal since all recreation and mitigation features will be implemented on project lands needed for flood control purposes.
* IDC and traffic delays not included.
* Fully funded to mid-point of construction (Nov 2003).

TABLE 29
COST APPORTIONMENT FOR THE
BYPASS CHANNEL AND VALLEY VIEW PLANS
($1000)

BYPASS CHANNEL PLAN
(LPP)

FIRST COST	FLOOD CONTROL			RECREATION			TOTAL COST SHARED			BETTERMENTS			TOTAL COSTS		
	Federal	Non-Federal	Total	Federal	Non-Federal	Total	Federal	Non-Federal	Total	Federal	Non-Federal	Total	Federal	Non-Federal	Total
Lands & Damages	-	49,496	49,496	-	-	-	-	49,496	49,496	-	-		-	49,496	49,496
Relocations	-	14,685	14,685	-	-	-	-	14,685	14,685	-	-		-	14,685	14,685
Construction	61,084	-	61,084	1,000	1,000	2,000	62,084	1,000	63,084	-	2,585	2,585	62,084	3,585	65,669
E&D	2,573	858	3,430	35	35	70	2,608	893	3,500	-	30	30	2,608	923	3,530
S&I	901	485	1,386	74	74	147	974	559	1,533	-	70	70	974	629	1,603
Subtotal	64,557	65,524	130,081	1,109	1,109	2,217	65,666	66,632	132,298		2,685	2,685	65,666	69,317	134,983
Cash Contributions	(6,504)	6,504		1,109	1,109		(5,396)	7,613			2,685		(5,396)	10,298	
Total	58,053	72,028	130,081	1,109	1,109	2,217	59,162	73,136	132,298		2,685	2,685	59,162	75,821	134,983
Percent of First Cost	45%	55%		50%	50%		45%	55%		0%	100%		44%	56%	
Final Adjustments	6,987	(6,987)		0	0	-	6,987	(6,987)	-	0	0	-	6,987	(6987.15)	-
Adjusted Total	65,041	65,041	130,081	1,109	1,109	2,217	66,149	66,149	132,298	-	2,685	2,685	66,149	68,834	134,983
Adjusted % of First Cost	50%	50%		50%	50%		50%	50%		0%	100%		49%	51%	

VALLEY VIEW PLAN
(NED PLAN)

FIRST COST	FLOOD CONTROL			RECREATION			TOTAL COST SHARED			BETTERMENTS			TOTAL COSTS		
	Federal	Non-Federal	Total	Federal	Non-Federal	Total	Federal	Non-Federal	Total	Federal	Non-Federal	Total	Federal	Non-Federal	Total
Lands & Damages	-	30,300	30,300	-	-	-	-	30,300	30,300	-	-		-	30,300	30,300
Relocations	-	8,491	8,491	-	-	-	-	8,491	8,491	-	-		-	8,491	8,491
Construction	40,367	-	40,367	-	-	-	40,367	-	40,367	-	-	-	40,367	-	40,367
E&D	2,100	700	2,800	-	-	-	2,100	700	2,800	-	-	-	2,100	700	2,800
S&I	777	419	1,196	-	-	-	777	419	1,196	-	-	-	777	419	1,196
Subtotal	43,244	39,910	83,154	-	-	-	43,244	39,910	83,154		-	-	43,244	39,910	83,154
Cash Contributions	(4,158)	4,158		-	-		(4,158)	4,158			-		(4,158)	4,158	
Total	39,087	44,067	83,154	-	-	-	39,087	44,067	83,154		-	-	39,087	44,067	83,154
Add'l Cash Contrib	14,963	(14,963)					14,963	(14,963)					14,963	(14,963)	-
Total	54,050	29,104	83,154				54,050	29,104	83,154				54,050	29,104	83,154
Percent of First Cost	65%	35%		0%	0%		65%	35%		0%	0%		65%	35%	

8.0 PLAN IMPLEMENTATION

8.1 General

In accordance with the Water Resources Development Acts of 1986 and 1996, project implementation requirements for the plans recommended for further study are summarized as follows:

Upon approval of the final report, funds will be provided (subject to availability) to initiate Preconstruction Engineering and Design, including the preparation of plans and specifications and necessary surveys and materials investigations. This would be followed by the preparation of a final project cost estimate by the District Engineer. At that time, a signed Project Cooperation Agreement (PCA) between the Corps of Engineers and the Santa Clara Valley Water District (SCVWD), the non-Federal sponsor, would be required. Upon execution of the agreement and acquisition of real estate, bids could be invited, and a contract could be awarded for construction. Following completion of construction, as-built drawings and an operation and maintenance manual will be furnished to the Santa Clara Valley Water District, which would be responsible for operation and maintenance of the project.

8.2 Division of Plan Responsibilities:

Section 211 of the Water Resources Development Act of 1996 (WRDA '96) provides specific non-Federal interests the opportunity to receive reimbursement for the construction of authorized flood control projects. Subparagraph (4) of Section 211 names the Upper Guadalupe River, California, project as a project which would be eligible for construction reimbursement. Corps policy states that Section 211 construction reimbursement is contingent upon approval by the Secretary of the Army of the plans for construction and the Secretary's determination that the project is economically justified and environmentally acceptable. This approval must be obtained prior to the initiation of construction of the work for which the reimbursement request will be made. Prior to negotiating a reimbursement agreement, the Secretary must notify the Committees on Appropriations of the House and the Senate. This notification must include the total commitment and the reimbursement requirements that the Administration intends to support in future budget submissions. As of the completion of this document, January 1998, the Santa Clara Valley Water District has not requested that Section 211 construction reimbursement be pursued for the construction of the Selected Plan. Therefore, Congressional authorization will be sought for Corps construction of the proposed project. The following Federal and non-Federal responsibilities must be met upon authorization.

A. Federal Responsibilities: The Corps of Engineers would be responsible for the following tasks:

(1) Conduct advance planning, engineering, and design studies.

(2) Prepare a Feature Design Memorandum.

(3) Prepare plans and specifications.

(4) Negotiate and execute a Project Cooperation Agreement.

(5) Contract and supervise construction.

(6) Prepare as-built drawings and O&M manual

(7) Conduct periodic inspection of the completed work with non-Federal interests to ensure proper operation and maintenance.

B. Non-Federal Responsibilities: As the sponsor for all project purposes, including flood control and recreation, the SCVWD would be responsible for the following tasks:

a. Provide a minimum of 35 percent, but not to exceed 50 percent, of total project costs as further specified below:

(1) Provide, during construction, a cash contribution equal to 5 percent of total project costs;

(2) Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations determined by the Federal Government to be necessary for the construction, operation, and maintenance of the project;

(3) Provide or pay to the Federal Government the cost of providing all retaining dikes, wasteweirs, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project; and

(4) Provide during construction any additional costs as necessary to make its total contribution equal to 35 percent of total project costs.

b. For so long as the project remains authorized, pay 100 percent of costs to operate, maintain, repair, replace, and rehabilitate the completed project or functional portion of the

c. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor now or hereafter owns or controls for access to the project for the purpose of inspection, and, if necessary after failure to perform by the non-Federal sponsor, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project. No completion, operation, maintenance, repair, replacement, or rehabilitation by the Federal Government shall operate to relieve the non-Federal sponsor of responsibility to meet the non-Federal sponsor's obligations, or to preclude the Federal Government from pursuing any other remedy at law or equity to ensure faithful performance;

d. Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the United States or its contractors;

e. Keep, and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 Code of Federal Regulations (CFR) Section 33.20;

f. Perform, or cause to be performed, any investigations for hazardous substances as are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for the operation, maintenance, repair, replacement, and rehabilitation of the project. However, for lands that the Federal Government determines to be subject to the navigation servitude, only the Federal Government shall perform such investigations unless the Federal Government provides the Non-Federal sponsor with prior specific written direction, in which case the Non-Federal sponsor shall perform such investigations in accordance with such written direction;

g. Assume complete financial responsibility, as between the Federal Government and the Non-Federal sponsor, for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for the operation, maintenance, repair, replacement, or rehabilitation;

h. As between the Federal Government and the non-Federal sponsor, the non-Federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability. To the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA;

i. Comply with the applicable provisions of the Uniform Relocation Assistance and Real

Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way required for the operation, maintenance, repair, replacement, and rehabilitation of the project, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act;

j. Comply with all applicable Federal and State laws and regulations including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army;"

k. Provide 35 percent of that portion of total cultural resource preservation, mitigation and data recovery costs attributable to flood control that are in excess of 1 percent of the total amount authorized to be appropriated for flood control;

l. Provide 50 percent of that portion of project costs attributable to recreation;

m. Participate in and comply with applicable Federal floodplain management and flood insurance programs in accordance with Section 402 of Public Law 99-662, as amended;

n. Within 1 year after the date of signing a project cooperation agreement, prepare a floodplain management plan designed to reduce the impact of future flood events in the project area. The plan shall be prepared in accordance with guidelines developed by the Federal Government and must be implemented not later than 1 year after completion of construction of the project;

o. Prescribe and enforce regulations to prevent obstruction of or encroachment on the project that would reduce the level of protection it affords or that would hinder operation and maintenance of the project;

p. Not less than once each year, inform affected interests of the extent of the protection afforded by the project; and

q. Publicize floodplain information in the area concerned and provide this information to zoning and other regulatory agencies for their use in preventing unwise future development in the floodplain and in adopting such regulations as may be necessary to prevent unwise future development and to ensure compatibility with protection levels provided by the project.

8.3 Views and Financial Capability of the Sponsor

The local sponsor (SCVWD) supports the Bypass Channel Plan as it would provide "100-year level of protection" while enhancing the natural habitat values as much as possible. The SCVWD is aware of local cost-sharing requirements associated with flood control projects, and has furnished a letter of intent.

The SCVWD supports the construction of the Bypass Channel Plan as it would have significant impacts on the local planning environment. The Bypass Channel Plan would remove approximately 2,000 acres and 6,600 buildings from the 100-year floodplain. Furthermore, implementation of the Bypass Channel Plan would be consistent with two major projects which impact the study area, while implementation of the Valley View Plan would be inconsistent with both of these projects. These projects are summarized below.

First, the Corps of Engineers, Sacramento District, is currently constructing a flood control project, also sponsored by the SCVWD, between Interstate 880 and Interstate 280 (immediately downstream of the current study area). This project, which was designed prior to the implementation of risk-based analysis techniques, is designed to pass flows associated with the one-percent chance event. The SCVWD is undertaking a local flood control project, independently and without Federal contribution, which is a 4,800-foot long bypass channel which is designed to join the downtown Guadalupe River Project and the proposed upper Guadalupe River Project. Implementation of the Valley View Plan would be incongruous with both the Federal and the local projects, while construction of the Bypass Channel Plan is consistent with both projects.

Second, the City of San Jose has planned a comprehensive recreation network in and around the study area. Most of the planned trails are either: (1) dependent upon acquisition of a flood control right of way along the upper Guadalupe River, or (2) proposed bicycle lanes on city streets. Implementation of the Valley View Plan would require cyclists and pedestrians to use busy thoroughfares within Reaches 7, 8, 10, and 11. However, implementation of the Bypass Channel Plan would enable San Jose to develop a continuous recreation trail within these reaches. The bike trail will connect an existing heavily used regional park, the Guadalupe River Park, with suburban open areas some five miles away, forming the backbone of a regional trail network. The bike trail will not be provided through the study area in the absence of a flood control project. Therefore, construction of the Bypass Channel Plan is necessary for realizing the potential recreation benefits.

The SCVWD has a policy of providing "100-year" level of flood protection and they strongly support the Bypass Channel Plan. Given the highly urbanized study area and historically increasing real estate costs it has proven to be cost effective in the long run to provide "100-year" protection. The local sponsor's "100-year" policy also reflects an equity issue, since, it may be perceived as unfair if one locality receives less than "100-year" protection.

Finally, the Bypass Channel Plan provides more protection against possible loss of life during major flood events than would the Valley View or Willow Glen Plans.

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

Major conclusions of this Feasibility study include:

- Significant flooding has historically occurred along the upper reaches of the Guadalupe River in the southern area of the City of San Jose.

- Economic analyses indicate that over 7,500 buildings lie within the 100-year floodplain as compared to 4,870 in the 50-year floodplain.

- Hydrologic and hydraulic analyses indicate that the existing channel provides protection for a 7 to 8-year flood event below the UPRR bridge; for a 5-year event on Ross Creek; and for a 9-year event on Canoas Creek. Therefore, the risk of flooding within the study area is substantial.

- The NED plan has been identified as the Valley View Plan which would provide "50-year level of protection" for the upper Guadalupe River.

- The Recommended Plan has been identified as the Bypass Channel Plan which would provide "100-year level of protection" for the upper Guadalupe River.

- The local sponsor is willing to cost-share in the construction of the Recommended Plan.

- The Recommended Plan fully meets the non-Federal sponsor's flood control objectives.

9.2 Recommendations

Reduction of flooding by means of structural improvements is economically justified at this time. The Valley View Plan has been identified as the NED Plan. However, the San Francisco District is recommending that the Bypass Channel Plan be constructed because it provides protection to three times as many structures as the Valley View Plan; it provides significant recreation opportunities; it is consistent with other Federal flood control projects within 1.5 miles of the study area; and it is consistent with local policies. The Federal share of the cost of the Recommended Plan will be limited to the Federal share of the cost of the NED Plan.

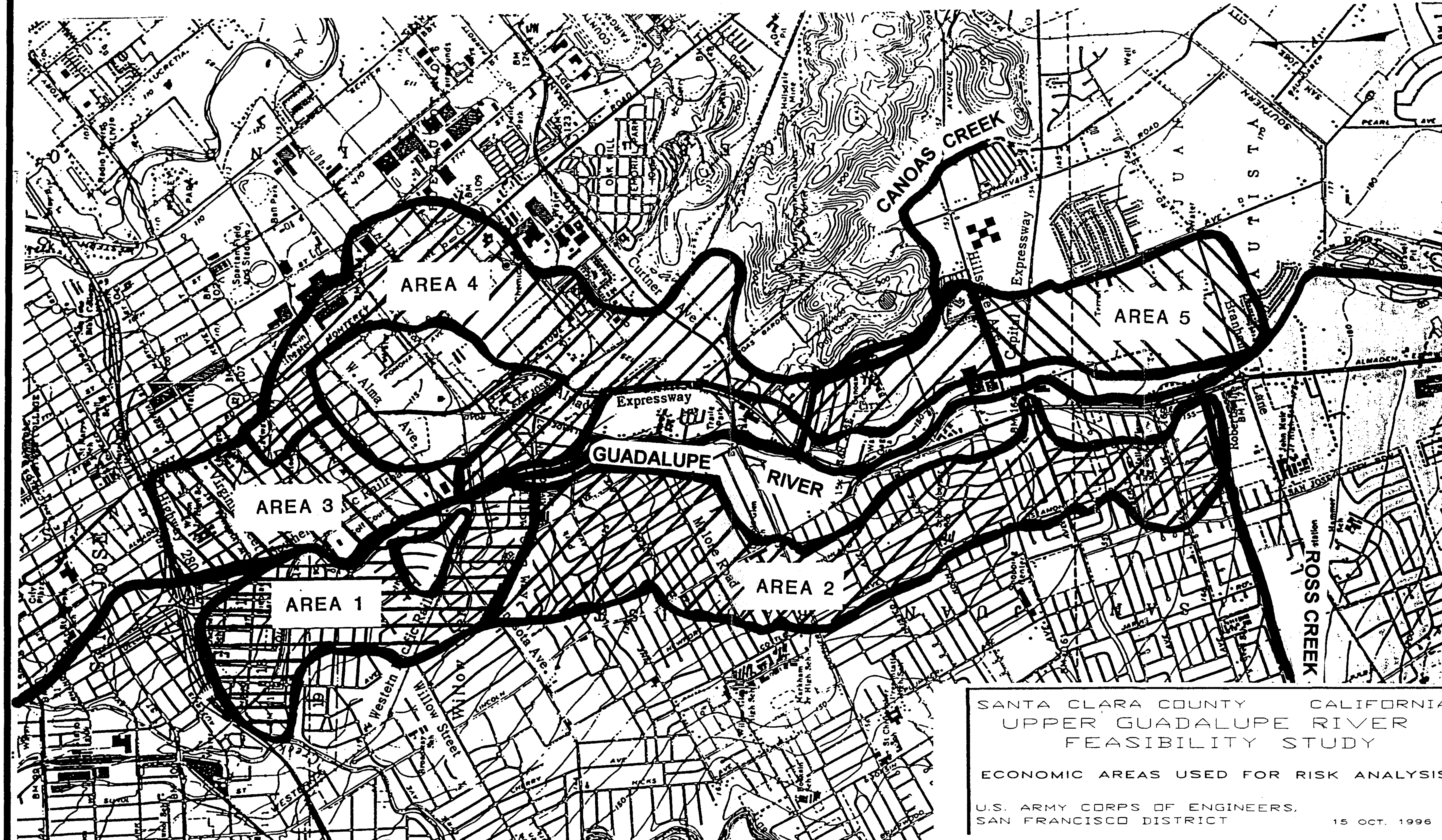
Accordingly, I recommend that improvements for flood damage reduction and recreation opportunities in the upper Guadalupe River area be authorized subject to cost sharing as required by Public Law 99-662, the Water Resources Development Act of 1986, as amended by Section 202 of Public Law 104-303, the Water Resources Development Act of 1996. This recommendation is also subject to the non-Federal sponsor agreeing to comply with applicable

Federal laws and policies, including the requirements as stated in Section 8.2 of this report. The first cost of the project is currently estimated at $132,298,000, of which the Federal government would contribute $54,050,000, and the non-Federal sponsor would contribute $78,248,000. The non-Federal sponsor would be responsible for an additional payment of $2,685,000 for betterments associated with project construction.

1-30-98
Date

RICHARD G. THOMPSON
LTC, EN
Commanding

PLATES



SANTA CLARA COUNTY CALIFORNIA

UPPER GUADALUPE RIVER

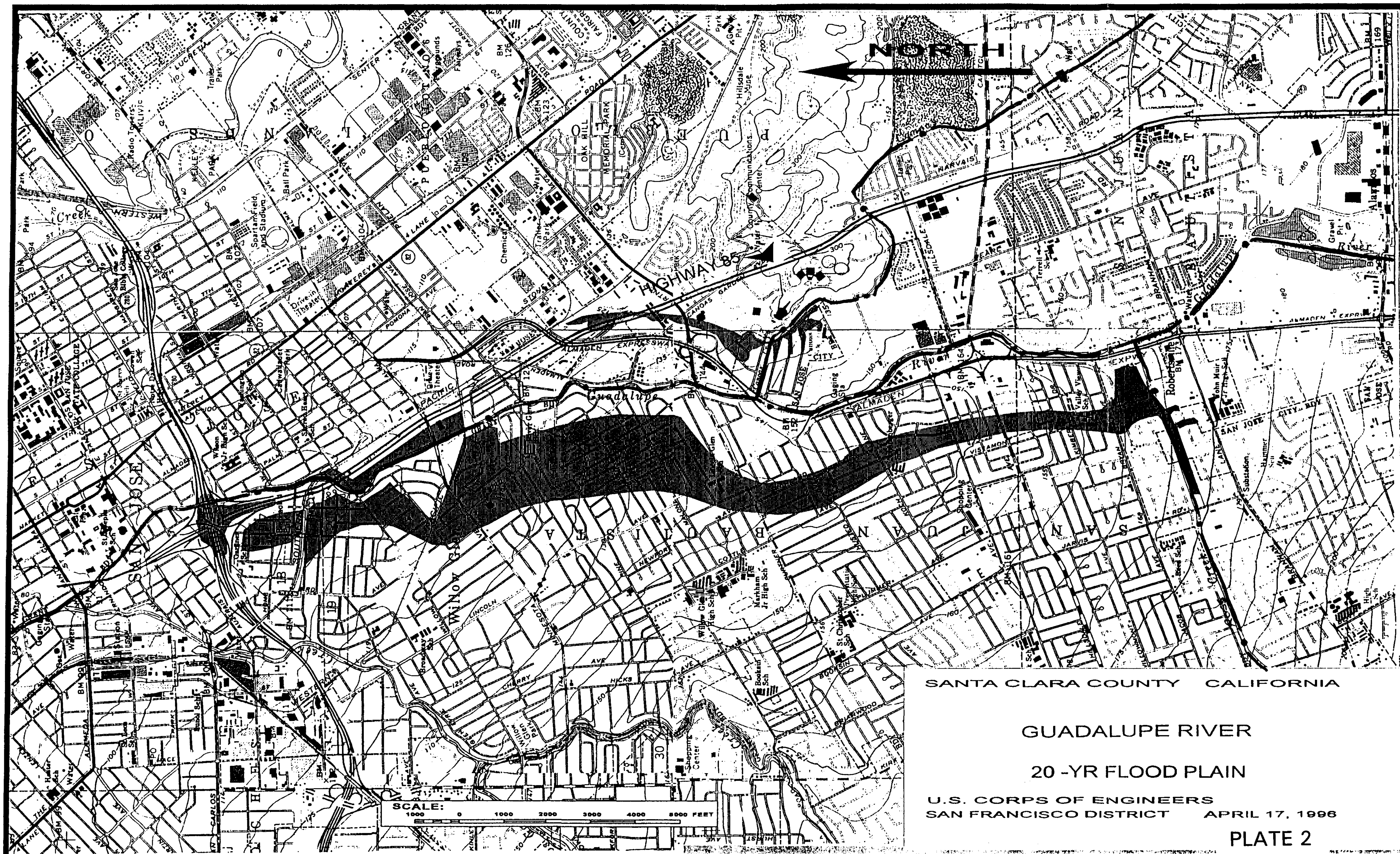
FEASIBILITY STUDY

ECONOMIC AREAS USED FOR RISK ANALYSIS

U.S. ARMY CORPS OF ENGINEERS, SAN FRANCISCO DISTRICT

15 OCT. 1996

PLATE 1


NORTH
HIGHWAY 85
Guadalupe
River
Willow Glen
SCALE:
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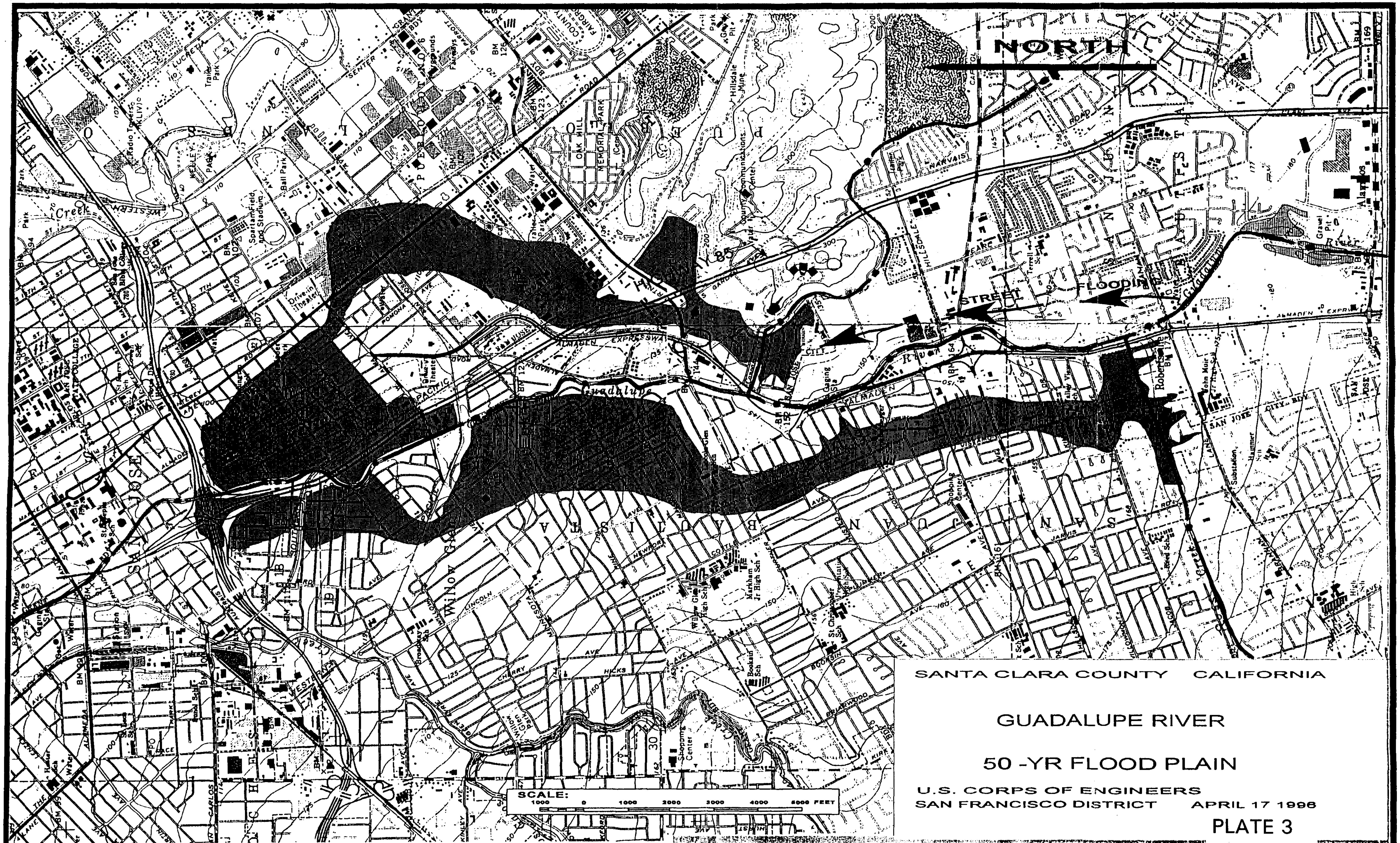
SANTA CLARA COUNTY CALIFORNIA
GUADALUPE RIVER
20 -YR FLOOD PLAIN
U.S. CORPS OF ENGINEERS
SAN FRANCISCO DISTRICT APRIL 17, 1996
PLATE 2



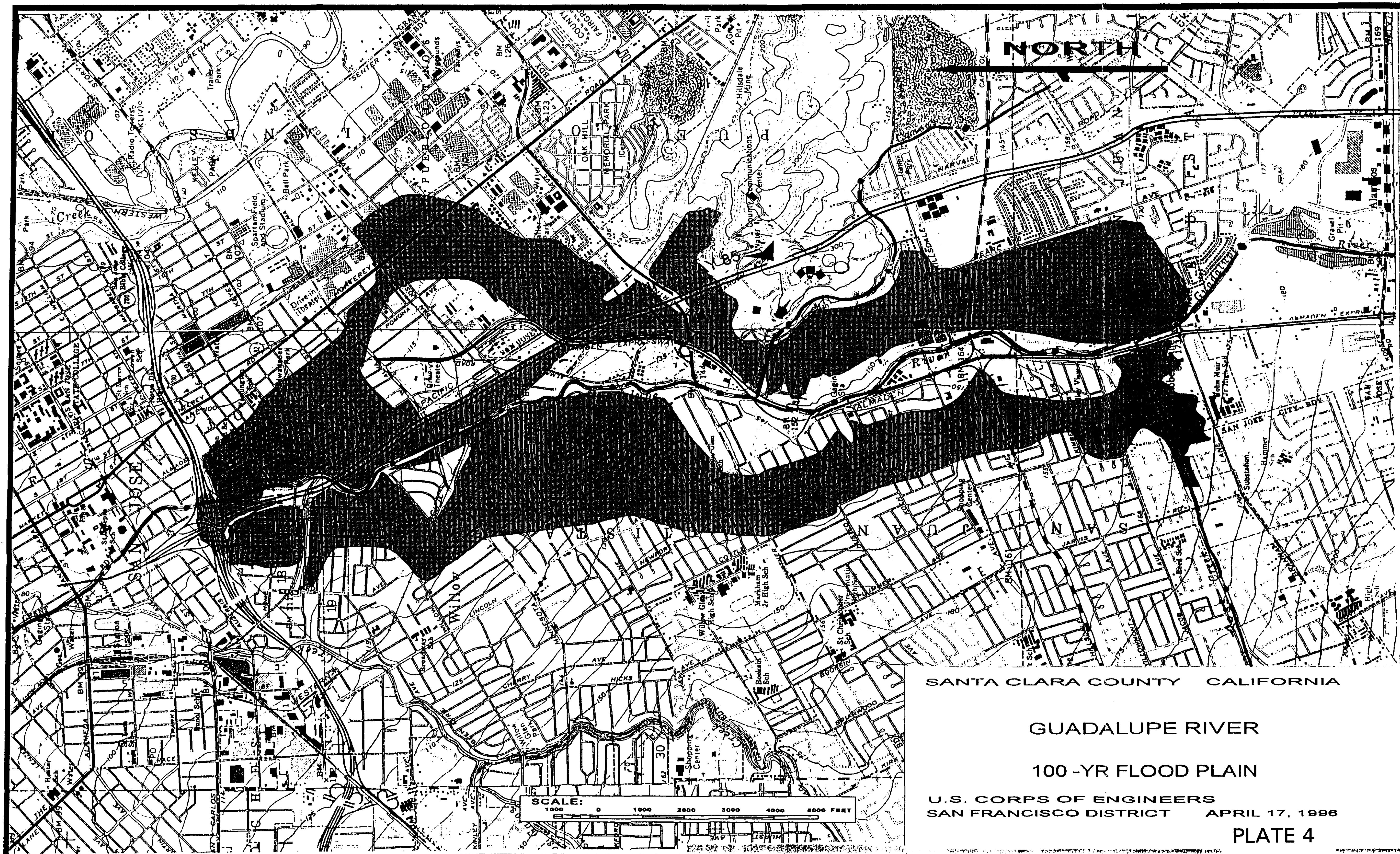
SANTA CLARA COUNTY CALIFORNIA

GUADALUPE RIVER

50 -YR FLOOD PLAIN

U.S. CORPS OF ENGINEERS
SAN FRANCISCO DISTRICT APRIL 17 1996

PLATE 3



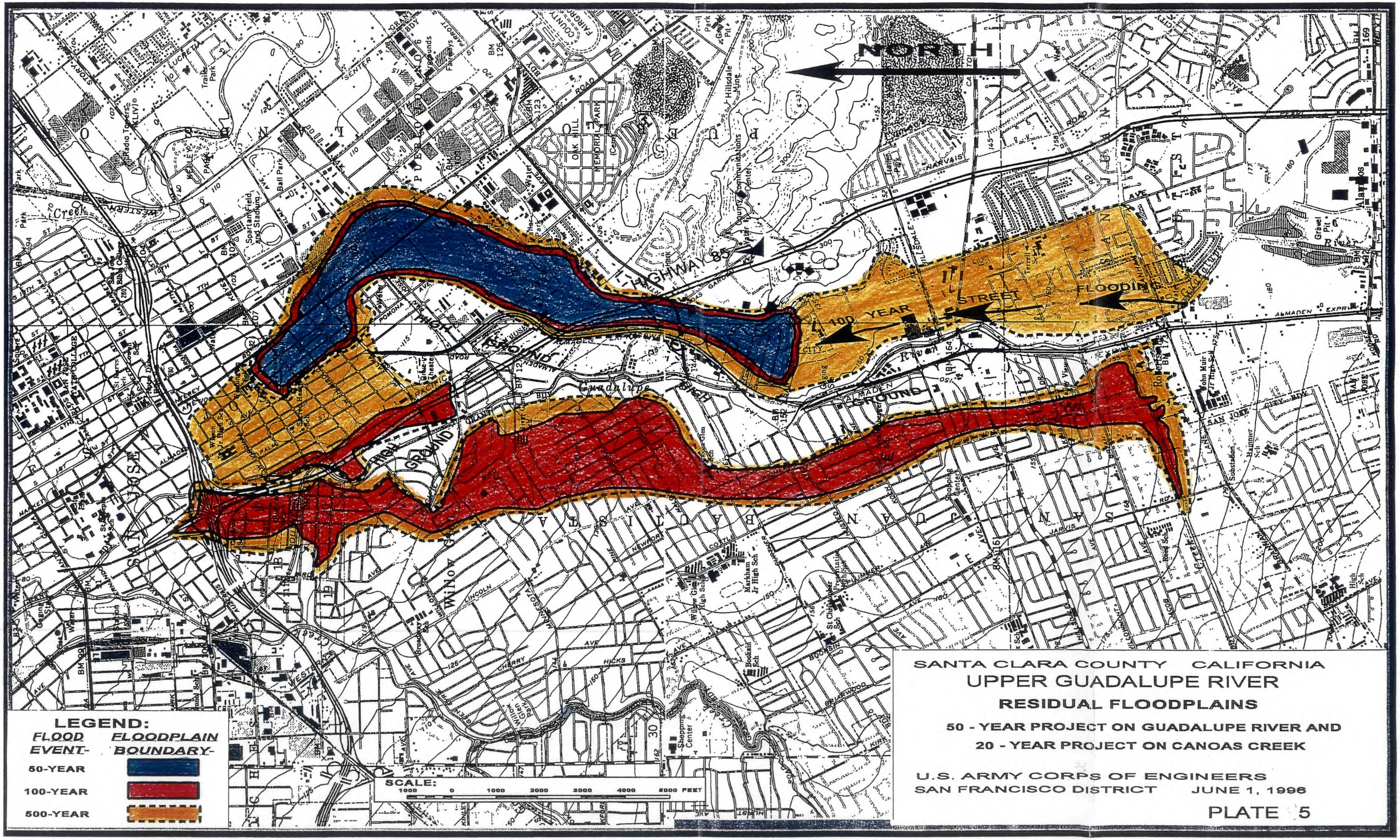
SANTA CLARA COUNTY CALIFORNIA

GUADALUPE RIVER

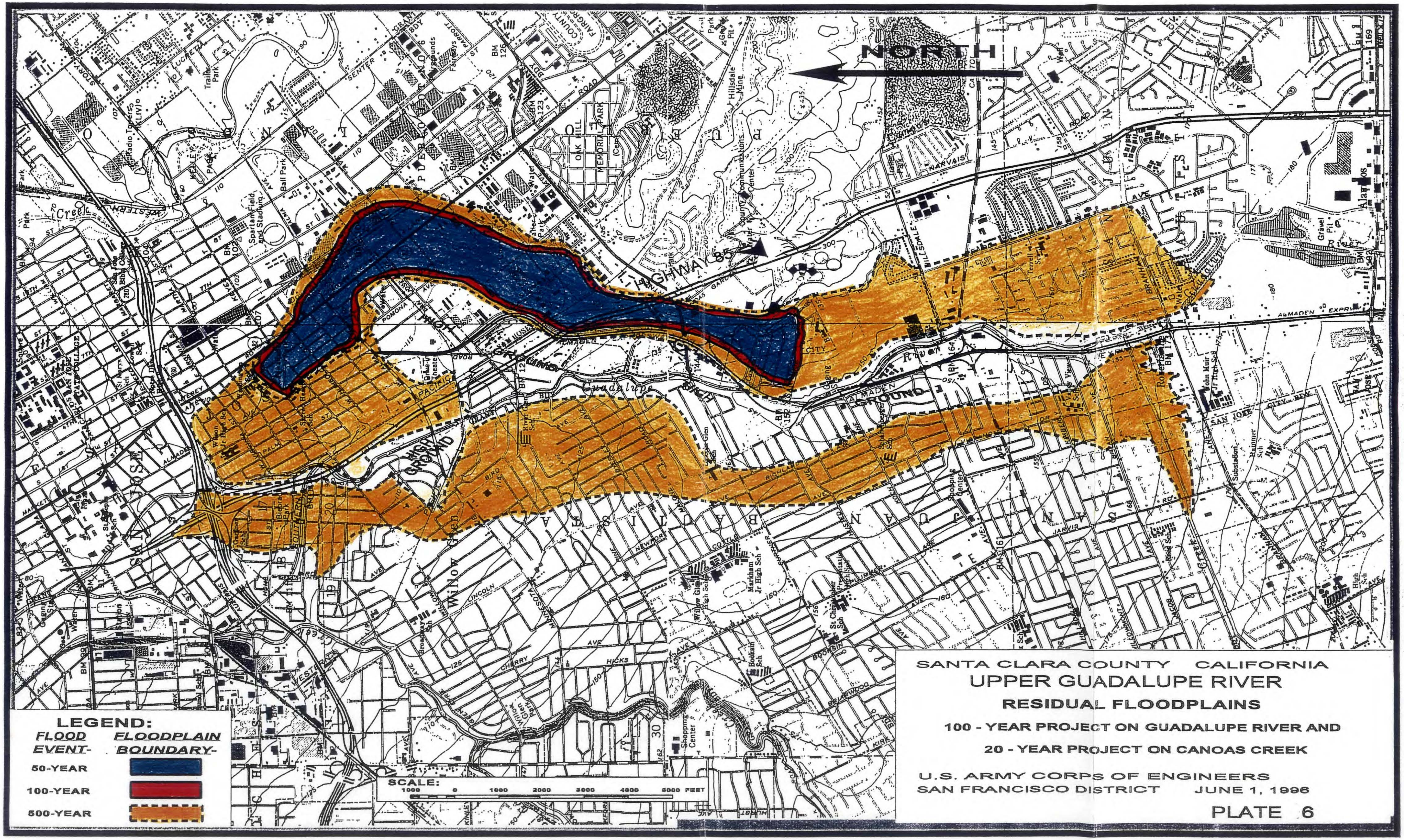
100 -YR FLOOD PLAIN

U.S. CORPS OF ENGINEERS
SAN FRANCISCO DISTRICT APRIL 17, 1996

PLATE 4



NORTH
HIGHWAY 85
100 YEAR
STREET
FLOODING
HIGH GROUND
Guadalupe
LEGEND:
FLOOD EVENT-
FLOODPLAIN BOUNDARY-
50-YEAR
100-YEAR
500-YEAR
SCALE:
1000 0 1000 2000 3000 4000 5000 FEET
SANTA CLARA COUNTY CALIFORNIA
UPPER GUADALUPE RIVER
RESIDUAL FLOODPLAINS
50 - YEAR PROJECT ON GUADALUPE RIVER AND
20 - YEAR PROJECT ON CANOAS CREEK
U.S. ARMY CORPS OF ENGINEERS
SAN FRANCISCO DISTRICT JUNE 1, 1996
PLATE 5


NORTH
LEGEND:
FLOOD EVENT-
FLOODPLAIN BOUNDARY-
50-YEAR
100-YEAR
500-YEAR
SCALE:
1000 0 1000 2000 3000 4000 5000 FEET
SANTA CLARA COUNTY CALIFORNIA
UPPER GUADALUPE RIVER
RESIDUAL FLOODPLAINS
100 - YEAR PROJECT ON GUADALUPE RIVER AND
20 - YEAR PROJECT ON CANOAS CREEK
U.S. ARMY CORPS OF ENGINEERS
SAN FRANCISCO DISTRICT JUNE 1, 1996
PLATE 6

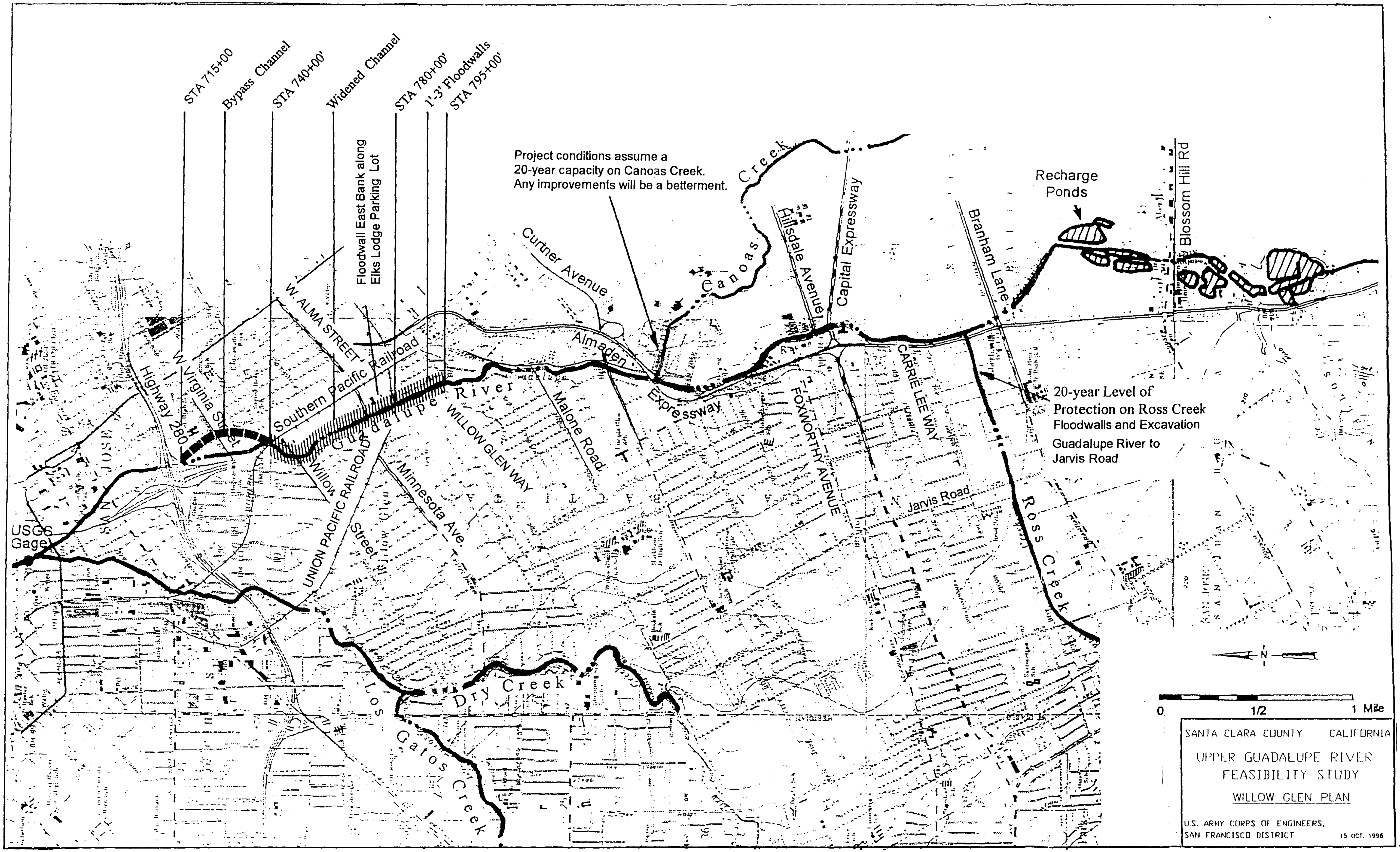
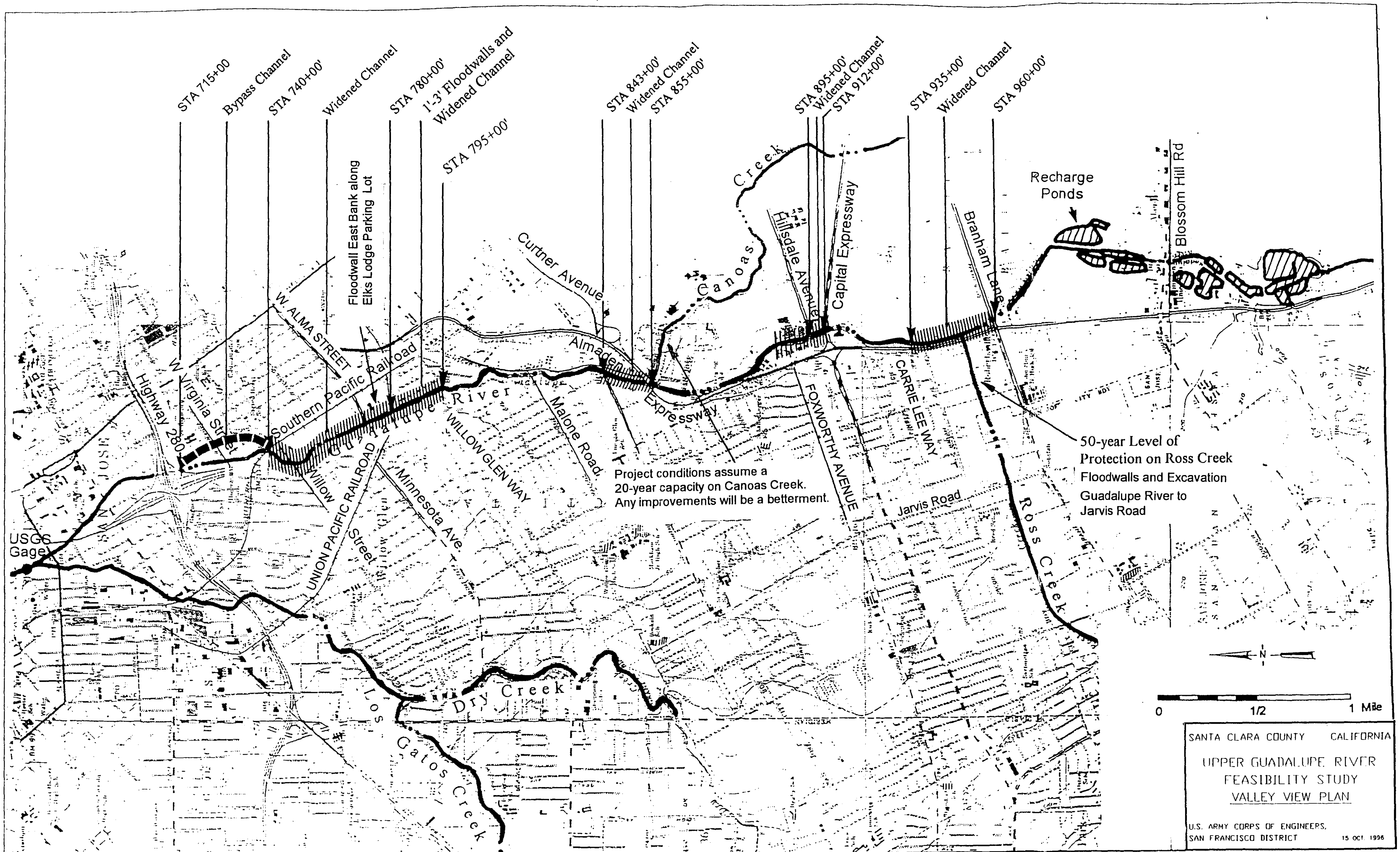

STA 715+00
Bypass Channel
STA 740+00'
Widened Channel
STA 780+00'
1'-3' Floodwalls
STA 795+00'
Floodwall East Bank along Elks Lodge Parking Lot
Project conditions assume a 20-year capacity on Canoas Creek. Any improvements will be a betterment.
Canoas Creek
Hillsdale Avenue
Capital Expressway
Branham Lane
Recharge Ponds
Blossom Hill Rd
Curtner Avenue
W. ALMA STREET
Southern Pacific Railroad
Almaden Expressway
Highway 280
W Virginia St
Guadalupe River
Malone Road
WILLOW GLEN WAY
Willow
UNION PACIFIC RAILROAD
Minnesota Ave.
Willow Glen
Street
FOXWORTHY AVENUE
CARRIE LEE WAY
Jarvis Road
Ross Creek
20-year Level of Protection on Ross Creek
Floodwalls and Excavation
Guadalupe River to Jarvis Road
USGS Gage
Dry Creek
Los Gatos Creek
SAN JOSE
N
0
1/2
1 Mile
SANTA CLARA COUNTY CALIFORNIA
UPPER GUADALUPE RIVER FEASIBILITY STUDY
WILLOW GLEN PLAN
U.S. ARMY CORPS OF ENGINEERS, SAN FRANCISCO DISTRICT
15 OCT. 1996

PLATE 7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Bypass Channel
STA 740+00'
Widened Channel
STA 780+00'
1'-3' Floodwalls and Widened Channel
STA 795+00'
Floodwall East Bank along Elks Lodge Parking Lot
STA 843+00'
Widened Channel
STA 855+00'
STA 895+00'
Widened Channel
STA 912+00'
STA 935+00'
Widened Channel
STA 960+00'
Recharge Ponds
Blossom Hill Rd
Canoas Creek
Hillsdale Avenue
Capital Expressway
Branham Lane
Curtner Avenue
Almaden Expressway
W. ALMA STREET
Southern Pacific Railroad
W. Virginia Street
Highway 280
Guadalupe River
Willow
WILLOW GLEN WAY
Malone Road
FOXWORTHY AVENUE
CARRIE LEE WAY
Jarvis Road
Ross Creek
50-year Level of Protection on Ross Creek
Floodwalls and Excavation
Guadalupe River to Jarvis Road
Project conditions assume a 20-year capacity on Canoas Creek. Any improvements will be a betterment.
UNION PACIFIC RAILROAD
Minnesota Ave.
Street
USGS Gage
Dry Creek
Los Gatos Creek
N
0
1/2
1 Mile
SANTA CLARA COUNTY CALIFORNIA
UPPER GUADALUPE RIVER FEASIBILITY STUDY
VALLEY VIEW PLAN
U.S. ARMY CORPS OF ENGINEERS,
SAN FRANCISCO DISTRICT
15 OCT 1996

PLATE 8

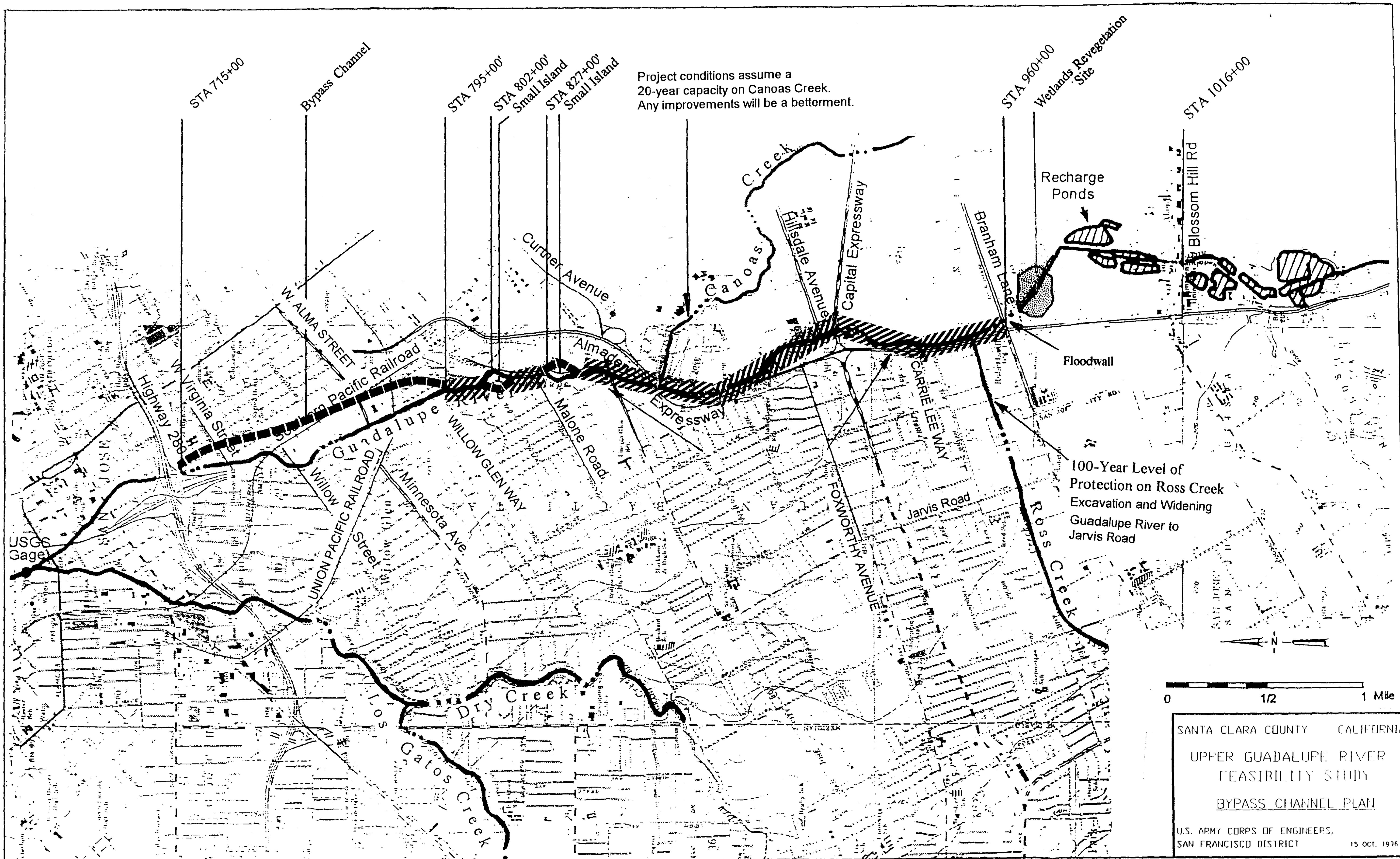
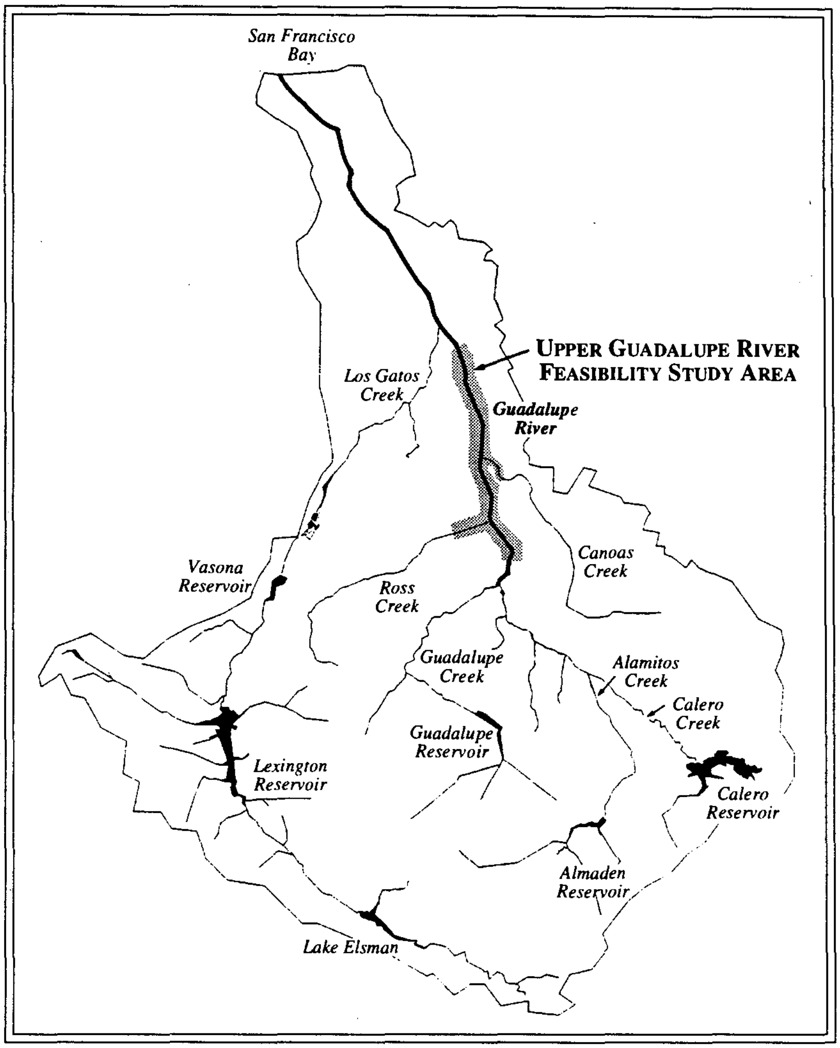

STA 715+00
Bypass Channel
STA 795+00'
STA 802+00'
Small Island
STA 827+00'
Small Island
Project conditions assume a
20-year capacity on Canoas Creek.
Any improvements will be a betterment.
STA 960+00
Wetlands Revegetation Site
STA 1016+00
Recharge Ponds
Blossom Hill Rd
Branham Lane
Capital Expressway
Hillsdale Avenue
Canoas Creek
Curtner Avenue
W. ALMA STREET
Southern Pacific Railroad
Almaden Expressway
Floodwall
Highway 280
W. Virginia Street
Guadalupe River
Willow Street
UNION PACIFIC RAILROAD
Minnesota Ave
WILLOW GLEN WAY
Malone Road
FOXWORTHY AVENUE
CARRIE LEE WAY
Jarvis Road
Ross Creek
100-Year Level of
Protection on Ross Creek
Excavation and Widening
Guadalupe River to
Jarvis Road
USGS
Gage
Los Gatos Creek
Dry Creek
N
0
1/2
1 Mile
SANTA CLARA COUNTY CALIFORNIA
UPPER GUADALUPE RIVER
FEASIBILITY STUDY
BYPASS CHANNEL PLAN
U.S. ARMY CORPS OF ENGINEERS,
SAN FRANCISCO DISTRICT
15 OCT. 1996

PLATE 9

Final
Environmental Impact Report/
Environmental Impact Statement
Upper Guadalupe River Feasibility Study



Prepared for

U.S. Army Corps of Engineers
San Francisco District
Federal Lead Agency

Prepared by

Science Applications International Corporation

January 1998

Final
Environmental Impact Report/
Environmental Impact Statement

Upper Guadalupe River Feasibility Study

Prepared for

U.S. Army Corps of Engineers
San Francisco District
Federal Lead Agency

Prepared by

Science Applications International Corporation

January 1998

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FIGURES

TABLES

SUMMARY

S.1 INTRODUCTION

This Environmental Impact Report/Environmental Impact Statement (EIR/S) analyzes the impacts associated with proposed flood control measures for the upper Guadalupe River in San Jose, California. The EIR/S fulfills regulations of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) that require agencies sponsoring these federal civil works projects to prepare a document that explains the consequences of the action on the environment. This feasibility study evaluates the extent and nature of the flood control problem. It investigates several different levels of protection, and identifies a flood control protection plan, called the National Economic Development Plan, that optimizes the size of the project from an economical point view. The cost of the NED plan determines to what extent the federal government is able to fund the construction of the project, or share funding with a local sponsor. The Corps of Engineers, San Francisco District (Corps), is the federal lead agency for the project and the Santa Clara Valley Water District (SCVWD) is the non-federal (local) sponsor. The feasibility study of flood control needs along the upper Guadalupe River is authorized by Section 205 of the Flood Control Act of 1948 (33 U.S.C. 701s), as amended.

The feasibility study area includes a 5.5-mile segment of the Guadalupe River in the City of San Jose. For flood control engineering descriptive purposes, the river has been divided into a number of "reaches," segments distinguished by major street and railroad crossings. The feasibility study area contains Reaches 7 through 12, extending from the Southern Pacific Railroad bridge just south of I-280, upstream 5.5 miles to the Blossom Hill Road bridge. The feasibility study area also includes areas of Ross Creek extending 5,200 feet upstream from its confluence with the Guadalupe River, and Canoas Creek extending 2,800 feet upstream from its confluence with the Guadalupe River. This part of the river, including Reaches 7 through 12, has flooded on several occasions in the past, with major episodes occurring in 1986 and 1995.

The principal objective of the proposed flood control work is to protect homes and businesses in this portion of the Guadalupe River drainage from flooding damage. Other flood control projects on areas of the river downstream (northward) have been analyzed and are under construction (i.e., the downtown Guadalupe River project, providing flood protection from Interstate 880 to Interstate 280), or are in the planning stages (including the upper Guadalupe River project improvements proposed by the SCVWD extending from U.S 101, two miles north and downstream of the feasibility study area, through Reach 12).

The Corps feasibility study evaluated a number of potential flood control alternative plans. Two alternative plans for providing flood protection on the upper Guadalupe River with the greatest net benefits are analyzed in detail in this document: a Channel Widening Plan, and a Bypass Channel Plan.

The Channel Widening Plan would provide protection from all floods up to an approximate 50-year flood event (a flood that occurs on the average of once every 50 years, or has a 2 percent chance of occurring in any one year). The major components of the plan include widening and benching along portions of the river to provide an expanded area for floodwaters, and a maintenance road and access points.

The Bypass Channel Plan would provide protection from all floods up to an approximate 100-year flood event (a flood that occurs on the average of once every 100 years, or has a 1 percent chance of occurring in any one year). Major components of the Bypass Channel Plan include a secondary channel located adjacent to much of the existing river that would not require removing important riparian vegetation on river banks during construction. Although construction of a bypass channel would reduce biological impacts, it would require relocation of a number of businesses and residents whose homes would be removed. Relocation of displaced businesses and residents would be provided by the Corps. In areas that would not include a bypass channel, the Plan includes widening and benching of the river to a much greater extent than under the Channel Widening Plan. Within some of the modified river banks and benches, hard bank protection including gabions (rock-filled wire cages) arranged in rows and concrete cribwall (a design allowing vegetation to grow through patterned openings) would be used. Where river banks would not be widened, natural vegetation would be retained except for where hard bank protection would be required for erosion control or for access ramps. A multi-use recreational trail would be incorporated running along maintenance roads constructed in the Bypass Channel Plan.

The Corps has determined that the NED Plan is the Channel Widening Plan. Although the SCVWD is expected to construct the Bypass Channel Plan supported by SCVWD, the federal financial contribution may be limited to what would have been spent to construct the smaller Channel Widening Plan. Alternatively, the Corps may cost-share the Bypass Channel Plan as the project is located in an urban area. This policy decision will be made by the Corps in Washington D.C.

S.2 MAJOR CONCLUSIONS AND FINDINGS

All significant impacts under either alternative plan would be mitigated. Several significant impacts during construction that could not be mitigated in the short-term, or in the intermediate-term until proposed revegetation plantings are fully established, would be mitigated in the long-term. Areas of environmental concern include the following: air quality; geological resources; water resources; biological resources; aesthetics and recreation; noise; transportation; land use; public services and utilities; cultural resources; hazardous materials; public safety; and socioeconomics. Unavoidable significant adverse impacts on land use would result under the Bypass Channel Plan due to a removal of homes and associated loss of residential neighborhood cohesion. All other long-term impacts would be mitigated to insignificance.

The alternatives' environmental consequences are summarized in Table S-1 at the end of this section. The table briefly describes the consequence or impact caused by each alternative plan by reach, any mitigation proposed in the EIR/S to address the impact, and the resulting level of impact after mitigation implementation. All environmental consequences are discussed in Chapter 4.

The Channel Widening Alternative is considered the Environmentally Superior Alternative. This alternative would require overall, less construction disturbance of biological habitat. Far fewer residences would be removed under the Channel Widening Alternative, requiring less relocation, and avoiding the significant long-term impacts resulting from the Bypass Channel that would permanently fragment the residential neighborhood on the west side of Mackey Avenue and parts of Willow Glen Way to Malone Road. All other environmental impacts would be basically equivalent for both alternatives.

Either plan would provide substantial flood protection to residents and businesses, a beneficial impact. The Bypass Channel Plan would provide enhanced recreational access and amenities under a Recreational Trail plan funded in part by the City of San Jose. The Bypass Channel Plan would provide a greater level of flood-control protection (from a 100-year event rather than a 50-year event) and would also increase the long-term continuity of riparian forest habitat. It therefore is considered the recommended plan.

A comparison of flood control alternatives by resource issue is shown in Table S-2, following Table S-1.

S.3 AREAS OF CONTROVERSY AND CONCERN

Public meetings on March 7, 13, and 29, 1989 and an initial feasibility study meeting/workshop on March 27, 1991 identified the following major concerns: housing relocation and compensation; street tree and biological habitat removal; increased exposure to Almaden Expressway noise and view; elimination of flood zone hazards; increased public access and nuisance to areas adjacent to backyards abutting the river resulting from new flood control access roads; removal of historic landmarks (either city, state, or national) for flood improvements; decreasing property values for those residents remaining adjacent to the flood control improvements; and traffic congestion during construction of flood control improvements.

The SCVWD held a public hearing on April 3, 1997 to solicit comment on their Draft EIR/S (Parsons Engineering Science 1997). The Corps held a public hearing on the public draft of this EIR/S on October 9, 1997. Concerns identified at these meetings are described in section 1.4.

S.4 UNRESOLVED ISSUES

The Channel Widening Plan is at a preliminary design stage. While the Channel Widening Plan is less developed than the Bypass Channel Plan, whichever plan is constructed would require additional development and elaboration prior to construction.

S.5 RELATIONSHIP TO ENVIRONMENTAL PROTECTION STATUTES AND OTHER ENVIRONMENTAL REQUIREMENTS

Table S-3, located after Table S-2 at the end of this section, summarizes the project's compliance with environmental requirements. These environmental requirements are described in section 3.3, and instances of either partial compliance or non-compliance are explained in that section as well.

Table S-1. Summary of Environmental Consequences
(page 1 of 11)

Project Alternative	Expected Significant Impact	Mitigation Measure	Significance after Mitigation
Land Use			
Channel Widening	Channel widening would remove four commercial businesses in the lower part of Reach 7, and portions of the Elk's Lodge parking lot in Reach 7. Nuisance impacts associated with construction would affect adjacent residential uses in several reaches.	The Corps shall ensure that commercial properties are fairly appraised and compensated for as part of the *Relocation Assistance and Last Resort Housing Plan*. Notify residents adjacent to flood control improvement areas 3 to 6 months prior to construction, identifying project location, residential removal locations, short-term traffic detours, and expected schedule. Hold community information meetings on nature and expected results of the project in association with notification process. Fully compensate all residents who temporarily vacate homes during construction, and compensate for any damage to residences caused by flood control facility installation. Install temporary construction fencing in reach 8 to replace backyard fences removed during construction.	
Bypass Channel	Bypass channel construction would remove 23 houses in Reach 8 on the west side of Mackey Avenue, and six homes from Willow Glen Way to Malone Road in Reach 9.	In addition to measures for Channel Widening Plan, the Corps shall ensure that residential properties are fairly appraised and compensated for as part of the *Relocation Assistance and Last Resort Housing Plan*. Notify residents adjacent to flood control improvement areas 3 to 6 months prior to construction, identifying project location, residential removal locations, short-term traffic detours, and expected schedule. Hold community information meetings on nature and expected results of the project in association with notification process.	Significant in the long term in that the residential neighborhood cohesion in several areas would be permanently fragmented by flood control improvements.

Notes: 1.
Channel Widening Plan described in section 2.4.1
2.Bypass Channel Plan described in section 2.4.2

Table S-1. Summary of Environmental Consequences (page 2 of 11)

Project Alternative	Expected Significant Impact	Mitigation Measure	Significance after Mitigation
		Air Quality	
Channel Widening and Bypass Channel	Short-term PM_{10} emissions in the form of fugitive dust from ground disturbing and earthmoving activities during construction.	Implement the following BAAQMD fugitive dust emission control measures during construction activities. These measures should not conflict with the goals of the biological restoration program: (1) water all active construction areas at least twice daily, (2) cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard, (3) apply water three times daily on all unpaved access roads, parking areas, and staging areas at construction sites, (4) sweep daily (preferably with water sweepers) all paved access roads, parking areas, and staging areas at construction sites, (5) sweep streets daily (preferably with water sweepers) if visible soil material is carried onto adjacent public streets, (6) hydroseed or apply soil stabilizers (non-toxic) to inactive construction areas, (7) enclose, cover, water twice daily, or apply soil stabilizers (non-toxic) to exposed stockpiles (dirt, sand, etc.), (8) limit traffic speeds on unpaved roads to 15 mph, and (9) replant vegetation in disturbed areas as quickly as possible.	Less than significant during the short-term construction period.
		Geologic Resources	
Channel Widening and Bypass Channel	Increased short-term and long-term erosion and excessive sedimentation of the Guadalupe River due to project construction activities.	Proper management of exposed or excavated soils including the following: • Immediate removal of excavated soils or use of silt fences where removal is infeasible. • Stabilization of exposed soils using standard erosion control techniques, including grout injections to stabilize cut slopes. • Limit major earthwork necessary to the non-rainy season (i.e., May - October).	Less than significant during the short-term construction period and in the long term.

Notes: 1.
Channel Widening Plan described in section 2.4.1
2.Bypass Channel Plan described in section 2.4.2

Table S-1. Summary of Environmental Consequences (page 3 of 11)

Project Alternative	Expected Significant Impact	Mitigation Measure	Significance after Mitigation
Geologic Resources			
Channel Widening and Bypass Channel	Long-term slope failure due to unstable slopes and/or seismic activity.	Reinforce cut slopes internally to provide stability. Use gabions to protect against erosion at locations with high water flood velocities; use cribwall construction where slopes are nearly vertical.	Less than significant in the during the short-term construction period and in the long term.
Water Resources			
Channel Widening and Bypass Channel	Short-term construction related erosion resulting in sedimentation of the River.	Prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) as required as part of the National Pollutant Discharge Elimination System (NPDES) permit program, and those described above under Geologic Resources.	Less than significant during the short-term construction period.
Biological Resources			
Channel Widening	Construction removal of approximately 6.5 acres of riparian forest. Construction removal of 100-150 trees protected by City ordinance. Disturbance of riparian forest adjacent to construction areas. Construction excavation or filling of Section 404 jurisdictional waters, including 0.28 acre of wetlands and 2.64 acres of Section 404 waters.	Prepare and implement a comprehensive, integrated vegetation mitigation plan.	Significant in the short term, with magnitude declining as revegetation becomes established over a period of 5-30 years, resulting in no subsequent long-term impact.

Notes: 1.
Channel Widening Plan described in section 2.4.1
2.Bypass Channel Plan described in section 2.4.2

Table S-1. Summary of Environmental Consequences
(page 4 of 11)

Project Alternative	Expected Significant Impact	Mitigation Measure	Significance after Mitigation
	Biological Resources		
Channel Widening	Construction impacts on hydraulics that affect migration, spawning, or rearing of chinook salmon and steelhead trout.	Limit construction to low-flow season (April 15-October 15), implement water quality mitigations.	Less than significant in long term.
	Construction removal and loss of shaded riverine aquatic (SRA) cover, including 0.68 acres of overwater shade and 2,535 feet of undercut bank habitat with potential adverse effects on fishes.	Conserve and restore SRA cover in the context of a comprehensive, integrated vegetation mitigation plan.	Significant in the short term, with magnitude declining as revegetation becomes established over a period of 5-30 years, resulting in no subsequent long-term impact.
	Construction removal and fragmentation of riparian wildlife habitat. Construction disturbance of riparian wildlife habitat adjacent to construction zones. Construction removal of wetland and aquatic wildlife habitats. Construction-related disturbance of wildlife.	Riparian forest plantings in bench areas and existing gaps.	Significant in the short term, with magnitude declining as revegetation becomes established over a period of 5-30 years, resulting in no subsequent long-term impact.
	Possible construction disruption of burrowing owl nesting areas.	Conduct burrowing owl survey and avoid adverse impacts.	Less than significant in the short and long term.

Notes: 1. Channel Widening Plan described in section 2.4.1
2.Bypass Channel Plan described in section 2.4.2

Table S-1. Summary of Environmental Consequences
(page 5 of 11)

Project Alternative	Expected Significant Impact	Mitigation Measure	Significance after Mitigation
Biological Resources			
Bypass Channel	Construction removal of approximately 9 acres of riparian forest. Construction removal of 250-300 trees protected by City ordinance. Construction disturbance of riparian forest adjacent to construction areas. Construction disturbance of riparian areas associated with erosion control repair work. Construction removal of 5.23 acres of urban forest habitat. Construction removal of 0.88 acre of Section 404 wetland and 9.93 acres of Section 404 waters.	Prepare and implement a comprehensive, integrated vegetation mitigation plan.	Significant in the short term, with magnitude declining as revegetation becomes established over a period of 5-30 years, resulting in no subsequent long-term impact.
	Construction loss of SRA habitat, including 0.86 acres of overwater shade and 1.100 linear feet of undercut banks, adversely affecting fishes.	Improve fish passage conditions and restore and increase SRA habitat in context of a comprehensive integrated vegetation mitigation plan.	Significant in the short term, with magnitude declining as revegetation becomes established over a period of 5-30 years, resulting in no subsequent long-term impact.

Notes: 1.
Channel Widening Plan described in section 2.4.1
2.Bypass Channel Plan described in section 2.4.2

Table S-1. Summary of Environmental Consequences
(page 6 of 11)

Project Alternative	Expected Significant Impact	Mitigation Measure	Significance after Mitigation
Biological Resources			
Bypass Channel	Construction removal and fragmentation of riparian wildlife habitat.	Riparian forest plantings in bench areas and existing gaps.	Significant in the short term, with magnitude declining as revegetation becomes established over a period of 5-30 years, resulting in no subsequent long-term impact.
	Construction disturbance of riparian wildlife habitat adjacent to construction zones.		
	Construction removal of wetland and aquatic wildlife habitats.		
	Construction-related disturbance of wildlife.		Less than significant in the short and long term.
	Possible construction disruption of burrowing owl nesting areas.	Conduct burrowing owl survey and avoid adverse impacts.	

Notes: 1.
Channel Widening Plan described in section 2.4.1
2.Bypass Channel Plan described in section 2.4.2

Table S-1. Summary of Environmental Consequences
(page 7 of 11)

Project Alternative	Expected Significant Impact	Mitigation Measure	Significance after Mitigation
Aesthetics and Recreation			
Channel Widening	Channel widening requiring removal of visually significant vegetation along eastern bank of Reach 7, eastern bank in Reach 10A, west bank in Reach 10C, and portions of both banks in Reach 11 would impact views by removing important visual elements and screening, and degrade natural appearing character of river corridor; construction equipment staging and storage during floodwall construction in Reach 8 would introducing visually incongruous structures during short-term, and flood control structures include bank protection and floodwalls would result in long-term visually incongruous structures and engineered improvements.	Minimize graded areas and vegetation removal. Where vegetation removed, revegetate within significant view corridors as soon as feasible. Monitor revegetation planting over minimum 5-year period to ensure vegetation successfully reestablished. Restore graded areas as closely as possible to their original contours. Locate construction staging and storage areas outside of visually sensitive areas where feasible, and screen with wood fence or other natural-appearing materials. Revegetate areas surrounding visually incongruous flood control construction elements with native vegetation of mixed height, capable of screening at least 50 percent of structures in 5 years and 75 percent of structures in 10 years. Revegetate top-of-banks with native evergreen trees and shrubs where adequate space is available. Move construction equipment from temporary staging area to central equipment area if construction is interrupted for periods over 2 weeks.	Significant in the short- and intermediate-term (5 to 30 years) until revegetation is established. Less than significant in the long-term after revegetation establishment.
	Widening on the west bank of Reach 10C could remove pathway adjacent to Old Almaden Road used by cyclists, walkers, and joggers .	None presently available.	Significant in the long-term.

Notes: 1.
Channel Widening Plan described in section 2.4.1
2.Bypass Channel Plan described in section 2.4.2

Table S-1. Summary of Environmental Consequences
(page 8 of 11)

Project Alternative	Expected Significant Impact	Mitigation Measure	Significance after Mitigation
Aesthetics and Recreation			
Bypass Channel	Bypass channel construction on east bank on Reaches 7, 8 would not impact visually significant riparian vegetation, but would create intermediate-term impacts by introducing new flood control improvements, changing neighborhood character. Widening and benching on east bank in Reaches 9, 10A, 10C, 11A, and on west bank on Reaches 11B, and 11C would remove significant natural screening vegetation.	Channel Widening measures defined above and the following: Incorporate earth tone materials, coarse and varied textures, and avoid smooth or shiny surfaces and white, bright colors in flood control structures and ground stabilization; allow for establishment of vegetation through and around flood control structures, where appropriate.	Significant in the short- and intermediate-term (5 to 30 years) until revegetation is established. Less than significant in the long-term after revegetation establishment.
	Potential incompatibility with Guadalupe Park South Master Plan.	Implement Recreational Trail Plan along proposed bypass channel and maintenance road;design flood control features including bridges, maintenance roads, and access points to allow continuous trail access along the river; continue to develop inter-agency coordination to incorporate Guadalupe River Corridor Park components in project design.	Beneficial as recreational amenities would be improved over existing conditions.
Noise			
Channel Widening and Bypass Channel	Residents on streets within 1,000 ft of construction locations may be exposed to noise levels (L_{eq}) over 62 dBA during construction.	Implement Noise Mitigation Plan.	Less than significant in the short term.
Transportation			
Channel Widening and Bypass Channel	Traffic flow on local roads, bridges, mass transit, and pedestrian ways would be impacted by construction traffic and temporary road and bridge closures.	Implement Construction Traffic Management Plan in conjunction with City of San Jose.	Less than significant in the short term.
Public Services & Utilities			
Channel Widening and Bypass Channel	Construction traffic and temporary road and bridge closures would affect response times of police and fire protection services.	Provide 60-day advance notice to police and fire departments of all road closures and other planned traffic delays.	Less than significant in the short term.

Notes: 1.
Channel Widening Plan described in section 2.4.1
2.Bypass Channel Plan described in section 2.4.2

Table S-1. Summary of Environmental Consequences
(page 9 of 11)

Project Alternative	Expected Significant Impact	Mitigation Measure	Significance after Mitigation
Public Services & Utilities			
Channel Widening and Bypass Channel	Water Company well(s) would be destroyed by construction.	Relocate well(s) prior to construction.	Less than significant in the short term.
	Various utility lines and other utility facilities would be destroyed by construction.	Relocate utility lines and other utility facilities prior to construction.	Less than significant in the short term.
	National Geodetic Survey (NGS) control monuments could be disturbed or destroyed during construction.	Consult with NGS regarding monument location. If monuments would be disturbed or destroyed, notify NGS no less than 90 days prior to this activity to plan for monument relocation.	Less than significant in the short term.
Cultural Resources			
Channel Widening and Bypass Channel	Long term impacts from flood control improvement construction possibly disturbing four significant archaeological sites: in Reach 7 (one); 11 (one); and Canoas Creek (two). Burials have been associated with the two sites in the vicinity of Canoas Creek improvements. Ground disturbances could encroach within unknown, previously undisturbed prehistoric resources. Disturbances to sites would be a loss of archaeological research potential and Native American heritage values.	Prepare Cultural Resources Treatment Plan providing for treatment of each identified significant cultural resource including site avoidance and if not possible, significance assessment, mitigation, and evaluation and treatment of unexpected resources encountered during construction. Consult with local Native Americans during treatment plan development. Periodically monitor construction in areas of greatest archaeological resource potential to identify any unknown, buried archaeological resources. Temporarily suspend activity in the event cultural resources discovered during construction until significance evaluation completed by qualified archaeologist under MOA.	Less than significant in the long term.

Notes: 1.
Channel Widening Plan described in section 2.4.1
2.Bypass Channel Plan described in section 2.4.2

Table S-1. Summary of Environmental Consequences
(page 10 of 11)

Project Alternative	Expected Significant Impact	Mitigation Measure	Significance after Mitigation
Hazardous Materials			
Channel Widening and Bypass Channel	Construction excavation causing contaminant migration from previously unknown hazardous waste sites within or adjacent to the project area. Exposure of nearby residents or construction personnel resulting from unearthing contaminated soils or groundwater during construction.	Develop a Construction Contingency Plan addressing any contaminated soils encountered, protecting workers and the public from contamination exposure, and preventing contamination migration.	Less than significant in the short and long term.
	Release of fuel or petroleum lubricants during construction from construction equipment fueling and maintenance operations.	Require part of construction specifications, procedures for the fueling and maintenance of construction vehicles to minimize the potential for accidental release of hazardous materials in sensitive areas.	Less than significant in the short and long term.
	Dewatering during construction causing migration of contaminants from nearby hazardous waste sites.	Evaluation of known hazardous waste sites in the area and monitoring of shallow groundwater before, during, and after construction, where necessary.	Less than significant in the short and long term.
Public Safety			
Channel Widening and Bypass Channel	Construction areas, construction traffic, and the reconstructed flood control facility would create potential public safety hazards or attractive nuisances.	Prepare and implement Construction Public Safety Plan for short-term impacts and Operational Public Safety Plan for long-term impacts.	Less than significant in the short and long term.
Socioeconomics			
Channel Widening	Construction would result in the removal of 4 businesses and long-term commercial dislocation.	Implement the *Relocation Assistance and Last Resort Housing Plan* including appraisal, acquisition and relocation of affected residents and businesses.	Less than significant in the long term.

Notes: 1.
Channel Widening Plan described in section 2.4.1
2.Bypass Channel Plan described in section 2.4.2

Table S-1. Summary of Environmental Consequences
(page 11 of 11)

Project Alternative	Expected Significant Impact	Mitigation Measure	Significance after Mitigation
Bypass Channel	Construction would result in the removal of 63 single-family residences and 20 businesses and long-term residential and commercial dislocation.	Implement the *Relocation Assistance and Last Resort Housing Plan* including appraisal, acquisition and relocation of affected residents and businesses.	Less than significant in the long term.

Notes: 1. Channel Widening Plan described in section 2.4.1
2. Bypass Channel Plan described in section 2.4.2

Table S-2. Comparison of Flood Control Alternatives[1]

Resource	Channel Widening Plan	Bypass Channel Plan
Air Quality	SM	SM
Geologic Resources	SM	SM
Water Resources	SM	SM
Biological Resources	SM	SM
Aesthetics and Recreation	SM	SM
Noise	SM	SM
Transportation	SM	SM
Land Use[2]	NS, BI	SU, BI
Public Services and Utilities	SM	SM
Cultural Resources	SM	SM
Hazardous Materials	SM	SM
Public Safety	SM	SM
Socioeconomics	SM	SM
Plans & Policies[3]	+, -	+, -

Notes:

1. For adverse impacts:
SU = significant and unavoidable adverse impact
SM = significant but mitigable adverse impact
NS = adverse but not significant impact
NI = negligible adverse or no impact
BI = beneficial impact

2. Land use refers to actual physical impacts.

3. For plans and policies, the plus (+) or minus (-) in the table refers to potential consistency or inconsistency with existing applicable land use plans and policies. A plus (+) = consistency with plans and policies, a minus (-) = potential inconsistency. Since both alternatives would be consistent with some plans/policies (primarily those related to flood control) and inherently inconsistent with other plans/policies (primarily those related to protection of biological habitats), both consistency (+) and inconsistency (-) are noted in the table.

Table S-3. Project Compliance with Environmental Requirements

Environmental Requirement	PROJECT COMPLIANCE *Channel Widening Plan*	*Bypass Channel Plan*
Federal Regulations		
National Environmental Policy Act	FC	FC
Clean Air Act	FC	FC
Clean Water Act	PC	PC
Fish and Wildlife Coordination Act	FC	FC
Endangered Species Act	PC	PC
National Historic Preservation Act	FC	PC
Archaeological and Historical Preservation Act	FC	FC
Federal Water Project Recreation Act	FC	FC
Executive Orders		
Executive Order 11593 (Protection and Enhancement of the Cultural Environment)	FC	FC
Executive Order 11988 (Floodplain Management)	FC	FC
Executive Order 11990 (Protection of Wetlands)	FC	FC
Executive Order 12088 (Federal Compliance with Pollution Control Standards)	FC	FC
Executive Order 12898 (Environmental Justice)	NA	NA
State of California Regulations		
California Environmental Quality Act	FC	FC
Porter-Cologne Water Quality Control Act	FC	FC
California Endangered Species Act	FC	FC
California Department of Fish and Game Wildlife Habitat Mitigation Policy	FC	FC
California Wetlands Policy	FC	FC
Local Regulations		
County of Santa Clara General Plan	PC	PC
City of San Jose Horizon 2000 General Plan	PC	PC

Legend: FC = Full compliance. All requirements of the law, policy, or related regulations would be met.
PC = Partial compliance. Some requirements of the law, policy, or related regulations may not have been met to date. Further action to satisfy these requirements is intended as described in section 3.3, and full compliance is expected upon completion of these actions.
NC = Not in compliance. Implementation of the project would conflict with the law, policy, or related regulations. Refer to the text of section 3.3 for additional information.
NA = Not applicable. The law, policy, or related regulations do not apply to the proposed project.

1.0 NEED FOR AND OBJECTIVES OF THE ACTION

1.1 PURPOSE AND NEED

The purpose of the project is to provide flood protection in the upper Guadalupe River, from the Southern Pacific Railroad Bridge near Willow Street upstream (southward) 5.5 miles to Blossom Hill Road, in the City of San Jose. Records of flooding in the project area date to 1779, with recent serious events in 1980, 1982, 1983, 1986, and 1995 (COE 1998). The flooding has resulted in bank erosion, debris accumulation, sediment deposition, and significant damage to public structures, including homes and commercial buildings. The potential for future floods thus represents a major public safety concern.

1.2 PROJECT AUTHORITY

The U.S. Army Corps of Engineers' (Corps) study of flood control needs along the Guadalupe River and its tributaries was originally authorized by Section 4 of the Flood Control Act of August 18, 1941. The act directs the Chief of Engineers to carry out preliminary examinations and surveys for flood control in drainage areas within the United States and its territorial possessions, including the Guadalupe River and tributaries in California (COE 1998).

1.3 PRIOR STUDIES, REPORTS, AND EXISTING PROJECTS

1.3.1 Prior to Upper Guadalupe River Feasibility Study

On June 6, 1945, the Chief of Engineers endorsed the Preliminary Examination Report of Guadalupe River and Tributaries (dated February 28, 1945) and authorized a flood control investigation that combined all the streams draining into San Francisco Bay south of the Dumbarton Narrows. The streams included Guadalupe River, Coyote Creek, San Francisquito Creek, Berryessa Creek, and numerous other creeks; by the 1941 authorization, these streams were reported under the title of Guadalupe River and Adjacent Streams (COE 1998).

The Guadalupe River and Adjacent Streams Investigation was initiated in 1948 but was suspended in 1950, during the Korean War. The study resumed in 1956, with a focus on San Francisquito Creek, at the request of local interests. A report was submitted to the Chief of Engineers in 1961 and was subsequently revised to resolve conflicts related to a proposed multi-purpose reservoir. The revised report made no recommendation for authorization of structural measures. Funds were allocated in Fiscal Year 1963 to resume investigations under the Guadalupe River and Adjacent Streams study authorization. By 1968, the investigation had studied solutions for flood control, which included channel modifications, levees, combinations of the two, off-site floodwater storage modification of the existing reservoir, and construction of additional dams or multipurpose reservoirs. None of these alternatives were found to be justified economically (COE 1998).

The project was placed in deferred status until local interests petitioned to reopen the investigation due to changing development in parts of the study area. Funds to resume the study were allocated by Congress in Fiscal Year 1972. A public meeting held that year resulted in the formation of a local advisory committee. Later, a Board of Directors to the Santa Clara Valley Water District's (SCVWD) flood control program was elected. Later, the SCVWD became the local agency responsible for flood control in the watershed. By 1975, the study had progressed to the point where the Corps had identified five flood problem areas and 29 alternatives as possible solutions. In 1976, the Corps had developed four channelization alternatives for the Guadalupe River and two alternatives were developed for the Baylands area, where the Guadalupe River and Coyote Creek floodplains merge near San Francisco Bay (COE 1998).

In 1980, a Stage 2 Report for the Guadalupe River and Adjacent Streams Investigation was completed. It indicated federal involvement for a flood control project could be justified for the Guadalupe River channel between Interstate Route 880 (I-880) and Park Avenue. In 1985, an Interim Feasibility study was completed that investigated two structural alternatives and a no-action alternative. One alternative was identified as the National Economic Development (NED) plan and the feasibility study report recommended implementation of flood control improvements in the reach between I-880 and I-280. Proposed channel modifications for the segment of the river upstream of I-280 were not economically justified, due to the shallow depth of potential flooding and predominance of residential development in the floodplain (COE 1998). Studies of the downtown portion of the Guadalupe River have been completed, and construction of flood control structures is now in progress.

1.3.2 Upper Guadalupe River Feasibility Study

The SCVWD has requested assistance from the Corps in providing flood protection in the vicinity of the upper Guadalupe River. To provide federal assistance, the Corps must first conduct appropriate studies to justify the federal investment to the Office of Management and Budget (OMB) and to Congress. Because federal funding is not guaranteed, or may not be timely, the SCVWD has moved forward with their own studies and design of a project. The SCVWD Guadalupe River Flood Control Project proposes the following: flood control improvements on the upper Guadalupe River from I-280 upstream (southward) to Blossom Hill Road and on Ross Creek to a 100-year level of protection. Improvements to Ross and Canoas Creek would protect against the backwater effects caused by Guadalupe River improvements (Parsons Engineering Science 1997) (see section 6.1.8 for a detailed project discussion). The SCVWD has prepared an EIR/S for the project that has been subject to public review. (Any reader wishing to obtain a copy of the SCVWD EIR/S executive summary may contact Dennis Cheong [SCVWD]).

The Corps is required to investigate several different alternatives for providing flood protection. In order to optimize the size of a project (from an economical point of view) the Corps investigates several different levels of flood protection. The Corps has included a modified version of the SCVWD design as one of several alternatives under investigation. This plan is called the Bypass Channel Plan. It differs from the SCVWD plan in that it does not include any flood control improvement features between I-280 and the Southern Pacific Railroad near Willow Street, nor any features south of Blossom Hill Road. These areas were excluded from the federal studies because they were unlikely to be economically justified.

Thus, there are two studies being conducted for the same general purpose (flood control), but with different scopes and criteria — the federal study (Corps/SCVWD), and the local study (SCVWD). To reduce the amount of paper required to publish the Corps EIS/EIR, studies and data presented in the SCVWD EIR/S (Parsons Engineering Science 1997) have been incorporated into the Corps EIS/EIR by reference.

Planning Process/Feasibility Study

The Corps of Engineers uses a two-phased planning process to determine whether there is a federal interest in constructing a flood control project. The first phase is called the Reconnaissance Phase.

During the Reconnaissance Phase, the Corps compiles existing data to identify the extent and nature of the flood control problem. Once the problem is identified, several alternatives are developed that would alleviate flooding in the study area. Costs and economic benefits (predominantly flood damages prevented) are developed for each alternative. All plans having costs that are greater than the benefits are eliminated from further study. An environmental assessment is usually performed during this phase, during which the proposed plans are provided to the appropriate resource agencies for review. If any of the alternatives studied during the Reconnaissance Phase are economically justified and could be constructed without unreasonable environmental impacts, the second phase of study is recommended.

The second study phase is the Feasibility Phase. During this phase, new information is gathered to develop the reconnaissance phase plans in greater detail. During the Feasibility Phase, a plan must be identified that maximizes the federal investment. This plan is called the National Economic Development (NED) plan. The cost of the NED plan determines to what extent the federal government is able to fund the construction of a project. The Corps studies a range of project sizes in order to ensure that the government does not construct a project which does not maximize the federal investment. Usually, the NED plan is the project that is actually constructed. However, a local sponsor may wish to have a different plan constructed. This is sometimes possible, but the federal government's financial support is limited by the NED plan costs.

Reports Prepared for this Study

The following reports were prepared by the Corps under the Guadalupe River and Adjacent Streams Investigation authority:

- *Draft Report of Survey on Guadalupe River and Adjacent Streams for Flood Control and Allied Purposes*. 1961. San Francisco District Corps.

- *Draft Report of Survey on Guadalupe River and Adjacent Streams for Flood Control and Allied Purposes*. 1968. San Francisco District Corps.

- *Phase I Report and Environmental Evaluation of Flood Control Alternatives, Guadalupe River and Adjacent Streams*. 1975. San Francisco District Corps.

- *Progress Report on the Guadalupe River and Adjacent Streams*. 1976. San Francisco District Corps.

- *Information Brochure on Guadalupe River and Adjacent Streams—Survey Investigation*. 1976. San Francisco District Corps in cooperation with the SCVWD.

- *Hydrologic Engineering Office Report: Guadalupe River and Coyote Creek, Santa Clara County, California*. 1977. San Francisco District Corps.

- *Stage 2 Report on Guadalupe River and Adjacent Streams Survey Investigation*. 1980. San Francisco District Corps.

- *Final Guadalupe River Interim Feasibility Report and Environmental Impact Statement*. 1985. San Francisco District Corps.

- *Final Coyote Creek and Berryessa Creek Interim Feasibility Report and Environmental Impact Statement*. 1987. San Francisco District Corps.

- *Final Reconnaissance Report: Upper Guadalupe River Flood Control Study*. 1989. San Francisco District Corps.

- *Guadalupe River General Design Memorandum*. 1991. Sacramento District Corps. This document was prepared for the Highway 880-Highway 280 Guadalupe River studies.

- *Mitigation and Monitoring Plan, Guadalupe River Project, Santa Clara County, California*. 1992. Sacramento District Corps. This document was prepared for the Highway 880-Highway 280 Guadalupe River studies.

- *Sediment Transport Modeling Study of the Upper Guadalupe River, Phase 2*. 1996. Phillip Williams & Associates, Ltd.

- *Upper Guadalupe River Flood Protection Study, Santa Clara County, California*. 1997. San Francisco District Corps.

The SCVWD has also provided the following reports which were used during various Corps studies:

- *Environmental Setting of the Watershed and Floodplain of Guadalupe River, Coyote Creek, and their Tributaries*. 1974. SCVWD.

- *Potential Flood Damages on Guadalupe River and Coyote Creek and Adjacent Streams*. 1974. SCVWD.

- *Study Report for the Guadalupe River from State Route 17 to Curtner Avenue*. 1976. SCVWD.

- *Guadalupe River Flood Control Planning Study*. 1977, 1981, and 1982. SCVWD.

- *Guadalupe River Watershed Planning Study Draft Engineer's Report*. October 1994. SCVWD.

- *Draft Environmental Impact Report/Environmental Impact Statement for the Guadalupe River Flood Control Project*. 1997. SCVWD.

In addition, the USFWS has prepared a report for the project:

- *Revised Draft Coordination Act Report: Upper Guadalupe River Flood Control Project*. 1997. USFWS.

The flood control alternatives considered during these periods, the conclusions of the 1988 Reconnaissance Report, and the existing (proposed) project are described in Chapter 2.

1.4 PUBLIC CONCERNS

The SCVWD held three public scoping meetings on March 7, 13, and 29, 1989 to hear preliminary concerns from communities residing along the river. The Corps also held an initial feasibility study meeting/workshop on March 27, 1991. Major concerns included the following potential effects:

- Housing relocation and policies for compensation and assistance during relocation;
- Removing trees and biological habitat along the river;
- Opportunities for enhancement of biological habitat along the river;
- Increased exposure to Almaden Expressway noise and view degradation resulting from tree removal along the river;
- Elimination of flood zone hazards;
- Increased public access and nuisance to areas adjacent to backyards abutting the river resulting from new flood control access roads;
- Removal of historic landmarks (either city, state, or national) for flood improvements;
- Decrease in property values for those residents who would not be relocated and remain adjacent to river;
- Traffic congestion during construction of flood control improvements; and
- Removal of abandoned cars and trash along the river banks.

An agency scoping meeting was held on February 13, 1990 attended by the Corps, SCVWD, City of San Jose, USFWS, and California Department of Fish and Game (CDFG). The USFWS and CDFG were primarily concerned with impacts on riparian habitat and fisheries. The City of San Jose was concerned with the proposed project's compatibility with the Guadalupe River Park South Master Plan.

The SCVWD held a public hearing on April 3, 1997 to solicit comment on their Draft EIR/S. In addition to the issues listed above, the following concerns regarding the adequacy of the environmental impact analysis were raised (personal communication, William DeJager 1997):

- Concerns with project description including use of set-back levees instead of a bypass channel, bypass location, use of other stabilizing techniques other than gabions, and alternative bridge removals;
- Removal of existing trash and concrete rubble in the river channel;
- Increased access to recreational trail resulting in public safety concerns, including potential for crime that requires security patrols along bypass channels. Also, support for the trail and potential for placing trail under bridges;

- Process of real estate acquisition, need to condemn 30 properties, and requirement for notification of residents within and adjacent to project areas;

- Feasibility of revegetation on gabions, lengthy period for revegetation establishment, potential for leaving existing vegetation unaltered and resulting maintenance of adjacent housing values;

- Lengthy period for construction (30 years, with a perceived 5-year gap);

- Herbicide use for maintenance and adverse effect on vegetation;

- Siltation during construction, based on downtown flood protection project results;

- Stability of cut bank slopes and effect on adjacent residential recreational spaces (back yards, swimming pools);

- Barriers including low river flows affecting ability for fish to safely pass through the channel, construction impacts on fisheries, and delays in removing existing fish barriers;

- Existing maintenance of the river is inadequate, resulting in public safety issues, illicit dumping, and private fencing;

- Reach 12 development would conflict with a proposed housing project and could possibly induce flooding;

- Visual impacts from construction and vegetation removal; and

- Impacts on non-endangered wildlife.

The Corps held a public hearing on this public draft of this EIR/S October 9, 1997. the following concerns regarding the adequacy of the environmental impact analysis were raised (personal communication, William DeJager 1997):

- Maintenance costs for the project

- Study costs

- Removal of concrete from river

- Do stream restoration alternative instead

- Maintenance of the existing channel, including trash, shopping carts, and vegetation growth

- Maintaining existing habitat

- Oversight of construction- would it be adequate?

- Effectiveness of mitigation questioned
- Effects of downtown project on fisheries and habitat
- Salmon and steelhead trout
- Studies taking too long; project should have been built by now
- Would project really be effective in preventing floods?
- Project is too expensive; do something cheaper like cleaning up the river
- Cleaning up the river is all you need to do to prevent flooding
- Controlled flooding is needed
- Effect of this project on the downtown project
- Do off-stream storage instead
- Store water in upstream reservoirs instead
- Difficulty in obtaining documents from library
- Maintaining the integrity of the river
- Upstream tributaries are not suitable habitat for anadromous fish
- More people should have been notified of the meeting
- Control development along the river
- Too much emphasis on fish and wildlife; take care of human needs by preventing flooding
- Rental properties operated by the SCVWD
- Flood insurance rates and benefits
- Homeowners have been paying flood insurance premiums all these years, and now they want to raise our local taxes to pay for this project. Where did all the money from our flood insurance premiums go?

1.5 PLANNING OBJECTIVES

Federal flood control projects are formulated to reduce potential public hazards and to take advantage of opportunities that contribute to national economic development by increasing output of goods and services. The plan that produces the greatest net economic benefit as measured by subtracting total annualized project costs from total annualized project benefits is referred to as the NED plan. In addition, NED objectives must be accomplished without causing unreasonable adverse impacts on environmental quality (COE 1998).

The development of recreational features is a secondary objective of the flood control project. The Corps maintains a policy for including recreation development in a given project, provided that the recreation facilities are within the flood-control project lands and are not "stand alone" facilities. The SCVWD and the City of San Jose recognize the need to coordinate park master-planning with the flood-control planning. The objective is to balance the need to reduce flood damage with the need to optimize public access and use of the river corridor (COE 1998).

1.6 PLANNING CONSTRAINTS

The following Corps planning constraints place limitations on how the Corps planning objective (providing flood protection) is achieved:

- Maximizing net economic benefits;

- Formulating a flood control plan that will be feasible and implementable; and

- Mitigating significant negative environmental impacts if this can be done in a cost-effective manner.

2.0 PROPOSED PROJECT AND ALTERNATIVES

The feasibility study area includes a 5.5-mile segment of the Guadalupe River in the City of San Jose. The Guadalupe River flows through the Santa Clara Valley and drains into the San Francisco Bay to the north (see Figure 2-1). For flood control engineering descriptive purposes, the river has been divided into a number of "reaches," segments distinguished by major street and railroad crossings. The feasibility study area contains Reaches 7 through 12, extending from the Southern Pacific Railroad bridge just south of I-280, upstream 5.5 miles to the Blossom Hill Road bridge (see Figure 2-2). This is, hydrologically, the middle portion of the watershed. For the purposes of this study it is called the "Upper Guadalupe River." The feasibility study area also includes areas of Ross Creek extending 5,200 feet upstream from its confluence with the Guadalupe River, and Canoas Creek extending 2,800 feet upstream from its confluence with the Guadalupe River.

Urban development in the Santa Clara Valley in the past 50 years has been extensive. Prior to World War II, the Santa Clara Valley supported agriculture and agriculture-related industries. After the war, industry expanded rapidly, and the associated suburban sprawl and population growth eliminated nearly all fruit orchards and vegetable farms in the following 20 years. Since the early 1970s, substantial growth of computer industries has occurred in the area, as the recognition of the Santa Clara Valley as "Silicon Valley" attests (COE 1998). Population increases have been dramatic. Santa Clara County's population doubled between 1950 and 1960 and doubled again by 1980. Census figures for the 1990s indicate a population of about 1.5 million people in Santa Clara County, with over half living within San Jose city limits (COE 1998). Much of this urban development was placed in floodplains including that of the Guadalupe River. This development within the floodplains has resulted in increased potential for risks to public safety and property damage caused by flooding.

The Guadalupe River drainage basin (see Figure 2-3) covers approximately 170 square miles, of which the upper Guadalupe River drainage area comprises approximately 95 square miles. Elevations within the watershed range from 0 to 3,790 feet above sea level. The Guadalupe River meanders across the gentle gradient of the Santa Clara Valley. Along the feasibility study area, there is less than a 100-foot change in elevation. The drainage basin is bounded on the south and southwest by the Santa Cruz Mountains, on the west by the drainage basins for San Thomas and Saratoga creeks, on the east by the Coyote Creek Basin, and on the north by San Francisco Bay. The watershed is mostly rural in the higher elevations and heavily urbanized in the lower reaches, where the project study area is located (COE 1998).

The headwaters of the Guadalupe River originate in the Santa Cruz Mountains near the summit of Loma Prieta. The headwater creeks (Guadalupe, Calero, and Alamitos Creeks) converge to form the Guadalupe River channel about ¼ mile upstream (south) of Blossom Hill Road. The river flows northwest for about 14 miles and ultimately into Alviso Slough at San Francisco Bay. Tributaries to the Guadalupe River include Ross, Canoas, and Los Gatos Creeks. Ross Creek, with a drainage area of 10 square miles; and Canoas Creek, with a drainage area of 19 square miles, are the two tributaries within the upper Guadalupe River feasibility study area. Los Gatos Creek, with a drainage area of 52 square miles, enters the Guadalupe River below the feasibility study area, downstream (north) of I-280 (COE 1998).

2.1 FEASIBILITY STUDY PLANNING PROCESS

The Corps of Engineers, San Francisco District (Corps) is the lead federal agency for the Upper Guadalupe River Flood Control Project and is responsible for the preparation of the feasibility study. The study uses a planning process consistent with the requirements of the Water Resources' Council

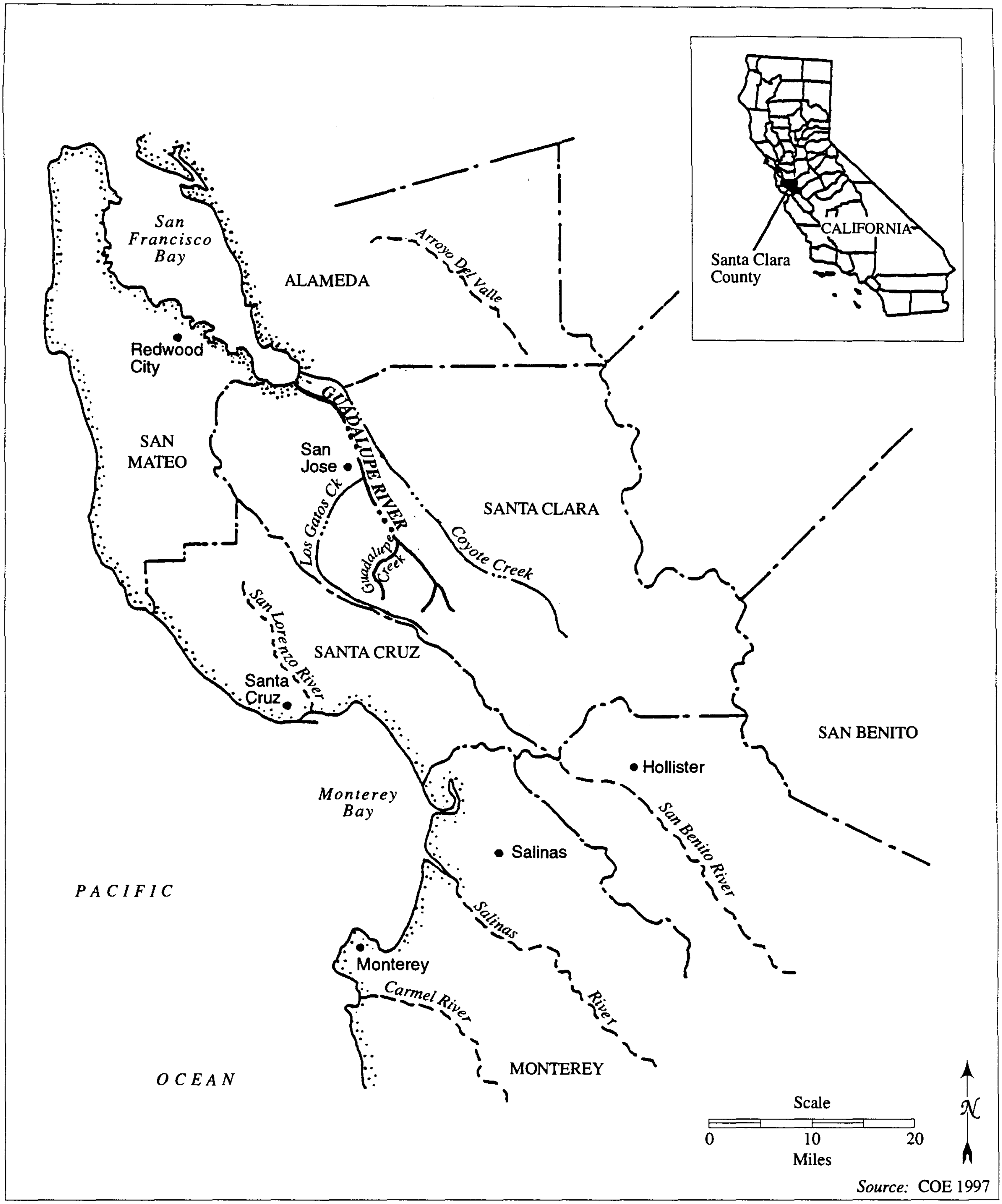
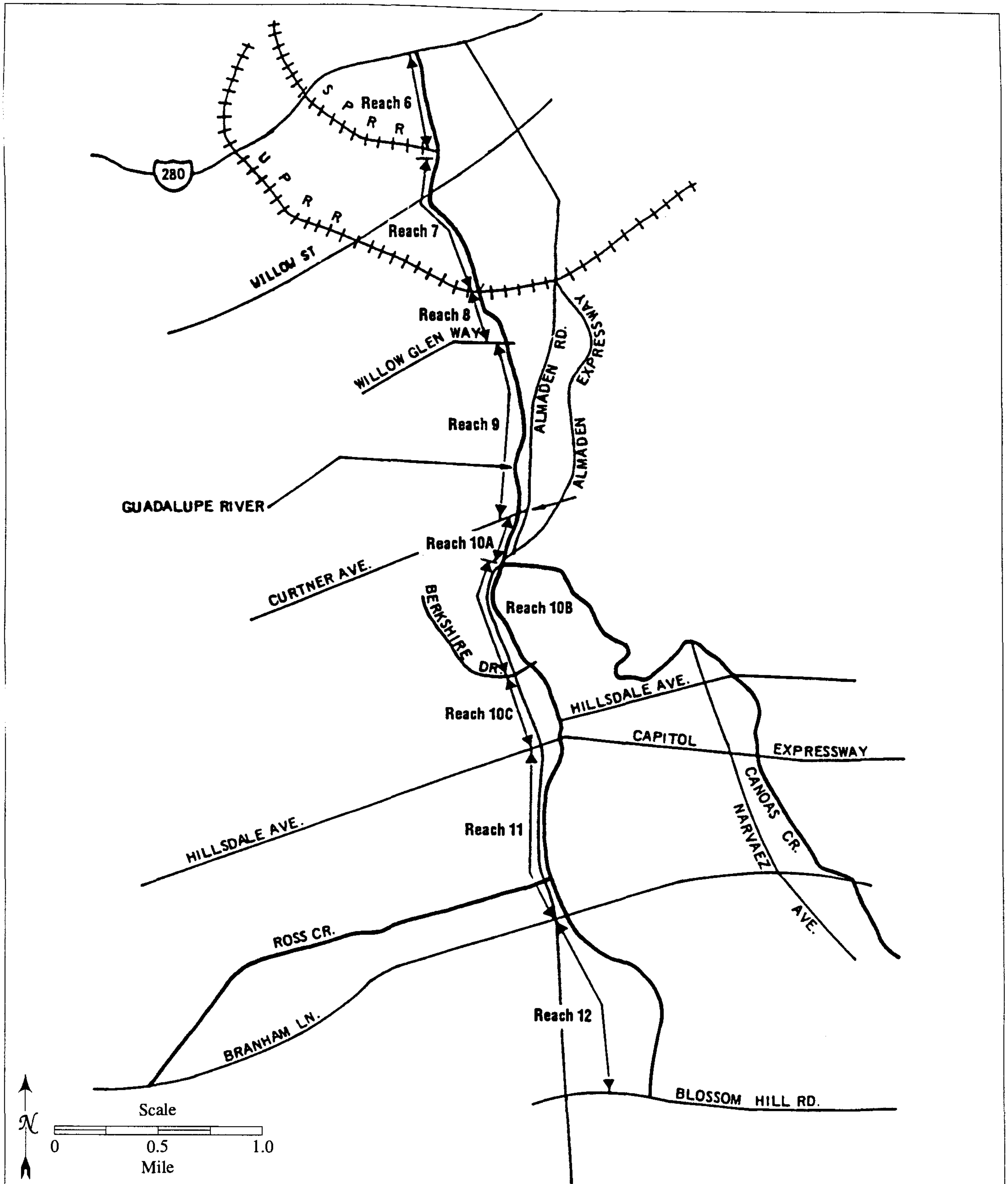


Figure 2-1. Regional Project Site Location



Source: COE 1997

Figure 2-2. Upper Guadalupe River Feasibility Study Limits, Reaches 7 to 12

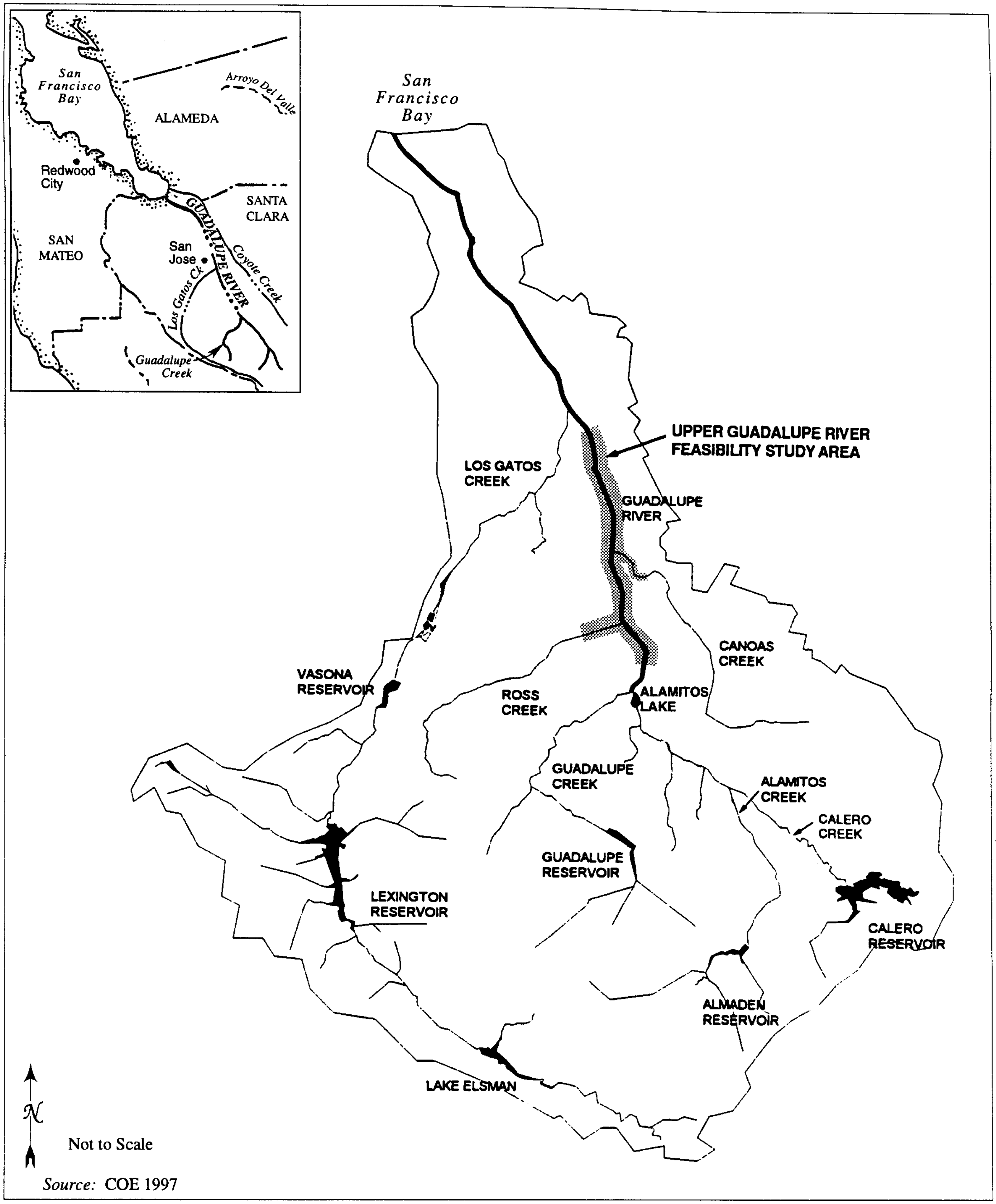


Figure 2-3. Guadalupe River Watershed

Principles and Guidelines, NEPA, CEQA, and the Corps Planning Guidance Notebook. Coordination with the SCVWD has been conducted throughout the study and they have provided technical and financial support. Other coordination has been conducted with the U.S. Fish and Wildlife Service (USFWS) under the provisions of Section 662(b) of the Fish and Wildlife Coordination Act. The USFWS has provided assistance and input on fish and wildlife resources as they relate to plan formulation, impact evaluation, and the development of mitigation measures. The Corps Sacramento District has provided technical assistance on the project. The feasibility study has also been coordinated with the City of San Jose.

The flood control planning process described above is summarized below:

1. Specification of flooding and related land resources problems.

2. Inventory, forecast, and analysis of flooding-related land resource impacts within the study area.

3. Formulation of alternative plans.

4. Analysis and evaluation of the effects of the alternative plans.

5. Comparisons of alternative plans.

6. Identification of the recommended NED plan.

The Corps' Upper Guadalupe River Flood Protection Study (COE 1998) documents the planning process to date. The following sections describe how alternative plans were formulated and the basis for selecting the two alternative plans considered in detail in this EIR/S.

2.2 FORMULATION OF CONCEPTUAL ALTERNATIVE PLANS

Conceptual flood protection alternative plans for the Guadalupe River area, including the present feasibility study area, were presented in the *Final Guadalupe River Interim Feasibility Report* (COE 1985). At that time, the Corps determined that a flood control project would only be economically feasible in the downtown San Jose area. This separate but related project is currently under construction (see sections 3.4 and 6.1.8)

Flood control improvement planning for the upper Guadalupe River was presented in the Corps' *Final Reconnaissance Report: Upper Guadalupe River Flood Control Study* (COE 1989). The study pursued evaluation of two preliminary channel modification plans based on elements considered in the previous Corps report, the Widened Earth Channel Plan and the Earth Bypass and Widened Earth Channel Plan, and determined that a feasibility study was warranted. The Widened Earth Channel Plan included single-sided bank widening of the river. The Earth Bypass and Widened Earth Channel Plan provided the same single-sided bank widening, with an earthen bypass in Reach 7 and 8 (COE 1989). In addition, a No Action Plan was considered.

Since 1989, the Corps has modified the structural alternatives, incorporating flood control methods to increase channel capacity with the goal of optimizing economic benefits and environmental protection, while maintaining hydraulic and engineering feasibility. The *Upper Guadalupe River Interim Feasibility Study Report* (COE 1993) and *Upper Guadalupe River Flood Protection Study Draft Report* (COE 1998) reconsidered a broad range of alternatives that had been evaluated in the previous Corps planning efforts. Non-structural methods included flood warning and evacuation systems, flood-proofing of existing structures, raising the elevation of existing structures, constructing small walls and levees around existing structures, purchasing and removing structures in the floodplain, and providing subsidized flood insurance. These measures were eliminated from consideration due to their economic and logistical infeasibility.

A Stream Restoration Alternative was considered, based on a fluvial geomorphological approach to flood prevention. This alternative incorporates a meandering multi-stage channel that contains the following from the middle of the river corridor outward to the banks: a low-flow channel capable of carrying normal river volumes; a bankful channel constructed adjacent to the low-flow channel that is capable of containing sediment and channel-forming flows; and a terraced floodplain that carries high storm flows. This alternative would allow for future meandering changes in the river system within the multistage channel design. This natural meandering would reduce erosion and sedimentation, reducing the need for river maintenance. Additionally, riparian vegetation could be reestablished on the terraced floodplain, providing habitat values for fish and wildlife.

In order to carry high channel flows during storm events, the stream restoration alternative would require widening the floodplain of the river by as much as a few hundred feet, and result in complete reconstruction of the meandering bankful channel. These modifications would result in major impacts to existing native riparian vegetation, shaded riverine aquatic habitat (SRA), fisheries, and would require the removal of approximately 200 households. A Stream Restoration Alternative would therefore be more damaging in the short-term, although potentially biologically preferable over a sufficiently long-term horizon.

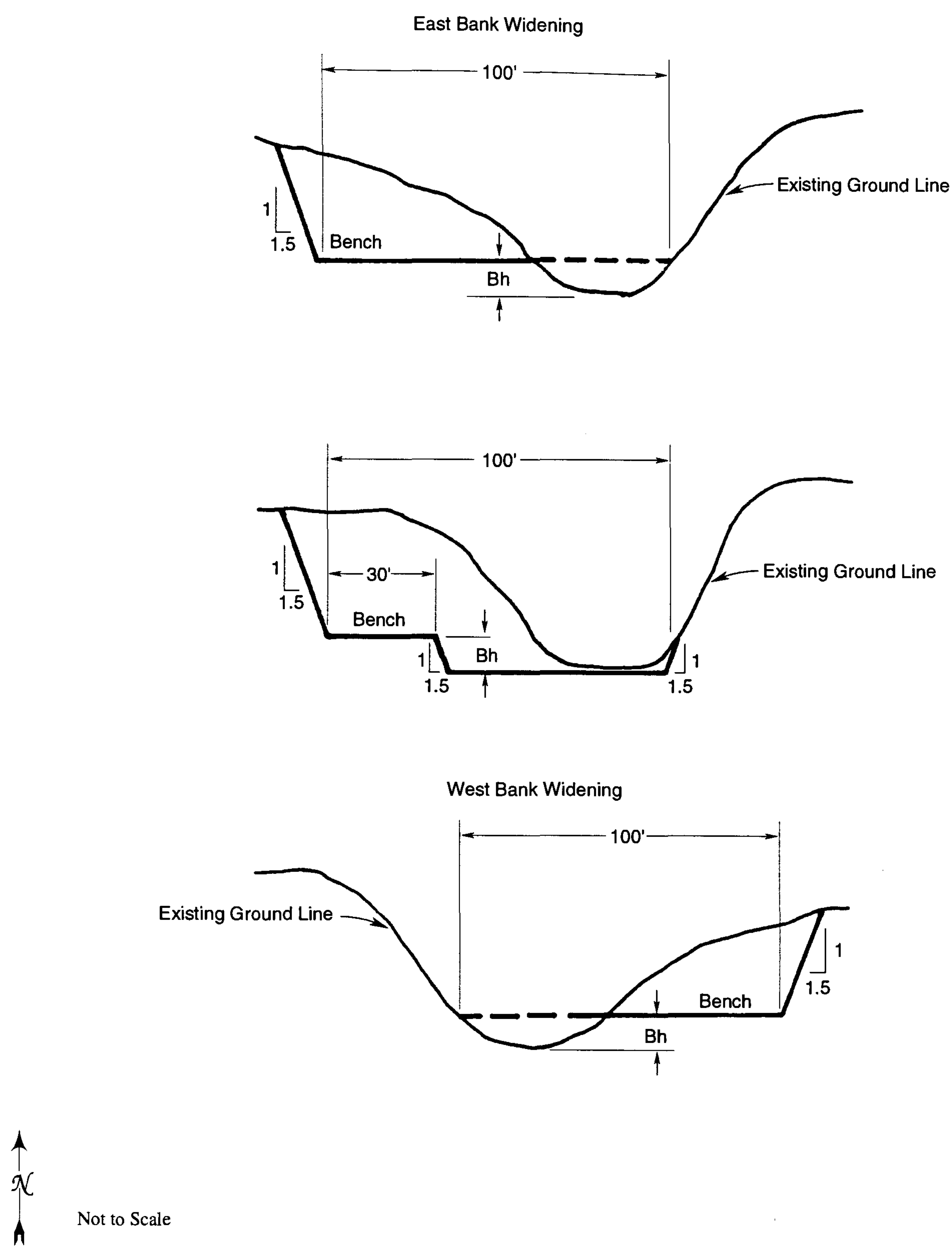
The Clean Water Act section 404(b)(1) guideline requirements for consideration of alternatives states that a permit cannot be issued in circumstances where a less environmentally damaging practicable alternative for the proposed project exists. Since other alternatives (discussed below) would be less environmentally damaging in the short-term, a permit could not be issued for the stream restoration alternative under the Clean Water Act section 404(b). The alternative was therefore eliminated from further consideration.

Structural measures outside the river channel included construction of upstream reservoirs or an offstream storage facility that would receive diverted river water during peak flow events. However, there is insufficient undeveloped land for offstream storage. These were also dropped from consideration due to high costs and associated environmental impacts.

Six basic channel modification features were considered by the Corps (COE 1993). These included the following:

- Widened Earth Channel: Increasing flow capacity by widening one side of the existing channel. The excavated bank would be planted with native grasses, shrubs, and trees, with no rock or concrete lining of the channel bottom or side slopes (Figure 2-4).

- Widened Rock Channel: Increasing flow capacity by widening one side of the existing channel, with slightly narrower channels to reduce right-of-way purchase requirements. The channel would be lined with rock to reduce potential erosion.



Source: BioSystems Analysis 1995

Figure 2-4. Conceptual Widened Earth Channel Plan Designs

- Earth Bypass Channel: Creating a secondary, parallel channel to carry excess flows during flood events. No rock or concrete lining of the bypass channel bottom or side slopes would be used. The natural channel would not be modified except for at the bypass channel diversion and reentry points (Figure 2-5).

- Covered Bypass Channel: Reinforcing the secondary, parallel channel with a concrete box culvert buried beneath the existing ground surface. The land above the bypass could be used for streets, parking areas, or open space.

- Floodwalls: Reinforced concrete walls built parallel to the tops of both existing channel banks. The natural channel would be preserved (Figure 2-6).

- Floodwalls with Selective Clearing: Clearing of brush and low shrubs along the channel banks to increase the channel capacity. Lower floodwalls would be required, but the channel vegetation would be disturbed.

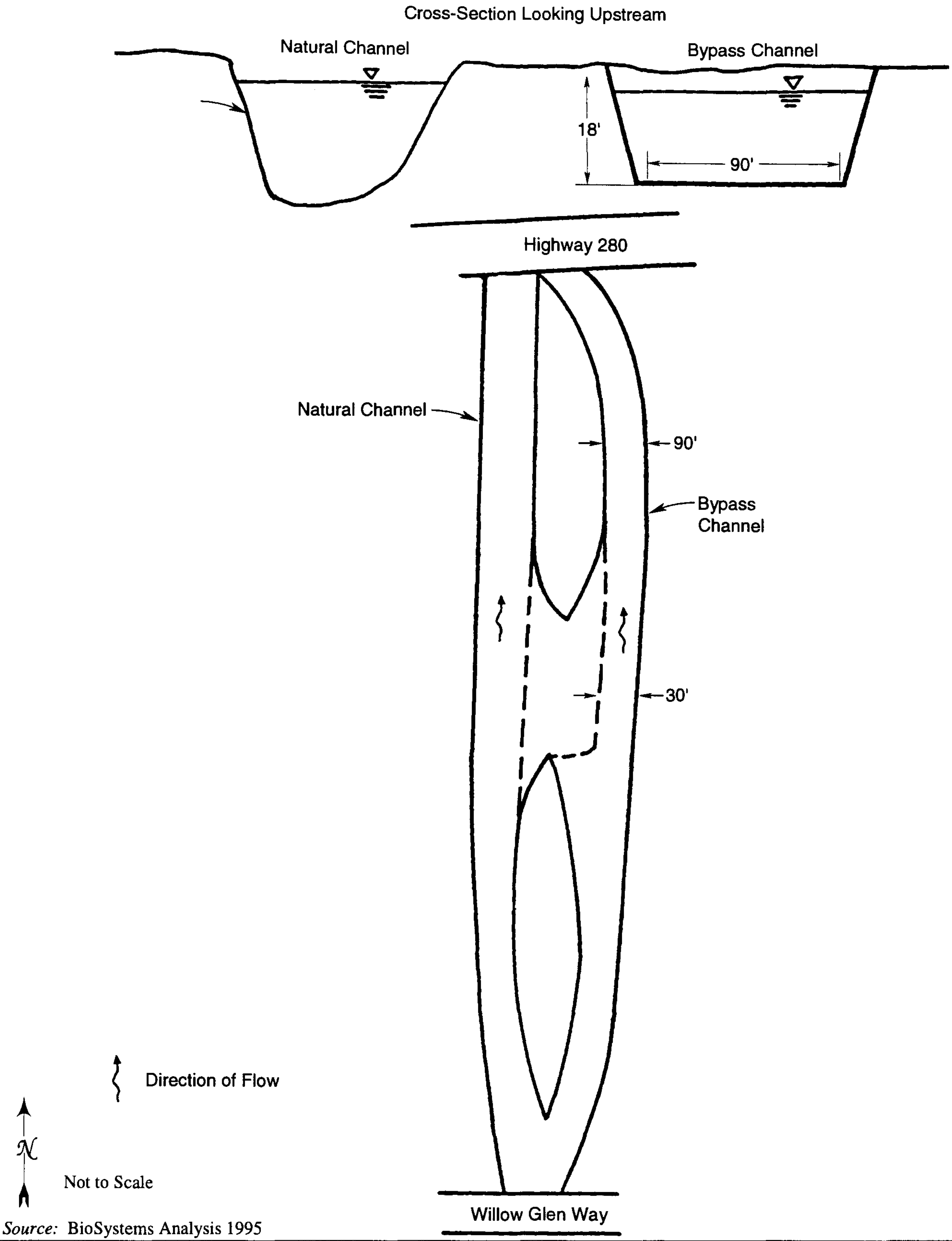
Full channelization, requiring concrete protection on both channel banks, was not considered feasible due to excessive biological impacts and substantial public controversy and lack of acceptance. High floodwalls were also not considered feasible due to logistical constraints (e.g., existing bridges and interior drainage problems) and public controversy and lack of acceptance. High levees (constructed earthen embankments), were not considered feasible due to excessive real estate costs and similar logistical constraints facing high floodwall construction.

The *Upper Guadalupe River Flood Protection Study Draft Report* (COE 1998) analyzed in detail three action plans including two Channel Widening Plan alternatives, a Bypass Channel Plan, and the No Action Plan. Currently, the capacity of the Guadalupe River is as low as 6,300 cubic feet per second (cfs) within some portions of the study area. The Channel Widening Plans included the Willow Glen and Valley View alternatives. The Willow Glen Plan, the smallest plan considered, would provide flood protection for up to a 20-year flood event (approximately 9,000 cubic feet per second [cfs]). The Valley View Plan, the intermediate plan, would provide flood protection for up to a 50-year flood event (12,000 cfs). The Bypass Channel Plan, the largest plan, would provide flood protection for up to a 100-year flood event (14,600 cfs) (COE 1998). All three plans would provide improvements on Canoas Creek to address the backwater effects resulting from improved flood protection on the Guadalupe River (COE 1998).

The SCVWD was responsible for formulating in detail the Bypass Channel Plan in a separate planning process, as described in section 1.3.2). The SCVWD Bypass Channel Plan incorporates aspects of the widened channel, bypass channel, and floodwall/levees (Parsons Engineering Science 1997) (see section 6.1.8 for a detailed discussion). This feasibility study has slightly modified the SCVWD plan, based on Corps engineering input, and called it the Bypass Channel Plan.

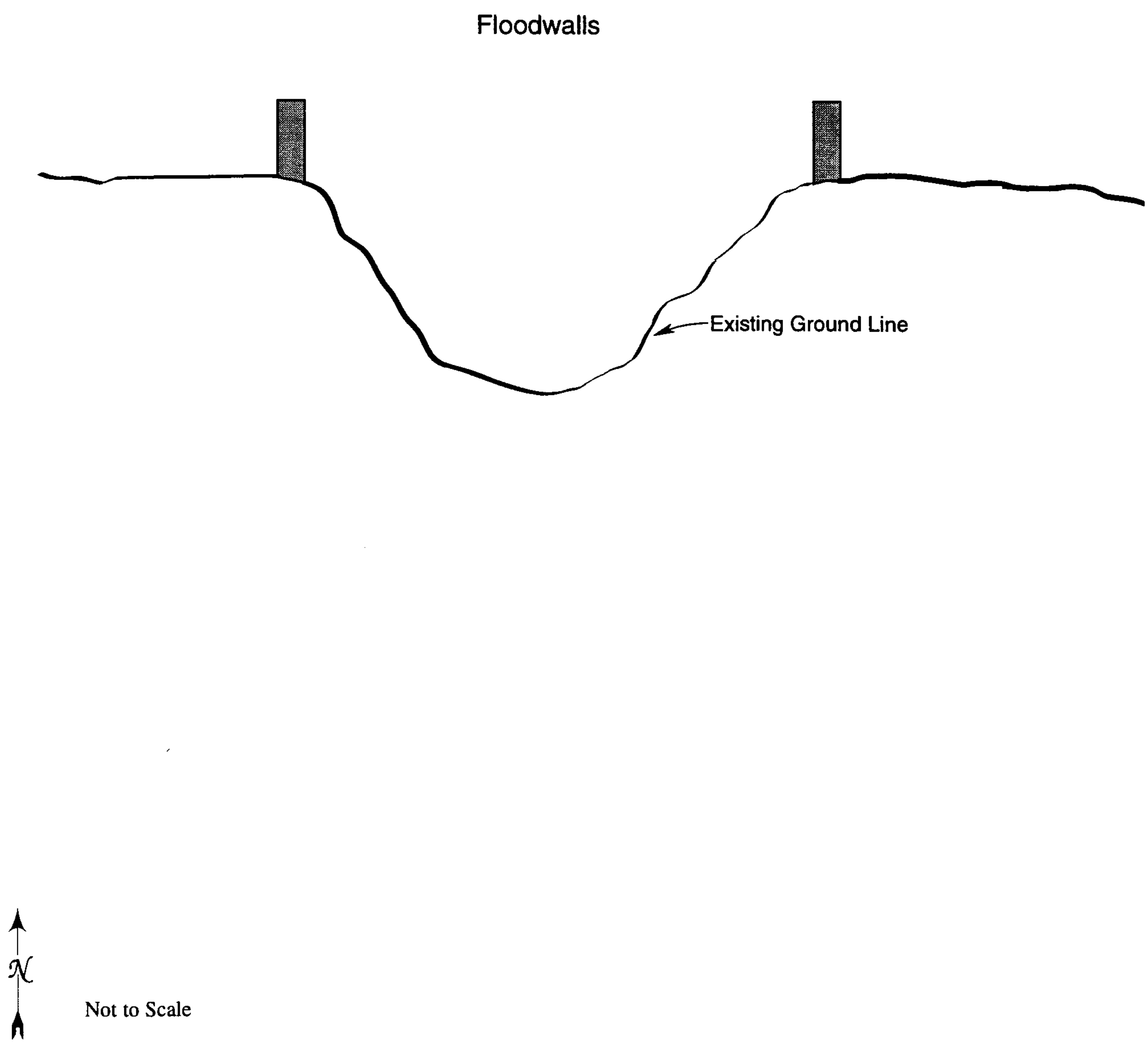
2.3 FORMULATION AND SCREENING OF COMPREHENSIVE FLOOD PROTECTION ALTERNATIVES

The formulation and screening of alternative comprehensive plans for flood protection is detailed in the Corps' Upper Guadalupe River Flood Protection Study (COE 1998). Briefly, the plan formulation process began by identifying where along the river "breakout areas" associated with flood events of various magnitudes were likely to occur, the associated economic costs, and the environmentally and



Source: BioSystems Analysis 1995

Figure 2-5. Conceptual Earth Bypass Channel Plan Design



Source: BioSystems Analysis 1995

Figure 2-6. Conceptual Floodwall Plan Design

socially acceptable control measures that could be applied. Alternative plans were then formulated by combining the least-cost control measures that would result in the greatest net economic benefits.

The results of this process were the development of the two Channel Widening alternative plans (Willow Glen and Valley View), both of which involved a widened channel at specific points, as well as low levees and/or low floodwalls at other points, and the Bypass Channel Plan. The largest plan would provide the greatest level of flood protection, but would also require a greater level of construction and temporary disruption to the environment.

The feasibility study identified benefit-to cost ratios of 5.4:1, 3.1:1, and 1.7:1 for the Willow Glen, Valley View Plan, and Bypass Channel Plans, respectively (COE 1998). Although the Willow Glen Plan has the highest benefit-to-cost ratio, it has lower net benefits than the Valley View Plan and the Bypass Channel Plan. The study determined that the Willow Glen Plan would remove only 400 acres and 15 percent of existing structures out of the 100-year floodplain, while the Valley View Plan would remove 1,300 acres and 27 percent of structures out of the 100-year floodplain, and the Bypass Channel Plan would remove 2,000 acres and 86 percent of structures out of the 100-year floodplain (COE 1998). Improvements on Canoas Creek would not increase protection against a 100-year flood event. The 880 homes in the study area adjacent to Canoas Creek would still require floodplain insurance. Additional economic analysis, project cost comparison and analysis, benefits analysis, and cost-sharing analysis is found in the Corps Feasibility Study Report (COE 1998).

2.4 ALTERNATIVES CONSIDERED FOR FURTHER STUDY

2.4.1 Channel Widening Plan

This EIS presents a detailed comparison of the Valley View Plan and the Bypass Channel Plan. Although it has the highest benefit-to-cost ratio, the Willow Glen Plan has not been included because it provides an unacceptably low level of flood protection and is unlikely to ever be constructed. The SCVWD would prefer to see the Bypass Channel Plan constructed since it provides the greatest level of protection. The Corps has determined that the NED Plan is the Valley View Plan, so this plan and the Bypass Channel Plan are being presented in this EIS. Although the SCVWD has proposed construction of the Bypass Channel Plan, the federal financial contribution may be limited to what would have been spent to construct the smaller Valley View Plan. Alternatively, the Corps headquarters may cost-share the Bypass Channel Plan as the project is located in an urban area. This policy decision will be made by the Corps in Washington D.C.

The Valley View Plan (called in this EIR/S the Channel Widening Plan) combines several of the engineering alternatives discussed above. The combination of the alternatives is based on maximizing net economic benefits through flood protection (if net economic benefits can be achieved) coupled with acceptable impacts on the environment after mitigation.

The Channel Widening Plan proposes approximately 50-year flood protection along reaches 7, beginning at the SPRR Bridge, through 12, at Blossom Hill Road of the upper Guadalupe River, and the lower part of Ross Creek. Improvements along Canoas Creek would address backwater effects resulting from improved flood protection on the Guadalupe River. Improvements in flood protection would be accomplished through a combination of channel widening, primarily along the east bank only, and the installation of low floodwalls on the existing top of the bank at a few strategic locations along the river. Procedures for channel widening involve excavating a bench on the existing bank at an elevation 3 feet above the channel bottom. The toe of the bench would be revegetated to mitigate losses of riparian forest and aquatic habitat. In most areas, cut slopes associated with channel widening would be compacted and smoothed to a slope of 1.5 feet horizontal to 1.0 feet vertical (1.5H:1V); they would not be covered with gabions or riprap. Cut slopes would be internally reinforced to provide stability. Slopes would be hydroseeded to provide vegetation cover for stabilization, but this is not expected to mitigate the loss of riparian forest. Gabions or crib walls (a design using cross-bracing on near vertical to vertical slopes) would be used to stabilize steeper cut slopes in reaches 10A and 10C.

Maintenance roads 12-feet wide, based on Corps engineering criteria and cost-sharing requirements, would be located at the top and toe of each cut slope. Access ramps to the benches would be located to minimize disturbance to biological habitats and minimize real estate costs.

In the Channel Widening Plan, the loss of riparian forest cannot be fully mitigated through the revegetation of disturbed areas. As a result, the Channel Widening Plan proposes additional mitigation through riparian forest and SRA cover creation or enhancement at a number of sites along the river (discussed in section 4.4 below).

In general, construction procedures would be as described for comparable portions of the Bypass Channel Plan in section 2.4.2. A Channel Widening Plan Operations and Maintenance Program defining erosion control and other types of maintenance detailed during the design phase would meet or exceed the program adopted by the SCVWD for the Bypass Channel Plan (personal communication, G. Dennis 1996). All fish passage improvements to the natural river channel within the feasibility study area that are proposed under the Bypass Channel Plan would be included under the Channel Widening Plan.

Residential property requiring removal would be purchased and individuals relocated, while businesses would be relocated in similar facilities outside of the feasibility study area.

The four reaches of construction under the Channel Widening Plan would require approximately 3 years to complete, limiting activity to the summer low-precipitation period (April 15 to October 15) (personal communication, G. Dennis 1996). Any construction outside this period would require prior approval from the California Department of Fish and Game.

A reach-by-reach description of the Channel Widening Plan follows, defined by geographical endpoints (railroads, streets), and engineering stations (measured in feet; for example, 713+00 is 71,300 feet along the river as measured south from the Bay, and 713+50 is 71,350 feet). Terminology describing habitats follows section 4.4, Biological Resources. The plan's components are summarized in Table 2-1.

Reach 7: **SPRR Bridge to Union Pacific Railroad (UPRR) Bridge (Sta. 741+00 to 781+00) — East Widened Earth Channel with Bench.** The east bank would be widened, creating a bench roughly 75 feet wide. Riparian forest restoration would occur along the toe of the bench to partially mitigate habitat losses due to channel widening. A maintenance-access road would be constructed along the top of the bank. The plan design for this reach allows a tie-in to the Reach 6 bypass channel that is expected to be constructed independently by the SCVWD. Bridges at Willow Street and Alma Avenue would be replaced. Four businesses located on Willow Street and Lelong Street in the downstream part of the reach would be relocated. A widened channel and floodwall would be constructed within the Elks Lodge parking lot, extending from West Alma Avenue south to the SPRR tracks at the boundary of Reach 8.

Table 2-1
Comparison of Channel Widening and Bypass Channel Plan Alternatives
(page 1 of 3)

Plan	*Location*	*Flood Control Method*	*Engineering Structure*	*Riparian Forest Impact/Mitigation Area*	*Structures Removed or Relocated*
			Reach 7		
Channel Widening	East Bank	Widening and benching	Earthen embankment; Replace Willow Street and Alma Street bridges	2.00/3.97 acres	4 businesses
Bypass Channel	East of river; east bank	Bypass channel; bank lowering (Willow St. to Alma Ave.); flood-wall (downstream along Lelong St. 300 feet from Alma Ave.)	Stepped gabions in bypass channel; channel crossing bridge at Willow Street; earthen lowered bank; excavation along concrete wall	0.53/3.28 acres	13 businesses Elks Lodge parking area
			Reach 8		
Channel Widening	East and west banks	Floodwalls	Excavation along floodwalls	0/0 acre (temporary disturbance of understory only)	None
Bypass Channel	East of river	Bypass channel	Stepped gabions; 190-foot weir drop structure downstream of Willow Glen Way	0.24/0.13 acre	23 homes
			Reach 9		
Channel Widening	None	None	Replacement of Willow Glen Way bridge	0/0.24 acre	None
Bypass Channel	East bank; east of river	Widening and benching; two 500-foot bypass channels (Willow Glen Way to Pine Ave.; upstream of Malone Road)	Earthen widened bank; bypass stepped gabions and east bank cribwall; replacement of Willow Glen Way bridge, relocated water wells	2.80/1.84 acres	6 homes, 2 partial backyards, 2 businesses
			Reach 10A		
Channel Widening	East Bank	Widening and benching	Earthen embankment; cribwalls	0.78/0.32 acre	None
Bypass Channel	East Bank	Widening and benching	Earthen bench, cribwall slopes; replacement of Curtner Ave. bridge	0.53/0.22 acre	None

Table 2-1
Comparison of Channel Widening and Bypass Channel Plan Alternatives

Plan	*Location*	*Flood Control Method*	*Engineering Structure*	*Riparian Forest Impact/Mitigation Area*	*Structures Removed or Relocated*
Reach 10B					
Channel Widening	West bank; channel bottom	None	Reconstruct rock-lined low-flow channel, with bordering riparian forest and SRA cover mitigation; lower stream gauge station	0/2.52 acres	None
Bypass Channel	West bank; east bench	Levee construction, floodwall at Lincoln Ave. overpass, low-flow channel reconstruction	Earthen levee, excavation for floodwalls, reconstruct rock-lined low-flow channel, with bordering riparian forest and SRA cover mitigation; lower stream gauge station; construct Pearl Ave. bridge	0.12/2.52 acres	None
Reach 10C					
Channel Widening	East bank alternating to west bank, then both banks	Widening and benching	Earthen embankments Replace Hillsdale Avenue Bridge	1.17/1.37 acres	Valley View Packing Plant
Bypass Channel	East bank	Widening and benching	Stepped gabions below maintenance road, cribwalls above road; remove Hillsdale Ave. bridge	1.44/2.79 acres	Valley View Packing Plant
Reach 11					
Channel Widening	None for 2,100 feet, then alternating east, west, east bank	Widening and benching	Earthen embankment	2.54/3.31 acres	None
11A Bypass Channel	East bank and east of river	Widening; bypass channel for 700 feet	Stepped gabions above widened benches; unlined bypass channel with rock-lined invert channel; removal of concrete rubble in channel bottom	2.20/2.15 acres	None
11B Bypass Channel	West bank	Widening to create 40-foot wide bench	Cribwall-lined bank slope; line bench bank with stepped gabions; remove concrete low flow crossing, excavate channel bottom	0.55/1.31 acres	Two homes and one water well

Table 2-1
Comparison of Channel Widening and Bypass Channel Plan Alternatives
(page 3 of 3)

Plan	*Location*	*Flood Control Method*	*Engineering Structure*	*Riparian Forest Impact/Mitigation Area*	*Structures Removed or Relocated*
			Reach 11		
11C Bypass Channel	West bank	Widening to create 40-foot wide bench; extend Ross Creek culvert entrance 80 feet	Cribwall-lined bank slope; concrete culvert apron and stepped pools for fish passage	0.63/0.77 acre	None
			Reach 12		
Channel Widening	None	None	None	0/0.37 acres	None
Bypass Channel	Both bank levees	Widening between percolation ponds and Blossom Hill Road; reconstruct levees between Chynoweth Ave. and SR 85	Earthen embankment	0.03/6.15 acres	None
			Ross Creek		
Channel Widening	Both banks; under Almaden Expressway and Jarvis Avenue	Low floodwalls; new culverts	Excavation along floodwalls; concrete culvert	0/0 acre	None
Bypass Channel	Both banks; under Almaden Expressway and Jarvis Avenue	Channel widening; new culverts	Articulated concrete mat at 1:1 slope on both banks	0/0 acre	None
			Canoas Creek		
Channel Widening	Both banks; under Almaden Expressway and Nightingale Drive	Low floodwalls; replace culverts	Excavation along floodwalls; concrete culvert	0/0 acre	
Bypass Channel	Both banks; under Almaden Expressway and Nightingale Drive	Low floodwalls; replace culverts	Excavation along floodwalls; concrete culvert	0/0 acre	None

Compensatory mitigation is proposed on the west bank between the SPRR and SR 87. Existing ruderal, herbaceous, and otherwise degraded habitat would be replanted to provide an expanded area of riparian forest. Additional mitigation is proposed just north of Alma Avenue along the top of the west bank on the graded SCVWD easement.

Reach 8: **UPRR Bridge to Willow Glen Way (Sta. 781+00 to 795+00) — Floodwalls.** Low floodwalls 1 to 3 feet high would be constructed along the existing tops of both the east and west banks.

Reach 9: **Willow Glen Way to Curtner Avenue (Sta. 795+00 to 845+00) — Bridge Replacement.** The Willow Glen Way Bridge would be replaced with a new 120-foot long structure. The existing pedestrian bridge would be removed and salvaged for the City. A mitigation area is proposed at station 829+00.

Reach 10A: **Curtner Avenue to Canoas Creek (Sta. 845+00 to 857+00) — Widened Earth Channel with Bench.** The east bank would be widened, creating a bench 10 to 40 feet wide. Riparian forest would be planted on the toe of the bench where space allows, whereas the new top of the bank would be along the shoulder of Almaden Road.

Reach 10B: **Canoas Creek to Berkshire Drive (Sta. 857+00 to 888+00) — No Improvements.** No flood control modifications are proposed along this reach. Construction of a rock-lined low-flow channel is proposed. To mitigate construction impacts elsewhere, riparian forest would be created or enhanced within the 50- to 80-foot wide channel bottom area from the northbound Almaden Expressway bridge southward to the upstream end of the reach. The plantings along the toe of the west bank would extend northward from the Almaden Expressway bridge to the downstream end of the reach.

Reach 10C: **Berkshire Drive to Capitol Expressway (Sta. 888+00 to 913+50) — Widened Earth Channel with Bench.** At the downstream end of this reach, the east bank would be widened out into adjoining agricultural land for a length of about 400 feet. Upstream, channel widening would shift to the west bank, continuing as far as Hillsdale Avenue. Both banks would be widened from Hillsdale Avenue to Capitol Expressway, and the Hillsdale Avenue Bridge would be replaced. Riparian forest would be restored on the toes of the benches. An additional mitigation area is proposed along the terrace of the west bank in ruderal herbaceous habitat.

Reach 11: **Capitol Expressway to Branham Lane (Sta. 913+50 to 961+00) — Widened Earth Channel with Bench.** No flood control modifications are proposed for the first 2,100 feet of the reach until the vicinity of Station 934+00. At this point, widening of the east bank is proposed for 450 to 500 feet, with the top of the cut slope extending into an existing SCVWD easement that abuts the adjacent residential area. One water well on the east bank would be relocated. In the vicinity of a concrete apron, channel widening would shift to the west bank for 200 to 400 feet then shift back to the east bank, continuing upstream along the SCVWD's easement to Branham Lane. The toes of the benches would be revegetated to partially mitigate riparian forest losses.Within the downstream portion of this reach, riparian forest creation or enhancement is proposed in five discrete areas of predominantly ruderal herbaceous habitat along the upper part of the west bank adjacent to Orchard Drive and Almaden Expressway. Large oak trees along the roadside would be avoided.

Reach 12: **Branham Lane to Blossom Hill Road (Sta. 961+00 to 1017+35) — No Improvements.** No flood control modifications are proposed under the Channel Widening Plan. Compensatory mitigation in the form of riparian forest restoration is proposed along the west bank and river terrace of this reach. The proposed mitigation area supports mostly ruderal herbaceous vegetation with scattered valley oaks, coast live oaks, and sycamores along the higher river terrace slopes.

Ross Creek: **Almaden Expressway to 750 feet Upstream of Jarvis Avenue — Floodwalls.** Low floodwalls 1 to 3 feet high and 5,200 feet long would be constructed on both creek banks. The creek channel would be widened to a 27-foot wide trapezoidal design from the main river channel to 750 feet upstream of Jarvis Avenue. New culverts would be constructed under Almaden Expressway and Jarvis Avenue.

Canoas Creek: **Almaden Expressway to 1,400 feet Upstream of Nightingale Drive** — Floodwalls. Culverts beneath Almaden Expressway and Nightingale Drive would be replaced, and low floodwalls 1 to 3 feet high and 2,800 feet long would be constructed on both creek banks.

2.4.2 Bypass Channel Plan

The Corps feasibility study Bypass Channel Plan addresses flood control improvements and biological mitigation along the same stretches of the Guadalupe River (between the SPRR Bridge and Blossom Hill Road), Ross Creek, and Canoas Creek as discussed for the Channel Widening Plan. The Bypass Channel Plan would provide, however, flood protection on the river and Ross Creek for up to a 100-year flood event. Flood improvements on Canoas Creek would address backwater effects resulting from improved flood protection on the Guadalupe River (COE 1998).

The Bypass Channel Plan construction would ensure relocation of existing utilities (such as water, gas, electricity, storm sewer, and telephone lines), water wells, and sanitary siphons. Homes and property requiring removal would be purchased and individuals relocated, and businesses would be relocated to similar facilities outside the feasibility study area. Areas of erosion affecting the river banks would be repaired and protected pursuant to the Maintenance Activities and Guidelines procedures (Parsons Engineering Science 1997). Construction of the Bypass Channel Plan as contemplated in the Corps' Upper Guadalupe River Protection Study (COE 1998) would extend over a 3-year period, interrupted only during the rainy season.

A brief description of the Corps feasibility study Bypass Channel Plan follows. A detailed description of construction in Reaches 7 through 12, Ross Creek, and Canoas Creek can be found in the corresponding sections of the SCVWD EIR/S (Parsons Engineering Science 1997). Bypass Channel Plan components are summarized in Table 2-1.

Reach 7: **SPRR Bridge to UPRR Bridge (Sta. 741+00 to 781+00) — Gabion Bypass Channel.** The bypass channel with stepped gabions would be constructed on the east side of the river, with a bottom width of between 30 and 85 feet. A maintenance access road would be placed on the bypass channel bottom. Access to the bypass channel would be from ramps located on the east bypass bank and to the river from ramps at Alma Avenue as well as ramps to the river near Willow Street. Vegetation in the existing river channel would be preserved.

Construction would require relocation of 13 commercial businesses. A floodwall would be constructed within the Elk's Lodge parking lot, extending from West Alma Avenue south to the SPRR tracks at the boundary of Reach 8. The bypass channel and floodwall would remove a portion of the Elk's Lodge parking lot. New bridges crossing the bypass channel at Willow Street and at West Alma Avenue would be built.

An eroded 450-foot long section of the west bank would be stabilized using boulders, root wads, soil, live cuttings, or other methods consistent with SCVWD's approved flood control program.

Reach 8: **UPRR Bridge to Willow Glen Way (Sta. 781+00 to 795+00) — Gabion Bypass Channel.** The gabion-lined bypass channel would continue parallel to the east river bank, with an 85-foot-wide bottom and 1:1 side slopes. The maintenance road would continue along the bypass channel bottom. Access to the bypass channel would be from ramps located on the east bypass bank and to the river from an existing maintenance road and ramp on the west bank. Elsewhere, vegetation in the existing river channel would be preserved. Riparian forest would be removed for the bypass channel entry weir.

Construction would require the removal of 23 homes on the west side of Mackey Avenue.

Reach 9: **Willow Glen Way to Curtner Avenue (Sta. 795+00 to 845+00) — Widened Gabion/Cribwall.** The east bank of the river would be widened up to 60 feet, creating a bench 20 to 70 feet wide and between 5 to 12 feet above the river bottom. The maintenance road would be placed along the bench. Two short bypasses would be constructed east of the river to avoid areas of high quality riparian forest, to reduce ecological impacts. One 500-foot-long bypass between Willow Glen Way and Pine Avenue would have a bottom width of 40 feet with stepped gabions on 1:1 side slopes. The second bypass upstream of Malone Road would be located on currently vacant land east of the river, and would have a bottom width of 40 feet with a cribwall on the east bank built at a 1:6 slope. Within the bypass, the maintenance road would be located on the bypass channel bottom. Portions of excavated bench areas would be revegetated.

Six homes, two partial backyard areas, and two businesses would be impacted. Existing water wells and facilities operated by the San Jose Water Company (SJWCo) would be relocated. The Willow Glen Way bridge would be replaced.

Two eroded sections of the west bank, totalling 500 feet in length, would be stabilized using boulders, root wads, soil, live cuttings, or other methods consistent with SCVWD's approved flood control program.

Reach 10A: **Curtner Avenue to Canoas Creek (Sta. 845+00 to 857+00) — Widened Cribwall Channel.** East bank widening would continue, creating a bench from 18 to 40 feet wide, with an elevation about 5 feet above the present channel bottom, and a crib wall on 1:6 slopes (Parsons Engineering Science 1997). The maintenance road would be placed along the bench. Riparian vegetation along the east bank would be removed. The Curtner Avenue bridge would be replaced. Portions of excavated bench areas would be revegetated.

Reach 10B: **Canoas Creek to Berkshire Drive (Sta. 857+00 to 888+00) — Levee and Revegetation.** A levee 4 feet high with a top width of 15-18 feet and 2:1 side slopes would be constructed on the west bank between the northbound and southbound Almaden Expressway. A 4-foot-high floodwall would be built at the Lincoln Avenue overpass for 300 feet, and a rock-lined low-flow channel would be made by reconfiguring rocks. A maintenance road would be built on the existing east bench upstream of northbound Almaden Expressway, with access to the road provided by a ramp upstream of Almaden Expressway. A Pearl Avenue bridge would be built in coordination with the City of San Jose, replacing the Hillsdale Avenue bridge, which would be removed in Reach 10C. Riparian forest would be created or enhanced from the northbound Almaden Expressway bridge southward to the upstream end of the reach. The plantings along the toe of the west bank would extend northward from the Almaden Expressway bridge to the downstream end of the reach.

Reach 10C: **Berkshire Drive to Capitol Expressway (Sta. 888+00 to 911+75) — Widened Gabion Channel.** The east bank would be excavated creating a bench between 20 and 58 feet wide, 8 feet above the present channel bottom. A maintenance road would be placed along the bench. For most of this reach, gabions would be used above the bench, and the slope from the bench down to the channel bottom would be left natural. Between Hillsdale and Capitol Expressway bridges, above the maintenance road the bank would be lined with cribwalls at a 1:6 slope, while the bank below would be lined with stepped gabions. A portion of the depressed bench would be revegetated.

A portion of the Valley View Packing Plant would be removed.

Reach 11A: **Capitol Expressway to Bryan Avenue (Sta. 911+75 to 937+60) — Widened Gabion Channel.** The east bank would be widened from Capitol Expressway south for approximately 300 feet, where a 700-foot long bypass channel with a bottom width of 50 feet and 2:1 unlined slopes would begin. Figure 2-9, depicting reach 11a in the draft EIR/S was inaccurate and has been deleted. Contrary to what this figure depicted, there would be no riparian forest vegetation on the east bank of reach 11a upstream of the bypass channel. Bypass channel slopes would be revegetated. After this point, the east bank would again be widened, where a maintenance road would be placed. Gabions would line the 1:1 slope above the bench. Existing concrete rubble within the river channel would be removed to enhance fish passage.

Reach 11B: **Bryan Avenue to Ross Creek (Sta. 937+60 to 947+90) — West Bank Widening with Cribwalls.** The west bank would be widened, creating an earth bench 40 feet wide and 5 feet above the channel bottom. The 1:6 side slope above the bench would be lined with cribwalls, and the 1:1 slope below lined with stepped gabions. Maintenance roads would be placed on the widened bench and on top of the east bank.

Two homes would be impacted and one SJWCo water well would be relocated.

Reach 11C: **Ross Creek to Bryan Avenue (Sta. 947+90 to 960+00) — West Bank Widening with Cribwalls.** The west bank would be widened to create a bench up to 60 feet wide with a 1:6 side slope lined with cribwall, approximately 6 feet above the channel bottom. A maintenance road would be placed on the bench and along the top of the east bank. Vegetation on the east bank would be avoided.

Reach 12: **Branham Lane to Blossom Hill Road (Sta. 961+00 to 1017+35) — Widened Earth Channel with Bench.** The west bank would be widened 25 feet between the seasonal percolation ponds and Blossom Hill Road to create a vegetation bench. Levees would be constructed and raised 6 feet on both banks between Chynoweth Avenue and Route 85, with maintenance roads placed on top of both the east and west banks.

Large areas of riparian, wetland, and open-water habitat would be planted in the reach area. Reduction in percolation pond areas would be offset by construction of 4.5 acres of pond offstream. Ruderal vegetation would be removed.

Ross Creek: **Almaden Expressway to 750 feet Upstream of Jarvis Avenue — Channel Widening with Concrete Mat.** The creek channel would be widened to a 35-foot wide trapezoidal design from the main river channel to 750 feet upstream of Jarvis Avenue. Both banks would be lined with articulated concrete mats at a 1:1 slope. New culverts would be constructed under Almaden Expressway and Jarvis Avenue. The Ross Creek culvert entering the Guadalupe River in Reach 11C would be extended 80 feet, with a concrete apron. The existing sanitary sewer pipe under Almaden Expressway would be relocated in coordination with the City. Mitigation for fisheries impacts along Ross Creek would include stepped fish pools, a low-flow channel to enhance fish passage, and weirs.

Canoas Creek: **Almaden Expressway to 1,400 feet Upstream of Nightingale Drive — Floodwalls.** Culverts beneath Almaden Expressway and Nightingale Drive would be replaced, and low floodwalls 1 to 3 feet high and 2,800 feet long would be constructed on both creek banks.

As participants in the National Flood Insurance Program (NFIP), the communities along the Guadalupe River are required to adhere to floodplain management policies and adopt ordinances that represent sound land use practices. The NFIP is administered by the Federal Emergency Management Association (FEMA) through the Federal Insurance Administration. FEMA produces Flood Insurance Rate Maps for the communities participating in the NFIP that identify flood hazard areas (i.e., 100-year floodplain) and restrict development in these areas. With implementation of the Bypass Channel Plan, participation in the NFIP would no longer be required except in areas remaining susceptible to flooding from Canoas Creek.

Recreation Plan

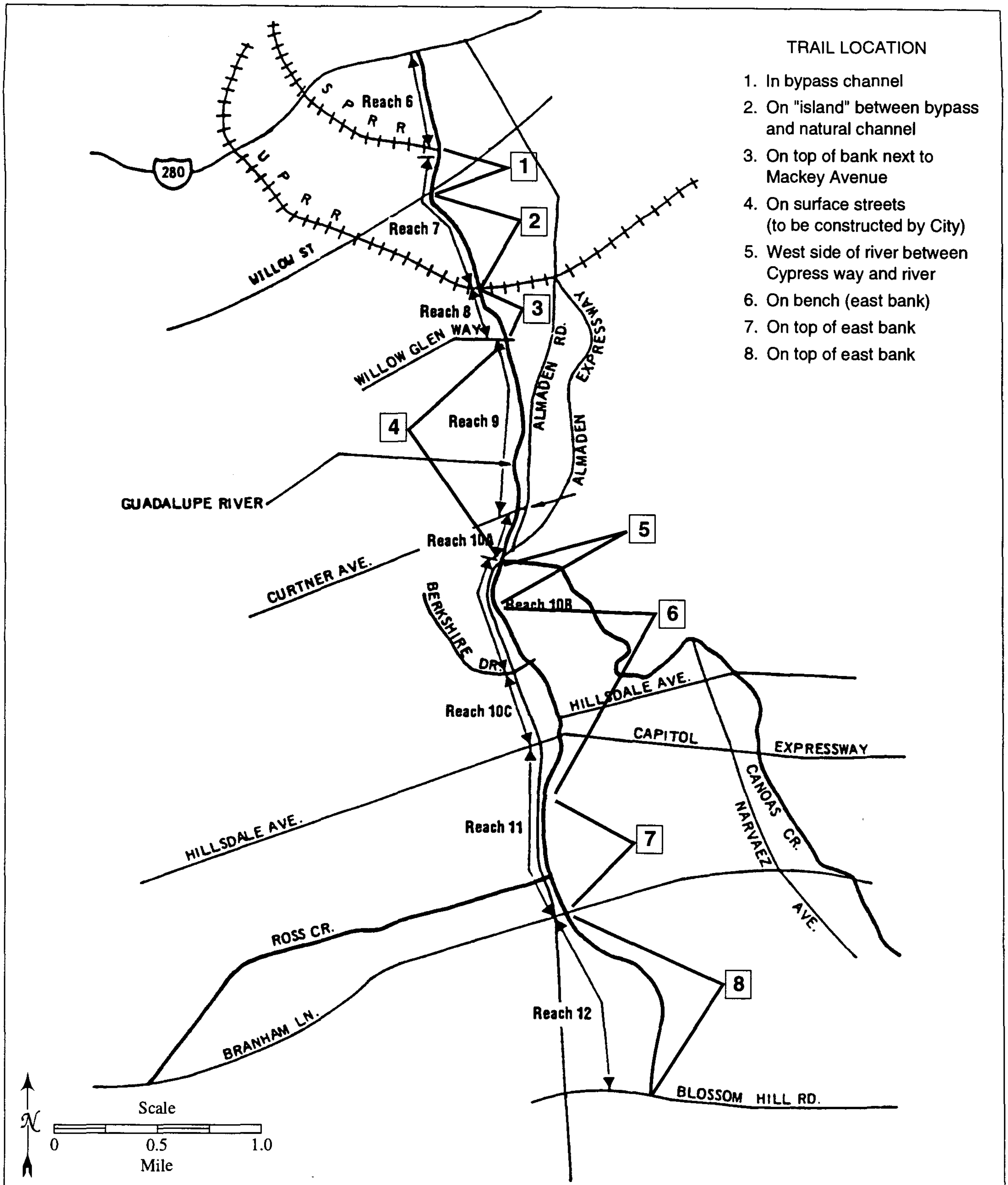
The Corps Upper Guadalupe River Feasibility Study has been coordinated with the City of San Jose, which has agreed to help fund recreation features associated with the project. These recreation amenities are considered part of the Bypass Channel Plan.

The feasibility study prepared by the Corps includes a recreational trail that would be a part of the Bypass Channel Plan. The recreational trail and associated facilities would be within the floodway, except in Reaches 9 and 10a, where it would fall outside the feasibility study area. In these reaches, the trail would run mostly along Almaden Road, and would be designed to encourage limited public access along the river for a distance of approximately 4 miles. The recreational trail would be constructed at the same time as the Bypass Channel, but would be contingent upon establishment of a wider right-of-way as proposed by the City of San Jose as part of their widening plan for this road. The Bypass Channel Plan recreational trail route is illustrated in Figure 2-7.

The trail would generally be 10 feet wide and paved, located on maintenance roads constructed on the widened bench adjacent to natural channel (see Figure 2-8) or on the levee between the bypass channel and the natural channel. Vehicle barriers at the trail access points would preclude motorized vehicles except for maintenance vehicles. Safety features would include call boxes, safety lighting at railroad and thoroughfare underpasses, directional signs, and selectively located fencing and railing. Approximately 3,800 feet of 3-foot high chain-link fence and approximately 1,500 feet of railing is proposed along selected portions of the trail. Public amenities would include picnic areas, benches, a par course, restrooms with drinking fountains, and interpretive signs.

2.4.3 No-Action Alternative

The No-Action Alternative would mean no change from the existing situation. No flood control project, structural or non-structural, would be implemented for the upper Guadalupe River by the federal government. The river would continue to periodically flood, damaging adjacent homes and businesses along the river. The City of San Jose would continue to participate in the National Flood Insurance Program.



Source: Personal communication, W. DeJager 1997

Figure 2-7. Bypass Channel Plan Recreational Trail

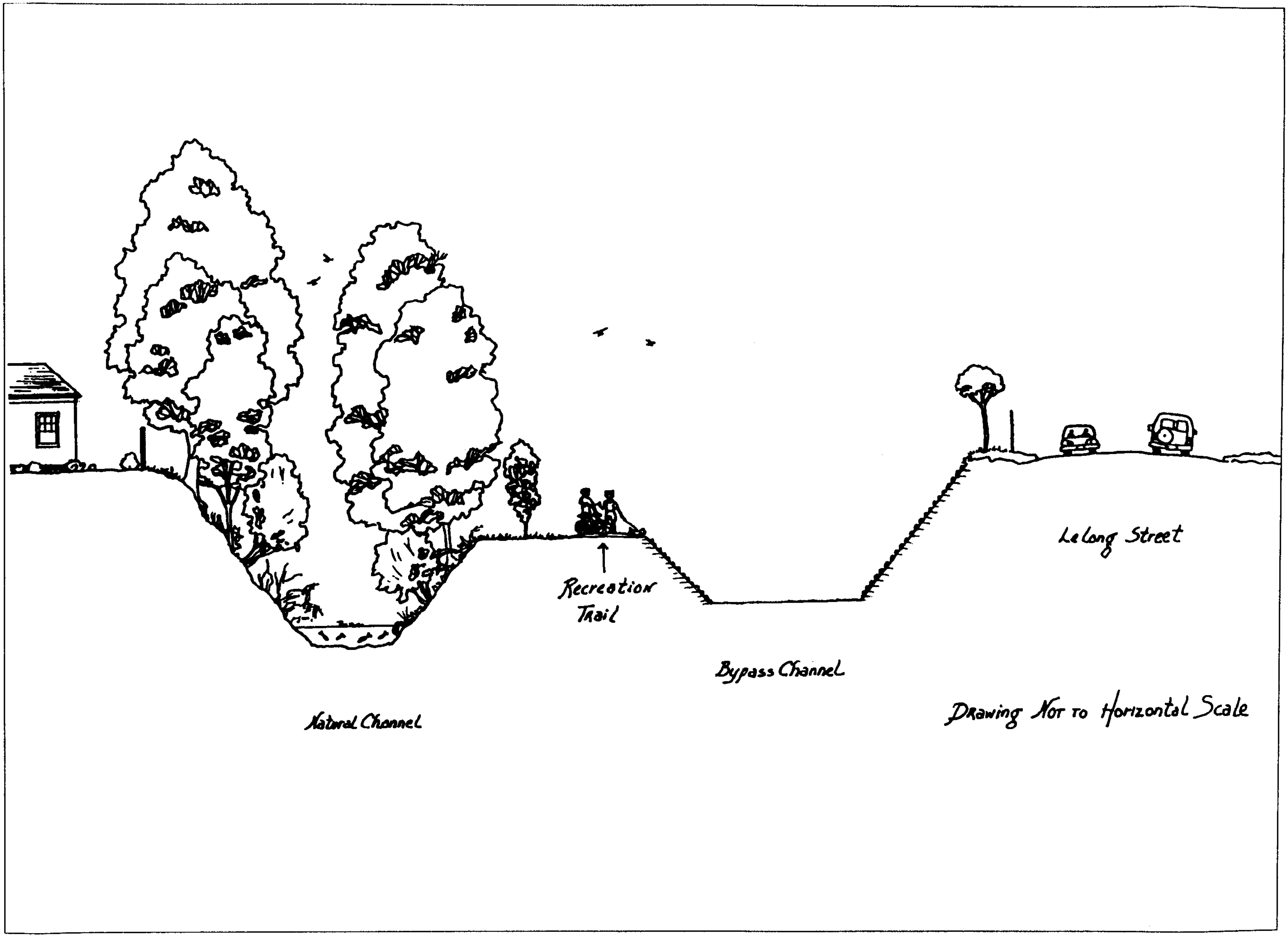


Figure 2-8. Recreation Trail Reach 7 Looking Downstream

3.0 ENVIRONMENTAL SETTING

3.1 EXISTING SITE CHARACTERISTICS

The Guadalupe River drainage basin (Figure 2-1) covers approximately 170 square miles, of which the upper Guadalupe River drainage area (upstream of Los Gatos Creek) comprises approximately 95 square miles. Elevations within the watershed range from 0 to 3,790 feet above sea level (NGVD datum). Along the river's course through the feasibility study area, there is less than a 100-foot change in elevation. The drainage basin is bounded on the south and southwest by the Santa Cruz Mountains, on the west by the drainage basins for San Tomas and Saratoga Creeks, on the east by the Coyote Creek Basin, and on the north by San Francisco Bay. Land uses in the watershed are mostly rural in the higher elevations and heavily urbanized in the lower reaches (COE 1998).

The headwaters to the Guadalupe River and Guadalupe, Calero, and Alamitos creeks originate in the Santa Cruz Mountains near the summit of Loma Prieta and converge to form the Guadalupe River channel about ¼ mi. upstream (south) of Blossom Hill Road. The river flows northwesterly for about 14 miles before discharging into Alviso Slough at San Francisco Bay. Tributaries to the Guadalupe River include Ross, Canoas, and Los Gatos Creeks. Ross Creek, with a drainage area of 10 square miles, and Canoas Creek, with a drainage area of 19 square miles, are the two tributaries within the upper Guadalupe River feasibility study area.

Much of Santa Clara Valley and nearly all of the lands along the 5.5-mile segment of the upper Guadalupe River under study are highly urbanized. Development within the floodplain consists of medium- to high-density single- and multi-family residences, and commercial properties including light industry facilities, small business offices, car dealerships, and neighborhood retail stores. Other modifications in the natural character of the river have occurred from the construction of numerous erosion control features, past flood control efforts, and water resource development projects. The area around Reach 12, in particular, has been greatly altered by sand and gravel mining that was conducted in the river from the 1930s until the late 1960s. These excavated areas are now used for percolation ponds for groundwater aquifer recharge (restoring the natural reservoirs from which wells draw the public water supply) and recharge along the river channel.

Mining for mercury ore (quicksilver) was conducted upstream, in the headwaters area between Alamitos and Guadalupe creeks, from around 1846 until 1890 and intermittently from the 1920s to the 1970s. Mercury contamination has been recorded in river sediments and trace concentrations of mercury continue to be detected in the recent river water samples (COE 1998).

The upper Guadalupe River is crossed by 12 public roads and two railroad lines. The Santa Clara County Transit District operates bus lines in the study area. Located in the median of SR 87, the Guadalupe Corridor Light Rail line runs the entire length of the study area. Utility lines serving the local community are located along the project corridor. Utility services are provided and operated by the San Jose Water Company (SJWCo), the City of San Jose Municipal Water System, Pacific Bell Company, American Telephone & Telegraph Company, and Pacific Gas & Electric Company (COE 1998).

Vegetation along the upper Guadalupe River consists of riparian forest, freshwater marsh, non-native weedy communities, and landscaped areas. Vegetation along the Guadalupe River represents one of the last remaining riparian forest corridors in Santa Clara Valley. The riparian forest in the lower reaches of the feasibility study area, while possibly more narrow than its historic extent, is relatively abundant and dense. In Reach 12, the riparian forest is much more discontinuous and degraded as a result of past gravel mining, the creation of percolation ponds, and other disturbances. The riparian forest and freshwater marsh along the river provide habitat for a variety of bird species, small mammals, reptiles, and amphibians. The river and adjacent riparian habitat also provides a corridor for wildlife movement through the highly urbanized region of greater San Jose. The aquatic habitat in the river channel, including the component identified as shaded riverine aquatic (SRA) cover, has also become degraded due to urbanization, previous channel modifications for flood control, gravel mining, and water resources development in the watershed. In spite of these disturbances, the river is used by anadromous fish species for spawning and rearing (COE 1998).

3.2 SURROUNDING LAND USES

A brief description of surrounding land uses is provided below. A more detailed discussion is in section 4.8, Land Use.

Residential development borders one and occasionally both sides of the river from Reach 7 through 10. The recently completed Tamien light rail transit station borders the east river bank in Reach 7. The San Jose Elks Lodge is on the parcel south of West Alma Avenue on the east bank in Reach 7. Commercial uses occupy the west side of the river just south of West Alma Avenue, and a small commercial/industrial area is on the east bank, just south of Willow Street.

In Reach 10B, open lands exist on the west bank adjacent to the Almaden Expressway, including a neighborhood park on the east bank. These lands are owned by the SCVWD. The Valley View Packing Plant complex and orchards are on the east bank of Reach 10C. Commercial uses occupy the west bank in Reach 10C and also the east bank upstream from the packing plant, and just upstream from the Capitol Expressway in Reach 11. Residential development continues on both banks upstream in Reach 11.

In both the northern and southern edges of Reach 12, office/commercial property borders the river, while residential properties are contiguous with the right-of-way on the east side of the river for most of the length of the reach outside this land use. Midway along this reach, beside both the east and west banks of the river, percolation ponds have been developed for groundwater recharge purposes. The central two-thirds of the western side of the reach are in active agricultural production.

Residential uses abut Ross and Canoas Creek banks.

3.3 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

The regulatory framework that would govern the proposed upper Guadalupe River flood control project includes several executive orders; numerous federal, state, and local regulations; and other governmental plans and policies. The relevance of these statutes to the proposed action is described below. Compliance of the proposed action is summarized in the EIS Summary, Table S-3. Situations of partial compliance or non-compliance in this table are explained in the text of this section.

3.3.1 Federal Regulations

National Environmental Policy Act of 1969 (42 USC 4341 et seq.)

The National Environmental Policy Act (NEPA) was established to ensure that the environmental consequences of federal actions are incorporated into agency decision-making. It establishes a process whereby the parties most affected by the impact of a proposed action are identified and their opinions are solicited. A Draft Environmental Impact Statement (EIS) that presents sufficient information to evaluate the suitability of the proposed and alternative actions is developed by the lead agency. The proposed action and alternatives are evaluated in relation to their environmental impacts, and a tentative selection of the most appropriate alternative is made. A Notice of Availability, announcing that the Draft EIS can be obtained for comment, is published in the *Federal Register*. After the Draft EIS comment period, the comments are addressed, revisions are made to the Draft EIS, and the document is published as a Final EIS. For the proposed action, the Corps is the lead agency under NEPA. This document fulfills the NEPA EIS requirement.

The Council on Environmental Quality (CEQ) has published NEPA implementation regulations at 40 CFR Parts 1500 to 1508. The Corps regulations for implementation of NEPA are published at 33 CFR Part 230. The U.S. EPA's NEPA implementation regulations are published at 40 CFR Part 6.

Clean Air Act of 1969 (42 USC Section 7401 et seq.)

The purpose of the Clean Air Act (CAA) is to protect the nation's air quality by regulating emissions of air pollutants. The CAA is applicable to permits and planning procedures related to project activities onshore and within the territorial sea. The territorial sea is defined as waters 3 miles seaward of the nearest shoreline. Section 118 of the CAA (42 USC 7418) requires that all federal agencies engaged in activities that may result in the discharge of air pollutants comply with state and local air pollution control requirements. In addition, Section 176 of the CAA (42 USC 7506) prohibits federal agencies from engaging in any activity that does not conform to an approved State Implementation Plan. Emissions from the project would comply with all federal and state air regulations and standards, including the conformity provisions of Section 176(c). However, emissions would exceed one of the local thresholds that the Bay Area Air Quality Management District (BAAQMD) has defined as significant under CEQA, i.e., more than 150 pounds per day of NO_x. Additional information on the CAA and other air quality regulations is in Appendix A.

Clean Water Act of 1977 (33 USC 1251 et seq.)

The objective of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Specific sections of the Act control the discharge of pollutants and wastes into aquatic and marine environments.

The major section of the CWA that applies to the proposed project is Section 401, which requires certification that the permitted project complies with the state water quality standards for actions within state waters. Under Section 301, states must establish water quality standards for all state waters, including the territorial sea. Project activities may not cause the concentrations of chemicals in the water column to exceed state standards. To receive state certification, a permit applicant must demonstrate that these standards would not be exceeded.

Section 404(b)(1) of the CWA establishes guidelines for the discharge of dredged or fill material into the aquatic ecosystem. Subpart A, Section 230.1(c) of the Section 404(b)(1) (40 CFR) guidelines states the following: "Fundamental to these Guidelines is the precept that dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge would not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern." The Section 404(b)(1) guidelines are equally important and are discussed in Appendix G of this document.

Although sections 401 and 404(b) of the CWA apply, by their own terms, only to applications for federal permits, the Corps has made a policy decision to apply them to their own projects. This policy is set out in Corps regulations at 33 CFR Part 336. Section 336.1(a) of that regulation states, "Although the Corps does not process and issue permits for its own activities, the Corps authorizes its own discharges of dredge or fill material by applying all applicable substantive legal requirements, including public notice, opportunity for public hearing, and application of the Section 404(b)(1) guidelines."

For discharge of wastewater into non-navigable waters of the state (e.g., from dewatering of sediments), Regional Water Quality Control Boards (RWQCBs) also issue National Pollutant Discharge Elimination System (NPDES) permits under Section 402 of the CWA.

At this time, the project is considered in partial compliance with the CWA until the following conditions are satisfied. The Corps and the SCVWD would need certification from the RWQCB that water quality standards will not be violated during construction. An NPDES permit would also be necessary since ground disturbance would cover more than 5 acres.

Fish and Wildlife Coordination Act of 1958 (16 USC 661 et seq.)

The Fish and Wildlife Coordination Act requires that whenever any body of water is proposed or authorized to be impounded, diverted, or otherwise controlled or modified, the lead federal agency must consult with the USFWS, the state agency responsible for fish and wildlife management (in California, the Department of Fish and Game), and for projects affecting marine fisheries, the National Marine Fisheries Service (NMFS). Section 662(b) of the Act requires the lead federal agency to consider USFWS and other agencies' recommendations. The recommendations may address wildlife conservation and development, damage to wildlife attributable to the proposed action, and measures proposed to mitigate or compensate for these damages. Input from the USFWS is usually provided in a Coordination Act Report (CAR). The Revised Draft CAR for the proposed project is included as Appendix F to this document. The Act is applicable to Corps and EPA evaluations of consistency with CWA Section 404 requirements.

Endangered Species Act of 1973 (16 USC 1531 et seq.)

The Endangered Species Act protects threatened and endangered species by prohibiting federal actions that would jeopardize the continued existence of such species or that would result in the destruction or adverse modification of any critical habitat of such species. Section 7 of the Act requires that consultation regarding protection of such species be conducted with the USFWS (and/or NMFS) prior to project implementation. An updated list provided by the USFWS of proposed and listed threatened and endangered species that could be present in the project area is provided in Appendix D.

During the project planning process, the USFWS evaluates the potential impacts of all aspects of the proposed action on threatened or endangered species. Their findings are contained in letters that provide an opinion on whether a proposed action would jeopardize the continued existence of endangered species or modify critical habitat. If a jeopardy opinion is issued, the resource agency will provide reasonable and prudent alternatives, if any, that would avoid jeopardy. A non-jeopardy opinion may also be accompanied by reasonable and prudent measures to minimize incidental take (loss or disturbance of individuals) caused by the proposed action. This EIR/S serves as the Biological Assessment required by this Act. The project is in partial compliance with the Endangered Species Act pending concurrence from USFWS regarding the biological conclusions in this document.

National Historic Preservation Act of 1966 (16 USC 470 et seq.)

The National Historic Preservation Act established the National Register of Historic Places (NRHP), which is a catalog of properties including sites, districts, buildings, structures, and objects considered significant for their historic, architectural, engineering, archaeological, or cultural value. Properties of local, state, or national significance may be eligible for inclusion in the NRHP. Under the statute, federal agencies are required to consider the effects of a proposed action on properties listed or determined eligible for listing in the NRHP. This is accomplished through coordination between the federal agency and the State Historic Preservation Officer (SHPO), leading to a plan that either avoids damaging any National Register property or satisfactorily mitigates adverse effects caused by a proposed action.

A records search has been performed that indicates there are recorded prehistoric or historic archaeological sites with value as cultural resources within the footprint of the proposed project. A field reconnaissance of the project site confirmed these findings. The findings to date will be coordinated with the SHPO. Any unavoidable archaeological or historical resource impacted by the project will require consultation with the SHPO to review and approve a treatment plan including excavation, analysis, or recordation to ensure full compliance with this statute.

Archaeological and Historical Preservation Act of 1974 (88 Stat. 174)

This Act amends the Reservoir Salvage Act of 1960 to extend its provisions and to provide funding to protect historical and archaeological remains found at dams and reservoirs during any alteration of the terrain caused by any federal construction project or federally licensed activity or program. This Act does not apply to the project because no dams or reservoirs would be affected by the proposed project.

Federal Water Project Recreation Act of 1965 (Public Law 89-72)

This Act established the federal policy that any investigation or plan for any federal navigation, flood control, reclamation, hydroelectric, or multi-purpose water resource project must give full consideration to the opportunities for outdoor recreation and for fish and wildlife enhancement. Wherever any such project can reasonably serve either or both of these purposes, it must be constructed, operated, and maintained accordingly. The proposed project would support the goals of this Act. The proposed wetland restoration would enhance fish and wildlife resources, and it may be enjoyed by recreationists.

Rivers and Harbors Act (33 USC § 403 et seq.)

Section 10 of this Act prohibits the obstruction or alteration of navigable waters of the United States without a permit from the Corps. Specifically, all types of development in or over navigable waters including bridges, dams, dikes, piers, wharfs, booms, weirs, jetties, dredging, and filling are regulated by requiring a Corps permit for such actions. Navigable waters are defined in 33 CFR Part 329 as those waters that are subject to the ebb and flow of the tide and/or have been used in the past, or may be used in the future to transport interstate or foreign commerce. Hence, Section 10 (and Corps) jurisdiction extends to the *historic* limits of navigability, including historic tidelands that have been diked and drained. This Act, read in conjunction with the Fish and Wildlife Coordination Act (16 USC §§ 661-666) and

NEPA of 1969 (42 USC §§ 4331-4347), permits the Corps to refuse on conservation grounds to grant a permit to dredge or fill in navigable waters. Again, the Corps does not issue itself a permit for Corps-proposed projects, but all Corps projects are planned and implemented to conform with the requirements of Section 10 of the Rivers and Harbors Act.

3.3.2 Executive Orders

Executive Order 11593, Protection and Enhancement of the Cultural Environment (36 FR 8921, 5/15/71)

Executive Order 11593 states that the federal government shall provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the Nation. The Order directs federal agencies to locate, inventory, and nominate to the National Register of Historic Places potentially eligible properties under their jurisdiction. Properties that have been nominated to the National Register are to be protected from inadvertent damage, destruction, or transfer until the their eligibility has been evaluated. The Order encourages the preservation of cultural resources on federal lands, and stipulates that federal plans and programs be developed to help preserve and enhance cultural resources located on non-federal lands. Compliance with the Order will be ensured through the Corps coordination with the SHPO.

Executive Order 11988, Floodplain Management (36 FR 26951, 5/25/77)

Executive Order 11988 states that each federal agency shall provide leadership and take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains. Federal agencies are directed to determine whether a proposed action will occur in a floodplain and, if so, to consider alternatives to avoid adverse effects and incompatible development in the floodplain. If development in a floodplain is deemed necessary, the federal agency must prepare and circulate a notice explaining why the action is proposed for the floodplain area. Agencies are to provide opportunity for early public review of any proposed actions in floodplains. The proposed project, by designing for a major flood and widening an inadequate floodplain, directly supports the intent of this Executive Order to minimize the impacts of floods. The NEPA/CEQA process also provides for early public involvement in this process.

Executive Order 11990, Protection of Wetlands (42 FR 26961, 5/25/77)

Executive Order 11990 states that each federal agency shall provide leadership and take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities. The Order does not apply to the issuance by federal agencies of permits, licenses, or allocations to private parties for activities involving wetlands on non-federal property. Agencies are to provide opportunity for early public review of any proposed plans or proposals for new construction in wetlands. The project is consistent with this Executive Order.

Executive Order 12088, Federal Compliance with Pollution Control Standards (43 FR 47707, 10/13/78)

Executive Order 12088 states that the head of each Executive agency is responsible for ensuring that all necessary actions are taken for the prevention, control, and abatement of environmental pollution with respect to federal facilities and activities under the control of the agency. This Order applies to federal property and operations, including military bases, open lands, office buildings, and other structures such as research laboratories. The head of each Executive agency is responsible for compliance with applicable pollution control standards. Each Executive agency shall cooperate with the EPA, and state, interstate, and local agencies in the prevention, control and abatement of environmental pollution. Since the project is not located on federal property, this Executive Order does not apply to the project.

Executive Order 12898, Environmental Justice

A Presidential Memorandum and this Executive Order, entitled Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, were signed by President Clinton on February 11, 1994. The Executive Order requires that, "To the greatest extent practicable . . . each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations . . . " The Presidential Memorandum further requires that each federal agency ensures that opportunities are presented for affected communities to provide input into the NEPA process, including identification of mitigation measures.

Consideration of this Executive Order in NEPA documentation ensures that two questions are asked: (1) is a federal project with significant adverse environmental impacts being proposed in a community that comprises largely minority or low-income persons, and (2) would any significant adverse human health or environmental effects of the project disproportionately affect minority or low-income persons?

Executive Order 12898 provides for an Environmental Justice Working Group with a 24-month environmental justice strategy development schedule. However, the Presidential Memorandum accompanying the Executive Order directs each federal agency to begin implementing specific directives immediately. One of the directives requires federal agencies to identify and address environmental justice issues in NEPA documents and to include measures to mitigate significant and adverse environmental effects of proposed federal actions on minority and low-income populations.

This Executive Order would not apply to the Channel Widening Plan or the Bypass Channel Plan, because in neither case would construction disproportionately affect minority or low-income populations.

3.3.3 State Regulations

California Environmental Quality Act of 1973 (Public Resources Code [PRC] Section 21000 et seq.)

CEQA establishes requirements similar to those of NEPA (section 3.3.1.1) for consideration of environmental impacts and alternatives, and for preparation of an Environmental Impact Report (EIR) prior to implementation of applicable projects. CEQA, however, requires that significant environmental impacts be mitigated to a level of insignificance, or to the maximum extent feasible. If full mitigation is not feasible, the state lead agency must make a finding of overriding considerations before approving the project. The proposed action falls under the purview of CEQA. This document fulfills the CEQA EIR requirement. The proposed mitigation measures in this document satisfy CEQA requirements because (1) mitigation measures are identified for every significant impact, (2) the extent of the impact after mitigation is noted (see column titled "Significance After Mitigation" in Table S-1), and the party responsible for implementing the measure is noted (see column titled "Responsible Party in Table H-1).

CEQA further requires that any significant effects resulting from implementing a mitigation measure also be discussed in the EIR; there would be no such significant effects associated with any of the mitigation measures associated with the proposed project.

The SCVWD is lead agency for the Bypass Channel Plan under CEQA. Responsible agencies (public agencies other than the lead agency that have responsibility for carrying out or approving a project) include USFWS, the California Department of Fish and Game (CDFG), Caltrans, RWQCB, and the City of San Jose.

Porter-Cologne Water Quality Control Act of 1966 (California Water Code Sec. 13000 et seq.; CCR Title 23, Chapter 3, Subchapter 15)

The Porter-Cologne Act is the primary state regulation that addresses water quality. The requirements of the Act are implemented by the State Water Resources Control Board (SWRCB) at the state level and, at the local level, RWQCBs. Under the direction of the SWRCB, the RWQCBs carry out planning, permitting, and enforcement activities related to water quality in California. The San Francisco Bay RWQCB has jurisdiction over the project area. The Act provides for waste discharge requirements and a permitting system for discharges to land or water. The Act also provides for Basin plans to identify beneficial uses of water resources and to implement appropriate controls.

Project construction activities must not result in adverse impacts on the quality of the surface water and groundwater in the vicinity of the site. In addition, discharge of water associated with possible dewatering operations must comply with water quality objectives established under this Act.

California Endangered Species Act of 1984 (Fish and Game Code Section 2050 et seq.)

The California Endangered Species Act provides for the recognition and protection of rare, threatened, and endangered species of plants and animals. The Act requires state agencies to consult with the CDFG to ensure that state-authorized or funded actions do not jeopardize the continued existence of a listed species. The Act prohibits the taking (collection, killing, or injury, whether intentional or accidental) of listed species without authorization from the CDFG. CDFG may authorize the taking of a listed species through a Memorandum of Understanding that establishes the extent of a taking permitted by CDFG and establishes required mitigation. The list of protected species identified by the State of Californian is provided in Table 4.4-8.

California Department Fish and Game Wildlife Habitat Mitigation Policy

The CDFG's wildlife habitat mitigation policy is one of no net loss of habitat value. The project would be in compliance with this policy through the proposed mitigation.

California Wetlands Conservation Policy (California Executive Order W-59-93)

The state policy recognizes the value of marshlands and other wetlands. The policy is that there be (1) no net loss of wetland acreage; and (2) a long-term gain in the quantity, quality, and permanence of wetland acreages and values in California. This policy is to be implemented in a manner that fosters creativity, stewardship, and respect for private property. The California Resources Agency and its various departments do not authorize or approve projects that fill or otherwise harm or destroy coastal, estuarine, or inland wetlands. Exceptions may be granted if all the following conditions are met: (a) the project is water-dependent; (b) no other feasible alternative is available; (c) the public trust is not adversely affected; and (d) adequate compensation is proposed as part of the project. The CDFG and Fish and Game Commission policy stresses the need to compensate for the loss of wetland habitat on an acre-for-acre basis. Compensation for the loss of wetland habitat values to fish and wildlife resources requires the creation of habitat values at the compensation site that at least duplicate those habitat values that are lost due to project implementation. Mitigation for lost habitat values may be accomplished in one of four ways (listed from most acceptable to least acceptable): in-kind, on-site; in-kind, off-site; out-of-kind, on-site; and out-of-kind, off-site. The project, with mitigations, will be consistent with this policy. Some current, although minor, jurisdictional wetlands along the existing creek channel would be lost or temporarily disturbed, but a larger area of equivalent wetlands would be created along the margins of the new channel.

3.3.4 Local Regulations

The project area is within the San Jose city limits, with a short segment of Reach 10 that borders County land. The project would be subject to the City of San Jose's Horizon 2000 General Plan and the Santa Clara County General Plan. Two other applicable documents are the City of San Jose's Riparian Corridor Policy Study (City of San Jose 1994) and the City's local park plan. The latter two documents are discussed in sections 4.4, Biological Resources, and 4.5, Aesthetics and Recreation, respectively.

County of Santa Clara General Plan

The Santa Clara County General Plan (1990) identifies a number of measures to protect creeks and streamside areas in its Natural Environment, Land Use, and Public Safety Elements. Its Natural Environment (NE) Element details the following eight policies that are relevant to the flood control project and for which the SCVWD shares responsibility with the County for proper implementation:

1. The remaining riparian vegetation associated with the streams and creeks of Santa Clara County shall be protected through the following means:

    a. By setback from the top of the bank.

    b. Regulation of the removal of trees and other vegetation.

    c. Reduction or elimination of the use of herbicides by public agencies.

    d. Controlling and designing of grading, road construction, and bridges near streams to minimize loss of riparian vegetation.

2. Public projects shall be designed to avoid damage to the stream environments.

3. Where possible, riparian woodlands, marshes, and floodplains that have been altered should be allowed to return to a natural state.

4. In floodplains that are not already developed, land uses shall be restricted to avoid need for major flood control alterations to the streams.

5. Flood control modifications to be made in streams that have substantial existing natural areas should use a floodplain design that avoids alterations of the creek and its immediate environments.

6. Public projects should preserve the stream environment and should provide multiple use for such purposes as parks, open space preserves, trails and flood control.

7. Lands near creeks and streams shall be considered to be in a buffer area consisting of the following land:

   a. An area extending 150 feet from top bank line landward where the creek is predominantly in its natural state (has not been converted to a concrete or riprap channel).

   b. An area extending 100 feet from high water line landward where the creek has had major alteration, such as concrete or riprap channelization.

   c. If (a) or (b) above is not applicable, establish an area sufficient to protect the creek from negative influences of adjacent development such as sedimentation, biochemical degradation, thermal pollution and aesthetic degradation.

8. Within these buffer areas, the following restrictions should apply to public projects and to private non-residential development:

   a. No building structure (except those required for flood control maintenance, reinforcement or bridging, etc.) or major parking lot shall be allowed.

   b. No grubbing, clearing, tree cutting, grading, debris disposal or any other despoiling action shall be allowed, except for removal of dead or diseased material after investigation has established that wildlife habitat of value for particular species will be retained.

   c. Screen the buffer area from obtrusive or unsightly aspects of a project outside the buffer in a manner that will create a feeling of continuity with the buffer, being careful to protect the native plant communities.

   d. Protect wildlife and endangered plant species within the area.

   e. Provide for trails and other compatible recreational uses when indicated in the County or City General Plans.

The Implementation portion of the Element requests, among other provisions, the following:

> *Restore, when possible, riparian vegetation which has been lost through past actions* (NE(i) 19).

In addition, the Land Use (LU) Element of the Plan specifically provides for creek and streamside protection and restoration when possible, as well as the avoidance of "building, parking, clearing or despoliation within the creek buffer area" (LU 10). Allowable Uses are defined accordingly:

Creeks and streamsides shall be preserved in their natural state providing for drainage, percolation, wildlife habitat, aesthetic relief and open space. Recreational uses that are environmentally compatible are allowable within the creek buffer area (LU 9).

The Public Safety (PS) Element considers flood control measures in the context of advancing other community goals, including "recreation, resource conservation, preservation of natural riparian vegetation and habitat, and preservation of the scenic values of the county's streams and creeks" (PS 21). It requires that flood control projects, whenever possible, "be designed to maintain creeks in their natural state" (PS 19).

City of San Jose Horizon 2000 General Plan

The Horizon 2000 General Plan (City of San Jose 1987) seeks to balance the need to protect the community from the risk of flood damage (which is the primary goal for Flood Policies) with the protection of the City's remaining riparian corridors. Among San Jose's six flooding-related policies, one in particular is applicable:

New development should be designed to provide protection from potential impacts of flooding during the '1%' or '100-year' flood.

At the same time, the City seeks to protect riparian resources and special-status species. The goal of the General Plan's Riparian Corridors and Upland Wetlands policies in the Natural Communities and Wildlife Habitats section is to:

Preserve, protect, and restore riparian corridors and upland wetlands within the City of San Jose's Sphere of Influence.

Policy 2 states that:

Creeks and natural riparian corridors and upland wetlands should be preserved whenever possible. When disturbances cannot be avoided, appropriate measures should be required to restore, or compensate for damage to, the creeks or riparian corridors.

The goal of the General Plan's Species of Concern policies in the Natural Communities and Wildlife Habitats section is to:

Preserve habitat suitable for Species of Concern, including threatened and endangered species.

Policy 2 for this element states that:

Habitat areas that support Species of Concern should be retained to the greatest extent feasible.

The goal of the General Plan's Marine Life and Wildlife Resources section is to:

Preserve areas of special marine and wildlife habitation, particularly those containing endangered species, as living research and recreational resources, and as indispensable parts of the total environment.

Policy 5 states that:

> *Significant creeks and natural riparian corridors within the Urban Service Area should be preserved whenever possible. When disturbances cannot be avoided, appropriate measures should be required to restore, or compensate for damage to the creeks or riparian corridors.*

While consistent with flood control land use policies, the Channel Widening Plan and the Bypass Channel Plan would conflict with some land use policies related to protection of streams, stream buffer zones, and natural habitats (particularly riparian and wetland habitats). Because the two alternatives would be consistent with some policies (those mainly related to flood control) and inconsistent with other policies (those mainly related to protection of biological habitats), they are designated as "PC" in Table S-3. The Bypass Channel Plan approach to flood control appears to be the most consistent with these two objectives, while the Channel Widening Plan approach would be unavoidably inconsistent with the City and County policies regarding stream and natural habitat preservation. The Bypass Channel Plan would be consistent with the City of San Jose policy calling for new development to provide an approximately 100-year flood level of protection; the Channel Widening Plan, providing an approximately 50-year flood level of protection, would be inconsistent with this policy. Either of the alternatives would be consistent with the City and County policies calling for restoration of unavoidable impacts on streams and riparian corridors. The channel widening approach would appear to be inconsistent with the Santa Clara County General Plan (Natural Environment Element) policy that calls for flood control modifications to use a design that avoids alteration of natural creek environments. The channel widening approach may also be inconsistent with the Public Safety Element policy (PS 19) that requires flood control projects be designed to maintain creeks in their natural state whenever possible (Parsons Engineering Science 1997).

Interagency coordination would continue to ensure that the recreational features and uses for the Guadalupe River Corridor Park are incorporated into the design of the flood control project. Key representatives from the San Jose Department of Recreation, Parks and Community Services, the City of San Jose, and the SCVWD have been meeting and should continue to meet at the beginning of each design phase of the project. The purpose of such meetings is to identify and reconcile differing perspectives and to maintain compatibility between the park master plan for the corridor and the corresponding elements of the flood control design. Compatibility with the appropriate policies of the City and County Land Use Elements related to discouraging the disturbance of riparian habitat by development and/or recreational uses would be retained by coordinating trail design with the San Jose Department of Recreation, Parks and Community Services. Whenever trail placement could adversely affect the habitat value of the riparian corridor, the trail would avoid those portions of the corridor sensitive to human intrusion.

Corps of Engineers

- RWQCB certification pursuant to Section 401 of the Clean Water Act that water quality standards will not be violated during construction.

Construction Contractor

- NPDES Permit. An NPDES permit would be necessary from the RWQCB since ground disturbance would cover more than 5 acres, and for stormwater discharge.

3.4 PROJECTS CONSIDERED IN THE CUMULATIVE ANALYSIS

The following "past, present, and reasonably foreseeable future actions" (40 CFR 1508.7) are considered cumulative projects affecting the Guadalupe River that are subject of the EIR/S analysis (Parsons Engineering Science 1997).

1. **Downtown Guadalupe River Project from I-880 to I-280**. The Corps project would remove 30.6 acres of riparian habitat and replant 64.3 acres. It is under construction and expected to be completed by 1999.

2. **Guadalupe River Park**. The project is sponsored by the City of San Jose Redevelopment Agency and is located adjacent to the lower Guadalupe River project. It includes a river walk system along the top of river banks (River Walk Project), and riverbank gabions and pedestrian bridge over Los Gatos Creek. Impacts include removal of 0.8 acre of riparian habitat and planting of 4.7 acres.

3. **Guadalupe River Park South Corridor Master Plan from I-280 to Coleman Avenue.** The San Jose City project would include trails and recreational amenities, resulting in potential disturbances to sensitive wildlife and riparian vegetation.

4. **SR 87 Freeway Upgrade Project from US 101 to Julian Street.** This completed project impacted 4.5 acres of riparian habitat and 1.1 acres of Corps jurisdictional wetlands, and included planting 7.5 acres of riparian habitat.

5. **SR 85 Transportation Corridor Project**. Completed improvements to the state route including bridge construction over the Guadalupe River impacted 0.1 acres of riparian vegetation on the river and indirectly, 4.5 acres on Los Gatos and Ross creeks. Over 12 acres of riparian vegetation was planted on site and 0.2 acre off site.

6. **San Jose International Airport Expansion Plan.** Airport expansion under construction includes replacement of the Airport Parkway Bridge, addition of a new bridge south of Airport Parkway Bridge, and widening Airport Boulevard adjacent to the Guadalupe River.

7. **San Jose Riparian Corridor Policy Study**. The City of San Jose Riparian Corridor Policy Study could affect the Guadalupe River watershed. This study provides policy and development guidelines for riparian areas along all creeks in the City, including defining the riparian corridor and development guidelines for setbacks, access control, landscaping and lighting, and compatible land uses. The City is reviewing the study and may propose its adoption in the future. Adoption and implementation of riparian corridor development guidelines could help to reduce the severity of cumulative impacts in the Guadalupe River watershed.

8. **Santa Clara Valley Water District Guadalupe River Flood Control Project.** The SCVWD proposes flood control improvements on the Guadalupe River extending north of the proposed project addressed in this EIS/R. Reach A includes a stretch nearly 2 miles long between U.S. 101 and U.S. I-880, approximately 2 miles north and downstream of Reach 7, which would be improved with widened channels, some floodwalls, and levees to provide a 100-year level of flood protection. Reach 6 includes a 2,800-foot stretch of the river from I-280 to the SPRR Bridge, and would include a bypass channel lined with steep gabions to provide a 100-year level of flood protection. The SCWVD also proposes floodwalls on both banks of

Canoas Creek and culverts between Guadalupe River and the Nightingale culvert to provide a 100-year level of flood protection. These improvements would be constructed as related elements to the proposed project development on Reaches 7 through 12.

9. **Almaden Road Widening**. The City of San Jose plans to widen Almaden Road within the feasibility study area. Widening of the road would require disturbances very close and likely within the proposed Bypass Channel Plan recreational trail corridor. A wider right-of-way for this segment of Almaden Road and partial reconstruction of portions of the road within this stretch of the feasibility study areas would be necessary to build the recreational trail. The City of San Jose would coordinate its land acquisition and road reconstruction with construction of the Bypass Channel Plan (William DeJager 1997).

4.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION AND ALTERNATIVES

4.1 AIR QUALITY

Air quality in the immediate project area and surrounding regional environment of the San Francisco Bay Area Air Basin (SFBAAB) would be affected by emissions from construction of the Channel Widening and Bypass Channel Plan alternatives. The following section includes a description of the affected air quality resource, impacts estimated from the proposed alternatives, and mitigations that would lessen significant project impacts.

4.1.1 Regulatory Setting

Air quality regulations were first promulgated with the *Federal Clean Air Act of 1969*. This act established the national ambient air quality standards and delegated the enforcement of air pollution control regulations to the states. In California, the Air Resources Board (ARB) enforces air regulations, but delegates the responsibility of stationary emission source regulation to local air pollution agencies. In the project area, the Bay Area Air Quality Management District (BAAQMD) is responsible for air pollution source regulation. Appendix A of this EIS/R contains a complete description of rules and regulations that apply to the project alternatives.

4.1.2 Existing Conditions

Description of Resource

Air quality at a given location is often described by the concentrations of pollutants in the atmosphere. Units of concentration are generally expressed in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The significance of a pollutant concentration is determined by comparing its concentration to an applicable national and/or state ambient air quality standard. These standards represent allowable atmospheric concentrations that protect public health and welfare and include a reasonable margin of safety to protect the more sensitive individuals in the population. National standards established by the EPA are termed the National Ambient Air Quality Standards (NAAQS) and are defined as the maximum acceptable concentrations that may not be exceeded more than once per year, except the annual standards, which may never be exceeded. State standards established by the ARB are termed the California Ambient Air Quality Standards (CAAQS). The CAAQS are defined as the maximum acceptable pollutant concentrations that are not to be equaled or exceeded. The NAAQS and CAAQS are presented in Appendix A, Table A-1. The main pollutants considered in this analysis include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and respirable particulate matter (PM_{10}).

Region of Influence (ROI)

The project area is located in Santa Clara County, which is part of the SFBAAB, which includes the counties of Santa Clara, San Mateo, San Francisco, Marin, Napa, Contra Costa, Alameda, and the southeast portion of Sonoma and the southwest portion of Solano counties. The SFBAAB covers an area of approximately 5,540 square miles. Identifying the ROI for air quality requires knowledge of the types of pollutants emitted, the emission rates and release parameters of the pollutant source, the source proximity to other pollutant sources, and local and regional meteorological conditions. The ROI for emissions of inert pollutants (pollutants other than O_3 and its precursors) is generally limited to a few miles downwind from a source.

The ROI for O_3 can extend much farther downwind than for inert pollutants. Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors. Ozone precursors are mainly the reactive organic gas (ROG) portion of volatile organic compounds (VOC) and nitrogen oxides (NO_x). In the presence of solar radiation, the maximum effect of ROG and NO_x emissions on O_3 levels usually occurs several hours after they are emitted and many miles from the source. Ozone and O_3 precursors transported from other regions can also combine with local emissions to increase local O_3 concentrations. Therefore, the ROI for O_3 from proposed construction activities could include a large portion of the SFBAAB.

Climate and Meteorology

The climate of the project area is classified as Mediterranean, characterized by warm, dry summers and mild, wet winters. The major influence on the regional climate is the Eastern Pacific High pressure system. Seasonal variations in the position and strength of this system are a key factor in producing weather changes in the area.

The Eastern Pacific High attains its greatest strength and most northerly position during the summer, when it is centered west of northern California. In this location, the High effectively shelters California from the effects of polar storm systems originating from the North Pacific. Large-scale downward motion associated with the High produces an elevated temperature inversion along the West Coast. The base of this inversion usually occurs from 1,000 to 3,000 feet above mean sea level and limits vertical mixing and thereby traps air pollutants in the lower atmosphere. Marine air confined below the base of the inversion often condenses into fog and stratus clouds due to contact with the cool Pacific Ocean. Stratus clouds are a mainstay of regional weather during the warmer months of the year from roughly May through October. These clouds often form offshore and move in through the Golden Gate and over the Peninsula during the evening hours toward the project area. As the land heats up during the following morning, clouds generally burn off over the coastline, then move back onshore the following evening.

With the approach of winter, the High begins to weaken and shift to the south, allowing polar storms to pass through the region. These storms produce periods of cloudiness, strong shifting winds, and precipitation. Storm conditions are usually followed by periods of clear skies, cool temperatures, and gusty northwest winds as storm systems move eastward. The number of days with precipitation varies greatly from year to year, resulting in a wide range of annual precipitation totals. The annual average precipitation total for the San Jose Airport is about 14 inches (BAAQMD 1985). Rainfall in the project region increases toward the higher terrain of the Guadalupe River watershed. About 90 percent of rainfall in the region occurs from November through April.

The July average daily maximum and January average daily minimum temperatures at the project area are 82° F and 40° F, respectively (BAAQMD 1985). Temperature extremes increase inland, as the moderating effects of the San Francisco Bay waters lessen.

The proximity of the Eastern Pacific High and a thermal low pressure system in the Central Valley region to the east produces a prevailing west to northwest air flow along the central and northern California coast for most of the year. This condition is a major factor in minimizing air quality impacts from almost 6 million people that live in the region. The northwest to southeast orientation of the Santa Clara Valley confines the wind flow in the project area. Northwest winds generally prevail during the daytime hours and southeast winds occur at night.

During the cooler months of the year, the Eastern Pacific High can combine with high pressure over the Great Basin to produce extended periods of light winds and low-level temperature inversions. This condition frequently produces poor atmospheric dispersion that can produce elevated levels of inert pollutants, such as CO and PM_{10}. Ozone standards traditionally are exceeded when this condition occurs during the warmer months of the year.

Baseline Air Quality

The EPA designates all areas of the United States as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. A nonattainment designation means that a primary NAAQS has been exceeded more than three discontinuous times in 3 years in a given area. Pollutants in an area are often designated as unclassified when there is a lack of data for the EPA to form a basis of attainment status. The SFBAAB is in attainment for NO_2, O_3, and SO_2 and in nonattainment for CO. The SFBAAB was redesignated from nonattainment to attainment of the O_3 standard in 1995 by the EPA (now referred to as a maintenance area for O_3). The CO nonattainment areas within the SFBAAB are limited to the Vallejo-Fairfield-Napa and San Jose metropolitan areas. The San Jose CO nonattainment area encompasses the project site and is produced by the combination of excessive mobile source emissions and the high frequency of surface-based temperature inversions during the winter months in the Santa Clara Valley. Since an exceedance of the CO NAAQS has not occurred in the SFBAAB since 1991, the BAAQMD has requested that the EPA redesignate the region as attainment for CO (BAAQMD 1993). The SFBAAB is also designated as in attainment for the annual PM_{10} standard and unclassified for the 24-hour PM_{10} standard (BAAQMD 1995).

The ARB designates areas of the state as either in attainment or nonattainment of the CAAQS. An area is in nonattainment if the CAAQS has been exceeded more than once in 3 years. At the present time, the SFBAAB is in nonattainment of the CAAQS for O_3 and PM_{10}. The SFBAAB is designated as a "serious" nonattainment area for O_3 by the ARB. The ARB redesignated the SFBAAB as attainment for CO in 1994.

San Francisco Bay Area Air Basin Emissions

Table 4.1-1 displays an estimate of air emissions that occurred within the SFBAAB in 1995. These data are projections from the SFBAAB 1990 base year emission inventory and incorporate factors such as population growth, lower emitting motor vehicles, and the implementation of current and proposed emission control measures (BAAQMD 1995). Transportation sources are one of the largest contributors to air pollutants in the SFBAAB. Motor vehicles account for approximately 45 percent of the ROG, 66 percent of the CO, 44 percent of the NO_x, and 10 percent of the SO_2 emitted in the SFBAAB (BAAQMD 1995). Table 4.1-1 also shows the total emissions for Santa Clara County.

4.1.3 Environmental Effects

Impact Significance Criteria

Criteria to determine the significance of air quality impacts are based on federal, state, and local air pollution standards and regulations. Impacts would be considered significant if project emissions (1) increase ambient pollutant levels from below to above a NAAQS or CAAQS or (2) substantially contribute to an existing or projected air quality standard violation. Any emissions of PM_{10} during construction are considered significant and require implementation of feasible fugitive dust control measures (BAAQMD 1995). Additionally, project impacts would be potentially significant if proposed construction or operational activities exceeded the emission thresholds that trigger a conformity analysis under Section 176(c) of the 1990 Clean Air Act Amendments (1990 CAA) (100 tons per year for CO or 50 tons per year of VOC, as identified in Appendix A).

Table 4.1-1
1995 Emission Inventory for the San Francisco Bay Area Air Basin
(tons/day)

	ROG	*CO*	*NO_x*	*SO_x*	*PM_{10}*
Residential	63	198	26	1	17
Commercial	82	94	0	0	7
Industrial	90	94	89	63	14
Infrastructure	1	9	34	1	1
Construction	13	213	54	5	61
Transportation	262	1792	245	31	321
Agricultural and Natural	23	24	6	0	41
Total - Bay Area Air Quality Management District	**535**	**2,425**	**454**	**102**	**462**
Total - Santa Clara County	**122**	**598**	**95**	**6**	**119**

Source: BAAQMD 1995.

Channel Widening Plan

Construction

Air quality impacts associated with construction of the Channel Widening Plan would occur from combustive emissions due to heavy equipment usage and PM_{10} emissions in the form of fugitive dust due to ground disturbance and earthmoving activities. Impacts due to combustive emissions from these sources would be less than significant, since most construction emission sources would be mobile and intermittent in nature and pollutant impacts from these sources would not be large enough in a localized area to cause or contribute to any exceedance of an ambient air quality standard. Emissions of fugitive dust due to ground disturbance and earthmoving activities would be potentially significant, but feasibly mitigated. Proper implementation of BAAQMD fugitive dust control measures during construction of the Plan would reduce the impact of these emissions to less than significant. The BAAQMD fugitive dust control measures are presented in section 4.1.4. All other air quality impacts from the Plan would be less than significant. Air quality impacts from the construction of the Channel Widening Plan would be short-term and only last for the duration of construction activities.

Operation

Routine flood control maintenance activities would generate long-term air quality impacts associated with vehicle and equipment use. Although erosion control in the feasibility study area would be decreased and sediment removal would probably stay at current levels, vegetation removal could increase related to maintenance of mitigation plantings. Clean-up activities associated with flood events would decrease. Together, these effects would generally result in no more than a minimal increase in emissions in the project area from current flood control activities. Operational air quality impacts associated with the Channel Widening Plan would therefore be considered less than significant.

Bypass Channel Plan

Construction

The magnitude of construction activities and resulting air quality impacts associated with the Bypass Channel Plan would be greater than those identified for the Channel Widening Plan. However, with proper implementation of BAAQMD fugitive dust emission control measures, impacts from fugitive dust would remain less than significant. All other air quality impacts from the Bypass Channel Plan would be insignificant. Air quality impacts from the construction of the Plan would be short-term and only last for the duration of construction activities.

Operation

Similar to the Channel Widening Plan, operational impacts associated with the Bypass Channel Plan would occur from routine flood control maintenance activities. Vegetation management would increase in some areas (e.g., vegetation clearing along ramps, and portions of benches and bypasses) while decreasing in other areas. Emissions from these activities would increase only slightly along the portions of the Guadalupe River affected by the Plan from current maintenance activities. Cleanup activities associated with flood events would decrease. These effects would generally result in no more than a minimal increase in emissions in the project area from current flood control activities, and a minimal impact associated with increased sediment removal. Operational air quality impacts associated with the Bypass Channel Plan would therefore be considered insignificant.

Conformity Determination

Since the project area is currently designated as a maintenance area for O_3 and nonattainment for CO, a project alternative would trigger a conformity analysis under Section 176(c) of the 1990 CAA if its emissions exceeded (1) 100 tons per year of CO or 50 tons per year of VOC or (2) 10 percent of the total SFBAAB inventories for VOC or CO (19,528 and 16,863 tons per year, respectively). The Bypass Channel Plan was chosen for analysis over the Channel-widening Plan, since this project alternative would produce the greatest amount of emissions. The analysis focused on short-term construction impacts, as long-term operational impacts from the project would only occur from occasional maintenance activities and would produce minor amounts of emissions. Construction emissions were based on construction equipment fuel usage data provided by the COE (personal communication, William DeJager). The results of the analysis determined that short-term construction emissions of VOC and CO from the Bypass Channel Plan would amount to 0.9 and 11.6 tons per year, respectively, and would not exceed their applicable de minimis thresholds. These emissions would also be well below 10 percent of the SFBAAB emission inventories for these pollutants. Consequently, further conformity analysis is not required and the proposed emissions would conform to the most recent federally-approved SIP, as required by Section 176(c) of the 1990 CAA. Since construction emissions from the Channel Widening Plan would be less than those that would occur from the Bypass Channel Plan, the Channel Widening Plan also would not trigger a conformity analysis. Details of the project conformity determination are provided in Appendices B and C of this EIS/R.

No-Action Alternative

Under the No-Action Alternative, the Channel Widening and Bypass Channel Plans would not be constructed and air quality impacts associated with these actions would not occur. However, an unquantifiable amount of pollutant emissions would result from clean-up equipment subsequent to flood events. While the amount of cleanup would vary depending upon the magnitude of flooding, the associated air quality impacts would be insignificant.

4.1.4 Mitigation Measures

Channel Widening Plan

Since the Channel Widening Plan would disturb ground areas of more than 4 acres in size, generating PM_{10} emissions, the following enhanced fugitive dust emission control measures identified by the BAAQMD would be required during construction activities to ensure that dust impacts remain less than significant. These measures should not conflict with the goals of the biological restoration program:

1. Water all active construction areas at least twice daily.

2. Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of space from the top of the holding area.

3. Apply water three times daily on all unpaved access roads, parking areas, and staging areas at construction sites.

4. Sweep daily (preferably with water sweepers) all paved access roads, parking areas, staging areas at construction sites, and adjacent public streets if soil material is visible.

5. Hydroseed or apply soil stabilizers (non-toxic) to inactive construction areas.

6. Enclose, cover, water twice daily, or apply soil stabilizers (non-toxic) to exposed stockpiles (dirt, sand, etc.).

7. Limit traffic speeds on unpaved roads to 15 mph.

8. Replant vegetation in disturbed areas as quickly as possible.

9. To minimize combustive emissions from construction equipment, internal combustive engines should be idled at a minimum and properly maintained and operated.

Bypass Channel Plan

Implementation of the mitigation measures identified in section 4.1.4 would ensure that air quality impacts from the Bypass Channel Plan would remain less than significant.

4.1.5 Unavoidable Significant Adverse Impacts

No unavoidable significant air quality impacts would occur from construction or operation of the Channel Widening or Bypass Channel plans.

4.2 GEOLOGIC RESOURCES (GEOLOGY, TOPOGRAPHY, SOILS/SEDIMENTATION, SEISMICITY)

4.2.1 Regulatory Setting

See sections 3.3.1, 3.3.2, and 3.3.3 for a description of the regulatory setting for geologic resources.

4.2.2 Existing Conditions

Information contained within this section for the baseline analysis of geology, soils, and seismicity has been derived from a number of previous studies and reports including the following: a preliminary environmental analysis by BioSystems, Inc. (1995) titled *Upper Guadalupe River Interim Feasibility Report, Environmental Working Paper, Final Report*; the Corps compilation of the *Upper Guadalupe River Interim Feasibility Report* (COE 1993), which included a subsurface investigation (62 electric cone–penetrometer test probings and 11 geotechnical borings) within Reaches 7–12, Canoas Creek, and Ross Creek; an Engineering-Science, Inc. investigation of geotechnical conditions along the project alignment for the *Draft EIR/EIS for the Guadalupe River Flood Control Project* (Parsons Engineering Science 1997); and a Philip Williams & Associates, Ltd. study of geotechnical conditions for the *Sediment Assessment Study of the Upper Guadalupe River* (COE 1993).

Topography

The project study area lies within the Guadalupe River drainage basin encompassing a total of approximately 170 square miles. The upper Guadalupe River drainage area (Guadalupe River upstream of Los Gatos Creek) comprises approximately 95 square miles. Elevations within the watershed range from 0 at the Guadalupe River-Alviso Slough at the southern tip of San Francisco Bay to over 3,790 feet NGVD (National Geodetic Vertical Datum of 1929) at Loma Prieta Peak in the Santa Cruz Mountains. Flowing north in a slight meander across the gentle gradient of the Santa Clara Valley, the Guadalupe River is within a watershed that is bounded on the south and southwest by the Santa Cruz Mountains, on the west by the drainage basins for San Tomas and Saratoga Creeks, on the east by the Coyote Creek Basin, and on the north by San Francisco Bay. Along the project study area, there is less than a 100-foot change in elevation. River bank elevations range from elevation 107 feet NGVD at Willow Street to elevation 180 feet at the Highway 85 freeway bridge crossing.

Regional Geology

The flood control project is located within the Santa Clara Valley, a structural depression referred to as the San Jose Plain. Geologic materials in the valley may be classified as older consolidated rock exposed in the surrounding mountains and younger unconsolidated fill sediments in the valley depression. The depression is filled with thick sequences of Plio-Pleistocene and Holocene age, unconsolidated alluvial (water-borne) fill. The alluvial fill ranges up to 1,500 feet thick in some places and lies over Jurassic–Cretaceous to Tertiary age bedrock of the Franciscan Formation. The fill material is composed of sand, gravel, silt, and clay that washed into the Santa Clara Valley from the bordering mountains. Deposition has been influenced by sedimentation rates and fluctuations in sea level due to glaciation.

The vertical and lateral distribution of rock and sediments in the valley has been modified by faulting and associated folding during the Cenozoic time period. The valley floor consists of an interbedded sequence of discontinuous, heterogeneous fluvial (transported by river or stream) deposits and continuous, relatively stratified basin and homogeneous estuarine clays. The project study area is located in the upper portion of the alluvial plain where the Guadalupe River downcut into the older Pleistocene Age alluvial fan deposits and then filled in with Holocene age alluvium. Alluvial deposition still occurs during flood stages of the rivers.

Site Geology and Soils

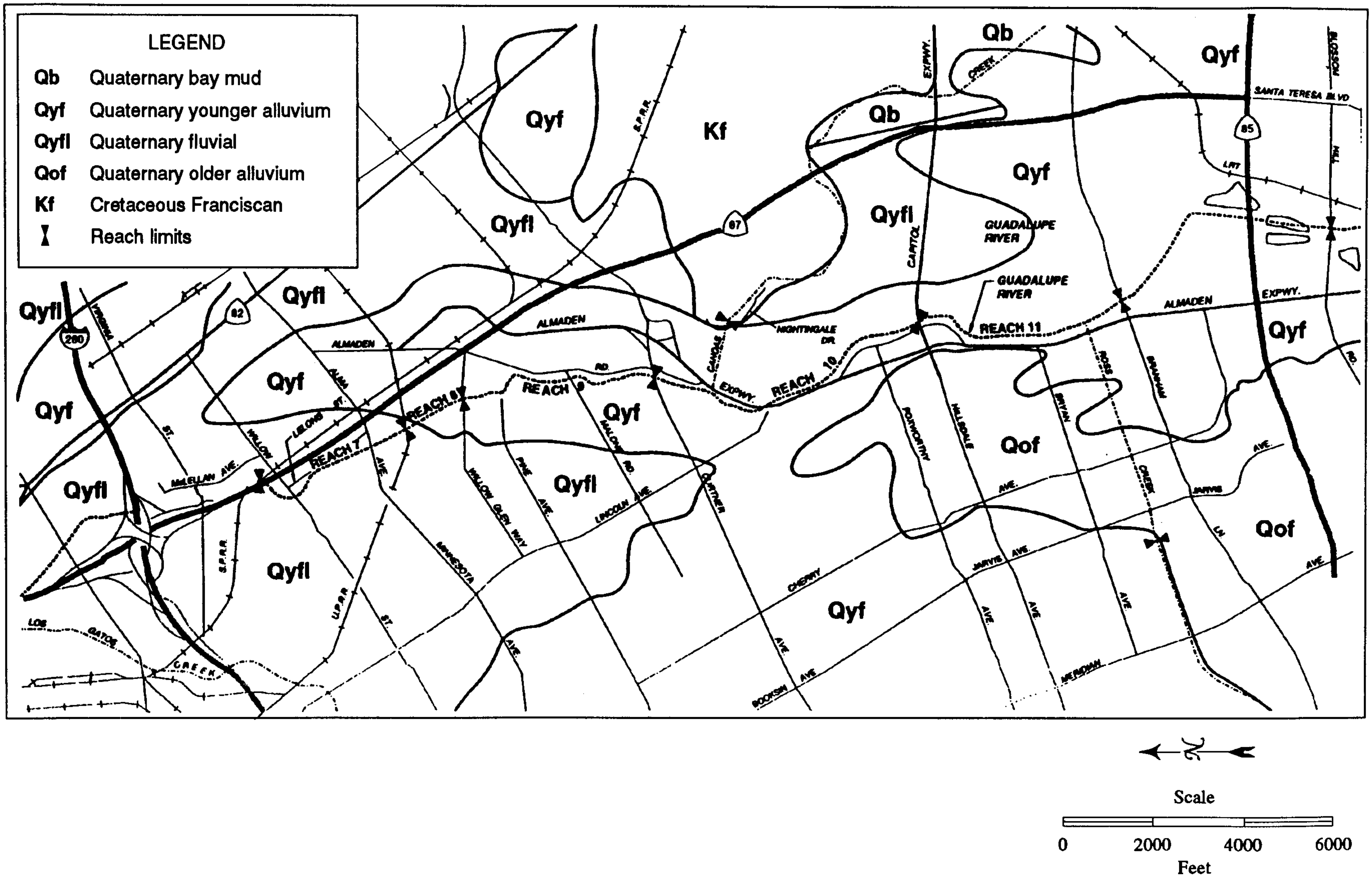
As described above, the project area is underlain by up to several hundred feet of alluvial deposits that overlie Franciscan bedrock. In general, the alluvial deposits have been characterized as unconsolidated well-graded, interbedded fine sands and silts with some gravel. Older Guadalupe River channel deposits vary locally and are composed of coarse grained or poorly graded sediments that were deposited by the ancestral Guadalupe River. These deposits are sometimes incised by the current river channel. The project study area reach of Ross Creek has been excavated and is channelized across natural levee deposits of the Guadalupe River. The surficial geology of the project study area is depicted in Figure 4.2-1. The geology surrounding Reach 7 is mapped as a Quaternary fluvial unit (Qyfl), the area along Reaches 8–12 is mapped as a Quaternary younger alluvium unit. Other surficial geologic units mapped in the study region include Quaternary bay mud (Qb), Quaternary older alluvium (Qof), and Cretaceous Franciscan Formation (Kf). Bedrock elevation is variable across the project area, ranging from -800 feet NGVD below Willow Street to an outcropping adjacent to the river at Oak Hill.

The surficial soils within the project study area have been mapped by the U.S. Department of Agriculture, Soil Conservation Service (SCS 1968). As depicted in Figure 4.2-2, these soils are composed of three soil types or associations: the Yolo, which includes all of the soils in Reaches 7 through 9 and portions of Reaches 10 through 12; the Clear Lake-Campbell, including portions of reaches 10 and 11; and the Sunnyvale-Castro-Clear Lake, which includes portions of Reach 12. These classifications are generally applicable to the upper 5 feet of the surface soils. The Yolo Association consists of silty-loams over clayey loam soils that are well drained with high percolation rates, low runoff rates, low shrink-swell capacity, and low erosion potential. The Clear Lake–Campbell Association are silty clays over clayey loam soils and the Sunnyvale–Castro–Clear Lake Association are calcareous silty-clays over calcareous clays. The latter two associations are poorly drained soils with low percolation rates, high runoff rates, moderate to high shrink-swell capacity, and moderate to low erosion potential.

The cone-penetrometer test probings conducted by the Corps indicated that the upper 30 feet of soil consists of interbedded silty clays, sandy clays, silts, clayey sand, and silty sands of variable thicknesses. The testing revealed a general trend of silty to sandy clays and clayey silts along Reaches 7 and 8 and sandier soils, with interbeds of silts and silty to sandy clay along Reaches 9–12. The sediment assessment prepared by Philip Williams & Associates (COE 1993) indicates that the study area is a stratified section of non-cohesive sand and gravels with cohesive silts and clays. Water erosion occurs more readily in the sand and gravels such that the river begins to undercut the overlying clay and silt beds. This condition makes the river susceptible to future bank erosion and channel widening.

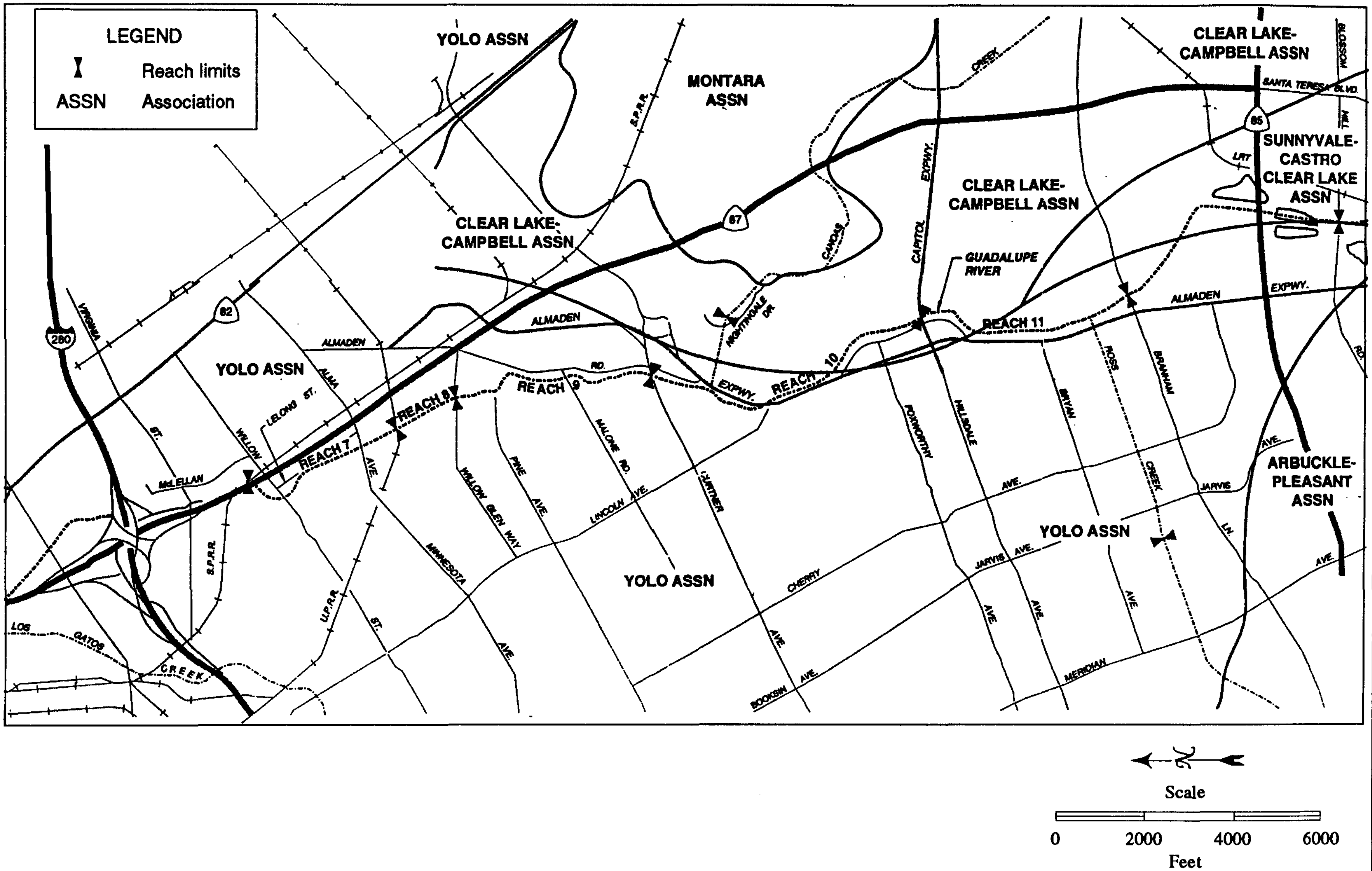
Subsidence

The Santa Clara Valley has historically experienced significant land subsidence due to excessive pumping of underlying confined groundwater aquifers. This pumping caused increased vertical loads to compact the confining silt and clay aquitards, resulting in land subsidence throughout the valley. Within the feasibility study area vicinity, the maximum land subsidence between 1934 and 1968 was over 8 feet in an area southeast of downtown San Jose. The total maximum subsidence at this location is estimated to be just under 13 feet (personal communication Tom Iwamura 1997). Between 1934–1967, subsidence



Source: Page, B.M. 1982 *Modified from:* Engineering Science 1994

Figure 4.2-1. Geologic Map



Source: USDA Soil Conservation Service 1968
Modified from: Engineering-Science, Inc. 1994

Figure 4.2-2. Soils Associations

ranged from 0.25 feet near Reach 6 (north of the feasibility study area and part of the SCVWD separate but related flood control protection project) to 3.7 feet near Reach 12. Importing State water through the South Bay Aqueduct in 1968 greatly reduced the demand for pumped groundwater, effectively controlling the subsidence due to overpumping of groundwater in the region. In addition, the percolation ponds constructed along the Guadalupe River, in and upstream of Reach 12 and elsewhere in the Santa Clara Valley, provide substantial groundwater recharge. Further subsidence due to groundwater withdrawal is not likely as long as adequate supplies and recharge capability remain available. However, it has been estimated (Atwater et al. 1977) that minor tectonic subsidence in the area is occurring at a rate of 0.3 to 0.5 mm per year. This subsidence would have little to no effect on the project over its projected 100-year life.

Seismicity

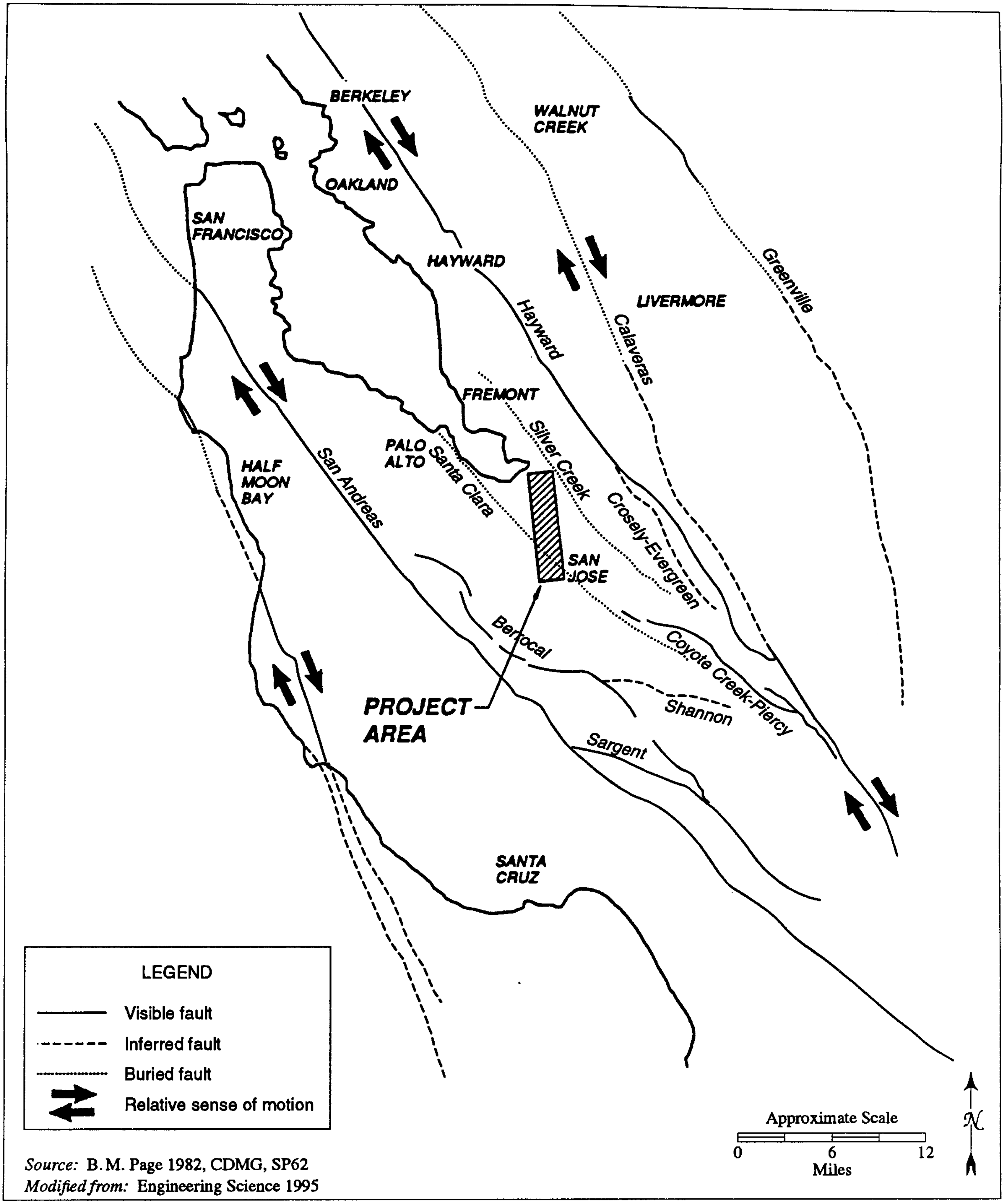
The tectonic setting of the San Francisco Bay area is characterized by three primary structural blocks, roughly separated by the active San Andreas and Hayward faults (Figure 4.2-3). These two fault zones are active members of the San Andreas Fault system that forms the boundary between the North American crustal plate and the Pacific Ocean plate. The Hayward and Calaveras fault zones branch off the San Andreas fault south of the project area. The Hayward fault extends north of the project area along the base of the Berkeley Hills to San Pablo Bay or farther. The San Andreas fault separates the San Francisco-Marin block on the east from the Point Reyes-Montara block on the west. A third major fault in this region is the Calaveras Fault, which lies east of the Guadalupe River and joins the Hayward Fault zone southeast of the project area. All of these faults are oriented in a general northwest–southeast trending direction, evidence of their relationship to the San Andreas fault. Historically, very damaging earthquakes have occurred on the faults associated with the San Andreas Fault system.

Additionally, eight less significant fault zones run through or along the margins of the San Jose Plain in this region: the Crosely-Evergreen, Sargent, Cascade, Shannon, Santa Clara, Silver Creek, Coyote Creek-Piercy, and Berrocal faults. Table 4.2-1 summarizes the characteristics of these faults.

Earthquakes of various size in the general region of the project are a major threat to the soil stability within the project study area and vicinity. Causing health and safety hazards and damage to buildings and roads, other potential effects of earthquakes can be liquefaction or ground failure in surface materials. Further potential hazards exist from the erosion and loss of river bank stability. The potential for a given material to be affected depends on its physical properties and its proximity to the fault trace. Unconsolidated, saturated fine sands and silts as well as unconsolidated moist to wet clays experience the greatest soil movement and ground shaking acceleration. Saturated fine sands and silts are also susceptible to liquefaction. Steeper slopes would be more prone to ground failure from liquefaction.

Ground accelerations in the project area could reach a mean of up to 0.34g from the San Andreas and Calaveras fault zones. Activity on the Hayward and Crosely-Evergreen fault zones could result in a mean ground acceleration rate of 0.65g in the project area. A more conservative estimate of ground acceleration, the mean-plus-one standard deviation, indicates that these faults could cause a ground acceleration rate of 1.00g in the project area. Probable active faults that lie under or close to the project area could cause even greater ground accelerations at the site.

Within the project study area, the seismic stability relative to the potential for liquefaction and landslides has been estimated. These estimates show a moderate to high potential for liquefaction throughout the project study area. They assume a major seismic event occurring during a wet season when the water



Source: B.M. Page 1982, CDMG, SP62
Modified from: Engineering Science 1995

Figure 4.2-3. Regional Active and Potentially Active Faults

table is high and the risk of liquefaction is substantially increased. Under dry conditions, with the groundwater table at a minimum of 20 feet below the surface, a majority of the sediments and surface deposits along the Guadalupe River have a low to moderate potential for liquefaction and ground failure in the event of a large earthquake.

Table 4.2-1. Characteristics of Faults in the Guadalupe River Region

Fault Zone	*Distance from Project*	*Maximum Credible Magnitude*	*Creep Rate (mm/yr)*	*Potential Ground Acceleration*	*Activity Classification*
San Andreas	9 mi	8.3	12.2	0.5g (gravity)	Active
Hayward	7 mi	7.0	6.0	0.5g	Active
Calaveras	10 mi	7.3	5.3	0.7g	Active
Evergreen-Crosely	6 mi	6.9	--	0.6g	Active
Sargent	9 mi	6.5	--	0.3g	Active
Shannon	2.5 mi	6.7	--	0.5g	Probably Active
Cascade	1 mi	6.6	--	0.7g	Probably Active
Santa Clara	0 mi	6.8	--	0.9g	Probably Active
Silver Creek	2.5 mi	6.2	--	--	Potentially Active
Coyote Creek-Piercy	0 mi	--	--	--	Potentially Active
Berrocal	4 mi	6.7	--	--	Potentially Active

Notes: Magnitude ratings are based on the Richter Scale.
Portions of the Hayward Fault are not active.
Hayward Fault creep rates are from Alameda County.
The Shannon and Piercy fault zones extend under the project area.
Active = Holocene activity (less than or equal to 11,000 years offset).
Probably Active = Evidence of late Quaternary activity.
Potentially Active = Quaternary activity (less than or equal to 3 millions years offset).
mm/yr = millimeters per year

Source: Parsons Engineering Science 1997; COE 1993.

4.2.3 Environmental Effects

Impact Significance Criteria

Geologic and seismic impacts are considered significant if, due to project construction or operation, people or property are exposed to geologic hazards. These hazards would include the following:

- Earthquake-induced ground motion resulting in substantial damage to project structures, and endangering human life;
- Near-surface geologic conditions are sufficiently unstable or otherwise susceptible to failure such that soils and geologic engineering techniques do not reduce geologic hazards to a level of insignificance.

Channel Widening Plan

Impacts to the geologic environment from the proposed project are associated primarily with project construction activities (e.g., sedimentation). Geologic impacts associated with post-construction flood protection would result from regional (e.g., seismic) and local (e.g., ground failure) geologic hazards. Construction impacts would predominantly be associated with increased erosion due to the extensive earthwork activity that would be required to construct the various flood control improvements along the river corridor. In particular, the channel widening proposed under this alternative would require excavation of major volumes of soil. The channel widening proposed would require earthwork along the existing banks, exposing channel slopes to wind and water erosion, which could significantly increase downstream sediment loads. Impacts from sedimentation would be mitigated to insignificance. Cut slopes would be hydroseeded and mitigation plantings would be established on either flat bench areas or on undisturbed areas currently lacking riparian forest, with the exception of visual mitigation plantings and a few habitat mitigation plantings. The threat of increased sedimentation would remain during the short- and intermediate-term until the erosion control hydroseeding and plantings on channel benches and undisturbed areas become stabilized.

Other construction impacts would be related to reinforcing excavation areas. Improperly placed or designed reinforcement could allow for lateral movement of the supported soils and settlement of the adjacent ground surface. Reinforcing would be particularly necessary where slopes composed of sand and silts are saturated. Additionally, the driving of piles for the shoring system could cause excessive ground vibrations. This can lead to settlement of the ground surface where loose sandy soils are present due to densification caused by the vibrations. Installation of adequate reinforcement necessary for proper construction can be accomplished using standard engineering construction techniques. Impacts would be insignificant.

Operational impacts could result during seismic events that destabilize excavated cut banks, and could result in ground failure of soils adjacent to and underlying structures. The extent of structural failure would largely depend upon the construction techniques employed. Slope instability along the flood control channel would be highest for those channels with the steepest slopes. The unconsolidated alluvial deposits that make up the project study area generally have a maximum angle of stability of 33 percent. Oversteepening and/or saturation of these soils resulting from groundwater recharge or flooding could cause slope instability and trigger ground failure. This impact would be less than significant by providing appropriate internal slope reinforcement.

Another hazard would be the threat of slope failure from a local or regional seismic event. Earthquakes can produce strong ground shaking that, in saturated soils, could also result in liquefaction, lateral spreading, ground cracking, and structural damage. In oversteepened channel slopes, seismic activity could trigger landslides. Channel banks with slopes greater than 2:1 (horizontal:vertical) would be the most susceptible to failure during an earthquake. All engineered structures, however, would be designed in accordance with required Uniform Building Code specifications for Seismic Zone IV. These specifications would mitigate impacts to insignificant levels.

Bypass Channel Plan

The construction-related and operational impacts of this alternative would be similar to those identified for the Channel Widening Plan. However, due to the larger size of the project (i.e., greater area of ground disturbance, the impacts identified would be slightly greater for this project. Impacts would be mitigated to insignificance with measures discussed for the Channel Widening Plan.

No-Action Alternative

The construction-related impacts identified above would not occur if the No-Action Alternative were chosen. Geologic hazards affecting the existing channel and flood control structures would not be increased or reduced.

4.2.4 Mitigation Measures

Mitigations for the impacts resulting from the Channel Widening and Bypass Channel Plans are detailed below.

Channel Widening Plan

The following is a required measure that has been incorporated as an element of the project description to ensure conformance with standards of the NPDES permitting program required by the RWQCB. The project component would address excessive sedimentation of the river downstream of project construction activities.

1. A Storm Water Pollution Prevention Plan (SWPPP) shall be prepared and executed that contains the following:

    a. Excavated soils shall be removed from the project area for use off site immediately following excavation. Where immediate removal is infeasible, silt fences shall be placed around any soil piles that need to remain on the project site. Other exposed soils shall be stabilized using standard techniques typically employed in such projects (e.g., revegetation, jute netting, staked hay bales, water bars, etc.).

    b. Major project construction earthwork shall occur during the summer and fall months to avoid the rainy season (November–April).

2. Cut slopes shall be reinforced internally to provide stability. Gabions shall be used to protect against erosion at locations with high water flood velocities. Cribwall construction shall be used where cut slopes are nearly vertical.

Bypass Channel Plan

The required project description components discussed for the Channel Widening Plan would apply to the Bypass Channel Plan.

4.2.5 Unavoidable Significant Adverse Impacts

There would be no unavoidable significant impacts associated with geologic hazards with the project components described above.

4.3 WATER RESOURCES (FLOODING, WATER QUALITY)

4.3.1 Regulatory Setting

Clean Water Act of 1972

The Clean Water Act (CWA) was established to restore and maintain the chemical, physical, and biological integrity of the nation's waters. One of the most significant federal statutes affecting both surface water and groundwater quality is that portion of the CWA that established the National Pollutant Discharge Elimination System (NPDES) permitting program. The NPDES requirements, as set forth in Section 402 of PL 92-500 (as amended), are designed to regulate point source discharges into waters of the United States. This program is implemented by the State Water Resources Control Board (SWRCB) in the State of California through the Regional Water Quality Control Boards (RWQCBs). Compliance with NPDES regulations will be required as part of the proposed project. Specifically, an NPDES permit will be required for project construction. Additionally, Section 404 authorizes the Corps to issue permits for and regulate the discharge of dredge or fill material into waters of the United States, which would include the Guadalupe River.

State and Regional Water Quality Control Plans

Under provisions of the state Porter-Cologne Water Quality Control Act and the CWA, the San Francisco Bay RWQCB (as a regional office of the SWRCB), regulates water quality in the San Francisco Bay region, which includes the project area. The regional boards are authorized to monitor surface and groundwater quality and to require permits for the discharge of wastewater to all navigable waters.

The SWRCB adopted statewide water quality control plans for Inland Surface Waters and Enclosed Bays and Estuaries in April 1991 (SWRCB 1991). The plans include guidelines for pollutants for which EPA or the state have developed criteria and that can reasonably be expected to impact beneficial uses. For each pollutant, numerical water quality objectives based on EPA 304(a) criteria are established for the protection of human health or aquatic life. Acute and chronic toxicity objectives and narrative objectives are also established. These plans supplement the Basin Plan for the San Francisco RWQCB region.

The Rivers and Harbors Act

The Rivers and Harbors Act was enacted by Congress in 1899 to protect interstate commerce in navigable waters through the regulation of streams and rivers. Sections 9 and 10 of the Act related to protecting navigable waters. Section 9 requires an applicant to obtain a permit to construct a dike or dam in navigable waters of the United States. Under Section 10, the Corps regulates projects or construction of structures in or over any navigable waters of the United States, including the excavation from or deposition of material in any such waters. The Corps' navigable water jurisdiction of the Guadalupe River extends upstream beyond the feasibility study area.

4.3.2 Existing Conditions

Rainfall

In the Santa Clara Valley, 90 percent of the normal annual rainfall occurs in the 6-month period from November through April, with January having the highest average monthly rainfall. Annual precipitation in the Guadalupe River basin averages about 26 inches per year and varies from less than 14 inches near the San Francisco Bay to over 50 inches in the headwaters area of the Santa Cruz Mountains. Table 4.3-1 shows rainfall amounts from recorded and statistical events at rain gauge station throughout the feasibility study area vicinity. Rainfall in the higher elevations of the drainage basin is often considerably greater. On January 31, 1963, the one-day rainfall recorded at the Millberry station, a privately operated facility, at elevation 1,841 feet was 10.25 inches. Because the station is privately managed, the reliability of the record is uncertain.

Surface Water Hydrology

The Guadalupe River drainage basin covers approximately 170 square miles at elevations ranging from 0 to 3,790 feet above sea level (NGVD datum). The headwater tributaries to the main river include Guadalupe, Calero, and Alamitos Creeks (see Figure 4.3-1). The Guadalupe River channel begins at the confluence of Guadalupe and Alamitos Creeks and flows northward approximately 14 miles through heavily urbanized portions of Santa Clara County, eventually discharging into the San Francisco Bay. Ross and Canoas Creeks are two tributary streams that enter the river within the project study area. A third tributary, Los Gatos Creek, enters the river downstream of the project study area. Information pertaining to the drainage area, tributaries, and reservoir storage of the Guadalupe River watershed is provided in Table 4.3-1.

Table 4.3-1. Drainage Area Data for the Guadalupe River

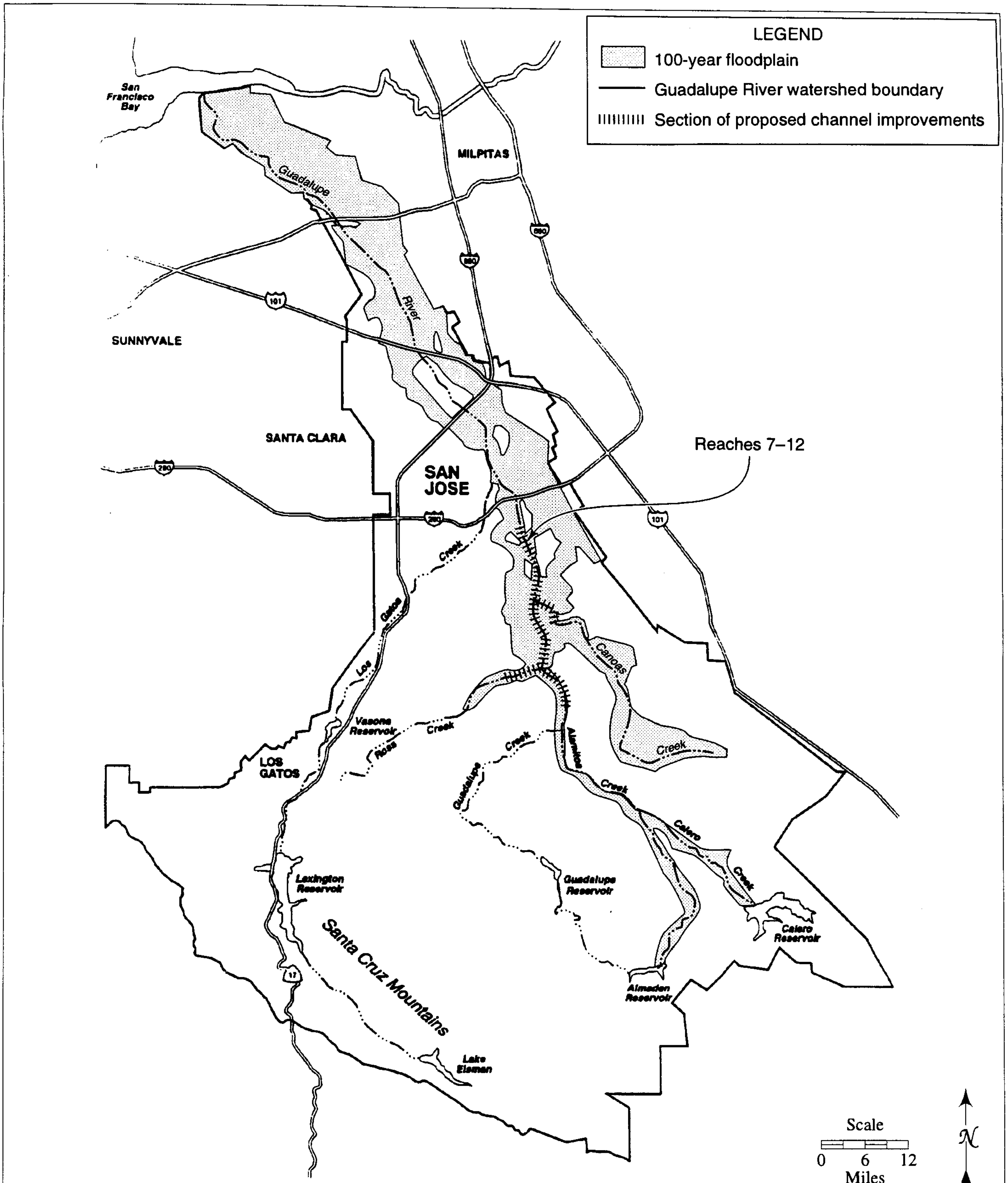
Stream Name	*Drainage Area (square miles)*	Reservoir Name	*Storage Capacity (acre-feet)*
Guadalupe River	170	Calero Reservoir	10,050
Guadalupe River south of I-280	95	Almaden Reservoir	1,780
Canoas Creek	19	Guadalupe Reservoir	3,740
Ross Creek	10	Lake Elsman	6,280
Alamitos Creek	38	Lexington Reservoir	20,250
Guadalupe Creek	15	Vasona Reservoir	400
Los Gatos Creek	55		

Source: COE 1977; Parsons Engineering Science 1997

Notes: The Guadalupe River drainage ends at Alviso Slough at San Francisco Bay.
The upper Guadalupe River drainage ends at I-280.
Calero, Almaden, and Guadalupe Reservoirs discharge to the upper Guadalupe River.
Elsman, Lexington, and Vasona Reservoirs discharge to Los Gatos Creek, below the study area.

The SCVWD operates five reservoirs in the drainage basin: Calero, Almaden, Guadalupe, Lexington, and Vasona reservoirs (see Figure 4.3-1). Lake Elsman is privately operated by the San Jose Water Company. The Calero, Almaden, and Guadalupe reservoirs are in the headwater streams to the upper Guadalupe River, while Lake Elsman and Lexington and Vasona reservoirs are along Los Gatos Creek. These reservoirs are operated for water supply storage and groundwater recharge purposes. None are used for flood control purposes, although they can provide incidental flood control benefits.

In addition to collecting surface runoff, Calero Reservoir is also the terminal storage reservoir for water that is imported into the drainage basin from the San Luis Project.



Source: COE 1997, Parsons Engineering Science 1997

Figure 4.3-1. Guadalupe River Watershed and 100-Year Floodplain

Active erosion and sedimentation are continual problems due to unstable banks along the river and the natural tendency of water courses to change course over time. These conditions can result in bank failures and debris blockages, with a related increased potential for flooding. Erosion can also increase the risk of damage to structures located adjacent to the river banks. Bank erosion along the Guadalupe River is attributed to high flow velocities that scour and cut away at the banks. The most severe erosion problems are within Reaches 7 through 9, from Willow Street to Curtner Avenue, with much of the sediment load washing downstream and being deposited in the reach between I-880 and U.S. 101, downstream of the study area. Sediment deposition also occurs within Reach 12 due to the accumulation of sediments generated from upstream sources. The average annual sediment yield from the upstream portion of the Guadalupe River basin to the study area has been estimated at about 1,600 tons per year per square mile of watershed.

Sediment transport modeling of the upper Guadalupe River (PWA 1996) concluded that dams upstream of the study area and urbanization within the watershed have both significantly reduced the natural runoff sediment load of the upper Guadalupe River. The model indicated that the reaches upstream experience very little river bed elevation changes, while the lower reaches of the study area experience some slight scour during flooding. This would support the conclusion that the river is relatively sediment-starved, despite occasional and localized sediment deposition in the study area.

Direct storm runoff in the drainage basin is extremely variable and has been modified by the construction of reservoirs and diversions as well as development in the drainage basin. An estimate of the average annual runoff between 1931 and 1960 was 35,500 acre-feet, based on data from the U.S. Geologic Survey (USGS) gauging station near downtown San Jose. The wettest recorded year occurred in 1938 when 123,000 acre-feet of runoff was measured.

Discharges under various frequencies for five locations within the project study area are provided in Table 4.3-2. The 100-year discharge calculated for the Guadalupe River channel ranges between 11,400 and 14,600 cfs within the study area. Under existing conditions, the river does not have the capacity to convey even moderate flood flows without the occurrence of flooding in the downstream reaches. Some areas of the river cannot hold a 10-year discharge.

Table 4.3-2. Design Discharges for the Upper Guadalupe River Feasibility Study

	Discharge (cfs)				
Location	*10-Year*	*20-Year*	*50-Year*	*100-Year*	*500-Year*
Guadalupe River upstream of Ross Creek	3,800	6,300	9,100	11,400	17,800
Guadalupe River upstream of Canoas Creek	4,600	7,300	9,700	12,400	19,000
Guadalupe River downstream of Canoas Creek	6,500	9,000	11,200	14,600	21,800
Canoas Creek at Guadalupe River	2,000	2,500	3,000	3,300	3,600
Ross Creek at Guadalupe River	—	1,550	1,950	2,350	3,100

Source: COE 1989; COE 1993; Parsons Engineering Science 1997.
cfs = cubic feet per second.

Flooding

Flood control projects have been fairly extensive on the Guadalupe River, but insufficient within the project study area to contain many flood events. In the river segment from San Francisco Bay upstream to I-280, the Corps and SCVWD have constructed, or are in the process of completing, three separate flood control projects to improve the river channel capacity to carry a 100-year flood discharge and to raise the levees in order to meet the freeboard standards (i.e., distance between the water surface and the top of the levee) for the flood insurance program of the Federal Emergency Management Agency (FEMA).

The Guadalupe River causes downstream flows in tributary creeks to back up (a "backwater effect"). In the case of Ross Creek, water from the river can actually flow up the creek for a short distance (a "backflow effect"). The banks of Ross Creek are low compared to the Guadalupe River, so during a 100-year flood, backflow would occur in Ross Creek. Backflow is also expected to occur on Canoas Creek during the 100-year flood, worsening flooding effects.

During a 20-year flood event (i.e., having a 5 percent chance of occurring in a given year), floodwaters overflow from the west bank of the river in Reach 8, between the Western Pacific Railroad and Willow Glen Way, then flow downstream toward I-280. Floodwaters also overflow the east bank in Reach 7, downstream of the Union Pacific Railroad, and flow downstream between the river channel and Highway 87 before reentering the channel at Virginia Avenue. Backwater effects cause Ross and Canoas creeks to overflow their banks and flood local streets. Flooding from Ross and Canoas creeks flows north and rejoins the river in Reaches 6 and 7.

The 50-year floodwaters (i.e., a flood event having a 2 percent chance of occurring in a given year) overflow from the east bank in Reach 7, downstream of Alma Avenue, and flow toward I-280. Floodwaters also overflow from the west bank in Reaches 7 and 8, at Willow Street and between the Union Pacific Railroad and Willow Glen Way, then flow downstream to I-280. Additionally, bank overflow occurs immediately upstream of Branham Lane. Backwater effects cause Ross Creek to flood with overflows from the north bank flowing through the floodplain toward I-280. Canoas Creek also overflows its north bank and inundates subdivisions from Blue Jay Road to Almaden Expressway and Highway 87. The estimated flooded area resulting from a 50-year event is depicted in Figure 4.3-2.

During the 100-year flood event (i.e., having a 1 percent chance of occurring in a given year), the floodplain inundates an area approximately 2,310 acres in size. The area flooded during a 100-year event is depicted in Figure 4.3-1. A more detailed view of a 100-year flood event of Reaches 7 through 12 is depicted in Figure 4.3-3. By comparison with the 50-year flood (see Figure 4.3-2), the area of inundation is slightly greater for most areas affected, with much more flooding occurring in the southeastern portion of the study area. The 500-year floodplain is similar to the 100-year floodplain, but with a greater area of inundation, covering approximately 2,960 acres. Under these conditions, floodwaters overflow the east bank in Reach 7, downstream of Alma Avenue, as well as in Reaches 11 and 12, around Branham Lane. Overflow of the east and west banks also occurs in Reaches 7 and 8 as it does under the 50-year flood event. Both Canoas and Ross creeks overflow both their north and south banks, although the north bank overflows are more important, especially for Ross Creek. These floodwaters flow through the floodplain toward I-280.

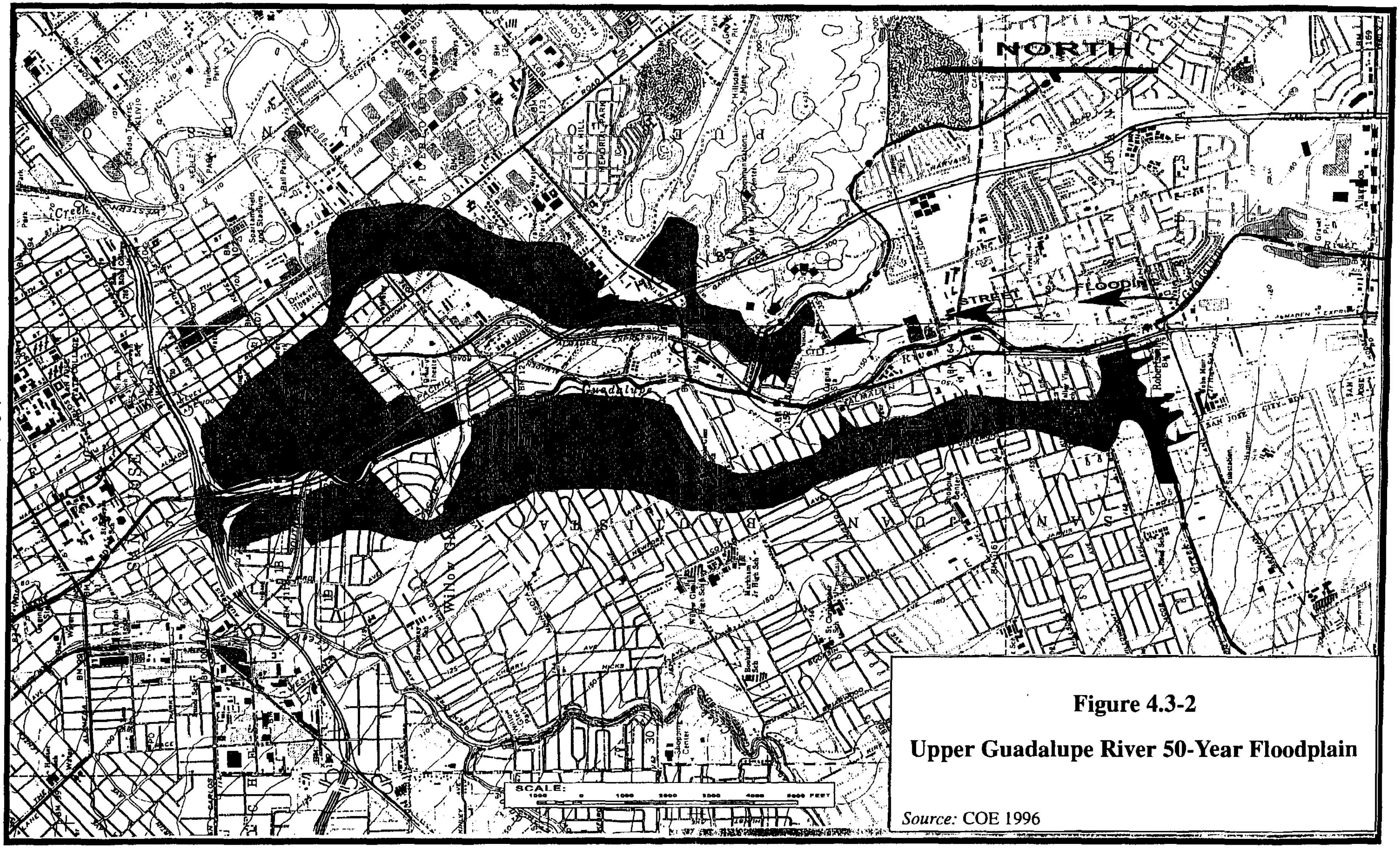


Figure 4.3-2

Upper Guadalupe River 50-Year Floodplain

Source: COE 1996

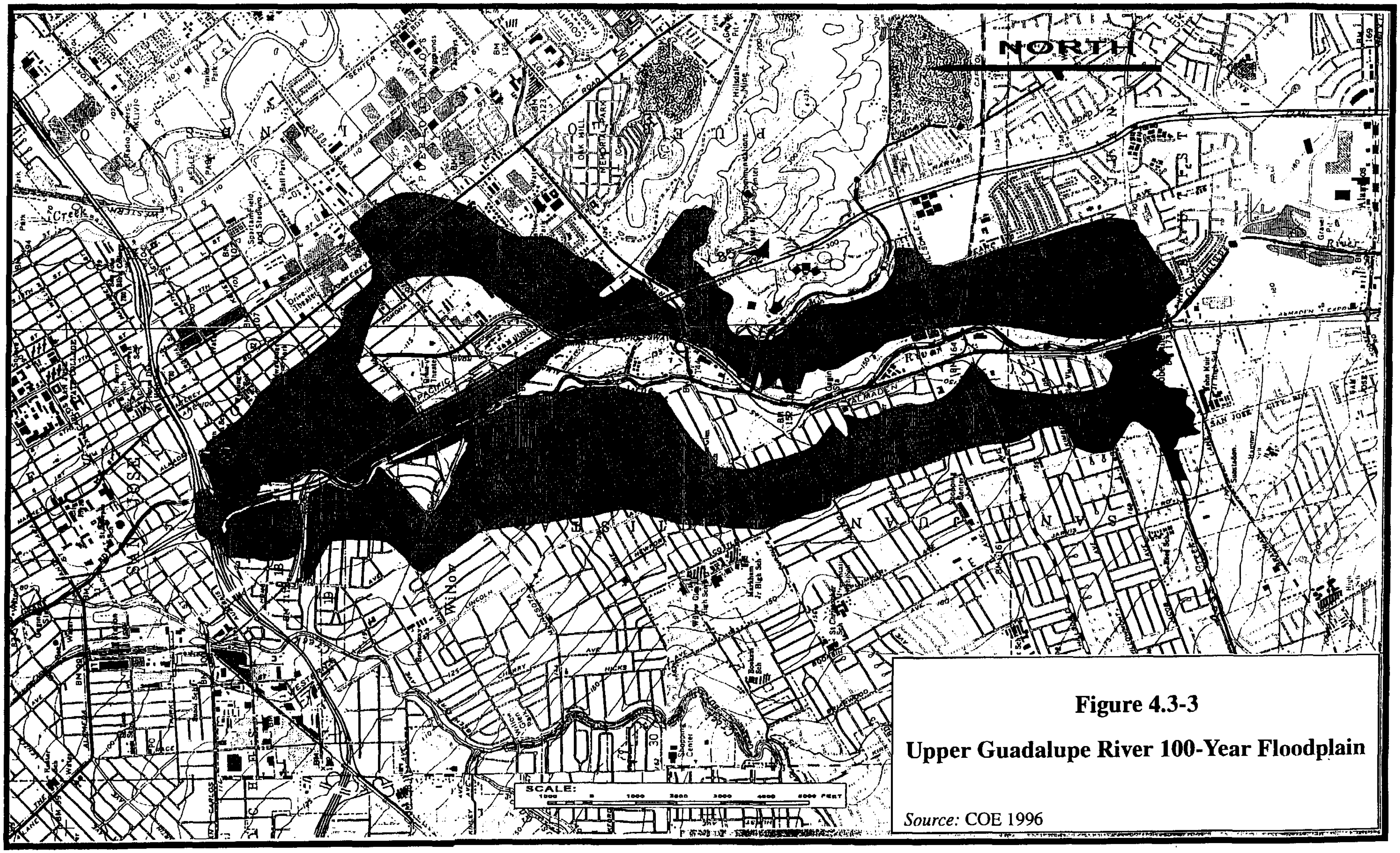


Figure 4.3-3

Upper Guadalupe River 100-Year Floodplain

Source: COE 1996

Water Quality

Water quality data for the Guadalupe River are collected by the USGS at the closest sampling station to the project area, located approximately 100 feet north of the confluence with Los Gatos Creek. Additionally, the SCVWD recently performed a study as part of their Nonpoint Source Pollution Control Program to estimate the annual loads of metals and organics to San Francisco Bay by watershed within the Santa Clara Valley. The study showed that the Guadalupe River watershed contributes an estimated 30 to 40 percent of the pollutant loads discharged to the Bay from Santa Clara County. Data from the study are presented in Appendix H, Table H-1. USGS sampling of water quality parameters includes dissolved oxygen (DO), turbidity, and pH, as well as concentration of trace inorganics such as metals. A sampling of historical USGS water quality data for the time period ranging from 1949 to the present is also presented in Appendix H, Table H-2.

Recent data indicate that the river water is nearly saturated with DO, pH of the water is slightly alkaline, and the water is very hard (i.e., high calcium carbonate concentration). Turbidity in the river water (measured in Nephelometric Turbidity Units [NTUs]) is highly variable, increasing greatly during the winter months. Active erosion sites are present along the river channel and erosion occurs throughout the project area, which accounts for the increased turbidity during the rainy season. Water quality data show some evidence of metals and other trace pollutants. Organic and inorganic contaminant concentrations present in the river can come from a variety of sources within the watershed including agricultural production upstream, commercial and industrial activities (e.g., leaking underground storage tanks, spills, other discharges, etc.), land development, urban runoff, and transportation activities. The solubility and transport of these constituents vary with river flow and seasonal conditions. As part of the SCVWD NPS Program, a survey was conducted of the Guadalupe River watershed to identify any unauthorized outfalls to the river and its tributaries that may be contributing to the total pollutant load in the river. Tables H-3 and H-4 list the permitted and unpermitted outfalls to the Guadalupe River identified, respectively. Table H-5 lists the outfalls identified for Ross and Canoas Creeks. The unpermitted outfalls identified are the subject of current investigations by the SCVWD (Parsons Engineering Science 1997).

Water quality of the river may also be affected by groundwater discharges. Under high groundwater conditions, groundwater flow may be directed toward the river and may transport chemicals from nearby hazardous waste sites. Some of these are currently being investigated and/or remediated and others have not yet been documented. Refer to section 4.11 for further discussion of this issue.

Groundwater

The Santa Clara Valley is a structural trough that is filled by unconsolidated alluvial fill deposits. These deposits are water-bearing and constitute a major groundwater basin. The water-bearing deposits consist of sand and gravel (the aquifers) and silt and clays (the aquitards, beds that are impediments to ground water flow). In the project study area, groundwater is generally encountered between 20 and 60 feet below the surface in unconfined aquifers or as a perched water table. In areas immediately adjacent to the Guadalupe River, the groundwater gradient historically sloped toward the river but decades of regional groundwater pumping has contributed to groundwater levels falling below the base of the river channel. Perched zones above the base of the river channel still provide some seepage into the river, even in drought conditions, but now that the main water table is below the base of the channel, the flow is predominantly away from the river.

The SCVWD has historically operated the Guadalupe and Los Gatos recharge systems within the Guadalupe River watershed to augment the groundwater supply and to reduce the threat of land subsidence caused by excessive groundwater pumping. The in-stream percolation ponds in Reach 12 were operated for many years. They have not been operated in the last two years as a permit was not obtained from the California Department of Fish and Game. The SCVWD expects to resume operation of these ponds for percolation purposes in the future. When operational, water is released during the dry season, from the various reservoirs in the Guadalupe River watershed, and the recharge systems facilitate percolation of water into the groundwater basin. Offstream recharge occurs at percolation ponds that are fed by water diverted from the creeks or by imported water pipelines and seasonal instream percolation occurs along both Guadalupe River and Los Gatos Creek. The SCVWD's artificial recharge program is carried out within the unconfined forebay of the basin which extends from the basin boundary at the foothills downstream to about Willow Street. Downstream of Willow Street, the recharge would only benefit the uppermost aquifer.

4.3.3 Environmental Effects

Impact Significance Criteria

Criteria used for determining significant impacts on water resources (flooding, water quality, and groundwater) are based on the extent the project would affect the local hydrologic environment and the resulting changes to local biota, land uses, residences and other development. Impacts on water resources are considered significant if an alternative would:

- Result in an increase in size of the 100-year floodplain in the project area, thereby increasing effects on residential and commercial developments;

- Result in degradation of surface or groundwater quality to a point of exceeding state water quality standards or objectives (e.g., RWQCB Basin Plan Objectives and state maximum contaminant levels, where applicable); or

- Violate laws and/or regulations adopted to protect or manage the water resource system in the project area.

Channel Widening Plan

Flooding

The Channel Widening Plan would provide a beneficial effect on the hydrology of the upper Guadalupe River by reducing the existing flood hazard. This beneficial effect would provide the channel with a higher capacity to contain flood flows than presently exists. The level of protection provided by the Channel Widening Plan would accommodate flows up to the size of an approximate 50-year flood. The area subject to flooding with implementation of the Channel Widening Plan is depicted in Figure 4.3-4. This includes flooded areas that would be expected following 50-year, 100-year, and 500-year flood events, respectively. The primary difference between the 50- and 100-year flood event is the area of inundation expected west of the river due to the 100-year event. The area of residual flooding in Figure 4.3-4 is due to flooding from Canoas Creek (see discussion of flooding for the Bypass Channel Plan).

The Channel Widening Plan would alter the depth, velocity, and duration of inundation within the Guadalupe River channel, increasing the volume of water retained within the channel in most reaches. Channel widening and floodwalls would affect Reaches 7, 8, 10A, 10C, and 11. By containing flood waters that would otherwise overflow the river bank and flow outside the channel, the improvements would increase the height of flood peaks within some reaches of the feasibility study area, as well as some downstream reaches. The reaches within the feasibility study area where increased volumes would occur would depend upon the specific characteristics of a given storm event. Under most events, increased volumes would be expected in Reaches 7 and 8. Reducing the depth and velocity of flows by providing additional channel capacity would likely reduce scouring and alter the sediment transport dynamics that currently exist. Backwater effects that presently occur up and into Ross and Canoas Creeks under high-flow conditions could also be altered and would reduce flooding from these tributaries.

Keeping floodwaters in the upper Guadalupe River channel would increase the height of flood peaks downstream of the project area. This would be a significant impact. The downtown Guadalupe River project currently under construction and the flood control improvements proposed in Reaches A and 6 (a separate but related project proposed by the SCVWD) would fully mitigate in advance these impacts in the downstream reaches to insignificance.

Water Quality

Impacts on surface water quality would be primarily related to activities necessary for construction of the flood control improvements. Grading and earthwork are required for the construction of a variety of flood control improvements. The Channel Widening Plan improvements would include channel widening, bench and floodwall construction, and replacement of three bridges. The structures that would be constructed for each of the alternatives are detailed in Table 2-1. Grading and earthmoving activities over a large area, particularly within the river channel itself, would likely increase erosion and the sediment load in the existing channel. These significant impacts would be mitigated to insignificance by implementing a Storm Water Pollution Prevention Plan (SWPPP) required as part of the NPDES program. The SWPPP would include measures to assure source reduction of pollutants, erosion and sediment control measures, and best management practices for reduction of pollutant discharges from stormwater runoff.

Construction activities can conceivably release and/or mobilize existing contaminants in impact-area soils, releasing them into groundwater flows. This significant impact would be mitigated to insignificance and is discussed in section 4.11.

Turbidity (i.e., suspended sediment load), can transport metals and phosphorus that bind to sediment particles. This significant impact on water quality would be mitigated to insignificance with implementation of the SWPPP and measures discussed in section 4.2.

Maintenance associated with the Channel Widening plan would include periodic trimming, removal, or treatment with EPA-approved herbicides of vegetation that is obstructing flood flows, causing structural damage, or impeding access and maintenance (see also section 4.4.3). Herbicides may also be used to control noxious weeds that degrade riparian habitat values. Herbicides would be applied in accordance with legal (label) requirements to prevent their unintended effects on aquatic habitats, by properly trained

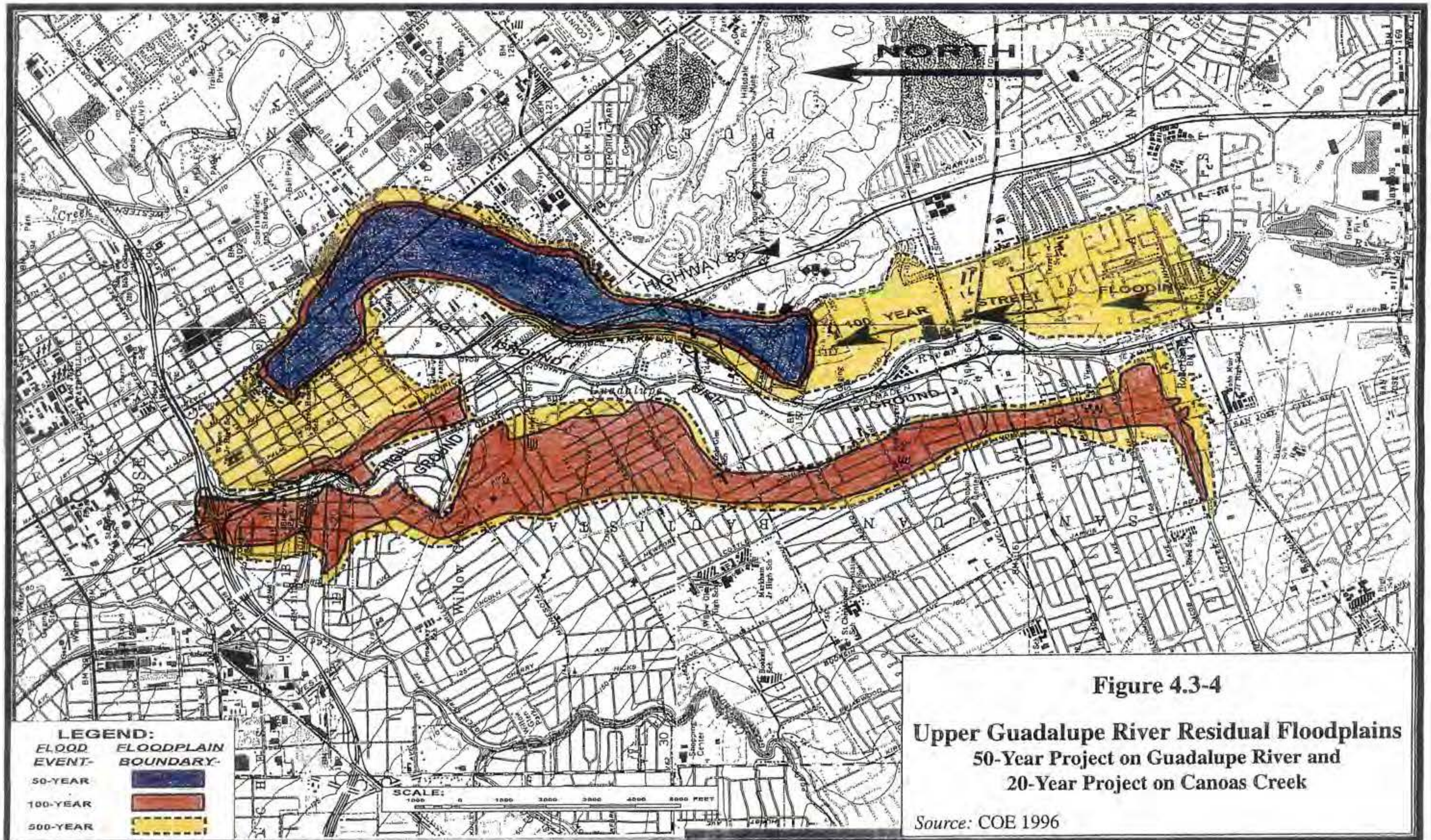


Figure 4.3-4

Upper Guadalupe River Residual Floodplains
50-Year Project on Guadalupe River and
20-Year Project on Canoas Creek

Source: COE 1996

and certified personnel. The herbicides used would be rapidly degraded to non-toxic by-products through biological and physical processes that would occur on plants and soil, such that they are not expected to be transported in runoff and impact adjacent aquatic habitats. Herbicide use is part of the SCVWD's maintenance plan that is the subject of a Memorandum of Understanding (MOU) with the Department of Fish and Game.

Herbicide use within the existing "natural" channel, i.e. along streambanks not subject to modification, would be reduced. Herbicide use would expand in newly constructed areas, e.g., on maintenance roads along floodway benches, and along bypass channels.

Groundwater

Dewatering, or pumping water from the river, may be required for construction of some of the proposed improvements. This would have a local, temporary, less than significant effect on groundwater flow conditions except where dewatering would occur in the vicinity of hazardous waste sites. In this case, contaminated groundwater could flow away from hazardous waste sites toward dewatering wells, a significant impact that would be mitigated to insignificance. For further discussion of hazardous waste impacts, refer to section 4.11.

Long-term groundwater hydrology within the project study area, particularly groundwater recharge, would be positively affected by the proposed flood control improvements. During the winter months, the relatively low bench height would increase the effective channel width, slowing the rate of flows within the channel and increasing the residence time for flood flows. This would increase groundwater recharge potential, a beneficial impact. Another potential beneficial impact would be the removal and/or treatment of soil and groundwater contamination that might otherwise remain in place, improving the overall soil and groundwater quality within the vicinity of the Guadalupe River. The SCVWD would require that any impacts to groundwater recharge facilities in Reaches 11 and 12 be mitigated.

Bypass Channel Plan

Flooding

This alternative would also provide a beneficial effect on the hydrology of the upper Guadalupe River by reducing the existing flood hazard. The major difference between the Bypass Channel Plan and the Channel Widening Plan is that the level of protection provided by the Bypass Channel Plan flood control improvements would accommodate flows up to the 100-year flood event, as compared to the 50-year protection provided by the Channel Widening Plan. The residual flooded area following implementation of the Bypass Channel Plan is depicted in Figure 4.3-5. The level of inundation on the east side of the river is similar to that depicted in Figure 4.3-4 (i.e., protection at the 50-year flood level), while the area west of the river would be completely protected from flooding during a 100-year storm event. The residual flooding depicted in Figure 4.3-5 for the 50- and 100-year flood conditions is due to flooding from Canoas Creek.

The major bypass channel is proposed in Reaches 7 and 8, with smaller bypass channels proposed in Reaches 9 and 11A. These bypass channels would reduce water volume and depth, as well as dampen changes in the velocity and duration of flood flows in the Guadalupe River channel within the feasibility study area.

Keeping floodwaters in the upper Guadalupe River channel would increase the height of flood peaks downstream of the project area, as discussed for the Channel Widening Plan. This would be a significant impact. The downtown Guadalupe River project currently under construction and the flood control improvements proposed in Reaches A and 6 (a separate but related project proposed by the SCVWD) would fully mitigate in advance these impacts in the downstream reaches to insignificance.

Water Quality

Water quality impacts would not differ appreciably from those described above for the Channel Widening Plan. Grading and earthwork required for constructing the Bypass Channel Plan flood control improvements would be slightly greater due to the increased level of flood protection. In addition to the channel widening and bench and levee construction, the Bypass Channel Plan would include bypass channels, numerous bridge construction and repair locations, and other flood control structures (e.g., weir drop structure, concrete culvert apron, articulated concrete mat structure, etc. [see Table 2-1]). Project grading and earthmoving activities could increase erosion and the sediment load in the existing channel. This would be a significant impact. A SWPPP would be required for the Bypass Channel Plan as part of the NPDES program and would mitigate this impact to insignificance.

As for the Channel Widening Plan, the Bypass Channel Plan would include using appropriate herbicides to control vegetation in some areas, as necessary for access and maintenance and for noxious weed control. The herbicides used would be of low toxicity to wildlife, rapidly degraded and not expected to impact surface water quality in the river. All use would be in conformity with legal requirements and an approved MOU with CDFG regarding maintenance procedures along the river. Public notification would be provided as required regarding any potential health hazards.

Herbicide use within the existing "natural" channel, i.e. along streambanks not subject to modification, would be reduced. Herbicide use would expand in newly constructed areas, e.g., on maintenance roads along floodway benches, and along bypass channels.

Groundwater

The effects on groundwater flow and quality would be similar to those described for the Channel Widening Plan. The additional bypass channel areas would provide additional surface area for groundwater recharge when flows are high enough to enter the bypass channels. This is a beneficial impact. The SCVWD would require that any impacts to groundwater recharge facilities in Reaches 11 and 12 be mitigated.

No-Action Alternative

No construction impacts would occur under the no-action alternative. Active bank erosion would continue at various locations within the feasibility study area in the absence of channel improvements. Periodic channel clearing and bank stabilization would occur on an as-needed basis.

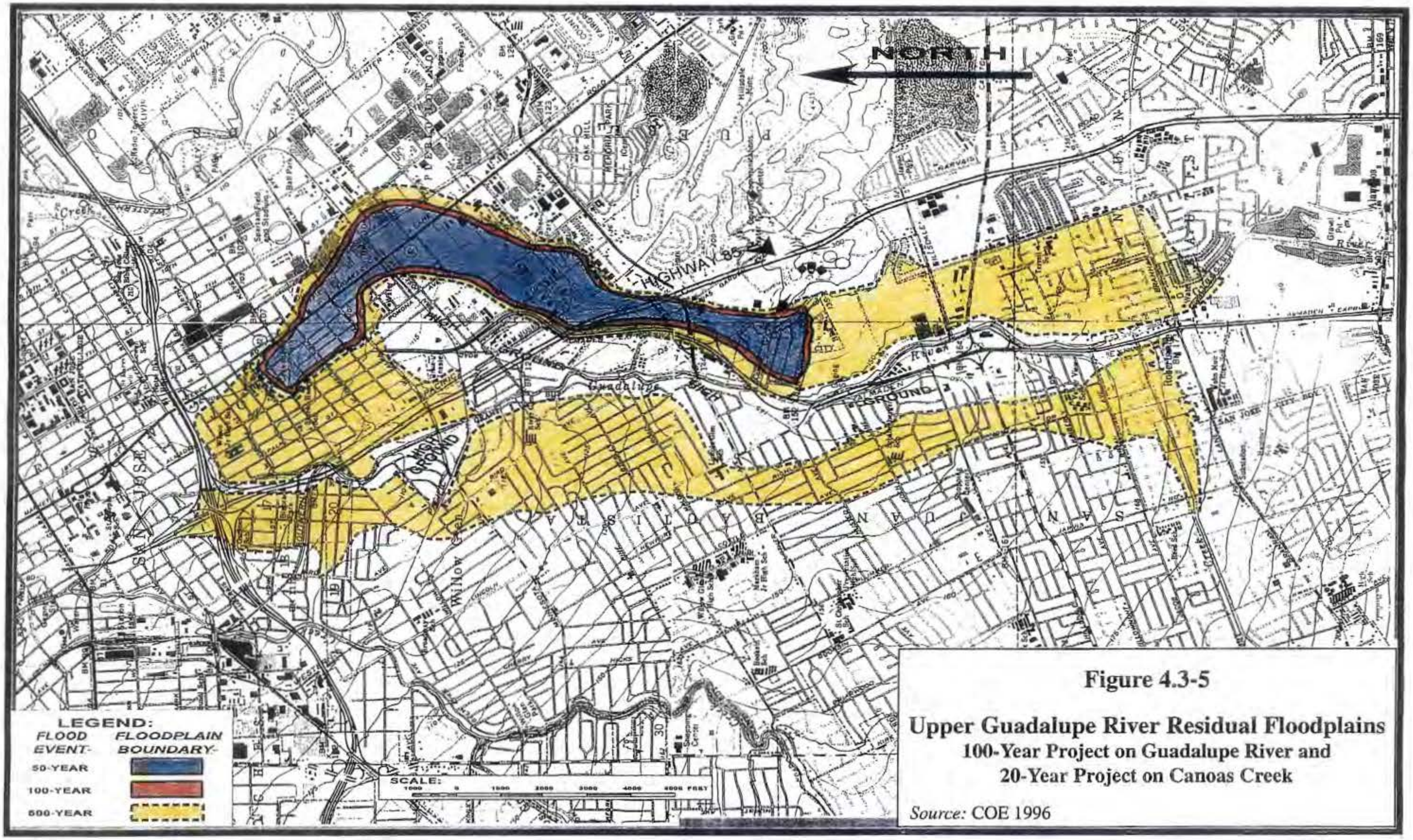


Figure 4.3-5

Upper Guadalupe River Residual Floodplains
100-Year Project on Guadalupe River and 20-Year Project on Canoas Creek

Source: COE 1996

4.3.4 Mitigation Measures

Flooding

The flood control alternatives would provide sufficient channel capacity to reduce the threat of flooding up to the level of protection for each alternative. No specific mitigation measures regarding flooding would be needed for either of the flood control alternatives. If the Channel Widening Plan were to be implemented, additional money would need to be included with the project's costs to address the impacts associated with the inclusion of floodwalls in Reach 8 and along Ross and Canoas Creeks.

Water Quality

Mitigation measures to reduce water quality problems related to turbidity would be addressed in the SWPPP. Wherever possible, the SWPP shall incorporate measures from the EPA's Pollution Prevention/Environmental Impact Reduction Checklist for Flood Control Projects. Additional mitigations described in section 4.2 should be included in the SWPPP and implemented to assure proper mitigation of sedimentation of the river. The project would comply with EPA-approved water quality standards as specified in the Basin Plan to protect beneficial uses of the river. The Corps shall consult with the Regional Water Quality Control Board to ensure that appropriate controls are placed on construction and maintenance activities.

Mitigation of hazardous waste impacts is addressed in section 4.11. No other specific water quality mitigation would be needed under any of the flood control alternatives.

Groundwater

Mitigation of impacts on groundwater recharge facilities is required. See section 4.11 regarding hazardous waste impacts.

4.3.5 Unavoidable Significant Adverse Impacts

There would be no unavoidable significant adverse impacts on water resources with implementation of the above mitigation measures.

4.4 BIOLOGICAL RESOURCES

4.4.1 Regulatory Setting

Statutes, regulations, and policies that are of particular relevance to Biological Resources include the following:

Federal Statutes, Regulations, and Policies

- National Environmental Policy Act
- Clean Water Act
- Fish and Wildlife Coordination Act
- Migratory Bird Treaty Act
- Endangered Species Act
- Regulatory Programs of the Corps of Engineers
- EPA 404(b)(1) Guidelines
- Executive Order 11988 - Floodplain Management
- Executive Order 11990 - Protection of Wetlands

California Statutes, Regulations, and Policies

- California Environmental Quality Act
- California Endangered Species Act
- Fish and Game Code Section 1601 - Streambed Alteration Agreement
- Fish and Game Wildlife Habitat Mitigation Policy
- California Wetlands Policy

Discussion of the above and the project's compliance with them is provided in section 3.3 of this document.

4.4.2 Existing Conditions

Vegetation

Methods

Vegetation surveys to characterize major habitat types and inventory trees were conducted by The Habitat Restoration Group in 1986, and 1989–1990. Additional baseline description of the project area was developed by the USFWS based on fieldwork conducted in March and August 1993 and November 1996, in collaboration with other project participants as part of the USFWS' Coordination Act Report (CAR), (USFWS 1997; Appendix D). An Environmental Working Paper prepared as part of the Corps' Feasibility Study (COE 1997) provided a summary of existing information and preliminary conclusions from the EIR/S as of October 1995. Baseline descriptions and analyses have been updated in the SCVWD's Draft EIR/S Biology section (Parsons Engineering Science 1997). That document and the Environmental Working Paper have been the primary sources of information for this EIR/S. To further confirm the adequacy of pre-existing data, a reconnaissance survey of the project area was also conducted by the Corps' contractor in late June 1996.

A list of all plants observed in the field was compiled (Appendix F). Searches were conducted for special-status plants; results are described below. Of the plant species observed within the project study area by The Habitat Restoration Group (see Appendix F), none are listed threatened or endangered species nor are there any that are proposed for listing or candidate species.

Generalized habitat types were mapped and digitized into a Geographic Information System (GIS) database (Parsons Engineering Science 1997). To assess project effects on riparian forest fragmentation, the EIR/S analysis also included calculations of riparian forest patch lengths and of the intervening gap lengths.

A tree inventory was conducted for the EIR/S, with all trees larger than 2 inches diameter at breast height (dbh) inventoried by species, size class, canopy closure class, and bank location. Trees which were at least 20 inches dbh were identified as "ordinance trees" for evaluation under the City of San Jose's tree ordinance.

Wetlands and other jurisdictional waters of the United States subject to regulation under Section 404 of the Clean Water Act were delineated by the SCVWD in June and July 1995. The delineation encompassed the project study area, as well as areas that are part of the SCVWD's proposed flood control project, including Reaches 6-13, Ross Creek, Canoas Creek, and a portion of Reach A. The delineation was reviewed and verified by the Corps in early 1996 (Parsons Engineering Science 1997).

Vegetation Communities. Six vegetated habitat types have been recognized within the project study area:

- riparian forest
- freshwater marsh
- ruderal herbaceous
- ruderal scrub
- upland landscaping
- urban forest

Three other types of unvegetated or sparsely vegetated habitats have been distinguished within the study area: (1) exposed earth with little or no vegetation and land covered by structures or pavement; (2) revetment (e.g., rock-filled gabions, concrete, or riprap) which serve to provide bank stabilization along the banks of the river and creek channels; and, (3) the low-flow, open-water river channel, which was full when aerial photographs were taken for habitat mapping.

The vegetated habitats are described below. The locations of the vegetated and unvegetated habitats within the project study area are shown in the maps provided in Appendix E. Habitat acreages are summarized in Table F-1, Appendix F.

RIPARIAN FOREST. Riparian forest, occupying about 30 acres along the river banks, is the most extensive and important vegetation community in the project area. The lower banks and sandbars are typified by Fremont cottonwood (*Populus fremontii*) and willows (*Salix* spp.). On middle and upper bank areas, the single most abundant tree is black locust (*Robinia pseudoacacia*), an invasive species that displaces native riparian forest trees. Native tree species in order of decreasing abundance include California black walnut (*Juglans hindsii*), blue elderberry (*Sambucus mexicana*), sycamore (*Platanus racemosa*), box elder (*Acer negundo* ssp. *californicum*), California buckeye (*Aesculus californica*), coast live oak (*Quercus agrifolia*), and valley oak (*Quercus lobata*). Other abundant non-native trees include fruit trees (especially *Prunus* spp.) blue gum (*Eucalyptus globulus*), and California pepper tree (*Schinus molle*). The understory may be quite shrubby in places and is composed of tree saplings as well as blackberry (*Rubus* spp.) and poison oak (*Toxicodendron diversilobum*) along with underlying herbaceous and grass species.

Parts of the riparian forest in the study area may be among the best remaining in the Santa Clara Valley. The riparian forest corridor is probably more narrow than its historic extent, currently ranging in width from about 30 feet to 275 feet wide (see Appendix E). In general, the riparian forest in the lower reaches of the study area (Reaches 7–9) is still fairly continuous and dense, while in the upper reaches (Reaches 10–12) the riparian forest is more discontinuous and degraded as a result of past gravel mining, flood control projects, highway development, and other development in this area. Reach 9 contains the most abundant riparian forest, covering about 9 continuous acres (see Appendix F, Table F-1), and ranges between 30–200 feet wide. The widest band of riparian forest occurs along Reach 10 (Reach 10C), ranging between 100–275 feet wide. Ruderal herbaceous vegetation dominates the channels of Ross and Canoas creeks.

Additional data on the structure and composition of riparian forest, including reach-by-reach descriptions, are contained in the SCVWD's EIR/S (Parsons Engineering Science 1997). A reach-by-reach discussion of riparian habitats is also provided below in the wildlife section.

FRESHWATER MARSH. The freshwater marsh community occurs sporadically on wet soils and shallow waters in the channels of the Guadalupe River, Ross Creek, and Canoas Creek. Approximately 4 acres of freshwater marsh is present in the study area, with the largest areas being along Reach 10B and Reach 12. The marshes are dominated by cattail (*Typha* sp.), California bulrush or tule (*Scirpus californicus*), curly dock (*Rumex crispus*), sedges (*Cyperus* spp. and *Carex* spp.), bur-reed (*Sparganium eurycarpum*), creeping water-primrose (*Ludwigia peploides*), and other herb and grass species. Occasionally, cottonwoods and willows are found growing in among the marshes. Freshwater marsh accounts for most of the jurisdictional wetland habitat in Appendix F, Table F-1. Areas of non-persistent vegetation within the stream channel are included in the acreage of "River" habitat and "Other Waters" in Appendix F, Table F-1.

RUDERAL HERBACEOUS AND RUDERAL SCRUB. The ruderal communities are disturbed habitats consisting of native and introduced plants. These communities occupy about 27 acres on and above the banks of the study area streams, occurring as a distinct habitat and also often extending into the riparian forest as an understory layer. The ruderal herbaceous community is dominated by a number of non-native and native herbaceous species, including black mustard (*Brassica nigra*), field mustard (*B. campestris*), cocklebur (*Xanthium strumarium*), fennel (*Foeniculum vulgare*), horseweed (*Conyza canadensis*), Italian thistle (*Carduus pycnocephalus*), perennial peppergrass (*Lepidium latifolium*), prickly lettuce (*Lactuca serriola*), and white clover (*Melilotus albus*). Dominant grasses in the herbaceous ruderal habitat are Bermuda grass (*Cynodon dactylon*), ripgut brome (*Bromus diandrus*), soft chess (*Bromus mollis*), and wild oat (*Avena barbata*). The ruderal scrub communities are dominated by shrubs and viny plants such as coyote bush (*Baccharis pilularis*), blackberry (*Rubus ursinus*), Himalaya berry (*R. procerus*), castor-bean (*Ricinus communis*), and poison oak (*Toxicondendron diversilobum*).

UPLAND LANDSCAPING. Trees and shrubs which have been planted as landscaping can be found around the buildings and along the roads of the project study area. The landscaped areas occupy about 8 acres, over half of which is in Reach 10B, at the top of the bank, adjacent to and encroaching into the riparian forests. The most common planted trees are eucalyptus, California pepper tree, coast redwood (*Sequoia sempervirens*), olive (*Olea europea*), holly oak (*Quercus ilex*), tree-of-heaven (*Alianthus altissma*), and Monterey pine (*Pinus radiata*), none of which are native to the project area.

URBAN FOREST. The urban forest habitats are considered to be those trees and shrubs located in and around the residential and commercial lots which do not fit into the category of a riparian forest or upland landscaping habitat. They are mostly garden plants and street trees with the common species being elm, tree-of-heaven, and black acacia (*Acacia melanoxylon*), as well as lemon (*Citrus limon*), orange (*C. sinensis*), and other fruit trees (*Prunus* spp.). Urban forest is most extensive at the northern end of the study area and along Ross and Canoas creeks.

Tree Inventory Results (Species, Size Class, Canopy Closure Class, and Bank Location). The results of the tree inventory are provided in the SCVWD Public Draft EIR/S (Parsons Engineering Science 1997) and summarized in Tables F-2 through F-4, Appendix F. There are 7,375 trees larger than 2 inches dbh within the riparian corridors of the study area. Several hundred trees also occur within adjacent urban forest areas. The trees are fairly evenly distributed between the east and west banks of the Guadalupe River although there are more trees along the east bank of the river.

Most of the trees occur from the top of the slope down to the mid-slope area along the channel, with fewer trees in the area between the lower slope and the channel bottom. At the time of measurement, there were 601 trees qualifying as "ordinance trees" ($\geq$ 20 inches dbh). None of the trees within the project study area qualify as heritage trees (trees that have been specifically identified by the City Council to have special significance to the community), but there are three designated heritage trees within urban forest habitat that is outside of Reach 9.

Wetlands and Other Jurisdictional Waters of the United States. Waters of the United States, including wetlands and navigable waters, are subject to federal jurisdiction under the Clean Water Act. Wetlands are defined in federal regulation as:

> . . . those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support and that under normal conditions do support a prevalence of vegetation typically adapted for life in saturated soil conditions. (33 CFR Part 328.3[b])

Consistent with this definition, the identification and delineation of Corps jurisdictional wetlands is based on the presence, under normal conditions, of wetland hydrology, hydric soils, and hydrophytic vegetation, as defined in the Corps' 1987 wetland delineation manual (Environmental Laboratory 1987). When all three criteria are met, the soil is saturated for a sufficient period (at least 5-10 percent of the growing season) to cause anaerobic conditions and recognizable physical-chemical changes in the soil that, in turn, lead to the development of hydrophytic vegetation. The latter is recognized on the basis of the wetland indicator status of the dominant plants (e.g., see Appendix F).

Navigable waters include the open ocean, tidal bays, and large rivers and lakes. "Other waters" refers to waters of the United States other than wetlands or navigable waters. Other waters include streams and ponds, which are distinguished by the presence of an ordinary high water mark (OHWM); other waters are generally open water bodies and are not vegetated; they can be perennial or intermittent water bodies and waterways.

The Corps regulates other waters to the outward limit of the OHWM (33 CFR Part 328.4[c][1]). The OHWM on a non-tidal water is the "line on shore established by the fluctuations of water and indicated by physical characteristics such as a clear natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas" (33 CFR Part 328.3[e]). Streams should exhibit a defined channel, bed, and banks to be delineated as other waters.

Within Reaches 7 through 12 and along Ross and Canoas creeks, the SCVWD has identified 4.85 acres of Corps-jurisdictional wetlands and 33.15 acres of other jurisdictional waters (Table F-1, Appendix F). The wetland areas consist of freshwater marsh habitat and the lower-bank portions of the riparian habitat. Other jurisdictional waters comprise the non-wetland habitats within the limits of ordinary high water, including open water, stream channels, and the lower riverbanks that lack wetland vegetation.

The wetlands occur at the toe of slope and in relatively shallow, slow-moving parts of the stream, as well as on point bars within the river. Each of the reaches of the study area contain some wetlands, but the acreages vary from reach to reach (Table F-1, Appendix F). The dominant hydrophytic plants of the freshwater marsh wetlands are cattail, bur-reed, sedge, and creeping water-primrose. Dominant plants within the riparian wetlands are the willows and cottonwoods. In addition to supporting hydrophytic vegetation, the delineated wetlands also contain hydric soils that are seasonally saturated or inundated by river flows. Relatively small portions of the riparian habitat are classified as wetland because (1) water depths and/or velocities within most of the river channel are too great, at least periodically, to allow the development of wetland vegetation; and (2) the riparian areas on the upper banks are insufficiently flooded or saturated.

Fisheries

Methods

Information on fisheries is based on several previous studies (Parsons Engineering Science 1997; USFWS 1993; and COE 1992).

A survey to map stream habitat and sample fish populations within the upper Guadalupe River was performed by The Habitat Restoration Group between July and September 1986 and in June 1987. Additional fish sampling was conducted in November and December 1986 in the Guadalupe River upstream of the project study area, upstream of Blossom Hill Road. They also performed a field survey of salmonid spawning in 1992–1993. During the 1986–1987 field surveys, fish sampling was conducted using backpack electrofishing techniques. Sites sampled included pool, riffle, and run habitats to determine macrohabitat use by fish. Captured specimens were measured by size group and abundance ratings were determined for juvenile and adult fish. In addition to characterizing habitat conditions at each sample site, measurements of streamflow, water temperature, and dissolved oxygen were recorded.

In the summer of 1991, the USFWS conducted fish sampling by electrofishing techniques. In 1992, the California Department of Transportation (Caltrans) sponsored a fishery monitoring survey of Ross Creek. In 1994, the SCVWD completed the fifth year of a monitoring program for a summer dams fishery study.

A survey of the aquatic habitat in the project study area was conducted in March, July, and August 1993 by biologists from the USFWS, CFDG, Jones & Stokes Associates, and The Habitat Restoration Group. The purpose of this survey was to verify habitat conditions and evaluate shaded riverine aquatic (SRA) habitat. Habitat features were mapped onto aerial photographs and habitat data from 98 randomly selected band transects were recorded. Habitat variables included instream and overhanging vegetation, instream woody debris and aquatic vegetation, natural undercut banks, bank stabilization structures (i.e., gabions, revetments, concrete linings), substrate composition, and channel width. This information was used to determine habitat quality for each side of the river (east and west banks) in each study reach. Aquatic habitat features of Ross and Canoas creeks have not been quantified, but the affected reach of each stream lacks SRA cover and microhabitat features important to salmonids, and neither stream provides appropriate spawning and rearing habitat upstream (Parsons Engineering Science 1997).

Fish Populations

The populations of native fishes in the southern San Francisco Bay streams began to decline around the turn of the century, as agricultural development and other activities increased, and later after World War II when urbanization became more significant. The advent of urban encroachment flood control structures, water diversions, urban discharges, and other activities have resulted in limitation on available habitat, reduced flood flows, and a decline in water quality, some or all of which may have reduced the native populations. Today, 15 species of fish are known to occur in the Upper Guadalupe River area (Table F-5, Appendix F). Additional species are likely to occur downstream in brackish/estuarine habitats, and in upstream tributaries. Fishes of the study area include eight native species and seven non-native species. The populations are composed of three anadromous species (fish that spend their adult life in the ocean and migrate up freshwater streams to spawn) and 12 resident species. Rainbow trout (*Oncorhynchus mykiss*) is a resident species that spawns in the watershed upstream of the project study area. The introduced species are abundant in the river and have a competitive advantage over the anadromous salmonids; they consume large quantities of macroinvertebrate prey species and are predators of juvenile salmonids. It is noted that although fishing is allowed in the river, CDFG recommends that fish not be consumed due to concerns over mercury contamination.

Two anadromous salmonids, chinook (king) salmon (*Oncorhyncus tshawytscha*) and steelhead trout (*O. mykiss*), occur in the study area. Despit anecdotal reports (USFWS 1977), there is no confirmed documentation that coho salmon have occurred historically (San Francisco Estuary Project 1997) or occur at present in the Guadalupe River, which generally lacks suitable habitat for this species. Historically, the Guadalupe River probably supported self-sustaining populations of steelhead trout (Leidy 1984). Chinook salmon were probably not native to the streams of south San Francisco Bay but are now present in the Guadalupe River. This may be due to smolt releases into the bay and delta by CDFG. Small runs of adult chinook salmon and steelhead trout persist in the Guadalupe River; however, the extent to which these are self-sustaining populations or strays from other rivers is not well-documented. Most chinook salmon spawning in the Guadalupe River occurs downstream of the project study area, below I-280; none occurs above Reach 13 (beyond the study area) because of a barrier to fish passage above Blossom Hill Road. Resident (non-anadromous) rainbow trout spawn in the river upstream of this barrier. Salmonids may occasionally migrate up Ross Creek, although the quality of spawning and rearing habitat is marginal. Canoas Creek has poor access due to the height of the culvert above the river, but CDFG has indicated that this stream does not affford suitable spawning and rearing habitat, and so fish passage should not be improved. The populations of salmonids in the river probably fluctuate in response to moderate-to-high precipitation years that create suitable environmental conditions for upstream migration of adults, adult spawning, and possible juvenile survival.

There is good documentation for chinook salmon spawning attempts in the project area, but successful reproduction is limited to the capture of two juveniles. Adult salmonids are seen annually in the Guadalupe River in the reaches downstream of the project study area. Chinook salmon and their redds have been observed at various locations along the Guadalupe River, especially in the downtown reach of the river (Parsons Engineering Science 1997). Chinook salmon were observed spawning in the Guadalupe River near Willow Glen Way (Reaches 8 and 9) in November of both 1986 and 1987, and numerous salmon were observed in Los Gatos Creek in 1996 at several locations (downstream of the project study area). The presence of adult chinook salmon was documented in the Guadalupe River in December 1993 and January 1994. Unidentified juvenile salmonids were caught at the confluence of Canoas Creek and Guadalupe River (Reach 10) in March 1994. In March 1996, two positively identified juvenile chinook salmon were captured under the Branham Lane bridge, immediately downstream of where redds had been found earlier in the winter (personal communication, N. Kogut 1997). While salmonid redds have been observed in the study area, summer water temperatures within this portion of the river system are often too high for steelhead/rainbow trout, and migration barriers preclude access by steelhead trout to better habitat upstream (Parsons Engineering Science 1997).

STEELHEAD TROUT. The National Marine Fisheries Service (NMFS) has completed a comprehensive status review of West Coast steelhead trout populations within California, Idaho, Oregon, and Washington and has identified 15 Evolutionary Significant Units (ESUs) within this range. Five of these ESUs were proposed for listing as threatened or endangered under the federal Endangered Species Act (61 FR 41541-41561, August 9, 1996). One of the five ESUs proposed for listing as threatened, the Central California Coast ESU, includes river basins from the Russian River (Sonoma County) to Soquel Creek (Santa Cruz County), and the drainages of the San Francisco and San Pablo bays. This ESU was listed as threatened in August 1997. Life-history information is generalized from Shapovalov and Taft (1954); little is known about the Guadalupe River population. Steelhead trout are sea-run rainbow trout. Steelhead trout migration and spawning coincides with the winter rainy season (Table F-6, Appendix F). Spawning typically occurs at the head of riffles, in the tail of pools, and in shallow runs. Females construct redds in habitats containing clean, loose gravel of small to medium size, average water velocities of 1-3 feet per second, and water depths of 0.75-3 feet. Eggs incubate in the redds for about 1 month and the newly hatched fry remain in the gravel for 2-6 weeks. The fry emerge from the nests to feed on small invertebrates in quiet, shallow waters. During their juvenile stage, the steelhead trout typically remain in freshwater for at least one year before migrating to the ocean during the spring. Most adult steelhead trout survive spawning and return to the ocean; this is presumably the case, although unconfirmed, in the Guadalupe River. Because juvenile steelhead trout rear in the river over a full year, adequate streamflows and water temperatures are required, especially during the low-flow summer season. Optimal conditions for juvenile rearing occur when water temperatures range from 43° to 65°F. The upper lethal limit for steelhead trout is 77°F.

It is not known whether steelhead trout juveniles are able to survive summer conditions in those portions of the river that are accessible to spawning adults. Juvenile survival may be limited by warm water temperatures and predatory fishes such as largemouth bass and green sunfish. Three juvenile trout were found in Reaches 9 and 10 in April and May 1995 (The Habitat Restoration Group 1995), but it is not known if these were juvenile steelhead trout, or rainbow trout washed downstream by high winter flows. In recent years, steelhead trout have been observed attempting to jump the drop structure at Blossom Hill Road; these fish could have been spawned upstream.

Although adult steelhead trout are known to migrate up the Guadalupe River, and numerous salmonid redds have been noted, confirmed steelhead trout redds and possible juveniles have been few. It is not known whether these fish represent a self-sustaining population of steelhead trout. It is possible that rainbow trout upstream of the study area could provide a source for adult steelhead migrants.

CHINOOK SALMON. The life history for chinook salmon is different from that of the steelhead trout. Adult chinook salmon will enter the Guadalupe River to spawn as early as June (see Table F-6, Appendix F). The adults typically spawn in the lower reaches of the Guadalupe River, in habitats of coarse gravel riffles. All adults die after spawning. To successfully incubate, the eggs need about 45 days of stable flows at a velocity of about 2.5 feet per second and a depth of at least 1.5 feet over the head of the riffle. The eggs hatch between late winter and spring (January to April). The young chinook salmon typically migrate to the ocean soon after emergence, although some remain in freshwater and migrate to the ocean as yearlings. Water temperatures less than 64°F are preferred for adult migration and spawning. The upper lethal limit for chinook salmon is at about 77°F; they can only tolerate brief exposure to this temperature, and optimal temperatures for growth and survival are much lower.

It is of interest to know the genetic affinities of local salmonid populations such as the chinook salmon of the Guadalupe River because such data can establish the uniqueness of local populations, their relationship to legally protected populations (e.g., winter-run chinooks of the Sacramento River), and their significance under CEQA and NEPA. A preliminary study of the genetic structure of 29 Guadalupe River chinook salmon indicated that 21 of the 29 were probably derived from known Merced and Feather River hatchery stocks, whereas the other 8 could represent either a native population or strays from another hatchery that has not yet been sampled (Nielson 1995, cited in Parsons Engineering Science 1997). As noted above, juvenile chinook salmon have recently been collected in the upper Guadalupe River. One specimen has been frozen for investigation of its genetic affinities (personal communication, N. Kogut 1997).

Fishery Habitat Conditions

Factors that most greatly influence fisheries habitat in a stream include streamflow, water quality, occurrence of fish migration barriers, available spawning sites, and streambed and shaded riverine aquatic (SRA) cover. The conditions of each of these factors in the upper Guadalupe River, as they relate to anadromous salmonid habitat suitability, are described below.

Anadromous fish utilize the Guadalupe River under present conditions. Although the physical conditions of the study area provide some favorable habitat attributes, the value of these reaches for spawning and rearing is limited by poor substrate conditions, seasonal flows, and partial migration barriers (all of which occur in portions of the river), as well as excessive summer water temperatures along much of the river (SCVWD 1997). Habitat quality varies within and between reaches.

The streambed and SRA cover in Reaches 7 through 10A of the study area provide some suitable habitat features for juvenile salmonid rearing, with an overhanging riparian forest canopy, undercut banks, exposed roots, and pools. However, much of the length of these reaches has a muddy channel bottom and little habitat diversity (USFWS 1997). These reaches generally lack suitable spawning gravel, so the spawning habitat is poor. Chinook salmon and steelhead trout juveniles may use this area for rearing, most likely in the spring. The potential value of this area as rearing habitat diminishes in the summer when water temperatures generally exceed optimal growth and survival (Parsons Engineering Science 1997), although it is possible that, at lease in some years, there are shaded pools along the river where temperatures remain cool enough for salmonids to survive during the summer.

Reaches 10B through 12 have a lower potential as rearing habitat because the channel is wider and more shallow, the riparian forest canopy is less well developed or even absent, undercut banks are scarce, water temperatures are probably higher, and flows are often minimal or absent during the summer months. However, portions of these upper reaches do provide suitable spawning gravel.

The portions of Ross and Canoas creeks within the study area have been channelized, lack woody vegetation and habitat diversity, and have minimal aquatic habitat value. Neither stream provides good spawning and rearing habitat for salmonids although some spawning probably occurs in Ross Creek (Parsons Engineering Science 1997). Access to both creeks is limited by drop structures where they join the Guadalupe River.

Suitable habitat for steelhead trout exists to varying degrees in the headwater tributaries to the river, upstream of the study area, but fish migration up to these reaches is generally prevented by existing barriers. The headwater tributaries below the dams represent a total of approximately 16 miles, portions of which contain potentially suitable steelhead spawning and rearing habitat that is not presently available (Parsons Engineering Science 1997). Habitat quality upstream varies; some areas are degraded but can still be traversed, and they could be restored in the future. For example, the lower part of Guadalupe Creek currently has poor habitat which would be restored as part of the downtown project's mitigation. Upstream areas have good habitat for trout. The presence of resident (rainbow) trout in upstream tributaries indicates that suitable conditions exist for steelhead, if these areas can be made accessible. Downstream of the study area, spawning and rearing habitat for chinook salmon in the Guadalupe River is present and accessible to adults migrating upstream.

STREAMFLOW. Winter flow regimes in the upper Guadalupe River are regulated somewhat by the three reservoirs (Calero, Almaden, and Guadalupe) in the headwater tributaries. There is perennial flow in the Guadalupe River downstream to the percolation ponds in Reach 12. Water has historically been percolated in these ponds and in the river channel behind gravel dams for groundwater recharge; the SCVWD plans to resume use of these ponds for recharge in the future.

In dry years, low water flows combined with partial barriers to migration may in some cases completely prevent adult salmonids from migrating through the study area reaches. During some summers, flows in the river can cease between Branham Lane and Canoas Creek. Records from a stream gauge in the Guadalupe River upstream of Canoas Creek at the upper end of Reach 10B (Gauge Station No. 23B) reveal that periods of no flow in this reach have occurred in every month of the year (although they are unusual during the winter months) and often exceed 50 percent of the time during the summer. These records indicate that the low flows are typically less than 5 cfs when there is flow.

Flows in the lower reaches (7 through 10A) are more reliable during summer months. From 1983 through 1991, streamflows in these reaches were augmented by groundwater pumping releases as part of a toxic waste cleanup program at the IBM and Fairchild Semiconductor properties along Canoas Creek. This program of discharges sustained relatively good year-round flows in the Canoas Creek and these lower reaches for several years and may have helped salmonid populations persist during the drought. However, discharges from the cleanup program have been greatly reduced in recent years and are now minimal.

Ross Creek is not regulated by a reservoir and is an intermittent stream. Some groundwater percolation is also performed in the Ross Creek channel (with water released into Ross Creek from pipelines operated by the SCVWD). Downstream of the study area, Los Gatos Creek is a major tributary to the Guadalupe River; winter flows on this stream are also regulated by reservoirs and instream flows are augmented for percolation in the summer.

WATER QUALITY. Water temperature, oxygen levels, and turbidity are critical elements of a stream's suitability as a fishery. Water temperatures and turbidity levels in the upper Guadalupe River are problematic for anadromous salmonid spawning and rearing. Oxygen levels typically are near saturation and do not appear to be a limiting factor (Parsons Engineering Science 1997). Water temperature is largely influenced by ambient air temperatures, streamflow, and the amount of shade over the water surface. Relatively low flows (compared to watersheds with more favorable precipitation and base flow characteristics) and areas of reduced or minimal shading by vegetation within the project study area reaches result in high water temperatures that are less than optimal to support spawning and rearing of salmonids. Excessive water temperatures can negatively influence the growth rate, swimming ability, and disease resistance of salmonids, leading to increased mortality of juveniles. Acceptable water temperatures would need to be maintained year-round for the river to support juvenile steelhead trout. Summer water temperatures within the project study area can reach 80°F (Parsons Engineering Science 1997), which can be lethal to juvenile salmonids. Water temperatures during the fall may exceed 57°F and preclude spawning migrations of adult chinook salmon. Summertime temperatures in the water maintained behind gravel dams in the percolation ponds of Reach 12 can range up to 77°F at the surface and would likely exceed the acceptable range for rearing steelhead trout. There is probably microhabitat variation along the river, resulting in shaded pools where cooler temperatures exist during the summer, at least in some years. Juvenile chinook salmon may be less affected by rearing conditions than steelhead trout because most chinook salmon may migrate out of the river in the spring before water temperatures become critical. Turbidity levels can also be undesirably high. The high turbidity can result from sediments in the stream from bank erosion, or could be related to inputs of fine sediment and nutrients from urban runoff.

MIGRATION BARRIERS. Several barriers to fish passage are present within the Guadalupe River channel and in the upstream tributaries (Figure 4.4-1). The most significant barrier to fish passage is a 13-foot-high drop-structure (Alamitos drop structure) in the river located above Blossom Hill Road at the upper end of Reach 13 (upstream of the study area). This unladdered drop-structure effectively prevents any appreciable upstream migration of anadromous salmonids, although steelhead trout may be able to surmount the barrier during very high flows. The drop-structure was built to control the bottom profile of the river bed and reduce velocities to protect the stream banks and it is used to divert flows into the groundwater percolation ponds. Other partial barriers within the project study area include an apron and weir structure at Hillsdale Avenue (Reach 10C), and an abandoned vehicle crossing downstream of Ross Creek (Reach 11). These partial barriers appear to mainly be a problem for fish passage during low flows.

In Ross Creek, excessive water velocities and shallow water depths in a 200-foot-long culvert located under Almaden Expressway may exceed fish swimming capabilities when the water surface elevation in the Guadalupe River is lower than the culvert invert. A steep-sloped, concrete lined channel immediately downstream of the culvert invert may also act as a vertical barrier. Fish passage into Ross Creek may be possible when the creek is inundated by a backwater effect from the Guadalupe River, which is predicted to occur when flows approach 925 cfs (a 2-year event).

In Canoas Creek, the channel invert at the mouth is over 5 feet above the Guadalupe River channel but fish passage into Canoas Creek may also be possible during backwater effects from the Guadalupe River when flows approach 1,754 cfs (also a 2-year event). However, the CDFG has indicated that Canoas Creek is not favorable for salmonid production and that fish passage into the creek should be discouraged.

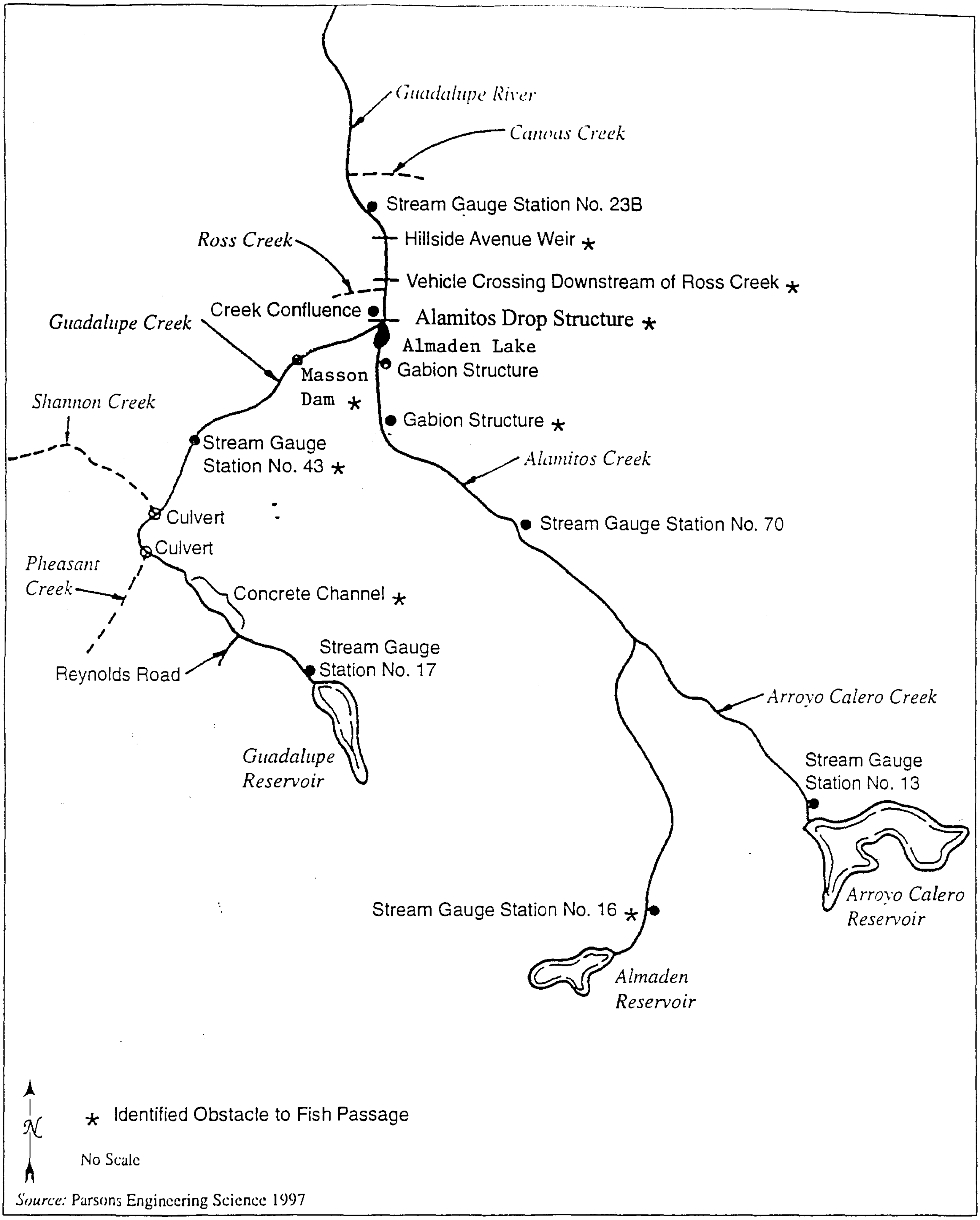


Figure 4.4-1. Identified Barriers to Fish Migration on Alamitos, Guadalupe, and Arroyo Calero Creeks

SPAWNING SITES. Spawning sites are determined by the locations of adequate gravels and shallow, riffle habitats in the stream channel. The reservoirs in the headwater tributaries act as sediment traps and reduce gravels supplies downstream, contributing to changes in the abundance, quality, and relative composition of gravels in the upper Guadalupe River. Natural gravels are very scarce downstream of Reach 10B, with the exception of a few gravel bars in Reach 9. The riffle substrate of most reaches is considered poor, consisting of relatively large pieces of concrete. Still, some suitable spawning sites do occur within the study area. During a 1987 survey by The Habitat Restoration Group, 13 potential spawning sites were identified from West Virginia Street upstream to Malone Road, with as many as 31 redds observed at these sites. In 1995 and 1996, SCVWD biologists surveyed the river from the Montague Expressway (downstream of downtown San Jose) upstream to the Alamitos drop structure. Of the 57 redds located, 10 were located within the study area (Parsons Engineering Science 1997). Suitable spawning sites are present in the headwater tributaries, above the study area, but are not accessible due to existing barriers.

Steelhead trout have in recent years been observed attempting to jump the drop structure at Blossom Hill Road. It is not known whether these fish were attempting to return to spawning and rearing areas farther upstream.

STREAMBED AND SHADED RIVERINE AQUATIC (SRA) COVER. The streambed and SRA cover characteristics of the upper Guadalupe River identified during the 1993 aquatic surveys are summarized in Table F-7, Appendix F. These data provide information on the condition of the fishery habitat of the river. The project study area reaches are predominantly pool habitats with a riffle:pool ratio ranging from 0.73:1 for Reach 8 to 0.06:1 for Reach 10 and a ratio of 0.24:1 for the entire study area. This is below the optimal ratio for an anadromous salmonid fishery, which should have a 1:1 ratio for spawning and rearing habitat. Only about 6 percent (1,784 feet) of the river is run habitat. About 29 percent (17,692 feet) out of the 61,520 feet of the stream bank length is shaded by overhanging riparian vegetation. Slightly more of the west bank is shaded than the east bank in all reaches except Reaches 10 and 12. In terms of surface area, about 16 percent (2.7 acres) of the 16.7 acres of total stream area is shaded, but this ranges from over 48 percent shaded area in Reach 9 to less than 0.1 percent shading in Reach 12 (SCVWD and COE 1994; Parsons Engineering Science 1997).

Undercut banks occur along 18 percent of the stream banks, again with more of the west bank undercut than the east bank. The shaded stream channel and undercut banks help to keep water temperatures down and provide cover for salmonids. These habitat features are virtually absent along the 25 percent (15,380 feet) of the total bank length that has already been modified by manmade structures for bridge abutments (2,350 feet; 4 percent) and bank protection (13,030 feet; 21 percent) using riprap, sacked concrete, rock-filled gabions, and concrete linings (SCVWD and COE 1994; Parsons Engineering Science 1997).

Wildlife

Methods

The USFWS and consultants to the SCVWD have conducted wildlife assessments of the project study area. The studies entailed habitat evaluations, systematic species surveys, and qualitative observations of wildlife use and habitat values. The results of these studies are contained in the following documents described in the Vegetation section.

The wildlife information and data that were presented in Appendices W-D, W-E, and W-F of *Draft Environmental Impact Report/Statement for the Guadalupe River Flood Control Project* (Parsons Engineering Science 1997) have also been used for this discussion.

Wildlife habitats were identified and characterized based upon the vegetation communities of the project study area (see section 2.2.3). In 1991, a Habitat Evaluation Procedure (HEP) analysis was performed by a team of biologists from The Habitat Restoration Group and BioSystems Analysis, Inc., in consultation with the USFWS and CDFG. HEP is an impact assessment methodology developed by the USFWS that documents the quality and quantity of available habitat for selected wildlife species. The six evaluation species selected for the first HEP analysis were: northern oriole, Pacific-slope flycatcher, rufous-sided towhee, belted kingfisher, yellow warbler, and downy woodpecker. The HEP was designed to describe the baseline riparian wildlife habitat conditions and determine riparian habitat values for the evaluation species.

A USFWS-led HEP analysis to address project impacts on SRA cover was prepared in 1993 (USFWS 1993). CDFG and SCVWD staff and consultant (Jones & Stokes) participated with USFWS in the field mapping of overhead shade with respect to the estimated mean high water channel along the affected reaches of the river. That analysis was updated in November 1996 to address the impacts of the bypass channel and channel widening plans (USFWS 1997; Appendix D).

In November 1996, a new HEP analysis to address the impacts of the channel widening and bypass channel plans on terrestrial habitats was initiated by the Corps and USFWS. Habitat attributes were measured in plots in Reaches 7 through 11, in locations impacted by the construction of one or both alternatives. Results of the new HEP analysis are included in the USFWS Revised Draft CAR (1997; Appendix D).

A year-long wildlife monitoring study, sponsored by the SCVWD, was conducted in the upper Guadalupe River from January 1986 to January 1987. The effort focused on bird populations, with less intensive sampling of mammal, reptile, and amphibian populations. The survey also focused on sampling within the riparian habitats of the project study area.

Bird surveys were conducted at 49 sample plots within the riparian habitats of the project study area (Parsons Engineering Science 1997, Appendices W-A and W-B). The habitat at each sample plot was further classified by size and cover of dominant vegetation according to the classification scheme in the CDFG's Wildlife Habitat Relationships (WHR) program. There were no sample plots in Reach 8, because of access limitations, nor in Ross or Canoas creeks, because they lack riparian habitat. Sampling entailed visual and aural observations recorded in 10-minute intervals between dawn and 9:30 A.M., with approximately four plots be sampled per day and each plot sampled about twice a month.

A small mammal trapping program was conducted over 560 trap-nights at various locations. At eight sites over 16 trap-nights, reptile and amphibian sampling was conducted by specific searches of suitable habitats and by a trapping program using drift nets and funnel nets.

In addition to the wildlife observations recorded during the 1986–1987 wildlife monitoring study, reconnaissance-level surveys of wildlife resources were performed in November and December 1989; January, April, May, and June 1990; and March and October 1992.

The SCVWD conducted wildlife surveys focusing on burrowing owls, other birds, and southwestern pond turtles along Reach 12 on June 20 and 27, and July 6 and 13, 1995. Habitat suitability for the California red-legged frog was also evaluated during the 1995 surveys (Parsons Engineering Science 1997). Surveys for red-legged frogs have subsequently been conducted in the study area, as discussed below under "Special Status Animals." Additional burrowing owl surveys may be conducted as requested by CDFG.

Wildlife Habitats

The riparian habitats of the Santa Clara Valley support some of the most important habitat for wildlife species in this county. The riparian habitats in general, and riparian forest in particular, provide sites for water, food, cover, and breeding to birds, mammals, reptiles, and amphibians. A CDFG estimate of wildlife species regularly occurring in Santa Clara County indicates that approximately 69 percent of the species (218 out of 314 species) use riparian habitats. It has been reported that densities of birds in riparian habitats can be more than 10 times those in adjacent habitats, and that up to 43 percent of all California bird species reach their maximum densities in the state's Central Valley riparian habitats. Biodiversity is generally highest in riparian forests.

Agriculture and urban development in the Santa Clara Valley has eliminated most of the riparian forest in the region. The riparian forest along the Guadalupe River and Los Gatos, Coyote, Llagas, and Stevens creeks constitute the last remaining areas of significant riparian forest in the valley. Along the upper Guadalupe River, the remaining riparian habitat has been reduced and degraded by channelization, gravel mining, and development along the banks of the river. The numerous road and railroad crossings have created breaks in the riparian corridor, as have flood and erosion control structures constructed along the river banks. In the upper reaches of the river (Reaches 11 and 12), much of the riparian forest has been totally eliminated by past gravel mining and development of percolation ponds. Despite the fragmented condition of its forest, the Guadalupe River is still an important area for wildlife. It supports a wide diversity of wildlife species, including some species that do not occur in adjacent habitats. The river also serves as a linear reserve, providing a refuge for wildlife in an urban environment, and a corridor for wildlife movement between the foothills and San Francisco Bay.

The wildlife habitats of the upper Guadalupe River coincide with and are distinguished by the vegetation communities that have been recognized within the project study area:

- riparian forest
- freshwater marsh
- ruderal herbaceous
- ruderal scrub
- upland landscaping
- urban forest
- unvegetated areas

The aquatic habitat of the river channel is also an important wildlife resource for certain species, as it is associated with the freshwater marshes in the channel and other communities along the river banks.

Riparian forests are considered to be among the most productive habitats for wildlife in California and these habitats support the most dense and diverse wildlife communities in the Santa Clara Valley. In mature riparian forests, the complex vegetation structure creates multiple layers and a variety of microhabitats within the riparian forest that provide niches for a diverse array of wildlife species. Large canopy trees, such as mature cottonwoods and willows, offer roost and nest sites for many bird species. Dead trees or snags, which occur in some areas along the upper Guadalupe River, provide nest and den sites for a variety of birds and small mammals.

The edge effects created by the juxtaposition of aquatic, riparian forest, and adjacent upland communities generally afford high levels of wildlife use, although linear configuration of these habitats is more favorable to species that utilize edge habitats, as opposed to forest interior inhabitants. The plants making up the riparian community, such as oak trees and some of the non-native species, supply important forage items of wildlife. Riparian forests tend to supply in close proximity many of the resources that are required by a great many wildlife species, not the least of which is water. This concentration of resources presumably allows species to acquire their needs with a lower output of energy. Additionally, riparian forests offer the shelter and cover to function as important passages for wildlife movement.

The other habitat types within the project study area are somewhat less productive and diverse than the riparian forest, but they still support significant wildlife resources. The freshwater marshes provide drinking water, forage items, and cover. Generally, freshwater marshes are important sites for amphibians, reptiles, waterfowl, and other birds, but the limited extent and distribution of freshwater marshes in the upper Guadalupe River reduces the value of this habitat. The ruderal herbaceous and ruderal scrub habitats support primarily granivorous (feeding on seeds or grain) and insectivorous wildlife that use available food items, and some raptors regularly hunt for small mammals in these habitats. Overall, there are fewer wildlife species in the ruderal habitats than in adjacent riparian and marsh habitats. Upland landscaping is of somewhat lower habitat value, primarily because it often consists of non-native vegetation, but native birds and other wildlife do use these areas to some extent for cover and food. In addition, some landscape vegetation is planted to attract birds, particularly around homes. The urban forest areas which are adjacent to riparian communities may provide moderate value for wildlife. Urban forest areas with large trees and understory plantings of shrubs are somewhat productive for wildlife, and habitat values are highest where native trees are present. Most wildlife species using the urban forest habitats are common residents or migrants that remain for short periods of time. Unvegetated sites are usually considered to have low wildlife habitat value because they lack cover or forage items; however, some wildlife species, such as ground squirrels and burrowing owls, make use of these open habitats.

The habitat conditions of the study area reaches are described below. Table F-1, Appendix F provides acreages by reach. Additional discussion is provided in the SCVWD EIR/S (Parsons Engineering Science 1997).

REACH 7. Reach 7 has a narrow (30–175 feet wide) but fairly continuous and dense riparian corridor that is dominated by native tree species. Within the riparian habitat, there are 74 trees >20 inches dbh (Parsons Engineering Science 1997) and the habitat supports good understory cover. The corridor is interrupted in places by three road crossings, several areas of ruderal habitat, and bank stabilization revetments. Two areas of upland landscaping habitat along the west bank somewhat extend the corridor of trees. About 60 urban forest trees are scattered on the east side of the river. There is no freshwater marsh in the aquatic habitat of the reach. Past land uses have degraded much of the habitat on the east bank in this reach. The west side is residential development.

REACH 8. As with Reach 7, the riparian forest of Reach 8 is fairly continuous but is interrupted in several places by bank stabilization revetments, and one small area of ruderal herbaceous habitat. There are 85 trees >20 inches dbh in the narrow riparian corridor (50–100 feet wide). Urban forest habitat occurs outside of the riparian zone in the residential development on the east side of the river. Residential development lines the west side of the river. There is no freshwater marsh in the aquatic habitat of the reach.

REACH 9. Reach 9 generally has the highest value for riparian wildlife of any portion of the project study area. The riparian corridor supports a dense canopy, multi-layered canopy that is up to 200 feet wide in some places. The understory is particularly dense in those areas near the river's edge that have not been disturbed. The riparian habitat is dominated by mature, native trees with 190 trees >20 inches dbh, including 18 cottonwoods >40 inches dbh. The tree canopy overhangs and shades a significant portion (48 percent) of the aquatic habitat in the river, the most of all the reaches. The riparian forest is interrupted by the Malone Street crossing, several relatively large sections of bank revetment, and two areas of ruderal habitat. Areas of urban forest occur outside of the riparian corridor, in the residential development on the east side of the river. Residential development also lines the west side of the river. There is no freshwater marsh in this reach but it does contain one of the few large gravel bars.

REACH 10. Overall, the wildlife habitat value of Reach 10 is moderate to low because of significant interruptions in the riparian corridor and the value of the riparian habitat is reduced in some areas where forest is sparse and narrow. Reach 10 is divided into three subreaches (10A, 10B, and 10C) with distinct habitat conditions. Subreach 10A (Curtner Avenue to Canoas Creek) supports a 40- to 200-foot wide riparian corridor of mostly native trees that is interrupted by the Almaden Expressway (southbound) crossing and some areas of ruderal habitat. The subreach is bordered by commercial development on the east side and residential development along the west side of the river.

Subreach 10B (Canoas Creek to Stream Gauge Station No. 23B) has been extensively modified by a continuous stretch of rock-filled gabions on the west bank and a low bench cut into the east bank. This subreach now supports large areas of ruderal herbaceous, ruderal scrub, and upland landscaping habitat with one area of freshwater marsh and only a few patches of riparian forest. During the channel modifications, the bank soils were highly compacted, making seedling establishment and wildlife burrowing activity difficult. The east bank bench has been planted with native trees and should support higher wildlife habitat values in the future. The subreach is bordered by a mix of residential and commercial development and the Almaden Expressway.

The riparian corridor along subreach 10C (Stream Gauge Station No. 23B to Capitol Expressway) is largely intact and relatively wide, thus maintaining relatively high wildlife habitat values. The riparian habitat includes groves of large, old sycamore trees along high up the banks on both sides. The corridor is interrupted by ruderal and landscaping habitats, particularly in the upstream portion. An orchard along the lower east side of the river enhances the wildlife habitat value. Old Almaden Road and commercial developments line the west side of the river. There are 83 trees >20 inches dbh throughout Reach 10, 35 of which are in 10A and 35 in 10C.

REACH 11. Reach 11 supports riparian forest that has generally high wildlife values, due in part to the presence of native coast live oaks and valley oaks, both of which are more common in Reach 11 than in any other reach. This reach also contains substantial amounts of non-native black locust, however, that may be gradually displacing the oaks and other native trees. A relatively dense understory also contributes to the high wildlife values of this reach, which has good habitat conditions for oak woodland wildlife species. The riparian forest is more extensive on the east bank and is interrupted by patches of ruderal scrub, ruderal herbaceous, and upland landscaping habitats. There is a also very small area of freshwater marsh at the upstream end of the reach.

Like Reach 10, Reach 11 has been divided into three subreaches (11A, 11B, and 11C) but the habitat conditions are not as distinct between the three subreaches of Reach 11 as they are in Reach 10. There are 130 trees >20 inches dbh throughout Reach 11, with 61, 47, and 22 in subreaches 11A, 11B, and 11C, respectively. A mix of residential and commercial developments and roadways line the river along both banks. Almaden Expressway runs along the top of bank on west side of the river through most of this reach, limiting wildlife use along that side of the river. During 1996, an active red-tailed hawk nest was sighted in a tall eucalyptus tree just east of the riparian corridor in subreach 11B.

REACH 12. Reach 12 has the most distinctive habitat of all the river reaches because of channel modifications that have resulted from past gravel mining and the development of percolation ponds. Ruderal scrub, ruderal herbaceous, open water, and freshwater marsh habitats are the dominant wildlife features of this reach. It has low riparian habitat value, with the lowest percentage of riparian forest, but it offers the most freshwater marsh habitat. It is the most open habitat with very few trees and no areas of continuous canopy cover. A large agricultural field, mapped as ruderal herbaceous habitat, is located on the west side of the river in the downstream portion of this reach. Residential development is situated across from the agricultural field with commercial development and the percolation ponds located in the upstream portion of the reach. State Route 85 has recently been constructed across the river, clearing all of the vegetation in the construction area. A future road crossing (Chynoweth Avenue) is also planned.

ROSS AND CANOAS CREEKS. Both creeks are narrow, channelized streams bordered by dense residential development. Their wildlife habitat values are very low and the most significant feature is the aquatic habitat. The creek banks support ruderal herbaceous habitats that are nearly continuous, except for some areas of bank revetment. Trees in the back yards of the adjacent residential developments form strips of urban forest habitat that run along the tops of the banks. There is no riparian forest or freshwater marsh habitat along the creeks.

Wildlife Species

Wildlife species data that were collected during the 1986–1987 wildlife monitoring study and the 1989–1992 reconnaissance surveys are presented in the SCVWD EIR/S (Parsons Engineering Science 1997). Information on special-status wildlife species is presented below.

The CDFG's WHR database predicts that 314 wildlife species (211 species of birds, 60 species of mammals, and 43 species of reptiles and amphibians) regularly occur within Santa Clara County and many more bird species are found on an occasional basis. Most of these species use the riparian habitats in Santa Clara County.

The number of bird species observed within each of the study area reaches (between 49 and 75 different species observed in the reaches) far exceeds the number of species of mammals (4–9), reptiles (1–2), and amphibians (1–3) combined. While the numbers of species within each reach varies, this variation is not that great and there appears to be an overall consistency in the diversity of species occurring within the different river reaches. However, this does not mean that the diversity represents the same species in all reaches. Species diversity along Ross and Canoas creeks is less than the diversity along the river itself (Parsons Engineering Science 1997).

BIRDS. A total of 121 bird species and 17,979 individual birds were recorded during the 1986–1987 wildlife monitoring study (Parsons Engineering Science 1997). Of these 121 species, 11 were observed only once and 16 species of waterfowl were observed only at the percolation ponds in Reach 12. At least 90 percent of the species observed were seen in riparian forest. The ten species observed in the greatest numbers were: house finch, bushtit, mallard, white-crowned sparrow, Anna's hummingbird, California towhee, yellow-rumped warbler, song sparrow, black phoebe, and cedar waxwing. Reach 9 probably supports the greatest diversity of breeding birds but overall, the Guadalupe River has a lower number of breeding bird species than similar, less urbanized streams in the region. This may be in part due to the relatively narrow width of the riparian corridor, competition for nest sites, or nest parasitism. Nonetheless, the avifauna of the Guadalupe River is undoubtedly much more abundant and diverse than similar-sized rivers that have been more fully channelized and cleared. In the context of a heavily urbanized area such as San Jose, the USFWS considers the existing wildlife corridor of the Guadalupe River to be a relatively scarce and valuable resource.

MAMMALS. A total of 16 mammal species were observed within the project study area, including opossum, mole, rabbit, hare, squirrel (3 species), gopher, mice (3 species), muskrat, rat, raccoon, cat (both feral and domestic), and domestic dog (Parsons Engineering Science 1997). This array of small mammals persist within the river and its riparian areas. Mammal use of the other habitat types is less and limited to fewer species, primarily rodents. Several species of bats potentially occur in the project study area but were not observed. Habitat for small mammals is of poor quality due to little undergrowth, compacted soils, limited areas of adjacent undeveloped land, vector control operations, and predation by dogs and cats.

REPTILES AND AMPHIBIANS. There were only 3 species of reptiles and 3 species of amphibians observed within the project study area: western fence lizard, ringneck snake, gopher snake, western toad, Pacific treefrog, and bullfrog (Parsons Engineering Science 1997). All of these are common species. The reptiles generally use the riparian forest and other terrestrial habitats while the amphibians are restricted to aquatic habitats of the river and freshwater marsh for at least part of their lifecycle. Other species may occur within the project study area but none were recorded during the wildlife surveys. The only species commonly observed was the western toad which was seen in large numbers during the summer. A large number of unidentified tadpoles were also observed. The same factors limiting mammal abundance, along with the presence of pollutants, are probably also limiting herptile abundance. In addition, portions of the river can frequently dry out prior to the breeding season, limiting suitable breeding sites, and there is little litter or ground cover along many sections of the river.

Rare, Threatened, and Endangered Species

Methods

Information on the occurrence of special-status plant and animal species is compiled from the documents described in the Vegetation section, and from communication with SCVWD Biologist Doug Padley (1996). In fulfillment of Section 7 of the Endangered Species Act, the Corps is preparing a Biological Assessment describing the occurrence of, and project effects on, federally listed, proposed, and candidate species, as well as state-listed species and federal and state species of concern. Appendix K contains the draft Biological Assessment.

Surveys that were conducted to investigate occurrences of plant and animal species in the project study area are described in these two documents and are summarized in the vegetation, fisheries, and wildlife sections of this report.

The term "special-status" refers to following categories of species:

- species *listed* as threatened or endangered under either the federal Endangered Species Act or the California Endangered Species Act;
- species *proposed* for federal or state listing as threatened or endangered;
- species that are *candidates* for federal listing;
- species that are former candidates for federal listing that continue to be federally recognized "species of concern;" and
- species that may meet the definition of rare or endangered under the California Environmental Quality Act (CEQA), including animals listed as *species of special concern* or as *fully protected* by the CDFG, and plants listed by the California Native Plant Society.

Special-Status Plants

Of the plant species observed within the project study area (see Appendix E), none are federal or state listed threatened or endangered species or federal species of concern and none are proposed for listing or candidate species. None of the special-status species known from the region are likely to occur owing to the absence of suitable habitat (Appendix K, draft Biological Assessment).

Special-Status Animals

The Central California Coast Evolutionarily Significant Unit (ESU) of the steelhead trout, which includes the fish that occur in the upper Guadalupe River, has been listed as threatened by the National Marine Fisheries Service (NMFS). This species was discussed previously under "Fisheries."

The Sacramento River winter-run chinook salmon is a federally listed endangered population but this does not include chinook salmon in the Guadalupe River. In February 1995, a petition was made for a coast-wide status review of all chinook populations. That status review is currently being conducted by NMFS.

Although not presently known to occur on the Guadalupe River, the California red-legged frog (*Rana aurora draytoni*), a federally listed threatened species, is known from two locations in the Guadalupe River watershed: 1) at the head of Lexington Reservoir on Los Gatos Creek, about 11 miles upstream of the confluence of Los Gatos Creek with the Guadalupe River, which is about 2 miles downstream of the study area; and 2) 1.5 miles downstream of Guadalupe Reservoir on Guadalupe Creek, about 5 miles upstream of the study area (USFWS 1997). In June 1996, habitats within the upper Guadalupe River were assessed by SCVWD biologists and SAIC biologists as to their suitability to support California red-legged frogs. A one-night spotlighting survey was conducted in the river by the SCVWD biologists on June 27, 1996. The upper Guadalupe River does provide potentially suitable habitat for California red-legged frogs with deep pools, vegetated slopes, and undercut banks in some sections. However, numerous predatory fishes such as bluegill and bass occur in the river, and the one-night survey revealed a dense population of bullfrogs. Bullfrogs and predatory fishes are known to eat tadpoles and young California red-legged frogs, and the abundance of these exotic predators greatly reduces the potential for red-legged frogs to occur here. No red-legged frogs were observed during the reconnaissance survey (not intended as USFWS protocol surveys). Five nights of surveys following the USFWS draft recommended protocol dated January 13, 1995 were conducted by SCVWD biologists in the lower Guadalupe River during the spring and summer of 1996 and no California red-legged frogs were found. Bullfrogs were observed but were not as numerous as was found in the upper Guadalupe River (Doug Padley 1996, personal communication). Surveys were done in the affected reaches of the study area by SCVWD biologists in 1997 according to USFWS protocol, resulting in no sightings of red-legged frogs.

Areas far upstream reportedly support California red-legged frogs and could serve as a source of future immigration into the project area if conditions are improved. Based on the abundance of bullfrogs in the study area and the strong tendency for bullfrogs to displace and eliminate red-legged frogs from otherwise suitable habitat, as well as the deleterious impact of exotic predatory fish (USFWS 1996), it is very unlikely that this species occurs in the study area.

Special-status wildlife species known to or likely to occur within the vicinity of project study area are listed in Table F-8, Appendix F.[1] No federal-listed, threatened, or endangered wildlife species, or proposed species, are known to inhabit the project study area. The federal-listed endangered peregrine falcon (*Falco peregrinus*) and several wildlife species that are federal species of concern have potential to occur within the study area. These are discussed in more detail in the impacts section below and in the draft Biological Assessment (Appendix K).

Six state-identified "species of special concern" have been observed within the project study area: burrowing owl (*Speotyto canicularia;* also identified as a non-game bird of management concern by USFWS [Parsons Engineering Science 1997]); yellow warbler (*Dendroica petechia*); merlin (*Falco columbarius*); sharp-shinned hawk (*Accipiter striatus*); and Cooper's hawk (*Accipiter cooperii*). The white-tailed kite (*Elanus caeruleus*), a state fully protected species, was also observed. A number of other state special-status wildlife species have potential to occur in the study area.

Burrowing owls have been observed in Reach 12. Between 1988 and 1991, at least one pair was a resident on the banks of the Guadalupe River and percolation ponds of Reach 12. Nesting was not confirmed, but was suspected due to the continued presence of the burrowing owls. In the early summer of 1995, burrowing owl surveys (four) in Reaches A and 12 were conducted by biologists from Jones & Stokes, with no owls sighted.

Yellow warblers were found nesting in the riparian forest habitat of Reach 6 through 11, placing their nests in shrubs and low trees. The nesting yellow warblers consisted of a small population of approximately 10 to 20 pairs. Reaches 10B, 12, Ross Creek, and Canoas Creek are not suitable habitat for nesting yellow warblers. The remaining five state species of special concern and the white-tailed kite are uncommon migrants and transient visitors to the project study area. These birds use a variety of the habitats and some forage in the percolation ponds of Reach 12. None are known to use the project study area habitats for

1 Note that it is the determination of the USFWS that these species may occur in the vicinity of the study area; this determination is an indication of which special status species may occur in the county (or a portion of the county) in which the project is located; therefore, this list may include some taxa that may not reasonably be expected to occur within the specific project area.

nesting. Most, but not all, of the federal and state special-status species that could occur would be associated with the aquatic habitat of the Guadalupe River and/or the corridor of riparian forest habitat.

Another state and federal species of concern that is also of local interest is the southwestern pond turtle (*Clemmys marmorata pallida*). This species is known from south of the study area (Appendix K), and its occurrence has been reported in a comment letter from the Western Waters Canoe Club (Appendix M). It is unlikely that suitable breeding habitat exists or that the project area supports a large number of individuals, given the fact that the species has not otherwise been reported.

4.4.3 Environmental Effects

Impact Significance Criteria

Impact significance criteria used in this analysis are consistent with those used by the SCVWD (1996). Generally, long-term net losses of populations, habitat areas, or ecological functions that are of recognized significance by local, state, or federal agencies are considered significant. In the present case, examples include the removal of riparian forest, urban forest, or freshwater marsh habitat, the loss of SRA cover, the loss of locally recognized heritage trees, barriers to fish and wildlife migration, and the loss of local populations of sensitive species.

Channel Widening Plan

Vegetation Impacts

CONSTRUCTION IMPACTS. Construction impacts would result from removal of riparian and upland vegetation, stress or injury to vegetation adjacent to construction areas, and filling or removal of jurisdictional wetlands and other waters of the United States. These would be significant in the short-to-medium term, but could be mitigated to insignificance in the long term. Feasible mitigation for these impacts by restoring disturbed vegetation areas is briefly described below and discussed in more detail in section 4.4.4. Plates in Appendix E show impact areas overlying existing habitats.

The following assumptions were made regarding construction-related impacts on vegetation.

- All existing vegetation would be eliminated along the banks of the river in areas that are graded to provide a wider channel. Restoration and natural recovery of freshwater wetland and riparian forest would occur along the floodway bench outside of the maintenance road corridor. Since the bench height is only 3 feet above the channel invert, it is reasonable to expect the successful reestablishment of riparian forest. Bank slopes above the maintenance road would be fairly steep (1.5H:1V) and not assumed to be restorable to riparian forest. They would be seeded for stabilization and would likely support ruderal-riparian scrub vegetation in the long term. Floodwalls are assumed to require a 10-foot wide clearing. Although low-bank vegetation would be reestablished on the benches, mitigation for middle and upper bank forest losses would occur, along with additional low-bank plantings at mitigation/compensation sites in non-impacted areas along the river (see maps in Appendix E).

- Some of the vegetation outside but adjacent to grading and construction areas may be injured or stressed by collisions with heavy equipment, sidecasting of graded material, or compaction of soil if no specific measures are taken to avoid such impacts. These impacts would be mitigated by avoidance or, if not avoided, be mitigated in the long term by restoration.

- Some existing wetlands and other waters of the United States would be filled, and additional areas would be cleared or excavated by grading. On-site mitigation vegetation replacement would occur along the outer part of the newly constructed benches.

- Cofferdams would likely be needed for most construction activities. Coffer dams are temporary structures necessary to dewater the creek and allow access across the creek during construction. The total volume of earthen fill for the coffer dams that would be placed in Section 404 jurisdictional waters as part of the Channel Widening plan is 3,700 cubic yards. Typically, a driving hammer and crane would be operated from the banks of the creek to place the fill. A bypass pipe would be used to maintain downstream flows. Materials and the method of placement would be selected to prevent erosion or an increase in creek water turbidity. Upon completion of construction, all material used for the cofferdams would be removed and the bed and banks would be returned to preconstruction contours. Delineated wetlands would be avoided as coffer dam sites. The California Construction Best Management Practice (BMP) would be implemented.

  Relatively open locations would be selected for placement of the cofferdams. As a result, overall impact should be minor. The other waters of the United States in the project area would be significantly impacted during short-term construction of the cofferdams. Since the cofferdams would be removed after construction, no long-term effects on biological resources would occur. The locations of cofferdams for the Channel Widening Plan would be determined during final design.

- No impacts on listed or proposed threatened or endangered plants would occur because no such plants occur in the project area.

- Erosion control and maintenance activities would be done by the SCVWD (see below).

OPERATIONAL IMPACTS. Operational impacts could result from changes in maintenance activities, such as periodic vegetation removal, trimming, or herbicide use that is more extensive or frequent than present practices. For both project alternatives, it is expected that in-channel maintenance would be reduced, although a wider area adjacent to the existing channel would be subject to maintenance, e.g., as required alongside maintenance roads.

The following assumptions were made regarding operational impacts on vegetation:

- Existing channel maintenance tasks include: removing accumulated sediment; cleaning debris from in-channel structures; controlling erosion by placing riprap, sacked concrete, or other materials where needed; using pre-emergent and postemergent herbicides on maintenance roads and floodways and selectively in revegetation areas; removing trash and debris; inspecting and monitoring conditions; removing dead trees and pruning live trees that could be hazardous in floods; trimming brush that could impede flood flows and maintenance access points; mowing or discing weeds; using herbicides on invasive weeds, noxious plants, and woody plants that could obstruct flood flows or cause structural damage; manual trimming of branches overhanging roadways; manual trimming or herbicide application in areas inaccessible to mechanical equipment; maintaining access roads; and repairing fences.

- Existing channel maintenance activities that affect native vegetation have been approved and monitored through Memoranda of Understanding (MOU) between the SCVWD and CDFG. Under the Channel Widening plan, a new maintenance program, modelled after the one proposed by the SCVWD for the Bypass Channel plan (Parsons Engineering Science 1997), would be developed to supersede the existing MOU. Differences between existing and proposed channel maintenance procedures are expected to be minor, including newly constructed roads and ramps that would be treated with pre-emergent and postemergent herbicides in accordance with applicable regulations; maintenance for new irrigation systems and mitigation plantings; and less mechanical and chemical vegetation control.

Acreage of impacts on vegetation are summarized for each habitat by reach in Table F-9, Appendix F.

Less-than-Significant Impacts

Less than significant impacts include the following:

PERIODIC REMOVAL OF VEGETATION FOR MAINTENANCE PURPOSES. The Channel Widening Plan would result in maintaining a larger area (including bypass channels and floodway benches) than is currently subject to maintenance but much of the additional area would have little or no vegetation. The maintenance program would incorporate several measures that would protect and enhance the riparian system, removing non-native trees and shrubs completely to increase the ratio of native to non-native vegetation. In addition, native vegetation would no longer be cleared from river channel banks unless absolutely necessary for bank erosion maintenance.

This impact is considered less than significant because the project would reduce the removal of native vegetation over preproject practices. No mitigation is required.

REMOVAL OF NONFOREST UPLAND VEGETATION. The Channel Widening Plan, including mitigation areas that would be converted to riparian forest, would eliminate up to approximately 4.80 acres of ruderal herbaceous vegetation, 2.60 acres of ruderal scrub, and 2.10 acres of upland landscaping (Appendix F, Table F-9). This impact is considered less than significant because: (1) most of the vegetation affected is not native, (2) all three habitats are locally and regionally common, (3) most areas of temporary disturbance (approximately half of the total impact) would recover naturally within a few years; and (4) to a limited extent, scrub vegetation would be allowed to grow naturally along the cut slopes of the widened channel. No mitigation is required.

As discussed by USFWS (1997) in Appendix D of this document, the ruderal scrub vegetation contributes to overall riparian habitat values, and is included by USFWS in the calculation of riparian habitat impacts and mitigation needs. The Corps accepts the inclusion of this vegetation type in the USFWS HEP analysis (Appendix D) for the purpose of defining a level of mitigation that avoids net losses of riparian values.

REMOVAL OF SMALL PATCHES OF URBAN FOREST. Small areas of urban forest may be impacted where it is necessary to trim or remove individual trees to install floodwalls or modify levees along the tops of banks. Tree losses have not been quantified but are expected to be less than significant as canopy growth by adjacent unaffected trees should rapidly fill in isolated gaps.

Significant Impacts

POTENTIAL LONG-TERM EFFECTS ON RIPARIAN FOREST FROM REMOVAL OF ADJACENT FOREST. With mitigation plantings as proposed (section 4.4.4), this impact would be rapidly diminished, with no long-term loss of riparian forest habitat or associated functions and values. However, in the short term, the removal of substantial amounts of adjacent riparian forest could lead to decreased shading, changes in soil moisture, changes in air temperature and wind exposure, and changes in the velocity and depth of flooding along adjacent or opposite banks. These significant effects could influence the growth and recruitment of constituent species, some positively, others negatively, with possible long-term effects on forest composition and structure. Removal of riparian forest habitat would in many cases narrow the existing forest and remove screening vegetation along the edge of the forest. Increased fragmentation of the riparian forest and the loss of interior forest habitat would be significant impacts that would be mitigated to insignificance in the long term with revegetation.

REMOVAL OF 6.5 ACRES OF RIPARIAN FOREST. The Channel Widening plan would result in the direct removal of approximately 6.5 acres of existing riparian forest by construction activities, such as grading and excavation. Impacts would occur along one bank, leaving the opposite bank intact, and would impact most or all of reaches 7, 10a, 10c, 11b and 11c. The structure and composition of riparian forest vegetation would be altered along the impacted banks. Over time, a band of low-bank vegetation would be reestablished on the toe of the floodway bench, but the mid- and upper-bank forest along these segments would be eliminated.

This impact is considered significant because: (1) riparian corridors support high levels of plant and wildlife diversity, (2) the ecological functions of riparian corridors are degraded by vegetation removal, and (3) much riparian vegetation has already been lost in Santa Clara Valley and throughout the San Francisco Bay region in recent decades. Impacts would be mitigated to insignificance in the long term by on- and off-site replacement plantings (section 4.4.4).

The acreage initially removed represents approximately 20 percent of the 34 acres of existing riparian forest mapped in the study area. Although revegetation is proposed along the outer edges of the benches, additional areas of riparian forest restoration are needed to avoid a net loss of this habitat. Included in this impact would be the loss of approximately 1,700 trees greater than 2 inches DBH (roughly 22 percent of existing trees). Roughly half of the trees to be removed are of species that are not native to the Guadalupe River. A rough estimate is that 10-12 valley oaks would be removed. The impact would be mitigated to insignificance by implementing a revegetation plan that assures no net loss of habitat.

REMOVAL OF 100-150 TREES PROTECTED BY CITY TREE ORDINANCE. Project construction would result in the removal of an estimated 100-150 trees that are large enough (over 18 inches DBH) to qualify for protection under the City's tree ordinance. Trees that are not on SCVWD property would require a tree removal permit and compensation.

This impact is considered significant because the impact represents about 12 percent of existing trees in this size class and because the SCVWD must comply with the City's tree ordinance. Impacts would be mitigated to insignificance in the long term by off-site replacement plantings (section 4.4.4).

DISTURBANCE OF RIPARIAN FOREST ADJACENT TO CONSTRUCTION AREAS. In the absence of preventive measures (which would be part of the BMPs implemented during construction), constructing the Channel Widening plan could result in substantial inadvertent injury to or mortality of riparian forest plants outside but adjacent to grading and construction areas (e.g., in lower bank sites between the channel bottom and excavated floodway benches). Without physical barriers between construction areas and protected vegetation, impacts resulting from collisions with heavy equipment, sidecasting of graded material, soil compaction, materials storage, and other factors can be expected. This impact is considered significant because, although the number and severity of inadvertent injuries cannot be predicted, they could conceivably affect a substantial number of trees and shrubs that would otherwise remain healthy. This impact is mitigable by avoidance and, if not avoided, would be mitigated to insignificance in the long term by on-site restoration.

EXCAVATION OR FILLING OF 0.28 ACRE OF JURISDICTIONAL WETLANDS AND 2.64 ACRES OF OTHER WATERS OF THE UNITED STATES. The Channel Widening Plan would result in the excavation or filling of approximately 0.28 acre of jurisdictional wetlands and temporary disturbance of 2.64 acres of Other Waters of the United States (Table F-9, Appendix F). This significant impact would be completely mitigated in the long term. Affected habitats would include areas of riparian forest, scrub, and ruderal vegetation along river banks at those locations where bank excavation would reach below the ordinary high water mark. The deposition of fill may occur incidental to excavation, but no direct filling is proposed in connection with bank widening. In any case, where jurisdictional wetlands along the river banks would be removed for construction of a bench, the bench itself would become a jurisdictional wetland, especially in cases where riparian forest mitigation plantings would be placed on the bench (which would be along the vast majority of the total length of the benches). The disruption of these habitats in the short term is considered significant because wetlands and other waters of the United States support high levels of plant and wildlife diversity and many such areas have been lost in Santa Clara Valley and throughout the San Francisco Bay region in recent decades. Wetland replantings would mitigate this impact to insignificance.

Fisheries Impacts

CONSTRUCTION IMPACTS. Construction activities associated with the Channel Widening plan that would result in adverse and beneficial impacts on fisheries include floodway improvements, bank stabilization measures, and removal of existing barriers to fish passage.

The following assumptions were made regarding construction-related impacts on fishery resources:

- Proposed channel modifications, including the removal or modification of partial and complete fish barriers, would result in a long-term benefit to fisheries resources, particularly steelhead trout, which would benefit from improved access to upstream spawning and rearing habitat. Presently, the tributary streams (i.e., Alamitos, Calero, and Guadalupe Creeks), at least along some stretches, contain better conditions for steelhead spawning and rearing than does the Guadalupe River. A beneficial impact for chinook salmon is less likely, but possible to the extent that individuals dispersing from downstream spawning and rearing areas may find additional suitable habitat upstream.

- Permanent loss of riparian vegetation from channel widening and bank stabilization activities would result in significant short- and long-term loss of physical habitat features (e.g., loss of vegetative cover and undercut banks), possibly increasing mean water temperature from loss of shade and reducing habitat complexity. Mitigation plantings on benches and in currently barren areas (section 4.4.4) would offset this impact in the long term.

- In-channel construction activities would be limited to the summer low precipitation period (April 15-October 15), with the condition that construction requiring stream dewatering or work in the channel invert not commence until May 1, provided that stream monitoring criteria are satisfied. Should stream monitoring criteria not be met, channel invert work and stream dewatering would not be allowed to commence until June 1. Additionally, the contractor would be required to implement an erosion control plan. These actions would minimize impacts of temporary increases in turbidity and suspended particles resulting from in-channel construction and nonpoint-source runoff to the river to less than significant. Limiting in-channel construction activities to the summer low-precipitation period would also minimize impacts on juvenile salmonids and adult fish migrating to upstream spawning areas, especially adult anadromous species such as chinook salmon and steelhead trout to less than significant.

- The construction contractor would be required to implement a hazardous materials control and response plan to minimize impacts from accidental spills of petroleum-based products associated with the operation of heavy machinery to less than significant.

OPERATIONAL IMPACTS. As is the case for the Bypass Channel plan, a new maintenance program would be written and implemented for the Channel Widening plan. The maintenance program would include site-specific actions, guidelines, and specifications and would be finalized through an MOU between the SCVWD and the CDFG. The Channel Widening plan's maintenance program would be based on the program that is currently proposed for the Bypass Channel plan (Parsons Engineering Science 1997, Appendix C), modified where required by differences between the two plans or the Corps' engineering requirements. Under either plan, maintenance would be done by the SCVWD, and the same erosion control methods and maintenance standards proposed for the Bypass Channel plan are likely to be applied for the Channel Widening plan as well.

As a result of increased channel capacity, maintenance requirements would be reduced. Operational impacts are considered less than significant.

Beneficial Impacts

INCREASE IN HABITAT AVAILABILITY FOR MIGRATING STEELHEAD TROUT AND CHINOOK SALMON RESULTING FROM REMOVING PARTIAL FISH BARRIERS. Proposed channel modifications include removing an abandoned stream gauge, consisting of a concrete apron and weir, at Hillsdale Avenue (Reach 10C) and a low-flow vehicle crossing (ford) downstream of Ross Creek (Reach 11B). Both structures are impediments to upstream migration by adult salmon and steelhead trout and require high flows (over 200 cfs at Hillsdale Avenue and 50-100 cfs at the ford) for successful fish passage. Only during peak urban storm runoff or prolonged watershed runoff do existing flows allow successful fish passage. Removing the barriers would enable access for migrating fish from the San Francisco Bay upstream to the drop structure above Blossom Hill Road at flows of approximately 10-15 cfs. These structures would be replaced with vortex rock weirs to maintain grade control while enabling fish passage.

The weir at stream gauge Station No. 23B partially inhibited fish migration because of the design of the structure. Water did not crest over the weir directly into the plunge pool, reducing the effectiveness of the plunge pool. Boulders below the water surface near the weir further reduced passage capabilities by reducing pool depth and passage corridors. The SCVWD has modified the weir and deepened the pool downstream of the weir thereby creating favorable hydraulic conditions for successful fish passage.

Less-than-Significant Impacts

FISH PASSAGE IN LOWER ROSS CREEK. Under existing conditions, Guadalupe River flows of approximately 530 cfs (a 1.5-year event) at the confluence with Ross Creek are necessary to inundate the upstream end of the RCB culvert (under the Almaden Expressway) on Ross Creek to a depth of 0.6 feet. Proposed improvements in the Guadalupe River channel would reduce water surface elevations during flooding events (Parsons Engineering Science 1997). These reductions would reduce the incidence and duration of backwater events that inundate the reinforced concrete box (RCB) culvert in lower Ross Creek and could result in reduced fish passage opportunities. The Channel Widening Plan would construct a fish ladder at the mouth of the creek to eliminate any potential adverse effects on steelhead access to upstream areas. The fish ladder will be operated as prescribed by the NMFS and CDFG. The overall impact is considered less than significant.

FISH PASSAGE IN LOWER CANOAS CREEK. The Channel Widening plan would reduce the likelihood of anadromous fish migration to upstream areas in Canoas Creek. These impacts are considered less than significant because the DFG has determined that this creek does not provide suitable spawning habitat and that upstream migration should, therefore be discouraged (Parsons Engineering Science 1997). Fish passage into the creek from the Guadalupe River would be reduced as a result of lowered water surface elevations during flood episodes, reducing the frequency and duration with which the culvert at the mouth of the creek is inundated. Quantification of this effect for the Channel Widening plan is not available, but the reduction should be less than what would occur under the Bypass Channel plan (see Parsons Engineering Science for details). Fisheries habitat along the creek could be affected by channel modifications to improve flood conveyance, but these impacts are also less than significant because of the poor quality of the habitat.

ACUTE AND CHRONIC TOXICITY TO FISHERIES AND REDUCED FISH PRODUCTIVITY RESULTING FROM CONSTRUCTION-RELATED ACTIVITIES. In the absence of preventive measures, activities associated with excavation, channel widening, and bridge replacement, floodwalls, maintenance roads, and access ramps could increase erosion processes, thereby increasing sedimentation and turbidity in downstream waterways. Excessive sediment quantities deposited in or near stream channels can degrade aquatic habitats. Sediments can smother developing eggs, degrade spawning habitat, and decrease food production. Increased turbidity can increase fish mortality; reduce feeding opportunities for fish, including rearing steelhead trout and chinook salmon; and cause fish to avoid biologically important habitat. These significant impacts would be avoided through the implementation of a Stormwater Pollution Prevention Plan, as described below.

Construction materials, such as concrete, sealants, oil and paint, could adversely affect water quality if accidental spills occurred during project construction. Increased pollutant concentrations could limit fish production, abundance, and distribution by reducing fish egg survival and causing direct mortality of fish. Steelhead trout and chinook salmon inhabiting the Guadalupe River require relatively clean, cold, well-oxygenated water for successful growth, reproduction, and survival and are not well adapted to survive in degraded aquatic habitats. These significant impacts would also be avoided (see below).

The construction contractor would be required to implement a Stormwater Pollution Prevention Plan to minimize the potential for sedimentation of aquatic habitats, including potential steelhead trout and chinook salmon spawning and rearing habitats. Measures in the plan would include but would not be limited to:

- Conducting all construction work according to site-specific construction plans that minimize the potential for sedimentation of aquatic habitat;

- Identifying all areas requiring clearing, grading, revegetation, and recontouring and minimizing the areas to be cleared and graded;

- Grading spoil sites to minimize surface erosion;

- Avoiding riparian and wetland vegetation, whenever reasonably possible, and identifying and fencing specific trees for riparian habitat maintenance (see Mitigation Measure V-4 in the "Vegetation" section);

- Covering bare areas with mulches and revegetating all cleared areas with native species;

- Preventing equipment operation in flowing water when performing in-channel activities by constructing cofferdams and diverting all streamflows around construction sites; and

- Constructing sediment catch basins across the stream channel immediately below the project site when performing in-channel construction to prevent silt- and sediment-laden water from traveling downstream and periodically removing accumulated sediments from the catch basin.

The construction contractor would be required to implement a hazardous materials control and spill response plan to reduce impacts on the aquatic ecosystem in general, as well as on spawning, rearing, and egg incubation stages of anadromous salmonids. The plan would control the use of hazardous materials, such as petroleum-based products used in heavy equipment and other toxic materials used during construction, and would mitigate impacts to insignificance. Measures would include but would not be limited to:

- Preventing raw cement, concrete or concrete washings, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to aquatic life from contaminating the soil or entering watercourses;

- Establishing a spill prevention and countermeasure plan before project construction that includes strict on-site handling rules to keep construction and maintenance materials out of drainages and waterways;

- Cleaning up all spills immediately according to the spill prevention and countermeasure plan and notifying CDFG immediately of any spills and cleanup procedures;

- Providing staging and storage areas located outside the stream's normal high-water area for equipment, materials, fuels, lubricants, solvents, and other possible contaminants;

- Removing vehicles from the normal high-water area of the stream before refueling and lubricating; and

- Preventing operation of equipment in flowing water.

The contractor would submit this plan to CDFG with its application for a streambed alteration agreement pursuant to Section 1601-1607 of the California Fish and Game Code before construction begins.

POTENTIAL IMPACTS ON FISH MIGRATION AND SPAWNING DUE TO CHANNEL CONSTRUCTION. To further reduce the likelihood of construction impacts on fish, construction would be limited to the April 15 to October 15 period. Construction in the channel invert or other construction activities requiring stream dewatering, heavy equipment operation in the channel, or stream crossings would be limited to the May 1 to October 15 period with the stipulation that such activities can commence before June 1 only if field surveys (consisting of a minimum of 3 days of sampling) indicate that no juvenile salmonids are present in the project vicinity and that average daily water temperatures have exceeded 64°F for a minimum of 3 days in a row (generally, conditions for steelhead trout and chinook salmon decline when water temperatures exceed 64°F in spring).

By limiting construction to the April 15 to October 15 period, two goals would be achieved: limiting construction to periods when migrating and spawning chinook salmon and steelhead trout are less likely to be affected; and maximizing the construction period, thereby reducing the number of years required to construct the project (and, specifically, the number of years that potential impacts on all fishery resources would occur).

The proposed construction period, which focuses on protecting migrating and spawning adult chinook salmon in fall and rearing steelhead trout and chinook salmon juveniles in spring, was developed by comparing the known life history and habitat requirements for these species with available streamflow and water temperature data for the Guadalupe River. As stated earlier under "Existing Fisheries Resources," adult chinook salmon enter the lower Guadalupe River as early as August and have been observed in the upper reaches of the river (i.e., the project area) as early as November, when seasonal rains and cooler weather result in improved stream conditions. Measured streamflows and water temperature data further substantiate that optimal conditions for chinook salmon migration and spawning typically do not occur in the project area until November (Parsons Engineering Science 1997). Consequently, proposed in-channel construction activities occurring up through October 15 would not affect adult chinook salmon migration and spawning.

Although construction activities in October would not affect adult steelhead trout migration (adults would not enter the river until December, at the earliest), construction activities occurring in spring could adversely affect steelhead trout migration and spawning, as well as juvenile steelhead trout and chinook salmon rearing and outmigration. Adult steelhead trout begin migrating up coastal streams in December and continue into May, although the majority of adults typically migrate prior to mid-April (Shapovalov and Taft 1954). Raleigh et al. (1984) report that optimal conditions for adult migration occur when average maximum water temperatures are between 37.5°F and 64.5°F. Optimal conditions for steelhead trout embryos and smolts occur at water temperatures below 55°F (Raleigh et al. 1984). For chinook salmon juveniles, optimal conditions for smoltification occur when average maximum water temperatures are between 53.6°F and 64.5°F (Raleigh et al. 1986). In general, conditions for steelhead trout and chinook salmon decline when water temperatures exceed 64°F in spring.

A review of available water temperature data for the Guadalupe River indicates that mean monthly water temperatures for April 1994 and 1995 averaged 61.5°F (H.T. Harvey & Associates temperature data [personal communication, T. Neudorf]). Based on these data, the optimal water temperatures for juveniles were exceeded in 1994 and 1995 by late-April to early-May. Mean water temperatures warmed to 66°F (73°F was the maximum water temperature recorded for the month) in May, despite the higher streamflow conditions and cooler weather that prevailed in spring 1995. These limited data suggest that water temperatures can exceed the acceptable range for salmonid eggs and embryos in March and April, and may create suboptimal conditions for smolts by late-April and early May.

Because of the variability in environmental conditions from year to year and the lack of a long-term database on Guadalupe River fisheries and water temperature data, it is difficult to accurately predict when conditions in the Guadalupe River become less than favorable for salmonids for any given year. Consequently, the construction period of April 15 to October 15 includes the conditional statements discussed above for in-channel construction activities affecting the channel invert during the April 15 to May 31 period. Adherence to these measures would minimize to less than significant adverse impacts on steelhead trout and chinook salmon populations, while also reducing the number of years required to construct the project. This impact is therefore less than significant, and no mitigation is required.

Significant Impacts

REDUCED FISH MIGRATION AND SPAWNING SUCCESS IN THE GUADALUPE RIVER RESULTING FROM CHANGES IN HYDRAULIC CHARACTERISTICS. The Channel Widening Plan would reduce current velocities and water depths, in Reaches 7, 10, and 11 during flood events. The modification of channel geometry may also affect gravel quality because of the reduction in the incidence and magnitude of channel maintenance and gravel flushing and sediment transport flows. The net consequences of these changes are uncertain, but any negative impacts on gravel availability that may occur are expected to be offset by improved habitat access for anadromous fish due to removal of, and modification of, barriers to migration. If this alternative is selected, then additional sediment modeling would be appropriate to determine the likely impacts on gravel characteristics in the river. Additional discussion is provided below.

Channel maintenance flows and gravel flushing flows are necessary to maintain stream channel and gravel quality (Milhous and Bovee 1977, Rosgen et al. 1986). Changes in sediment load or discharge can result in changes in channel shape, loss of spawning habitat, and loss of cover (Milhous and Bovee 1977). Increases in the width-to-depth ratio of stream channels can degrade fish habitat, such as spawning habitat, and create fish passage problems for migrating species such as chinook salmon and steelhead trout.

Significant reductions of peak flows can also cause sedimentation problems because the size of the substrate material that can be transported through the system is reduced. As flows are reduced, the size of the substrate material that is deposited is also reduced. Fine sediments, such as sand-, silt-, and clay-sized particles, can adversely affect redd construction, egg survival, fry emergence, and food production by filling in the pore spaces in cobble and gravel beds.

Construction of the Channel Widening Plan would widen the existing channel, thereby reducing current velocities and water depths in all or portions of Reaches 7, 10, and 11 during most flood events. The modification of channel geometry may also affect the quality and quantity of spawning gravels because of the reduction in the incidence and magnitude of channel maintenance flows, gravel flushing flows, and sediment transport flows in general.

The Guadalupe River is generally deficient in sediment due to upstream dams that intercept sediment from the upper watershed. A sediment modeling study (Philip Williams and Associates 1996) has determined that neither the Channel Widening Plan nor the Bypass Channel Plan would result in appreciable sedimentation due to this sediment-starved condition. Therefore, neither of these plans is likely to significantly increase sedimentation in salmonid habitats, as reductions in water velocity would not be sufficient to cause sediment loads to exceed the sediment carrying capacity of the river.

Field surveys show that the river is deficient in gravel downstream from Canoas Creek (Reaches 7-10a). Gravel transport could be reduced in some areas by the Channel Widening Plan, as the low bench height would allow relatively low flows to overflow onto the bench, reducing the velocity and gravel carrying capacity of these flows. However, the capacity of much larger flows to move gravel would be unchanged. In any event, the remaining low flow channel in widened areas would tend to create an area of relatively fast flows (relative to the largely vegetated bench) that would encourage gravel transport in this part of the channel during highflow events.

Gravel transport would not be a problem in Reaches 7 through 10a. This portion of the river has almost no spawning habitat at present. The existing low flow channel would remain to provide fish passage. On the average, water in the low flow channel would reach a depth of 3 feet before spilling over onto the bench. Instream cover lost due to channel widening would be reestablished through mitigation plantings.

In Reach 10B, a new low flow channel would be created which would improve fish passage and spawning potential. Channel widening would initially have negative impacts on salmonid habitat in Reaches 10C and 11 as a result of the removal of streambank vegetation although, as with lower reaches, a low flow channel averaging 3 feet in depth would remain and would provide fish passage. It is not known if channel widening in portions of these reaches would affect gravel quantity and quality downstream in Reach 10B. Reach 12 would be unchanged from current conditions.

REDUCTION IN SHADED RIVERINE AQUATIC (SRA) COVER RESULTING FROM THE REMOVAL OF 4,034 LINEAR FEET OF OVERWATER VEGETATION AND 2,535 LINEAR FEET OF UNDERCUT BANK ALONG THE GUADALUPE RIVER. Based on the Revised Draft CAR (USFWS 1997), construction activities associated with grading and excavation of streambanks and bank protection activities would result in the direct removal of 4,034 linear feet of overhead cover in the form of overwater riparian vegetation and 2,535 linear feet of undercut banks. These features are expected to gradually reestablish over time along the modified channel, but the initial impact represents 26 percent of the total SRA cover and 29 percent of the total undercut bank habitat in Reaches 7-12 of the Guadalupe River. These losses could significantly affect salmonids in the Guadalupe River by reducing fish egg survival through increases in water temperature, increasing juvenile fish mortality through decreases in escape habitat, and reducing habitat complexity.

Canopy cover maintains shade for water temperature control. Approximately 50 percent to 75 percent midday shade provides optimal habitat in terms of productivity and thermal regulation for most trout streams (Raleigh et al. 1984). Limited shading can result in water temperatures exceeding the optimal range for salmonids (53°F to 66°F); too much shade can also limit primary productivity in streams. Chinook salmon and steelhead trout are coldwater species sensitive to temperature changes within and above optimal levels. Deleterious water temperatures during spawning, egg incubation, and early-rearing periods can reduce fish survival. Existing water temperatures often exceed optimal levels for chinook salmon and steelhead trout in the Guadalupe River as a result of limited canopy cover.

The loss of SRA cover is considered significant because the existing amount of stream shading is well below the range of 50 to 75 percent considered optimal for trout streams and existing water temperatures approach or exceed the upper limit of the optimal range for salmonid production. Additional decreases in stream shading would likely result in an increase in water temperatures and contribute to ongoing temperature-related impacts on fishery resources. The impact would be significant in the short and intermediate term until mitigation revegetation is established. Impacts would be gradually reduced and become less than significant in the long term. Based on the USFWS (1997) HEP, the mitigation plan for the Channel Widening alternative would create enough SRA cover to mitigate construction losses.

Wildlife Impacts

The same assumptions made regarding impacts on vegetation and fisheries are applicable to the wildlife impact analysis. Less than significant impacts include the removal of low-value wildlife habitat associated with ruderal scrub and herbaceous vegetation, and the impacts of floodwall installation on urban forest habitats in Reach 8 and along Ross and Canoas creeks. The urban forest impacts are considered less than significant because of the small areas that would be affected by installation of the low floodwalls, leaving these habitats essentially intact.

Construction of the recreation trail would not have any significant impacts on wildlife. The entire length of the trail would be located either on maintenance roads on project lands, or off-site on non-habitat lands. Wildlife may be temporarily disturbed by project construction; the minimal additional construction work associated with trail installation could cause minor and temporary additional impacts.

Operation of the trail (recreational use and maintenance) would not significantly affect wildlife. Riparian forest birds such as the yellow warbler are likely to experience some degree of disturbance from recreational use adjacent to portions of its habitat. Increasing human intrusion into forest habitat has been shown to have a negative impact on some breeding songbirds (Riffell et al. 1996), but it is unlikely that species breeding along the Guadalupe River would be similarly affected, given that local populations are probably acclimated to human disturbance under current conditions.

Significant impacts of the Channel Widening Plan on wildlife include the following:

REMOVAL AND FRAGMENTATION OF RIPARIAN WILDLIFE HABITAT. The Channel Widening Plan would result in the initial removal of about 6.5 acres of riparian forest that provides important wildlife habitat. Losses by reach were presented in Appendix F, Table F-9. Removal of long sections of forested habitat along the riverbanks increases habitat fragmentation and may reduce local species diversity (Terborgh and Winter 1980; Jensen et al. 1990). This impact would occur prior to riparian forest regrowth in mitigation areas, and is considered significant because of its magnitude, because of the importance of riparian forest as habitat for resident and migratory wildlife, including sensitive species (e.g., yellow warbler [state special concern species]), and because riparian forest has declined locally (Santa Clara Valley), regionally (Central Coast), and statewide.

DISTURBANCE OF RIPARIAN WILDLIFE HABITAT ADJACENT TO CONSTRUCTION AREAS. In the absence of preventive measures, constructing the Channel Widening plan could result in substantial loss of riparian wildlife habitat outside, but adjacent to, grading and construction areas. The loss of adjacent riparian wildlife habitat would be significant because of the local, regional, and statewide decline of riparian habitats. This impact would be mitigated to insignificance in the long term with revegetation.

REMOVAL OF WETLAND AND AQUATIC WILDLIFE HABITATS. Implementing the Channel Widening plan would result in the removal of approximately 0.28 acre of wetland. Approximately 2.64 acres of other waters of the United States (Table F-9, Appendix F) would be indirectly impacted by construction activities at the edge of the channel. The original vegetation, functions and values of these habitats are expected to reestablish naturally over time, but the short-term loss is still significant.

CONSTRUCTION DISTURBANCE TO WILDLIFE SPECIES ALONG THE GUADALUPE RIVER. Construction-related noise and activity could disturb foraging, breeding, and roosting wildlife along the Guadalupe River. This short-term impact is considered significant because of the high use of the Guadalupe River by water birds for foraging and roosting and because construction activity could disturb substantial numbers of breeding or roosting wildlife along the river.

Rare, Threatened and Endangered Species

FEDERALLY LISTED OR PROPOSED SPECIES. Pursuant to Section 7 of the Endangered Species Act, a Biological Assessment of the project's effects on endangered species has been prepared and is included as Appendix K. This document will be submitted to the USFWS and National Marine Fisheries Service (NMFS). Additional consultation between the Corps and these agencies will occur as required.

The Corps has reviewed the list provided by USFWS of federally listed, proposed and candidate species and species of concern that may occur in the project region. Based on review of species distributions and habitat requirements, the only federally listed species likely to occur in areas impacted by the project is the steelhead trout (recently listed as threatened). The California red-legged frog (also listed as threatened) has not been found in repeated surveys in the study area and, therefore, is considered unlikely to occur. Additional discussion is provided below and in the Biological Assessment (Appendix K). No other federally listed, proposed, or candidate species are known or expected to occur, except possibly as rare transients, or to otherwise be adversely affected by the project.

Steelhead Trout and Other Salmonids. Although the chinook salmon of the Guadalupe River are not currently listed as proposed for listing, they are of high concern to regulatory agencies and the public and so are included in this discussion. The Channel Widening plan would have short-term significant adverse impacts on salmonid habitat in the river due to the removal of streambank vegetation and loss of undercut banks. These habitat features would begin to reestablish along benches, and begin to be offset by mitigation plantings, during the first decade following construction. In the long term, SRA cover would exceed existing conditions as riparian vegetation reestablishes along benches and in mitigation areas.

Construction impacts would be mitigated to insignificance by limiting construction to the low-flow season (April 15-October 15), and by a variety of measures to avoid water quality impacts during construction (discussed in the previous section of this document). Impacts of vegetation removal would in addition be at least partially offset by the removal of barriers and incorporation of fish passage structures along the river.

As discussed previously, the Channel Widening plan would provide fish passage structures at the mouth of Ross Creek to avoid any reduction in access to upstream habitats that may be utilized by steelhead. Project impacts on salmonid access to poor-quality habitat in Canoas creeks are insignificant.

As discussed in the previous section of this document, hydrologic modifications of the channel, by reducing the depth and velocity of peak flows, may affect the distribution and quality of gravel along the river. The net effects are uncertain, but any negative effects should be offset by the enhancement of fish migration to more valuable habitats upstream. If this alternative is selected, additional sediment modeling would be appropriate to better determine its effects on gravel characteristics in the river.

California Red-Legged Frog (Rana aurora draytoni). The California red-legged frog is not known to occur along the affected reaches of the river, and is unlikely to occur, based on the completion of surveys consistent with USFWS protocols. The presence of bullfrogs and the sporadic occurrence of typical habitat for this species (freshwater marsh) along the river further diminish the suitability of habitat for red-legged frogs in the areas that would be affected by the project. At present, the project is considered unlikely to have adverse effects on this species. Survey results have been forwarded to the USFWS, and their response is pending.

FEDERAL SPECIES OF CONCERN. Federal species of concern include former candidates that could be reconsidered for listing in the future. The Corps' Biological Assessment evaluates potential project impacts on all federal species of concern. Species for which suitable habitat exists in project impact areas, and which have either been observed in field surveys or have a reasonable likelihood of occurrence other than as rare transients, are as follows.

Bat Species of Concern. Three bat species that are federal species of concern, including small footed myotis (*Myotis ciliolabrum*), long-eared myotis (*Myotis evotis*), and long-legged myotis (*Myotis volans*), could roost or forage along the Guadalupe River. Temporary disturbance and loss of riparian forest that provides some roosting and/or feeding habitat could result from project construction. Mitigation plantings, however, would eventually increase the total availability of habitat for these species.

San Francisco Dusky-Footed Woodrat (Neotoma fuscipes annectens). This large rodent inhabits forested and brushy habitats. Like other woodrats, it builds large nests of sticks and other debris. Woodrats have not been found during field surveys and trapping programs in the study area, nor have their nests been noted. However, they could exist in riparian forest or ruderal scrub habitats within the study area. Temporary disturbance, loss, and fragmentation of some habitat for this species could result from project construction, should it be present in the area. Mitigation plantings would eventually increase the total habitat available and reduce habitat fragmentation (Jones & Stokes 1997), if the area is utilized by this species.

Tricolored Blackbird (Agelaius tricolor). This bird inhabits freshwater marshes but also forages in fields. Field surveys did not note any individuals, but it could occur on an occasional basis in the study area, primarily in Reaches 10B and 12 during the spring months. Construction of planned mitigation areas in Reach 10B could have minor impacts on this species.

Burrowing Owl (Athene cunicularia hypugea). The Channel Widening alternative could result in the temporary disturbance of nesting burrowing owls, if they are present at the time of construction of mitigation areas in Reach 12. This impact would be considered significant because the CDFG includes the burrowing owl on its list of species of special concern and any disturbance of this species could contribute to its decline. This impact is mitigable to insignificance (see Mitigation Measures).

Contrary to its name, the burrowing owl does not actually dig its own burrows. Instead, it inhabits burrows abandoned by other animals such as ground squirrels. Unlike most owls, it is often active during the day. This species has been declining in the Pacific Coast region, possibly due to poisoning resulting from efforts to control rodents, as well as the expansion of agriculture.

Burrowing owls have been observed in Reach 12 in the past. Between 1988 and 1991, at least one pair was a resident on the banks of the Guadalupe River and percolation ponds of Reach 12. Nesting was not confirmed, but was suspected due to the continued presence of the burrowing owls. More recent surveys have failed to find any nesting in the area. However, this species could again utilize habitat this reach.

Little Willow Flycatcher (Empidonax traillii brewsteri). This bird favors riparian habitats, mainly in canyons. It is known to occur in the study area, and the channel widening plan would remove some habitat for this species. As this is one of the species used in the terrestrial HEP, project impacts would be fully mitigated by riparian forest plantings. Short-term habitat fragmentation would be mitigated by these plantings (Parsons Engineering Science 1997).

STATE-LISTED, PROPOSED, AND SPECIAL CONCERN SPECIES. Many of the species mentioned above are also listed by CDFG. The winter-run chinook salmon and willow flycatcher are state-listed endangered species. State special concern species include California red-legged frog, San Francisco dusky-footed woodrat, tricolored blackbird, and burrowing owl. Refer to the previous section for discussion of project effects on these species. In addition, the yellow warbler, a state special concern species, is present and would be affected as discussed below. Additional discussion of state species of special concern is provided in the draft Biological Assessment (Appendix K).

Yellow Warbler (Dendroica petechia). The yellow warbler utilizes riparian forest throughout California. Yellow warblers were found nesting in the riparian forest habitat of Reach 7 through 11, placing their nests in shrubs and low trees. The nesting population consists of approximately 10 to 20 pairs. This species would experience some habitat loss and fragmentation under the channel widening plan. However, as it is used in the terrestrial HEP as a basis for determining mitigation needs for riparian forest, impacts are expected to be fully mitigated. Temporary habitat fragmentation would be mitigated though riparian forest plantings (Parsons Engineering Science 1997).

Bypass Channel Plan

Vegetation Impacts

The same assumptions stated previously for the Channel Widening Plan apply to the Bypass Channel Plan. The following impacts are specific to the Bypass Channel Plan. Acreages of impacts on vegetation are summarized for each habitat by reach in Table F-10, Appendix F. Plates in Appendix E show impact areas overlying existing habitats.

Earthen fill for the cofferdams under Section 404 jurisdiction is 7,000 cubic yards based on the Ordinary High Water line. The area of other waters of the United States to be filled temporarily by these structures is 1.06 acres. The potential locations of 25 cofferdams are shown on the engineering drawings for the Bypass Channel Plan (Parsons Engineering Science 1997).

No impacts on listed or proposed threatened or endangered plants would occur because no such plants occur in the project area. Impacts on valley oaks are discussed with impacts on riparian forest.

Operational impacts would be similar to those associated with the Channel Widening Plan except with regard to the additional maintenance of the bypass channel.

Less-than-Significant Impacts

As discussed previously, less-than-significant impacts include the periodic removal of vegetation for maintenance purposes; potential long-term decline in riparian forest integrity from removal of adjacent forest; and removal of nonforest upland vegetation.

Significant Impacts

REMOVAL OF 9 ACRES OF RIPARIAN FOREST. Implementing the Bypass Channel plan would result in direct removal of approximately 9 acres of existing riparian forest by construction activities, such as grading and excavation. This impact would be more than offset over time as riparian forest would develop in mitigation plantings along new channel banks. The acreage initially impacted represents approximately 30 percent of the existing riparian forest mapped in Reaches 7-12. At least half of the loss would be in graded sites not available for on-site replacement; at least a third of the loss would be in sites that could be used for revegetation. Included in this impact would be the loss of up to 3,100 trees greater than 2 inches DBH (up to 40 percent of existing trees). These numbers are known to be overestimated because project revisions since tree surveys were conducted in 1991 have reduced the number of trees that would be removed by an estimated 5-15 percent. Approximately 53 percent of the trees to be removed are of species that are not native to the Guadalupe River. Approximately 33 valley oaks could be removed.

The structure and composition of riparian forest vegetation would be altered along one bank of the river through most of the study area, but the nature of changes varies in different reaches. In reaches 7 and 8, little forest would be removed initially, and subsequent reforestation would create a wider forested corridor. In reach 9 through 10a, mid- to upper bank forest would be removed to create a wider channel; with limited replacement on the toe of the bench, the riparian forest corridor would be narrowed. In reaches 10c through 11, a bench would be created 5 to 8 feet above the channel invert, leaving lower bank vegetation intact, but mid- and upper bank vegetation removed initially, but at least partially reestablished on-site through revegetation. Additional details are presented in Parsons Engineering Science (1997).

This impact is considered significant because: (1) riparian corridors support high levels of plant and wildlife diversity, (2) the ecological functions of riparian corridors are degraded by vegetation removal, and (3) much riparian vegetation has already been lost in Santa Clara Valley and throughout the San Francisco Bay region. Mitigation replantings would mitigate this impact to insignificance in the long term.

REMOVAL OF 250 - 300 TREES PROTECTED BY CITY TREE ORDINANCE. Project construction would result in the removal of an estimated 250-300 trees that are large enough (over 18 inches DBH) to qualify for protection under the City's tree ordinance. This impact is considered significant because the impact represents about 30-36 percent of existing trees in this size class and because the SCVWD must comply with the City's tree ordinance. As the constructing agency, the Corps would be required to obtain a tree removal permit and provide compensation for ordinance trees. Mitigation replantings would mitigate this impact to insignificance in the long term.

DISTURBANCE OF RIPARIAN FOREST ADJACENT TO CONSTRUCTION AREAS. In the absence of preventive measures, constructing the Bypass Channel plan could result in substantial inadvertent injury to or mortality of riparian forest plants outside but adjacent to grading and construction areas (e.g., in lower bank sites between the channel bottom and excavated floodway benches). Without physical barriers between construction areas and protected vegetation, impacts resulting from collisions with heavy equipment, sidecasting of graded material, soil compaction, materials storage, and other factors can be expected. This impact is considered significant because, although the number and severity of inadvertent injuries cannot be predicted, they could affect a substantial number of trees and shrubs that would otherwise remain healthy. Mitigation replantings would mitigate this impact to insignificance in the long term.

DISTURBANCE OF RIPARIAN FOREST ASSOCIATED WITH EROSION REPAIR ACTIVITIES. Bank erosion that occurred in Reaches 7 and 9 during the floods of January and March 1995 would be repaired as part of the construction of the flood control project. Small amounts of the "existing" riparian forest area included in preproject habitat maps and tables has been removed already by the floods. Additional small areas could be removed or disturbed by movement of equipment and materials for the erosion repair work. The maximum combined area of flood-caused impacts and construction-caused impacts would be approximately 0.63 acre. This impact is considered significant. Replantings would mitigate this impact to insignificance in the long term.

REMOVAL OF 1.29 ACRES OF URBAN FOREST. Implementing the Bypass Channel plan would result in permanent removal of 1.29 acres of urban forest in Reaches 8 and 9, and Ross Creek (Table F-10, Appendix F). Some additional backyard trees could die or become severely stressed if their root systems were disturbed by floodwall construction or other permanent impacts on Ross and Canoas creeks or the Guadalupe River. Some of the acreage included in this impact occurs in or adjacent to construction staging areas where no removal of urban forests would occur.

EXCAVATION OR FILLING OF 0.9 ACRE OF JURISDICTIONAL WETLANDS AND 9.93 ACRES OF OTHER WATERS OF THE UNITED STATES. The Bypass Channel Plan would result in removal or temporary disturbance of approximately 0.9 acre of wetlands and 9.93 acres of other waters of the United States (Table F-10, Appendix F). This impact is considered significant because wetlands and other waters of the United States support high levels of plant and wildlife diversity and many such areas have been lost in Santa Clara Valley and throughout the San Francisco Bay region in recent decades. Most or all of the impacts on other waters of the United States would be temporary impacts during construction. Following construction, ordinary high waters would occupy equal or greater areas in every reach and would remain in essentially the same locations (except in the middle of Reach 10B, where the low flow channel will shift slightly eastward). Significant wetland losses would be replaced through mitigation plantings along the modified channel reducing impacts in the long term to less than significant.

A portion of the wetland impact would be the result of temporary disturbance or minor grading. Narrow strips of seasonal wetland affected in many such areas are expected to reestablish naturally, because natural recovery of seasonal wetland vegetation has been observed on some banks and bars on the lower Guadalupe River. Other portions of the wetland impact (particularly in Reaches 10B, and 12) would require mitigation replanting to be mitigated to insignificance.

Fisheries

CONSTRUCTION. Construction activities associated with the Bypass Channel plan that would result in adverse and beneficial impacts on fisheries include floodway improvements, bank stabilization measures, and removal of existing barriers to fish passage. The same assumptions stated previously for the Channel Widening Plan are applicable to the Bypass Channel Plan.

OPERATIONAL IMPACTS. Operational changes that would result in adverse and beneficial impacts on fisheries include operation of bypass channels and changes in vegetation maintenance activities.

The following assumptions were made regarding operational impacts on fisheries:

- The SCVWD would design bypass channels that would avoid impacts on fishery resources. Sloping the bypass channel invert toward the west bank would reduce the potential for fish entrapment by creating a low-flow channel that would provide fish with adequate water depths as flows recede. The SCVWD would not include design features (e.g., gradient-control structures) in bypass channels that could result in the formation of ponded water habitats that could entrap fish during receding flow events. To further reduce the potential for fish entrapment within constructed bypass channels, the SCVWD would submit final design plans for bypass channels to CDFG for review.

- The proposed maintenance program incorporates several measures that would protect and enhance the riparian system. This proposed program potentially would increase streamside vegetation coverage and densities, which could result in an increase in the areal coverage and density of SRA cover.

- The SCVWD currently operates in-stream percolation ponds in Reach 12 during summer. The Bypass Channel plan would include continued operation of seasonal graded percolation ponds during summer without substantial changes to existing conditions.

Beneficial Impacts

INCREASE IN HABITAT AVAILABILITY FOR MIGRATING STEELHEAD TROUT AND CHINOOK SALMON RESULTING FROM REMOVING PARTIAL FISH BARRIERS. Proposed channel modifications include removing an abandoned stream gauge, consisting of a concrete apron and weir, at Hillsdale Avenue (Reach 10C) and a low-flow vehicle crossing (ford) downstream of Ross Creek (Reach 11B). Both structures are potential barriers to upstream migration by adult salmon and steelhead trout and require high flows (over 200 cfs at Hillsdale Avenue and 50-100 cfs at the ford) for successful fish passage. Only during peak urban storm runoff or prolonged watershed runoff do existing flows allow successful fish passage. Removing the barriers would enable access for migrating fish from the San Francisco Bay upstream to the drop structure above Blossom Hill Road at flows of approximately 10-15 cfs and higher.

The weir at stream gauge Station No. 23B partially inhibited fish migration because of the design of the structure. Water did not crest over the weir directly into the plunge pool, reducing the effectiveness of the plunge pool. Boulders below the water surface near the weir further reduced passage capabilities by reducing pool depth and passage corridors. The SCVWD has modified the weir and deepened the pool downstream of the weir thereby creating favorable hydraulic conditions for successful fish passage.

Removal of the Alamitos drop structure at Blossom Hill Road in Reach 13 by the SCVWD is a separate action that will enhance fish passage in the Guadalupe River upstream of the study area (see Parsons Engineering Science 1997).

Less-than-Significant Impacts

FISH PASSAGE IN LOWER ROSS CREEK. Proposed channel modifications include widening the existing lower Ross Creek channel from Almaden Expressway to 700 feet upstream of Jarvis Avenue and installing RCB culverts at Almaden Expressway and Jarvis Avenue to increase flood conveyance capacity in lower Ross Creek. Proposed improvements in the Guadalupe River channel would reduce water surface elevations during flooding events. These reductions would reduce the incidence and duration of backwater events that inundate the reinforced concrete box (RCB) culvert in lower Ross Creek and could result in reduced fish passage opportunities (Parsons Engineering Science 1997). To avoid any reduction in fish passage opportunities for steelhead, a fish ladder would be constructed at the mouth of the creek, to be operated as prescribed by the NMFS and CDFG. As a result, impacts would be less than significant.

FISH PASSAGE IN LOWER CANOAS CREEK. The Bypass Channel plan would reduce the likelihood of anadromous fish migration to upstream areas in Canoas Creek. This impact is considered less than significant because the DFG has determined that Canoas Creek does not provide suitable spawning habitat and that upstream migration should, therefore be discouraged (Parsons Engineering Science 1997). Fish passage into the creek from the Guadalupe River would be reduced as a result of lowered water surface elevations during flood episodes, reducing the frequency and duration with which culvert at the mouth of the creek is inundated (see Parsons Engineering Science for details). Fisheries habitat within the creek would be affected by channel modifications to improve flood conveyance, but these impacts are also less than significant because of the poor quality of the habitat.

ACUTE AND CHRONIC TOXICITY TO FISHERIES AND REDUCED FISH PRODUCTIVITY RESULTING FROM CONSTRUCTION-RELATED ACTIVITIES. As discussed for the Channel Widening plan, temporary construction impacts on water quality would have less-than-significant impacts on fisheries because of the implementation of a Stormwater Pollution Prevention Plan, as well as a hazardous materials control and spill response plan. These same measures described for the Channel Widening plan are part of the Bypass Channel plan (Parsons Engineering Science 1997), and no additional mitigation is required.

POTENTIAL IMPACTS ON FISH MIGRATION AND SPAWNING DUE TO CHANNEL CONSTRUCTION. As discussed for the Channel Widening plan, the Bypass Channel plan includes limitations on the timing of in-channel construction that would reduce potential impacts on fish migration and spawning to less-than-significant levels. These procedures are identical to those described for the Channel Widening plan and are part of the Bypass Channel plan (Parsons Engineering Science 1997).

ADVERSE EFFECTS ON FISHERY RESOURCES RESULTING FROM OPERATING BYPASS CHANNELS. Implementing the Bypass Channel plan would include constructing and operating a 5,400-foot-long bypass channel in Reaches 7-8 and two separate 500-foot-long bypass channels in Reach 9 (one at Pine Avenue and one upstream of Malone Road). HEC-2 modeling results indicate that the bypass channel in Reaches 7-8 would not begin operating until flows in the natural channel exceed 1,500 cfs. The Pine Avenue and Malone Road bypass channels in Reach 9 would become operational when flows exceed 1,600 cfs and 700 cfs, respectively (Bravo 1993). Although the Malone Road bypass channel would operate more frequently and for longer durations than the other bypass channels, operation of the Malone Road bypass channel would likely have minimal effects on fish spawning and migration because it is relatively short. Operation of the Pine Avenue bypass channel would have the least effect on fisheries of the proposed bypass channels because it is short and would operate less frequently and for shorter duration than the other two bypass channels. The following discussion focuses on the potential effects of operating the bypass channel in Reaches 7-8 because it has the greatest potential for impacts on fishery resources. Each of the following impacts are assessed below and determined to be less than significant:

- Fish entrapment or delays in migration resulting from operating bypass channels,

- Reduced fish migration and spawning success in the Guadalupe River resulting from changes in hydraulic characteristics, and

- Reduced channel maintenance flows and gravel flushing flows.

FISH ENTRAPMENT OR DELAYS IN MIGRATION RESULTING FROM OPERATING BYPASS CHANNELS. The proposed design would not be a significant cause of fish entrapment or delays in migration. The following discussion provides additional background and analysis relevant to this issue.

Possible delays in migration or entrapment of fish are dependent on a number of variables, such as the length and design of the bypass channel, the frequency and duration of bypass operation, the coincidence of bypass operation with the migration timing of adult and juvenile fish, and the behavior of adult and juvenile chinook salmon and steelhead trout. Unless an adequate connection to the River at the upstream end of the bypass is maintained, adult chinook salmon and steelhead trout could move into the bypass channel during high flows and experience delays in migration or, worse, become stranded by receding flows. Juvenile outmigrants could also move into the bypass channel during high-flow events in spring and be stranded by receding flows. The formation of isolated pool habitats could increase the potential for fish entrapment during receding flows. Delays in fish migration and fish entrapment would reduce chinook salmon and steelhead trout abundance by increasing fish mortality or lowering reproductive success. Based on the existing flow frequency data and known steelhead trout spawning and migration criteria from the scientific literature, most steelhead trout migration and spawning in the Guadalupe River occurs at flows less than 1,500 cfs.

Hydrologic data for water years 1972-1991 indicate that flows equaling or exceeding 1,500 cfs on the Guadalupe River at stream gauge Station No. 23B (Reach 10B) have occurred from November through April (Parsons Engineering Science 1997). During this period of record, flows equaled or exceeded 1,500 cfs on 45 days; February had the greatest number of days (14), followed by January (13 days), March (10 days), April and November (3 days), and December (2 days). Because the peak migration season for adult chinook salmon occurs from October through December, minimal effects on migrating adult chinook salmon from operation of the bypass channel would occur. During October through December, flows equaled or exceeded 1,500 cfs (i.e., the minimum flow necessary for bypass operation) on only 5 days combined out of 1,748 possible days (i.e., 92 days in October through December over 19 years).

Although bypass channel operation is more likely to occur in winter during the adult steelhead trout migration period (i.e., December through April), effects on migrating adult steelhead trout would be minimal because bypass operation would occur infrequently and for short durations. An analysis of daily peak flows determined that during the 1972-1991 period, Guadalupe River flows equaled or exceeded 1,500 cfs on only 42 days, approximately 1.5 percent of the total days occurring during the 6-month rainy season. Most high-flow periods had flows exceeding 1,500 cfs for no longer than 1 day in duration (Parsons Engineering Science 1997).

The rate at which juvenile fish would be drawn into the bypass channel depends on the number of juvenile fish migrating downstream when the bypass channel is flooded and the relative proportion of Guadalupe River flows entering the bypass channel during a flood event. The greatest likelihood of juvenile fish entering the bypass channel would occur when peak juvenile migration coincides with floodflows of large magnitude and long duration. Because the bypass channel would operate infrequently and for short durations, it is unlikely that a large proportion of the total juvenile fish population would be drawn into the bypass channel during any given flood event. Furthermore, because the downstream end of the bypass channel would be directly connected with the Guadalupe River, juvenile fish entering the bypass channel would be expected to migrate down the bypass channel and re-enter the River.

Entrapment of juvenile and adult fish could also occur during a receding flood event, if ponded water habitats formed and became isolated as the bypass channel drained. Juvenile and adult fish trapped within these ponded areas could experience delays in migration or, worse, suffer increased mortality from predation and desiccation of habitats.

The proposed design--sloping the bypass channel invert toward the west bank would reduce significant impacts of fish entrapment by creating a low-flow channel that would provide fish with adequate water depths as flows recede. The design would not include features (e.g., gradient-control structures) in bypass channels that could result in the formation of ponded water habitats with the potential to entrap fish during receding flow events. This impact is considered less than significant because bypass channels would operate infrequently, and for short durations, would be unlikely to trap substantial numbers of salmonids or delay their migration.

REDUCED FISH MIGRATION AND SPAWNING SUCCESS IN THE GUADALUPE RIVER RESULTING FROM CHANGES IN HYDRAULIC CHARACTERISTICS. Impacts on spawning and migrating chinook salmon and steelhead trout in main channel reaches depends on several variables, such as the effect of bypass operation on water depths and velocities in main channel reaches, the frequency and duration of bypass operation, and the coincidence of bypass operation with chinook salmon and steelhead trout spawning and migration periods.

When operational, the proposed bypass channels would reduce the magnitude of existing flows in the affected reaches of the Guadalupe River and could adversely affect adult migration and spawning if flow reductions caused unsuitable hydraulic characteristics (e.g., exceedingly shallow water depths) to occur in the main channel. Adult chinook salmon and steelhead trout require suitable water depths and velocities for successful migration and spawning. Excessively shallow water depths and high water velocities can reduce fish passage capabilities at natural barriers, such as gravel riffles, and unfavorable changes in hydraulic characteristics could reduce the amount of available spawning habitat for adult chinook salmon and steelhead trout.

Impacts on chinook salmon spawning and migrating would be minimal because of the slight probability that bypass operation would occur during chinook salmon spawning and migration (see discussion above under "Fish Entrapment or Delays in Migration Resulting from Operating Bypass Channels"). Furthermore, bypass channel operation would not affect egg survival for either chinook salmon or steelhead trout because bypass operations would not substantially affect hydraulic characteristics in the main channel during egg incubation periods.

Although bypass operation would more likely occur in winter during adult steelhead trout migration and spawning periods (December to March), minimal effects on steelhead trout migration in main channel reaches would occur because bypass operation would not affect water depths and water velocities when flows are less than 1,500 cfs. Based on the existing flow frequency data and known steelhead trout spawning and migration criteria from the scientific literature, most steelhead trout migration and spawning in the Guadalupe River likely occurs at flows less than 1,500 cfs.

These impacts are considered less than significant because bypass operation would have minimal effects on water depths and water velocities during chinook salmon and steelhead trout migration and spawning periods. No mitigation is required.

REDUCED CHANNEL MAINTENANCE FLOWS AND GRAVEL FLUSHING FLOWS. Operation of the bypass channel would reduce the magnitude of high flows in the main channel when floodflows are diverted into the bypass channel. This reduction in high flows in the main channel could have secondary effects on channel geometry and gravel quality because of the reduction in the incidence and magnitude of channel maintenance and gravel flushing and sediment transport flows.

Channel maintenance flows and gravel flushing flows are necessary to maintain stream channel and gravel quality (Milhous and Bovee 1977, Rosgen et al. 1986). Changes in sediment load or discharge can result in changes in channel shape, loss of spawning habitat, and loss of cover (Milhous and Bovee 1977). Increases in the width-to-depth ratio of stream channels can degrade fish habitat, such as spawning habitat, and create fish passage problems for migrating species such as chinook salmon and steelhead trout.

Significant reductions of peak flows can also cause sedimentation problems because the size of the substrate material that can be transported through the system is reduced. As flows are reduced, the size of the substrate material that is deposited is also reduced. Fine sediments, such as sand-, silt-, and clay-sized particles, can adversely affect redd construction, egg survival, fry emergence, and food production by filling in the pore spaces in cobble and gravel beds.

The effects of bypass operation on gravel flushing, sediment transport, and channel maintenance flows are dependent on how bypass operation affects the magnitude and duration of flows responsible for channel formation. Effective discharge, the flow that just fills a nonincised channel to flood stage with an approximate recurrence interval of 1.5 years, is the flow that determines the channel geometry and is responsible for transporting the largest part of the sediment load over the long term (Andrews 1980, Wolman and Miller 1960 in Rosgen et al. 1986). Using the method described by Leopold and Dunne (1978) and streamflow data from Stream gauge Station No. 23B provided by the SCVWD, an annual-maximum flood series was constructed for water years 1971-1991 to determine the effective discharge. The 1.5-year recurrence interval is a good estimator of effective discharge (Wolman and Leopold 1957, Dunne and Leopold 1957, and Williams 1960 in Rosgen et al. 1986). However, the 1.5-year recurrence flow from the historical annual-maximum flood series may provide only an approximate estimate of effective discharge because of the effects of urbanization and reservoir operation on Guadalupe River hydrology. Based on existing hydrologic data, the 1.5-year recurrence interval flow is estimated to be approximately 850 cfs, considerably lower than the minimum flow (1,500 cfs) required to initiate bypass channel operation. Bypass operation is therefore expected to have minimal, less than significant effects on the magnitude and duration of flows responsible for channel formation.

Bypass channel operation would therefore not increase the frequency or duration of low- to medium-range flows that could result in an increase in the amount of fine sediments deposited in the main channel. Bypass channel operation would not affect the magnitude or duration of intermediate flows that control channel geometry and transport the largest part of the sediment load over the long term. Existing dams and reservoirs are likely the dominant factor controlling gravel abundance, relative composition, and quality in the Guadalupe River. Impacts are therefore considered less than significant, and no mitigation is required.

REDUCTION IN IN-STREAM COVER AND SHADE ASSOCIATED WITH PERIODIC VEGETATION REMOVAL AND DISTURBANCE FOR FLOODWAY MAINTENANCE. Implementing the proposed maintenance program (Parsons Engineering Science 1997) would result in periodic removal or substantial trimming of riparian plants in the channel bottom, removal of weedy species, application of herbicides on maintenance roads, and trimming of overhanging vegetation to a height of 12 feet along maintenance roads. The proposed maintenance program incorporates several measures that would protect and enhance the riparian system, including selectively removing nonnative trees and shrubs to increase the ratio of native to non-native vegetation.

This impact is considered less than significant because the project would decrease the extent or frequency of vegetation clearing over preproject practices. No mitigation is required; however, the SCVWD would implement Mitigation Measure V-3, a vegetation protection plan for riparian and urban forests (refer to Section 4.12, Vegetation). Successful implementation of this measure would mitigate to insignificance the potential of inadvertent impacts and improve the integration of vegetation replacement, enhancement, protection, and monitoring activities with floodway maintenance and management in the project area.

Significant Impacts

REDUCTION IN SHADED RIVERINE AQUATIC (SRA) COVER RESULTING FROM THE REMOVAL OF 4,958 LINEAR FEET OF OVERWATER VEGETATION AND 1,100 LINEAR FEET OF UNDERCUT BANK ALONG THE GUADALUPE RIVER. Construction activities associated with grading and excavation of streambanks and bank protection activities would initially result in the direct removal of 4,958 linear feet of overhead cover (this represents 30 percent of the overhead forest cover and 13 percent of the undercut bank habitat that is present) in the form of overwater riparian forest vegetation and 1,100 linear feet of undercut banks in Reaches 7-12. More than half of the loss of overwater vegetation would occur in Reaches 9 and 10A, whereas 61 percent of the loss of undercut banks would occur in Reach 10A. The removal of overwater vegetation would reduce existing shading amounts by an average of approximately 5 percent throughout all project reaches (Parsons Engineering Science 1997).

Overhead cover and undercut banks are important SRA cover variables that would be affected by the Bypass Channel plan. Undercut banks and overhead cover provide fish with cover from predators, and canopy cover (overhanging vegetation) maintains shade for stream temperature control and provides an energy input to the stream in the form of fallen leaves and insects. Riparian forest also is important in controlling watershed and streambank erosion and in maintaining undercut banks.

This impact would diminish over time as these habitat features reestablish, but in the short to intermediate term it is significant because overhead cover is an essential component of salmonid streams in this region. Salmonid populations are highly influenced by the amount of available cover, and much of the SRA cover in the Guadalupe River has been lost in recent decades as a result of urbanization, roadway and bridge construction, and flood control projects. Without appropriate mitigation, reductions in SRA cover could adversely affect fish production, abundance, and distribution in the Guadalupe River by reducing fish egg survival through increases in water temperature, increasing juvenile fish mortality through decreases in escape habitat, and reducing habitat complexity.

Canopy cover maintains shade for water temperature control. Approximately 50 to 75 percent midday shade provides optimal thermal regulation for most trout streams (Raleigh et al. 1984). Limited shading can result in water temperatures exceeding the optimal range for salmonids (53°F to 66°F); too much shade can also limit primary productivity in streams. Chinook salmon and steelhead trout are coldwater species sensitive to temperature changes within and above optimal levels. Deleterious water temperatures during spawning, egg incubation, and early-rearing periods can reduce fish survival. The existing amount of stream shading is well below the range considered optimal for trout streams, and existing water temperatures approach or exceed optimal values for salmonid production. In the absence of preventive measures, additional decreases in stream shading would likely result in an increase in water temperatures and contribute to ongoing temperature-related impacts on fishery resources.

USFWS (1997) calculations suggest that the Bypass Channel plan would need an addition 1.41 acres of SRA cover to mitigate the losses caused by construction. This is based on optimistic assumptions, which are supported by the SCVWD's analyses, regarding the success of SRA cover mitigation in Reach 10B. The Bypass Channel plan contains other measures, discussed previously under Beneficial Impacts, that enhance fish passage and overall fisheries habitat conditions in the river. These beneficial aspects should be sufficient to make up for the apparent shortage of SRA cover mitigation.

Construction Impacts — Wildlife

The same assumptions made for the vegetation and fisheries analyses are applicable to this section. Following are the significant impacts of the Bypass Channel Plan on wildlife.

REMOVAL AND FRAGMENTATION OF RIPARIAN WILDLIFE HABITAT. The Corps and the FWS had agreed to modify the previous terrestrial HEP to reflect current project impacts and mitigation areas. Sufficient background data on this HEP could not be located, so it was necessary to do a new terrestrial HEP. The SCVWD was initially involved in the process, but did not agree with the use of certain models and with the HEP's assumptions regarding the timing of impacts and mitigations and, as a result, withdrew. The FWS feels this new HEP better characterizes the habitat values to be affected, while the SCVWD disagrees.

The HEP analysis of the riparian wildlife resources of the project was designed to:

- Describe the existing riparian wildlife habitat conditions for selected evaluation species in the project area and mitigation sites;

- Determine the baseline riparian wildlife habitat values for the evaluation species in the project area and mitigation sites;

- Quantify impacts on riparian wildlife habitat from implementation and operation of the project;

- Determine whether the proposed compensation mitigation plan would fully offset direct, on-site, project-related impacts on riparian wildlife habitat for the evaluation species; and

- Develop management actions for mitigation sites in the project area.

The Bypass Channel Plan would result in removing 9.08 acres of riparian forest that is important wildlife habitat from construction activities such as grading and excavation. Losses of riparian habitat are presented by reach in Table F-10 in Appendix F. The significant loss of riparian habitat would eliminate or displace wildlife species such as the yellow warbler (state species of special concern) that occupy riparian habitat at the project site. The HEP analysis determined that the evaluation species least affected by project implementation would be the northern oriole and that the downy woodpecker would be the most affected evaluation species. Replanting would mitigate this impact to insignificance in the long term.

Project construction would increase wildlife habitat fragmentation along the Guadalupe River corridor, possibly reducing local species diversity by affecting the capability of certain reaches of the river, notably Reaches 9 and 10A, to support breeding riparian bird species (Terborgh and Winter 1980; Jensen et al. 1990). This significant impact would be mitigated over time as riparian forest develops on revegetation sites.

Removal of riparian forest is considered significant because of the disproportionately high value of this resource as wildlife habitat, and because of the local (Santa Clara Valley), regional (Central Coast), and statewide declines that have increased the significance of remaining occurrences of this habitat.

DISTURBANCE OF RIPARIAN WILDLIFE HABITAT ADJACENT TO CONSTRUCTION AREAS. In the absence of preventive measures, constructing the Bypass Channel Plan could result in substantial loss of riparian wildlife habitat outside, but adjacent to, grading and construction areas. This loss of habitat is considered significant because of the local, regional, and statewide decline of riparian habitats. This impact would be mitigated to insignificance by measures to avoid impacts outside of designated construction areas.

REMOVAL OF URBAN FOREST WILDLIFE HABITAT. The Bypass Channel Plan would result in removal of urban forest wildlife habitats amounting to a total of 1.29 acres in Reaches 8 and 9 and on Ross Creek (Table F-10, Appendix F; see also Parsons Engineering Science 1997, Table 4.12-5). Additional backyard trees could die or become severely stressed if their root systems were disturbed by floodwall construction or other actions affecting Ross and Canoas creeks or the Guadalupe River. The loss of this buffer would temporarily reduce the habitat values of the adjacent riparian forest. Many animals, especially birds, that use the riparian forest corridor move out to forage in adjacent upland habitats, including urban forests. This impact is significant in the short term, whereas in the long term, the impact would be fully mitigated by proposed revegetation along the Bypass Channel and elsewhere.

REMOVAL OF WETLAND AND AQUATIC WILDLIFE HABITATS. The Bypass Channel Plan would result in the permanent removal or temporary disturbance of approximately 0.9 acre of wetland and 9.93 acres of other waters of the United States (Table F-10, Appendix F). The original vegetation, functions and values of these habitats may reestablish naturally in areas of temporary disturbance, and possibly in areas of excavation or filling, depending on the degree of disturbance. This impact is considered significant because wetland and aquatic wildlife habitats have high value for wildlife and have declined substantially in Santa Clara Valley, the central Coast Ranges region, and the state. The impact would be mitigated to insignificance in the long term with establishment of mitigation replantings.

CONSTRUCTION DISTURBANCE TO WILDLIFE SPECIES ALONG THE GUADALUPE RIVER. Construction-related noise and activity could disturb foraging, breeding, and roosting wildlife along the Guadalupe River. This short-term impact is considered significant because of the high use of the Guadalupe River by water birds for foraging and roosting and because construction activity could disturb substantial numbers of breeding or roosting wildlife along the river.

DISRUPTION OF BREEDING AND RISK OF MORTALITY TO BURROWING OWLS. Implementing the Bypass Channel plan could result in the disturbance (e.g., from grading and construction activities) of breeding burrowing owls in Reach 12. If present during breeding or wintering seasons, owls in burrows could be injured or killed by construction activities. This impact is considered significant because CDFG includes the burrowing owl on its list of species of special concern and the project could contribute to the decline of the species locally and regionally. The impact would be mitigated to insignificance by completing surveys to determine any owl burrow locations, avoidance of these locations, and relocation if necessary.

Operations Impacts — Wildlife

Operations impacts on wildlife would be insignificant. The project would reduce the extent of habitat disturbance along the riparian corridor compared to existing practices. Recreational use of the river corridor would increase, but activity would be controlled and concentrated along a well-defined trail, resulting in minimal disturbance of sensitive wildlife that resides in riparian forest habitats, compared to the existing condition, in which human disturbance is diffuse and largely uncontrolled along the river.

Rare, Threatened and Endangered Species

FEDERALLY LISTED OR PROPOSED SPECIES. The SCVWD's EIR/S (Parsons Engineering Science 1997) serves as the Biological Assessment of the Bypass Channel plan's effects on listed and proposed species, as well as candidates and species of concern. In general, the same conclusions reached for the Channel Widening plan (see also Appendix K) are applicable to the Bypass Channel plan and are summarized below.

Steelhead Trout and Other Salmonids. As discussed previously for the Channel Widening plan and under "Fisheries" for this alternative, Bypass Channel construction would have short-term adverse impacts on stream habitat features that may affect migration, spawning, and rearing by steelhead trout and chinook salmon. With mitigation as proposed, these short-term effects would be offset by long-term improvements in habitat quality. Short-term water quality impacts would be mitigated by measures to be incorporated into the Stormwater Pollution Prevention Plan and by limiting construction to the low-flow season. The Bypass Channel plan would reduce peak flows in the main channel, but other measures to improve fish passage are expected to more than offset any adverse effect of reduced peak flows.

California Red-Legged Frog (Rana aurora draytoni). Impacts on California red-legged frogs are considered unlikely, given that this species has not been found in the study area despite repeated surveys. Survey results have been forwarded to the USFWS, and their response is pending.

FEDERAL SPECIES OF CONCERN; STATE-LISTED, PROPOSED, AND SPECIAL CONCERN SPECIES. Impacts of the Bypass Channel plan on these species are essentially the same as those of the Channel Widening plan discussed previously (see also Appendix K; Parsons Engineering Science 1997). Potentially significant impacts on burrowing owls in Reach 12 are mitigable to less-than-significant levels as described under Mitigation Measures below. All other impacts are considered less-than-significant after mitigation, with any adverse short-term effects more than offset by long-term gains in habitat value.

4.4.4 Mitigation Measures

Channel Widening Plan

Vegetation

Areas where riparian forest would be planted to mitigate losses caused by construction are shown on plates in Appendix E. The total of 12.1 acres of mitigation matches that required under equal compensation according to the HEP (USFWS 1997). Mitigation acreages by reach are as follows:

Reach	Bench Acreage	Non-Bench Acreage	Total
7	3.37	0.60	3.97
8	0.00	0.00	0.00
9	0.00	0.24	0.24
10a	0.32	0.00	0.32
10b	0.00	2.52	2.52
10c	1.23	0.14	1.37
11	1.70	1.61	3.31
12	0.00	0.37	0.37
Total	**6.62**	**5.48**	**12.10**

Note: Riparian forest acreage within total mitigation acreage. Reach 10b acreage is classified as non-bench mitigation as it would not be located on a bench excavated for channel widening.

In other respects, mitigation measures for the Channel Widening Plan are in part adapted from those developed for the Bypass Channel Plan (Parsons Engineering Science 1997). The Channel Widening Plan proposes seeding cut slopes of the widened river channel, and other disturbed upland habitats with herbaceous vegetation sufficient for erosion control.

1. Prepare and implement an integrated vegetation mitigation plan. The Corps shall prepare and implement a detailed mitigation plan to compensate for removal of riparian forest, SRA cover, City ordinance trees, and wetlands and other jurisdictional waters of the United States. All of these planting needs shall be integrated into a single plan because some plantings shall provide compensation for more than one impact; plantings that compensate for different impacts shall be implemented side-by-side at the same time; methods of planting. maintenance, and monitoring shall be similar for all types of vegetation; and scheduling of planting, maintenance, and monitoring shall be coordinated for all mitigation plantings.

   The integrated vegetation mitigation plan shall provide detailed information on planting locations (specific to each vegetation type), plant materials (e.g., species, source, and size), planting methods (e.g., site preparation and plant spacing), maintenance methods (e.g., irrigation and weed control), monitoring methods (e.g., sample design, data requirements, survey frequency, and reporting requirements), and success criteria (e.g., species composition, percent survival, and percent canopy cover).

Goals, concepts, and guidelines that shall be incorporated into the detailed mitigation plan are listed below.

RIPARIAN FOREST

- Establish sufficient acreage on newly excavated benches and cut slopes and in compensation sites elsewhere along the river to avoid a long-term net loss of acreage and ecological function, based on the results of the USFWS HEP analysis (1997). For planning purposes, the Corps will use equal compensation, i.e., no net loss of habitat value for all evaluation species combined, as a basis for mitigation planning. The USFWS HEP suggests that 12.1 acres of riparian forest mitigation are needed to provide equal compensation for the Channel Widening plan's impacts. As indicated above the currently planned mitigation plantings meet this threshold.

- Plant local, native riparian species, including herbaceous plants used for erosion control.

- Where possible, plant riparian vegetation for mitigation in existing gaps or openings (e.g., those that are unvegetated or are ruderal herbaceous areas) to reduce fragmentation and heterogeneity in the riparian corridor.

- Use percent survival, canopy cover, stem density, and species composition of planted vegetation as success criteria for the riparian forest mitigation plantings. Percent survival would be most relevant during the first 1-3 years, whereas longer-term goals should emphasize cover, density, and species composition.

SHADED RIVERINE AQUATIC HABITAT

- Establish sufficient linear footage of new vegetative cover to ensure no net long-term loss of SRA habitat values by planting native riparian shrubs and trees (especially willows) along unshaded banks. As currently proposed, about 10,000 linear feet of river-forest interface would be created by the Channel Widening Plan.

- Plantings intended to provide SRA cover shall be planted along the water's edge at summer low flows and shall be sufficiently dense to provide shade along at least 85 percent of the bank's length. At ground level, the width of plantings for riparian mitigation will vary from approximately 10 to over 30 feet because the space available for vegetation planting varies. Where mitigation plantings are confined to narrow strips, riparian trees would be allowed to spread out above a height of 12-15 feet. In other areas, SRA cover will be planted where there are no constraints on planting widths. Only riparian plantings located within 15 feet of the wetted channel are considered as SRA mitigation. When mature, the widths of SRA plantings will exceed the ground level width by 10-50 feet, depending on the diameter of the canopies.

CITY ORDINANCE TREES

- Provide adequate compensation for removal of ordinance trees (typically 4:1 replacement based on tree number [Hamilton 1993]) and incorporate these trees into the mitigation plantings for riparian forest or urban forest, as appropriate.

WETLANDS AND OTHER JURISDICTIONAL WATERS OF THE UNITED STATES

With the exception of the riparian forest/SRA cover mitigation plan for Reach 10B, permanent impacts on true marsh habitat as opposed to other wetland areas of non-marsh vegetation within the stream channel would be minimal under the Channel Widening Plan.

- Establish sufficient acreage of constructed jurisdictional wetlands to provide no net loss of wetlands within the project area. Restore as much as possible of the temporarily disturbed wetlands on-site along the edges of the excavated bench.

- Use native grasses, sedges (*Cyperus* spp. *Carex* spp.), water-plantain (*Alisma* spp.), and knotweeds (*Polygonum* spp.) or other native plants that are flexible enough to be minimally disturbed by channel maintenance activities and minimize obstruction of flood flows.

- Use jurisdictional wetland delineation criteria as a basis for success criteria for the constructed wetlands.

- Post-construction acreage of waters of the United States will equal or exceed pre-construction acreage; hence no mitigation is suggested.

LOCATIONS

- Locate all mitigation plantings in Reaches 7-12 and begin "off-site" mitigation plantings in areas where channel widening is not required, such as Reach 12, as early as possible.

- Where sites can be revegetated following construction disturbance or minor grading, implement mitigation directly on the sites that were disturbed. Implement the remaining mitigation plantings in appropriate locations that are currently unvegetated or occupied by ruderal vegetation or sparse, degraded riparian forest.

SUCCESS CRITERIA

Monitoring shall continue for 5 years or until all success criteria are met. Criteria for success of the mitigation plantings shall be based on density of live woody plants per acre and plant species diversity during the initial 5-year monitoring period. Specific criteria for tree and shrub densities shall vary with the type of community. Revegetation sites shall be required to contain all the native species initially planted (although relative amounts may change) after 5 years. Remedial action shall be implemented and the monitoring period extended if success criteria are not met.

MAINTENANCE AND MONITORING

- Ensure protection of mitigation plantings and facilitate establishment of vigorous vegetation.

- Monitor the mitigation plantings in a manner that provides early feedback to the Corps and its revegetation contractors on methods to improve results or correct problems, allows a determination of when success criteria have been achieved, and provides the documentation needed for monitoring required under CEQA and by project permits.

- Follow the mitigation monitoring guidelines of the Corps (1991) for standards of wetland monitoring design and reporting. Riparian and wetland plantings shall be monitored for at least 5 years, including at least 2 years after the removal of irrigation systems.

2. Implement a public education program. The Corps shall participate with the SCVWD in a program to educate the community and creekside homeowners about biological mitigation and habitat protection associated with the project and to solicit their cooperation and support. The program shall be similar to that proposed for the Bypass Channel Plan. The program shall be coordinated with Mitigation Measure 1 and the SCVWD's channel maintenance program for the Guadalupe River.

3. Implement a vegetation protection plan for riparian and urban forests. The Corps shall prepare and implement a plan to protect vegetation that does not need to be removed during project construction from inadvertent damage.

   Before construction begins, a survey shall be conducted to identify and flag locations of construction area boundaries, specific trees near or within construction areas that are to be saved, and selected trees that may be transplanted to a mitigation area. Orange plastic barricade fencing shall be erected or similar measures taken along construction area boundaries to identify areas of protected vegetation. The fencing shall be placed as close to the actual limit of grading or construction (i.e, as far from the forest edge) as possible. If practical. selected trees within construction areas shall be transplanted for use in a designated mitigation area by an experienced tree-moving contractor.

   During construction, attachment of ropes, cables, or guys to trees outside the construction area shall be avoided, except in emergencies. Trees not designated for removal that are damaged during construction shall be trimmed under the direction of a qualified arborist to minimize the risk of disease. Trees outside the construction area that are damaged beyond recovery shall be replaced by the contractor at a minimum 3:1 basis with additional native trees in a designated riparian forest mitigation area or shaded riverine aquatic habitat cover mitigation area.

Fisheries

4. Conserve and restore undercut banks on site and improve fish passage conditions. The Corps shall mitigate construction-related impacts on undercut banks and short-term temperature impacts associated with vegetation clearing during construction by implementing the following specific measures:

   Avoid losses of undercut banks where possible. Depending on final engineering design requirements, it may be possible to avoid the excavation of undercut banks along some sections designated for channel widening. In these areas, banks shall be fenced off-limits to construction activity.

   Even if undercut banks can be saved, the FWS feels that the removal of adjacent trees whose roots stabilize these banks would result in the loss of these banks over time. The Corps and USFWS have assumed for planning purposes (including the HEP) that this would be the case. However, if undercut banks can be saved initially, it may be possible to stabilize them afterwards through plantings of young willows. The mitigation plan for the channel widening alternative calls for planting these residual bank areas for mitigation purposes. It is not known to what extent this would preserve existing undercut banks.

Based on the revised aquatic HEP (USFWS 1997), there would be no need to create artificial undercut banks. The FWS assumes in the aquatic HEP that SRA cover attributes would gradually return over a period of 30 years, but only in areas that are not hardened, and the HEP discounts the instream cover correction factor accordingly.

In addition, the loss of undercut banks, overhead cover and stream shading shall be mitigated to insignificance by implementing Measure 1.

Wildlife

Impacts on wildlife other than rare, threatened, or endangered species (discussed below) shall be mitigated by vegetation measures described previously (Mitigation Measures 1 through 3).

RARE, THREATENED, AND ENDANGERED SPECIES

Steelhead Trout. Additional mitigation measures if necessary shall be determined in consultation with NMFS.

California Red-Legged Frog. This species is unlikely to be present or affected by the project, and no mitigation measures are proposed. The Corps will consult with USFWS to determine whether additional protective measures are warranted.

5. To mitigate potential impacts on burrowing owls to insignificance, surveys shall be conducted in planned mitigation areas in Reach 12 during the nonbreeding season (September-January) and no more than 2 weeks before construction begins, to determine whether burrowing owls are occupying the construction site before construction.

Within 30 days of conducting the survey(s), the results shall be forwarded to the CDFG. If no burrowing owls exist at the construction site, no additional mitigation measures shall be required. If survey results reveal the presence of burrowing owls, monitoring by a qualified wildlife biologist shall be required during construction activities, and a report of monitoring activities shall be forwarded to the CDFG.

The following mitigation measures shall be implemented, depending on when construction is scheduled to occur.

- If construction occurs during the nonbreeding season (September-January), construction shall be avoided within 160 feet of the active burrow to avoid disturbing or killing the burrowing owls, until the burrow is vacated and destroyed as indicated below. This schedule shall comply with laws under the California Fish and Game Code, the federal Migratory Bird Treaty Act, and CDFG's burrowing owl guidelines.

Monitoring of potential wintering burrows would be necessary to ensure that no owls were killed during grading. A qualified wildlife biologist shall survey the affected area within 2 weeks before construction activity begins to determine if active burrows are present. After determining that active burrows are unoccupied, the burrows shall be destroyed to prevent reoccupancy during construction.

- If construction occurs during the breeding season (February-August), the owls shall be excluded from the construction area before the breeding season begins and prevented from returning by the following actions:

  - Examining all potential burrows in Reach 12 during the nonbreeding season (September-January) to determine the presence or absence of owls,

  - Destroying or collapsing unoccupied burrows to prevent their use during the nonbreeding and breeding seasons, and

  - Monitoring the construction site and continuing to destroy burrows until grading begins to ensure that new burrows constructed by ground squirrels are not occupied by owls and used as dens.

- If no other options are available, relocate burrowing owls. The Corps shall prepare a relocation and habitat protection plan in coordination with CDFG and USFWS and obtain permits from both CDFG and USFWS.

Within 60 days of completion of construction activities in Reach 12, a letter report shall be submitted to CDFG that includes results of the preconstruction survey, monitoring and preventive actions taken during construction, and postconstruction conditions. With implementation of these mitigation measures, there would be no impact on this species unless relocation becomes necessary.

Bypass Channel Plan

Vegetation

Plates in Appendix E show areas preliminarily designated for the mitigation plantings called for in Mitigation Measure 1. A reach-by-reach quantification of net changes in habitat types, assuming successful mitigation, is provided in Parsons Engineering Science (1997). Mitigation acreages by reach are as follows:

Reach	Acreage
7	3.28
8	0.13
9	1.84
10	5.53
11	4.23
12	6.15
Total	**21.16**

Certain revegetation measures not described here are assumed to be part of the Bypass Channel Plan (i.e., seeding grasses and other herbaceous plants on the floodway benches and bypass channel bottoms, planting most gabion slopes with blackberries, and seeding upland sites with grasses as needed to minimize soil erosion as required in the Stormwater Pollution Prevention Program).

1. The Corps shall prepare and implement a detailed mitigation plan to compensate for removal of riparian forest, shaded riverine aquatic (SRA) cover, urban forest. City ordinance trees, and

wetlands and other jurisdictional waters of the United States. All of these planting needs shall be integrated into a single plan because some plantings shall provide compensation for more than one impact; plantings that compensate for different impacts shall be implemented side-by-side at the same time; methods of planting. maintenance, and monitoring shall be similar for all types of vegetation; and scheduling of planting, maintenance, and monitoring must be coordinated for all mitigation plantings.

The integrated vegetation mitigation plan shall provide detailed information on planting locations (specific to each vegetation type), plant materials (e.g., species, source, and size), planting methods (e.g., site preparation and plant spacing), maintenance methods (e.g., irrigation and weed control), monitoring methods (e.g., sample design, data requirements, survey frequency, and reporting requirements), and success criteria (e.g., species composition, percent survival, and percent canopy cover).

This measure is expected to provide a net long-term increase in habitat quality along the Guadalupe River, because it shall replace with native species all of the riparian forest removed during construction (much of which is dominated by non-native and weedy plants). Net loss of habitat value shall be avoided by using a sufficient replacement ratio based on the results of the new terrestrial HEP, initiating construction in Reaches 12 and 10B in the early years of the multi-phase construction implementation, and revegetating Reaches 12 and 10B in the first fall planting season after reach construction.

Goals, concepts, and guidelines that shall be incorporated into the detailed mitigation plan are listed below.

Riparian Forest

- Establish new riparian forest in Reaches 7-12. Mitigation required by the Corps would be based upon the results of the new terrestrial HEP, after completion of an incremental mitigation analysis. As currently proposed (Parsons Engineering Science 1997), the Bypass Channel plan provides approximately 21 acres of mitigation plantings to offset the loss of about 9 acres. This exceeds the threshold of value of 14.6 acres for equal compensation as well as the value needed for in-kind compensation, determined by the revised USFWS HEP (1997).

- Plant tree and shrub species that are native to the local riparian system. Incorporate only native plant material into seed mixes of herbaceous plants used for erosion control.

- Where possible, plant native riparian trees and understory shrubs for mitigation in existing gaps or openings (unvegetated or ruderal herbaceous areas) to reduce fragmentation and heterogeneity in the riparian forest.

- Use percent survival, canopy cover, stem density, and species composition of planted vegetation as success criteria for the riparian forest.

Shaded Riverine Aquatic Habitat

- Establish at least 4,958 linear feet of new vegetative cover by planting native riparian shrubs and trees (especially willows) along unshaded banks. This provides the replacement ratio needed to meet the SRA cover requirements.

- Plantings intended to provide SRA cover shall be located along the water's edge at summer low flows and should be sufficiently dense to provide shade along at least 85 percent of the bank's length. Sufficient bank lengths shall be planted to achieve the net replacement of overhead cover, taking into account the formation of gaps in the canopy. At ground level, the width of plantings for riparian mitigation shall vary from approximately 10 to over 30 feet because the space available for vegetation planting varies. In some areas, SRA cover shall be planted on narrow strips of the low flow channel and floodway terraces that shall be kept free of woody vegetation.

  In other areas, SRA cover shall be planted where there are no constraints on planting widths. Only riparian plantings located within 15 feet of the wetted channel are considered as SRA cover mitigation. When mature, the widths of SRA plantings shall exceed the ground level width by 10-50 feet, depending on the diameter of the canopies.

Urban Forest

- Establish at least 1.29 acres of new sycamore-valley oak forest in selected top-of-bank sites in Reaches 7-12. This goal is based on a 1:1 replacement ratio (based on canopy area).

- Use native tree species in the urban forest revegetation sites, especially California sycamore, valley oak, coast live oak, and California wild rose.

City Ordinance Trees

- Comply with the City of San Jose's tree ordinance requirements for trees removed by the project that are not on SCVWD property.

- Consult with the City Arborist to identify and evaluate trees greater than 18 inches DBH that shall be removed by the project on land not owned by the SCVWD. Identify specific compliance and mitigation requirements when the number and value of affected trees have been determined.

- Provide adequate compensation for removal of ordinance trees (typically 4:1 replacement based on tree number [Hamilton 1993]) and incorporate these trees into the mitigation plantings for riparian forest or urban forest, as appropriate.

Wetlands and Other Jurisdictional Waters of the United States

- Establish at least 0.89 acre of constructed jurisdictional wetlands to provide no net loss of wetlands within the project area.

- Construct new wetlands in Reaches 10B and 12. Restore as much as possible of the temporarily disturbed wetlands on-site in Reaches 7-12.

- Use native grasses, sedges (*Carex* spp.), water-plantain (*Alisma* spp.), knotweeds (*Polygonum* spp.), or other native plants that would be minimally disturbed by channel maintenance activities and minimize obstruction of flood flows.

- Use jurisdictional wetland delineation criteria as a basis for success criteria for the constructed wetlands.

- Provide at least 9.93 acres of constructed and restored other waters (at least a 1:1 replacement ratio) to compensate for other waters that are either disturbed or eliminated during project construction.

Locations

- Locate all mitigation plantings in Reaches 7-12 and begin implementation of mitigation plantings in Reach 12 in the early years of the multi-phase construction.

- Where sites can be revegetated following construction disturbance or minor grading, implement mitigation directly on the sites that were disturbed. Implement the remaining mitigation plantings in appropriate locations that are currently unvegetated or occupied by ruderal vegetation or sparse, degraded riparian forest.

- Plates in Appendix E show anticipated locations of mitigation planting sites for riparian forest, urban forest, and wetlands. More detailed specifications of planting locations are to be included in the detailed mitigation plan.

Success Criteria

Monitoring shall continue for 5 years or until all success criteria are met. Criteria for success of the mitigation plantings shall be based on density of live woody plants per acre and plant species diversity during the initial 5-year monitoring period. Specific criteria for tree and shrub densities shall vary with the type of community. Revegetation sites shall be required to contain all the native species initially planted (although relative amounts may change) after 5 years. Remedial action shall be implemented and the monitoring period extended if success criteria are not met.

Maintenance and Monitoring

- Provide maintenance that shall protect mitigation plantings and facilitate establishment of vigorous vegetation.

- Monitor the mitigation plantings in a manner that provides early feedback to the SCVWD and its revegetation contractors on methods to improve results or correct problems, allows a determination of when success criteria have been achieved, and provides the documentation needed for monitoring required under CEQA and by project permits.

- Follow the mitigation monitoring guidelines of the Corps (1991) for standards of wetland monitoring design and reporting. Riparian and wetland plantings shall be monitored for at least 5 years, including at least 2 years after the removal of irrigation systems.

Riparian Forest Fragmentation

Estimates of post-project riparian forest patch and gap lengths (Parsons Engineering Science 1997) indicate that reductions in total gap length ranging from 11 percent to 60 percent would occur in Reaches 7, 10B-C, 11, and 12. Small increases or decreases (+4 percent to -6 percent) would occur in Reaches 8, 9, and 10A. Overall, total gap length would decrease by 23 percent and total patch length:gap length ratio would improve from 1.2:1 under preproject conditions to 2.3:1 under postproject conditions under the Preferred Project. No additional mitigation measures are suggested.

2. The Corps shall prepare and implement a program to educate the community and creekside homeowners about biological mitigation and habitat protection associated with the project and to solicit their cooperation and support. Principal actions shall include:

    - Developing an educational brochure on proper stream care to be distributed to homeowners along the Guadalupe River within the environs of the project area before construction begins. This brochure shall explain (1) the reasons for the removal of non-native vegetation, (2) the values of native vegetation along the riparian corridor and on private property, (3) reasons for not dumping debris, (4) related issues concerning water quality, and (5) guidelines for aesthetic improvement.

    - Conducting a series of workshops for creekside homeowners before and after project construction to explain the riparian mitigation program to be implemented, the value of riparian habitat to wildlife, and the goals of the mitigation program.

The program shall be coordinated with Mitigation Measure 1 and the SCVWD's channel maintenance program for the Guadalupe River.

3. The Corps shall prepare and implement a plan to protect vegetation that does not need to be removed during project construction from inadvertent damage. This plan shall incorporate standard construction practices used by the SCVWD and described in the project description.

Before construction begins, a survey shall be conducted to identify and flag locations of construction area boundaries, specific trees near or within construction areas that are to be saved, and selected trees that may be transplanted to a mitigation area. Orange plastic barricade fencing shall be erected or similar measures taken along construction area boundaries to identify areas of protected vegetation. The fencing shall be placed as close to the actual limit of grading or construction (i.e, as far from the forest edge) as possible. If practical, selected trees within construction areas may be transplanted for use in a designated mitigation area by an experienced tree-moving contractor.

During construction, attachment of ropes, cables, or guys to trees outside the construction area shall be avoided, except in emergencies. Trees not designated for removal that are damaged during construction shall be trimmed under the direction of a qualified arborist to minimize the risk of disease. Trees outside the construction area that are damaged beyond recovery shall be replaced at a minimum 3:1 basis with additional native trees in a designated riparian forest mitigation area or shaded riverine aquatic habitat cover mitigation area.

4. The Corps shall replace or compensate property owners for any native or non-native backyard trees that die or become severely stressed as a result of flood wall construction or other construction-related activities. Replacement shall be provided on a 1:1 in-kind basis for trees with drip lines within 10 feet of project construction that die or become severely stressed during construction, or within 1 year after completion of construction for trees that are determined by a qualified arborist, on a case-by-case basis, to have been affected by project construction.

5. The Corps shall use live willow cuttings and other plant materials in the revegetation of eroded areas as specified in the maintenance program, and shall revegetate all areas cleared for access to the erosion repair sites with native riparian vegetation. This mitigation measure is similar to the riparian mitigation called for in Mitigation Measure 1. The mitigation goal for the erosion repair sites is no net loss because the initial impact resulted from natural causes (flooding), the proposed repair methods shall allow for on-site recovery of riparian vegetation, and the sites shall be less susceptible to erosion after the repairs are completed.

Fisheries

6. The Corps shall mitigate construction-related impacts on undercut banks and short-term temperature impacts associated with vegetation clearing during construction by implementing the following specific measures:

CONSTRUCT 1,100 LINEAR FEET OF UNDERCUT BANKS, USING APPROPRIATE BIOTECHNICAL TECHNIQUES AND PROVIDE 4,958 LINEAR FEET OF SRA HABITAT. In consultation with CDFG and USFWS, the design shall use appropriate prevention materials in association with replanted vegetation, to create 1,100 linear feet of undercut bank habitats. This measure is not part of the Corps' Bypass Channel plan, but part of a separate project that would be constructed by the SCVWD. This measure shall compensate for the loss of undercut banks during grading and streambank excavation at a 1 to 1 ratio. Before initiating construction, the existing 1,100 linear feet of undercut banks shall be documented in terms of water depths, velocities, and depths of undercut to provide detailed information on existing conditions. Undercut bank mitigation areas shall be located in Reaches 7, 10A, 10B, 11A, 11B, and 11C. Mitigation areas shall be evaluated annually for five years to determine whether created undercut banks are functioning properly by providing habitat conditions similar to those that were measured for existing conditions. If full mitigation cannot be achieved by created banks, the SCVWD shall consult with CDFG and USFWS, initiate remedial actions, and continue monitoring for an additional 5 years. Remedial actions shall include redesign of revetment or other appropriate mitigation based on negotiations with CDFG and USFWS.

Mitigation shall be considered complete in the fifth year if created undercut bank lengths provide habitat conditions similar to those measured for preproject conditions. In addition, the loss of undercut banks, overhead cover and stream shading shall be mitigated by implementing Measure 1. Successful implementation of this measure, in combination with proposed restoration efforts in Reaches 10B and 12 and proposed reductions in-channel vegetation maintenance throughout all project reaches, is expected to result in an overall net increase in overwater vegetation, provide for more continuous shading over the entire project area, mitigate the impact to insignificance and be consistent with the USFWS requirement of "no net loss of aquatic habitat values or acreage."

Implementing these measures shall result in a 1:1 replacement of overwater vegetation (Parsons Engineering Science 1997). Locations of proposed revegetation sites, including SRA cover mitigations sites, are presented in plates in Appendix E.

IMPROVE FISH PASSAGE CONDITIONS ON GUADALUPE CREEK. This mitigation measure will not be part of the Corp's Bypass Channel plan, but will instead be considered a separate project by the local sponsor as a cumulative beneficial impact. Mitigation benefits from this proposal have not been quantified using the HEP methodology, so their cost-effectiveness can not be compared to other mitigation measures. This measure can be considered as a qualitative benefit to fisheries.

The SCVWD shall improve fish passage conditions on Guadalupe Creek at:

- Stream Gauge Station No. 43, and
- a channelized stream reach midway between the Pheasant Creek confluence and Reynolds Road.

Fish passage structures shall be designed in consultation with CDFG and USFWS and incorporate engineering considerations and biological criteria developed for fish passage to ensure that adequate fish passage is maintained.

The Corps and SCVWD shall implement a two-phase monitoring program of fish passage improvement (i.e. along the channelized stream reach halfway between the Pheasant Creek confluence and Reynolds Road) to determine the success of the improvements: annual surveys (phase one) to determine whether fish are using the structures; and ongoing maintenance surveys in perpetuity (phase two) to ensure that structures are operating as designed. No monitoring of stream gauge Station No. 23 is proposed because only minor modifications to the weir are needed to improve fish passage, precluding the requirement to build an actual fish passage structure such as a fish ladder. The SCVWD shall develop an appropriate monitoring program in coordination with CDFG and USFWS to document the successful passage of migratory fish (primarily chinook salmon and steelhead trout). Phase one of the monitoring program shall commence in the fall following completion of fish passage improvements. Monitoring shall be conducted from October 1 to April 30 when migrating adult chinook salmon and steelhead trout are expected to occur.

Monitoring activities shall consist of visual surveys at improvement locations; carcass, redd, and juvenile surveys in reaches upstream of improvement locations; automated fish counting systems mounted at each fish passage structure; or a combination of two or more methods to document the successful passage of adults. The precise sampling protocol shall be developed in consultation with CDFG and USFWS and shall depend on the opportunities and constraints governed by the local conditions (e.g., high turbidity levels during storm runoff periods may preclude the use of visual observations as a sampling method).

The SCVWD shall submit an annual monitoring report to CDFG for up to 5 years after completion of fish passage improvements. In addition to formal monitoring efforts, the SCVWD shall look for indicators of passage problems, such as fish congregating downstream of the ladder or failed attempts by fish to negotiate the ladder during routine and ongoing maintenance practices, conducted during phase two (discussion below). If the objective of attaining fish passage has not been met and is not due to factors beyond the SCVWD's control (e.g., drought, natural downstream barriers, or limited number of fish), remedial actions shall be initiated and monitoring shall continue for up to an additional 5 years. Remedial actions shall include redesign of structural improvements or further negotiations with CDFG and USFWS regarding other appropriate mitigation.

This measure shall be considered successful when fish passage was documented, and no indicators of passage problems are present. After successful fish passage was documented, phase one of the monitoring program shall considered complete.

Phase one of the monitoring plan shall include repeated surveys during the rainy season (i.e., October 1 through April 30) to ensure that the fishways are free if obstructions and debris that would preclude their normal operation. The SCVWD shall follow the same maintenance and inspection procedures as outlined in an existing MOU with CDFG and take reasonable and appropriate measures to remove accumulated debris in a timely manner to restore to normal the operation of the fishway. The current MOU requires the SCVWD to inspect all fish ladders once every working day and at least once per day during high flow events on nonworking days during the migration season. This phase of the monitoring program shall continue for the life of the improvement structure.

Mitigation Measure Cf-1 (Chapter 6, "Cumulative Impacts") requires the SCVWD to provide fish passage at the gabion structure on Alamitos Creek, which shall provide fish access to an additional 10.68 miles of stream habitat. This measure would increase the availability of habitat by slightly more than what would be potentially affected by the cumulative effects of this project, including other ongoing projects on the Guadalupe River (i.e., State Route 87 and the Corps Downtown Guadalupe River Flood Control Project), which totals approximately 9 miles of river. Successful implementation of Mitigation Measure Cf-1, in conjunction with implementing Mitigation Measure 6, should provide chinook salmon and steelhead trout access to a combined total of 13.3 miles of additional spawning and rearing habitat. Together, these measures would result in a long-term benefit to the anadromous fishery of the Guadalupe River because of the increase in habitat availability and the anticipated benefits associated with the improved habitat conditions found in these tributary streams.

Wildlife

Apart from impacts on special status wildlife (see below), impacts of the Bypass Channel Plan on wildlife shall be mitigated by the vegetation mitigations (1 through 5).

7. To mitigate impacts on burrowing owls to insignificance, surveys shall be conducted in planned construction and mitigation areas in Reach 12 during the nonbreeding season (September-January) and no more than 2 weeks before construction begins, to determine whether burrowing owls are occupying the construction site before construction.

Within 30 days of conducting the survey(s), the results shall be forwarded to the CDFG. If no burrowing owls exist at the construction site, no additional mitigation measures shall be required. If survey results reveal the presence of burrowing owls, monitoring by a qualified wildlife biologist shall be required during construction activities, and a report of monitoring activities shall be forwarded to the CDFG.

The following mitigation measures shall be implemented, depending on when construction is scheduled to occur.

- If construction occurs during the nonbreeding season (September-January), construction shall be avoided within 160 feet of the active burrow to avoid disturbing or killing the burrowing owls, until the burrow is vacated and destroyed as indicated below. This schedule shall comply with laws under the California Fish and Game Code, the federal Migratory Bird Treaty Act, and CDFG's burrowing owl guidelines.

Monitoring of possible wintering burrows would be necessary to ensure that no owls were killed during grading. A qualified wildlife biologist shall survey the affected area within 2 weeks before construction activity begins to determine if active burrows are present. After determining that active burrows are unoccupied, the burrows shall be destroyed to prevent reoccupancy during construction.

- If construction occurs during the breeding season (February-August), the owls shall be excluded from the construction area before the breeding season begins and prevented from returning by the following actions:

  - Examining all potential burrows in Reach 12 during the nonbreeding season (September-January) to determine the presence or absence of owls,

  - Destroying or collapsing unoccupied burrows to prevent their use during the nonbreeding and breeding seasons, and

  - Monitoring the construction site and continuing to destroy burrows until grading begins to ensure that new burrows constructed by ground squirrels are not occupied by owls and used as dens.

- If no other options are available, relocate burrowing owls. The Corps shall prepare a relocation and habitat protection plan in coordination with CDFG and USFWS and obtain permits from both CDFG and USFWS.

Within 60 days of completion of construction activities in Reach 12, a letter report shall be submitted to CDFG that includes results of the preconstruction survey, monitoring and preventive actions taken during construction, and postconstruction conditions.

Rare, Threatened, and Endangered Species

STEELHEAD TROUT. Additional mitigation measures if necessary shall be determined in consultation with NMFS.

CALIFORNIA RED-LEGGED FROG. Given the conclusion that this species is unlikely to be present or affected by the project, no mitigation is proposed. The Corps will consult with the USFWS to determine whether any additional protective measures are warranted.

4.4.5 Unavoidable Significant Adverse Impacts

Channel Widening Plan

All significant impacts can be mitigated to less-than-significant levels in the long term, because sufficient acreage is available to provide riparian forest habitat replacement to compensate for losses that would occur in conjunction with channel widening. Detailed assessments of the channel widening's effects on river hydrology are required to determine the precise location and extent of riparian forest restoration.

Impacts would be significant in the short and intermediate term until establishment of mitigation replantings.

Bypass Channel Plan

All significant impacts can be mitigated to less than significant levels in the long term, based on the completion of detailed assessments and consultation defined for the channel widening above. Impacts would be significant in the short and intermediate term until establishment of mitigation replantings.

4.5 AESTHETICS AND RECREATION

This section addresses the potential for the project to affect visual resources and view corridors during construction (short term), during revegetation establishment (intermediate term), and operation (long term).

4.5.1 Regulatory Setting

Evaluation of the effect the proposed project may have on the aesthetics or visual resources of the existing environment is provided in the CEQ Regulations sections as stated below:

40 CFR 1502.16 Environmental Consequences

> This section shall include discussions of: (c) possible conflicts between the proposed action and the objectives of federal, regional, state, and local land use plans, policies, and controls for the area concerned; (g) urban quality, . . . and the design of the built environment.

40 CFR 1508.8 Effects

> Effects and impacts . . . include . . . aesthetic, cultural, social, or health, whether direct, indirect, or cumulative.

4.5.2 Existing Conditions

Regional Setting

The following discussion of existing aesthetic and recreation resources within the project area is based on the visual analysis prepared by Jones & Stokes for the *EIR/EIS for the Guadalupe River Flood Control Project* (Parsons Engineering-Science 1997) and an inventory, forecast, and analysis of aesthetic and recreation resources in the *Upper Guadalupe River Reconnaissance Report* (COE 1989) and the *Upper Guadalupe River Interim Feasibility Report, Environmental Working Paper* (BioSystems Analysis 1995). Field visits for the analysis in the EIR/EIS were conducted during summer 1989, summer and fall 1990, fall 1992, spring 1993, and summer 1996.

The Guadalupe River riparian corridor provides visual relief from surrounding urban development. One of few rivers in the urban area of Santa Clara Valley that has not been constricted to a narrow band by the use of levees, the upper reaches of the Guadalupe River are predominantly lined with extensive vegetation that is considered an important visual resource.

Although scenic due to its natural character, the public recreation use of the corridor is limited. Portions of the river along residential areas are used informally, as evidenced by existing paths along the banks. Most of the riverbank, however, is posted with "No Trespassing" signs, and developed trails or other recreational facilities along the river banks do not exist. The river, however, is navigable by small watercraft such as canoes and kayaks at moderate to high flows throughout the feasibility study area (Lawrence Johmann, Western Waters Canoe Club 1997; Appendix M, Letter J).

The City of San Jose is interested in developing recreational opportunities and is coordinating their efforts with the SCVWD's flood control planning process. The city's interim report for the south corridor includes conceptual plans for trails and park development that give consideration to the flood-control alternatives already being developed for the feasibility study area.

The visual and recreational use setting is provided by reach below.

Reach 7. The riparian forest along Reach 7 is dense for most of its length, with only few visible areas of barren earth bank or riprap-covered surfaces (see Figure 4.5-1). The east bank is visible from Lelong Avenue, SR 87 and the LRT West Alma Avenue Station. It backs up against the Elks Lodge parking lot. The western bank is visible from backyards of residential development. Travelers on the Willow Street Bridge experience expansive, although fleeting, views.

Public access to the river is limited in Reach 7, though a narrow trail runs along the top of the east bank inside the Elks Lodge parking lot fence. The trail is used by pedestrians to reach West Alma Avenue.

Reach 8. Reach 8 includes dense, mature riparian tree canopy as well (see Figure 4.5-2). Residents living on Mackey Avenue can view vegetation on the east bank, while the west bank growth is visible to Creek Drive residents. Public views of both banks are experienced from the Willow Glen Way Bridge, and background views are experienced by travellers on SR 87 and the LRT. The Willow Glen Way Bridge has a rustic or historical quality that contributes to the neighborhood character.

Residents on Creek Drive can easily access the river and have in some cases constructed decks and treehouses near the edge of the riparian forrest corridor.

Reach 9. The narrow river corridor in Reach 9 includes tall riparian forest (see Figure 4.5-3). Homes back up to the river and residents enjoy open space views from their backyards. Public views of the river are also experienced from Almaden Road downstream of Curtner Avenue. Other public views are from the Willow Glen Way Bridge, a parallel, adjacent pedestrian suspension bridge, the Malone Road Bridge, and the Curtner Avenue Bridge.

Access to the river is limited along the reach, although residents, particularly on the west bank, have extended their backyard fences to incorporate river corridor areas.

Reach 10A. The visual character of the relatively short Reach 10A is similar to Reach 9, with fairly dense riparian forest along both banks (see Figure 4.5-4). Limited views of the west bank are experienced by residents, while the eastern bank is seen by travellers along Almaden Road and shoppers at the Almaden Shopping Center. Other public views are experienced from the pedestrian crossing on the Almaden Expressway Bridge.

Public use of the eastern river bank is limited due to the narrow Almaden Road shoulder. Both banks are steep, discouraging access.

Reach 10B. Unlike other areas on the river downstream, Reach 10B lacks riparian forest canopy. The banks have been modified by flood control improvements including widening and benching, stepped gabions, and riprap (see Figure 4.5-5). The downstream portion of the reach has minimal vegetation cover and is visible to travellers on SR 87. Although the view of the river contrasts with the adjacent urban landscape, the lack of riparian vegetation at this point makes the area less visually appealing. In the upstream portion of the reach, the eastern bank is visible from residences on Skylark Drive. Portions

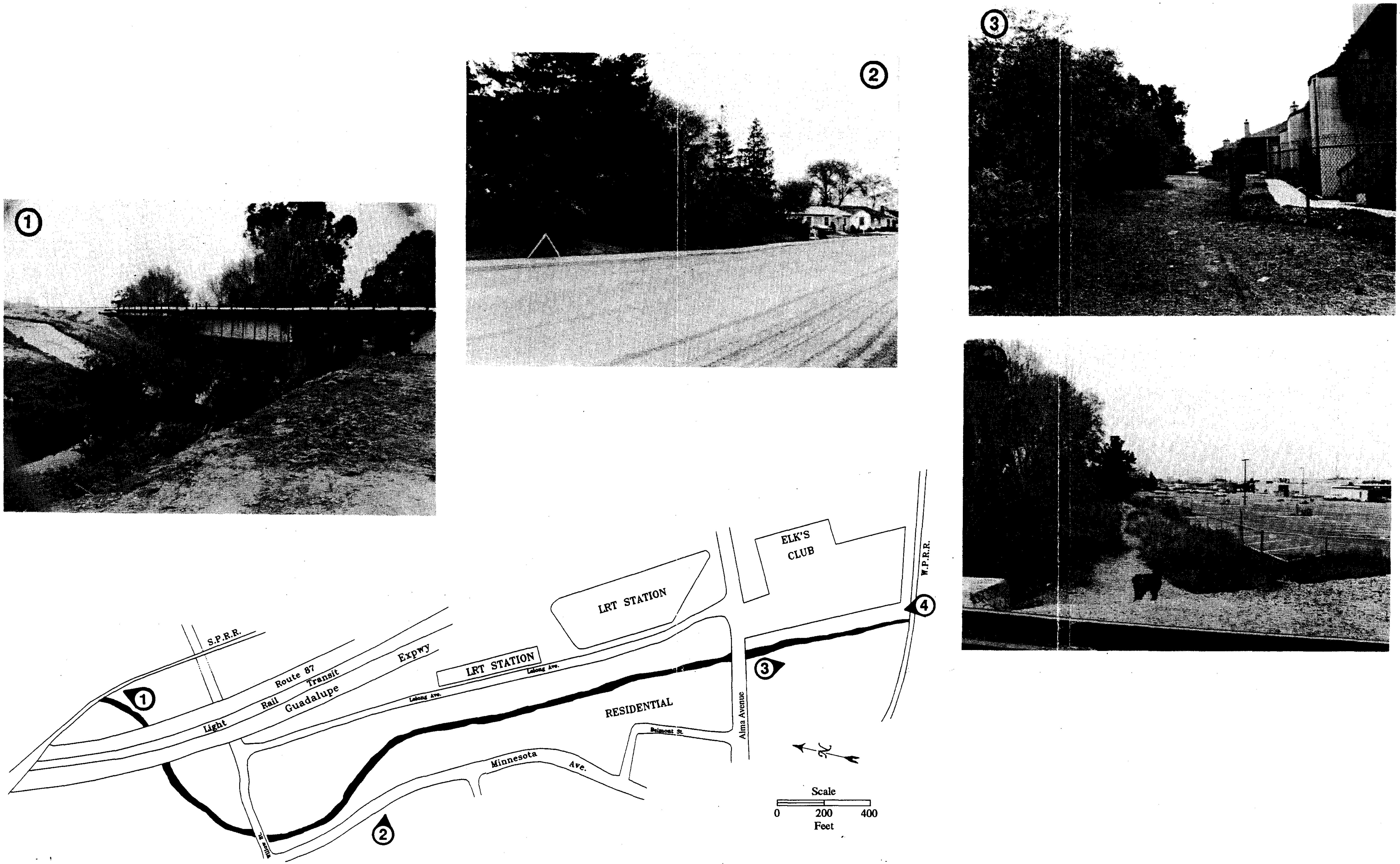
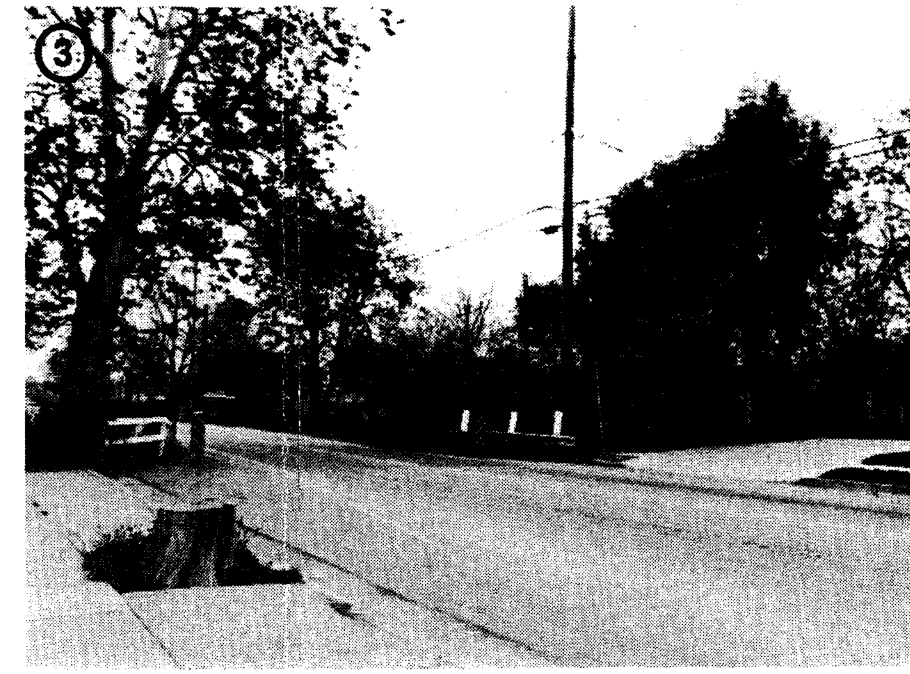
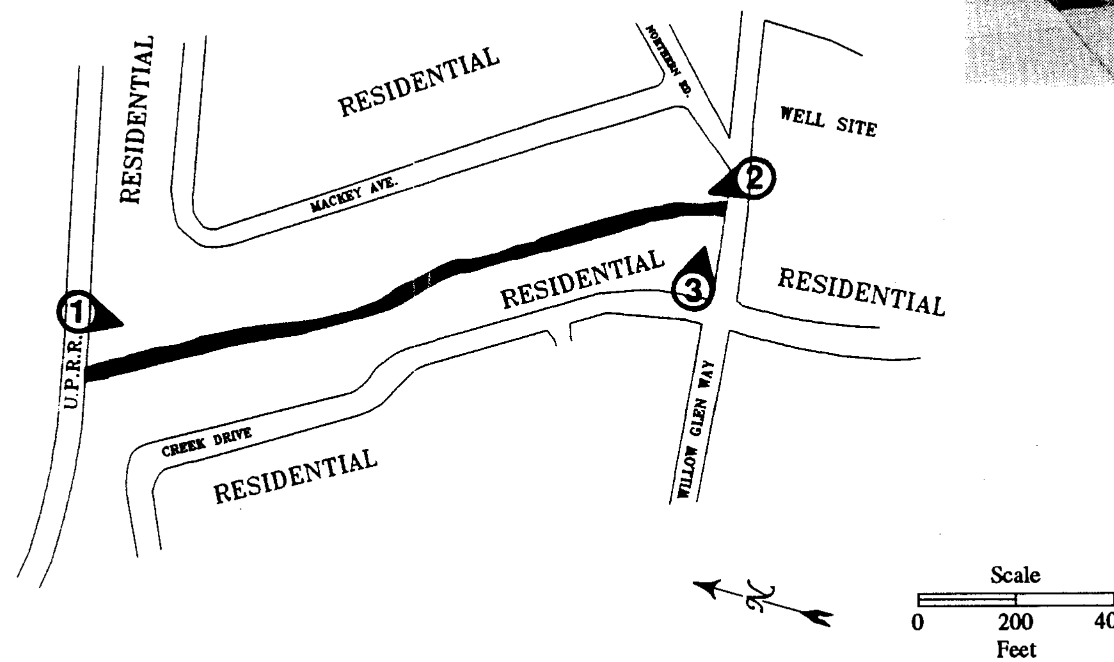


Figure 4.5-1
Reach 7 Existing Visual Setting

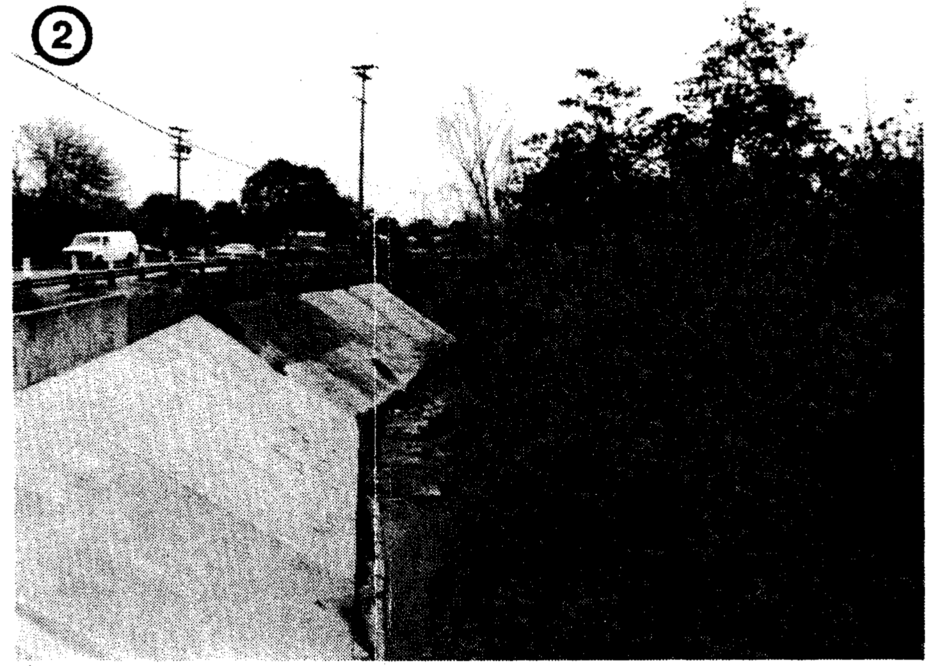
Source: Parsons Engineering Science 1997

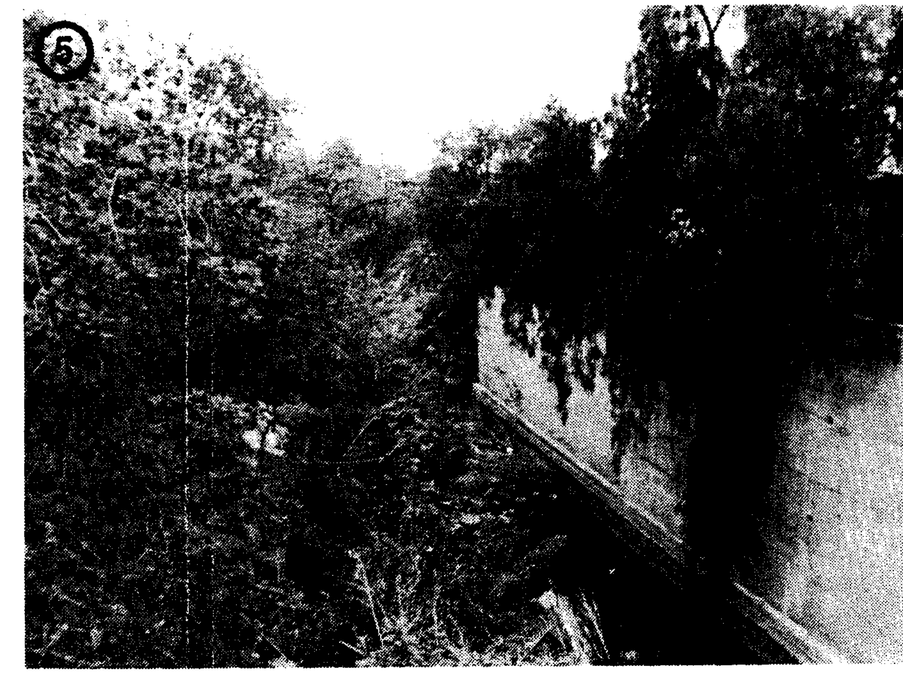


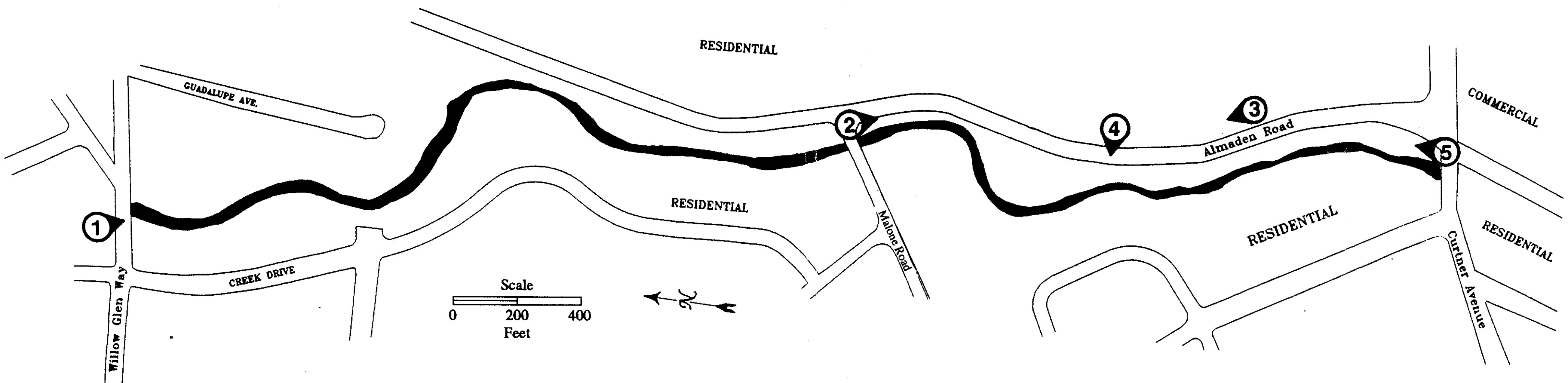


Source: Parsons Engineering Science 1997

Figure 4.5-2
Reach 8 Existing Visual Setting

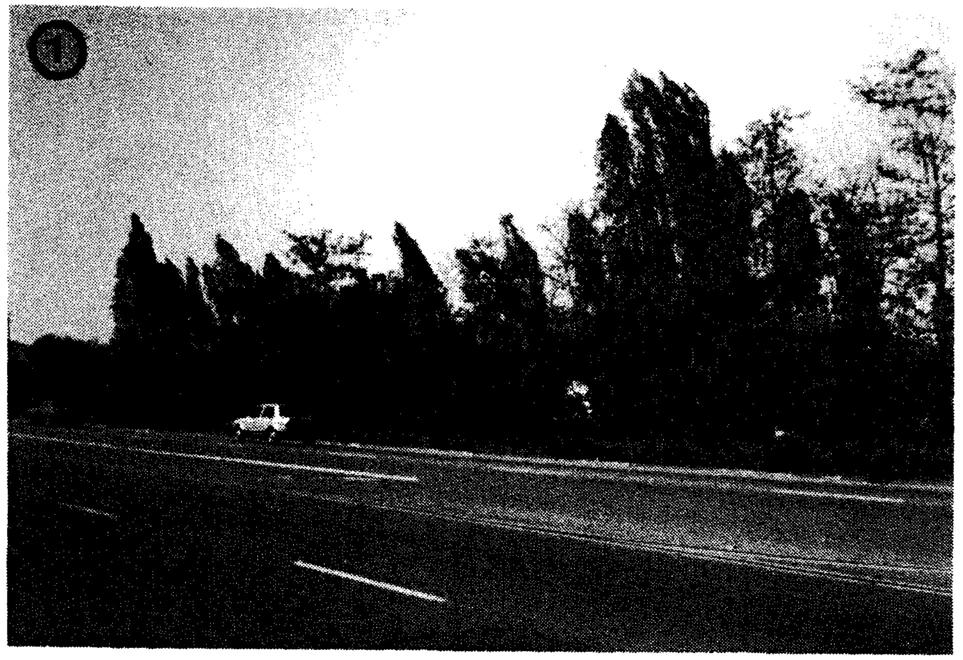


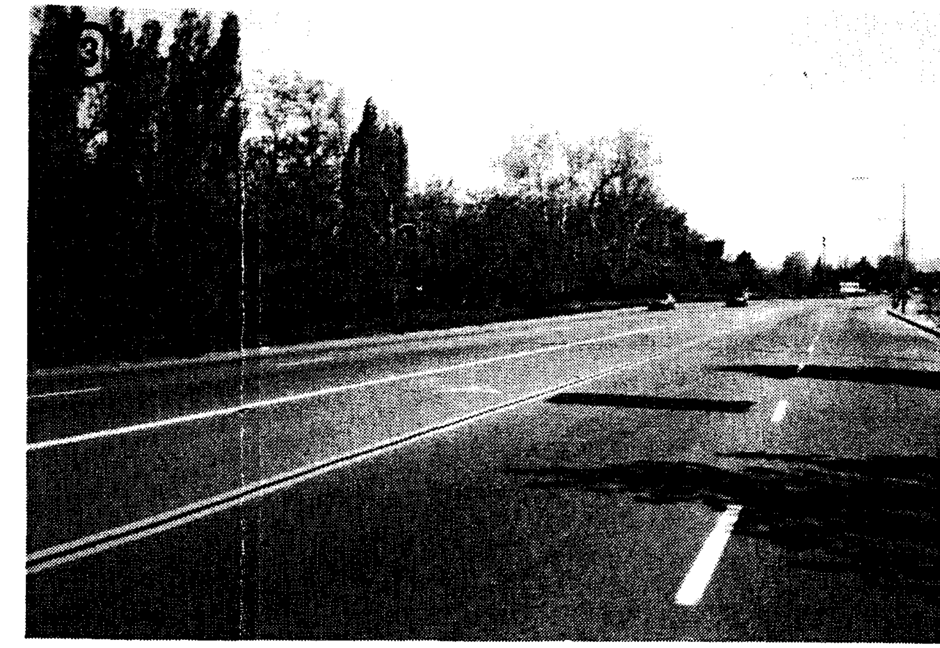


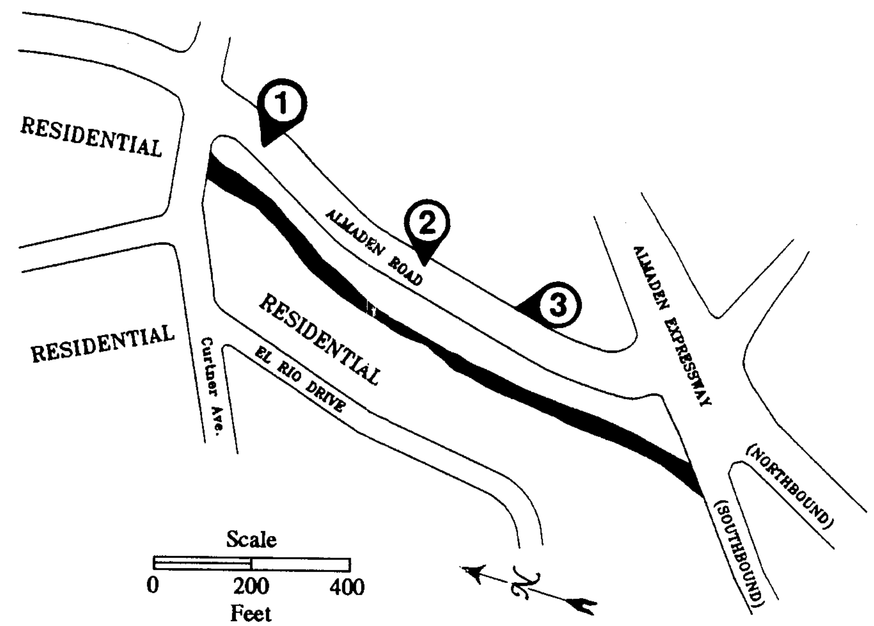


Source: Parsons Engineering Science 1997

Figure 4.5-3
Reach 9 Existing Visual Setting







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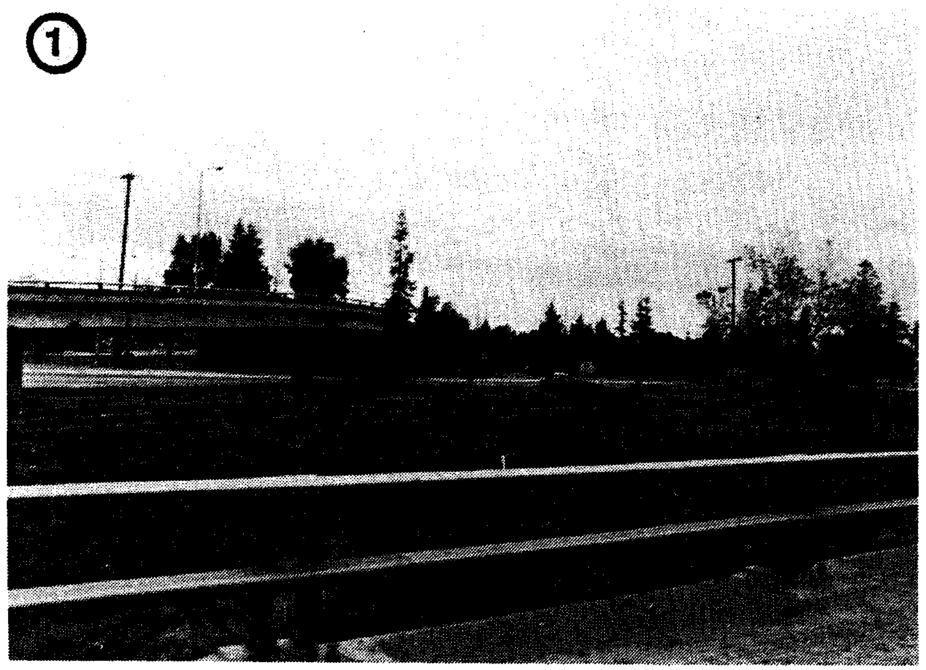
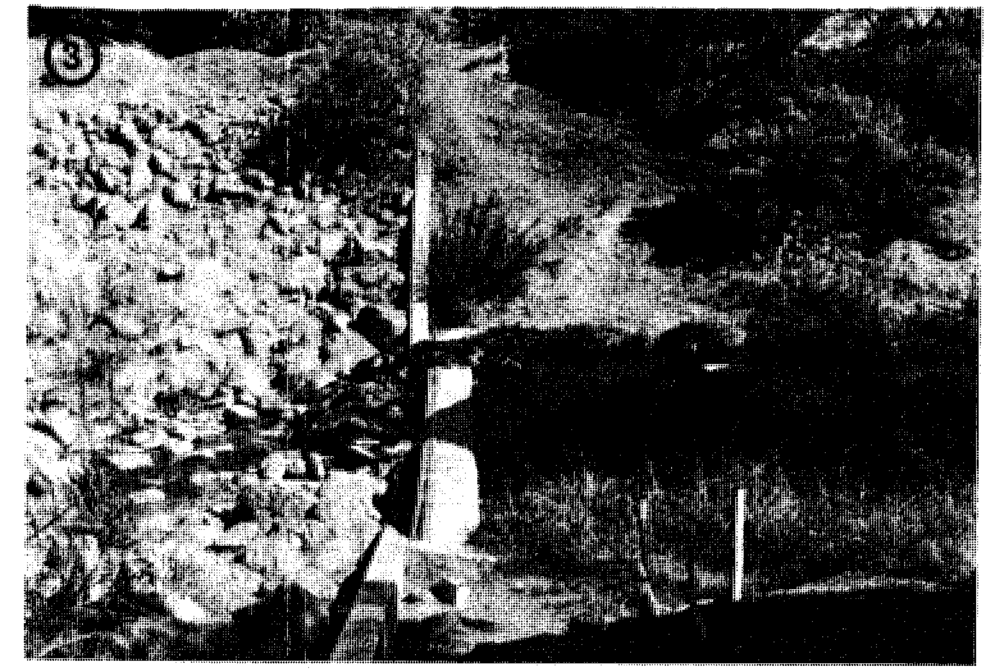
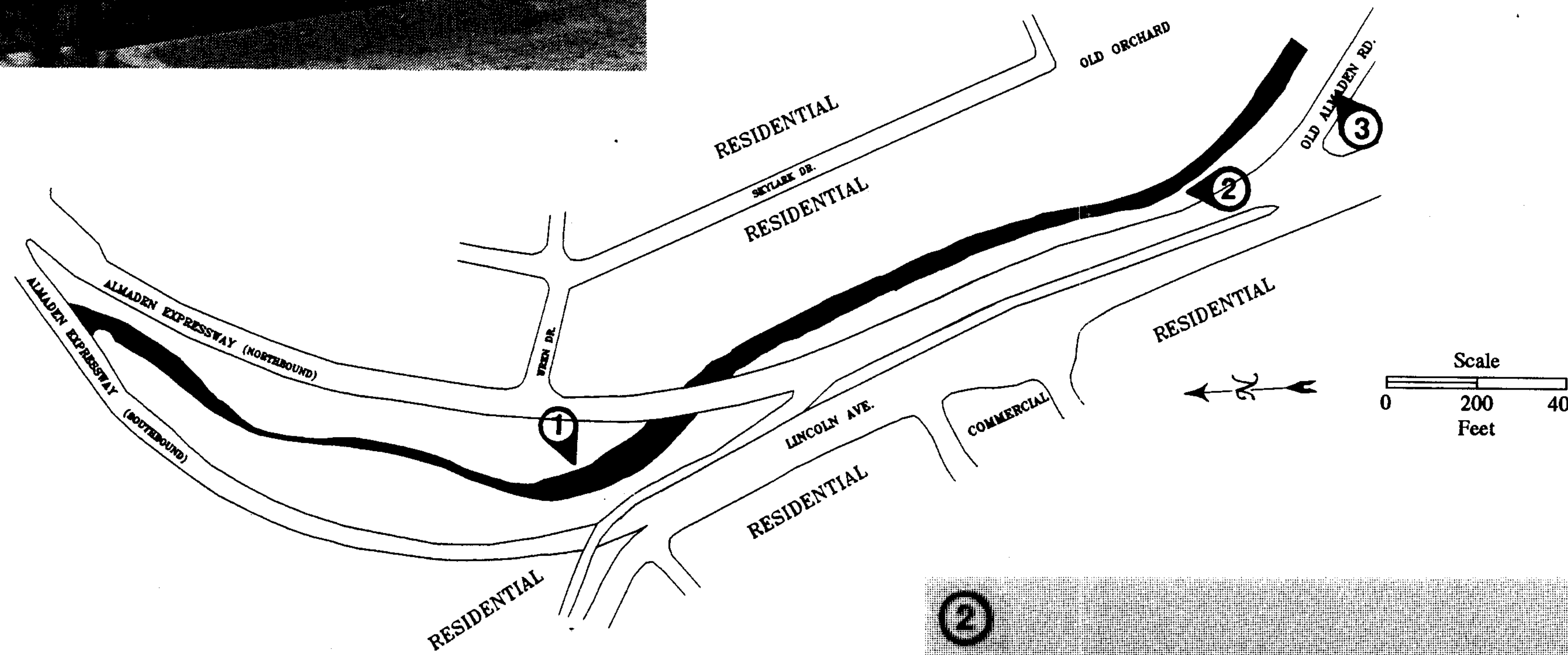
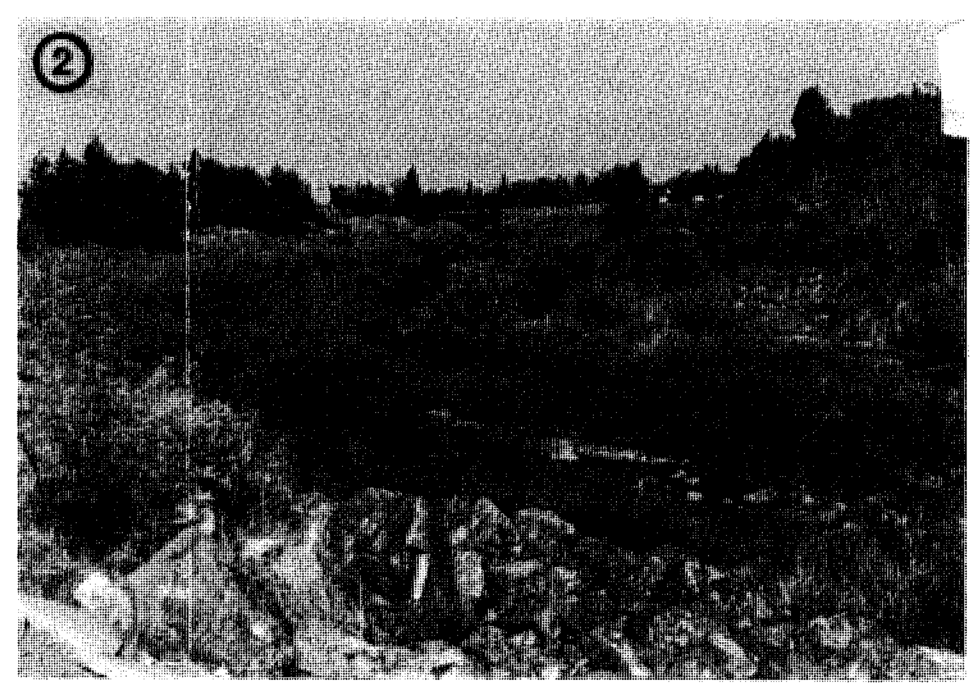
Source: Parsons Engineering Science 1997

Figure 4.5-4
Reach 10A Existing Visual Setting









Source: Parsons Engineering Science 1997

Figure 4.5-5
Reach 10B Existing Visual Setting

of the Valley View Packing Plant orchard are on the eastern bank upstream. Although the river is not densely vegetated, it is visible from adjacent public view corridors as open space.

Recreational opportunities include a small public area adjacent to Wren Drive overlooking the river, and a narrow path following the east bench in the southern portion of the reach.

Reach 10C. North of Foxworthy Avenue, the river channel is narrow and vegetation is dense; south of Foxworthy Avenue, the channel widens and vegetation is sparser (see Figure 4.5-6). Clusters of mature riparian vegetation exist along the river corridor. The Valley View Packing Plant borders the east bank and extends to Hillsdale Avenue; commercial development exists adjacent and upstream of the plant. Travellers on Old Almaden Road experience views of the west bank. Other public views are from the Hillsdale Avenue Bridge and the Capitol Expressway Bridge.

A pathway along the west bank adjacent to Old Almaden Road is used by cyclists, walkers, and joggers, although its narrowness and location next to the busy road minimize recreational opportunities.

Reach 11A. The reach is wide and contains a dense, continuous riparian canopy (see Figure 4.5-7). The west bank of the river is seen by travellers on Chard Drive and the Almaden Expressway, while the eastern bank is visible from the residential backyard on Wellington Square. Riparian growth screens views of Almaden Expressway traffic from these residential views.

Walkers and cyclists use the bicycle path along the north shoulder of the Almaden Expressway, enjoying views of the river's west bank. A wide bench on the top of the east bank between the Wellington Square residential area and the river is informally used by joggers, hikers, walkers, and cyclists.

Reach 11B. This reach is covered with mature riparian forest on steep slopes, with a wide bench along both banks (see Figure 4.5-8). Residential backyards abut the eastern river banks, while public views of the west bank are enjoyed by travellers along the Almaden Expressway. A bicycle lane on the expressway also provides views.

Access to the river is extensive, with the bench along the east bank used by neighborhood residents. The SJWCo property on the east bank upstream portion of the reach is fenced off, but unauthorized recreational use of the area occurs.

Reach 11C. The reach includes riparian forest and stands of eucalyptus trees along steep banks (see Figure 4.5-8). Views of the east and west banks are similar to Reach 11B. Additionally, public views are experienced from the Branham Lane Bridge.

Reach 12. Bank vegetation includes scattered mature riparian, orchard, and eucalyptus trees, with sparse non-native ground cover along the channel bottom (see Figure 4.5-9). Residential development along Tonino Road fronts the eastern bank in the upstream portion of the river. Agricultural activity borders the west bank in this portion. The downstream areas of the river are flanked by percolation ponds, and have only sparse bank vegetation. Public views of the river are experienced from the Almaden Expressway and bicycle lanes (although distant), the SR 85 overpass, Chynoweth Avenue, Blossom River Drive, Blossom Hill Road, Branham Lane, and the Oakridge LRT station. Water reflections on the river and pond and a general open space character provide an important visual quality.

The percolation ponds are informally used for fishing and swimming.

Ross and Canoas Creeks: The creek stretches within the feasibility study area are flood control channels with trapezoidal banks, forming narrow, straight channels with no riparian forest. They are bordered by residential development, but appear as drainage ditches. These sections of the creeks have overall a very low aesthetic value. Public access to the channels is prohibited by locked chain-link gates.

4.5.3 Environmental Effects

Impact Significance Criteria

The project would cause an adverse, significant aesthetic impact if it would result in either of the following:

- Substantially degrade the quality of an identified visual resource, including but not limited to unique topographic features, undisturbed native vegetation, surface waters and major drainages, and parks or recreational areas; or

- Substantially obstruct any scenic vista or view visible to the public.

Beneficial impacts would result if project components would improve the visual quality of views from residences or publicly accessible vantage points (e.g., roads, trails, etc.).

The project would cause an adverse, significant impact on recreational opportunities if it would impede or conflict with established recreational uses. (This definition incorporates criteria listed in CEQA Guidelines Appendix G [w]).

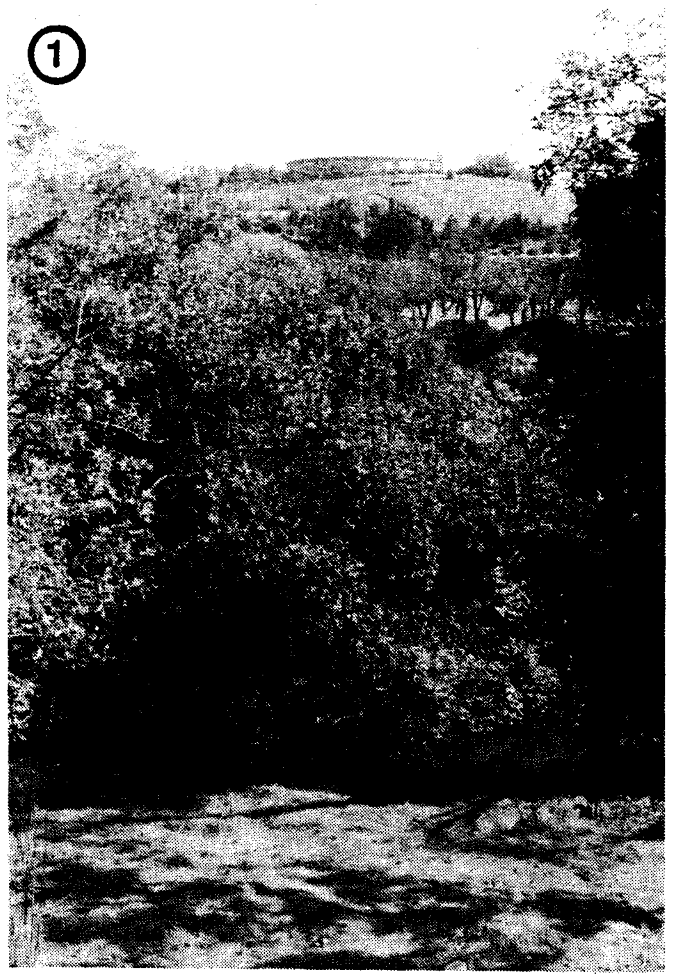
Channel Widening Plan

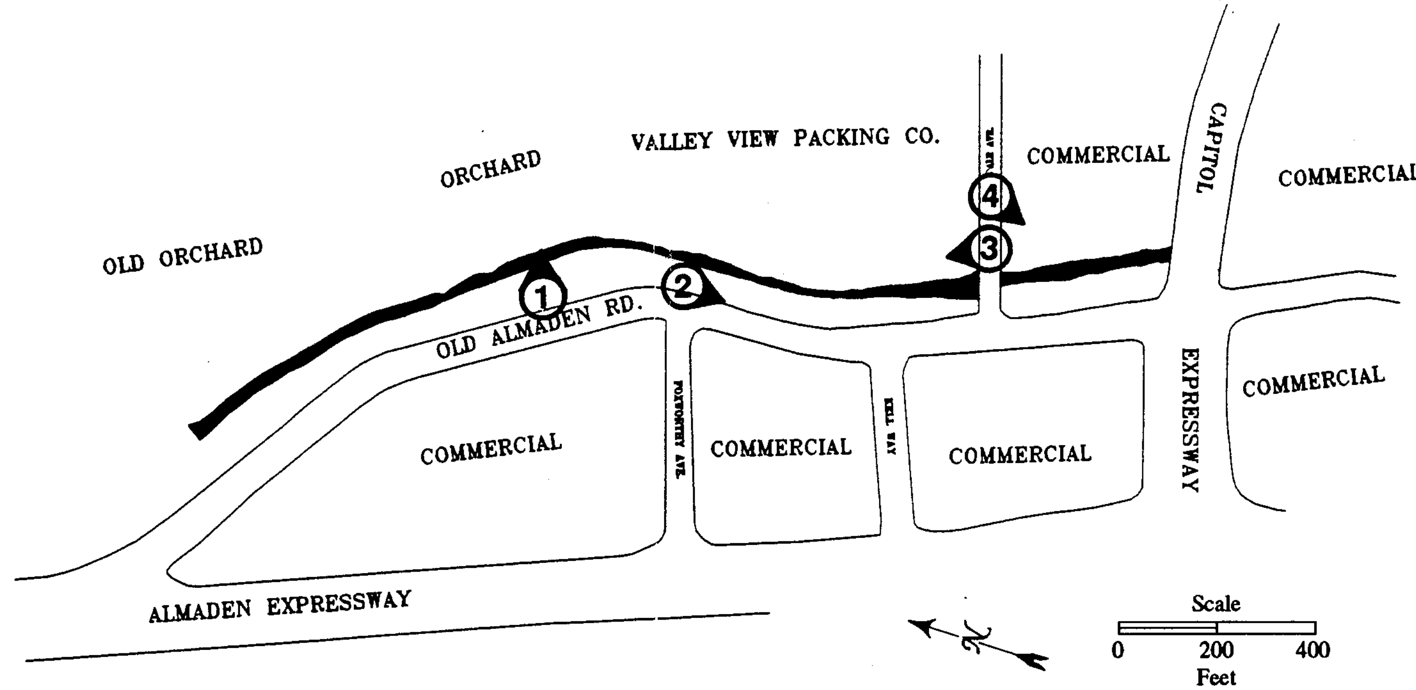
General Characteristics

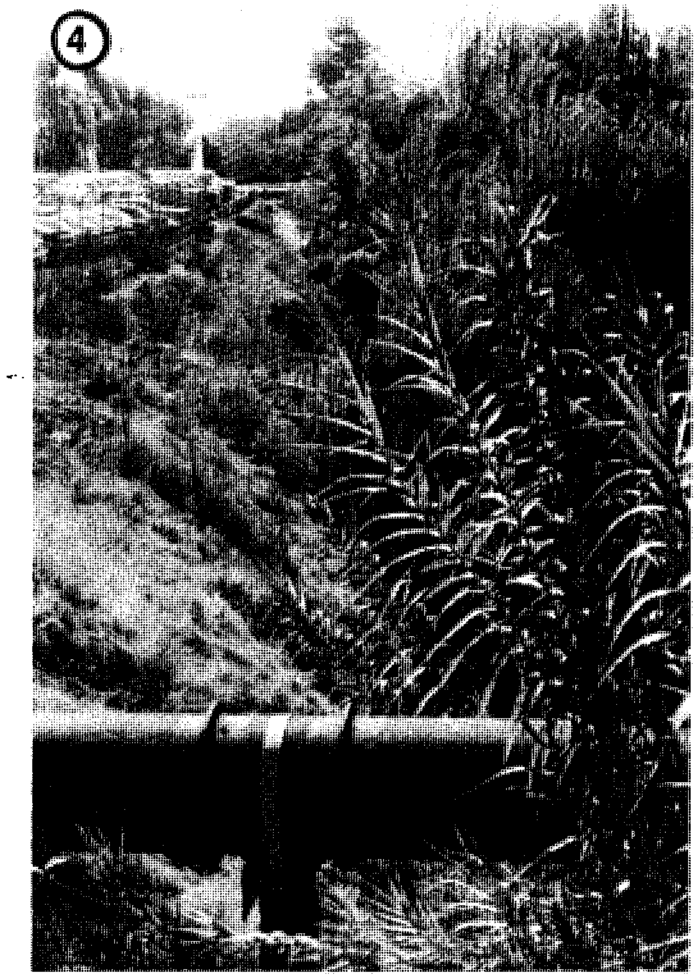
Construction activities, constructed project elements, and operation/maintenance activities following project construction would result in impacts on visual resources. Construction activities resulting in short-term visual impacts include vegetation removal, earthwork activities, removal of infrastructure and structures, and activity at heavy equipment and material staging and storage areas. Constructed project elements including river channel modifications, access ramps, maintenance roads, and other associated facilities could cause long-term visual impacts. Operation and maintenance activities (in addition to current management practices) have not been finalized by the Corps, so the SCVWD upper Guadalupe River Flood Control Project maintenance plan (see section 6.1.8) is used to reasonably project impacts. They may, however, include vegetation control and maintenance, removal of sediments, debris, and obstructions from channels and adjacent areas, and repair, cleaning, and replacement of facilities and structures that could result in long-term visual impacts.

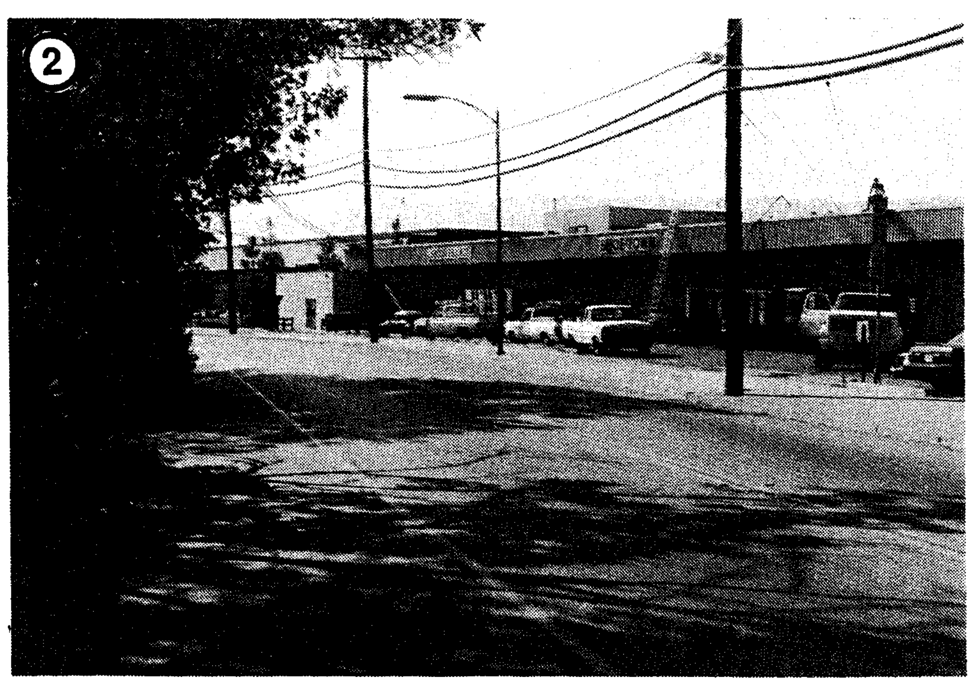
Construction-Related Activities

Construction-related activities in visually sensitive reaches of the stream corridor would reduce the visual quality of these areas. Activities that reduce visual quality include the following: earthwork activities



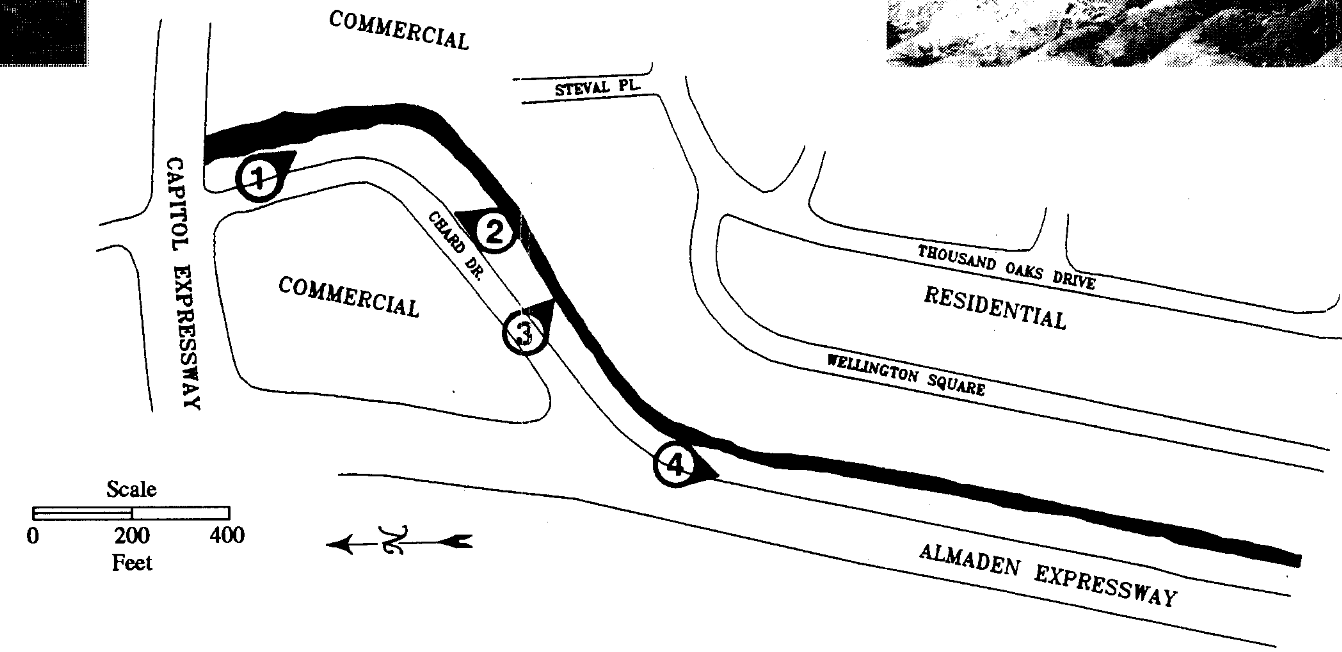






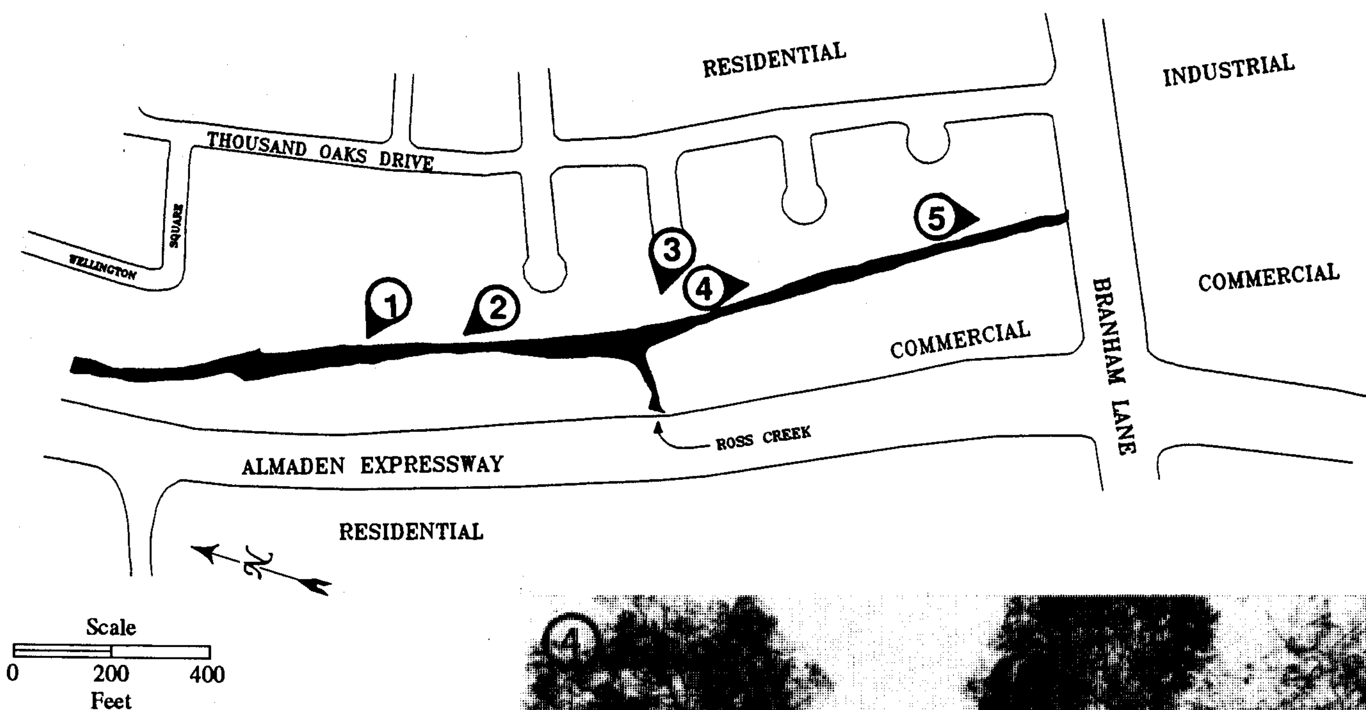
Source: Parsons Engineering Science 1997

Figure 4.5-6
Reach 10C Existing Visual Setting



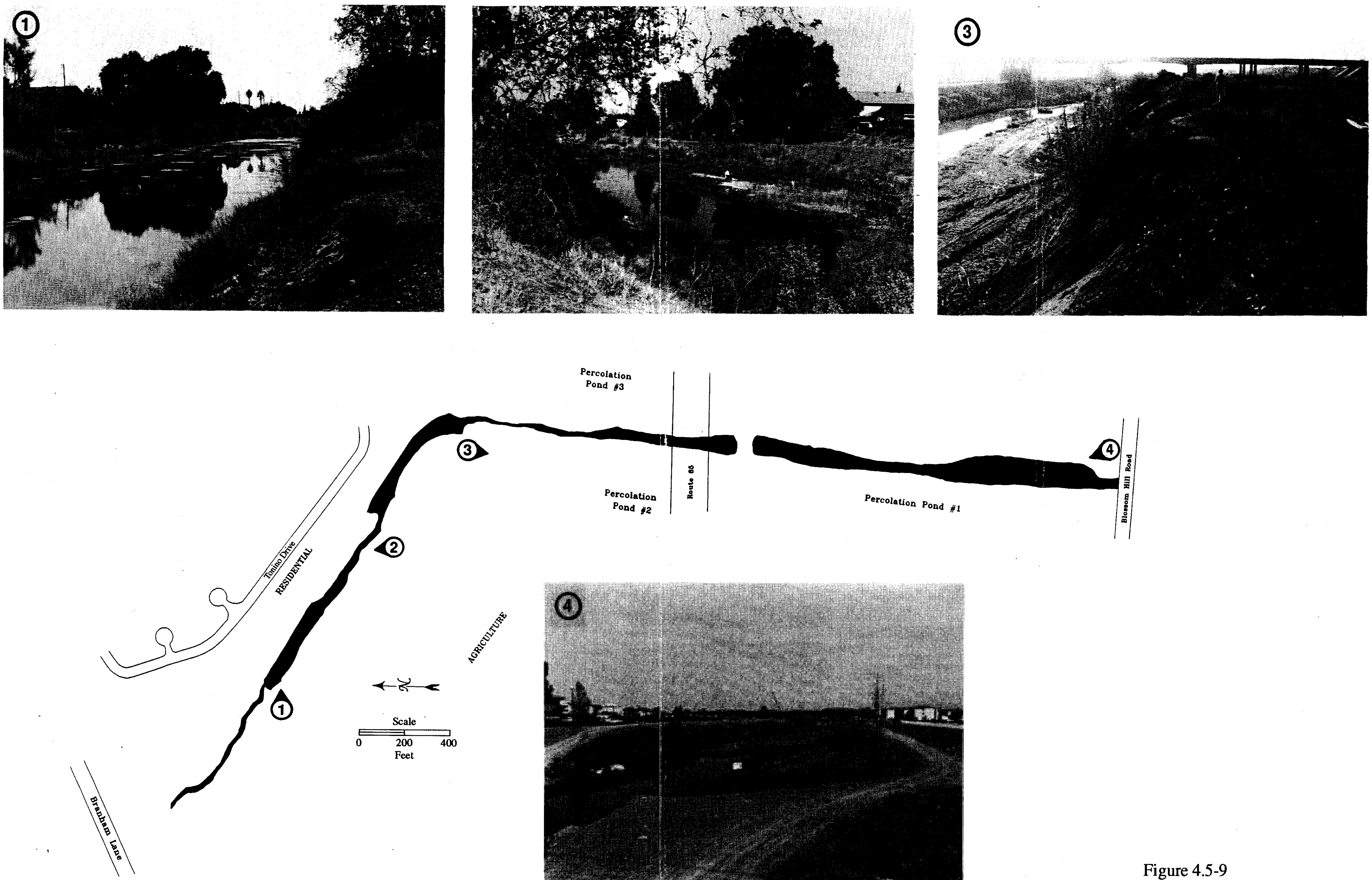
Source: Parsons Engineering Science 1997

Figure 4.5-7
Reach 11A Existing Visual Setting



Source: Parsons Engineering Science 1997

Figure 4.5-8
Reach 11B and 11C Existing Visual Setting



Source: Parsons Engineering Science 1997

Figure 4.5-9
Reach 12 Existing Visual Setting

(e.g., clearing, grading, and excavating); building flood control features; siting temporary offices, fences, sanitary facilities, and other structures; building temporary access roads; and establishing staging areas to store equipment, construction materials, excavated material, and debris. These impacts would be significant but would be mitigated to insignificance by locating staging and equipment storage areas outside of visually sensitive areas, and if not feasible, then screening them from general viewing. Construction impacts on river recreation activities such as canoeing and kayaking would be short-term, and therefore less than significant.

Removal or Substantial Reduction of Views of Important Vegetation

Removing mature vegetation from the stream corridor would reduce its attractive visual quality. Views of streamside vegetation experienced from the highly urbanized area adjacent to the Guadalupe River are relatively scarce outside of the feasibility study area. Removing mature riparian forest would substantially reduce the scenic qualities of this natural environment along the river corridor. These significant impacts on visual resources of the feasibility study area can be feasibly mitigated to less than significant by revegetation planting. The impacts, however, would be experienced for several years and, in some areas, up to several decades until the mitigation replanting vegetation achieves the height and density of the existing riparian habitat. (The SCVWD revegetation plan would achieve a minimum of 50 percent visual screening in 5 years [Parsons Engineering Science 1997].) These impacts are called "intermediate-term" impacts because they can extend longer than short-term construction impacts, but would eventually be mitigated to less than significant by replanting, and are therefore not considered "long term."

Increased Visibility or Viewer Awareness of Visually or Aesthetically Incongruous Elements from Removing or Reducing Screening Vegetation

Much of the vegetation in the stream corridor screens facilities such as parking lots, storage areas, service areas, garages, streets and freeways, and other similar elements of urban development. Reducing or removing riparian forest that screens these features can reduce the overall visual quality of the river corridor. This significant impact could be feasibly mitigated to less than significant by revegetation planting. The loss of screening vegetation impact would be reduced as mitigation plantings would become established. Although some areas would suffer a permanent reduction in visual screening, revegetation would mitigate most of these impacts over time. In many areas, the revegetation would represent improved screening over existing conditions. Overall, visual screening would be increased relative to existing conditions in the long term.

Degradation of the Natural-Appearing Character of the River Corridor

Natural-appearing river corridors are a scarce visual resource in urbanized areas of the Santa Clara Valley. The removal of mature vegetation and addition of flood control structures in some areas could degrade the natural-appearing aesthetic character of the river corridor. Channel widening could modify existing natural, irregular, and meandering lines of the streamcourse and the undulating forms of streambanks, introducing more regular engineered curves and straight lines. In some areas, widening the channel and increasing the steepness of side slopes would broaden the stream corridor cross section, creating a more open appearance that would substantially alter the stream's present topographic character. Some landforms, such as drainages, berms, and side slopes of channels, help to blend structural elements with their surroundings and contribute to the corridor's aesthetic character and visual quality. Removing or substantially altering these landforms could reduce this quality. These changes would be significant impacts on the feasibility study area's visual resources, but would be mitigated to insignificance with revegetation plantings. Mitigation plantings would minimize the extent of the impact over time.

Removal of mature vegetation in visually sensitive areas along the stream corridor would result in reduced shade, and could degrade the general aesthetic character of the neighborhood. This significant impact on the feasibility study area's visual resources would be mitigated to insignificance by the mitigation revegetation plantings as described above.

Reduced Visual Quality by Removing or Replacing Structural Elements or Introducing Visually Incongruous Structures and Engineered Improvements

New structures and engineered improvements in visually sensitive areas of the stream corridor could introduce built elements differing substantially from and contrasting with existing natural visual elements in terms of form, line, color, and texture. Introduction of substantially different and contrasting elements could reduce the visual character and quality of visually sensitive areas of the river corridor, including introduction of man-made structural elements with regular patterns of materials and surface treatments. This significant impact on the feasibility study area's visual resources would be mitigated to insignificance with the long-term establishment of proposed mitigation revegetation plantings.

The following provides a short description of impacts on visual resources and recreational uses by reach.

Reach 7. Significant short-term impacts on visual resources would result from removal of vegetation along the eastern bank. Establishment of replacement vegetation would reduce the effect to less than significant. Construction of the floodwall in the Elk's Lodge parking lot would not block views of the riparian corridor. Resulting impacts on visual resources would be insignificant.

Recreational uses would not be affected.

Reach 8. Significant short-term impacts related to construction equipment staging and storage would occur during construction of the floodwalls on both sides of the river. These impacts would be reduced to less than significant by locating the staging and storage outside of sensitive visual areas or by screening them. The floodwalls would not require removal of riparian canopy on the river banks, so residential views on either side of the river would not be impacted. Floodwall construction would result in long-term impacts of river views as seen from the Willow Glen Way Bridge, but these views are transitory and are less than significant.

Reach 9. No adverse impacts would result since no construction is proposed. Revegetation mitigation at station 829+00 would provide a beneficial visual impact upon establishment.

Reach 10A. Widening of the eastern bank would result in significant short- and intermediate-term impacts on views experienced by travellers along Almaden Road and on the Almaden Expressway Bridge, and views of residents on the west side of the river. The impacts would be mitigated to insignificance with establishment of revegetation plantings.

Limited recreational use of the river along the east bank would not be significantly impacted by proposed improvements.

Reach 10B. No impacts would result as no flood control protection construction is proposed. Mitigation planting would provide a beneficial visual impact by enhancing views of the river from SR 87 and Skylark Drive.

No recreation impacts would result from the proposed plan.

Reach 10C. Views experienced from Old Almaden Road would be subject to significant short- and intermediate-term impacts from proposed west bank widening. Views of the river from the Hillsdale Avenue would be significantly impacted over the long term, as would the views from the Capitol Expressway Bridge. These impacts would be mitigated to insignificance with establishment of mitigation revegetation. The plantings on the east and west banks would result in a long-term increase in the extent and density of riparian forest within the reach. Mitigation plantings on the east bank would be more dense than existing riparian forest.

The pathway along the west bank adjacent to Old Almaden Road used by cyclists, walkers, and joggers could be removed as part of widening. Although use of the pathway is affected by width constraints and traffic, the loss of the existing recreational amenity is considered significant. No mitigation would be currently provided under the Channel Widening Plan. The Bypass Channel Plan recreational trail component would mitigate this impact to insignificance.

Reach 11. Widening and benching on alternating river banks would remove mature riparian forest viewed from public roadways and/or residential backyards. Widening on the east bank would affect backyard views from Wellington Square, while widening on the west bank would impact views of Almaden Expressway traffic. This would be a significant short- and intermediate-term impact on local visual resources. These impacts would be mitigated to insignificance with mitigation revegetation establishment.

The wide bench informally used by recreationists on the east bank between Wellington Square backyards and the river would be impacted. If this alternative were selected, minor changes in design could avoid impacts on the bicycle path existing on the Almaden Expressway east shoulder on the west river bank. Impacts would be mitigated to insignificance.

At creek flows over 1500 cfs, water would flow over the top of the weir into the bypass channel, creating a waterfall. This would be a hazard to canoeists and kayakers. Mitigation would be public warnings not to use boats on the river during high flows. Impacts would be mitigated to insignificance.

Reach 12. No adverse impacts would result, and establishment of mitigation plantings would provide a beneficial aesthetic impact, though the areas to be vegetated are not visually prominent from publicly-accessible locations.

Ross and Canoas Creeks. Floodwalls would be constructed on the creeks. Ross Creek and Canoas Creek within the feasibility study area are not an important visual resource so aesthetic impacts from floodwall construction would be insignificant. Since there is not public access to the creeks within the feasibility study area, no recreational impacts would occur.

Bypass Channel Plan

Potential impacts on visual resources would be similar in character (short-, intermediate-, and long-term) as discussed for the Channel Widening Plan.

As discussed in section 2.4.2, for purposes of the Corps feasibility study, a recreational trail and facilities would be incorporated into the Bypass Channel Plan. The recreational trail and associated facilities would be mostly within the floodway and would be designed to encourage limited public access along the river for a distance of approximately 4 miles (see Figure 2-8). The recreational trail would be compatible with the Guadalupe River South Corridor park master plan developed by the City of San Jose (Guadalupe River South Task Force Committee). The final plan has not been developed, but would attempt to provide the best views of the Guadalupe River while causing the least impacts on the natural character of the river. Beneficial recreational impacts would result from development of the river trail.

Reach 7. Bypass channel construction on the east bank would result in less than significant impacts. River bank lowering and flood wall construction within the river would result in short-term impacts during this activity, but would not remove riparian forest visible from travellers on local roadways and the Elk's Lodge. The floodwall construction would create long-term visual resource impacts as seen the Alma Avenue Bridge. Since these views are transitory, impacts would be less than significant.

The narrow trail running along the top of the east bank inside the Elk's Lodge parking lot fence would be eliminated, but replaced with the recreational trail on top of the maintenance road, with a picnic area including two tables, benches, and a par course. This is a beneficial recreational impact because greater access would be provided than presently exists.

Reach 8. Bypass channel construction would affect the residential character of Mackey Avenue. The bypass channel would result in short-term construction impacts and intermediate-term impacts until establishment of the mitigation revegetation would mitigate the impact to insignificance.

The recreational trail proposed on top of the maintenance road and a restroom with drinking fountain would provide beneficial recreational amenities.

At flows over 1,500 cubic feet per second (cfs), water would flow over the top of the proposed 190-foot long weir drop structure downstream of Willow Glen Way into the bypass channel, creating a waterfall. Although use of the river at this location is very minor, this would be a significant safety hazard and impact to canoeist and kayakers during this time. Impacts would be reduced to insignificance by posting public warnings to not use watercraft on the river during high flows. No other recreational impacts would result, because the floodwalls would not affect any historical use of the river in this area.

Reach 9. Widening and benching of the east river bank and construction of two 500-foot bypass channels would significantly impact public views from Almaden Road and looking west across the river from homes to the east during the short and intermediate term, until establishment of mitigation revegetation reduces the effect to insignificant.

The recreational trail proposed on the reconstructed Almaden Road would result in a beneficial recreational impact.

Reach 10A. Widening and benching of the east river bank would significantly impact public views as experienced from Almaden Road and the Almaden Expressway Bridge during the short and intermediate term. Cribwall construction on steep slopes would result in long-term impacts as seen from the bridge. These impacts would be reduced over time and reduced to insignificant with establishment of mitigation revegetation.

The recreational trail proposed on the reconstructed Almaden Road would be a beneficial recreational impact.

Reach 10B. Construction of a levee on the west bank would be an insignificant impact on visual resources. The levee height would not be substantial relative to the existing ground surface, and the earthen structure would blend in with the existing ground cover.

The recreational trail on top of the levee maintenance road, and picnic area with 4 tables would be a beneficial recreational impact.

Reach 10C. Widening and benching on the east bank would not be visible by adjacent viewers on public roads, due to the dense riparian forest on the west bank. Limited views from the Capitol Expressway Bridge would be significantly impacted during the short- and intermediate term. These impacts would be reduced over time to insignificance with the establishment and growth of mitigation plantings.

The recreational trail on the widened east bench maintenance road would be a beneficial recreational impact.

Reach 11A. Widening and benching on the east bank would be visible by residents along Wellington Square, resulting in a short- and intermediate-term visual impact. These impacts would be reduced over time and reduced to insignificant with establishment of mitigation revegetation on the east bank, at the top of the cut bank. The overall residual effect would be less than significant.

The wide bench on the east bank informally used by recreationists would be replaced by a paved trail with legal access along the maintenance road, representing a beneficial recreational impact.

Concrete rubble would be removed in Reach 11A. This activity would enhance existing canoeing and kayaking recreational activities.

Reach 11B. Widening and benching on the west bank would be visible by travellers along the Almaden Expressway, including bicyclists. Residents on the east bank could experience some visual impact due to removal of trees on the east bank. Possible widening on the west bank also could result in visual impacts. Impacts on visual resources would be significant during the short and intermediate term. These impacts would be reduced over time and reduced to insignificant with establishment of mitigation revegetation.

A concrete low flow crossing would be removed, and the channel bottom would be deepened. These activities would enhance existing canoeing and kayaking recreational activities. The recreational trail on the widened east bench maintenance road, restroom with drinking fountain, and four picnic tables with benches would provide a beneficial recreational impact.

Reach 11C. West bank widening and benching impacts would be the similar to those in Reach 11B. Public views from the Branham Lane Bridge would be significant in the long term as well, because the cement cribwall-lined bank slope would be a contrast to the native banks. These impacts would be reduced over time and reduced to insignificant with establishment of mitigation revegetation.

The recreational trail on the widened east bench maintenance road would provide a beneficial recreational impact.

Reach 12. Widening of the west bank and reconstruction of levees would not remove significant vegetation. The construction impacts would be significant in the short term, but no adverse intermediate- or long-term impacts would result. Location of equipment staging and storage outside of visually sensitive areas or screening them would mitigate the short-term impact to insignificant. Additional riparian forest planting would provide a beneficial visual impact.

The recreational trail on the improved maintenance road would be a beneficial recreational impact.

Ross and Canoas Creeks. Floodwalls would be constructed on Canoas Creek, while Ross Creek would be widened. Banks on both creeks would be covered with cement articulated mat. The construction would not result in adverse visual or recreational impacts, because the creeks within the feasibility study area are not an important aesthetic resource. Since there is not public access to the creeks within the feasibility study area, no recreational impacts would occur.

No-Action Alternative

No impacts on visual resources or recreational opportunities would result under this alternative.

4.5.4 Mitigation Measures

Channel Widening Plan

The following measures are recommended to mitigate significant aesthetic impacts.

1. In the event flood control construction is interrupted for periods of over two weeks, all equipment and materials shall be moved from the temporary staging area to a central equipment area to minimize the localized impacts on visual resources.

2. All areas within significant view corridors where vegetation is removed shall be replanted as soon as feasible and graded areas restored as closely as possible to their original contours. The planting plan shall include irrigation as necessary and monitoring of the planting over a minimum 5-year period to ensure that the vegetation is successfully re-established.

3. Staging, heavy equipment storage, and construction material storage areas shall be located outside visually sensitive areas where feasible. If staging areas cannot be located outside visually sensitive areas, they shall be screened from general viewing. Screening may be accomplished using natural wood fencing (minimum 5-foot-high) or other natural-appearing screening materials that effectively screens views of equipment storage areas.

4. Graded areas and vegetation removal shall be minimized.

5. Views of vegetation of high visual interest or aesthetic value that have been removed in visually sensitive areas shall be reestablished as part of project implementation. Riparian forest consistent with biological mitigation goals shall be established that also provides

high visual values including screening (e.g., coast live oaks, sycamores, toyon, and cottonwoods).

6. Views of visually incongruous elements in visually sensitive areas resulting from project implementation shall be screened with vegetation of mixed height, using locally native riparian species. Replanting shall emphasize trees that reach a height of at least 20 feet in 10 years (except where prevented by site conditions) and shrubs and small trees that can normally reach a height of at least 6 feet in 5 years. Vegetation foliage shall effectively achieve a minimum of 50 percent screening in 5 years and 75 percent screening in ten years.

7. The revegetation plan shall include top-of-bank screens with native evergreen trees and shrubs where adequate space is available within the existing right-of-way.

Bypass Channel Plan

In addition to the Channel Widening Plan measures defined above, the following measures are required to mitigate significant impacts.

1. Flood control structures and ground stabilization shall incorporate materials with earth tone colors (e.g., shades of brown, tan, and gray), with generally coarse and varied textures, avoiding smooth or shiny surfaces and white or other bright colors. The structures shall allow for establishment of vegetation including the following:

   - planting native vines and ground covers in openings in crib walls; and

   - planting native vines and brambles and where possible, trees and shrubs in gabion walls.

2. Recreational opportunities shall be given detailed consideration, in coordination with local interests, during all phases of project development. Appropriate cost-shared recreation features shall be identified that best use project lands to maximize the overall project benefits, while minimizing impacts on habitat values. Flood control features, such as bridges, maintenance roads, and access points, shall be designed to allow continuous trail access along the river.

3. Inter-agency coordination shall continue to assure that the recreational features and uses for the Guadalupe River Corridor Park would be incorporated into the flood control project design. Key representatives from the San Jose Department of Recreation, Parks and Community Services, the City of San Jose, the SCVWD, and the Corps shall continue to meet at the beginning of each critical phase of the project to identify and reconcile potential differences and to maintain compatibility between the park master plan for the corridor and the corresponding elements of the flood control design. Compatibility with the appropriate policies of the City and County Land Use Elements related to discouraging the disturbance of riparian habitat by development and/or recreational uses shall be retained by coordinating trail design with the San Jose Department of Recreation, Parks and Community Services. Whenever trail placement could adversely affect the habitat value of the riparian forest corridor, the trail shall avoid those portions of the corridor sensitive to human intrusion.

4. Signs with warnings to avoid use of watercraft during high flows on the river, particularly within Reach 11, shall be posted.

4.5.5 Unavoidable Significant Adverse Impacts

The mitigation measures identified above would reduce all short-, intermediate-, and long-term impacts to insignificant levels, except for loss of recreational access along the west bank adjacent to Old Almaden Road under the Channel Widening Plan. This impact would be significant and unavoidable. The Corps should work with the City to devise local mitigation, if the City is interested.

4.6 NOISE

This description of the existing noise environment in the project area and the analysis of potential noise impacts of the Guadalupe River flood control project was derived in part from the noise impact assessment prepared for the *EIR/EIS for the Guadalupe River Flood Control Project* (Parsons Engineering Science 1997). The assessment was based on noise data obtained from available studies in the project region and field measurements of ambient sound levels.

Noise Measurement and Terminology

Noise is defined as unwanted sound that disrupts normal activities or that diminishes the quality of the environment. Noise is usually caused by human activity and is added to the natural acoustic setting of an area. Major noise sources that contribute regionally and locally to ambient noise levels are transportation-related (mobile) sources, including vehicular traffic, trains, aircraft overflights, and ship traffic. Other noise sources that contribute to local ambient noise levels are stationary sources, such as construction activity, that affect a smaller area.

Sound levels can be easily measured, but the variability in how people react to sound complicates measuring its impact. People judge the magnitude of sound sensation in relative terms such as "loudness" or "noisiness." Physically, sound pressure magnitude is measured on a sound-level scale and quantified in units of decibels (dB).

The human hearing system is not equally sensitive to sound at all frequencies. Because of this variability, a frequency-dependent adjustment called A-weighting has been devised so that sound may be measured in a manner similar to the way the human hearing system responds. The use of the A-weighted sound level is often indicated by using the abbreviation "dBA" for expressing the adjusted decibel measurement. An increase in the noise level of 10 dBA is judged by most people to be a doubling in loudness, whereas most people are unable to detect a change in level of less than 3 dBA.

In a typical outdoor environment, the noise level varies over time according to various activities in the community (e.g., an automobile passing by, an aircraft flying overhead, or a dog barking). Because of the time-varying noise level in a community, the description of the noise environment becomes more difficult without reference to a specific point in time. A description of the noise environment with a single number to represent an hour or even a whole day is desirable so that easy reference and comparisons can be made. A method widely used in the United States considers the average noise level over a period of time and is referred to as the equivalent level (L_{eq}). L_{eq} represents an average noise level in an environment where the actual noise level varies with time.

Land uses such as housing, religious, educational, convalescent, and medical facilities are more sensitive to increased noise levels than are commercial or industrial land uses. These noise sensitive land uses are referred to as noise sensitive receptors.

4.6.1 Regulatory Setting

Federal, state, and local governments have established noise guidelines and regulations to preserve quality of life in the community and to protect citizens from potential hearing damage and various other adverse physiological, psychological, and social effects associated with excessive noise. Several methods have been devised to relate noise exposure over time to community response.

The U.S. Environmental Protection Agency (EPA) has developed the day-night average noise level (L_{dn}) as the rating method to describe long-term annoyance from environmental noise. L_{dn} is similar to a 24-hour L_{eq} A-weighted, but with a 10 dB compensation for nighttime (10 P.M. to 7 A.M.) noise levels to account for increased annoyance by noise during normal sleep hours. The U.S. Air Force and the U.S. Department of Housing and Urban Development also use L_{dn} for evaluation of community noise impact.

The State of California has adopted the Community Noise Equivalent Level (CNEL) for environmental noise monitoring purposes. CNEL is similar to L_{dn} but includes a weighting of 5 dB during evening hours (7 P.M. to 10 P.M.), while nighttime hours (10 P.M. to 7 A.M.) are weighted by 10 dB. For outdoor noise in a given environment, the federal L_{dn} noise is usually 0.5 to 1 dB less than CNEL.

The City of San Jose has adopted a Noise Element in their General Plan that contains land use and noise compatibility guidelines consistent with the above-mentioned federal and state guidelines. The city's guidelines address four noise level objectives that are to be evaluated in land use planning and development. These objectives are described in section 4.6.3.1.

4.6.2 Existing Conditions

The existing noise environment of communities along the Guadalupe River is affected by a number of noise sources, most of which are transportation-related (i.e., aircraft, railway, and roadway). Noise measurements conducted at various locations along the feasibility study area corridor indicate that aircraft overflights have an important influence on existing ambient noise levels, especially in the northern one-third of the study area. East of the San Jose International Airport, noise from aircraft operations affects residential properties along Guadalupe Parkway and Sonora, Santa Paula, and San Juan Avenues. South of the airport, noise from aircraft operations affects residential properties north of Willow Street along Palm Street, Harliss Avenue, and McLellan Avenue. Noise levels at these properties are between CNEL 60 dB and 65 dB. In addition, residential properties near the Almaden Expressway and I-87 are substantially influenced by traffic noise.

4.6.3 Environmental Effects

When considering a community's reaction to noise impacts, normalizing factors should be taken into account. According to the U.S. EPA (EPA 1974), the extent to which a community is sensitive to a noise activity will be influenced by the existing background noise level experienced. The higher the existing background noise, the less noticeable will be the new noise source. Similarly, the lower the existing background noise, the more objectionable the intruding noise will be judged by the community. The threshold for such an existing background noise level is between 58 to 62 dBA.

Another important factor is the attitude and awareness of the community toward the project (EPA 1974). If the community is aware that the operation causing the noise is necessary and will not continue indefinitely, the impact will be less objectionable. The result of background noise and community attitude could, for example, reduce the perceived noise level by 5 dBA to 15 dBA compared to other noise impacts where these factors are not involved (EPA 1974).

The duration of continual daily construction operations affecting a community is also considered. When the number of continual days of construction activities between breaks is short (less than two weeks, for example), communities will tolerate higher noise levels (CERL 1978). A break in construction activities lasting four or more days will give the community relief from noise impacts.

Impact Significance Criteria

CEQA Appendix G(p) states that "A project will normally have a significant effect on the environment if it will increase substantially the ambient noise levels for adjoining areas." Local jurisdictions have adopted Noise Element guidelines that provide guidance for determining a substantial increase in noise.

The City of San Jose's General Plan Noise Element contains four noise level objectives that are to be considered in land use planning. These objectives are (1) a long-range, exterior day-night average (L_{dn}) noise objective of L_{dn} 55 dBA; (2) a short-range, exterior noise objective of L_{dn} 60 dBA; (3) an interior noise objective of L_{dn} 45 dBA; and, (4) a maximum exterior noise level of L_{dn} 76 dBA that should not be exceeded in order to avoid significant adverse health effects. The last noise criterion addressing adverse health effects is based upon and would apply only to long-term operational noise impacts, and does not apply to temporary noise such as construction activities. The noise impacts of the proposed action would occur primarily during the construction phase, hence, the second objective most directly applies to this project.

The municipal code in the City of San Jose does not contain a noise ordinance to control specific, non-transportation type noise sources such as construction noise. The City's Noise Element includes the following statement concerning construction noise: "Construction operations should use available noise suppression devices and techniques."

For construction noise sources, it is appropriate to equate the average or equivalent noise level (L_{eq}) to L_{dn} when the disturbing noise does not occur during evening and nighttime hours from 7 P.M. to 7 A.M. An exterior noise criterion of L_{dn} 60 dBA is approximately equal to an L_{eq} of 62 dBA for construction noise in the above conditions. Hence, any construction noise levels at sensitive receptor locations that exceed an L_{eq} of 62 dBA would be considered a significant noise impact.

Channel Widening Plan

Assessment of construction noise requires a knowledge of the types of equipment to be used as well as the noise levels produced by each piece of equipment and an estimate of the amount of usage for each piece of equipment. Table 4.6-1 provides the data that were used in the assessment of construction noise during the five typical stages of public works construction operations: clearing, excavation, foundation, erection, and finishing. The use of diesel-powered heavy equipment, jackhammers, and gasoline-powered chainsaws would result in relatively high noise levels adjacent to the project area (Parsons Engineering Science 1997).

Construction noise would temporarily increase noise levels above the background noise in areas around the construction sites. Average overall construction noise levels of the various construction stages as experienced at various distances from a construction site have been calculated and are presented in Table 4.6-2. Channel Widening construction could cause noise levels of 63 to 70 dBA at 1,000 feet from the project area when construction activities are within a clear line-of-sight to the receptor. The noisiest construction activity would be excavation. During excavation activities, the potential noise levels could exceed the criterion by as much as 24 dBA at distances of 100 feet and by 8 dBA at distances of 1,000 feet. Therefore, noise-sensitive land uses up to a distance of 1,000 feet from the construction activity

Table 4.6-1. Typical Noise Data for Construction Equipment

		USAGE FACTORS IN VARIOUS STAGES [b]				
Equipment Type	L_{eq}[a] at 50 ft	*Clearing*	*Excavation*	*Foundation*	*Erection*	*Finishing*
Air compressor	82	---	1.0(2)	0.4	0.4	0.4(2)
Backhoe	85	0.04	0.4	---	---	0.16
Concrete mixer	85	---	---	0.16(2)	0.4(2)	0.16(2)
Crane, derrick	88	---	0.1	0.04	0.04	---
Dozer	85	0.04	0.4	---	---	0.16
Generator	78	1.0(2)	0.4(2)	0.4(2)	0.4	0.4(2)
Grader	85	0.08	---	---	0.2	0.08
Jackhammer	88	---	---	---	0.04	0.1(2)
Loader	82	0.04	0.4	---	---	0.16
Pneumatic tool	85	---	---	0.04(2)	0.1	0.04
Pump	76	---	0.4(2)	1.0(2)	0.4(2)	---
Saw	78	0.08(2)	---	0.04(2)	---	---
Scrapper	88	0.08	---	0.2	0.08	0.08
Shovel	82	0.04	0.4	0.04	---	0.04
Truck	83	0.16(2)	0.16	0.4(2)	---	0.16(2)

Notes: a. L_{eq} is the average noise level in dBA.

b. Usage factors are used to determine the average noise level (L_{eq}) produced during a construction stage considering all noise sources together. The usage factors are based on the percentage of sites where the equipment is present and the duration of the equipment while present. A number in parentheses indicates multiple equipment present. A "—" indicates not present during the stage.

Source: SCVWD & COE 1996

Table 4.6-2. Overall Construction Noise Levels

	AVERAGE NOISE LEVEL AT VARIOUS DISTANCES[a]			
Construction Stage	*100 ft.*	*200 ft.*	*500 ft.*	*1,000 ft.*
Clearing	80	75	69	63
Excavation	86	81	75	70
Foundation	83	78	72	66
Erection	83	78	72	66
Finishing	83	78	72	66

Note: a. The average noise level (Leq) produced during a construction stage is shown at various distances (with an unobstructed, clear line-of-sight) from the approximate center of construction activities. Noise levels are expressed in dBA. Background noise will increase the above noise levels as follows: when the background noise is equal to or within 1 dBA of the construction noise, the overall noise level is 3 dBA higher than those shown above; background within 2-3 dBA, an increase of 2 dBA; within 4-9 dBA, an increase of 1 dBA; and a background 10 dBA or more less than the construction noise below will not increase the overall noise level.

Source: SCVWD & COE 1996

would be exposed to construction noise exceeding L_{eq} 62 dBA, a significant impact. The impact would be mitigated to insignificance by adopting a Noise Mitigation Plan.

After completion of the construction phase of the flood control project, no significant noise impacts would occur. Activities such as routine and periodic maintenance that require access within the project right-of-way would generate insignificant noise levels due to their temporary duration. Short-term noise impacts that result from equipment used by clean-up crews after flooding on city streets would be generally eliminated, although equipment would still be required within the floodway to clear debris accumulations and fallen streets. Noise impacts generated by cleanup activities after very large floods would be substantially reduced. This is considered a long-term beneficial noise impact.

Bypass Channel Plan

The overall construction scenario noise levels of the various construction stages, as presented in Table 4.6-2 for the Channel Widening Plan, would be similar for the Bypass Channel Plan. Bypass Channel Plan noise impacts would differ due to the amount of excavation required and the locations of construction activity relative to the nearby residential land uses.

The Bypass Channel Plan calls for excavation of bypass channels in Reaches 7, 8, 9, and 11A. This has noise impact implications for two reasons: (1) as indicated in Table 4.6-2, excavation is the noisiest construction activity and (2) in some cases, construction of the bypass channels would generate construction noise affecting a greater number of residences. The Bypass Channel Plan would involve somewhat more excavation in Reach 7 due to construction of a bypass resulting in greater noise impacts. The Bypass Channel Plan would create much greater noise impacts in Reach 8 due to construction of a bypass instead of floodwalls. The Bypass Channel Plan would involve major construction in Reach 9, directly adjacent to residential neighborhoods, compared to no construction in Reach 9 for the Channel Widening Plan. The Bypass Channel Plan would involve more construction and more extensive noise impacts in Reaches 10 and 11. It would also involve considerable construction and noise impacts in Reach 12, compared to no construction in Reach 12 for the Channel Widening Plan. Impacts on Canoas Creek resulting from floodwall excavation would be identical to the Channel Widening Plan. Impacts from widening on Ross Creek would be slightly greater than the Channel Widening Plan. Due to their location close to sensitive residential noise receptors, these impacts would be significant but mitigated to insignificance by adopting a Noise Mitigation Plan.

No-Action Alternative

Under the No-Action Alternative, the noise-generating sources associated with project construction would not be employed. Existing noise sources would continue to contribute to ambient noise levels. Thus, the No-Action Alternative would result in no change in present ambient noise levels.

4.6.4 Mitigation Measures

Channel Widening Plan

1. The following noise control measures shall be included in a Noise Mitigation Plan designed to minimize construction noise impacts that could result from implementation of the Channel Widening Plan:

a. Construction equipment shall be equipped with manufacturer's standard noise control devices (e.g., mufflers, lagging, and/or engine enclosures). Other noise control measures shall be implemented as necessary to comply with the local plans or development permit requirements. Equipment that meets SCVWD noise standards of 83 dBA at 25 feet (77 dBA at 50 feet) shall be used. Contractors shall be permitted to use equipment that is capable of exceeding the noise levels of 83 dBA at 25 feet provided that such equipment is operated in a manner that does not exceed the limits.

b. In no instance shall the noise level at any point outside the property line or temporary construction area exceed 86 dBA. In residential areas, no construction shall occur between the hours of 7:00 P.M. and 7:00 A.M. without City approval.

c. The use of temporary plywood barriers for noise reduction shall be determined on an individual basis by location, particularly in all areas where the construction activities would be within 200 feet of noise sensitive land uses (public, quasi-public, and residential uses) and construction is expected to continue for more than two weeks between breaks of four or more days.

d. Pavement breakers shall be used in place of jackhammers.

e. Pumps for diverting water flows shall be enclosed.

f. All construction equipment shall be inspected at periodic intervals to ensure proper maintenance and hence, lower noise levels, as well as compliance with the local general plan noise element policies.

g. Noisy operations shall be avoided when possible where construction progresses within 500 feet of noise-sensitive land uses. The distance between noisy construction related activities and noise-sensitive land uses shall be maximized. For example, construction-related truck routes shall avoid heavily populated residential streets, whenever possible. Truck routes along industrial or commercial streets or streets with mostly open space along them shall be required even though these routes may be longer and out of the way. Noisy stationary equipment shall be located away from project boundaries that are near noise-sensitive land uses.

h. Should pile driving be required due to special circumstances, only vibration/sonic-type pile drivers shall be used, with acoustically treated engine enclosures and mufflers, reducing noise levels to 85 to 90 dBA at 50 feet.

i. Construction shall not be continuous at any location for more than seven calendar days at a time except under emergency conditions.

The Noise Mitigation Plan would reduce overall construction impacts on the community would be lowered by 3 to 7 dBA. Table 4.6-3 shows the revised impacts at various distances from the approximate center of construction activities, as compared with noise levels shown in Table 4.6-2 (see section 4.6.3.2). Implementation of the following mitigation measures would provide sufficient noise reduction to achieve compliance with recommended noise construction criteria.

Table 4.6-3. Revised Construction Noise Levels

Construction Stage	Average Noise Level at Various Distances[a] 100 ft.	200 ft.	500 ft.	1,000 ft.
Clearing	77	72	66	60
Excavation	79	74	68	63
Foundation	79	74	68	62
Erection	77	72	66	60
Finishing	77	72	66	60

Note: a. The average noise level (Leq) produced during a construction stage is shown at various distances (with an unobstructed, clear line-of-sight) from the approximate center of construction activities. Noise levels are expressed in dBA. Background noise will increase the above noise levels as follows: when the background noise is equal to or within 1 dBA of the construction noise, the overall noise level is 3 dBA higher than those shown above; background within 2-3 dBA, an increase of 2 dBA; within 4-9 dBA, an increase of 1 dBA; and a background 10 dBA or more less than the construction noise below will not increase the overall noise level.

Source: Parsons Engineering Science 1997.

Bypass Channel Plan

All mitigation measures recommended for the Channel Widening Plan also apply to the Bypass Channel Plan.

4.6.5 Unavoidable Significant Adverse Impacts

Channel Widening and Bypass Channel Plans

Implementation of the Noise Mitigation Plan would avoid all significant adverse impacts from construction noise. No unavoidable significant adverse impacts would occur.

4.7 TRANSPORTATION

The following transportation analysis is based in part on an investigation of traffic prepared for the *EIR/EIS for the Guadalupe River Flood Control Project* (Parsons Engineering Science 1997). For that investigation, Barton-Aschman Associates, Inc. conducted traffic counts at one key intersection and on 11 key street segments potentially impacted by construction of the project. In addition, traffic volume information was obtained from the files of three sources: the City of San Jose, the County of Santa Clara, and Barton-Aschman Associates, Inc.

4.7.1 Regulatory Setting

The City of San Jose has adopted a Circulation Element of the General Plan (City of San Jose 1987), which includes planning provisions for the circulation of people and goods on public roads. The Circulation Element supports the goals, objectives, policies, and proposals of the land use element; it also has direct relationships with the housing, open space, noise, and safety elements. In addition to ensuring that the transportation infrastructure is adequate to meet the circulation needs of the community, the Circulation Element provides a planning tool for the city to ensure that impacts resulting from traffic flow are consistent with existing and planned land uses along the roadways.

4.7.2 Existing Conditions

Roadways and Bridges

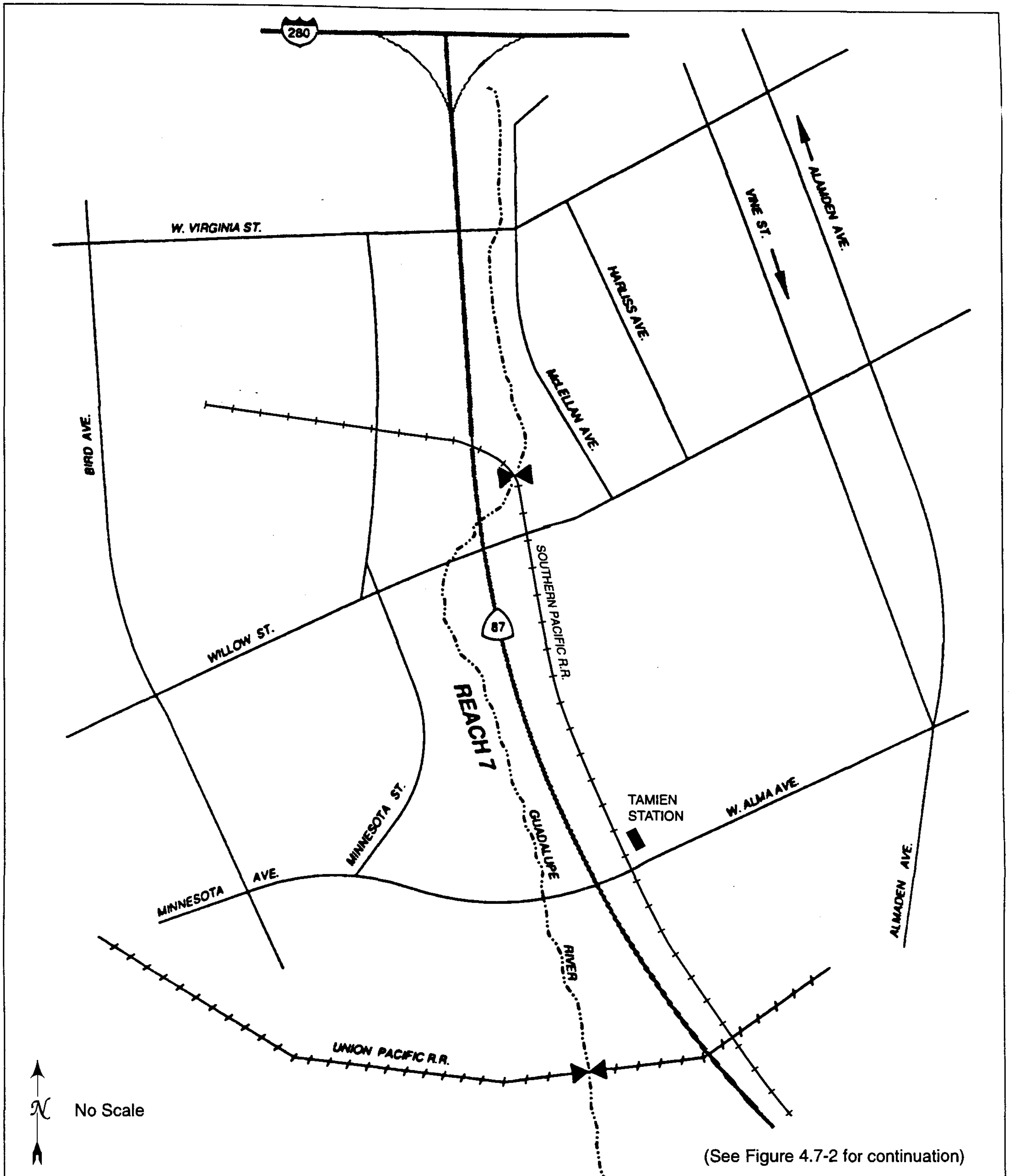
The highways, major streets, and railroads in the project study area, including all those that bridge the Guadalupe River, are shown in Figures 4.7-1 and 4.7-2. The northern part of the project corridor, which includes Reach 7 of the Guadalupe River, is shown in Figure 4.7-1. Reaches 8, 9, 10, and 11 in the central area of the project corridor are shown in Figure 4.7-2. Proposed work in the southernmost portion of the river corridor (Reach 12) would not affect any roadways, bridges, or mass transit and is not addressed in this transportation analysis.

Twelve bridges cross the Guadalupe River in Reaches 7 through 11 including two railroad bridges (Southern Pacific and Union Pacific railroads), three freeway/expressway bridges (State Route 87, Almaden Expressway, and Capitol Expressway), and seven other roadway bridges (Willow Street, West Alma Avenue, Willow Glen Way, Malone Road, Curtner Avenue, Hillsdale Avenue, and Branham Lane).

Bus Service

Existing bus service throughout the county is provided by Santa Clara Valley Transportation Authority (VTA). Numerous bus lines cross the Guadalupe River on the following streets in the project study area:

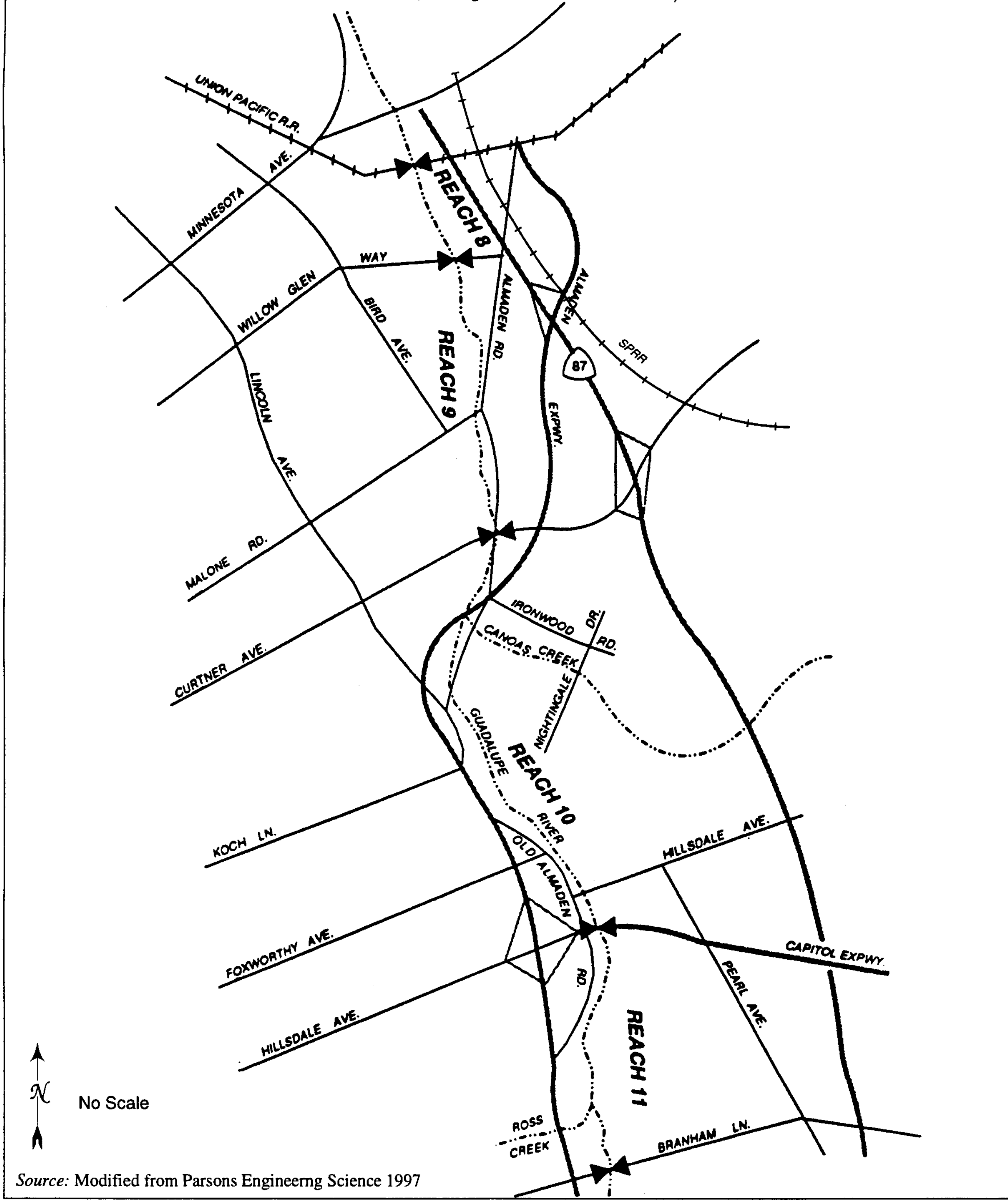
- Willow Street: Line #25
- West Alma Avenue: Line #82
- Malone Road: Line #67
- Curtner Avenue: Line #26
- Almaden Expressway: Line #64
- Hillsdale Avenue: Line #37
- Capitol Expressway: Lines #37 and #67
- Branham Lane: Line #27



Source: Modified from Parsons Engineering Science 1997

Figure 4.7-1. Project Area Road Network (Reach 7)

(See Figure 4.7-1 for continuation)



Source: Modified from Parsons Engineerng Science 1997

Figure 4.7-2. Project Area Road Network (Reaches 8-11)

Light Rail Transit Service

The southern portion of the Guadalupe Corridor Light Rail Transit (LRT) line, operated by Santa Clara VTA, is located in the median of State Route 87 (SR 87). SR 87 is shown in Figures 4.7-1 and 4.7-2 (above). The LRT line provides commuter transportation between the south San Jose area and the downtown and northern areas of San Jose. LRT stations in the project study area are located at Virginia Street, Alma Avenue (Tamien Station), Curtner Avenue, Capitol Expressway, and Branham Lane. Trains run every 10 minutes in each direction, northbound and southbound.

Caltrain Service

Caltrain is passenger train service that connects San Jose with San Francisco to the north and with Gilroy to the south. Caltrain is operated by Amtrak and governed by a joint powers board, which includes the San Mateo County Transit District, the Santa Clara VTA, and other agencies. Caltrain uses the SPRR tracks, which cross the Guadalupe River between Virginia Street and Willow Street in Reach 7. One Caltrain station (Tamien Station) is located in the project study area at Alma Avenue. The Tamien Station area is currently within the 50-year floodplain of the Guadalupe River. The service to Tamien Station provides a convenient connection to VTA's light rail transit system, which also stops at Tamien Station (see Figure 4.7-1). Between San Jose and Gilroy, Caltrain service through the study area consists of four trains daily in each direction (northbound and southbound) seven days a week, except on weekends when the service does not operate south of Tamien Station. Future plans call for expansion of Caltrain service to Gilroy to six or eight trains daily in each direction (personal communication, J. Unites 1997).

Traffic Volumes

During the week of July 1, 1996, 24-hour traffic counts were taken on the following street segments:

- Willow Street (between Minnesota Avenue and Lelong Street)
- West Alma Avenue (between Belmont Way and Lick Avenue)
- Willow Glen Way (between Creek Drive and Northern Road)
- Malone Road (between Bird Avenue and Almaden Road)
- Curtner Avenue (between Coastland Avenue and Almaden Road)
- Almaden Expressway (between Almaden Road and Koch Lane)
- Nightingale Drive (between Ironwood and Redbird drives)
- Hillsdale Avenue (between Old Almaden Road and Pearl Avenue)
- Capitol Expressway (between Old Almaden Road and Pearl Avenue)
- Almaden Expressway (between Prosper Avenue and Branham Lane)

Data from these traffic counts and traffic volumes from other sources for other key roadways are presented in Table 4.7-1.

Freeways and Expressways

State Route 87 (SR 87) is a recently completed state highway that generally parallels the Guadalupe River and crosses the river in Reach 7 (see Figure 4.7-1). SR 87 has provided relief to congested parallel facilities, primarily the Almaden Expressway, which has an interchange with SR 87 in the vicinity of Reach 9 (see Figure 4.7-2).

Table 4.7-1. Existing Traffic Volumes

Street	Direction	Lanes	Weekday Volume	Peak-Hour Volume A.M.	Peak-Hour Volume P.M.
Willow Street	EB	1	4,652	199	395
	WB	1	4,166	185	304
West Alma/Minnesota Avenue	EB	2	7,511	592	475
	WB	2	7,184	307	575
Willow Glen Way	EB	1	1,325	81	119
	WB	1	1,373	122	94
Malone Road	EB	1	3,607	157	373
	WB	1	3,548	225	280
Curtner Avenue	EB	2	8,926	602	609
	WB	2	8,372	497	613
Almaden Expressway (north of Koch)	NB	3	24,396	3,917	1,192
	SB	4	27,701	899	2,813
Almaden Expressway (north of Branham)	NB	3	21,747	3,240	1,124
	SB	3	21,801	875	1,904
Nightingale Drive	NB	1	600	49	46
	SB	1	395	17	36
Hillsdale Avenue	EB	1	3,181	143	289
	WB	1	2,968	361	222
Capitol Expressway (SR 85)	EB	3	17,738	752	1,508
	WB	3	17,835	1,383	1,152

Source: Parsons Engineering Science 1997.

Almaden Expressway (G8) is a Santa Clara County highway that generally parallels the Guadalupe River and crosses the river and Canoas Creek in Reach 10 near its confluence with Canoas Creek (see Figure 4.7-1). Almaden Expressway also crosses Ross Creek in Reach 11 (see Figure 4.7-2). The County plans to eventually widen Almaden Expressway to accommodate high occupancy vehicle (HOV) lanes in both directions.

Capitol Expressway (G21) is a Santa Clara County highway that crosses the Guadalupe River and defines the boundary between Reaches 10 and 11. Capitol Expressway terminates at its interchange with the Almaden Expressway on the west side of the river (see Figure 4.7-2).

In the Almaden Expressway corridor, many signalized intersections are congested during peak hours. Level of service (LOS) is a description of an intersection's operation, ranging from Level A to Level F, with LOS A representing free-flowing traffic, and LOS F heavy congestion (see Appendix I for complete definitions). For signalized intersections, the City of San Jose's method for analyzing level of service was utilized. The procedure is based upon the volume-to-capacity (V/C) ratio, which is the hourly rate of flow in the critical movements (such as left-turns against traffic) divided by the estimated hourly capacity of the intersection. For unsignalized intersections, the level of service procedure used is described in the *Highway Capacity Manual* by the Transportation Research Board (USDOT 1995). Level of service criteria for this methodology are stated in very general terms and are related to general delay (the time required to get through an intersection) ranges. Criteria are based upon the reserve of unused capacity of each lane in question. The following intersections were found to operate at an LOS considered unacceptable in urban areas (E or F) during the A.M./P.M. peak hours:

- Almaden Rd/Ironwood Drive and Almaden Expressway (A.M. LOS F and P.M. LOS E)
- Almaden Expressway and Koch Lane (A.M. LOS F and P.M. LOS E)
- Old Almaden Road and Hillsdale Avenue (A.M. and P.M. LOS F)
- Almaden Expressway and Branham Lane (A.M. and P.M. LOS E)

All of the above intersection operations have been improved substantially by the completion of SR 87. Up to 40 percent of the commuter traffic northbound in the morning and southbound in the evening uses the new freeway instead of other more heavily used north/south arteries. Reduction in north/south traffic at intersections in the study corridor has reduced delay and improved LOS on all east/west roadways.

Streets with direct access to freeway interchanges, particularly Capitol Expressway and Curtner Avenue, have experienced reduced traffic flows. However, the Hillsdale Avenue bridge is a unique case. Large numbers of drivers use the Hillsdale Avenue bridge over the Guadalupe River to avoid the congested interchange of Almaden Expressway and Hillsdale Avenue/Capitol Expressway, one block to the south (see Figure 4.7-2). The opening of SR 87 has greatly reduced, although it has not eliminated, these diverted trips.

4.7.3 Environmental Effects

Impact Significance Criteria

The threshold of significance for transportation impacts is generally the level of additional traffic that would be perceptible to the motoring public, measured in roadway and/or intersection V/C.

Channel Widening Plan

Short-Term Construction Impacts

Nearly all Channel Widening Plan transportation impacts would occur during the construction phase and would be short term. The increased construction-related traffic generally would not be significant, but temporary construction detours due to roadway realignment or bridge replacement could create short-term significant impacts on roadway and intersection V/C operations. Short-term transportation impacts would be mitigated to insignificance by adopting a Construction Traffic Management Plan (see section 4.7.4 for the plan's components). The various short-term transportation impacts are discussed generically in the following paragraphs:

ROADWAYS. Widening of the river channel would not directly impact any road configuration, but some local roadways would be temporarily impacted by construction activities. During revegetation efforts along Reach 10B, temporary closure of some lanes of the Almaden Expressway for equipment access may be necessary. An encroachment permit from the County must be obtained prior to the commencement of any construction-related activity within the Almaden Expressway right-of-way. Existing culverts that carry Canoas Creek beneath Almaden Expressway and Nightingale Drive would be replaced. Construction along Canoas Creek would require temporary full closure of Nightingale Drive and diversion of southbound trips along the existing one-way frontage road paralleling Almaden Expressway to Redbird Drive. Northbound trips would need to use Redbird Drive and a different segment of the frontage road to access the Almaden Road/Ironwood Drive intersection and the Almaden Expressway. These would be significant short-term impacts that would be mitigated to insignificance by adopting a Construction Traffic Management Plan including activity scheduling and phasing to reduce congestion, placement of warning signs, and provision of detours. The Construction Traffic Management Plan would include scheduling of the two Canoas Creek box culverts during separate time periods (Parsons Engineering Science 1997). No long-term adverse impacts on roadways would occur.

BRIDGE CONSTRUCTION. Alteration of bridges that carry the three major highways (SR 87, Almaden Expressway, and Capitol Expressway) across the Guadalupe River would not be required. The Channel Widening Plan requires three bridge replacements: the Willow Street and Alma Avenue bridges in Reach

7 and the Hillsdale Avenue bridge in Reach 10C. The traffic currently using bridges that would be temporarily closed would be redirected to neighboring bridges that would remain open. Diverted traffic would result in significant, short-term impacts on neighborhood streets. The impacts would be mitigated to insignificant by adopting a Construction Traffic Management Plan including activity scheduling and phasing to reduce congestion, warning signage, and detours.

BUS SERVICE. During construction, Santa Clara Valley Transportation Authority (VTA) bus lines that use any of the project bridges and local roads would need to be temporarily rerouted and rescheduled during bridge or road closures. Detouring of bus lines would cause more vehicle-miles of travel on the affected routes and possible travel time delays; and could change bus schedules sufficiently to require printing and dissemination of new time tables; and could require an increase in the number of transit vehicles and operators, which could result in temporarily increased operating costs. These would be significant short-term impacts that would be mitigated to insignificance by providing early notification to VTA to allow for bus line rerouting and to minimize the need for rescheduling, and by adopting a Construction Traffic Management Plan designed to minimize adverse transportation impacts.

LIGHT RAIL TRANSIT SERVICE. No alteration of the SR 87 bridge, which carries the Santa Clara Valley Transportation Authority (VTA) Light Rail Transit (LRT) line across the Guadalupe River near the north end of Reach 7, would be required. Although stream channel widening would occur beneath the bridge, no construction work in or around the LRT operating right-of-way is anticipated. If it becomes necessary to conduct construction activities in or around the LRT right-of-way, an access permit would be obtained from VTA prior to performing such work.

TRUCK TRAFFIC. Construction activities would include earthwork requiring haul trucks traveling in and out of the project area. Construction of bridges, floodwalls, and other flood control features would require ready-mix concrete trucks and steel-carrying trucks. Increased truck activity in the project area during construction would disrupt traffic flow in residential neighborhoods. This would be a significant, short-term impact that would be mitigated to insignificance by adopting a Construction Traffic Management Plan including detours to minimize disruptions, maintaining a minimum of one lane open to traffic at all times, and avoiding the closure of two adjacent bridges simultaneously.

SPRR AND UPRR OPERATIONS. Railroad freight operations on the Southern Pacific Railroad (SPRR) and Union Pacific Railroad (UPRR) tracks (and Caltrain passenger service on the SPRR tracks) could be affected by Channel Widening Plan construction since both tracks cross the Guadalupe River. The Channel Widening Plan would beneficially affect Caltrain service by providing the Tamien Station area with protection from a 50-year flood event, but still leaving it within the 100-year floodplain.

The Channel Widening Plan includes construction of reinforced concrete box culverts under the SPRR and UPRR bridges in Reach 7. Typically, the box culverts would be constructed on site and later jacked under the railroads by pushing or pulling on either side of the crossings. If the Southern Pacific and Union Pacific Transportation Companies were to allow track closure for temporary bridge installation, then the jacking method would not be used. Installation of a temporary bridge would involve raising the track profile, driving piles, removing both existing tracks, installing shoring, and placing structural steel beams and diaphragms. Following temporary bridge construction, tracks would be reinstalled, including rails, ties, and ballast. The jacking method would have no significant rail transport impacts. The temporary bridge installation method would have a significant short-term impact on railroad scheduling. This impact would be mitigated to insignificance by adopting a Construction Traffic Management Plan including scheduling track removal and replacement during non-peak use periods designated by the railroad.

PEDESTRIAN AND BICYCLE USE. Bridge and road closures during construction would likely have an impact on pedestrian and bicycle travel in the project area, particularly on children going to and from school. Some students currently cross Guadalupe River bridges on their way to school. Pedestrian and bicycle access to the Virginia and Tamien LRT stations could also be disrupted by closure of bridges and roads, such as the West Alma Avenue bridge. These would be significant short-term impacts. The impacts would be mitigated to insignificance by adopting a Construction Traffic Management Plan that would provide for temporary alternative pedestrian bridge access that would also accommodate bicycles.

Long-Term Operational Impacts

Operational transportation impacts would be associated with flood control maintenance activities including erosion control and vegetation trimming. Any increases in trips associated with long-term maintenance would be insignificant when compared to existing traffic volumes at adjacent intersections and roadways. Flood-caused road and rail blockages, flood damage to roadways and rail facilities, and the resulting disruptions of traffic flow during storm cleanup would be reduced over time, which would be a beneficial impact.

Bypass Channel Plan

Short-Term Construction Impacts

CONSTRUCTION TRAFFIC IMPACTS RELATED TO BRIDGE CONSTRUCTION. During the construction phase of the Bypass Channel Plan, some bridge construction would be required and some streets would be closed temporarily, causing traffic diversions through residential neighborhoods; this would be a significant short-term impact that would be mitigated to insignificance by adopting a Construction Traffic Management Plan as discussed for the Channel Widening Plan.

The proposed alteration or replacement of existing bridge or culvert crossings is described in Table 4.7-2. Malone Road is not included on the table, because the Malone Road bridge was completed in 1990 and is compatible with the project as constructed. Capitol Expressway also is not included, because no new construction is proposed for the Capitol Expressway bridge.

The peak-hour volumes on every street crossing the Guadalupe River in the feasibility study area (from north to south) are shown in Table 4.7-3. Peak-hour volumes are used to evaluate impacts associated with the morning and evening commute periods.

Rather than determining the impact of all possible bridge closing combinations, a discussion of likely scenarios is presented. To judge whether a particular bridge street could accommodate traffic diverted from closed adjacent bridges, the typical capacity of each link is addressed (Table 4.7-3). These capacities were derived from the following lane flows, in vehicles per hour (vph):

- 750 vph for collector streets
- 1,600 vph for arterial streets
- 1,900 vph for expressways (no expressways would be closed at any time)

Table 4.7-2. Bridge Construction for the Bypass Channel Plan

Bridge	Reach	Proposed Construction
Willow Street	7	New bridge over new bypass channel, east of existing river bridge*
West Alma Avenue	7	New bridge over new bypass channel
Willow Glen Way	8/9	Replace existing river bridge with new bridge*
Curtner Avenue	9/10	Replace existing river bridge with new bridge*
NB Almaden Expressway	10	Install additional box culvert for Canoas Creek flow.
Hillsdale Avenue	10	Replace existing river bridge with new bridge*
Almaden Expressway	11	Enlarge box culvert for Ross Creek flow
Nightingale Drive	Canoas Creek	Install additional box culvert for Canoas Creek flow.*

Note: * Requires street closure during construction

Table 4.7-3. Affected Traffic Arteries

Street	Temporary Bridge Closures Required	Direction	Critical Peak-Hour Volume	Number of Lanes	Typical Capacity	Unused Capacity
Willow Street	Yes	EB	400	1	750	350
		WB	300	1	750	450
West Alma Avenue	Yes	EB	600	2	1,500	900
		WB	600	2	1,500	900
Willow Glen Way	Yes	EB	100	1	750	650
		WB	100	1	750	650
Malone Road	No	EB	400	1	750	350
		WB	300	1	750	450
Curtner Avenue	Partial[1]	EB	600	2	3,200	2,600
		WB	600	2	3,200	2,600
Almaden Expressway north of Koch	No	NB	4,000	3	5,700	1,700
		SB	3,000	4	7,600	4,600
Almaden Expressway north of Branham	No	NB	3,250	3	5,700	2,450
		SB	1,900	3	5,700	3,800
Nightingale Drive	Yes	NB	600	1	750	150
		SB	400	1	750	350
Hillsdale Avenue	Yes	EB	300	1	750	450
		WB	350	1	750	400
Capitol Expressway (SR 87)	No	EB	1,500	3	5,700	4,200
		WB	1,400	3	5,700	4,330

Note: 1. Bridge replacement in stages with two lanes open at all times.
Source: Parsons Engineering Science 1997.

Although these capacity values are general and would in actuality depend upon the peak-hour operation of the adjacent signalized intersections, they are adequate for planning purposes.

The short-term impact of construction road closings can be estimated from Table 4.7-3. The traffic volumes using bridges that would be closed would be redirected to neighboring bridges remaining open. The volumes assume that bridge closing would be phased, and that no two adjacent bridges would be closed simultaneously.

West Alma Avenue could theoretically accept all 650 peak-hour vehicles from Willow Street to the north. Impacts would be reduced to less than significant if two lanes were kept open at all times on the four-lane West Alma Avenue. Constricting the present West Alma Avenue traffic to one lane westbound and one lane eastbound would have some impact, but it would be much less than if the entire street were closed. A significant impact would occur if the roadway were completely closed, resulting in a traffic diversion through the residential neighborhoods that line the Guadalupe River. This impact would be reduced to less than significant by adopting a Construction Traffic Management Plan including detours to minimize disruptions, maintaining a minimum of one lane open to traffic at all times, and avoiding the closure of two adjacent bridges simultaneously.

The temporary closure of Willow Glen Way could be absorbed by Malone Road to the south and West Alma Avenue to the north with minimal impact. Impacts would be less than significant assuming two lanes on West Alma Avenue remain open.

The Curtner Avenue roadway and bridge carry the highest volume of traffic of any street proposed for temporary closure. Complete closure during bridge replacement would result in a significant, short-term impact. The impact would be mitigated to insignificance by adopting a Construction Traffic Management Plan including staging the bridge replacement so that two lanes (one in each direction) could be kept open during daytime and early evening hours. Nighttime bridge closure for detour changeovers could be accommodated.

Because of the sensitive nature of the neighborhood to the north and the Koch Lane residential area to the south of the new Malone Road bridge, partial capacity would be maintained on Curtner Avenue. However, Malone Road, which would not be closed, could accept only a limited amount of traffic diverted from other bridges before the negative impact upon this residential street would be felt.

ALMADEN EXPRESSWAY. Existing culverts that carry Canoas Creek beneath Almaden Expressway would be replaced. During culvert replacement and other improvements along Reach 10B, temporary closure of some lanes of the Almaden Expressway for construction equipment access is probable. An encroachment permit from the County must be obtained prior to the commencement of any construction activity within the Almaden Expressway right-of-way. As shown in Table 4.7-3, peak-hour north-bound Almaden Expressway volumes already exceed capacity. No acceptable alternate routes exist for diverted traffic, except SR 87. However, SR 87 is expected to carry large volumes of traffic generated by future development, and would attract only 400 to 500 peak-hour vehicles from Almaden Expressway (in the peak direction). Therefore, all expressway lanes would be required. If fewer than three lanes in each direction are maintained, extreme congestion would result, with up to 1,000 cars flooding local streets in peak hours, attempting to bypass the construction bottleneck. This would be a significant short-term impact that could be mitigated to insignificance by adopting a Construction Traffic Management Plan providing for three operating lanes during the peak hour and maintaining walkway access at all times.

Bus Service. During construction, Santa Clara VTA bus lines that use any of the project bridges and local roads would be significantly impacted in the short-term in a manner similar to that described for the Channel Widening Plan. The impact would be mitigated to insignificance by adopting a Construction Traffic Management Plan as discussed for the Channel Widening Plan.

Light Rail Transit Service. No alteration of the SR 87 bridge, which carries the Santa Clara VTA Light Rail Transit (LRT) line across the Guadalupe River near the north end of Reach 7, would be required. Although construction of a gabion-lined bypass channel on the east side of the river bottom would occur beneath the bridge, no construction work in or around the LRT operating right-of-way is anticipated. If it becomes necessary to conduct construction activities in or around the LRT right-of-way, an access permit would be obtained from VTA prior to performing such work.

Truck Traffic. Construction of bridges, floodwalls, and other flood control features would require ready-mix concrete trucks and steel-carrying trucks. The increased truck activity in the project area during construction could cause short-term disruptions of traffic flow in residential neighborhoods similar to that described for the Channel Widening Plan, including that on Canoas Creek. The impact would be mitigated to insignificance by adopting a Construction Traffic Management Plan as discussed for the Channel Widening Plan.

SPRR and UPRR Operations. Railroad freight operations on the Southern Pacific Railroad (SPRR) and Union Pacific Railroad (UPRR) tracks (and Caltrain passenger service on the SPRR tracks) could be affected by Bypass Channel Plan construction since both tracks cross the Guadalupe River. The Bypass Channel Plan would beneficially affect Caltrain service by providing the Tamien Station area with protection from a 100-year flood event.

The Bypass Channel Plan includes construction of reinforced concrete box culverts under the SPRR and UPRR bridges in Reach 7. Typically, the box culverts would be constructed on site and later jacked under the railroads by pushing or pulling on either side of the crossings. If the Southern Pacific and Union Pacific Transportation Companies were to allow track closure for temporary bridge installation, then the jacking method would not be used. Installation of a temporary bridge would involve raising the track profile, driving piles, removing both existing tracks, installing shoring, and placing structural steel beams and diaphragms. Following temporary bridge construction, tracks would be reinstalled, including rails, ties, and ballast. The jacking method would have no significant rail transport impacts. The temporary bridge installation method would have a significant short-term impact on railroad scheduling. The impact would be mitigated to insignificance by adopting a Construction Traffic Management Plan as discussed for the Channel Widening Plan.

Pedestrian and Bicycle Use. Bridge and road closures during construction would have a significant short-term impact on pedestrian and bicycle travel similar to that described for the Channel Widening Plan. The impact would be mitigated to insignificance by adopting a Construction Traffic Management Plan as discussed for the Channel Widening Plan.

Long-Term Operational Impacts

Operational transportation impacts would be associated with flood control maintenance activities including erosion control and vegetation trimming. Any increases in trips associated with long-term maintenance would be insignificant when compared to existing traffic volumes at adjacent intersections and roadways. Flood-caused road and rail blockages, flood damage to roadways and rail facilities, and the resulting disruptions of traffic flow during storm cleanup would be reduced over time, which would be a beneficial impact.

No-Action Alternative

The No-Action Alternative would have no impacts on traffic flow or roadways. The existing conditions would continue.

4.7.4 Mitigation Measures

Channel Widening Plan

The following mitigation measures constitute the framework of a Construction Traffic Management Plan designed to minimize transportation impacts that could result from implementation of the Channel Widening Plan:

1. During development of the construction plans, a detailed Construction Traffic Management Plan shall be prepared and implemented. The Santa Clara VTA and other interested parties will be invited to participate in development of the plan. Traffic detours, including bus routes, shall be established to minimize the disruption of traffic caused by construction. To the extent feasible, construction shall be phased to maintain a minimum of one lane open to traffic at all times in each direction. No two adjacent bridges shall be closed at the same time.

2. The following measures shall be considered to minimize impacts on the Almaden Expressway:

   a. Schedule construction work during summer months when traffic is lighter.
   b. Schedule installation of multiple box culverts during separate time periods (e.g., on Canoas Creek).
   c. Install culverts by boring and jacking.
   d. Use pre-cast box sections for culvert construction.

3. Traffic management techniques such as the use of barricades and warning signs shall be applied as are described in the *Manual of Traffic Controls for Construction and Maintenance Work Zones* (Caltrans 1996) and the *Manual on Uniform Traffic Control Devices for Streets and Highways* (USDOT 1993). Impacted areas shall be notified regarding alternate traffic and pedestrian routes.

4. The Santa Clara VTA shall be notified in advance of any planned bridge closures. Notification shall occur so that bus lines can be rerouted and disruption to bus schedules can be minimized. Compensation for costs incurred by VTA during construction, such as costs associated with notifying the public of bus route/schedule changes or costs associated with operation of additional vehicles, will be a matter of negotiation between SCVWD and VTA. The VTA Bus Stop Coordinator will be contacted at least 72 hours prior to the start of any construction work affecting bus stops or transit operations.

5. Temporary alternative pedestrian bridge access shall be provided during bridge closures to avoid blocking access to schools and LRT stations. Any pedestrian bridge shall be designed to accommodate bicycles.

6. Construction haul routes and other measures shall restrict truck traffic on residential streets to only those streets where project activities occur. The Corps shall monitor the movements of construction vehicles to ensure that trucks use only the designated routes. Work on or near residential streets shall be limited by time of day to between 7:00 A.M. and 6:00 P.M. to prevent night-time disruption to nearby residents.

7. The Corps shall comply with all railroad company regulations and instructions governing railroad operations and property including the following: the use of signals and flags for all railroad property, including directing train traffic, as a protection against accidents; conducting operations adjacent to the railroad facilities and within the railroad right-of-way in such a manner as to maintain structures and other facilities in good and safe conditions; and the protection of tracks and the traffic moving on such tracks, wires, and signals at or in the vicinity of the construction area. Any construction activities that require track removal and replacement shall be scheduled on weekends or at other times as designated by the railroad.

8. Construction work at the Canoas Creek and Ross Creek crossings of the Almaden Expressway shall be planned to provide three lanes open in the peak traffic direction during peak hours.

Bypass Channel Plan

In addition to measures defined above for the Channel Widening Plan, the following mitigation measure would be required for the Bypass Channel Plan:

9. Work on Almaden Expressway shall minimize interference with either the northbound A.M. peak-hour or the southbound P.M. peak-hour weekday commute traffic. Three lanes shall be maintained in each direction. The existing walkway along the Almaden Expressway frontage road between Ironwood and Redbird drives shall be maintained at all times.

4.7.5 Unavoidable Significant Adverse Impacts

With implementation of the above measures, short-term construction impacts on transportation would be mitigated to a level of insignificance, and no unavoidable significant adverse transportation impacts would result.

4.8 LAND USE

The land use analysis addresses the project's compatibility with existing land uses in the vicinity except for recreational uses, which are discussed in section 4.5. Other considerations related to land use and the sections in which they are addressed include aesthetics (section 4.5), noise (section 4.6), transportation (section 4.7), and public safety (section 4.12).

4.8.1 Regulatory Setting

The regulatory setting for land use issues includes the locally adopted plans and policies that apply to the project area. Evaluation of effects on land use plans and policies is provided for in CEQ's NEPA regulations, which state that an EIS shall discuss, "Possible conflicts between the proposed action and the objectives of Federal, regional, State, and local ... land use plans, policies, and controls for the area concerned." (40 CFR 1502.16(c)).

Locally adopted plans and policies are discussed in Chapter 3 under section 3.3.4 (Local Regulations). State and federal agencies also have laws and regulations that relate to land use issues; these are included in sections 3.3.1 (Federal Regulations), 3.3.2 (Executive Orders), and 3.3.3 (State Regulations). Land use permits and approvals needed for the project are also part of the regulatory setting and are discussed in section 3.3.5.

4.8.2 Existing Conditions

Agricultural, industrial, commercial, residential, and open space uses exist in the vicinity of the feasibility study area. Residential uses predominate, occupying about 70 percent of the project area. Land uses along the river are described below by reach.

Reach 7. Along the west bank of Reach 7, the land use is predominantly single-family residential except for some commercial uses just south of West Alma Avenue and some multi-family residential uses along the UPRR tracks at the south end of the reach. Along the east bank north of Willow Street, the river is flanked by a mixture of residential, light industrial, and open space. The open space, formerly commercial and now vacant, is on the north side of Willow Street. Along the east bank south of Willow Street is a small but prominent commercial/light industrial area. East of the river between Willow and West Alma Avenue, Lelong Street parallels the river and separates the riparian corridor from the SR 87 corridor. A former golf course (along Lelong Street) is now vacant except just north of West Alma Avenue where the Tamien light rail transit station was constructed. The San Jose Elk's Lodge is on the parcel south of West Alma Avenue on the east bank. The river banks are generally vegetated throughout this reach.

Reach 8. The river is largely bordered by single-family residences in this reach. Homes adjoining the river are well-maintained and occupy 1/8- to 1/4-acre lots. Homes on the east side of the river give the appearance of a residential island bounded by SR 87, the river, the UPRR right-of-way to the north, and commercial uses south of Northern Road.

Reach 9. A combination of residential uses and open space, vacant lots characterize this reach of the river. Single-family residences on 1/4-acre lots line the river's west bank, particularly between Willow Glen Way and Malone Way. South of Malone Way to Curtner Avenue, ten half-acre lots back on the channel. A San Jose Water Company (SJWCo) well field is located at Willow Glen Way on the east bank. An adjacent property is open space that slopes in grassy, tree-covered terraces to the river.

Property just south, adjoining the same bank, is also well-vegetated native and ornamental plantings. Farther south along the east bank and adjacent to Almaden Road, a number of bank stabilization improvements have been constructed to control erosion. (Another visually prominent flood control improvement is the sackcrete bank at the lower end of Reach 9, visible from the Willow Glen Way Bridge.) Almaden Road parallels the east bank south of the well field.

Reach 10. Santa Clara County owns land immediately adjacent to the river's east bank between Curtner Avenue and the Almaden Expressway (Reach 10A). The Willow Glen Shopping Center is located on the east side of Almaden Road. The west bank of the river is occupied predominantly by residential properties, with many backyard terraces and decks encroaching up to the river banks. In Reach 10B, the SCVWD owns lands on the west bank adjacent to the Almaden Expressway. The SCVWD property continues south of the expressway on the same side of the river. The land between the east bank of the river and the northbound lane of the expressway is also under the jurisdiction of the SCVWD. Beyond this area are residential and commercial uses, while west of the Almaden Expressway are residences and a neighborhood park. An abandoned orchard lies south of Blue Jay Drive. The Valley View Packing Plant complex is south of this open space on the east bank of Reach 10C. A commercial car dealership is adjacent to the east bank between Hillsdale Avenue and the Capitol Expressway. Commercial uses are adjacent to Old Almaden Road, running along the west river bank.

Reach 11. This reach is bound by the Capitol Expressway to the north and Branham Lane to the south. The Almaden Expressway parallels the river along its west bank. The northern section of this reach is dominated by commercial businesses and car dealerships to the east, and retail and commercial development to the west. The east side of the channel includes land and easements owned by the County and SCVWD. More than 75 percent of the east bank to Branham Lane adjoins residential uses. An existing private path parallels much of this side of the river. A SJWCo well field lies along the middle of this reach (11B), between the river and Thousand Oaks Drive. The SJWCo well field extends west across the river to the Almaden Expressway. This land is vacant except for cyclone cages that protect water well pumping equipment. A service road, which fronts the cul-de-sacs along the east side of the river, extends to Branham Lane. Ross Creek enters the river via a concrete culvert about 1,000 feet north of Branham Lane. In Reach 11C, commercial property borders the west bank south of the SJWCo land. Commercial buildings service entrances face the river bank.

Reach 12. Office/commercial property borders the river in the northeast portion of this reach, which is bound by Branham Lane, Tonino Drive, and a narrow strip of land that parallels the river. A river right-of-way managed by the SCVWD runs along both sides of the northern segment and varies from 100 to 350 feet wide. Residential properties are contiguous with the right-of way on the east side of the river for about 30 percent of the reach length. Commercial uses are on both sides of the river along the reach's northern and southern edges. Most of the homes have enclosed back yards, with the exception of a few with landscaped terraces that lead down to informal paths. Midway along this reach, beside both the east and west banks of the river, percolation ponds have been developed for groundwater recharge purposes. The two ponds on the western bank occupy an extensive area approximately 2,000 feet long and up to 350 feet wide. The SCVWD right-of-way in the southern segment of the reach varies from 250 to 1,000 feet wide, beyond which are located residential subdivisions. On the east side of the river, adjacent the percolation pond, is a new multi-unit residential area.

The land bordering the northwestern edge of the reach is principally commercial, with minor industrial/commercial uses. The central two-thirds of the western side of the reach are zoned for agriculture and are in production. This area, which is actively used to grow row crops such as beans, tomatoes, strawberries, and corn, extends from the river to the Almaden Expressway. SR 85, which occupies a 200-foot right-of-way, crosses the reach via a 1,600-foot-long bridge. Continuing south along the west side, Sanchez Drive stretches along the river beyond the commercial activity that fronts on Blossom Hill Road and the length of the percolation ponds beyond it. A number of townhouses and condominiums were recently completed or are under construction beside Sanchez Drive.

Ross Creek and Canoas Creek. Ross Creek enters the river between reaches 11B and 11C. Canoas Creek enters the river between reaches 10A and 10B. The reaches of both creeks within the project area have been channelized by prior flood control efforts. Residential uses are adjacent to both creek banks and homes are generally only 60 to 80 feet from the channel.

4.8.3 Environmental Effects

Impact Significance Criteria

Impacts on land use are considered significant if the project substantially conflicts with existing or planned land uses. Types of land use conflicts could include the following: (1) the conversion of public open space into urban- or suburban-scale uses; (2) disruption or division of the physical arrangement of an established community; or (3) creation of incompatible land use types (Parsons Engineering Science 1997).

Channel Widening Plan

The removal of fences and other property barriers would result in short-term privacy and security impacts on homes adjacent to the construction sites; fence removal could also increase the incidence of pets escaping from yards. Loss of residents' privacy and related security impacts, because of the proximity of the project construction to residential backyards adjacent to the corridor, would be a temporary, less-than-significant impact.

During construction, residences adjacent to the project would be affected by the noise, dust, and increased traffic hazards associated with the widening of the river channel and the construction of flood control facilities. Residential neighborhoods that would be temporarily disturbed are in the following areas:

- Minnesota Avenue and Belmont Way (Reach 7);
- Mackey Avenue (Reach 8);
- El Rio Drive (Reach 10A)
- Old Almaden Road (Reach 10C); and
- Thousand Oaks (Reach 11).

These types of impacts, usually considered "nuisance" impacts, are addressed in the air quality, noise, traffic, and public safety sections of the EIR/S, along with mitigations to reduce their effect to less than significant (see sections 4.1.3, 4.6.3, 4.7.3, and 4.12.3, respectively). Because these impacts would be short-term and would not have a permanent effect on neighborhood character, their long-term effect on land use would be less than significant.

The only structures that would be removed with the Channel Widening Plan would be four commercial businesses in the lower part of Reach 7; these businesses would be relocated under the SCVWD *Relocation Assistance and Last Resort Housing Plan* (see Bypass Channel Plan discussion). Some other business properties, including the Elk's Lodge parking lot in Reach 7, would be altered without a complete disruption and loss of business. With appropriate compensation, these land use impacts would be short-term and less than significant. In some cases, as in Reach 11, the distance from the river channel to residences would be minimized. This would not affect land use patterns and would be an insignificant impact.

The acquisition by the SCVWD of certain properties that are currently designated for commercial and industrial land uses in Reach 10C near the Capitol Expressway would result in a loss of land potentially available for light industrial and commercial uses. This would be an insignificant impact considering the small acreages involved compared to the available supply of land.

Regionally beneficial land use impacts would result from the project by creating a buffer along the river corridor (Parsons Engineering Science 1997). The project would result in the conversion of commercial and industrial land use to open space dedicated to flood control and recreation purposes. The project would consequently reduce the risk of loss of life and property damage during major flood events. This would be a significant, long-term beneficial impact on land use.

Bypass Channel Plan

The impacts described above for the Channel Widening Plan would also occur under the Bypass Channel Plan. The following additional impacts would occur under the Bypass Channel Plan.

Implementation of the Bypass Channel Plan would result in changes in land uses along the river corridor. A total of 63 homes and 20 businesses would be removed. The most substantial impacts on land use would occur along Reaches 7, where 13 businesses would be relocated south of Willow Street between Lelong Street and the existing channel, in Reach 8 where 23 houses would be affected on the west side of Mackey Avenue, and in Reach 9 where six homes would be displaced from Willow Glen Way to Malone Road. The loss of businesses (commercial land uses) is considered an adverse but insignificant impact as it would not be sufficient to substantially alter the commercial character or financial integrity.

The loss of housing would substantially fragment and disrupt the cohesive residential character of the neighborhood by introducing flood control improvements and interrupting the neighborhood block. This effect would be greatest in the neighborhood around Mackey Avenue, where 23 residences would be removed. According to significance criterion (2) listed above, this is a significant long-term land use impact. Proposed mitigation would reduce long-term impacts on relocated residents and short-term impacts caused by inconveniences during construction, and the flood protection improvements would provide beneficial public safety and recreational impacts. Long-term land use impacts on residential community cohesion, however, would remain significant and unavoidable.

The SCVWD has developed and implemented a *Relocation Assistance and Last Resort Housing Plan* (SCVWD 1990) that provides for acquisition of properties necessary for constructing the Bypass Channel Plan, including compensation of home owners and relocation of residential and commercial tenants. Since 1990 when the plan was originally devised, it has been revised in 1993 and will shortly be revised again (personal communication, Sally LaMere 1997). Only 12 residences and 15 businesses remain to be acquired by the SCVWD within the feasibility study area (personal communication, Sally LaMere 1997).

Completion of the flood control facilities would protect an estimated 7,200 homes, 230 businesses, 11 public buildings, and an estimated 1,390 automobiles from flood-related damage. The following schools would also be protected from flood hazards: River Glen Elementary, Canoas Elementary, Lincoln Glen Elementary, Washington Elementary, Valley View Elementary, and Scallenberger (Parsons Engineering Science 1997). This is considered a long-term beneficial impact. Compared to the Channel Widening Plan (providing protection against up to a 50-year flood), the Bypass Channel Plan (providing protection against up to a 100-year flood) would have a greater long-term, beneficial impact on land use, because the risk of flooding would be mitigated to a greater extent.

No-Action Alternative

Under the No-Action Alternative, the adverse but insignificant land use impacts that would result from the other alternatives would not occur. The significant impacts associated with the loss of community cohesion due to the removal of residences and the adverse but insignificant impacts from the loss of businesses would not occur. The long-term beneficial impact from increased protection against floods would also not occur. The impacts on land use from periodic flooding of the creek (e.g., damage to residential and commercial property) would continue to occur with roughly the same frequency as they have in the past. Depending on the severity and location of the flooding, such impacts could be greater or less than the impacts described for the project, although their timing would be less predictable. New development in the project area would continue to be subject to floodplain management criteria.

4.8.4 Mitigation Measures

Channel Widening Plan

1. Neighbors in the project area shall be notified of the project by mail and by posted notice of the following: the project's importance, its exact location in their vicinity, and the project's expected timetable. Such notification shall include a map of the affected area and shall occur at least 3 months, and preferably 6 months, before construction begins. This notification is important to minimize the land use impacts on existing residents. Notification shall be coupled with community information meetings on the nature and expected results of the project to reduce the potential impact of abrupt changes on the affected residents in the immediate vicinity of the corridor.

2. Temporary construction fencing shall be installed to replace backyard fences removed during construction. This fencing shall remain in place throughout the duration of construction to provide security and privacy. Permanent fences shall be repaired or replaced after project construction.

3. To minimize the direct and indirect impacts associated with project construction, mitigation measures pertaining to air quality, noise, and traffic during the construction period shall be implemented for the project and included as part of the construction contract documents.

4. Standard "best management" construction measures shall be followed to minimize the disturbance to residents. Examples of such measures include watering the disturbed construction area to minimize windblown dust (see section 4.1.4), and limiting or prohibiting construction-related truck traffic during peak travel times (see section 4.7.4).

5. The four commercial businesses that would be relocated shall be fully compensated for all expenses related to the relocation. Relocation under either plan would be covered by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (PL 91-646).

6. Any residents required to move out of their home temporarily shall be fully compensated for all of their expenses related to the move (e.g., temporary lodging elsewhere).

7. Any physical damage to the homes associated with installation of flood control facilities shall be repaired to pre-damage conditions.

Bypass Channel Plan

The mitigation measures for the Channel Widening Plan described above would apply to the Bypass Channel plan. The following additional measures would also apply to the Bypass Channel plan:

1. The notification to affected residents shall include housing removal locations and detailed street maps explaining future changes in traffic flow direction on Mackey Avenue and Guadalupe Avenue.

2. The requirements of the Relocation Assistance and Last Resort Housing Plan, the Relocation Advisory Assistance Program, and the Relocation Assistance Payment Program shall be satisfied for this project, and relocation costs shall be paid to displaced residents.

4.8.5 Unavoidable Significant Adverse Impacts

Channel Widening Plan

There would be no unavoidable significant impacts on land use from implementation of the Channel Widening Plan.

Bypass Channel Plan

The Bypass Channel Plan would remove substantial numbers of residences resulting in a loss of community cohesion. This is a long-term unavoidable significant land use impact. This impact would be partially offset by long-term beneficial impacts on land use from reduced flooding risks and increased recreational amenities.

4.9 PUBLIC SERVICES AND UTILITIES

This discussion of public services and utilities is based in part on the analysis prepared for the *EIR/EIS for the Guadalupe River Flood Control Project* (Parsons Engineering Science 1997).

4.9.1 Regulatory Setting

Various state and local laws and regulations govern the functions and operations of public services and utilities. The City of San Jose would have responsibility for ensuring the proper operations of most public services and the local utilities. Regional communications and gas and electrical power utilities are under the authority of state agencies.

4.9.2 Existing Conditions

Police Protection Services

Police protection service for the project area is provided by the San Jose Police Department. The area served by the department is divided into districts, many of which are traversed by the Guadalupe River channel. As of July 1996, the police department was authorized for 1,299 sworn officers. With these personnel, the department would have 1.5 sworn officers per thousand population. The national average is 2.2 sworn officers per thousand population. For cities the size of San Jose, the national average is 2.9 sworn officers per thousand (Parsons Engineering Science 1997).

Fire Protection Services

The San Jose Fire Department, which serves a total area of 203 square miles, provides all fire protection services for the area covered by the flood control project. The Fire Department has 30 engine companies, 11 truck companies, one hazardous incident team, one arson investigator, and five battalion chiefs on duty in 30 fire stations. Of this total, nine engine companies, four truck companies, and three battalion chiefs respond to portions of the feasibility study area (Brooks 1994).

The recommended standard emergency travel time for the nearest engine company to a given locale in the city is 4 minutes. Travel times vary from 1.8 minutes to 6.6 minutes for the first engine responding to portions of the flood control feasibility study area, which is considered an acceptable level of service. The fire department responded to an estimated 80 fire alarms in the study area in the 1992/1993 fiscal year. In the study area, the department estimates that 50 percent of all calls are for grass and brush fires and 25 percent are for medical emergency and rescue calls.

Solid Waste Collection Service

Solid waste collection service is provided by Waste Management, Inc. Residential service is provided once per week, generally during the hours of 6 A.M. to noon. Commercial service is provided one to five times per week. Garbage trucks characteristically park alongside parked cars while serving residences. For commercial areas, garbage trucks often park in shopping center parking areas.

City Parks

City-operated parks and open spaces adjacent to the project corridor include River Glen Park (along Reach 8), Roy Avenue Mini Park (beside Reach 9), Canoas Park (Reach 10), the Thousand Oaks Park (near Reach 11), and the SCVWD lands surrounding their headquarters (beside Reach 12).

Public Utilities

Public utility easements along the flood control project corridor include water, sewer, stormdrain, telephone and television cables, gas pipelines, and electrical transmission lines. Sewer, and storm drain systems are operated by the City of San Jose. Water systems are operated by the San Jose Water Company (SJWC). Underground telephone cables are maintained and operated by Pacific Bell and AT&T. Underground gas pipelines and electricity lines are maintained by the Pacific Gas & Electric (PG&E) Company.

Geodetic Control Monuments

The federal National Geodetic Survey maintains horizontal and vertical geodetic control monuments that are used for surveying purposes. There is the potential for these control points to be located within the feasibility study area.

4.9.3 Environmental Effects

Impact Significance Criteria

According to CEQA Appendix G, Significant Effects item (2), a project could have a significant effect on the environment if the project interferes with emergency response plans or emergency evacuation plans.

Channel Widening Plan

Police Protection Services

During construction, the project would cause only minor traffic problems, occasional trespassing, and incidental events that would require police protection services. This would be a short-term significant impact that could feasibly be mitigated to less than significant with appropriate prior notification of the police department concerning construction activities (as described in section 4.9.4).

Fire Protection Services

During construction, response times for fire protection would be temporarily increased in some areas. Response would be increased by about 1 minute during construction of bridges or culverts on Willow Street and West Alma Avenue (Reach 7). During construction of the Hillsdale Avenue Bridge, it would be necessary to modify response routes for some fire companies (Reach 10C). Temporary delays could also be caused by the enlargement of culverts by the Almaden Expressway (Reach 11C) and other locations. Management of bridge closures and detours during construction are discussed in section 4.7 (Transportation). These short-term delays would be significant impacts that could be feasibly mitigated to less than significant with appropriate prior notification of the fire department concerning construction activities (as described in section 4.9.4).

Following completion of the flood control project, the overall effect on fire service would be beneficial. Fire responses would not be subject to the difficulties and delays previously encountered in some areas due to flooding, and companies operating in these areas would likely be more efficient in their emergency and firefighting responsibilities (Osby 1990).

Solid Waste Services

Flood control improvement construction activity would not affect solid waste collection routes in residential and commercial neighborhoods. Therefore, no impacts on solid waste services are anticipated.

Parks

No adverse impacts on the city's parks would result from the construction of the Channel Widening Plan. Implementation of the Guadalupe River Park South Corridor Master Plan, a separate but related project, (see section 3.4), would not adversely impact the Channel Widening activity because proposed recreational corridors would not be affected.

Water Well Disruption

One well operated by the San Jose Water Company is located within the area impacted by construction. This well is downstream of the Ross Creek Channel inlet on the east side of the river in Reach 11. Loss of this well would be a significant impact. The short-term impact could be mitigated to less than significant by relocation of the well prior to construction so that no interruption to public water service would occur.

Relocation of Utilities

During construction, a number of utilities such as pump stations and PG&E power poles would be disturbed and would require relocation in all reaches. Underground utilities such as gas and power lines would require relocation during channel and bridge construction. Relocation of utilities may result in short-term service interruptions for surrounding areas. This is a short-term significant impact that would be mitigated to less than significant by requiring utility excavation permit and encroachment permit compliance (as described in section 4.9.4).

Project construction would have the potential to disturb or destroy National Geodetic Survey control monuments. This would be a significant impact on infrastructure used to maintain accurate survey data.

Bypass Channel

Impacts caused by implementation of the Bypass Channel plan are similar to those caused by the Channel Widening Plan with the following exceptions:

- Police Protection Services. Security issues potentially requiring police protection services could result from implementation of the proposed recreational trail described in section

2.4.3. The Corps has anticipated these concerns and has incorporated numerous security features into the design of the trail, including call boxes and lighting, reducing potential significant long-term impacts to less than significant. The City of San Jose will be responsible for administering recreation facilities. The City has a policy that recreation trails, such as the proposed trail, are closed at night. Please refer to section 2.4.3 and section 4.12 (Public Safety) for additional information regarding the recreational trail plan.

- Fire Protection Services. A 1-minute delay to response times would be caused by bridge construction on Willow Glen Way Bridge and Curtner Avenue Bridge (Reach 10A). This would be an adverse but less than significant short-term impact.

- Water Well Disruption. An additional San Jose Water Company water well (Reach 9) is located in the area impacted by construction. Loss of this well would be a significant impact; but the impact could be mitigated to less than significant by relocation of the well prior to construction, avoiding any interruption in public service.

Geodetic Control Monuments

Similar to the Channel Widening Plan, project construction would have the potential to disturb or destroy National Geodetic Survey control monuments. This would be a significant impact on infrastructure used to maintain accurate survey data.

No-Action Alternative

The no-action alternative would have no impacts on public services and utilities. The existing conditions would continue.

4.9.4 Mitigation Measures

Channel Widening Plan and Bypass Channel Plan

1. The Corps shall notify the City of San Jose Police Department regarding road closures or other activities during construction that would be likely to impede delivery of police services. The Crime Prevention Unit shall be contacted pertaining to accommodations for visibility and accessibility by emergency vehicles.

2. The Corps shall provide the San Jose Fire Department a 60-day advance notice to plan for modified responses to accommodate the constrictions or closures of West Virginia Street, Willow Street, West Alma Avenue, Willow Glen Way, Curtner Avenue, and Hillsdale Avenue. County Communications shall also be notified of all road closures.

3. The Corps shall fund the San Jose Water Company's relocation of water wells in the area impacted by construction (Reaches 9 and 11) prior to construction to prevent interruption of water supply.

4. Whenever utilities are moved, the Corps shall obtain a Utility Excavation Permit from the San Jose Public Works Department prior to the initiation of project construction. The general

conditions and requirements of such permits include the project's working hours, necessary traffic control devices, trench backfill and pavement restoration methods, and coordination with other construction projects in the general vicinity. In addition, the Corps shall secure both standard and special encroachment permits. Utility excavation permits shall be issued to utility companies with franchise agreements with the City of San Jose (Khouzam 1990). Relocation of utilities shall be coordinated with the appropriate utility company. All utilities relocation shall be performed by the appropriate utility company unless directed otherwise by the company. The Corps shall be responsible for repair of any damage to utilities.

5. The Corps shall determine the location of a any geodetic control monuments within the feasibility study area. If any monuments would be disturbed or destroyed by project construction, the Corps shall notify the National Geodetic Survey no less than 90 days prior to this activity in order to plan for their relocation. The Corps shall be responsible for the cost of any relocation(s) required.

4.9.5 Unavoidable Significant Adverse Impacts

Channel Widening Plan and Bypass Channel Plan

All significant impacts can be mitigated to a level of insignificance by implementation of the recommended measures, no unavoidable significant adverse impacts would result under either plan.

4.10 CULTURAL RESOURCES

A cultural resource, as defined by the National Historic Preservation Act (NHPA), is any prehistoric or historic district, site, building, structure, or object. This can include natural landscapes, traditional cultural lands, cultural practices, and/or beliefs of a living community.

4.10.1 Regulatory Setting

Identification and evaluation of significant cultural resources are mandated under federal statutes, including the NHPA and Executive Order 11593. Section 106 of the NHPA requires a federal agency to consider the effects of its intended project on "historic properties" (a federal term used interchangeably with cultural resources) that are determined eligible for listing in the National Register of Historic Places (NRHP).

The Advisory Council on Historic Preservation published the regulations implementing the Section 106 process (36 CFR Part 800). One of the initial steps in the Section 106 process is to delineate the project's Area of Potential Effect (APE). In general, the APE includes the areas where project activities could affect historic properties located on terrestrial surfaces or underwater, including areas adjacent to the construction site where indirect effects related to ground disturbance can occur (see section 4.10.2 for a description of the APE).

Federal and state criteria are used to evaluate the significance of cultural resources. The significance of a cultural resource is determined by its "integrity" and whether it meets eligibility criteria for the NRHP (36 CFR 60.4). To meet the NRHP criteria for integrity, a cultural resource must contain one or more of the following qualities:

A. Is associated with events that have made a significant contribution to the broad patterns of history; or

B. Is associated with the lives of persons significant in the past; or

C. Embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; or

D. Has yielded, or may be likely to yield, information important in prehistory or history.

Additionally, Appendix K (Archaeological Resources) of the California Environmental Quality Act (CEQA) states that an important or significant archaeological resource is one that:

A. Is associated with an event or person of:
   1. Recognized significance in California or American history; or
   2. Recognized scientific importance in prehistory.

B. Can provide information that is both of demonstrable public interest and useful in addressing scientifically consequential and reasonable or archaeological research questions;

C. Has a special or particular quality such as oldest, best example, largest, or last surviving example of its kind; or

D. Is at least 100 years old and possesses substantial stratigraphic integrity; or

E. Involves important research questions that historical research has shown can be answered only with archaeological methods.

4.10.2 Existing Conditions

Regional and Ethnographic Overview

The Guadalupe River is located within the central coast region of California. The environment in this region has changed considerably during the Holocene (the last 10,000 years) due to natural processes such as climatic and sea level change, as well as relatively recent human impacts such as draining and filling of wetlands. These changes have in turn affected both prehistoric and historic patterns of human land use and settlement. The project site is a natural site for sediment accumulation.

Land adjacent to the Guadalupe River has been inhabited for thousands of years by Native American peoples. Prehistoric sites as old as 8,000 years before present (B.P.) are recorded in the region (Moratto 1984). However, the number of older prehistoric sites within the feasibility study area is expected to be very low based on the sparse distributions of these sites throughout California during the period from approximately 8,000 to 2,000 years ago (Moratto 1984). If any such sites exist within the feasibility area, they would be expected to be buried under sediment deposited by thousands of years of floods.

The name Ohlone is used to represent all the groups of people that are indigenous to the area now occupied by San Francisco, Alameda, and Santa Clara counties, as well as portions of Marin and San Mateo counties. At the time of Spanish colonization, the Ohlone inhabited an area of approximately 5,000 square miles (Costo and Costo 1995).

The Ohlone lifestyle and economy were well adapted to the local environment. They lived in tribelets ranging in size from about 50 to 500 people; each tribelet had a permanent village and some had additional special use sites (e.g., plant gathering, acorn processing, hunting, or shellfish collecting) (Heizer 1978). They gathered plants and shellfish, and hunted for land mammals, birds and fish that would have been available in and adjacent to the Guadalupe River.

The river was surrounded by extensive wetland and riparian forest vegetation. Due to the rich and varied food supplies that would have been available in such an environment, permanent prehistoric village sites and/or temporary camps for gathering seasonal food resources would be expected within the vicinity of the river.

During the period of Hispanic settlement in the region, the project study area was within the lands of the Pueblo of San Jose (established in 1777) and the land grant of the San Juan Bautista Rancho (granted in 1844). Cattle ranching for the trade of hide and tallow was the primary land use and economic activity during this period. Some water management was practiced to provide water for irrigation and domestic use and the Guadalupe River served as the source of water for the pueblo, ranches, and farms along its banks.

Following the California gold rush (after California had been acquired by the United States), development in the Santa Clara Valley increased and land use shifted towards more intensive agricultural practices. Wheat farming was practiced initially but this gave way to the production of fruit crops such as prunes, apricots, and pears for drying, and grapes for winemaking. The Santa Clara Valley underwent continual subdivision of lands for more farming, residential development, and industrial activities. Water management efforts were implemented on the Guadalupe River and Canoas Creek for flood control to allow more agricultural lands to come under production, for water supply, and to run mills for industrial purposes (COE 1998).

After the end of World War II, agricultural lands in the valley were gradually converted to urban uses. Meanwhile, some of the Ohlone survived Spanish and Anglo colonization, and today several thousand people in the Bay Area and central California can trace their ancestry back to the Ohlone.

A cultural resources survey and evaluation was completed by Archaeological Resources Management (ARM 1990) for the SCVWD EIR/S (Parsons Engineering Science 1997). The cultural resources study consisted of an archaeological resources evaluation and historic architectural survey report. The archaeological research included archival research, a surface survey of the project study area, and subsurface testing at four archaeological sites within the project study area. Another archaeological site in the project area was subject to excavations prior to the current project. The historic architectural survey entailed archival research to develop a historical context for the study area and identify potentially significant historic structures.

The ARM report procedures and findings were reviewed by Archaeological Resource Service (ARS 1993) for the Corps. This report determined if the ARM study was sufficient for use as a Section 106 compliance document, using appropriate federal standards for evaluating historical properties. ARS found that the ARM report failed to adequately evaluate the architectural context (e.g., the larger neighborhood or regional setting) of the historical resources within the project area.

Paleoenvironmental Conditions

The prehistoric and historic hydrological conditions of the Guadalupe River, Coyote Creek, and major tributary creeks in the region had a significant influence on the distribution and settlement of people in the Santa Clara Valley. Prior to flood control efforts on the Guadalupe River, sheetflooding in the Willow Glen area (Reach 8) was common during the winter months since the river channel was shallow and frequently overtopped. The flooding created a freshwater marsh in this area that consequentially buried many prehistoric archaeological features under several feet of soil. The marsh also restricted early historic development in this part of the project study area. The upper reaches of the river were confined within a channel that stayed within its banks more consistently and afforded opportunities for some development near and along the river. Also prior to channelization, Canoas Creek flowed through several shallow marshy areas and it did not join the Guadalupe River until the two streams had reached the area that is now downtown San Jose.

Prehistoric and Historic Archaeological Resources

Prehistoric and historic archaeological resources are described below for each reach of the river.

Reach 7. A large prehistoric village site, CA-SCL-690, was identified on a low terrace of the east river bank, near the SPRR railroad tracks and in the vicinity of the feasibility study area (Parsons Engineering

Science 1997). The site was partially excavated by archaeologists from the California Department of Transportation (Caltrans) and San Jose State University. Complete human burials were discovered at this site and cultural material included shell beads and pendants, manos, mortars and pestles, projectile points, a bone whistle, shell, and other artifactual and non-artifactual material. Artifacts from this site date from A.D. 720 to A.D. 1270. The site was considered eligible for NRHP listing. It is possible the site was not fully excavated and buried resources may extend into the project construction area.

Reaches 8 and 9. No prehistoric or historic archaeological sites are recorded within Reach 8 or 9.

Reach 10. No prehistoric sites were identified within Reach 10. An historic archaeological site (CA-SCL-635H) is a redwood retaining wall dating back from the 1860s to 1870s. It is located on the east bank of the Guadalupe River Bank 450 feet south of the Curtner Street Bridge, adjacent to the east bank of Canoas Creek. The site may represent a river flood control and/or erosion control structure. Test excavations conducted in 1990 revealed remnants of vertical redwood planks extending about 9 feet below the surface and historic artifacts within the surrounding soil. Continuous exposure to water and resulting deterioration have left the site with little stratigraphic integrity. The site has been determined to be ineligible for NRHP listing (COE 1998).

Reach 11. A prehistoric site, CA-SCL-636, is partially defined within the Reach 11 boundary. The remaining portion of the site is obstructed by structures on private property. Although the boundaries have not been precisely defined, the site record describes it as close as 40 feet from the riverbank. It is considered potentially eligible for NRHP listing (COE 1998).

No historic archaeological sites are recorded within the reach.

Reach 12. No prehistoric or historic archaeological sites are recorded within Reach 12.

Ross Creek. No prehistoric or historic archaeological sites are recorded within the Ross Creek feasibility study area.

Canoas Creek. There are two archaeological sites recorded in the Canoas Creek study area. CA-SCL-294 is a large occupation site located on the southern creek bank. The relatively undisturbed site deposits contain human burials, dietary shell and bone fragments, lithic artifacts, and shell beads that were found in test units to a depth of 3 feet. Archaeological testing resulted in recommending the site for National Register eligibility listing (ARM 1990). CA-SCL-674, is a low density stone tool manufacturing site about 325 feet west of Canoas Creek. Shellfish remains and two burials identified during sewer line construction monitoring in 1988 (ARM 1990) indicate that the site was used as a habitation camp. Significance testing within the feasibility study area revealed prehistoric cultural materials extending to only shallow depths. ARM (1990) suggested that the deposit was possibly transported from another area through historic soil movement or that the remains may be a special use site occupied for brief periods of time for food acquisition and/or preparation. Although the site has been characterized as disturbed, the presence of burials within the site indicates that this is a potentially significant site and may be eligible for NRHP listing. Additional testing would be required to determine the integrity of the entire site deposit. Portions of the site may extend into the feasibility study area.

Buried Sites Below Alluvial Deposits

Since the project area is located within an alluvial environment, additional archaeological sites may be buried under alluvium and therefore be undocumented at this time.

Historic Architectural Properties

Historic architectural properties within the project study area are described below for each study reach of the river. Neither the ARM (1990) nor the ARS (1993) reports indicate whether the Office of Historic Preservation concurred with the significance evaluations for the structures prepared by ARM. None of the bridges within the feasibility study area are identified on the Caltrans State and Local Bridge Inventory as eligible for NRHP listing.

Reach 7. Seven structures and the Western Pacific Railroad bridge are present within Reach 7. All the structures (dating to the 1920s, 1950s, and 1960s) were determined not eligible for NRHP listing (ARM 1990; ARS 1993).

Reach 8. The area around Reach 8 was subdivided in the 1950s. Nine structures were evaluated but none were found to have historic or architectural significance (ARM 1990; ARS 1993). A footbridge over the Guadalupe River at Willow Glen Way, originally constructed over Los Gatos Creek in 1932, was moved to its present location in 1956. This bridge was determined not eligible for NRHP listing (ARM 1990).

The Willow Glen area of Reach 8 was a marshy area subject to frequent flooding in historic times. One of the first flood control efforts on the Guadalupe River was initiated here in the 1860s when a canal (named the Lewis Canal) was dug in the location of the present-day Guadalupe River channel alignment. The canal was created to reclaim the marshy land for agricultural use (ARM 1990). The resource's location has been determined not eligible for NRHP listing (COE 1998).

Reach 9. Nine structures were evaluated in Reach 9. The house at 760 Malone Road, built in 1900, was initially considered to have potential significance. After further review, none of the structures were determined eligible for NRHP listing.

Reach 10. The Valley View Packing Company complex, at 1095 Old Hillsdale Avenue, directly east of the river, was started by the Rubino family on an 18-acre parcel that was purchased in 1916, and is one of the last family-owned and operated fruit processing enterprises in the Santa Clara Valley. Other associated facilities on site include the foundation of an abandoned prune dehydrator that could have been a prototype for the modern prune dehydrator developed by the Rubinos in 1935 (the rest of the dehydrator has been removed from the property). Two other structures on site include the original Rubino residence, a ca. 1930s prairie-style bungalow that is now a company office building, and a ca. 1950s industrial building. The residence structure and prune dehydrator constructed in the 1930s are considered to have moderate historical significance due to their age, style, and historical associations (ARS 1993). Although ARM did not consider the structures individually for their historic value or whether the complex should be considered as an historic district, the structures are considered to have, at least, moderate levels of significance. The prune dehydrator, however, was removed from the property prior to a NRHP eligibility determination was made. The Valley View Packing Company complex was determined not eligible for NRHP listing.

Reach 11. A structure at 13958 Almaden Expressway was determined not eligible for the NRHP.

Reach 12. No historic structures were identified within Reach 12.

Ross Creek. No historic structures were identified in the Ross Creek feasibility study area.

Canoas Creek. No historic structures were identified in the Canoas Creek feasibility study area.

4.10.3 Environmental Effects

Impact Significance Criteria

The NHPA outlines the requirements of federal agencies to consider a project's effects on significant cultural resources (36 CFR Part 800). Impacts on cultural resources are considered significant if a property meeting the criteria for listing in the NRHP would be:

A. Physically damaged or altered;

B. Isolated from its historic context; or

C. If project elements would be introduced that are out of character with the significant property or its setting.

CEQA (Appendix G) lists "significant effects" criteria that are also applicable to the proposed project. A significant effect on cultural resources was defined if the project would:

A. Disrupt or adversely affect a prehistoric or historic archaeological site or a property of historic or cultural significance to a community or ethnic or social group, or a paleontological site except as part of a scientific study; or

B. Conflict with established recreational, educational, religious, or scientific uses of the area.

Native Americans are considered an ethnic and social group under Criterion A. Contemporary Native Americans consider that disturbances to prehistoric archaeological sites adversely impact their heritage values. Although all sites are important, villages and burial sites are generally considered the most sensitive heritage resources.

Channel Widening Plan

Potentially Buried Archaeological Resources in all Reaches. The potential exists in all reaches for disturbing archaeological deposits buried below alluvial sediments. This would be a potentially significant impact on archaeological research and Native American heritage values. This impact would be mitigated to insignificance by implementing a cultural resources treatment plan by the Corps during construction, including periodic archaeological monitoring in the areas within the feasibility study area considered to have the greatest potential for archaeological resources. The plan would include the provision for archaeological excavations if intact archaeological resources were encountered to assess the resource's significance and mitigation, if necessary. Native Americans would be consulted in developing the treatment plan.

Reach 7. Proposed widening and benching with earthen embankments along the east bank would require removing four businesses and the replacement of the Willow Street and Alma Avenue bridges. These bridges are considered architecturally and historically insignificant (ARM 1990), and impacts would be insignificant.

The project could impact areas of archaeological site CA-SCL-690 that have not been systematically mapped and recorded. As the site was determined eligible for NRHP listing, this would be a significant impact on archaeological research and Native American heritage values. The impact would be mitigated to insignificance by attempting to avoid the resource, and, if not possible, implementing a cultural resources treatment plan that would provide for retrieval of important prehistoric information through archaeological investigations at the site. Native Americans would be consulted in developing the treatment plan.

Reach 8. No historical or archaeological properties are located within the reach. However, proposed excavation to create floodwalls could expose archaeological materials buried below alluvial deposits. This would be a potentially significant impact on archaeological research and possibly Native American heritage values. This impact would be mitigated to insignificance by implementing the cultural resources treatment plan.

Reach 9. Replacement of the Willow Glen Way bridge would require the removal of the existing footbridge at this location. The footbridge was moved here in 1956 from its original location at Lincoln Avenue on Los Gatos Creek. The footbridge has been evaluated and is not considered to have historical or engineering merit (Parsons Engineering Science 1997). Removal of the footbridge would therefore be an insignificant impact.

Reach 10A. No prehistoric archaeological sites are known in the Reach 10A project area. Widening and benching on the east bank of the Guadalupe River Bank 450 feet south of the Curtner Street Bridge and adjacent to the east bank of Canoas Creek has the potential to damage portions of CA-SCL-635H. Because the site has been determined ineligible for NRHP listing, impacts on the retaining wall remains would be insignificant. Previously unrecorded historic materials could be exposed along the base of the retaining wall. Depending on the nature of the historic remains, impacts on historical research values could be significant. This impact would be mitigated to insignificance by implementing a cultural resources treatment plan that would provide for significance evaluation of historic archaeological materials, and if necessary, their mitigation.

Reach 10B. No recorded cultural resources impacts would be impacted.

Reach 10C. Proposed replacement of the Hillside Avenue Bridge is part of proposed widening and benching. Because the bridge has been determined ineligible for NRHP listing, impacts would be insignificant.

Reach 11. Proposed widening and benching along Reach 11 would occur along alternating east and west banks of the drainage beyond the first 2,100 feet of the reach. Excavation could impact the periphery of CA-SCL-636, potentially eligible for NRHP listing. This could be a significant impact on archaeological research and Native American heritage values. The impact would be mitigated to insignificance by attempting to avoid the resource, and, if not possible, implementing a cultural resources treatment plan that would provide for retrieval of important prehistoric information through archaeological investigations at the site. Native Americans would be consulted in developing the treatment plan.

Ross Creek. There are no known cultural resources along the portion of Ross Creek that would be affected by the proposed construction of low floodwalls and replacement of an existing culverts. The potential for encountered intact soils that had not been disturbed by earlier construction is low, though possible. Proposed excavation could expose archaeological materials buried below recent alluvial deposits. This would be a potentially significant impact on archaeological research and Native American heritage values. This impact would be mitigated to insignificance by implementing a cultural resources treatment plan including periodic archaeological monitoring in the areas within the feasibility study area considered to have the greatest potential for archaeological resources, as described above.

Canoas Creek. CA-SCL-294, a large village site with burials that is considered eligible for NRHP listing, could be disturbed by floodwall construction. This would be a highly significant impact, as burials and burial-related material are highly sensitive to contemporary Native Americans. CA-SCL-674, the low density stone tool scatter, could also be impacted by floodwall construction. Although testing did not identify dense material deposits, human remains were recovered from a 1988 sewer trench excavation. It is possible that intact features or additional human burials within the impact area previously unidentified may be uncovered by project construction. Disturbance of the site would be a significant impact. The impact would be mitigated to insignificance by attempting to avoid the resource, and, if not possible, implementing a cultural resources treatment plan that would provide for retrieval of important prehistoric information through archaeological investigations at the site. Native Americans would be consulted in developing the treatment plan.

Bypass Channel Plan

Potentially Buried Archaeological Resources in all Reaches. The potential exists for disturbing archaeological deposits buried below alluvial sediments in all reaches. This could be a significant impact on archaeological research and Native American heritage values. This impact would be mitigated to insignificance by implementing the cultural resources treatment plan discussed under the Channel Widening Plan.

Reach 7. The bypass channel proposed along the east bank would remove 13 businesses and the parking area for the Elk's Lodge, which were determined to be insignificant resources. Impacts would be adverse, but not significant. The Union Pacific Railroad Bridge, which crosses over the river, was declared to have no historical or engineering merit; impacts of bridge removal would be insignificant. Excavation of the bypass channel could potentially adversely affect prehistoric site CA-SCL-690, recorded in the vicinity of the feasibility study area. This prehistoric site is considered eligible for NRHP listing so that any impacts to the resource would be significant. Implementing the cultural resources treatment plan would mitigate impacts on archaeological resources to insignificance, as described for the Channel Widening Plan for this reach.

Reach 8. A bypass channel is also proposed that would remove 23 homes. None of the homes has significant historical value nor are they eligible for NRHP listing, so impacts would be insignificant.

Reach 9. Two 500-foot bypass channels would be constructed, requiring removal of six homes, two partial backyards, and two businesses. The removal of the house at 760 Malone, ineligible for NRHP listing, would be an insignificant impact. Although insignificant, architectural elements and/or structures should be offered to local interested historical associations for their use (ARM 1993).

No archaeological properties were located within Reach 9 boundaries.

Reach 10A. The redwood retaining wall (CA-SCL-635H) and potential historic materials along the base of the wall would be disturbed by widening of the river along the east bank. The impact on the wall would be less than significant. If unknown historical resources were identified during construction, impacts would be mitigated to insignificance by implementing the cultural resources treatment plan, similar to the Channel Widening Plan.

Reach 10B. No recorded cultural resources would be impacted.

Reach 10C. The Valley View Packing Company complex would be removed due to east bank widening. Because the resource is ineligible for NRHP listing, impacts would be insignificant.

Reach 11. CA-SCL-636 is located in Reach 11A and would be potentially impacted by plan development. Impacts on archaeological research and Native American heritage values are considered potentially significant until formal NRHP assessment of the resource is completed. The impact would be mitigated to insignificance by implementing the cultural resources treatment plan as described for the Channel Widening Plan.

Reach 12. No recorded cultural resources would be impacted by proposed widening between percolation ponds and Blossom Hill Road along the west bank, and reconstructing levees on both banks.

Ross Creek. No recorded cultural resources would be affected by the project, but excavation for channel widening and for existing culvert replacement could penetrate previously undisturbed soils containing unknown cultural resource deposits, as discussed for the Channel Widening Plan. This impact would be mitigated to insignificance by implementing the same measure described for the Channel Widening Plan.

Canoas Creek. Possible significant impacts to CA-SCL-294 and CA-SCL-674 would be similar to the Channel Widening Plan, as discussed above. These impacts would be mitigated to insignificance by avoidance and implementing the cultural resources treatment plan described for the Channel Widening Plan.

No-Action Alternative

The No-Action Alternative would directly impact cultural resources present in the project area. Continued flooding and erosion would continue, however, causing gradual destruction of cultural resources currently exposed or potentially exposed in river banks.

4.10.4 Mitigation Measures

The following measures would apply to both alternative flood protection plans under consideration.

Channel Widening Plan and Bypass Channel Plan

1. A Cultural Resources Treatment Plan shall be developed by the Corps, detailed during the design phase of the project. The plan shall address the treatment of all cultural resources and sensitive areas identified in previous investigations. The plan shall incorporate relevant federal, state, and local guidelines, in consultation with representatives of local Native American communities, and shall be developed so that it can form the basis of a subsequent Programmatic Agreement (PA) pursuant to Section 106 of the NHPA and its

implementing guidelines (36 CFR 800). The plan shall provide for treating each cultural resource including possible avoidance, significance assessment, mitigation, and evaluation and treatment of unexpected resources encountered during construction, and shall include the provisions defined below.

2. Construction activity shall be designed to avoid all known significant cultural resources.

3. A qualified archaeologist shall periodically monitor project construction ground disturbances (including demolition of structures and removal of paved surfaces) in areas determined to have the greatest potential for archaeological site location to ensure that buried archaeological deposits are identified. In the event potentially significant resources are identified during any of the earth disturbing activities, construction shall be temporarily redirected until the significance of the finds are determined under local, state, and federal guidelines. These excavations shall be subject to the Cultural Resources Treatment Plan discussed in measure 1.

4. Architectural elements and/or structures that would be demolished should be offered to the San Jose Historical Museum, the Victorian Preservation Association, or other interested parties for their use.

4.10.5 Unavoidable Significant Impacts

Channel Widening Plan and Bypass Channel Plan

Implementation of the Cultural Resources Treatment Plan would mitigate all impacts to insignificance. No unavoidable significant impacts would result.

4.11 HAZARDOUS MATERIALS

4.11.1 Regulatory Setting

Federal Regulations

A variety of laws and regulations governing the management and control of hazardous substances have been promulgated to protect the environment. These regulations fall under the jurisdiction of the U.S. Environmental Protection Agency (EPA). Some of the more important federal laws are listed below.

- The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or Superfund, creates national policy and procedures to identify and clean up sites where hazardous substances have been released into the environment and provides the mechanisms by which these remedial actions are financed. Additionally, the Superfund Amendment and Reauthorization Act (SARA), which extended and amended CERCLA, required that due diligence be exercised in the investigation of past and current handling of hazardous substances prior to property sale.

- The Resource Conservation and Recovery Act (RCRA) was enacted in 1974 as the first step in regulating the potential health and environmental problems associated with solid hazardous and non-hazardous waste disposal.

- The Toxic Substances Control Act (TSCA), enacted in 1976, regulates and controls harmful chemicals and toxic substances in commercial use, in particular, polychlorinated biphenyls (PCBs).

- The Federal Insecticide, Fungicide, and Rodenticide Act (as amended) controls the manufacture, use, and disposal of pesticides and herbicides.

- The Hazardous and Solid Waste Act (HSWA) includes the 1984 amendments to RCRA to address gaps in the area of highly toxic wastes.

- 29 CFR, Part 1910 — contains the Occupational Safety and Health Administration (OSHA) requirements for workers at hazardous waste sites including emergency response, hazard communication, and personal protective equipment.

State and Local Regulations

California has developed hazardous waste regulations that are similar to the federal laws, but that are much more stringent in their application. The basic law established in California, similar to RCRA, is the Hazardous Waste Control Law. More detailed information concerning the implementation of these requirements is given in Title 22 of California Code of Regulations (CCR), Chapter 30. The Hazardous Waste Control Law (HWCL) empowers the Department of Toxic Substance Control (DTSC), a division of Cal-EPA (formerly part of the Department of Health Services), to administer the state's hazardous waste program and implement the federal program in California. This law includes underground storage tank (UST) regulation.

Other relevant state laws include the following:

- Proposition 65, which focuses on carcinogenic or teratogenic contaminants and executes the state's community-right-to-know program.

- Underground Tank Law that regulates underground storage to prevent groundwater contamination.

- Porter-Cologne Water Quality Control Act, adopted in 1969, that requires the maintenance of the highest reasonable quality of the state's waters. It authorizes the Regional Water Quality Control Board (RWQCB) to supervise cleanup efforts at spill sites that have affected groundwater.

The DTSC has the primary responsibility for enforcement and implementation of hazardous waste control laws in the State of California. However, this responsibility is shared with other state and local government agencies, including the State Water Resources Control Board (SWRCB), (RWQCB), and city and county governments.

4.11.2 Existing Conditions

Channel Widening Plan and Bypass Channel Plan

The environmental analysis for the Bypass Channel Plan (ESI 1994) presented an inventory of contaminated sites within the feasibility study area, obtained from a review of regulatory agency files. This initial list identified 13 sites that have the potential to impact the project area. Each of these sites is located by reach as follows: Reach 7 (three sites); Reach 8 (no sites); Reach 9 (one site); Reach 10 (one site); Reach 11 (one site); and Reach 12 (seven sites). Six of the releases were determined to have the potential to impact the feasibility study area. Nine of the sources of contamination were identified as leaking underground storage tanks (LUSTs) while two surface spills, one a leaking sump, and one unknown source. The primary contaminants released included gasoline and diesel. Other contaminants consisted of chlorinated hydrocarbons, aromatic hydrocarbons, waste oil, and solvents.

A subsequent assessment of potentially contaminated properties along the project right-of-way (ROW) was conducted in two phases. A Project Area Review Report and a Preliminary Site Assessment Report were completed by Kleinfelder in January and August of 1992, respectively. The completed assessment identified 24 sites within 500 feet of the Bypass Channel Plan study area that were designated as having a "high" potential for hazardous waste contamination. The review included the following: evaluation of regulatory agency files and contaminated site lists to identify contaminated sites within 0.5 mile of the project alignment; Sanborn Fire Insurance maps and historic aerial photographs to identify past usages of properties within 500 feet of the project alignment; and conducting a site reconnaissance of known releases and other areas of concern within the construction corridor. The approximate location and a summary of the sites identified as high potential for contamination are included in Appendix J.

As a follow-up to the initial or Level I investigation, Kleinfelder performed a Phase II (more intensive) investigation of selected properties along the Guadalupe River ROW. The scope of work for this study included soil and groundwater sampling at 16 individual parcels, embankment soil and river sediment sampling at ten specified locations, and random soil sampling at selected location of proposed bypass channels and island banks. The results of the Level II investigation identified six areas of concern along the feasibility study area corridor. A brief description of each of these areas is provided below (Kleinfelder 1995).

Reach 7

- **Santa Clara County property, Willow Street and Lelong Avenue** — Approximately 89 cubic yards of soil below a storm drain outfall pipe contain hazardous concentrations of Chlordane (an organochlorine pesticide), DDT, and concentrations of Dinoseb (a chlorinated herbicide).

- **Caltrans property and Lee's Diesel Service, 1125 Lelong Avenue and 450 Willow Street, and Bruzzone Property, Paramount Roofing and Multiple Businesses, 1127 Lelong Avenue and 456 Willow Street** — A plume of petroleum hydrocarbon contamination has impacted soil and groundwater beneath these three parcels. The estimated volume of soil impacted is 16,400 cubic yards. The extent of the groundwater contamination was not assessed as part of the investigation.

- **Elk's Lodge** — Concentrations of mercury at hazardous waste levels were detected in the upper 5 feet of soil across the site.

Reach 9

- Golden State Builder Farr Construction, 1891 Almaden Road — Review of historical aerial photographs showing industrial activity identified these parcels as areas of potential concern. Access was denied Kleinfelder field investigators during the Level I and Level II investigations.

Reach 10

- **Valley View Packing Company** — This site contains a documented fuel release and some pesticide contamination in shallow soil. The volume of soil impacted by pesticide contamination is estimated at 4,720 cubic yards. The petroleum contaminated soil volume is estimated at 5,000 cubic yards.

Reach 12

- **Agricultural lands** — This area, proposed for biological habitat restoration, has elevated soil concentrations of metals and pesticides below hazardous waste thresholds. However, mercury and pesticide concentrations in the soil exceed the guidelines established by the RWQCB for "cover" but not "non-cover" wetlands use. Nickel and silver concentrations exceed the guidelines for cover and non-cover soils.

4.11.3 Environmental Effects

Impact Significance Criteria

Impacts result from contaminant exposure and subsequent risk to human health or safety. Impacts resulting from project construction or operation that would be considered significant include the following:

- Public exposure to hazardous waste encountered in soils or groundwater from project construction activities.

- Contaminant migration into the river or other sensitive areas due to exposure of subsurface contamination during project construction.

- Project construction or operation inhibiting investigative or remedial actions at known hazardous waste sites within the project alignment.

Channel Widening Plan

Known sites of soil and groundwater contamination identified during Level I and Level II site investigations would be remediated in accordance with applicable laws and regulations prior to initiation of construction activities. As evidenced by the large number of potential hazardous waste sites that would be encountered along the Channel Widening Plan alignment, there is the possibility that earthwork activities required for construction of the flood control improvements would encounter previously undiscovered contaminated soils and/or groundwater from releases on properties near the project study area. This could result in contaminant migration or a release of contaminants into the river and subsequent effects on sensitive riparian biota. Unearthing subsurface contamination could also lead to exposure of nearby residents or construction personnel by inhalation, ingestion, or direct contact. There is also the potential for a release to occur during construction from construction equipment fueling and maintenance operations. These impacts would be considered significant but mitigated to insignificance with adoption of a Construction Contingency Plan, including methods to control unknown contaminant discoveries.

Bypass Channel Plan

The potential impacts of contamination in the vicinity of the Bypass Channel Plan alignment are similar to those identified above for the Channel Widening Plan alignment. However, the likelihood of encountering previously undiscovered contamination would be greater for the Bypass Channel Plan due to the greater amount of excavation required. Construction is more likely to encroach within contaminated sites on the east, rather than west, side of the river.

No-Action Alternative

The No-Action Alternative would not require urgent abatement of environmental contamination. In most cases, aside from plume migration and detection off site, the main reason for investigating potential contamination is the transfer of property ownership and related liability. Under the No-Action Alternative, there would be no need for SCVWD to acquire properties within the ROW. Environmental contamination of properties within the ROW would be the same as under current conditions.

4.11.4 Mitigation Measures

Channel Widening Plan

1. A Construction Contingency Plan shall be developed by the Corps including methods to control potential migration of contamination discovered during construction, as well as safety considerations for on-site construction personnel and the general public. Details of the plan shall include, but not be limited, to the following:

   a. Procedures for identification of contaminated soil during earthmoving operations.

b. Immediate measures to protect workers and the public from exposure to contaminated areas (e.g., fencing or hazard flagging, covering of contaminated soils with plastic, etc.) and prevent migration of the contaminants to the surrounding environment.

c. Steps to be taken following initial discovery of contaminated soils. Notification shall be made to the local environmental health officials, SCVWD, and the construction contractor immediately following identification of previously unknown contamination within the construction area.

2. A project-specific remediation plan shall be developed and implemented to reduce contaminant concentrations to acceptable levels and shall contain the following: (a) characterization of the problem, (b) a review of remedial options (i.e., feasibility study), and (c) a detailed plan for implementation of the chosen alternative. Excavation and any other remediation activities necessary shall be consistent with all biology, air quality (dust suppression), cultural resources, and other mitigation measures applicable to the project.

3. As part of construction specifications, procedures for the fueling and maintenance of construction vehicles shall be required to minimize the potential for accidental release of hazardous materials in sensitive areas. This shall include designated refueling and maintenance areas located a minimum of 50 feet from the river corridor.

4. Ongoing remediation projects at hazardous waste sites in the vicinity of the project shall be evaluated and monitored, if necessary, on a case-by-case basis to assure that construction activities do not adversely affect environmental cleanup activities and include a review of site conditions, characterization reports, remedial action plans, and any other site data available regarding existing contamination and remediation efforts.

5. In the vicinity of ongoing site remediation efforts, groundwater monitoring wells shall be the constructed adjacent to construction dewatering areas to monitor water quality and groundwater gradient before, during, and after construction to determine construction impacts on nearby site remediation projects.

Bypass Channel Plan

The mitigations necessary for the Bypass Channel Plan would be similar to those identified for the Channel Widening Plan. Required mitigation would, however, be dependent upon the location of hazardous waste sites relative to the construction corridor.

4.11.5 Unavoidable Significant Adverse Impacts

Adherence to local and state regulations regarding hazardous waste investigation and remediation and implementation of the mitigations described above regarding nearby hazardous waste cleanup operations would reduce the identified impacts to less than significant levels.

No unavoidable significant impacts associated with either of the flood control alternatives would occur.

4.12 PUBLIC SAFETY

This section addresses the potential for public exposure to unsafe conditions resulting from construction and operation of the proposed flood control project. Other public health and safety issues related to handling, storage, or transport of hazardous materials are discussed in section 4.11 of this EIR/S.

4.12.1 Regulatory Setting

Enforcement of public safety regulations related to construction activities for a flood control improvement project are the responsibility of various state and local agencies, including the California Occupational Health and Safety Administration, California Department of Transportation, and various local agencies such as the San Jose City Public Works, Police, and Fire departments.

4.12.2 Existing Conditions

Existing safety concerns related to the upper Guadalupe River are primarily associated with the potential for flooding resulting from runoff during rainstorms. The existing channel in reaches 7 and 8 and portions of reaches 10, 11, and 12 cannot accommodate a 50-year flood event, and some portions of the river cannot contain a flood as small as 7 years in return frequency. As a result, portions of the feasibility study area are subject to flooding and property damage. Historically, flooding on the Guadalupe River has caused extensive damage in the cities of San Jose and Alviso. Recent storms have caused relatively minor flooding within the study area, although the March 1995 flood caused major flooding in downtown San Jose, downstream. The major impact in past floods has been property damage (Parsons Engineering Science 1997).

Public access to the river channel is partially controlled by fences located along the tops of the channel banks. This feature discourages access to the river from adjacent residential and commercial properties and minimizes other public safety hazards. Substantial lengths of the river, however, are unfenced.

4.12.3 Environmental Effects

Impact Significance Criteria

According to the CEQA Appendix K, Significant Effects (v), a project would have a significant effect on the environment if it would create a potential public health or safety hazard. Public safety concerns of the project are associated with: (1) temporary hazards related to construction activities in and around residential and commercial areas; and (2) potential hazards associated with public access to the river channel after completion of the project.

Channel Widening Plan

Potential Impacts due to Unauthorized Entry to the Construction Areas. Although access to the river is generally difficult, public access and unauthorized entry into the feasibility study area during construction could result in public safety hazards. Rivers and channels are attractive nuisances to children, and unsupervised entry to the river and other flood control facilities could result in injury. This would be a significant short-term impact that would be mitigated to insignificance by requiring warning signs and fencing of construction areas.

Roadway and Bridge Construction Hazards. Construction in and adjacent to roadways, bridges, and pedestrian walkways would conceivably create hazards for vehicular traffic and pedestrians. Constricted roadways, large construction vehicles, and detours could present traffic hazards. This would be a significant short-term impact that would be mitigated to insignificance by requiring warning signs and fencing of construction areas by posting construction access routes and avoiding residential neighborhoods.

Potential Impacts due to Unauthorized Entry. After project completion, public safety hazards could result from unauthorized entry into the river channel and associated flood control facilities, such as culverts. Culverts and other inlets and outlets that may be accessible to the public could create attractive nuisances, resulting in injuries. This would be a significant impact long-term impact that would be feasibly mitigated to insignificance by posting permanent warning signs in areas along the channel.

Bypass Channel Plan

The potential public safety issues related to construction and operation of the Bypass Channel Plan are essentially the same as those described for the Channel Widening Plan with the exception of developing the recreational trail and amenities.

Potential Impacts due to Recreational Access. The Bypass Channel Plan would include development of a recreational trail within the floodway and would encourage public access along the river for a distance of approximately 4 miles. Public access off the trail would not be encouraged except at designated locations where picnic tables and other public facilities (e.g., rest rooms, drinking fountains, a par course, interpretive signs, and benches) would be located. Proposed design safety features would include call boxes, safety lighting at railroad and roadway underpasses, vehicle barriers at trail access points, and directional signs. Also for public safety purposes, approximately 3,800 feet of 3-foot high chain-link fence and approximately 1,500 feet of railing is proposed along selected portions of the trail. The approximately 5,300 feet (over 1 mile) of fencing and railing would not prevent access to the river, but it would help to confine trail users to the designated recreational use areas. The City of San Jose would be responsible for administering the recreational trail and associated facilities. The City has a policy that recreational trails are closed at night; this would reduce public safety concerns for trial users and adjacent residents. Public safety issues could result from increased public accessibility and possible unauthorized entry into the river channel and associated flood control facilities, such as culverts. Culverts and other inlets and outlets that may be accessible to the public could create attractive nuisances, which could result in injuries. This would be a significant impact that would be mitigated to insignificance by incorporating the measures discussed for the Channel Widening Plan.

No-Action Alternative

The potential public safety issues related to the no-action alternative are the same as the existing conditions described in section 4.12.2. The potential impacts related to construction activities would not occur under the No-Action Alternative.

4.12.4 Mitigation Measures

Channel Widening Plan and Bypass Channel Plan

1. The Corps shall prepare and implement a Construction Public Safety Plan designed to address short-term public safety impacts during construction activity. The plan shall include the following.

   a. Project construction areas shall be posted with warning signs and shall be adequately fenced and barricaded or equipped with other security measures to prevent unauthorized access during construction.

   b. Prior to commencement of construction activities for any phase of the project, access routes for construction truck traffic shall be identified and posted. Routes into construction areas shall avoid residential neighborhoods to the maximum extent practical. Construction zones shall be clearly marked and posted, and flag personnel shall be used wherever necessary to direct traffic.

   c. Notification shall be given to residents and businesses in the surrounding area before construction begins. Alternative traffic and pedestrian routes for impacted areas shall be posted.

2. The SCVWD shall prepare and implement a Operational Public Safety Plan designed to address long-term public safety impacts during the life of the proposed action. The plan shall include the following:

   a. Permanent warning signs (e.g., no entry, no swimming, or diving), fencing, barricades, and/or other access control measures shall be erected in areas along the channel, where necessary, to restrict or prohibit public access.

4.12.5 Unavoidable Significant Adverse Impacts

Significant short-term construction and long-term operational public safety impacts identified above would be mitigated to insignificance with mitigation measure implementation. No unavoidable significant adverse impacts would occur under either alternative plan.

4.13 SOCIOECONOMICS

The following discussion of existing social and economic conditions within the project area is based on the socioeconomic analysis prepared for the *EIR/EIS for the Guadalupe River Flood Control Project* (Parsons Engineering Science 1997).

4.13.1 Regulatory Setting

Both NEPA and CEQA require assessment of project-related social and economic impacts. The CEQ regulations for implementation of NEPA (40 CFR Parts 1500-1508) define (Section 1508.8) "effects" to include, among other things, economic and social effects, whether direct, indirect, or cumulative. The CEQA Guidelines (Section 21083[c]) state that an agency must determine that a project may have a significant effect on the environment if it will cause substantial adverse effects on human beings, either directly or indirectly. The Guidelines further discuss economic and social effects in Section 15131, which states that economic or social effects of a project shall not be treated as significant effects on the environment. An EIR, however, may evaluate the physical changes on the environment caused by project-related economic or social changes. Additionally, economic or social effects of a project may be used to determine the significance of physical changes caused by the project.

4.13.2 Existing Conditions

Population and Labor Characteristics

The City of San Jose is the urban hub of the South Bay Region. With a 1990 population of 782,250 people, it the largest city in Santa Clara County and the San Francisco Bay Region. As illustrated by Table 4.13-1, the population of the city dramatically increased in the two decades following World War II. The growth rate of San Jose began to taper off from an average of 4 percent per year from 1970 to 1980, to an average of 2.4 percent per year increase between 1980 and 1990.

Table 4.13-1. Population Growth in San Jose (1950 to 1990)

Area	*1950*	*1960*	*1970*	*1980*	*1990*
City of San Jose	95,280	204,196	445,779	628,283	782,248
Santa Clara County	290,547	642,315	1,064,714	1,295,071	1,496,577
Bay Area	2,681,322	3,638,939	4,628,199	5,179,759	6,020,147
City of San Jose	*1950-1960*	*1960-1970*	*1970-1980*	*1980-1990*	
Population Change	+108,916	+241,583	+182,504	+153,965	
Percent Change	+114.3	+118.3	+40.9	+24.5	

Source: U.S. Bureau of the Census 1995; ABAG 1995a.

Much of the city's economic activity centers around the computer and semiconductor industries. The city's primary employment sectors are shown in Table 4.13-2. The services sector predominates, accounting for 34.7 percent of total employment, while the manufacturing and wholesale sector makes up about 26.6 percent of the available jobs. The retail trade sector is the city's third largest employer, amounting to 17.1 percent of the city's total employment in 1990.

Table 4.13-2. Employment Distribution in the San Jose Metropolitan Area (1990)

Section	*Percent of Total*
Services	34.6
Manufacturing and Wholesale	26.6
Retail Trade	17.1
Agriculture and Mining	0.6
Other	21.0

Because of the large base of employment opportunities and the diversity of skill levels and occupational opportunities in the city's industries and services, unemployment in San Jose has historically been low relative to California as a whole. Between 1990 and 1995, the city's annual average unemployment rate varied between a low of 4.7 percent in 1990 and a high of 8.1 percent in 1992. In 1995, the annual average unemployment rate was 5.8 percent (State Employment Development Department 1996).

The city has a resident civilian labor force of about 425,600 people, which is 54.4 percent of the total population of San Jose (ABAG 1995a, CDF 1993). This is equivalent to one worker per 1.8 residents. The city's ethnic profile among workers is diverse. According to the city's Office of Economic Development, approximately 50 percent are white, 5 percent are Afro-American, 26 percent are Hispanic, and 19 percent are Asian (primarily Filipino, Chinese, and Vietnamese) (U.S. Bureau of the Census 1990).

Current Housing Stock and Recent Housing Growth

In 1993, San Jose had 265,028 housing units (CDF 1993). Of these, approximately 350 (0.13 percent) were immediately adjacent the Guadalupe River Flood Control Project corridor. The majority of homes in the project area were constructed in the 20-year period immediately following World War II. Very little new residential construction has occurred in the project area in the past 15 years. The economic cycle for many of the properties is on the decline. Many single-family units have been converted to multi-family dwellings and new businesses have been established on the borders of the project area. Housing units in the project area are generally in average to good condition.

4.13.3 Environmental Effects

Impact Significance Criteria

CEQA Appendix K, Significant Effects states that a project will normally have a significant socioeconomic effect if it displaces a large number of people or disrupts or divides the physical arrangement of an established community.

Channel Widening Plan

Impacts on Direct, Indirect, and Induced Employment

The Channel Widening Plan would affect temporary, short-term employment during construction, but it would not be likely to affect direct permanent, long-term employment. Operation of the flood control project would not generate any new permanent jobs at the SCVWD or the Corps. The potential construction employment impact would not have an adverse county-wide impact on the construction labor market, because the greater San Francisco Bay region would provide sufficient resources for the 3-year period of activity.

The project could have secondary employment effects. Two types of secondary employment result from any large project, indirect employment and induced employment. Indirect employment results from jobs generated by the establishment of new on-site businesses, while induced employment is work generated by direct and indirect employees purchasing goods and services in the community. The flood control improvements would not result in measurable indirect employment impacts, because neither their construction nor operation would involve the establishment of new employment-generating businesses.

Expenditures by project-related direct employees would be limited to short-term construction-related employees. Induced employment generated by the project would be temporary and limited to the handling and sale of consumer goods and building supplies. ABAG's 1987 *Input-Output Model and Economic Multipliers for the San Francisco Bay* (updated March 1995) has been used to estimate the flood control project's short-term construction activity would generate just over 100 induced jobs. This is a less than significant socioeconomic impact due to the large size of the surrounding urban community.

Direct Impacts on Housing Stock and Businesses

Implementation of the Channel Widening Plan would not require removal of any residences. Operation of the flood control project would not adversely affect the affordability of remaining housing in the project area.

The Channel Widening Plan would, however, displace four businesses. This would be a significant impact that would be mitigated to insignificance through financial and informational relocation assistance. Under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, the Corps would be required to make a payment to the displaced businesses for their actual reasonable moving expenses, in addition to paying fair market value for any acquired lands or easements.

The Corps would also be required to assure that a relocation assistance program would be provided and that decent, safe, and sanitary properties would be available in areas not less desirable in regard to public utilities and public and commercial facilities and at rents or prices within the financial means of the businesses displaced. These relocation assistance requirements would adequately mitigate the economic impacts of business displacements and would ensure that the same businesses could re-establish at a different location. This would ensure that any significant impacts on employment would be mitigated to insignificance.

Bypass Channel Plan

Impacts on Direct, Indirect, and Induced Employment

Implementation of the Bypass Channel Plan would generate approximately 21,330 person-days of temporary construction employment, which is equivalent to 112 person-years of employment, assuming a 9-month work season or an estimated 71 temporary construction-related jobs for a 3-year period (personal communication, Dennis Cheong 1996). This employment impact on the region-wide construction labor market would be less than significant.

The flood control project would have no measurable indirect employment impacts, because neither its construction nor operation would involve the establishment of new employment-generating businesses. Expenditures by project-related direct employees would be limited to temporary, construction-related employees. Induced employment generated by the project would be temporary and limited to the handling and sale of consumer goods and building supplies. Based on ABAG's 1987 *Input-Output Model and Economic Multipliers for the San Francisco Bay* (updated March 1995), the Bypass Channel Plan's construction activity would generate 107 induced jobs (Parsons Engineering Science 1997).

Direct Impacts on Housing Stock and Businesses

Implementation of the Bypass Channel Plan would require relocating 63 residences and 20 businesses from the project area. In October 1993, an updated Relocation Assistance and Last Resort Housing Plan was prepared for the SCVWD. The update includes (1) a review of the original 1990 Relocation Plan; (2) interviews with remaining households and businesses in the displacement area; (3) an analysis of the housing needs of the residents who would be displaced; (4) a survey of the current local real estate market; (5) an estimate of the cost of relocating the remaining occupants; and 6) a review of 10 randomly selected case files from completed relocations. The review of the randomly selected relocation files concluded that all persons received relocation information and relocation payments to which they were entitled.

The typical resident of the Mackey/Malone/Almaden Road area is Caucasian (56 percent), a homeowner (56 percent), and has lived in the current residence for an average of 22 years. One homeowner had lived in the same home for 43 years. Eighty percent of the residents in the Mackey/Malone/Almaden Road area have lived in their home more than 10 years. Twenty-five percent of the renters (tenants) have lived in the same home for over 10 years. One tenant reported 35 years at the same address. Three years was the briefest period of tenancy. Tenants are typically paying significantly lower rents than those advertised in the San Jose area, and rent supplements are likely for approximately 90 percent of the tenants. Purchase differentials are likely to be necessary for at least 10 percent of the homeowners and may be necessary for all (Parsons Engineering Science 1997).

Impacts on displaced residents and business owners of the project area would be significant to those residents who have no desire to leave their present homes or businesses or for whom moving would be a burden because of age or health. A total of 160 persons are estimated to have been or would be displaced by the Bypass Channel Plan, based on information provided by the 1993 Relocation Assistance and Last Resort Housing Plan Review and Update (assuming an average household size of 2.5 persons). This is considered a significant impact that can be mitigated to insignificance by implementing the relocation program. After construction, the affordability of remaining housing in the project area would not be adversely affected.

The loss of housing would substantially fragment and disrupt the cohesive residential character of the neighborhood by introducing flood control improvements and interrupting the neighborhood block. This effect would be greatest in the neighborhood around Mackey Avenue, where 23 residences would be removed. This impact is addressed in section 4.8.3, under Land Use.

4.13.4 Mitigation Measures

The following measure is applicable to both alternative plans. The document on which the measure is based can be reviewed at SCVWD offices. The plan is available for anyone who is eligible for relocation assistance.

Channel Widening Plan and Bypass Channel Plan

The SCVWD shall implement the Relocation Assistance and Last Resort Housing Plan. This plan provides a framework to provide for the consistent administration of acquisition, appraisal, and relocation programs by for this project. Its relocation assistance and payment procedures shall be strictly applied. No person shall be displaced in connection with the project unless and until adequate replacement housing has been provided. Relocation assistance found in the SCVWD's Relocation Assistance Information guidelines, amended in 1989, including the Relocation Advisory Assistance Program and the Relocation Assistance Payment Program, shall be made available to all qualified individuals.

4.13.5 Unavoidable Significant Adverse Impacts

Channel Widening Plan

No unavoidable significant impacts would result.

Bypass Channel Plan

While housing unit replacement would be assured by the Corps as part of the Relocation Assistance programs, the absolute number of housing units would still be reduced in the project corridor. In addition, while the 20 displaced businesses would be or have been moved, this represents a net reduction of business activity in the project area. However, because adequate replacement housing stock is available and suitable locations for businesses exist, no unavoidable significant impacts would occur under the Bypass Channel Plan.

The Bypass Channel Plan would remove substantial numbers of residences resulting in a loss of community cohesion. This is a long-term unavoidable significant land use impact that is addressed in section 4.8.5., under Land Use.

Discussion of Executive Order 12898, Environmental Justice, can be found in section 3.3.2.

5.0 RECOMMENDATIONS

This section presents a comparison of the environmental impacts of the Channel Widening and Bypass Channel alternatives. It identifies an environmentally preferred alternative as required by CEQA and NEPA. Following this discussion, an overall recommendation is made as to which alternative best addresses the greatest balance between economic and environmental benefits.

5.1 Environmentally Preferred Alternative

The Channel Widening Alternative is considered the Environmentally Superior Alternative. This alternative would overall require less construction disturbance of biological habitat. Far fewer residences would be removed under the Channel Widening Alternative, requiring less relocation, and avoiding the significant long-term impacts resulting from the Bypass Channel that would permanently fragment the residential neighborhood on the west side of Mackey Avenue and parts of Guadalupe Avenue. A recreational trail would not be provided under the Channel Widening Alternative, however. The lack of this amenity would result in an unavoidable significant recreational impact in Reach 10C, where the pathway along the west bank adjacent to Old Almaden Road used by cyclists, walkers, and joggers could be removed. All other environmental impacts would be basically equivalent for both alternatives.

5.2 Recommended Alternative

The construction and long-term maintenance of the Bypass Channel Plan is recommended over the Channel Widening Plan or the No-Action Alternative because it would more substantially reduce the potential for flooding and have the greatest economic and environmental benefits, taking into account the project's mitigation measures. Although both plans would reduce biological impacts to less than significance, the Bypass Channel Plan would reduce all other environmental impacts, including those caused by flooding, to insignificant levels. The Bypass Channel Plan would accommodate the proposed recreational trail and amenities on new maintenance roads and adjacent areas that would not be provided under the Channel Widening Plan, and would mitigate all recreational impacts to insignificance.

The Bypass Channel Plan would substantially reduce the potential for public hazards and property damage by providing protection against an approximate 100-year flooding event, compared to the protection against an approximate 50-year event provided by the Channel Widening Plan. The greater economic benefits of flood protection, and other environmental and recreational benefits, would offset the Bypass Channel Plan's greater costs of construction and the need to relocate a larger number of businesses and to purchase a greater number of residences to be removed, as compared to the Channel Widening Plan. The Channel Widening Plan would not correct existing erosion problems except where they coincide with plan engineering features.

The No-Action Alternative would not provide protection from flooding hazards and would not provide recreational benefits of the river trail proposed by the City of San Jose. It therefore is not recommended over either the Bypass Channel Plan or the Channel Widening Plan.

6.0 CUMULATIVE IMPACTS

6.1 OTHER PROJECTS IN THE VICINITY OF THE GUADALUPE RIVER CORRIDOR

Nine major projects are proposed, approved, under construction, or recently completed by other public agencies within the Guadalupe River system. The cumulative impact analysis considers the impacts of these projects combined with the impacts of the proposed action alternatives, both the Channel Widening and Bypass Channel Plans. Potential cumulative impacts on resources within the Guadalupe River system are discussed in section 6.2 with particular emphasis on cumulative effects on riparian systems.

The major areas of potential cumulative impacts are vegetation, wildlife and fishery resources. Impacts on shaded riverine aquatic (SRA) cover were not specifically addressed in the environmental analyses for the projects discussed below, except for the Downtown Guadalupe River Flood Control Project. Impacts on riparian habitat for other projects include some habitat that is adjacent to the Guadalupe River.

6.1.1 Guadalupe River Flood Control Project from I-880 to I-280

This approved project (the Downtown Guadalupe Project) will be constructed in three phases. Construction at the first reach (Hedding Street to I-880) began in August 1992. The project will be completed in 1998 or later (personal communication, William DeJager, 1997). The U.S. Army Corps of Engineers (Corps) prepared an Environmental Impact Statement (EIS) for the project in 1985. In January 1991, the Corps prepared an Environmental Assessment (EA) that incorporated some recreational aspects of the Guadalupe River Park Project (January 2, 1991) and addressed additional impacts on riparian corridor vegetation and fish and wildlife habitat resulting from trail construction and recreational use. In 1992, the Corps prepared a final mitigation and monitoring plan to address project-related impacts. This plan is being revised to address a number of issues, including impacts on SRA cover (Hoover and Mitchell 1993). Some mitigation for the downtown project may be located within the upper Guadalupe River project area; this is still being determined and will be handled by a separate NEPA/CEQA document for the entire SRA mitigation plan for the downtown project.

Project construction activities will eliminate 15.3 acres of riparian habitat and 25,000 square feet of potential anadromous salmonid spawning gravels. Wetlands will not be affected. The project will affect approximately 9,800 linear feet of SRA cover; however, impacts on SRA cover and mitigation sites are being reevaluated. Other impacts include potentially elevated instream temperatures and anadromous salmonid staging/resting area losses (Mitchell and Schoenberg 1993).

Mitigation for the loss of riparian habitat requires planting 22.5 acres of riparian vegetation. For loss of potential spawning gravels in the project area, 25,000 square feet will be replaced and maintained. Mitigation for losses of SRA cover is being re-evaluated and could be located in various reaches of the Guadalupe River and tributaries. Mitigation measures for fish impacts include providing a low-flow channel and replacement of spawning gravels. A 10-year mitigation evaluation will determine the success of mitigation measures and whether additional corrective measures and monitoring are necessary (Hoover 1993).

6.1.2 Guadalupe River Park

The approved Guadalupe River Park Project, sponsored by the City of San Jose Redevelopment Agency, is adjacent to the Corps' Downtown Guadalupe flood control project, at the top of bank and beyond and includes the River Walk Project and the Confluence Point and West Project. The River Walk Project between Woz Way and Park Avenue consists of a river walk system along the top of banks. The Confluence Point and West Project is at the confluence of Los Gatos Creek with Guadalupe River. This project includes riverbank gabions and a pedestrian bridge over Los Gatos Creek (Talbot 1992).

In addition to the impacts associated with the Corps flood control project along the same reach of the Guadalupe River (Reach 3), this project will affect 0.8 acre of riparian habitat. The Corps prepared an EA/EIS for the I-280 to I-880 flood control project (dated January 2, 1991) to address additional impacts on riparian corridor vegetation and fish and wildlife habitat resulting from incorporation of trail construction and recreational use from the River Park Project. Mitigation for loss of riparian habitat as a result of adopting the locally preferred flood control plan will consist of 4.7 acres of native riparian habitat plantings.

6.1.3 Guadalupe River Park South Corridor Master Plan (I-280 to Coleman Avenue)

This proposed project is a park master plan for development of recreational facilities along the Guadalupe River. Potential impacts from trail system development and recreational use will be addressed in an EIR when the park master plan is finalized. Although no riparian habitat removal would result, buildout of the master plan could include disturbances to sensitive wildlife and trampling of existing riparian vegetation and riparian revegetation areas. Elements of the master plan are included in the feasibility study Bypass Channel Plan alternative evaluated in this EIR/S, including the through multi-use trail, picnic facilities, par courses, and associated safety features (e.g., call boxes, security lighting). Additional recreational amenities may be included in the final master plan and be constructed by the City along the Bypass Channel Plan alignment.

6.1.4 SR 87 Freeway Upgrade Project (Highway 101 to Julian Street)

Freeway widening and bridge construction has affected 4.54 acres of riparian habitat and 1.09 areas of Corps jurisdictional wetlands. No long-term impacts occur on fishery resources have occurred. Mitigation for loss of riparian habitat and wetlands required planting 7.29 acres of riparian habitat adjacent to the east side of the Guadalupe River and 1.09 acres to mitigate impacts on wetlands (USDOT and Caltrans 1992; Vincent 1992, 1993).

6.1.5 SR 85 Transportation Corridor Project

The project has directly affected 0.1 acre of riparian vegetation on the Guadalupe River mainstream and indirectly affected 4.5 acres on Los Gatos and Ross creeks. Mitigation for loss of riparian habitat requires planting 12.1 acres of riparian vegetation on site and 0.2 acre off site (Monette 1992). Bridge construction did not adversely affect fisheries, and fish passage was provided to ensure that adverse impacts would not occur on fishery resources in Ross Creek (Monette 1992).

6.1.6 San Jose International Airport Expansion Plan

The airport expansion plan proposes the replacement of the Airport Parkway Bridge, addition of a new bridge south of Airport Parkway Bridge, and the widening of Airport Boulevard.

6.1.7 San Jose Riparian Corridor Policy Study

The City of San Jose Riparian Corridor Policy Study could affect the Guadalupe River watershed. This study provides policy and development guidelines for riparian areas along all creeks in the City, including defining the riparian corridor and development guidelines for setbacks, access control, landscaping and lighting, and compatible land uses. The City is reviewing the study and may propose its adoption in the future. Adoption and implementation of riparian corridor development guidelines could help to reduce the severity of cumulative impacts in the Guadalupe River watershed.

6.1.8 Santa Clara Valley Water District Upper Guadalupe River Flood Control Project

The SCVWD proposes to construct additional flood control improvements in Reach A and Reach 6 of the upper Guadalupe River north (downstream) of the proposed project addressed in this feasibility study area EIR/S.

Reach A includes a stretch nearly 2 miles long between U.S. 101 and U.S. I-880, approximately 2 miles north and downstream of Reach 7, which would be improved with widened channels, some floodwalls, and levees.

Reach 6 includes a 2,800-foot stretch of the river from I-280 to the SPRR Bridge, and would include a bypass channel lined with steep gabions. Construction of the bypass channel would require removal of one block of McLellan Avenue (between West Virginia Street and Willow Street) and modification of the West Virginia/Harliss Avenue and the McLellen/Edwards Avenue intersections. The construction would necessitate removal of 54 homes and one partial backyard. Existing utilities would be relocated at the District's expense. A new bridge would be constructed for the West Virginia Street crossing of the bypass channel (Parsons Engineering Science 1997).

The SCVWD also proposes floodwalls on both banks of Canoas Creek between Guadalupe River and the Nightingale culvert. These improvements would be constructed as related elements to the proposed project development on Reaches 7 through 12.

The SCVWD would also provide fisheries improvements in Reach 13, upstream of the feasibility study area Reach 12, including fish passage improvements (a fish ladder) at the Blossom Hill drop structure. The fish ladders are not mitigation for any other impact. Riparian forest would be planted in Reach 13 also. The improvements may address losses of SRA cover associated with the Downtown Guadalupe Project (see section 6.1.1) and SCVWD project-related impacts.

6.1.9 Almaden Road Widening

The City of San Jose plans to widen Almaden Road within the feasibility study area. Widening of the road would require disturbances very close and likely within the proposed Bypass Channel Plan recreational trail corridor. In Reach 9, the recreational trail would not be constructed in advance of construction work for the road widening project, and the road widening and channel widening work would be done concurrently due to their interdependence and space limitations.

6.2 CUMULATIVE IMPACTS AND MITIGATION MEASURES

The cumulative impact assessment evaluates the contributions of both the Channel Widening Plan and Bypass Channel Plan alternatives. The plans' contributions to cumulative impacts are discussed separately where appropriate.

Geology, Soils, and Seismicity

During the construction period, all of the cumulative projects in the vicinity have the potential to contribute to erosion and resultant sedimentation in the river. All projects would be subjected to seismic hazards such as ground shaking. These impacts are feasibly mitigated to less than significant with implementation of construction-period erosion control programs, and with standard seismic safety measures incorporated in design (see section 4.2.4). No significant long-term cumulative impacts would occur.

Hydrology

Ultimately, the proposed cumulative project flood control improvements would provide increased protection against future flood events. This impact is considered beneficial.

Potential changes in recharge rates that could result from other flood control improvement projects, such as the construction of upstream dams or percolation ponds, or from highway construction or development projects, could affect the amount of available water supply. The magnitude of the cumulative impact on recharge areas would depend on the net affect of the project on recharge rates and the effectiveness of mitigation measures proposed for this project and other projects identified in section 6.1, above. Both Channel Widening Bypass and Channel Plans would increase the size of channel surface areas, increasing groundwater recharge potential. This would be a minor but beneficial contribution to regional hydrology.

Water Quality

The Channel Widening or Bypass Channel Plan's contribution to cumulative construction impacts on water quality would be mitigated to insignificance with implementation of the required Storm Water Pollution Prevention Program (see section 4.3.4). Other flood control and transportation system improvement projects would also be subject to program implementation, ensuring that their impacts were mitigated to insignificance. Creation of recreational amenities and riparian corridor studies would have no effect on water quality. Cumulative project impacts on water quality are therefore insignificant.

Hazardous Materials

Neither the Channel Widening nor Bypass Channel Plans would directly contribute to cumulative hazardous materials impacts because they would not include the long-term use, storage, or disposal of significant quantities of hazardous materials. The alternatives could, as discussed in section 4.11.3, affect groundwater conditions and could result in changes to site characterization investigations or remedial activities (groundwater cleanup) at known hazardous waste sites in the vicinity. Other construction activities within the cumulative project area (projects identified in section 6.1, above) could have other adverse or beneficial impacts on groundwater flow directions and potential impacts on surface and groundwater quality.

Land Use and General Plan Considerations

Construction of cumulative projects would contribute to short-term land use impacts such as dust and noise generation during construction. Under the Bypass Channel Plan, the character and cohesion of some residential neighborhoods within the feasibility study area would be substantially changed by removing houses for bypass channel construction. The Channel Widening Plan would not require removal of residences so this impact would not result. Although revegetation of the riparian corridor would mitigate the loss of vegetation, over the long term the loss of residential community cohesion would be a significant contribution to regional land use impacts.

Other cumulative impacts on residential land use character and cohesion include 408 units displaced by the State Route [SR] 85 project [Caltrans 1987] and 41 units removed by SR 87 [Caltrans 1991]). The Corps flood control project between I-880 and I-280 would displace 24 units [COE 1985]). Three approved city-sponsored projects in San Jose would displace a total of nine residences. Five would be removed by the San Pedro Street project; two would be displaced by the Parole Office project and by the Sierra Road extension (Zia 1992). The Relocation Report prepared by the SCVWD indicates that adequate replacement housing stock is available. SCVWD policy is designed to permit displacement only after replacement housing is located. Therefore, no long-term significant cumulative impacts on land use would result from the project.

Socioeconomics

Cumulatively, other projects proposed in the area would generate a significant number of construction-related jobs. This would be a beneficial impact for the local economy. The revised *Relocation Assistance and Last Resort Housing Plan* (SCVWD 1993) indicates that adequate replacement housing stock is available for residents displaced by the Bypass Channel Plan. SCVWD policy is designed to permit displacement only after replacement housing is located. Therefore, the Bypass Channel Plan's long-term contribution to socioeconomic cumulative impacts would be less than significant. The Channel Widening Plan would have no effect on residential displacement issues.

Transportation

Either the Channel Widening Plan or the Bypass Channel Plan would contribute to cumulative traffic impacts when considered with the SCVWD-proposed construction of flood control improvements in Reach 6 of the upper Guadalupe River (see section 6.1.8). These cumulative traffic impacts would be short-term and less than significant. During construction of a new West Virginia Street bridge over the bypass channel, traffic normally using West Virginia Street would be redirected to Willow Street or West Alma Avenue. Willow Street has sufficient unused capacity to absorb the West Virginia Street traffic during construction (see Table 4.7-3). Even if the construction schedules for West Virginia and Willow streets overlap, West Alma Avenue has sufficient unused capacity to accept the traffic from both streets during construction (Parsons Engineering Science 1997). The proposed Construction Management Traffic Plan would further reduce the proposed action's contributions to short-term impacts during construction.

With construction of either one of the project alternatives along with the SCVWD-proposed Reach 6 project, flood-caused blockages of SR 87 and the light rail line in Reach 6 would be nearly eliminated. This would be a cumulative long-term transportation benefit.

Noise

San Jose International Airport has prepared an airport expansion plan for the year 2000, which includes noise contours for airport operations. Noise from aircraft operations is estimated to increase approximately 1 dBA in the long term.

The Guadalupe Corridor Transportation Facility (GCTF) will affect noise environments in Reaches 6, 7, and 8. The EIS for that project (UMTA 1988) analyzes operational noise impacts from SR 87 and light rail transit operations. Results indicate that existing noise levels with the project will be increased by 2 to 7 dBA after mitigation. The most significant future noise increase from GCTF would occur at the residences on Mills Court and the end of Atlanta Avenue in Reach 7. For these cases, the existing noise level is estimated to increase from 58 to 63 dBA (L_{eq}) in future years. The Channel Widening or the Bypass Channel Plan alternatives would increase ambient short-term noise levels during construction no more than 2 dBA. This would be an insignificant contribution to short-term noise levels.

Other major roadways in the study region will experience a significant increase in traffic volumes due to regional growth. Noise increase from regional growth is expected to be 2 dBA or less near major arterials and 2 to 4 dBA in areas remote from major arterials in the next 20 years. Proposed flood control improvement alternatives would not generate significant noise over the long-term. Contributions to cumulative impacts are therefore insignificant.

Air Quality

Since the proposed flood-control improvement alternatives would not have operational air quality impacts, potential contributions to cumulative impacts would occur only during short-term construction periods. Implementation of BAAQMD fugitive dust control measures would reduce cumulative PM_{10} emissions impacts to less than significant (see section 4.1.4). Combustive emissions from construction equipment would be intermittent and would be an insignificant contribution to short-term cumulative impacts.

Public Services and Utilities

Both Channel Widening and Bypass Channel Plan alternatives would have short-term impacts during construction on public services and utilities that would be reduced to less than significant with proposed mitigation measures (see section 4.9.4). No long-term contributions to cumulative public services and utilities impacts would occur. Other cumulative project impacts on public services and utilities would be short-term and reduced to less than significant.

Public Safety

The flood control project improvements are designed to protect public safety. Public safety would be protected by appropriate construction and operational safety measures, including Bypass Channel Plan measures to limit public access to the immediate vicinity of the recreational trail. Access provided by the recreational trail proposed as part of the Bypass Channel Plan (and as envisioned in the Guadalupe River South Corridor Master Plan) may, however, pose concerns associated with increased access to the river corridor. The City of San Jose should evaluate the trail and park system with respect to any additional safety concerns it may create. The Channel Widening Plan would not generate additional public safety concerns relative to the recreation trail. The plan's impacts would be limited to creating new flood control facilities that could entice trespassing hazards, similar to other flood control improvement projects in the vicinity. These impacts would be reduced to less than significant with proposed mitigation (see section 4.12.4).

Vegetation

The following cumulative impact analysis is based on a reconnaissance-level field inventory of riparian habitats throughout the Guadalupe River system by The Habitat Restoration Group in 1990 and a review of existing documents describing proposed and approved projects (Parsons Engineering Science 1997, Appendix C-A).

For the purposes of this assessment, the Guadalupe River system encompasses the Guadalupe River mainstream from the mouth at Alviso Slough in South San Francisco Bay to its confluence with Alamitos Creek, and major tributaries of the Guadalupe River: Los Gatos Creek, Canoas Creek, Ross Creek, Guadalupe Creek, Alamitos Creek, and Arroyo Calero Creek. The study areas for Los Gatos Creek, Guadalupe Creek, Alamitos Creek, and Arroyo Calero Creek extend upstream to their reservoirs (Table 6-1).

Table 6-1. Stream Segments included in the Cumulative Impact Assessment for Biotic Resources

Stream	*Segment*	*Total Stream Miles*[a]
Guadalupe River	Alviso Slough (SPRR) to confluence with Alamitos Creek	18.8
Los Gatos Creek	Confluence with Guadalupe River to Lexington Reservoir	11.0
Canoas Creek	Confluence with Guadalupe River to Cottle Avenue	7.6
Ross Creek	Confluence with Guadalupe River to Kennedy Road	5.6
Guadalupe Creek	Confluence with Guadalupe River to Guadalupe Reservoir	5.5
Alamitos Creek	Confluence with Guadalupe River to Arroyo Calero to Almaden Reservoir	7.2
Arroyo Calero	Confluence with Alamitos Creek to Arroyo Calero Reservoir	4.0
Total		59.7

Note: a. Bank miles = stream miles x 2.
Source: The Habitat Restoration Group 1991 (unpublished data).

No previous studies have analyzed the cumulative impacts of this and other planned projects relative to the historical extent and distribution of riparian habitat along the Guadalupe River system. Substantial

Table 6-2. Historical Projects that Have Affected the Nature, Extent, and Distribution of Riparian Habitat in the Guadalupe River System

(page 1 of 2)

Affected Reach	*Project Description*	*Construction Date*	*Miles of Affected Stream Course*
Guadalupe River			
Willow Glen Way to Willow Street	Lewis Canal	1866[1]	0.8
Alviso Slough County Marina and SPRR to Highway 101	District channelization/levee improvements	1963-1965, 1985[2,7]	4.6
Highway 101 to I-880	District channel excavation, levees adjacent to San Jose Airport	late 1960s[1]	2.0
Branham Lane to Blossom Hill Road	Gravel quarry operation	before 1970s[1]	1.3
Coleman Avenue to Blossom Hill Road	District percolation ponds: Los Capitancillos and Almaden	1970[7]	Unknown
Blossom Hill Road to Almaden Expressway and Coleman Avenue	District flood control project, gabion slope protection, replace drop structure, in-channel percolation ponds		0.5
Ironwood Drive to Foxworthy Avenue, Almaden Expressway to 6,600 feet upstream	Santa Clara County Transportation Agency widening of Almaden Expressway, gabion slope protection, rock lining	1972/1973[7]	2.0
From 4,150 feet to 8,240 feet upstream of Highway 237	Westerly bank levee	1974[7]	0.8
Los Gatos Creek			
Downstream of Vasona Reservoir	Construction of Vasona Reservoir	1935[6]	Unknown
Downstream of Lexington Reservoir	Construction of Lexington Reservoir	1952[6]	Unknown
Lexington Reservoir to Saratoga Avenue	Concrete channelization and levee slopes associated with construction of Highway 17	1966-1969[7]	1.9
Ross Creek			
Confluence with Guadalupe River to Kirk Road	Channelization	1955[7]	1.5
Camino del Cerro to Kirk Road	Channelization	1955[7]	

Table 6-2. Historical Projects that Have Affected the Nature, Extent, and Distribution of Riparian Habitat in the Guadalupe River System
(page 2 of 2)

Affected Reach	*Project Description*	*Construction Date*	*Miles of Affected Stream Course*
Canoas Creek			
Almaden Road to Canoas Creek (existing)	Channelization	1970[7]	7.2
Nightingale Drive to Cottle Road	Channelization	1967[7]	Unknown
Almaden Expressway to Nightingale Drive	Channelization	1976[7]	Unknown
Guadalupe Creek			
Downstream of Guadalupe Reservoir	Construction of Guadalupe Reservoir	1935[6]	Unknown
Confluence with Guadalupe River to Camden Avenue	District flood control modified floodplain	1982[7]	2.2
Alamitos Creek			
Downstream of Almaden Reservoir	Construction of Almaden Reservoir	1935[6]	Unknown
Camden Avenue to McKean Road	Grading, berms (private developer)	1975[7]	Unknown
Camden Avenue to Almaden Lake Park	District channelization	1980[7]	3.0
Arroyo Calero Creek			
Downstream of Calero Reservoir	Construction of Calero Reservoir	1935[6]	Unknown

References:

1. Santa Clara Valley Water District. February 1990. Guadalupe River planning study (Bayshore Freeway upstream to Camden Avenue on Guadalupe Creek). Draft engineer's report.
2. _____. September 1982. Guadalupe River planning study (Southern Pacific Railway to Highway 101). Engineer's report and focused environmental impact report.
3. _____. February 1977. Alamitos, Calero, and Santa Teresa Creeks. Planning study and environmental impact report.
4. _____. 1975. Proposed flood control project for Guadalupe River (Blossom Hill Road to Almaden Expressway). (Central Zone Project No. 3015.) Engineer's report and final environmental impact report.
5. Earth Metrics, Inc. 1977. Proposed flood control plans for Alamitos, Calero, and Santa Teresa Creeks. Final environmental impact report.
6. Santa Clara Valley Water District. 1989. Water supply and distribution facilities.
7. Additional dates confirmed by review of District construction documents and historical aerials.

Source: The Habitat Restoration Group 1991 (unpublished data).

portions of the system have been highly disturbed. Table 6-2 lists previously constructed water management projects that may have reduced the extent of riparian habitat along the Guadalupe River and its tributaries. Because many small urban, residential, and agricultural development projects have occurred within the Guadalupe River system, only major projects are included in Table 6-2.Historical changes in the Santa Clara Valley (in agriculture, urban development, and water development) have resulted in substantial loss of riparian forest within the Guadalupe River system. Much of the remaining forest has been degraded by fragmentation, disturbance, reduced flooding, and introduction of non-native species.

Currently, riparian forest occurs along 60.9 bank miles of the Guadalupe River system (51.0 percent of the system total of 119.3 bank miles). Approximately 16.5 bank miles of riparian forest occurs along the Guadalupe River (44.0 percent of the Guadalupe River; total of 37.5 bank miles). Approximately 4.0 bank miles (3.3 percent of the system total) have been modified through the installation of gabions, concrete lining, riprap, and underground culverts. The remaining areas have been converted to ruderal vegetation, upland landscaping, and bare areas. Existing amounts of major habitats in the Guadalupe River system are summarized in Table 6-3.

Under either the Channel Widening Plan or the Bypass Channel Plan, the extent of hardened bank along the Guadalupe River would be increased. This increase would occur primarily along the middle to upper parts of banks widened to provide increased channel capacity. Small-scale, incremental increases in the acreage of hardened banks may also occur where less damaging bio-engineered erosion control measures are attempted but fail. An extensive area of channel bank habitat will also be hardened as part of the downtown Guadalupe River project. The cumulative extent of bank hardening along the river has not been quantified, but this may be an important aspect of the cumulative impact of riparian forest habitat loss, possibly resulting in the degradation of residual habitat values beyond what is measured in terms of lost acreage of riparian forest or other vegetation types.

IMPACT: Direct Removal of Riparian Forest and Near-Term Reduction in Mature Riparian Forest. Implementing several projects that are close together or overlap in time and space amplifies the effects of riparian forest removal. Although the direct impacts of each project would be mitigated by planting, maintaining, and monitoring replacement vegetation, the combined impact on riparian forest condition would be greater than the sum of the incremental effects because the interim loss of shade, habitat, and self-sustaining vegetation would affect wildlife more than if the projects were widely separated in time and space. The majority of the impact would be on cottonwood/willow forest, which possesses high botanical and wildlife values.

This is considered a significant cumulative impact, because historically the amount, condition, and continuity of riparian forest in the Santa Clara Valley, especially along the Guadalupe River, has been substantially reduced, thereby increasing the regional importance of remaining riparian habitats to fish and wildlife. The SCVWD will minimize its contribution to this impact by implementing the following mitigation measures.

The SCVWD currently participates in watershed management planning for the Guadalupe River watershed in coordination with other responsible agencies. This effort will help guide the long-term management of biotic and other resources within the Guadalupe River system.

Table 6-3. Summary of Fish Habitat Accessible by Removal of Fish Barriers on the Guadalupe River and Alamitos, Calero, and Guadalupe Creeks

		Access to Habitat				
Fish Barrier to be Removed	*Location*	*Feet*	*Miles*	*Cumulative Miles*	*Creek Benefited*	*Fish Passage Limit*
Stream Gauge Station No. 23B (1)	Guadalupe River	2,100	0.40	0.40	Guadalupe River	Hillsdale Avenue weir
Hillsdale Avenue weir (2)	Guadalupe River	3,550	0.67	1.07	Guadalupe River	Vehicle crossing downstream of Ross Creek
Vehicle crossing downstream of Ross Creek (3)	Guadalupe River	8,600	1.63	2.70	Guadalupe River	Blossom Hill drop structure
Blossom Hill drop structure (4)	Guadalupe River	1,650	0.31	3.01	Guadalupe River	Guadalupe River/Alamitos Creek and Guadalupe River/Guadalupe Creek confluences
Blossom Hill drop structure (4)	Guadalupe River	9,650	1.83	4.84	Guadalupe Creek[1]	Mason Dam
Mason Dam (5)	Guadalupe Creek	6.850	1.30	6.14	Guadalupe Creek	Stream Gauge Station No. 43
Stream Gauge Station No. 43 (6)	Guadalupe Creek	3,300	0.63	6.76	Guadalupe Creek	Concrete channel
Concrete channel (7)	Guadalupe Creek	3,750	0.71	7.47	Guadalupe Creek	Guadalupe Reservoir
Blossom Hill drop structure (4)	Guadalupe River	4,200	0.80	8.27	Alamitos Creek[2]	Gabion structure upstream of Mazzone Drive
Gabion structure upstream of Mazzone Drive (8)	Alamitos Creek	34,900	6.61	14.88	Alamitos Creek	Stream Gauge Station No. 16
Stream Gauge Station No. 16 (9)	Alamitos Creek	1,350	0.26	15.13	Alamitos Creek	Almaden Reservoir [not proposed to be removed]
Gabion structure upstream of Mazzone Drive (8)	Alamitos Creek	21,500	4.07	19.20	Calero Creek[3]	Arroyo Calero Reservoir

Notes: Length is based on stations in Santa Clara Valley Water District's Maps of Flood Control Facilities and Limits of 1% Flooding (June 1993 edition).

A total of eight fish barriers would be removed, resulting in approximately 19 cumulative miles of recovered access to fish habitat.

1. Fish passage benefit begins at Guadalupe River/Guadalupe Creek confluence.
2. Fish passage benefit begins at Guadalupe River/Alamitos Creek confluence.
3. Fish passage benefit begins at Alamitos Creek/Calero Creek confluence.

MITIGATION: Minimize Recreational Impacts on Riparian Forest. To minimize indirect impacts on remaining riparian forest vegetation and revegetation areas, the Corps would incorporate the following measures into the project.

- The permanent maintenance road would not be sited within the revegetation areas in Reach 12 to avoid disturbance of mitigation plantings.

- The perimeters of riparian forest mitigation revegetation sites accessible to recreational users would be fenced and posted with "Mitigation Area, Please Do Not Disturb" signs until the vegetation has become well established (an estimated 5-8 years).

- Where possible, dense vegetative screening would be planted between trails or maintenance roads and revegetation sites.

- The SCVWD would continue to be fully involved in the planning of the trail system for the Guadalupe River Corridor South Park so as to protect the mitigation sites and natural areas.

MITIGATION: Implement Revegetation during the First Fall Planting Season after Reach Construction. To minimize the delay between project impacts on riparian forest habitat and the attainment of full compensation in revegetation areas, the Corps would revegetate during the first fall planting season after completing construction in each reach

In addition, the construction schedule would begin improvements in Reaches 7 and 12 early in the project phasing. Because Reaches 7 and 10B contain much of the mitigation vegetation, completing construction in these reaches would allow for the earliest possible establishment of mitigation vegetation and for providing compensation for temporary loss of habitat.

Wildlife

Implementation of several projects would result in substantial long-term increases in human activity within the Guadalupe River riparian corridor. In addition, the SCVWD has a policy governing joint public use of SCVWD facilities (Resolution No. 74-38) that would allow future park projects to utilize floodway maintenance roads for trails. After completion of construction, increased human activities would include revegetation monitoring, floodway maintenance work, and recreational uses. These activities could increase disturbance of wildlife over current levels, especially during the breeding season.

This cumulative impact would be greater than the sum of the impacts of each project separately, because the impacts would be close together or overlapping in time and space, reducing the potential for wildlife to tolerate or avoid the disturbance.

This impact is considered less than significant because wildlife in the affected areas are already subjected to substantial disturbance from urban activities outside the project areas, and urban and recreational disturbances would increase even in the absence of the major projects listed above. No mitigation is required; however, the Corps would minimize its contribution to wildlife disturbance by implementing mitigation measures recommended to reduce impacts on vegetation.

Fisheries

The preferred project and other major projects would modify the stream channel and riparian corridor of the Guadalupe River, removing streamside vegetation that shades the stream channel and provides fish escape cover. These major channel modifications could be initiated within a few years of each other and span a significant portion of the channel of the Guadalupe River. However, construction of much of the preferred project could occur 10-20 years after the other major projects.

Implementation of the Downtown Guadalupe project was determined to affect approximately 9,800 linear feet of SRA cover; however, impacts on SRA cover are being reevaluated. Implementing the proposed upper Guadalupe project would result in the direct removal of 3,959 linear feet of overhead cover in the form of overwater riparian vegetation and 359 linear feet of undercut banks.

Loss of SRA cover from implementing the downtown Guadalupe project will be fully mitigated according to efforts that are currently underway. The downtown project will not receive permits to allow completion until referenced mitigation plans are deemed acceptable by regulatory agencies. Impacts on SRA cover from the preferred project would be fully mitigated. Mitigation measures required for the SRA impacts of the preferred project are discussed under "Fisheries." Mitigation for removal of riparian habitat is also discussed under "Vegetation." Required mitigation to compensate for removal of riparian forest and SRA cover includes preparing and implementing an integrated vegetation mitigation plan. The separated timing of the project and the SCVWD's participation in watershed management planning will also help to minimize cumulative impacts on the riparian corridor of the Guadalupe River.

The cumulative impact of removing streamside vegetation is therefore considered less than significant, and no mitigation is required.

IMPACT: Blocked Access to Optimum Fishery Habitat Upstream. Construction impacts of the proposed project are increased by the continued effects of previous projects. An impassable drop structure upstream of Blossom Hill, constructed as part of a SCVWD flood control project in 1977, blocks access by steelhead and salmon to spawning and rearing habitat in Alamitos, Arroyo Calero, and Guadalupe creeks. Two downstream barriers at Hillsdale Avenue and Branham Lane have restricted the migration of steelhead and salmon upstream to the drop structure except when flows exceed approximately 100 cfs.

The project proposes to remove the fish barriers at Hillsdale Avenue and Branham Lane. Further, the SCVWD will modify the weir at stream gauge Station No. 23B to improve fish passage conditions. Measures to improve fish passage would be implemented by the SCVWD as part of separate but related projects (Parsons Engineering Science 1997). These measures, described below, would result in improved fish passage to upstream areas. As a result this impact is fully mitigated and no additional measures are needed.

In accordance with a September 1995 settlement agreement, the SCVWD has committed to construction of a step pool fish ladder at the Blossom Hill drop structure that will be fully operational by October 15, 1999 (see "Settlement Agreement" in Chapter 3, "Preferred Project and Alternatives"). This will provide access to an additional 2.9 miles of fish habitat from the drop structure to potential fish barriers at Mason Dam on Guadalupe Creek and the gabion structure on Alamitos Creek upstream of Mazzone Drive (Table 6-3).

Even with these mitigation measures, construction of the proposed project and other projects on the Guadalupe River, addressed earlier in this chapter, would result in cumulative impacts on anadromous fish habitat, water temperatures, and potential sedimentation of spawning and food producing areas. These cumulative impacts are considered significant.

The SCVWD proposes to provide fish passage at the gabion structure on Alamitos Creek upstream of Mazzone Drive. This improvement would provide access to approximately 10.7 miles of upstream fish habitat (Table 6-3), which is more than the total miles of the Guadalupe River included in the project areas for the Upper Guadalupe River Flood Control Project (approximately 6.4 miles) and the Downtown Guadalupe River Flood Control Project (approximately 2.6 miles). Fish passage devices would be designed in consultation with CDFG and USFWS and incorporate engineering considerations and biological criteria developed for fish passage to ensure that adequate fish passage is maintained.

Successful implementation of this measure, in conjunction with other mitigation measures, would allow anadromous species (such as chinook salmon and steelhead trout) access to more suitable spawning habitat in the upstream tributaries. Other measures include improving fish passage conditions at Mason Dam, Stream Gauge Station No. 43, and the concrete channel on Guadalupe Creek and would provide access to 2.6 miles of higher quality fish habitat upstream of the project.

Implementing the foregoing measures would allow access to approximately 13.3 miles of more suitable upstream spawning and rearing habitat, which would result in a significant, long-term beneficial impact on fishery resources. With the step pool ladder at the Blossom Hill drop structure and modifications to the partial barriers in the Upper Guadalupe River, a total of approximately 19 miles or more suitable habitat would be available.

The SCVWD would implement a two-phase monitoring program of the fish passage improvements at Alamitos Creek to determine the success of the improvements: intense annual surveys (phase one) to determine whether fish are using the structures and ongoing surveys in perpetuity (phase two) to ensure that structures are operating as designed. The SCVWD would develop an appropriate monitoring program in coordination with CDFG and USFWS to document the successful passage of migratory fish (primarily chinook salmon and steelhead trout) at the gabion structure on Alamitos Creek. Phase one of the monitoring program would commence in the fall following completion of fish passage improvements. Monitoring would be conducted from October 1 to April 30 when migrating adult chinook salmon and steelhead trout are expected to occur.

Potential monitoring activities could consist of visual surveys at the improvement location; carcass, redd, and juvenile surveys in reaches upstream of the improvement location; automated fish counting systems mounted at each fish passage structure; or a combination of two or more methods to document the successful passage of adults. The precise sampling protocol would be developed in consultation with CDFG and USFWS and would depend on the opportunities and constraints governed by the local conditions (e.g., high turbidity levels during storm runoff periods may preclude the use of visual observations as a sampling method).

In addition to visual observations to determine successful fish passage, the SCVWD would look for indicators of passage problems, such as fish congregating downstream of the ladder or failed attempts by fish to negotiate the ladder.

The SCVWD would submit an annual monitoring report to CDFG for up to 5 years after modification of the gabion structure on Alamitos Creek. If the objective of attaining fish passage has not been met and is not due to factors beyond the SCVWD's control (e.g., drought, natural downstream barrier, or limited numbers of fish), remedial actions would be initiated and monitoring would continue for up to an additional 5 years. Remedial actions could include redesign of structural improvements or further negotiations with CDFG and USFWS regarding other appropriate mitigation.

This measure would be considered successful when fish passage was documented and no indicators of passage problems are present. After successful fish passage was documented, phase one of the monitoring program would be considered complete.

Phase two of the monitoring plan would include repeated surveys during the rainy season (i.e., October 1 through April 30) to ensure that the fishway is free of obstructions and debris that could preclude their normal operation. The SCVWD would follow the same maintenance and inspection procedures as outlined in an existing MOU with CDFG and take reasonable and appropriate measures to remove accumulated debris in a timely manner to restore to normal the operation of the fishway. The current Memorandum of Understanding requires the SCVWD to inspect all fish ladders once every workday and at least once per day during high flow events on nonworking days during the migration period. This phase of the monitoring program would continue for the life of the improvement structure.

This measure would provide fish access to an additional 10.7 miles of stream habitat. Successful implementation of this measure, in conjunction with other measures, would provide chinook salmon and steelhead trout access to a combined total of 13.3 miles of additional spawning and rearing habitat. Together, these measures will result in a long-term benefit to the anadromous fishery of the Guadalupe River because of the increase in habitat availability and the anticipated benefits associated with the improved habitat conditions found in these tributary streams. With the step pool ladder at the Blossom Hill drop structure and modifications to the partial barriers in the Upper Guadalupe River, a total of approximately 19 miles of more suitable habitat would be available.

Aesthetics and Recreation

During construction, either the Channel Widening or Bypass Channel Plan alternative would contribute to a temporary change in the visual character of the project area. Successful implementation of revegetation and other mitigation measures discussed in section 4.5.4 would restore the long-term aesthetic character of the riparian corridor. Beneficial recreational impacts would result from development of the river trail. The proposed project alternatives would not result in long-term significant contributions to cumulative impacts on visual/aesthetic resources.

The City of San Jose's proposed widening from Malone Road to the southbound lanes of the Almaden Expressway would encroach within the Bypass Channel Plan recreational trail corridor. A wider right-of-way for this segment of Almaden Road and partial reconstruction of portions of the road within this stretch of the feasibility study areas would be necessary to build the recreational trail. The City of San Jose would coordinate its land acquisition and road reconstruction with construction of the Bypass Channel Plan (William DeJager 1997). This would eliminate any conflicts between Almaden Road Widening and the Bypass Channel Plan recreational trail.

Historic and Archaeological Resources

Urbanization has had an adverse effect on the various cultural resources located along the Guadalupe River. Prehistoric cultural resources such as habitation sites, food processing areas, and Native American cemeteries have been affected by construction projects such as housing developments, roadwork, and utility installation. In addition, historic properties have been affected by modernization, demolitions, and general effects of urbanization. In particular, Spanish and Mexican period cultural resources and late 19th century and early 20th century housing areas or structures have been altered, removed, or lost.

Both Channel-Widening and Bypass Channel plans could affect cultural resources along the Guadalupe River and could contribute to cumulative impacts on archaeological, historical, and Native American heritage resources found within the Santa Clara Valley. The alternative plans' direct impacts on archaeological sites would be mitigated to insignificance (see section 4.10.4), but would contribute to a general loss of the existing data base, impacting research potential and Native American heritage values. The potential to impact human burials in unmapped areas of CA-SCL-690 would be of particular concern to local Native Americans. This data base in the Santa Clara Valley includes intact prehistoric and historic resources such as midden deposits, Native American burials, historic structures, and historic archaeological deposits. Cultural resources located along the Guadalupe River are important to understanding the development of the area since the river had been an important factor in shaping the prehistoric and historic development of the area.

Development of Canoas Creek improvements under the SCVWD Upper Guadalupe Flood Control project could impact two archaeological sites with human remains. If human remains were disturbed, the effect on Native American heritage values would be particularly adverse. In this case, cumulative impacts would be significant, but mitigated to insignificance by involving Native Americans in formulation of cultural resource treatment plans and in their implementation.

Removal of the remaining components of the Valley View Packing Company (if still remaining on site at the time of construction), and other historical structures (bridges and residences) under the Bypass Channel Plan and the historic redwood retaining wall under both alternative plans would be a significant contribution to impacts on historical resources that would be reduced to less than significant with proposed mitigation measures (see section 4.10.4).

7.0 THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Both the Bypass Channel and the Channel Widening Plans would result in significant impacts experienced over three time periods: during construction (short term); until biological mitigation measures achieve specified goals (intermediate term); and operation (long term). Either flood protection plan would result in long-term reduction in the flood risk to homes and businesses in San Jose near the Guadalupe River, Ross Creek, and Canoas Creek. Reduced flood hazards would enhance land uses in the vicinity of the project area, by eliminating requirements for insurance and flood protection, and decreasing potential costs of flood-related damage.

Nearly all significant short-term impacts during construction would be reduced to less than significant by mitigation: air quality (fugitive dust generation during grading); geological resources (increased erosion and sedimentation during grading); water resources (degradation of water quality due to erosion); aesthetics and recreation (incompatible heavy construction equipment and materials working in a natural setting); noise (construction equipment noise affecting the occupants of adjacent residential areas); transportation (construction equipment trips, road and bridge closures affecting traffic flow); public services and utilities (relocation of wells and utility lines); cultural resources (ground disturbances and demolition of structures); hazardous materials (release of contaminants in excavated soil); public safety (construction activities creating safety hazards and nuisances); and socioeconomics (relocation of businesses).

Construction of the Bypass Channel Plan would have an unavoidable, significant long-term impact on residential land uses where the cohesion and integrity of neighborhood blocks would be interrupted by parcels developed as part of flood control improvements.

With either flood protection plan, significant unavoidable impacts on biological resources would occur during the short- and intermediate term until mitigation replantings are established. Riparian forest revegetation establishment could take as little as 2-3 or up to 10 years, while full replacement of the relatively mature forest found in some locations could take up to 40-50 years. Impacts would also affect aesthetics and recreation (important public and private views that include natural settings adjacent to the river, and new flood control improvements contrasting with the natural environment that would not be screened). Proposed mitigations include careful monitoring for effectiveness to expedite revegetation establishment and minimize these impacts.

No significant unavoidable impacts on biological resources would occur over the long-term operation of the either Channel Widening Plan or Bypass Channel Plan, assuming the successful implementation of mitigation measures presented in the EIR/S. These measures would enhance long-term biological productivity.

Either flood protection plan would provide numerous immediate and long-term beneficial impacts by limiting potential flooding damage and improving public safety in the vicinity of the upper Guadalupe River. This beneficial impact is considered particularly important, since future floods could have substantial repercussions throughout the project vicinity. Erosion of stream banks would be minimized, which would eliminate the need for constructing flood control protective mechanisms such as concrete channelling. Biological resources would be enhanced in the long term by the restoration of riparian forest, which is of extremely high value to fish and wildlife, and preventing the disturbance of this area by future flood control projects and development. A trail running the length of river improvements funded by the City of San Jose would provide recreational benefits.

The No-Action Alternative would not provide any of the benefits described above. Potential flooding and erosion impacts would remain, resulting in the need for flood control cleanup activity and potentially other, more intrusive modifications to the upper Guadalupe River.

The long-term consequences of either flood protection plan include enhancing local public safety and the biological integrity of the upper Guadalupe River, while substantially reducing future costs and environmental impacts associated with flood damage repair and cleanup. These enhancements are substantial when compared to the short-term and intermediate-term adverse, project-related construction impacts.

8.0 GROWTH-INDUCING IMPACTS

Either flood protection plan would provide protection to reaches of the upper Guadalupe River, reducing potential hazards to public safety and property. Although some residents and/or businesses would be relocated elsewhere, substantial increases in population would not result. No extension of public utilities including roads or sewer lines would result. Therefore, the project would not induce growth and does not have any growth-inducing impacts.

9.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Resources that are committed irreversibly or irretrievably are those that cannot be recovered if the project is implemented. With either flood protection plan, a portion of the project area which now supports residential and commercial uses would be committed to flood control purposes. This commitment of land for flood control would essentially be irreversible, and would commit future generations to similar uses. The proposed action would not result in a large commitment of nonrenewable resources. Nor would the project include highway construction or other improvements that would provide access to a previously inaccessible area. In addition there would be the following irreversible or irretrievable effects.

- Fossil fuels (diesel and gasoline) would be used by construction equipment and by construction workers' vehicles commuting to the site.

- The materials or supplies used during construction would be consumed.

- There would be short-term impacts on local and regional air quality.

- Under the Channel Widening Plan there would be a short-term loss of 6.5 acres of riparian forest including 1,700 trees that would, after 5 to 30 years, be offset by the restoration of a greater acreage of riparian forest. Under the Bypass Channel Plan, these figures would be 9 acres of riparian forest and up to 3,100 trees that would, after 5 to 30 years, be offset by the provision of a greater acreage of riparian forest. Either plan would also cause a short-term loss of SRA cover and undercut banks, habitat features that are important to salmonids. With the Channel Widening Plan, 0.67 acre of SRA cover and 2,535 feet of undercut banks would be removed during project construction whereas with the Bypass Channel Plan, 0.86 acre of SRA cover and 1,100 feet of undercut banks would be lost. Habitat restoration measures would replace these features beginning during the first decade after construction, exceeding existing habitat values in approximately 30 years.

- There would be an intermediate-term degradation of the visual resources (i.e., scenic views) of the project area as seen from public and private vantage points.

- There would be short-term noise impacts on residents in the project vicinity during construction.

- There would be short-term impacts on traffic circulation in the project area during construction.

- There would be a short-term reduction in the quality of the recreational opportunities along the upper Guadalupe River.

- Significant archaeological and historical resources could be disturbed or removed. Both Channel Widening and Bypass Channel Plans could encroach with portions of a significant archaeological site that is known to include human burials.

The Bypass Channel Plan's disturbance of two archaeological sites containing human burials, if it cannot be avoided, would be a substantial commitment of irretrievable resources. Other environmental impacts resulting from either plan would not result in substantial commitments of resources.

10.0 PUBLIC INVOLVEMENT AND INTERAGENCY COORDINATION

10.1 PUBLIC INVOLVEMENT PROGRAM

A public hearing on the adequacy of the Draft EIR/S will be held during the 45-day public review period for the Draft EIR/S. The transcript of that meeting and the comments received on the Draft EIR/S will be included in the Final EIR/S.

10.2 REQUIRED COORDINATION

The Corps and SCVWD have made numerous efforts to coordinate the development of this project with other agencies, including the Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), the State Resources Agency, the California Department of Fish and Game, the Regional Water Quality Control Board (RWQCB), and other agencies. These coordination efforts have involved discussions, meetings, and correspondence primarily on the issues of steelhead trout, endangered species, and water quality.

The USFWS's *Revised Draft Supplemental Coordination Act Report* (DCAR) for the project was released in 1996. Appendix D contains the Service's recommendations related to the project as contained in the DCAR. The final CAR will be provided in time to be included in the Final EIR/S.

The USFWS' updated list of proposed and listed threatened and endangered species that may occur in the project area is provided in Appendix E in its entirety. This EIR/S serves as the Biological Assessment for the project. The conclusion of the Corps' Biological Assessment is that the project is not likely to adversely affect federally listed or proposed, threatened, and endangered species. The USFWS will review this EIR/S to determine whether it concurs with this conclusion.

The Corps has initiated coordination with the State Historic Preservation Officer (SHPO) with regard to cultural resources that may be present in the project area. Additional consultations pursuant to Section 106 will be pursued and completed prior to construction commencement.

10.3 AGENCIES, ORGANIZATIONS, AND INDIVIDUALS RECEIVING THIS EIR/S

Federal Agencies and Officials

Advisory Council on Historic Preservation
Army Corps of Engineers
Department of Commerce
Department of Energy
Department of Housing and Urban Development
Department of Interior
Environmental Protection Agency
Farm Service Agency
Federal Emergency Management Agency
Federal Highway Administration
Fish and Wildlife Service
Hon. Rep. Tom Campbell
Hon. Rep. Zoe Lofgren
Hon. Senator Barbara Boxer
Hon. Senator Diane Feinstein

National Marine Fisheries Service
Natural Resources Conservation Service

State and Regional Agencies

Bay Area Air Quality Management District
Caltrans
California Department of Fish and Game
Resources Agency
Senate Committee on Natural Resources and Wildlife
San Francisco Regional Water Quality Control Board
Sonoma State University, Northwest Information Center (cultural resources)
State Lands Commission
State Water Resources Control Board

Local Agencies and Officials

City of Santa Clara
Evergreen Resource Conservation District
San Francisco Regional Water Quality Control Board
City of San Jose
- City Council
- Mayer Susan Hammer
- Public Works Department

Santa Clara County Board of Supervisors
Santa Clara County Libraries
- Almaden
- Cambrian
- Dr. Martin Luther King, Jr.
- Pearl Avenue
- Rosegarden
- Santa Teresa

Santa Clara County Mosquito Abatement District
Santa Clara County Parks and Recreation Commission
Santa Clara County Planning Department
Santa Clara Valley Transportation Authority
Santa Clara Valley Water District

Organizations and Individuals

Bay City News Service
Becchine, Virginia
California Waterfowl Association
Carson, Charles — Building Industry Association
Chappell, James — SPUR
Espersen, Tomas
Feinstein, Arthur
Flanagan, Carolyn — Hacienda Environmental Science Magnet

Friends of the River
Guadalupe-Coyote Resource Conservation District
Hesler, John — David Powers Associates
Jakovina, Robert and Harriet
Jones & Stokes, Inc.
Kulakow, Stan
Lifeweb
Lucas, Libby
Magney, David — California Native Plant Society
Mewalt, Richard
Mineta, Norman
Nature Conservancy
Noelle, Mara — Wetlands Research
Pacific Bell
Pacific Gas and Electric
Parsons Engineering-Science
Peninsula Conservation Center
Royce, James — Sierra Club, San Francisco Bay Chapter
San Francisco Bay Bird Observatory
San Jose Water Company
Santa Clara Valley Audubon Society
Santa Clara County Streams for Tomorrow
Sierra Club, Loma Prieta Chapter
Silberstein, Mark — Elkhorn Slough Foundation
Sloan, Dr. Doris
Spencer, Gayle
Sykes, Walter — NRCS Water Resources Planning
Timby, Sara
Union Pacific Railroad
Valley View Packing Company
Western Waters Canoe Club

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Vyas, Ashok. Project Engineer, Roads and Airports Department, County of Santa Clara. 1997.

13.0 LIST OF PREPARERS AND CONTRIBUTORS

Name	*Title or Expertise*	*Experience*	*Role in Preparing EIR/S*
Corps of Engineers			
W. DeJager	Biologist, Environmental Planning Section	5 years	EIR/S Manager
L. Galal	Study Manager, Plan Formulation Section	6 years	Study Manager
P. LaCivita	Chief, Environmental Planning Section	20 years	Technical Management
SAIC			
S. Fusco	Senior Program Manager	24 years	Program Manager
D. Stone	Senior Scientist	19 years	EIR/S Project Manager; Aesthetics and Recreation; Cultural Resources
D. Pontifex	Senior Scientist	16 years	Land Use; Utilities
M. Dungan	Senior Biologist	19 years	Biological Resources; Section 404(b)(1) Determination
D. Kentro	Senior Scientist	19 years	Noise; Transportation; Public Services and Utilities; Public Safety; Socioeconomics
E. Tambini	Registered Geologist	9 years	Geological Resources; Water Resources
C. Crabtree	Air Quality Specialist	13 years	Air Quality

14.0 ACRONYMS

ARM	Archaeological Resources Management
APE	Area of Potential Effect
ARB	California Air Resources Board
ARS	Archaeological Resource Service
BAAQMD	Bay Area Air Quality Management District
B/C	benefit-to-cost ratio
BMP	Best Management Practices
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAR	Coordination Act Report
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
COE	U.S. Army Corps of Engineers
CWA	Clean Water Act
Db	decibel
DO	dissolved oxygen
DOHS	California Department of Health Services
DTSC	California Department of Toxic Substance Control
DWR	California Department of Water Resources
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESI	Engineering Science, Inc.
FEMA	Federal Emergency Management Agency
GCTF	Guadalupe Corridor Transportation Facility
HSWA	Hazardous and Solid Waste Act
HWCL	Hazardous Waste Control Law
L_{dn}	day-night average noise level
L_{eq}	equivalent noise level
LOS	level of service
LPP	Locally Preferred Plan
LRT	Light Rail Transit
LU	Land Use Element
LUST	leaking underground storage tank
MCE	maximum credible earthquake
MCL	maximum contaminant level
$\mu g/m^3$	micrograms per cubic meter
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NAAQS	National Ambient Air Quality Standards
NE	Natural Environment Element
NED	National Economic Development
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum of 1929
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NO_x	nitrogen oxides

Acronyms

NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSRL	No-Significant-Risk Levels
NTU	Nephelometric Turbidity Unit
OSHA	Occupational Safety and Health Administration
O_3	ozone
PCB	polychlorinated biphenyls
PG&E	Pacific Gas & Electric Co.
PM_{10}	respirable particulate matter
ppm	parts per million
PRC	Public Resources Code
PS	Public Safety Element
RCRA	Resource Conservation and Recovery Act
ROG	reactive organic gas
ROI	region of influence
ROW	right-of-way
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendment and Reauthorization Act
SCS	Soil Conservation Service
SCVWD	Santa Clara Valley Water District
SFBAAB	San Francisco Bay Area Air Basin
SJWCo	San Jose Water Company
SO_2	sulfur dioxide
SPRR	Southern Pacific Railroad
SCVWD	Santa Clara Valley Water District
SHPO	State Historic Preservation Officer
SR	State Route
SRA	shaded riverine aquatic habitat
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TSCA	Toxic Substances Control Act
UPRR	Union Pacific Railroad
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
UST	underground storage tank
V/C	volume-to-highway capacity
vph	vehicles per hour
VOC	volatile organic compounds
WQC	water quality criteria
WWTP	wastewater treatment plant

15.0 INDEX

APPENDIX A

AIR QUALITY REGULATIONS

APPENDIX A

APPLICABLE AIR QUALITY REGULATIONS

FEDERAL REGULATIONS

Clean Air Act of 1969 (42 U.S.C. Section 7401 et seq.)

Air quality regulations were first promulgated with the Clean Air Act of 1969 (CAA). The CAA is intended to protect national air quality by regulating emissions of air pollutants. The CAA is applicable to permits and planning procedures related to project activities onshore and within the territorial sea. The territorial sea is defined as waters 3 miles seaward of the nearest shoreline. Section 118 of the CAA (42 USC 7418) requires all federal agencies engaged in activities that may result in the discharge of air pollutants to comply with state and local air pollution control requirements. In addition, Section 176 of the CAA (42 USC 7506) prohibits federal agencies from engaging in any activity that does not conform to an approved State Implementation Plan (SIP).

The CAA established the National Ambient Air Quality Standards (NAAQS) and delegated enforcement of air pollution control to the states. The California Air Resources Board (ARB) is responsible for the enforcement of air pollution regulations. The ARB, in turn, has delegated the responsibility for regulating stationary emission sources to local air pollution agencies. In the project area, this agency is known as the Bay Area Air Quality Management District (BAAQMD).

The NAAQS shown in Table A-1 include both primary and secondary pollutant standards. Primary standards are mandated to protect public health, while secondary standards are intended to protect public welfare from any known or anticipated adverse effects of a pollutant, such as materials soiling, vegetation damage, and visibility impairment. The CAA states that all federal and state ambient air quality standards must be maintained during the operation of any emission source.

The CAA delegates to each state the authority to establish its own air quality rules and regulations. State adopted rules and regulations must be at least as stringent as the federal requirements. In states where the NAAQS are exceeded, the CAA requires preparation of a SIP, that identifies how the state will meet the federal standards within mandated time frames (as outlined in the Clean Air Act Amendments of 1990).

The Clean Air Act Amendments of 1990 (42 USC 7401 et seq., as amended by P.L. 101-549)

The Clean Air Act Amendments of 1990 (1990 CAA) revised the planning provisions for areas that do not meet the NAAQS. The 1990 CAA identifies new nonattainment classifications and compliance dates, specific emission reduction goals, a demonstration of reasonable further progress and attainment, and incorporates more stringent sanctions for failure to attain or meet interim milestones. The severity of the nonattainment classification determines the requirements and compliance dates for reaching attainment.

To determine progress toward attainment of the O_3 standard, nonattainment regions must reduce VOC emissions basinwide by 15 percent for the first 6 years and by an average 3 percent per year thereafter until the region reaches attainment. The SIP must contain control measures that will facilitate the reduction in emissions and show progress toward attainment of the O_3 standard. With regard to CO and PM_{10} nonattainment areas, plans must be submitted that identify ways to reduce these emissions and show progress toward attainment.

Table A-1. National and California Ambient Air Quality Standards

Pollutant	Averaging Time	CALIFORNIA STANDARDS[a]	NATIONAL STANDARDS[b] Primary[c]	Secondary[d]
Ozone (O_3)	1-Hour	0.09 ppm (180 $\mu g/m^3$)	0.12 ppm (235 $\mu g/m^3$)	Same as Primary Standard
Carbon Monoxide (CO)	8-Hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	-
	1-Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	-
Nitrogen Dioxide (NO_2)	Annual	-	0.053 ppm (100 $\mu g/m^3$)	Same as Primary Standard
	1-Hour	0.25 ppm (470 $\mu g/m^3$)	-	-
Sulfur Dioxide (SO_2)	Annual	-	0.03 ppm (80 $\mu g/m^3$)	-
	24-Hour	0.04 ppm (105 $\mu g/m^3$)	0.14 ppm (365 $\mu g/m^3$)	-
	3-Hour	-	-	0.5 ppm (1,3000 $\mu g/m^3$)
	1-Hour	0.25 ppm (655 $\mu g/m^3$)	-	-
Suspended Particulate Matter (PM_{10})	Annual	30 $\mu g/m^3$	50 $\mu g/m^3$	Same as Primary Standard
	24-Hour	50 $\mu g/m^3$	150 $\mu g/m^3$	Same as Primary Standard
Sulfates	24-Hour	25 $\mu g/m^3$	-	-
Lead	30-Day	25 $\mu g/m^3$	-	-
	Quarterly	-	1.5 $\mu g/m^3$	Same as Primary Standard
Hydrogen Sulfide	1-Hour	0.03 ppm (42 $\mu g/m^3$)	-	-
Vinyl Chloride	24-Hour	0.010 ppm (26 $\mu g/m^3$)	-	-
Visibility Reducing Particles[e]	8-Hour (10 A.M. to 6 P.M.)	In sufficient amount to produce an extinction coefficient of 0.23 per km due to particles when the relative humidity is less than 70 percent.	-	-

Notes: a. California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM_{10}, and visibility reducing particles are not to be exceeded. The standards for sulfates, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded.

b. National standards other than O_3 and those based on annual averages, are not to be exceeded more than once a year. The O_3 standard is attained when the expected number of days per calendar year with a maximum hourly average concentrations above the standard is equal to or less than one.

c. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

d. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects from a pollutant.

e. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range when relative humidity is less than 70 percent.

The 1990 CAA states that a federal agency cannot support an activity unless the agency determines that the activity will conform to the most recent EPA-approved SIP within the region of the proposed action. This means that federally supported or funded activities will not (1) cause or contribute to any new air quality standard violation, (2) increase the frequency or severity of any existing standard violation or, (3) delay the timely attainment of any standard or any required interim emission reductions or other milestones in any area. In accordance with Section 176(c) of the 1990 CAA, the EPA promulgated the final conformity rule for general federal actions in the November 30, 1993 *Federal Register*. Based on this rule and the present attainment status of the San Francisco Bay Area Air Basin (SFBAAB), the proposed action would conform to the most recent EPA-approved SIP if annual project emissions remain below the following levels: (1) 100 tons of CO or 50 tons of VOC. The BAAQMD showed in their *Ozone Maintenance Plan* that control of VOCs alone would demonstrate attainment of the national ozone standard for the next 10 years (through 2006) in the SFBAAB. This plan was approved by the EPA in May 1996 and included an exemption from controlling NOx emissions (the other component to ozone formation) for the purpose of attainment planning, assuming that the region remains in compliance with the ozone standard. Consequently, this NOx exemption also applies to ozone conformity determinations in the SFBAAB and only VOC emissions need to be analyzed for this analysis. Appendix C provides the results of the project conformity analysis.

STATE REGULATIONS

Pursuant to the CAA, the ARB established the CAAQS, which are more restrictive than the NAAQS and include pollutants for which there are no federal standards.

California Clean Air Act of 1988, as amended in 1992

The California Clean Air Act (CCAA) outlines a program to attain the CAAQS for O_3, CO, NO_2, and SO_2 by the earliest practical date. However, areas in nonattainment for PM_{10}, lead, sulfates, hydrogen sulfide, and visibility are not expressly required to develop an attainment plan under the CCAA. Since the SFBAAB is presently in nonattainment of the CAAQS for O_3, the BAAQMD is required to reduce O_3 precursor emissions by five percent annually, until this standard is reached. Exceptions to this requirement are allowed only if the attainment plan contains all feasible measures to control emissions. The requirements and compliance dates for reaching attainment are based on the severity of the nonattainment classification. Since the CAAQS are more restrictive than the NAAQS, emission reductions beyond what would be required to show attainment for the NAAQS will be needed. Consequently, the main focus of attainment planning in California has shifted from the federal to state requirements.

LOCAL REGULATIONS

BAAQMD Rules and Regulations

Rules adopted by local air pollution control districts and accepted by the ARB are included in the SIP. When approved by the EPA, these rules become federally enforceable. The BAAQMD, having received the necessary approvals, has developed the *BAAQMD Rules and Regulations* to regulate stationary sources of air pollution in the SFBAAB. Selected rules and regulations pertinent to the project and related activities described in this document are summarized below.

- *Regulation 1, Section 301 - Public Nuisance.* This rule states that no person shall discharge from any source air contaminants that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or public, or that endangers the comfort, repose, health, or safety of any such persons or public, or that causes, or has a tendency to cause, injury or damage to business or property.

- *Regulation 6* identifies standards that limit particulate matter emissions and the visibility and opacity of effluent from all sources.

- *Regulation 7* identifies limitations on odorous substances and specific emission limitations on certain odorous compounds.

- *Regulation 9, Rule 1, Section 304* states that a person shall not burn any liquid fuel having a sulfur content in excess of 0.5 percent by weight.

The following thresholds used by the BAAQMD to determine the significance of emissions for CEQA analyses would apply to the proposed project alternatives: (1) emissions of PM_{10} during construction would be significant if fugitive dust control measures identified by the BAAQMD would not be implemented during construction activities (BAAQMD 1995).

Attainment/Maintenance Plans

Ever since the NAAQS for O_3 was promulgated by the EPA in 1971, violations of this standard have occurred annually in the SFBAAB until recently. Pursuant to the regulations of the CAA, the ARB was required to periodically submit plans to the EPA that would demonstrate attainment or progress toward attainment of the O_3 standard, beginning in 1979. These *attainment plans*, authored largely by the BAAQMD, outlined measures that would reduce emissions mainly from stationary sources and eventually bring the region into attainment. Due to the success of these plans and the decrease in emissions from on-road vehicles over the last two decades, no O_3 violations occurred in the SFBAAB from 1990 through 1992. In 1993, the BAAQMD requested the EPA to redesignate the region as attainment for O_3 in the *Redesignation Request and Maintenance Plan for the National O_3 Standard* (O_3 Maintenance Plan) (BAAQMD, ABAG, and MTC 1993). Upon final approval of the O_3 Maintenance Plan by the EPA, this redesignation became effective on June 21, 1995.

Based upon measures that reduce VOC emissions and a demonstration that NO_x emissions would not increase in future years, the O_3 Maintenance Plan shows continued attainment of the NAAQS for O_3 in the SFBAAB for at least 10 years. However, during heat waves in the summer of 1995, exceedances of the NAAQS for O_3 occurred in the SFBAAB. Consequently, additional control measures contained in the O_3 Maintenance Plan, such as NO_x Reasonably Available Control Technologies (RACT), may have to be implemented by the BAAQMD.

In addition to the O_3 redesignation, the BAAQMD requested the EPA to redesignate the SFBAAB as in attainment of CO, since the region did not record any violations of the 8-hour CO NAAQS for the 2-year period of 1992-1993 (the 1-hour standard for CO has not been exceeded in the region since 1985). Credit for this air quality improvement can be traced to improvements in the vehicle inspection and maintenance (I&M) program, additional contingency measures adopted in 1990, and the introduction of a wintertime oxygenated fuels program, as required by the 1990 CAA. The request for redesignation is presented in the *Redesignation Request and Maintenance Plan for the National CO Standard* (BAAQMD, ABAG, and MTC 1994). This CO Maintenance Plan contains a contingency measure that would improve the effectiveness of the existing I&M program in the event of a CO standard violation.

In conformance with the CCAA, the BAAQMD developed the *Bay Area 1994 Clean Air Plan* (CAP) to bring the SFBAAB into attainment with the O_3 CAAQS (BAAQMD 1994). The CAP is an updated version of the 1991 plan and includes eight additional control measures beyond what were proposed in the 1991 plan. These measures represent all feasible measures to control O_3 precursor emissions in the SFBAAB. Nevertheless, the CAP cannot demonstrate attainment of the state O_3 standard by 1997. As a result, the BAAQMD will be required to update the CAP in 1997 to report on progress toward attainment of the state O_3 standard. Application of all feasible control measures outlined in the CAP would theoretically reduce basinwide emissions of ROG and NO_x by 13.6 and 7.3 percent, respectively, during the 1994 through 1997 planning period.

Emission control measures proposed in the CAP include indirect and area source control programs, application of Best Available Retrofit Control Technology (BARCT) to existing stationary sources, a modification of the permitting program to achieve no net increase in emissions from permitted sources with a potential to emit more than 15 tons per year of O_3 precursor pollutants, consideration of transportation control measures that will reduce vehicle miles travelled, and significant use of low-emission motor vehicles by vehicle fleet operators.

A determination of project consistency with each plan is required to evaluate if the proposed action would interfere with the attainment or maintenance strategy outlined in these documents. A proposed action generally would be consistent with the intent of a plan if project emissions are included in the future emission inventories forecasted in the plan. In general, construction emissions are considered to be consistent with the regional air quality plans, since they are included in emission inventories that form a basis for these plans and are not expected to inhibit attainment or maintenance of the O_3 and CO standards in the SFBAAB (BAAQMD 1995).

APPENDIX B

AIR QUALITY EMISSION CALCULATIONS

CONFORMITY DETERMINATION FOR THE UPPER GUADALUPE RIVER FEASIBILITY STUDY YEAR 2001

Table 1. Emission Source Data for Construction of the Bypass Channel Plan.

Equipment Type	*Annual Fuel Usage*	*Annual Mileage*
Construction Equipment	19,000	NA
Haul Trucks	NA	120,000

Table 2. Emission Factors for Construction of the bypass Plan.

	Emission Factors							
Equipment Type	*TOG*	*ROG*	*CO*	*NOx*	*SOx*	*PM*	*PM10*	*Units*
Construction Equipment	78.1	75.0	1126.5	346.1	37.5	18.3	17.6	Lb/1000 Gal
On-road Truck - 50 mph	1.5	1.4	6.8	14.0	0.6	2.0	1.9	Gm/Mi

(a) BAAQMD CEQA Guidelines (BAAQMD 1995).

(f) EMFAC7F for year 2001 (ARB 1993), except SOx adjusted to reflect 0.05% sulfur content in diesel.

Table 3. Annual Emissions Produced from Construction of the Bypass Channel Plan.

	Pounds per Year				
	ROG	*CO*	*NOx*	*SOx*	*PM10*
Construction Equipment	1,425	21,404	6,576	713	348
Haul Trucks	371	1,788	3,693	148	537
Total - Pounds/Year	**1,796**	**23,192**	**10,269**	**861**	**885**
Total - Tons/Year	**0.9**	**11.6**	**5.1**	**0.4**	**0.4**

APPENDIX C

AIR QUALITY CONFORMITY DETERMINATION

CLEAN AIR ACT CONFORMITY ANALYSIS
UPPER GUADALUPE RIVER FEASIBILITY STUDY
SAN JOSE, CALIFORNIA

1.0 INTRODUCTION

This analysis supports the conformity determination for the proposed Upper Guadalupe River Feasibility Study and demonstrates that these flood control improvements would comply with section 176(c) of the Clean Air Act, as amended (CAA).

2.0 REGULATORY BACKGROUND

As required by the CAA, states establish State Implementation Plans (SIPs) to ensure that areas in attainment of the National Ambient Air Quality Standards (NAAQS) remain in compliance with these standards and that they have a viable plan for nonattainment areas to reach attainment. Section 176(c) of the CAA requires that federal actions conform with the most recent federally-approved SIP. Conformity to an implementation plan means that:

1. A project will conform to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards, and

2. A project will not (a) cause or contribute to any new violations of any standard in any area, (b) increase the frequency or severity of any existing standard violation in any area, or (c) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area. The determination of conformity shall be based on the most recent estimates of emissions, as determined by the metropolitan planning organization or other agency authorized to make such estimates.

In accordance with Section 176(c), the U.S. EPA promulgated the final conformity rule for general federal actions on November 30, 1993. Conformity determination is a two-step process: (1) applicability analysis and (2) conformity analysis. Applicability analysis is performed by comparing annual project direct and indirect emissions to de minimis pollutant thresholds outlined in the conformity rule. The more severe the nonattainment status of a region, the smaller the de minimis thresholds. Federal actions are assumed to conform with the most recent federally-approved SIP if total direct and indirect emissions caused by the federal action are less than the de minimis thresholds. The definitions of total direct and indirect emissions for conformity purposes distinguish emissions according to timing and location rather than the type of emission source. Direct emissions occur at the same time and place as the federal action. Indirect emissions include those that may occur later in time or at a distance from the federal action. In addition, the conformity rule limits the scope of indirect emissions to those which can be quantified and are reasonably foreseeable by the federal agency at the time of analysis, and those for which the federal agency can practicably control and maintain control through its continuing program responsibility.

If emissions from a proposed federal action exceed a de minimis threshold, a formal conformity analysis would be required as the next step in the conformity determination process. A federal action would conform with the most recent federally-approved SIP if its emissions were consistent with all relevant requirements and milestones contained in the applicable SIP and the action meets any of the following requirements: (1) the total emissions from the action are accounted for in the applicable SIP, (2) for ozone (O_3) and nitrogen dioxide (NO_2), the total emissions are fully offset by either a revision to the SIP or by emission reductions so that there is no net increase in emissions of these pollutants, or (3) for carbon monoxide (CO), sulfur dioxide (SO_2), or particulate matter less than 10 microns in diameter (PM_{10}), dispersion modeling shows that project emissions would not (a) cause or contribute to a new ambient air quality standard violation or (b) increase the frequency or severity of any existing standard violation in any area.

3.0 APPLICABILITY ANALYSIS

All activities associated with the Upper Guadalupe River Feasibility Study are located within the San Francisco Bay Area Air Basin (SFBAAB). The project area within the SFBAAB is currently designated as a maintenance area for O_3, attainment for NO_2 and SO_2, unclassified for PM_{10}, and nonattainment for CO. Therefore, a project alternative would trigger a conformity analysis if its emissions exceeded (1) 100 tons per year of CO or 50 tons per year of volatile organic compounds (VOC) or (2) 10 percent of the total SFBAAB inventories of VOC or CO (19,528 and 16,863 tons per year, respectively). As stated in Appendix A of this FEIS/R, the SFBAAB is presently exempt from analyzing NO_x emissions as part of conformity determinations for O_3.

The Bypass Channel Plan was chosen for analysis over the Channel-widening Plan, since this project alternative would produce the greatest amount of emissions. The analysis focused on short-term construction impacts, as long-term operational impacts from the project would only occur from occasional maintenance activities and would produce minor amounts of emissions. Construction emissions were based on construction equipment fuel usage data provided by the COE (personal communication with William DeJager). The results of the analysis determined that short-term construction emissions of VOC and CO from the Bypass Channel Plan would amount to 0.9 and 11.6 tons per year, respectively, and would not exceed their applicable de minimis thresholds. These emissions would also be well below 10 percent of the SFBAAB emission inventories for these pollutants. Consequently, further conformity analysis is not required and the proposed emissions would conform to the most recent federally-approved SIP, as required by Section 176(c) of the CAA.

4.0 CONCLUSIONS

Construction of the proposed Upper Guadalupe River Feasibility Study project alternatives would result in short-term increases in air emissions. However, these emissions would be less than the conformity de minimis thresholds and 10 percent of the VOC and CO emissions for the SFBAAB. Long-term operational emissions from the project alternative would remain well below these thresholds. Therefore, by definition, the project would not (1) cause or contribute to any new ambient air quality standard violation, (2) increase the frequency or severity of any existing standard violation, or (3) delay timely attainment of any standard. As a result, the project would comply with section 176 (c) of the CAA.

For the reasons provided above in this conformity analysis, I conclude that the Upper Guadalupe River Feasibility Study project alternatives would conform to the applicable SIP. In light of this, I also conclude that the proposed flood control improvements are in compliance with section 176 (c) of the CAA, as amended.

____

Richard G. Thompson
Lieutenant Colonel, Corps of Engineers
District Engineer
San Francisco District
Date: ______________________________

APPENDIX D

USFWS COORDINATION ACT REPORT

AND CORPS OF ENGINEERS RESPONSES

UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

REVISED DRAFT FISH AND WILDLIFE COORDINATION ACT REPORT FOR THE

GUADALUPE RIVER FLOOD CONTROL PROJECT, UPPER REACHES

PREPARED BY:

U.S. Fish and Wildlife Service
Division of Ecological Services
Sacramento Field Office
Sacramento, California

PREPARED FOR:

U.S. Army Corps of Engineers
San Francisco District
San Francisco, California

April 1997

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Sacramento Field Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95821-6340

IN REPLY REFER TO:

April 25, 1997

Mr. William Angeloni
Chief, Planning/Engineering Division
Corps of Engineers, San Francisco District
211 Main Street
San Francisco, California 94105-1905

Subject: CESF-Guadalupe River Flood Control Project, Upper Reaches

Dear Mr. Angeloni:

In accordance with the Scope of Work for Fiscal Year 1996, enclosed are three copies of the Fish and Wildlife Service's revised draft Fish and Wildlife Coordination Act Report for the subject project. It is based on substantial changes to the alternative designs and includes revisions to the 1993 aquatic Habitat Evaluation Procedures (HEP) analysis, as well as a new terrestrial HEP study conducted in 1996. Comments on the draft report and most recent HEP studies have been carefully considered in preparation of this report, and incorporated where the Service deemed appropriate. By copy of this letter, we request that the California Department of Fish and Game and National Marine Fisheries Service provide us with their comments and/or concurrence with our findings within 30 days of receipt of this document.

As always, we thank your staff for their cooperation during the planning process. If you have any questions, please contact Dr. Steven Schoenberg of my staff at (916) 979-2107.

Sincerely,

Michael Hoover
for Wayne S. White
Field Supervisor

ENCLOSURE

cc: FWS, AES, Portland, OR
CDFG, Monterey (Keith Anderson)
CDFG, Yountville (Margeret Roper)
GCRCD, San Jose (Libby Lucas)
JSA, Sacramento (Jeff Kozlowski)
NHI, San Francisco (Richard Roos-Collins)
NMFS, Santa Rosa (Dante Maragni)
SCVWD, San Jose (Terry Neudorf)
SWRCB, Sacramento (Oscar Balaguer)

EXECUTIVE SUMMARY

This is the Fish and Wildlife Service's revised draft detailed report on the Corps of Engineers' (Corps') proposed Upper Guadalupe River Flood Control Project. The project would increase the level of flood protection to part of suburban San Jose, California. This report evaluates how the project would affect fish and wildlife resources and provides recommendations for avoiding, minimizing, and compensating adverse impacts.

Two alternatives for flood protection of lands adjacent to the Guadalupe River from I-280 to Blossom Hill Road: the locally-preferred bypass/widening alternative with 100-year flood protection, and the Corps' widening alternative with 50-year flood protection. The bypass/widening alternative consists of a bypass around Reaches 6-8, cribwall or gabion edge floodways with relatively high bench cuts (~6 feet above invert) in Reaches 9-11 (some with partial bypasses), levees in Reach 12, access ramps, and erosion protection (both biotechnical and gabion). To replace 17.3 acres of impacted forest and scrub-shrub, 23.7 acres of mitigation would consist of riparian planting infill on channel slopes, restoration in Reach 10b, and on top-of-bank terraces away from the stream edge at various locations. The widening alternative involves excavation of deep bench cuts (~3 feet above invert) in Reaches 7 and 10-11, floodwalls in Reach 8, and no work in Reach 9. About 12.6 acres of mitigation, for 13.5 acres of affected riparian forest and scrub-shrub, would include unlimited riparian plantings on affected impact areas, infill, and restoration of Reach 10b. A terrestrial HEP analysis showed that the acreage necessary to mitigate lost riparian values in-kind is similar for the two alternatives (19-21 acres).

Stream and streamside vegetation impacts differed between alternatives. The bypass/widening alternative affected somewhat more overhead shade, and slightly less riparian contact with stream edge, than the widening alternative. Mitigation increased contact by 4,000 feet for the bypass/widening alternative (primarily in Reach 10b), and by 9,000 feet for the widening alternative (10b plus on-site). Restoration of 10b would greatly increase fish passage through and stream conditions within this reach. An aquatic HEP analysis was performed for the overall project was conducted with two Reach 10b success scenarios. Mitigation for aquatic impacts was moderately inadequate for both scenarios for the bypass/widening alternative, and adequate for both scenarios for the widening alternative.

The bypass/widening alternative provides comprehensive flood and erosion protection, but causes partial, permanent impacts to high quality areas (e.g., Reach 9,10a), such as thinning of the riparian corridor and replacing larger trees with smaller and shorter willow species. One low quality area (Reach 10b) would be improved substantially by plantings, however the success of such mitigation is highly dependent on the as yet unverified assumption that water supply, through streamflow or groundwater, will be sustained in perpetuity. The widening alternative has more stream edge vegetation, but does so at the expense of greater temporal impacts, and with a lower level of flood protection.

Although the locally-preferred plan is greatly improved over previous designs, opportunities for impact avoidance and corridor preservation are not as yet fully optimized. Project modifications, both major and minor, are identified on a site-specific basis to maximize bank edge vegetation consistent with flood control objectives.

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I. INTRODUCTION

This document is the Fish and Wildlife Service's (Service's) draft detailed report on the proposed Upper Guadalupe Flood Control Project. It has been prepared under the authority and under the provisions of Section 2(b) of the Fish and Wildlife Coordination Act (FWCA, 48 stat. 401, as amended; 16 U.S.C. 661 et seq.). The Service has previously provided Planning Aid Letters in 1989 and 1991, and a Draft FWCA report 1993 (USFWS 1993), for this project. Since the 1993 report, the project alternatives and associated mitigation plans have been substantially revised.

Based on new designs, comments on the 1993 report, and other information provided through February 1997, this report compares the impacts of the locally-preferred, bypass/widening alternative (100- year flood protection) with the Corps of Engineers' (Corps') National Economic Development plan widening alternative (50-year flood protection). Pursuant to the Scope of Work for fiscal year 1996, this report: (1) reviews existing data on the importance of local fish and wildlife resources, (2) identifies project impacts to these resources, (3) ranks the alternatives from a resource conservation standpoint, (4) identifies modifications for further resource conservation and enhancement, and (5) revises the aquatic and terrestrial quantitative evaluation using Habitat Evaluation Procedures (HEP). The information in the present report has been informally coordinated with the local sponsor, Santa Clara Valley Water District (SCVWD), the California Department of Fish and Game (CDFG) , and the National Marine Fisheries Service (NMFS), several of whom participated in the HEP revision. We request these agencies to formally comment or provide a letter of concurrence on the findings of this draft report; any comments we receive will be fully considered in preparation of our final report.

The Guadalupe River drains a 160-square-mile area in the Santa Cruz Mountains and suburban San Jose, flowing north from the confluence of Alamitos and Guadalupe Creeks through the City of San Jose, emptying into San Francisco Bay (Figure 1). The climate of the Guadalupe River Basin is similar to the rest of the San Francisco Bay area. Summers are generally warm and dry, whereas winters tend to be cool and wet. Temperatures range from an average high of 81°F in July to an average low of 49°F in January. Precipitation in the basin occurs primarily from November to April; average annual precipitation ranges from about 14 inches near the Bay to over 50 inches in some headwater areas.

Water resource developments include reservoirs on Alamitos, Guadalupe, Los Gatos, and Arroyo Calero Creeks, and a number of man-made groundwater percolation ponds located on or adjacent to the Guadalupe River and Guadalupe Creek which are used to enhance basin groundwater recharge. At its origin, base flow runoff in the Guadalupe River is largely captured by reservoirs, with controlled releases from the reservoirs and from the SCVWD Almaden Pipeline maintaining perennial stream habitat downstream on Guadalupe Creek and at the percolation ponds along Coleman Avenue and upstream of Branham Lane. Little or no summer flow exists for much of the streambed downstream of Hillsdale Avenue, except in a few recent years, when groundwater pumping into Canoas Creek was conducted. The river does obtain some accretions seasonally from Canoas and Ross Creeks within the project area, and from Los Gatos Creek downstream of the project area.

The project includes privately and federally-funded portions that include sections of the Guadalupe River from Blossom Hill Road and Interstate 280 (Reaches 6 through 12), and Highway 101 to Interstate 880 (Reach A). These reaches display channel incision and bank erosion, while lacking sufficient capacity to contain peak discharges. The project also includes previously modified sections of Ross Creek (to 700 feet upstream of Jarvis Avenue), and Canoas Creek (to about 1,300 feet

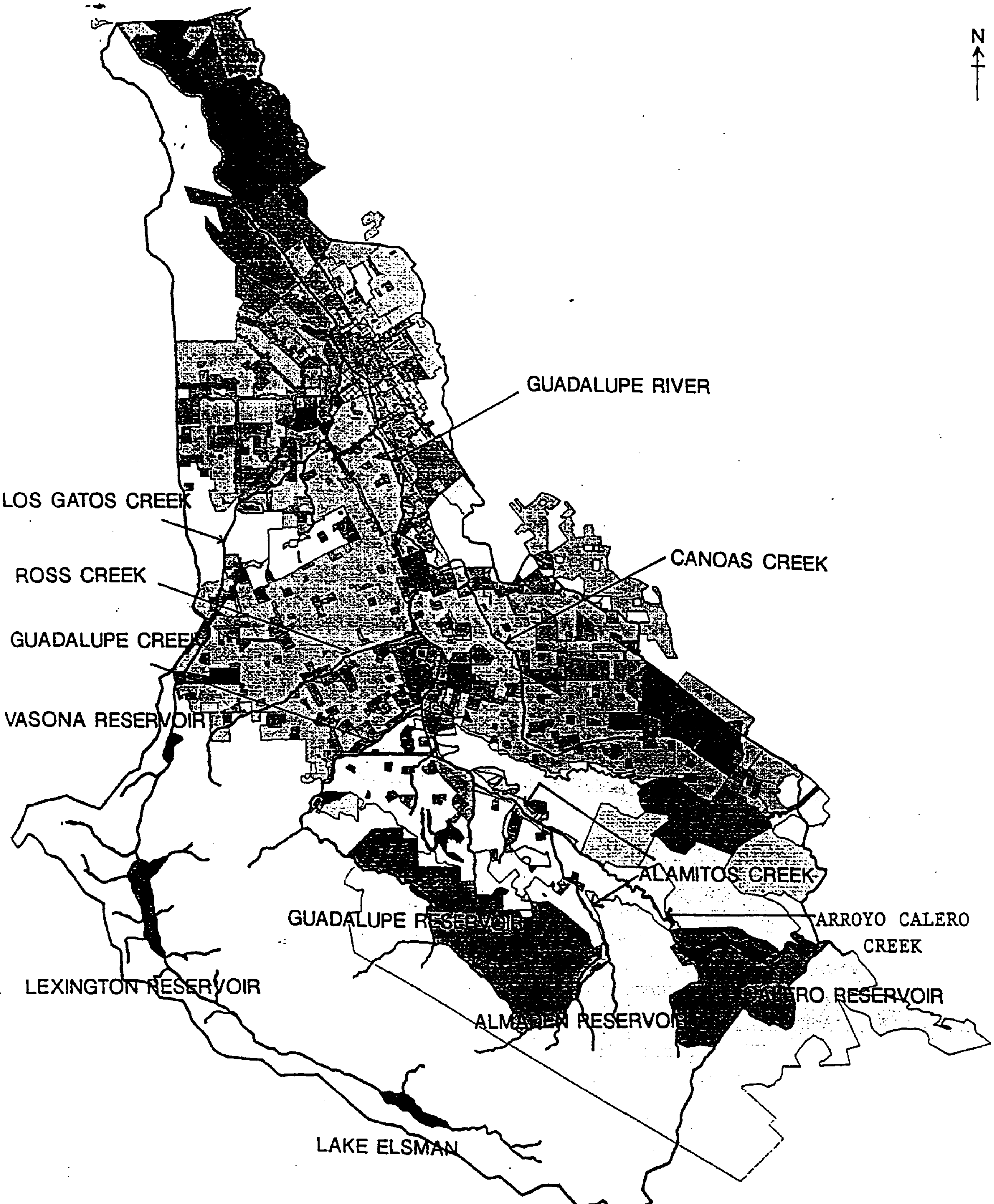

Figure 1. The Guadalupe River watershed, showing the locations of tribuatries and water supply reservoirs (from SCVWD 1997).

upstream of Nightingale Drive). The extent and type of construction varies with alternative and would include a combination of the following: channel bypasses, channel widening, channel lining with gabions or cribwalls, bridge reconstruction, floodwalls, and levees. The purpose of the project is to modify these areas so that the river will convey flows up to the 100-year event. For the quantitative analysis of impacts and mitigation in this report, only portions within the Corps' study area (excluding Reaches 'A' and 6) were considered.

II. PROJECT ALTERNATIVES

For our analysis, the project area is divided into 17 distinct sections which differ in hydrologic input, topography, past flood control work, and/or construction-type prescribed under the two project alternatives (Figure 2). The boundaries of these sections are as follows:

(1)	Reach A: Highway 101 to Interstate 880	(STA 48000-58000)
(2)	Reach 6: Interstate 280 to Southern Pacific Railroad (SPRR)	(STA 71300-74100)
	Reach 7: SPRR to Western Pacific Railroad (WPRR)	
(3)	SPRR to Willow Street	(STA 74100-75300)
(4)	Willow Street to STA 76300	(STA 75300-76300)
(5)	STA 76300 to Alma Street	(STA 76300-77300)
(6)	Alma Street to WPRR	(STA 77300-78100)
(7)	Reach 8: WPRR to Willow Glen Way	(STA 78100-79500)
(8)	Reach 9: Willow Glen Way to Curtner Avenue	(STA 79500-84500)
	Reach 10: Curtner Avenue to Capitol Expressway	
(9)	Subreach 10a: Curtner Avenue to Canoas Creek	(STA 84500-85700)
(10)	Subreach 10b: Canoas Creek to Berkshire Drive	(STA 85700-88800)
	Subreach 10c: Berkshire Drive to Capitol Expressway	
(11)	Berkshire Drive to Hillsdale Road	(STA 88800-90650)
(12)	Hillsdale Road to 100 feet upstream of Capitol Expressway	(STA 90650-91350)
	Reach 11: Capital Expressway to Branham Lane	
	Subreach 11a: Capitol Expressway to San Jose Water Company well field	
(13)	upstream of Capitol Expressway to downstream of Ross Creek	(STA 91350-91850)
(14)	downstream of Ross Creek to S.J. Water Company	(STA 91850-93800)
(15)	Subreach 11b: San Jose Water Company well field to 300 feet upstream of Ross Creek	(STA 93800-95300)
(16)	Subreach 11c: 300 feet upstream of Ross Creek to Branham Lane	(STA 95300-96100)
(17)	Reach 12: Branham Lane to Blossom Hill Road	(STA 96100-101735)

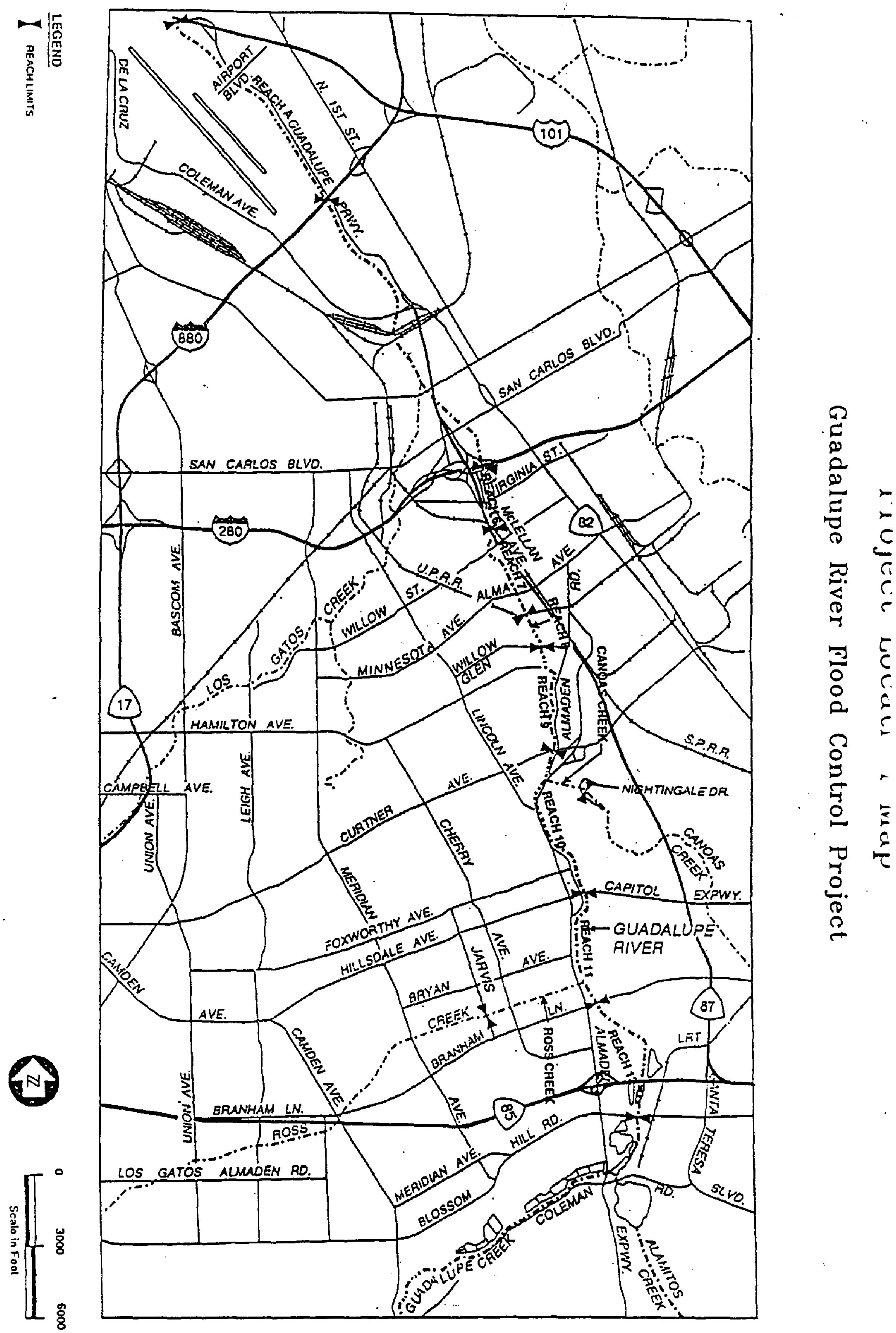

Figure 2. Reach location map for the Upper Guadalupe River Flood Control Project.

A. Bypass/widening Alternative (Locally Preferred Plan)

This plan consists of both bypass and widening elements, and provides a 100-year level of flood protection. A bypass would be constructed around the natural channel in Reaches 6-8. Channel widening would be done in most of Reaches 9, 10A, 10C, 11A-C, and a portion of Reach 12, and the banks reinforced in some sections with a combination of stepped gabions and cribwall construction. Short bypass features, with partially gabion-stabilized banks would be constructed in a two locations in Reach 9 and one site in Reach 11A. Several areas in the bypassed reaches would receive biotechnical erosion protection. Bridges at Willow Glen Way and Curtner Avenue would be replaced, the bridge at Hillsdale Avenue would be removed, and new bridges would be constructed over open portions of the bypass floodway at Willow and West Virginia Streets. Levees in Reach 12 would be raised. Floodwalls would be constructed along Canoas Creek, and Ross Creek would be widened and lined with articulated concrete mattress. Ramps and maintenance roads would be constructed for access to one or both sides of the channel, depending on location. Non-federal work would include minor channel improvements in Reach A, with addition of a levee and floodwall, and access ramps.

To mitigate for impacts to riparian cover, 22.55 acres would be planted and managed as riparian forest. The mitigation consists of a combination of replanting within the impact area, "infill" replacement of ruderal herbaceous and scrub-shrub on areas adjacent to the river, and widening of the existing riparian corridor on areas of other cover-types (urban landscaping, ruderal herbaceous).

B. Widening Alternative (National Economic Development or NED Plan)

This plan includes only widening elements and provides a 50-year level of flood protection. Widening would be done in Reaches 7, 10A, 10C, a part of 11A, and 11B-C. No substantial work would be done in Reaches 9, 10B, most of Reach 11A, Reach 12, or Ross Creek. Bridges would be replaced at the Willow Street, Alma Street, UPRR, Willow Glen Way, and Hillsdale crossings. Floodwalls would be constructed along Reach 8, a portion of Reach 7, and Ross Creek. Levees along Canoas Creek would be raised. Some access ramps and maintenance roads would be constructed, though less extensive than the bypass/widening alternative. Non-Federal work in Reaches A and 6 would occur as in the bypass/widening plans.

Mitigation with riparian replanting would total 11.75 acres, predominantly on the lower, excavated benches within the impact areas, as well as infill.

C. Reach-Specific Comparison of Alternatives: Construction Impacts and Mitigation

The table below provides a reach-specific comparison of the proposed construction, impacts to habitat, and mitigation measures:

Bypass/widening Alternative	Widening Alternative
Reach 6: A gabion bypass channel would be constructed to the east of the river on current residential property with its exit near Grant Street. Riparian mitigation will be at the top of bench to the east and infill to the west.	*Reach 6:* Non-federal work assumed to be the same as the bypass.

Bypass/widening Alternative

Reach 7 (741-753): Continued gabion bypass channel avoids riparian impacts; top of bench riparian mitigation between river and bypass, and on east bank between the bypass and Willow Street; west bank ramp near Route 87 southbound.

Reach 7 (753-763): Continued gabion bypass channel and riparian impact avoidance, and top of bench riparian mitigation between river and bypass. West bank ramp near Willow Street. Some biotechnical work with boulders/plants on the west bank.

Reach 7 (763-773): Continued gabion bypass channel and riparian impact avoidance, and top of bench riparian mitigation between river and bypass. East bank ramp impacts near Alma Avenue.

Reach 7 (773-781): Continued gabion bypass channel. East bank ramp near impacts Alma Avenue.

Reach 8: Continued gabion bypass channel and top of bench infill. Riparian impacts from bypass exit near Willow Glen Way.

Reach 9: Mainly east bank widening with 5- to 6-foot bench cuts thinning riparian corridor except for some existing trees. Two 400-500 foot partial east bank bypasses opposite Pine Avenue and upstream of Malone Street. Repositioning of natural channel upstream of Malone Street. Two biotechnical and one stepped gabion erosion protection sites at the channel edge; 6:1 sideslope cribwall floodway protection along Almaden Road. Mitigation as 10-foot-wide planting areas on east bank, bench upstream of Malone Street and on both created bypass islands.

Reach 10a: East bank widening with 5-foot bench cut; 6:1 cribwall along Almaden Road; 10-foot-wide willow revegetation band near river edge.

Widening Alternative

Reach 7 (741-753): East bank widening with bench cut 3-feet above the invert causes riparian impacts to the bank edge; mitigation on all impact areas, and on west bank and top of bench between SPRR and Route 87 northbound.

Reach 7 (753-763): Continued east bank widening and riparian impacts, with mitigation on all impact areas.

Reach 7 (763-773): continued east bank widening and riparian impacts, with mitigation on all impact areas.

Reach 7 (773-781): Continued east bank widening riparian impacts; mitigation on all impact areas. East bank top floodwall.

Reach 8: Floodwalls on both bank tops; minimal riparian impacts assumed.

Reach 9: No work.

Reach 10a: East bank widening with 3-foot bench cut; 6:1 sideslope cribwall along Almaden Road; 5-20-foot-wide revegetation band near river.

Bypass/widening Alternative	Widening Alternative
Reach 10b: No floodwork. Restoration consisting of gabion replantings on west between southbound and northbound Almaden expressway crossings; mixture of wetland or riparian plantings on natural bank from the northbound crossing to Streamgage 23b.	*Reach 10b:* Same as bypass.
Reach 10c (888-906): Excavate east bank to 6-foot above invert cut avoids some bank edge; riparian mitigation on 100-foot-wide band next to east bank; 6:1 sideslope cribwall on the east floodway edge.	*Reach 10c (888-906):* Partial impacts from east bank widening to 3-foot cut downstream of Foxworthy Avenue and west bank from Foxworthy to Hillsdale Avenues always to bank edge; replanting on all impact areas except ramp access on west. About 1:1.5 floodway sideslope.
Reach 10c (906-913): East bank excavation to 6-feet above invert goes to bank edge; east bank not planted; west bank converted to riparian; continued cribwalls.	*Reach 10c (906-913):* Both banks excavated mitigation on impact areas; less steep floodway sideslopes without cribwalls.
Reach 11a: Mostly east bank excavation to bank edge; 1:1-2 sideslope stepped gabion floodway. East bypass around 400-500 feet of riparian opposite Chard Drive. Mitigation as infill on west bank only.	*Reach 11a:* Minor (400-feet) east bank widening. Mitigation on impact area and west bank infill similar to bypass alternative.
Reach 11b: West bank excavation of floodway to the invert widens river channel precluding vegetation on bank edge; 2:1 sideslope earth river banks; 6:1 sideslope cribwall floodway west bank. Two west bank ramps with stepped gabions. Reconfigure Ross Creek outfall, some hardening. Riparian mitigation about 100 feet from stream edge.	*Reach 11b:* Excavate most of east bank and about half of west bank to 3-foot bench height with 1:.75-1.5 sideslope gabion floodway slope on both sides. Mitigate in all impact areas. One west bank ramp. Assume the same Ross Creek outfall work and impacts.
Reach 11c: Continue west side floodway, with riparian mitigation away from west stream edge.	*Reach 11c:* Continue east bank excavation/on-site mitigation as in 11b.
Reach 12: Levees constructed/raised on one or both banks on non-riparian areas; riparian revegetation, with the exception of 420 feet upstream of Branham Lane, is not near stream channel though some is associated with existing percolation ponds.	Reach 12: Same as bypass alternative.

III. EXISTING RESOURCES

A. Vegetation

Vegetation surveys of the project area have been previously conducted in the late 1980's by Habitat Restoration Group (HRG, Felton, CA), and additional vegetation parameters were surveyed as part of the revised terrestrial HEP conducted for this report (SCVWD 1997). The project area consists of a mixture of riparian forest, ruderal herbaceous, scrub-shrub, and hardbanking features. In general, the stream edge and lower banks are dominated by willows and cottonwood, middle bank areas by black locust, walnut, box elder, and others, while the upper banks support coast live oak, sycamore, valley oak, as well as walnut, California pepper tree and privet. The shrub understory includes himalaya blackberry, poison oak, and young trees. Landscaping plantings include eucalyptus, holly oak, and fruit trees. Shallower portions of the river invert support freshwater marsh species like tules, while deeper areas are barren of vegetation.

Between reaches, the riparian areas differ considerably in age and quality of vegetation. Reaches 6 through 9 possess older, more dense, and more continuous riparian vegetation. In Reach 6, which is not included as part of the Federal project alternatives, the most abundant species are cottonwood, willow, and black walnut, with the most mature vegetation downstream of Virginia Street on the west bank. Reach 7 shows greater variability. The short section between Route 87 and SPRR has relatively sparse riparian cover and actively eroding banks. Much more continuous riparian cover is present in the section immediately upstream past Willow Street to about STA 760. At this point, the east bank is mainly ruderal scrub, and the west bank becomes steep, with a mixture of young trees in what appears to be recently collapsed bank, and older trees at the stream edge. This latter site, up to STA 763 is the location of the first biotechnical repair element proposed in the bypass/widening plan. From this point of Reach 7 to Alma Avenue, the riparian cover is sparser, particularly on the east bank. The remaining portion of Reach 7 from Alma Avenue to UPRR, as well as all of Reach 8 is again much higher quality riparian cover, with denser, larger trees, and more overwater shade. Between 450 and 600 feet of bank hardening is present in each of Reaches 6, 7 and 8.

Beginning at Willow Glen Way, the riparian cover in Reach 9 includes larger cottonwoods, black locust, walnut, box elder and occasional large sycamores, but fewer willows than downstream reaches. The riparian cover is up to 200 feet wide, and supports as high as 240 feet/acre of tree basal area (Appendix A). Several areas with very steep natural or hardened banks are present. Some of these steeper areas are unstable and have younger trees such as the biotechnical site downstream of Curtner Avenue, while others, such as the west bank upstream of Malone Road, have significant groves of cottonwoods. The riparian cover is nearly continuous trees, with the exceptions of several hundred feet of bank hardening at each of two east bank sites; one upstream of Malone Road and another bordering Almaden Road and scrub-shrub bordering the east bank for about 600 feet downstream of Curtner Avenue.

Despite very steep banks, Reach 10a is nearly continuous riparian forest and has a similar species mix to that in Reach 9. Reach 10b has been modified by channel widening and gabions, supporting primarily ruderal herbaceous and limited scrub vegetation, and a few, recently planted cottonwood saplings. Bounded by streamgage 23b upstream, this area can exhibit very dry soils in the summer months and is not used for percolation. Reach 10c does have more permanent water, and a relatively continuous riparian corridor north of Hillsdale Avenue. There are some large sycamores on the upper bank, with the densest vegetation on the west bank between Kell Way and Foxworthy Avenue.

Vegetation bordering the prune packing plant on the east bank north of Hillsdale Avenue is sparse, low quality riparian, ruderal scrub, and/or ornamental trees.

Reach 11a is a mosaic of riparian and ruderal scrub cover of varying quality. Black locust is the most common species, particularly on the east bank opposite Chard Drive, although there are some large specimens of oak, willow, sycamore, and eucalyptus just south of Capitol Expressway. Poison oak forms some dense patches. The west bank has patches of scrub, a mix of blackberry with various woody shrubs, as well as other areas with medium-to-large willows, cottonwoods, and sycamores. Reaches 11b and 11c shows some continuous, moderate-aged riparian vegetation on the east bank, south of Branham Lane and adjacent to Wellington Square, but the rest of these subreaches is ruderal vegetation, or much sparser riparian cover.

Reach 12 has been affected by former quarrying, agriculture and, until recently, instream percolation operations. Only herbaceous annuals grow in the ponded area exposed when the dams are removed, while limited riparian vegetation is present above the percolation pond edge on the west bank.

The areas along Ross and Canoas Creeks that would be impacted by the project consist predominantly of ruderal herbaceous vegetation on the banks and some freshwater marsh vegetation in the channel bottom. A portion of Ross Creek has already been stabilized with concrete.

B. Fisheries

Historically, the Guadalupe River probably supported small runs of winter-run steelhead trout and coho salmon (Skinner 1962). Adults of both species would have normally entered the river in early winter, and the young would remain for at least one year, migrating upstream into the cooler tributaries. Initial logging, followed by numerous barriers, impoundments, diversion, subsidence, pollution from urban runoff, gravel mining, and introduction of non-native fish species have greatly reduced the habitat quality of the river.

Nevertheless, adult chinook salmon and steelhead trout have been documented on the Guadalupe River at least since 1986 (Ulmer 1988, studies by Harvey Stanley Associates and Habitat Restoration Group, HRG 1991, as summarized in SCVWD 1997). Though it had been believed that these fish were strays attracted by discharge from a groundwater pumping operation, the fish have continued to ascend the river since cessation of the pumping in 1992 (Western Waters Canoe Club, 1995, personal communication). Several chinook salmon fry were collected in the vicinity of Branham Lane in March 1996. The life cycles of salmon and steelhead in this system are poorly known and subject to considerable speculation. Historically, the Bay area streams would not have had sufficiently cool, sustained flows to allow salmon, which occur mainly on the mainstems of major Central Valley and some coastal streams. The persistence of chinook salmon in the Guadalupe River may partly be a result of supplemental flows derived from urban basement and/or air conditioner discharges, or perhaps artesian water supported by ongoing percolation operations. Peak flows following storm events in the Guadalupe River basin have also increased greatly due to urbanization; this may result in moving young fish soon after emergence to lower portions of the river, potentially reducing the normal requirement for typical stream rearing. The limited surveys of salmon spawning suggest that about 85% occurs downstream of the project reaches, between Brokaw Road and San Carlos Street.

Other fish species populations vary somewhat with location. The more important native species are California roach, hitch, Sacramento sucker, and prickly sculpin while non-natives include largemouth bass, green and pumpkinseed sunfishes, mosquitofish, goldfish, and carp. Pacific lamprey have also been observed in redds downstream of the project area (Hedding Street), and attached to the Blossom Hill drop structure upstream of the project area.

C. Wildlife

A wildlife monitoring study conducted in 1986-1987 included systematic, twice monthly bird surveys in 49 plots for a period of 12 months throughout the project length (except for Reach 8), trapping for mammals where activity was observed or suspected, and trapping for reptiles and amphibians in eight areas (reviewed in SCVWD 1997).

Of the 121 bird species observed, 11 were observed only once, including an unidentified falcon and several owls, while 16 species of waterfowl were observed only at the percolation ponds in Reach 12. The ten most abundant species are (in order of decreasing abundance): housefinch, bushtit, mallard, white-crowned sparrow, Anna's hummingbird, California towhee, yellow-rumped warbler, song sparrow, black phoebe, and cedar waxwing. The survey does indicate that the Guadalupe River has a lower number of breeding bird species than similar but less urbanized streams in the region. This may be in part due to the relatively narrow width of the stream corridor, competition for avian nest sites by European starlings, or nest parasitism by brown-headed cowbirds. Nevertheless, the avifauna is undoubtedly much more abundant and diverse than similar-sized rivers which have been more fully channelized and cleared. For a heavily urbanized area such the city of San Jose, the existing wildlife corridor of the Guadalupe River is considered a relatively scarce and valuable asset.

Common amphibian species along the Guadalupe River, include the bullfrog, western toad, and Pacific treefrog, which are restricted for at least part of their lifecycles to riverine or wetland habitats, and Calfiornia slender salamander, which may occur in other cover-types as well. Reptiles which occur in the project reaches, both in riparian and other cover-types, include the western fence lizard, gopher snake, common garter snake, ringneck snake and western skink. Typical mammals include muskrat, opossum, shrews, squirrels, gophers, mice, voles, raccoon, and several bats, primarily in riparian areas, as well as cats and dogs. Mammals would be less abundant and diverse in ruderal, upland landscaping, and urban forest areas than in riparian areas.

D. Endangered Species

Below are brief discussions of federally-listed and endangered and threatened species, and species proposed for these designations, which may occur in the project area or be affected by the project. The Corps should review its Federal agency responsibilities as outlined in Appendix F. The most recent list for the project was developed on May 15, 1996; as preliminary information, we have provided updated lists dated January 16, 1997 (Appendix F). The Service has consultation responsibility for all species other than anadromous fishes, which are the responsibility of NMFS. The Corps should make a written request for updating any such list that is more than 90 days old at the time that preparation of a Biological Assessment, or updated Biological Assessment, for the project is undertaken.

American Peregrine Falcon - Endangered (*Falco peregrinus anatum*): This species prefers ledges of high cliffs with commanding views of surrounding woodlands, forests, or coastal habitats; most occupy nests below 4,000 feet elevation. They prefer to nest near marshes, lakes, and rivers that support an abundance of birds, but may travel several miles from their nesting grounds to forage on pigeons, shorebirds, waterfowl, and songbirds. Coastal and inland marsh habitats are especially important in fall and winter, when they attract large concentrations of shorebirds and other water birds. It is probably an infrequent visitor to the project area, having been observed in Reach 6, just downstream of the project area. Construction activities for either alternative could result in some temporary reduced use of the lower reaches by this species, while the widening alternative would result more prolonged due to larger temporal losses of riparian cover in Reach 7.

California clapper rail - Endangered (*Rallus longirostris obsoletus*): This species' prime habitat consists of large salt marshes with well-developed tidal slough networks and adjacent mudflats. The project area is considerably upstream of tidally-influenced area such that known or potential habitat for this species is unlikely to be adversely affected.

California Red-Legged Frog - Threatened (*Rana aurora draytonii*):
This species was formerly abundant in fresh and brackish water marshes and riparian habitats surrounding San Francisco Bay. Population decline is believed to have been caused by loss or degradation of preferred riparian habitat; negative influences include (a) the removal of streamside woody or emergent aquatic vegetation that results in loss of shading and more warmwater microhabitats, (b) loss of refugia such as undercut banks, holes, root masses, and gravel substrate and (c) introduction of exotic predatory fish and bullfrogs. California red-legged frogs lay their eggs in clusters around aquatic vegetation from December to early April. The larvae require 3-5 months to complete metamorphosis. Adults are highly aquatic when active but are less dependent on permanent water bodies than other frog species.

Routine flood control maintenance includes vegetation removal, herbicide spraying, shaping of banks to control erosion, and desilting operations. Thus, construction and maintenance of a flood control project on the upper Guadalupe River may have some adverse impacts on this species and its habitat. Currently, the project area has some areas of extensive undercut banks in association with waters deeper than 2 feet and scattered freshwater emergent vegetation; habitat attributes preferred by the red-legged frog.

This species may occur within the project reaches. The most recent records of red-legged frog include sightings in 1987 at the head of Lexington Reservoir, on Los Gatos Creek, and in 1977 about 1.5 miles downstream of Guadalupe Reservoir, on Guadalupe Creek. Appropriate surveys in accordance with approved Service protocols would need to be done to confirm presence or absence. Until such surveys are complete, presence would be assumed.

Other species: Most of the remaining species are not present in the project area. Two of the listed plant species, Santa Clara Valley dudleya and Metcalf Canyon jewelflower, are associated with serpentine soils that are absent from the project area. The other listed plant species, robust spineflower, is found in west side coastal montane woodland or scrub, also absent from the project area. Similarly, the project area does not overlap the known habitat of bay checkerspot butterfly, the only listed invertebrate species. The listed delta smelt and proposed Sacramento splittail are found in estuarine areas of the Sacramento-San Joaquin Delta well outside of the project area and they are not likely to be affected.

However, steelhead trout are proposed for listing and are known to be present near or within the project area. Adult steelhead have been seen entering the river, however, reproduction and smolting have not yet been confirmed. Steelhead are an anadromous form of rainbow trout. Adults in the Bay area populations exhibit what is known as the winter-run pattern, migrating during the rain and snowmelt season from December to June. They spawn in cool, small-graveled rivers, after which the adults may return to the ocean. The young rear for at least 1 year in freshwater (usually two years), before migrating to the ocean as smolts, where they mature after another 1 to 3 years. If reproduction does occur presently, the loss of shaded riverine aquatic cover in some project reaches could cause water temperature increases which may adversely impact this species. Restoration of a low-flow channel and riparian vegetation in other reaches could have potential temperature and passage benefits.

IV. FUTURE WITHOUT THE PROJECT

The following description of existing conditions and impacts is based on evaluation of habitat conditions in 1993 and 1996 for the aquatic and terrestrial HEPs, and evaluation of impacts by comparison with project plans for the two alternatives. On a reach-specific basis, we estimated the following impacts: (1) slope-corrected acreage losses of riparian forest and scrub-shrub (Table 1), (2) losses, in area and lineal feet, of overstream vegetation, or "overhead shade"(Table 2), (3) losses, in lineal feet, of natural bank and undercut bank (Table 3), (4) changes in habitat value, expressed as Average Annualized Habitat Units (AAHUs), using HEP models for the project impact and mitigation areas (Table 5, *see* Appendix A for details), and (5) changes in lineal feet of contact of riparian cover with stream edge (Table 4). Habitat losses and riparian contact lengths were based on construction and mitigation plans provided in July 1996 superimposed over cover-type maps prepared from 1986 surveys, and provided by the local sponsor's consultant (Jones and Stokes Associates, Sacramento) in September 1996. Impacts to undercut lengths, and overstream shade cover lengths and areas were based on 1993 measurements by the HEP team, using the 1996 construction plans.

Past bank protection activities have ranged from placement of sacked concrete or gabions, to apparently haphazard dumping of broken concrete. Sections of the river that are not hardened show active bank erosion, undercutting, and channel incision, apparently caused by high peak flow velocities. As-needed maintenance would probably continue without the project, involving removal of fallen trees or branches protruding into the channel and short-term fixes such as placement of riprap in newly eroded areas.

Riparian quality would remain high in sections with adequate water (e.g. Reaches 6-9, 10a); those with insufficient water (Reach 10b) or periodic inundation (Reach 12) would support minimal or no vegetation. The riparian community would have moderate to high dominance by non-native species, such as black locust and black walnut, although some native species like willows and cottonwoods would establish in areas with perennial water. The width and continuity of the riparian corridor, overstream shade, and undercut banks, would remain approximately at its current state, as would use by fish and wildlife resources.

V. FUTURE WITH THE PROJECT

A. Bypass/widening Alternative

1. Riparian Habitat

Construction of the bypass/widening alternative would impact 17.27 acres (11.26 acres of riparian forest, and another 6.01 acres of riparian scrub-shrub) (Table 1). Habitat area would increase modestly with mitigation (23.72 acres, corrected for slope), however the distribution and quality of habitat would change both positively and negatively, depending on the reach. Significantly reduced wildlife use would occur during the 2 year construction period due to disturbance by earthmoving equipment and placement of project features. Establishment of shrub cover will be relatively rapid and vigorous during initial irrigation (3-5 years), and more variable and site dependent thereafter. Overall, the need to establish a significant portion of the mitigation on higher bench elevations away from the river will result in a greater proportion of xeric species like oak and sycamore, while floodway capacity concerns will result in more and shorter willow riparian species on lower benches. The portion of the mitigation area specified for cottonwood and mixed riparian tree species should, over a minimum period of 30 years, restore values equal to or greater than pre-project conditions.

Table 1. Riparian forest and scrub-shrub: existing conditions and summary of impacts of construction of the bypass/widening or widening alternatives of the Guadalupe River Flood Control Project (Federal portions only). Loss and mitigation acreages only are corrected for slope; existing conditions are from SCVWD (1997) and are not slope-corrected. Values are in acres.

Reach	Existing Riparian Forest	Rip. Forest Loss, alternative:		Existing Scrub-Shrub	Scrub-Shrub Loss for alternative:	
		Bypass	Widening		Bypass	Widening
7	4.43	1.02	2.31	1.29	0.52	1
8	1.66	0.26	0.033	0	0	0
9	8.97	3.65	0	0.48	0.45	0
10a	1.68	0.64	0.92	0.38	0.29	0.37
10b	1.26	0	0	2.6	0.83	0.83
10c	4.4	1.82	1.96	0.92	0.77	0.49
11a	3.94	2.4	0.58	2.49	1.97	2.1
11b-c	3.47	1.45	2.14	1.1	1.16	0.75
12	2.28	0.02	0	4.17	0.02	0
Total Project	32.09	11.26	7.96	13.43	6.01	5.54

Over time, the wider corridor would improve conditions in the bypassed stream Reaches 7-8, and next to percolation areas in Reach 12, providing a buffer to disturbance. HEP analysis showed that the project would require about 20.7 acres to compensate losses to all evaluation species in-kind. The relatively low mitigation ratio (1.4:1) is a consequence of relatively low values for existing scrub-shrub, the moderate existing forest age (about 30 years), and uniform assumptions regarding growth and cover development on mitigation sites (Table 5, Appendix A). If these assumed conditions are not achieved, mitigation would not be adequate to compensate for project impacts.

Although complete losses would not occur in any reach, permanently reduced corridor widths in some areas and a redistribution of quality habitat would take place. The most significant impacts of the project would occur in Reach 9 where the east bank habitat would be partially narrowed and hardened by floodway and bypass features. On-site mitigation in Reach 9, while providing some side shade, would probably result in more limited wildlife use for the full length to Curtner Avenue. East bank floodway construction would also reduce riparian corridor width in Reaches 10a and 11a, although the existing quality is not quite as high as in Reach 9. Floodway construction on the east bank of Reaches 11b-c and several hardening elements in this area would reduce values at the stream edge, and replace them with riparian plantings not less than 100 west of the bank.

At the upper end of the project, most of the mitigation for riparian losses is planned in Reach 10b, Reach 12, and to a lesser extent, the west bank of Reaches 11a and 11c. The success of Reach 10b plans will likely be dependent on the provision of water and uncertain groundwater depths; this area is downstream of the percolation area and receives virtually no accretions from urban runoff. If plantings establish successfully, habitat quality and wildlife use will increase greatly over existing conditions. If, over the long term, sufficient water is not provided and/or groundwater depths become too low for plant establishment, the mitigation will probably fail after irrigation has ceased. Water supply would probably be less of a concern to riparian vegetation in Reaches 11-12, although actual stream habitat may still be less permanent than the impact areas.

The type of vegetation in on-site mitigation in some impact areas would differ from that lost. Low-growing, dense willow species are specified for portions of Reaches 9 and 10a adjacent to the floodway, presumably to maximize floodway capacity. These species lack some of the habitat features provided by larger tall species like cottonwoods, such as snag production and deadwood, large woody debris, upper canopy nest sites and perches, large horizontal projection of overstream cover, and association of large shallow roots with bank undercuts. These near-floodway areas would also be subject to seasonally high velocities which would scour the ground humus layer.

The species which utilize the mitigation areas would be somewhat different than existing conditions. Mitigation areas at low elevation or on steep slopes near the water edge would be represented by species associated with water, hydrophytes and/or thick shrub layers: belted kingfisher, yellow warbler, northern oriole, black phoebe, and, near wetland mitigation areas, common yellowthroat and mallard. In the more open sycamore and oak riparian areas, one would expect other bird species such as white-breasted nuthatch, western kingbird, western bluebird, and eventually, acorn woodpecker. Amphibians would be more prevalent near the water edge than on riparian plantings higher on the bench or farther from the water.

2. Riverine Habitat

About 10% of the remaining, existing natural bank, would be hardened with a combination of gabions, cribwall, concrete, and boulder biotechnical treatments; total revetment (existing plus project associated) would approach 30% of the total stream length (Table 2). With the exception of the biotechnical treatment, woody vegetation would not regrow, and some areas near bypass entrances and exits would be maintained. About 15% of the natural undercuts would be lost, and the benches lowered and/or banks hardened such that these would probably not reform.

Table 2. Summary of impacts to undercut bank and natural bank (new revetment), due to construction of bypass or widening alternatives for the Upper Guadalupe River Flood Control Project (Federal portions only). All values are in feet.							
reach	bank length	existing undercuts	undercut losses, feet		existing revetment	new revetment, feet	
			bypass	widening		bypass	widening
7	8578	4265	600	1900	1636	640	640
8	2968	850	40	0	774	290	0
9	9906	2090	350	0	2185	1325	0
10	14272	1300	110	520	7872	100	100
11	9280	185	0	115	0	1180	575
12	1800	0	0	0	0	0	0
Grand totals	46804	8690	1100	2535	12467	3535	1315

About a third of the overhead stream shade would be lost initially with construction of the bypass/widening alternative (0.86 acres, 4,775 lineal feet) (Table 3). Much of this loss is localized in floodway areas of Reaches 9, 10a, and 11b, and in bypass entrance/exit elements of Reaches 7-8. Until vegetation re-establishes, stream temperatures could increase in affected reaches during the spring-fall. Some temperature impacts would remain in areas with one-sided widening, such as Reach 10a, 11a, and 9. The higher bench cuts will avoid some streamedge trees in Reach 9, but not 10a. At mitigation sites, vegetative sideshade should begin to establish rapidly following plantings with rapidly growing willows. However, values associated with large trees like woody instream cover via exposed roots and overstream perches would increase more gradually over a period of 30-40 years, and be more limited in the near stream willow pallette. In the bypassed sections (Reaches 7,8), topographic shade created by channel incision and most vegetative shade would be preserved, and stream temperatures should be similar to existing conditions. More detailed model studies would be needed to better estimate thermal impacts for both alternatives.

Table 3. Summary of impacts of the bypass/widening and widening alternatives of the Upper Guadalupe Flood Control Project on overhead vegetative stream shade (Federal Portions only).								
	Existing Conditions		Bypass/widening Alternative			Widening Alternative		
Reach	stream	shade	shade loss		construction methods	shade loss		construction methods
	area	area	acres	feet		acres	feet	
7	1.85	0.67	0.11	543	ramps, boulder biotech	0.33	1900	excavate east bank
8	0.67	0.21	0.03	154	bypass entrance	0	0	no work
9	1.84	0.91	0.35	1813	partial east/west bank widening bypass, bould biotech, ramps	0	0	no work
10a	0.58	0.19	0.10	669	same as widening	0.11	598	excavate east bank
10b	2.17	0	0	0	mitigation area	0	0	mitigation area
10c	1.39	0.16	0.07	535	excavate east bank	0.09	735	east/west widening
11a	1.46	0.20	0.05	293	excavate east bank , bypass	0.02	90	some east bank
11b	1.06	0.16	0.10	444	ramps, excavate west bank	0.10	465	east/west widening
11c	0.38	0.08	0.04	324	ramps, excavate west bank	0.04	246	excavate east bank
12	0.30	0.001	0	0	same as widening	0	0	no excavation
Totals:	12.69	2.58	0.86	4775		0.68	4034	

Increased temperatures may have an adverse impact on anadromous fishes (salmon and steelhead), known to spawn in the project area. However, establishment of a low-flow channel could result in better passage conditions which, if upstream barriers are removed in their entirety, would allow use of upstream tributaries. Water temperatures are perrenially cooler in these tributaries and may benefit some anadromous species like steelhead trout. Selection of spawning areas is also dependent upon flow and substrate; where inadequate flows exist, the fish may choose to remain in and downstream of the lower reaches of the project and there would be no passage benefit at these times.

The net impact of the project on stream shade can be roughly approximated using the contact length with riparian cover. For the alternative as a whole, stream edge contact should increase by about 4,000 feet (Table 4); significantly, all of this increase is attributable to the extensive natural and gabion bank plantings in Reach 10b.

The results of the aquatic HEP indicated that over half of the habitat value losses occurred in Reaches 9, 10a, and 11a, while the majority of the habitat value gains would be achieved through mitigation in Reach 10b (Table 5). Nevertheless, mitigation would not be adequate to compensate for losses, even under optimistic scenarios for shade development in Reach 10b; this is attributed in part to portions of the channel border in this reach being designated for freshwater marsh which does not provide overhead cover and other SRA attributes. Using conservative futures for Reach 10b, we estimate a deficit of about -13.7 AAHUs, requiring an equivalent compensation area of about 15.04 acres.

Though not indicated as revetted in cover maps, some steepsided portions of the impacted riparian area (e.g., east bank along Almaden Road, Reach 10a; west bank upstream of Malone Street, Reach 9) , as well as the channel invert at various work locations (e.g. downstream of Hillsdale, Reach 10c; Reaches 11a-b) have been partially covered with dumped concrete or other riprap. Presently affected terrestrial areas have somewhat less ground cover, possibly reducing wildlife use, while aquatic areas would experience less overhead shade and benthic productivity than would a natural bank or bottom. Presumably, much of this rubble will be removed during construction of the project, and mitigation areas could exceed baseline conditions in quality in some specific areas.

Table 4. Contact length of riparian forest with stream edge: existing conditions and summary of impacts of construction of the bypass/widening or widening alternatives of the Guadalupe River Flood Control Project (Federal portions only).

Reach	bank length	Existing	bypass impact	bypass mitigation	net change	widening impact	widening mitigation	net change
7	8578	4728	830	735	-95	2503	3768	1265
8	2968	2276	260	0	-260	0	0	0
9	9906	7682	2680	945	-1735	0	0	0
10a	2832	2106	130	110	-20	859	927	68
10b	6390	0	0	4363	4363	0	4363	4363
10c	5050	3948	110	785	675	1650	2312	662
11a	4850	2676	1180	2266	1086	387	1590	1203
11b-c	4430	2589	740	312	-428	1419	1720	301
12	1800	70	0	420	420	0	420	420
Total	46804	26075	5930	9936	4006	6818	15100	8282

Table 5. Summary of HEP analysis for the Upper Guadalupe River Flood Control Project (Federal Portions only). See Appendix A for details.

A. Terrestrial HEP: Compares the impacts and mitigation for five riparian species models; chooses the area needed for compensation as that which compensates impacts to all species (bold number). All Reaches are combined.

Alternative	Bypass/Widening (23.72 acres mitigation)			Widening (12.61 acres mitigation)		
Model	Net Change in AAHUs		compensation area needed (acres)	Net Change in AAHUs		compensation area needed (acres)
	Plan Alternative	Management Plan		Plan Alternative	Management Plan	
Northern Oriole	-5.73	14.61	9.31	-4.68	7.76	7.59
P-C Flycatcher	-8.69	15.04	13.70	-7.56	8.03	11.87
R-S Towhee	-10.43	15.04	16.44	-8.39	7.99	13.23
Yellow Warbler	-5.21	7.51	16.47	-3.58	3.99	11.30
D. Woodpecker	-8.69	9.96	**20.70**	-7.98	5.29	**19.00**

B. Aquatic HEP: Reach-specific comparison of impacts and mitigation using a single, cover-type SRA model; allows equal compensation between reaches. The recommended values (bold numbers) are based on a worst-case scenario (50% success in Reach 10b); parenthetical values of full success in Reach 10b are for informational purposes only. The candidate management area is equal to the stream area, and is 11.7 acres with either alternative.

Reach	Bypass/Widening			Widening		
Model: SRA Cover-type	Net Change in AAHUs		compensation area needed	Net Change in AAHUs		compensation area needed
	Plan Alternative	Management Plan		Plan Alternative	Management Plan	
7	-8.05	5.14	Conservative: assuming 50% success in Reach 10b **15.04 acres**	-26.46	16.22	Conservative: assuming 50% success in Reach 10b **11.30 acres**
8	-2.01	0		0	0	
9	-18.26	6.06		0	0	
10a	-9.22	7.65		-9.22	8.12	
10b	-2.51	7.76 (15.52)	Optimistic: assuming 100% success in Reach10b 13.11 acres	-2.51	7.76 (15.52)	Optimistic: assuming 100% success in Reach10b 10.14 acres
10c	-7.06	6.89		-9.28	10.38	
11a	-7.26	9.63		-4.36	7.22	
11b-c	-7.55	3.82		-8.61	7.46	
12	0	1.24		0	1.24	

B. Widening alternative

1. Riparian Habitat

Construction of the widening alternative would impact about 13.5 acres (7.96 acres of riparian forest and 5.54 acres of riparian scrub-shrub). About 12.61 acres of riparian forest would be replanted as mitigation. The distribution of impacts and mitigation are different from the bypass/widening alternative. Low, 3-foot-high bench cuts for the widening alternative (Reaches 7, 10a, 10c, portions of 11a, and 11b-c) would necessitate vegetative removal to the stream edge. Except for Reach 10b, mitigation for the widening alternative would be of varying width largely on these same bench impact areas. The mitigation in Reach 10b, and associated effects would be the same as just described for the bypass/widening alternative. Reaches 7 and 11c would be greatly affected by east bank widening in areas of high baseline riparian habitat quality, which would reduce values for a considerable period following construction until mitigation vegetation grows back. Impacts would be nearly the same in Reach 10a despite a lower bench height. In Reach 10c, most of the high quality vegetation on the west bank between Kell Way and Foxworthy Avenue would be lost (with the exception of a ramp tentatively sited for the west bank downstream of Foxworthy Avenue, these areas would be replanted).

Due to the lower level of flood protection with the widening alternative, impacts are avoided in certain areas, and more vegetation allowed in others. In particular, Reaches 8 and 9 would not be impacted by this alternative, and the values and utilization by wildlife would remain high. Impacts would also be avoided on the entire east bank of Reach 11a, and infill planting allowed on the west bank. The short section from Hillsdale Avenue to the Capitol Expressway would have mitigation plantings on both sides, compared with only one side for the bypass/widening alternative.

Despite a third less impact area than the bypass/widening alternative, the HEP results indicate that nearly the same acreage (19 acres) of mitigation would be required to fully offset all impacts in-kind. This is due to slightly higher baseline Habitat Suitability Indices (HSIs) for the impact areas affected by the widening alternative for four models. The same qualitative differences between impact and mitigation vegetation would occur, and be greater or less depending on the planting pallette distribution. If the replanted benches allowed more large trees (cottonwoods, large willows, sycamores), vertical habitat and wildlife diversities would increase. On the other hand, if these benches were planted with short willow species, diversity would be lower. The Corps should provide a tentative distribution of planting pallettes for the mitigation area of the widening alternative.

2. Riverine Habitat

Impacts would be significant where one-sided widening is planned; of the 0.68 acres of lost overhead shade, nearly half of this is in Reach 7. The 3-foot bench cuts would remove vegetation to the stream edge, creating an open environment that would result in increased stream temperature. These increases could result in mortality of egg and juvenile stages of salmonids such as chinook and steelhead. The lower benches would reduce topographic shade permanently, although over time, vegetative shade would probably offset most of this impact. On one hand, the lower benches may limit the amount of undercuts which might be created in impacted banks; it is estimated that this alternative would result in twice the naturally undercut bank losses (2,535 feet) as the bypass/widening alternative, mostly due to widening Reach 7. On the other hand, the amount of hardscape is about 2,215 feet less for the widening alternative, owing to its fewer ramps and bank protection features. This would allow some additional component of instream cover through exposed roots and more dense shrub layers at the stream edge.

Stream edge contact after mitigation would increase by over 8,000 linear feet over baseline conditions, of which half is associated with Reach 10b, and the rest significant infill in Reaches 10c and 11a-c. This increased planting at the stream edge may eventually moderate adverse impacts of increased water temperature, although both shade and other cover benefits would vary dependent on the revegetation species.

Compared to the bypass/widening alternative, habitat value impacts for the widening alternative would be much greater in Reach 7, nil in Reaches 8-9, and about the same in Reaches 10a-11c (Table 5). In addition to the same mitigation values in Reach 10b, additional habitat value is predicted to occur with the widening alternative in Reach 7. Overall, the mitigation area needed did not exceed the stream area, even when mitigation on Reach 10b was assumed to be 50% successful.

VI. DISCUSSION

A. Mitigation Policy

The recommendations herein for mitigation and the protection of fish and wildlife resources conform with the Service's Mitigation Policy as published in the Federal Register (46:15 January 23, 1981). The Mitigation Policy provides Service personnel with guidance in making recommendations to protect, conserve, and enhance fish and wildlife resources. The policy helps ensure consistent and effective Service recommendations, while allowing agencies and developers to anticipate Service actions and plan early for mitigation needs.

Under the Mitigation Policy, resources are assigned to one of four distinct Resource Categories, each having a mitigation planning goal which is consistent with the fish and wildlife habitat values involved. The Resource Category designation covers a range of habitat values from those considered to be unique and irreplaceable to those believed to be much more common and of relatively lesser value to fish and wildlife. Mitigation goals range from "no loss of existing habitat value" (Resource Category 1) to "minimize loss of habitat value" (Resource Category 4). The goal for Resource Category 2 is "no net loss of in-kind habitat value"; to achieve this goal, any unavoidable losses of habitat value would need to be replaced in-kind. As defined in the Mitigation Policy, "in-kind replacement" means providing or managing substitute resources to replace the habitat value of the resources lost, where such substitute resources are physically and biologically the same as, or closely approximate, those lost.

In applying the Mitigation Policy during a habitat impact assessment, each specific habitat or cover-type which may be impacted by the project is identified. Selection of evaluation species is then conducted based on several rationales, including: (a) species known to be sensitive to specific land and water use actions, (b) species that play a key role in nutrient cycling or energy flow, (c) species that utilize a common environmental resource, or (d) species that are associated with important resource problems, such as anadromous fish and migratory birds, as designated by the Director or Regional Directors of the Service. Evaluation species used for Resource Category determinations may or may not be the same as those used in an application of the Service's HEP, if one is conducted. Finally, based on the relative importance of each specific habitat to its selected evaluation species, and the habitat's relative abundance, the appropriate Resource Category and associated mitigation planning goal are determined.

In addition to mitigation goals defined according to Resource Categories in the National Mitigation Policy, Region 1 of the Service has a further goal of "no net loss of wetlands *acreage* or habitat *values*, whichever is greater." The Service applies this goal for all proposed Federal and non-Federal water development or flood control activities in California that may affect wetlands habitats. For the purposes of this project, all wetlands, both freshwater marsh and any riparian habitat (riparian forest, riparian scrub-shrub, SRA-cover) impacted would be subject to this goal of no net loss.

In recommending mitigation for adverse impacts to any of these habitats, the Service uses the same sequential mitigation steps recommended in the Council on Environmental Quality's regulations. These mitigation steps (in order of preference) are: avoidance, minimizing, rectification measures, measures to reduce or eliminate impacts over time, and compensation measures.

Exclusions to the Mitigation Policy are that it does not apply to: (a) threatened and endangered species, (b) projects permitted or licensed prior to Service authorities, or (c) Service recommendations related to enhancement of fish and wildlife resources. The Policy also allows some latitude in Service guidelines for meeting the goal of in-kind replacement of habitat value as prescribed by the Resource Category 2 determination. Specifically, *exceptions* to this goal may be recommended at the discretion of the Service, when either (a) different habitats and species available for replacement are determined to be of greater value than those lost, or (b) in-kind replacement is not physically or biologically attainable in the ecoregion. One example where this may be appropriate would be replacement of scrub-shrub with riparian forest. The scrub-shrub which is present in the project area is representative of recently disturbed areas that are transitional to riparian forest and overlap in species composition. Since riparian forest would result in greater habitat values (to both terrestrial and aquatic components), such a substitution would be acceptable to the Service.

B. Cover-types and Mitigation Goals

The project area has cover types: **riparian forest; riparian scrub-shrub; ruderal herbaceous; freshwater emergent marsh; Shaded Riverine Aquatic cover (SRA cover); Shaded Palustrine Aquatic cover (SPA cover), urban forest, and upland landscaping.**

Riparian Forest consists of woody vegetation predominated by trees greater than 5 meters tall and which is in close proximity to and under the hydrologic influence of an adjacent watercourse. It is present in the project area as a narrow band (40-100 feet wide) along the stream margin in most reaches. Typical species of this cover-type are cottonwood and various willow species on the lower banks, black walnut and box elder on the middle banks, and sycamores and live oak on the upper bank. Understory species include shrubs such as poison oak, young willows, elderberry, blackberry, and others. Riparian forests provide nesting, resting, and/or foraging values for diverse avian wildlife, including kingfishers, woodpeckers, orioles, warblers and other songbirds, as well as reptiles, amphibians and small mammals. Appropriate evaluation species would include birds such as the yellow warbler and northern oriole, which occur in such habitats and whose habitat preference reflects the proximity of trees to water. Within Santa Clara County and the project area in particular, this cover-type is present only along a very few rivers and creeks, of which the Guadalupe River is the major river and largest individual component. Although probably much more widespread historically, riparian forests have been severely reduced by initial agricultural activities followed by more recent and intensive urban development. By virtue of its regional scarcity, importance to wildlife, and non-consumptive human values (e.g., birdwatching) we have designated riparian forest as Resource Category 2 (i.e., no net loss of in-kind habitat value).

Riparian scrub-shrub cover consists of modest (at least 10%) to high density woody vegetation less than 5 meters tall, in areas which are in relative close proximity to and under the hydrologic influence of a watercourse. This cover-type has been re-classified from the previous designation as "ruderal" scrub-shrub, as the areas so designated were largely within the incised channel, and had some features (seasonal influence of the stream channel) on growth. Such areas are distributed throughout the river corridor as patches and are typified by young trees (willows, cottonwoods, black walnut, black locust, boxelder), native shrubs like poison oak and blackberry, as well as coyote bush on the upper banks. These areas probably occur where there has been modest disturbance in the past, but infrequent maintenance such as clearing or herbiciding. Migratory songbirds were selected to represent the values of this cover-type, because of the importance of such habitat as a source of food, water, and cover for songbirds, and the abundant occurrence of songbirds where scrub-shrub is present. Because of the scarcity of scrub-shrub habitat in the project area, we have designated it as Resource Category 2 (i.e., no net loss of in-kind habitat value).

Ruderal herbaceous cover consists of areas with no or very low proportions of woody vegetation, and are predominated in the project area by non-native species like bermuda grass, horseweed, fennel, field mustard, wild oat, yellow star thistle, and others. These areas may or may not be under the influence of adjacent watercourses. The lack of woody vegetation in these areas probably reflects recent disturbance, frequent ongoing maintenance (e.g. herbicides), and/or reduced water availability. Such areas are used by small mammals and reptiles, and raptors which forage on them, although avian use is probably greatly reduced compared to riparian areas. Although natural habitats of any kind have been reduced by urbanization, ruderal herbaceous cover is more common, with moderately large contiguous tracts occurring near Reaches 10c and 12. Due to this greater abundance and lower value, we designate it as Resource Category 4 (i.e., minimize loss of habitat value).

Shaded Riverine Aquatic (SRA) cover is the unique, nearshore aquatic zone which occurs along the edge of flowing waters where the adjacent riverbank is composed of natural substrate, and supports riparian vegetation which overhangs or protrudes into the water. SRA cover has three primary habitat characteristics (Fris and Dehaven 1992): overhanging vegetation, in-water cover, and natural, often eroding banks associated with flowing waters. These attributes provide refuge from predators, moderation of water temperature stress, food, rearing areas and/or spawning substrates for a variety of fishes (including the proposed endangered steelhead trout), as well as perches, resting, and nesting areas for many bird species. Such areas are very important as a source of cover and forage for resident fish species like roach, hitch and sucker, juveniles of anadromous species such as chinook salmon and steelhead trout, and avian predators. Appropriate evaluation species could include juvenile salmonids, and waterbirds such as herons and kingfishers. Along the Guadalupe River and its tributaries, SRA cover has been adversely impacted by numerous bridge crossings, concrete, sacrete and gabion bank protection, rubble dumping into the stream channel, vegetation maintenance, and diversion of baseflows into upstream percolation ponds. By virtue of its support of a high diversity of aquatic and terrestrial species and its regional scarcity, SRA cover in the project area is designated Resource Category 2, with goals of no net loss of in-kind habitat value.

Shaded Palustrine Aquatic (SPA) is a nearshore aquatic zone which occurs along the interfaces of riparian areas with water bodies that are not streams or river channels, such as the proposed riparian mitigation plantings next to percolation ponds in Reach 12. Such areas retain some but not all of the attributes of SRA cover. Both in-water and over-water cover occur in SPA, however, lack of flowing water would limit features like undercuts and exposed roots, and the size of the percolation ponds would mute temperature moderation benefits of SRA cover. Such cover would nevetheless be used by evaluation species like warmwater fishes and kingfishers. SPA cover is appropriately placed in Resource Category 2 (i.e., no net loss of in-kind habitat value).

Freshwater Emergent Marsh occurs in less shaded, shallow portions of the stream channel or adjacent perrenially wet soils, and supports obligate wetland species like cattail, tule, and creeping water primrose as well as facultative species like curley dock and other herbs and sedges. These areas are used for cover and forage by water-affiliated birds like mallard, herons, egrets, and black phoebe, as well as toads, frogs, and garter snakes. Such areas are extremely important to these evaluation species, and this cover-type is not regionally abundant. Accordingly, it is placed in Resource Category 2 (i.e., no net loss of in-kind habitat value).

Urban Forest is typified by native and non-native trees planted in backyards of houses adjacent to the river corridor; the most significant areas which would be impacted are in Reaches 7-8 of the bypass/widening alternative for floodway construction. Though this habitat supports similar species as riparian forest, wildlife use and overall values are reduced owing to a variety of human influences: mowing, herbiciding, understory removal, pets, pollutants, and pavement. Widespread residential development and irrigation make this cover-type relatively common. Due to this greater abundance and lower value, we designate it as Resource Category 4 (i.e., minimize loss of habitat value).

Upland Landscaping consists almost entirely of non-native shrubs and small trees, both highly managed in form and arrangement as aesthetic features near residences and businesses. As with urban forest, some songbirds may use upland landscaping, particularly if adjacent to riparian areas, but the productivity of this habitat is low and the disturbance level high. It is appropriately placed in Resource Category 4 (i.e., minimize loss of habitat value).

C. Modifications for Conservation and Enhancement

In our 1993 report (USFWS 1993), the following potential modification approaches were discussed which could avoid impacts of the project, focussing primarily on the locally-preferred bypass/widening alternative: (1) substitute bypasses for widening of Reaches 9 and 10a, (2) restore a natural channel in concert with conversion of percolation from in-stream to an off-stream facility in Reach 12, (3) restore appropriate depths and widths of the low-flow channel in Reach 10b in particular as well as 11a downstream of Ross Creek, (4) raise bench heights in floodway areas, such as in portions of Reach 9, and throughout Reaches 10a and 10c, and in order to do so, steepening sideslopes on the landward side of floodways (such as with cribwall construction). The revised plans incorporate these approaches in modified fashion in some of the recommended areas, and have added other biotechnical elements for erosion protection in others. Several bypass concepts are described in part in the "minimize vegetation impacts", or MVI alternative, discussed in the draft EIR/EIS (SCVWD 1997). The MVI alternative bypass concept relies on residentially developed lands, mainly on the west bank. We have carefully reviewed these plans and recommend the following specific modifications to the bypass/widening alternative for conservation purposes:

1. *Design additional floodway capacity (widening, box culvert, bypass extention) to allow for more floodway vegetation (especially large trees) or avoid impacts entirely:* (a) increase the width of the floodway channel from Willow Glen Way to the Pine Island Bypass, using currently undeveloped San Jose Water Company property, and allow more vegetation on this widened bench; (b) construct a box culvert bypass around Reach 9 and 10a, under Almaden Road (or adjacent parking lots, e.g., upstream of Curtner Avenue) from STA 810 to an exit just north of Almaden Expressway Southbound; (c) increase the width of the floodway channel on the east bank between Hillsdale Avenue and the Capitol Expressway, onto a developed area now used as a parking lot, and reduce maintenance of the east bank to allow for more vegetation; (e) from Chard Avenue to Ross Creek,

increase floodway width on the west bank at the expense of one northbound lane of the Almaden Expressway; the increased capacity of which should be used to permit unlimited stream edge riparian on the east bank, currently designated as a maintained floodway. Consider replacing any unacceptable reduction in traffic capacity in conjunction with this modification, with an additional lane on median strip land; (f) immediately upstream of Ross Creek, acquire sufficient property to obtain floodway capacity on the west side, so as to allow revegetation on the west bank as far as possible up to Branham Lane. If modifications 4(e-f) are not possible, a secondary option would be to relocate some of the revegetation area from the edge of the floodway to the bank of the stream channel.

The cost of these options would vary, but would be higher than currently proposed project features due to the need to acquire lands and, possibly mitigate infrastructural features. A very coarse range of cost would be between $1,000,000-$5,000,000 per 1,000 feet of stream.

2. *Restore a low-flow channel in Reach 12 through relocation of percolation ponds off-stream:* Described under the MVI alternative in SCVWD (1997), this would involve discontinuing operation of the two in-stream percolation ponds between Branham Lane and Blossom Hill Road, excavating a low-flow channel from the first seasonal dam along the west side to future Chynoweth Avenue as well as a bench on the west bank upstream of Chynoweth, and revegetating both sides of this new channel, and both sides of the existing channel up to Blossom Hill Road. The pre-existing large channel would function as a bypass for floodflows, and the new channel would contain baseflows and have unlimited vegetation. The stream channel and riparia may receive some water through lateral groundwater movement from adjacent percolation ponds. Including the percolation ponds, the cost of this option to be around $15,000,000.

3. *Replace traditional existing or proposed riprap with biotechnical features, for example:* (a) downstream of the first boulder biotech site on the west bank (STA 760), (b) proposed stepped gabions on the west bank opposite the Pine Island Bypass (~STA 803-805), (c) ~STA 810, east bank, where Almaden Road is closest to the river, (c) proposed stepped gabions on the west bank opposite the Malone Bypass; (d) unvegetated area near the existing west bank ramp downstream of Willow Glen Way; (e) west bank revetment upstream of Willow Glen Way bridge; (f) west bank revetment downstream of the Almaden Expressway Southbound crossing, (g) bordering access ramps at many locations. The cost would probably on the order of the cost of the replaced method.

4. *Minimize Ramps and Roads:* (a) Eliminate the east bank access ramp upstream of Alma Avenue, which appears to be duplicated by the access ramp downstream of Alma Avenue; require maintainance vehicles to back down the remaining ramp to access area south of Alma, (b) reposition the east bank access ramp upstream of Willow Glen Way so that access is beneath the bridge (slated to be replaced), reducing impacts to high quality vegetation, (c) eliminate at least one of the three ramps all within 400 feet of Malone Road. The cost-savings associated with this modification would be site-specific and relatively low, on the order of $100,000 per element.

5. *Modify designated "boulder biotechnical" erosion repair sites to minimize hardening of channel banks and bottom:* in these sites (identified in alternatives section), the plan cross-sections suggest geoweb on the steepest slopes, but a continuous cover of 3.5 foot diameter boulders, presumably for grade control, on the channel bench to bank toe. The problem in this method is that it will limit shrub layer vegetation, while causing acceleration of water velocities over the repaired areas which may cause additional erosion downstream. Instead, we recommend using natural materials (live logs,

rootwads) with limited rock (not more than quarter ton) at the bank toe, and as partial cross-channel grade stabilizers (dimensions of 3-5 feet wide and deep) buried at grade and spaced one for every 6 inches drop in grade (about 130-150 feet apart). This should be sufficient to control erosion.

6. *Supplement lower-quality, non-native ruderal-scrub with native riparian plantings at sites not currently designated on the mitigation plan:* (a) east bank (STA 756-63); (b) west bank, just downstream of Alma; (c) west bank, downstream of Ross Creek (Reach 11b); (d) off-site, in Reach 6, low scrub on both banks just downstream of the SPRR crossing. The cost would vary with the size of the planting, and need for irrigation (range $5,000-$20,000 per acre).

D. Acceptability of Alternatives

1. Widening Alternative

The widening alternative evaluated in this report differs significantly from the previous version (USFWS 1993), which included widening of Reach 9 in both alternatives. Since the widening alternative provides a level of flood protection that would not be preferred by the local sponsor, its purpose in this analysis is only to provide a basis for determining the Federal cost share for mitigation of the proposed project. The widening alternative avoids impacts in Reaches 8-9, has less impacts overall on riparian areas and overstream shade, less revetment, and more mitigation as unlimited vegetation on the streambank than the bypass/widening alternative. Undercut bank losses are greater than the bypass/widening alternative. Some areas unimpacted by this alternative may be subject to bank failure and emergency repairs. The low benches would remove all vegetation to the bank edge, might limit undercut bank formation, and the planting regime (not specified) could involve smaller trees. A major concern with the widening alternative is the extensive temporal losses due to low bench cuts near the bank edge; a considerable period of time would pass before shade vegetation would establish, which might cause losses of the small runs of anadromous fish on the river. The values achieved by mitigation would vary with the type of trees allowed; this has not been specified for this alternative. Establishing a higher berm immediately adjacent to the river could possibly avoid this temporal loss of shade.

2. Bypass/widening Alternative

The bypass/widening alternative would provide some potential benefits due to better management. Rubble removal could increase shrub layer quality on land and benthic production in the stream channel. Areas with lower-quality scrub-shrub or non-native riparian trees would be replaced more desireable native species. Where permanent impacts occur, they are not of a complete nature so that complete fragmentation of the corridor is avoided. Aquatic and terrestrial habitat would be improved in Reach 10b, and the stream geometry there would allow for better fish passage.

Quantitative analyses indicated only partial acceptability of the bypass/widening plan based on consistency with mitigation planning objectives. First, we evaluated losses and mitigation quantities using a number of habitat parameters, including riparian and stream area, contact of bank with riparian area, undercut losses and shade losses. For the project as a whole, this mitigation does technically achieve the Regional objective of no net quantitative loss of habitat area. Also, using formal HEP procedures (Appendix A), it was determined that riparian mitigation proposed would be sufficient to replace riparian habitat values. The aquatic HEP indicated that mitigation would be slightly deficient. The alternative would balance losses of riparian contact with mitigation, avoid most undercut features, and hopefully replace lost shade. However, the habitat value will be redistributed, with impacts in highest quality areas, and mitigation in lowest quality areas.

The mitigation proposed in Reach 10b is not contiguous with an area of similar quality to Reaches 6-8, and it is uncertain whether such mitigation will be successful there. During our field sampling in 1993, when the impacted Reach 9 exhibited moist soils and standing water, Reach 10b was extremely dry. The position of Reach 10b immediately downstream of the percolation area yet upstream of potential accretions from tributaries or urban runoff, and the possibility that groundwater may recede well below the surface, raise an important concern as to the persistence of riparian vegetation and support of aquatic resources in this area. Provision of water through irrigation would be sufficient to maintain terrestrial habitat only and is not generally done or desired in perpetuity; losses of surface water or soil moisture due to depth to groundwater will also affect aquatic habitat and wildlife. This area is intended to provide a significant portion of the riparian and SRA cover mitigation, as well as some freshwater wetland. Until the issue of water supply to Reach 10b is fully investigated and resolved, the overall project cannot be considered acceptable.

Qualitative differences between the impacted and mitigation vegetation are an important consideration, and in some cases raise further objections about project acceptability. First, the proposed designation of top-of-bench plantings as "riparian" and the prospective success on such terraces is uncertain. Over the long term, mitigation plantings will be subject to natural variation in groundwater levels that may recede below the roots of shrubs and some trees, causing death or inhibited growth. Such areas between floodways and the stream will also lack signficant surface runoff influence. These higher plantings are intended to be composed of more xeric species like oak and sycamore resistent to drought. This portion of the mitigation (30% of the total), while expected to provide sufficient habitat value, is different from the lost vegetation near the channel invert and slopes. Second, the willow riparian plantings on low benches (15% of the total) maximize floodway capacity but, as discussed earlier (*see* Future With the Project), does so at the expense of many habitat components unique to large trees with a shrub understory .

An important consideration in the acceptability of the project are cumulative impacts from other projects, past and anticipated (partially summarized in Table 5.3, Volume 1 and p. 2-19 of Engineer's Report *in* SCVWD 1997). These are very extensive throughout the Guadalupe River and its tributaries. We estimate at least a quarter of the banks within the project reaches has been permanently revetted with hardscape; the proposed project will increase this by another 5-6%. Past projects in the area include the Almaden Expressway in 1975 (Reach 11), gravel quarrying in Reach 12 followed by instream percolation pond installation, smaller sacreted areas, removal of large trees, and non-systematic placement of broken concrete and/or boulder riprap. Mitigation for these projects is either unknown or simply did not occur. Since such areas are proposed for mitigation for the current project (e.g. Reach 10b), we recommend the Corps thoroughly research all past permitted and Federal project activities to ensure that these have not been specified as mitigation for any other project.

Other projects include mitigation, but not necessarily in a linear corridor or on a natural bank. Major impacts downstream of the proposed project include the partially constructed Lower Guadalupe Flood Control Project (or "downtown" project) which, when completed, would affect about 4 miles of the lower river, including extensive hardbanking with limited vegetation in one section (Contract 3). Guadalupe River Park (also in downtown San Jose) has been completed, and includes significant gabion, albeit aesthetically compatible, bank protection features and riparian losses along both the

Guadalupe River and its major tributary, Los Gatos Creek. Also downtown, extensive impacts have been caused by construction of Route 87 and other related road interchanges near or crossing the river, and more could occur with freeway upgrades. Floodway maintenance to relatively low roughness design specifications further limits vegetation in several significant lengths of the river outside the project area, including leveed areas in the vicinity of the San Jose Airport north to Alviso (including Reach A), and much of Alamitos Creek.

The Guadalupe River presents a common planning problem in that various residential, commercial, or roadway developments encroach nearly to the top of channel slope. Even in reaches where the vegetation is not fully developed, there is deficient capacity to carry design floodflows in most areas. Some project reaches upstream of Reach 8 would be qualitatively altered by one-sided widening to or very near to the bank edge. In some portions, the use of cribwalls in conjunction with higher bench cuts allows some, narrow width, bank edge vegetation in widened areas constrained by right-of-ways. Elsewhere, one bank would remain open, causing both reduction in corridor width as well as increased disturbance to wildlife. Impact avoidance (and the mitigation vegetation) in these areas appears to be limited by a desire to maintain flood control features within existing right-of-ways, thereby minimizing project costs. Based on our evaluation of potential options (*see* Modifications, above), we do not believe that maximum avoidance has been achieved with this design. Major modifications which include culvert under existing roadways, or removal of roadways for open bypasses, need to be taken seriously. The final design must maximize avoidance and mitigation on site, and be supported by binding assurances of mitigation success .

VII. CONCLUSION AND RECOMMENDATIONS

The Service recognizes the riparian corridor of the upper Guadalupe River and its tributaries as a valuable regional resource, providing the only habitat in an otherwise large urban area for a diverse terrestrial wildlife and aquatic species assemblage, including small runs of anadromous fish. It is our agency's position that any proposed project for flood control in the basin be done in a manner which would allow an enhanced riparian corridor with maximum potential habitat quality and minimum necessary human intervention following construction. Such a design should allow for natural bank and stream bottom with unlimited mature riparian vegetation growth (both height and understory) on both sides of the river, and a widened riparian corridor, with the major floodway capacity separate from the river channel on either a widened bench or bypass. Although portions of the project approach these objectives through the use of bypass floodways, we have significant remaining concerns about the design, impacts, and mitigation in other areas, and about the cumulative impact of this project in combination with other projects and developments within or near the corridor.

The Service recommends that the Corps of Engineers:

1. Modify the design of the project to meet the goal of continuous, bank edge vegetation on both sides of the channel, with a riparian width of no less than 50 feet wide beginning at the top of the low-flow channel bank. The recommended approaches and locations are described in full detail in the Modifications section, and include (in order of decreasing significance) :

   (a) Design additional floodway capacity (widening, box culvert, bypass extention) to allow for more floodway vegetation, especially large tree species, or avoid impacts entirely in Reaches 9, 10a, and 11a-b;

(b) Restore a low-flow channel in Reach 12 through relocation of percolation ponds off-stream to allow additional riparian corridor and stream values;

(c) Replace existing or proposed hardbank protection with biotechnical features that maximize vegetation;

(d) Eliminate some proposed ramps and roads to minimize hardbanking;

(e) Reduce channel and bank hardening in "boulder biotechnical" erosion repair sites;

(f) Supplement lower-quality, non-native ruderal-scrub with native riparian plantings at sites not currently designated on the mitigation plan;

2. Provide or fund studies to fulfill data needs necessary to assess impacts and mitigation, as follows:

(a) prepare a reach-specific summary of anticipated mitigation conditions for both alternatives, classified by plant composition (pallette distribution), elevation above the channel invert, distance from the channel edge, and other corridor parameters as described in recommendation 3c-d;

(b) for each alternative, conduct a updated reach-specific baseline survey of terrestrial cover-types in the impact areas, with slope-corrected areas, so as to allow comparison of the existing condition of the impact areas with the proposed mitigation pallettes, in terms of plant composition, elevation above the channel invert, distance from the channel edge (assuming a stream edge at the one-third bankful stage, and corridor parameters as described in recommendation 3c-d;. This will allow an objective evaluation of the ecological equivalence between the impacted sites and mitigation sites.

(c) concurrent with 2(b), make any necessary corrections to SRA and riparian areas due to differences in water levels assumed for the 1984 terrestrial and 1993 SRA studies.

(d) evaluate groundwater depths and responses in different water-year types, and soil types in proposed mitigation sites with particular attention to Reach 10b; such studies should be sufficient to evaluate the probable long-term success of vegetation on these sites with irrigation not to exceed 5 years;

(e) evaluate riparian impacts and mitigation, and thermal impacts on stream temperatures of this project in combination with the Lower Guadalupe Flood Control Project; clearly distinguish mitigation areas of the upper and lower projects.

3. Provide mitigation sufficient to compensate all habitat area and value losses in-kind; based on HEP and other quantitative analyses in this report, such mitigation would fulfill the following criteria:

(a) no less than full replacement of habitat value of all aquatic and terrestrial habitat, with the exception of scrub-shrub where it is replaced by riparian forest;

(b) no net loss of in-kind wetland acreage, where wetlands include freshwater marsh, riparian forest and scrub-shrub, and Shaded Riverine Aquatic cover (i.e., stream area);

(c) no net loss in linear feet of habitat corridor parameters (i.e., riparian contact with stream edge, total overhead cover, overhead cover by large trees, stream length with two-sided vegetation, stream length with one-sided vegetation);

(d) riparian mitigation located within 100 feet of the low-flow channel and at elevations sufficient to allow influence of the stream on vegetation and eliminate the need for long-term irrigation; in no case should elevation exceed 20 feet above the invert of the stream;

(e) no less than full replacement of large riparian tree sub-covertypes (i.e., with the cottonwood/willow and "mixed" planting pallettes) at the water edge and within 40 feet of the channel.

(f) under the assumptions that the proposed mitigation were to meet the above criteria, and that no significant changes in the HEP were to result from information requested in recommendation #2 or comments received, the minimum mitigation areas would be:

	Area needed to compensate for:	
Alternative	Terrestrial Impacts	Aquatic Impacts
Bypass/Widening	20.7 acres	15.04 acres
Widening	19.0 acres	11.30 acres

4. Develop a comprehensive mitigation and monitoring plan to ensure that habitat value objectives are achieved, through monitoring of key characteristics of the riparian and stream cover, soil moisture, streamflow, and water temperature, with agreement of the Service on parameters and monitoring protocols.

Performance criteria for SRA cover should also be incorporated into the plan, such as (a) persistence of surface water in the mitigation sites equivalent to the impact sites, (b) shade cover by vegetation and undercut banks compared to target levels, (c) mitigation of instream temperature impacts to pre-project levels. The Corps should clearly state hydrologic criteria such as soil moisture and depth of the groundwater table which will be maintained in perpetuity in all mitigation areas through naturally-occurring flows or, if necessary, upstream releases past streamgage 23b. The biological basis for such criteria should be clearly stated and be consistent with the needs for riparian growth as specified in the mitigation plan. The plan should include specific remedial actions and timetables in the event of mitigation failures, and such actions should be a legally binding responsibility of the local sponsor.

5. Research all past permitted and federally-sponsored project actions in the project reaches to ensure that proposed mitigation areas have not been previously designated as mitigation.

6. Complete appropriate Section 7 consultations and conferences, and implement any additional measures determined by the Service or NMFS staff to minimize and offset impacts to listed species.

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APPENDIX A: Habitat Evaluation Procedures Report for the Guadalupe Flood Control Project, Upper Reaches

Introduction

Habitat Evaluation Procedures, or HEP, is an accounting methodology developed by the Fish and Wildlife Service (Service) for quantifying the value of habitat to selected wildlife species or communities associated with that habitat. It is based on the assumption that habitat area can be weighted by a model index value between 0.0 and 1.0 called a Habitat Suitability Index (HSI), that provides a measure of suitability for the particular species or community assemblage of concern. The models convert measured or estimated habitat variables (usually denoted V1, V2...etc.) that are important to life requisites of these evaluation species to Suitability Indices (SIs), and combines these SIs using specified equations to obtain the HSI. This is done for several points of time (referred to as Target Years, or TYs) over the life of the project; each set of HSIs for a given condition is referred to as the "futures". For these futures, the HSI is then multiplied by the habitat area to obtain habitat units, and the average of these over the life of the project (Average Annualized Habitat Units, or AAHUs) used as a basis for determination of differences due to project construction (called Plan Alternatives, or "PAs") and/or mitigation plans (called "MPs"). The losses are expressed by the difference between futures with project (without mitigation) and without project conditions for the impacted sites. Mitigation plan gains are expressed by the difference between futures with and without management for the mitigation site(s). Finally, the adequacy of the mitigation plan may be appraised by comparing the candidate management area to the area needed for full mitigation.

In order to accomplish such an analysis, HSIs must be evaluated over the life of the project both for with and without-project conditions. Baseline data serve as a good starting point for evaluating current conditions, however, changes in the future must be estimated. Ideally, this would be done through examination of previously-studied mitigation sites or a chronosequence of natural habitat of known age. Unfortunately, data on such areas is generally sparse and highly dependent on site-specific characteristics like water availability and soils. Thus, the typical approach involves a concensus-based setting of future HSIs based on best-professional-opinion by what is referred to as a "HEP-team". For most Federal projects such as this, the HEP-team minimally consists of at least one member of the Service, the lead Federal agency, and the local sponsor, but may include regulatory State agencies and consultants.

Background and Justification

Service participation in the Upper Guadalupe Flood Control Project as a Federal project began in late 1992. A previous terrestrial HEP was done in 1987-1988 without Service participation and submitted to us to review in preparation of a preliminary draft Coordination Act Report. In the late 1980s, there was increasing evidence that the Guadalupe River supported anadromous fishes and, consistent with just-completed HEPs for a separate flood control project on the lower reaches, the Corps funded additional HEP work for the Service to evaluate SRA cover for upper reaches. Baseline studies of SRA cover and evaluation of preliminary plans were completed and published in 1993. In our 1993 report and subsequent review of the original terrestrial HEP, we believed that the mitigation ratio recommended (0.8:1) was atypically low for moderate-value riparian systems, questioned the validity of the study, and provided general guidance that the mitigation ratio be at least 2:1.

The revised plans for both bypass/widening and widening alternatives supplied for analysis in June-July 1996 included significant differences in both impact and mitigation areas. The aquatic HEP data were sufficiently recent and available in Service files such that a revision of the impacts and futures could be done without remeasurement. However, the terrestrial HEP was not adequately documented and over 9 years had passed since the measurements were made. Several cover variables were apparently mis-measured as closure and lacked consistency between models and the sample sites appeared to be not within the impact sites and, in any case, unavailable for Service review. The 1987 HEP did not evaluate scrub-shrub which, in the latest mitigation plans, would be replaced by riparian forest. Inclusion of scrub-shrub is consistent with the Sacramento Field Office's recent analysis for the Lower American River (USFWS 1996), and other projects throughout California. The 1987 HEP recommended, but did not implement, slope-corrections to the impact and mitigation areas. Lastly, in response to the Service's 1993 report, the Corps would not accept the Service-recommended mitigation ratio unless supported by quantitative assessment specific to the project area.

In view of these events, the Corps funded a revised terrestrial HEP to be conducted in November 1996. Members of the HEP-team included the Fish and Wildlife Service (Steve Schoenberg), California Department of Fish and Game (Margeret Roper, Keith Anderson), Corps of Engineers (Bill DeJager), and the Santa Clara Valley Water District (Terry Neudorf, Dennis Cheong, Rechelle Blank). Field work was performed cooperatively by representatives of the Service, Corps, and local sponsor. Per guidance from the Corps, the general assumptions of a 100-year project life and equivalent mitigation in Reaches 10b and 12 were applied to both terrestrial and aquatic HEPs.

TERRESTRIAL HEP:

Models

The models selected, with the exception of the belted kingfisher, are the same as those previously chosen and accepted by the local sponsor through their consultant, Habitat Restoration Group, in 1987. Except for the yellow warbler, the models were not modified from published versions. All models have been used throughout California by the Service's Sacramento Field Office and have been accepted by various State and Federal agencies. Three of the models (northern oriole, rufous-sided towhee, pacific coast flycatcher) were developed for specific use in California These models were discussed with the HEP-team on November 19, 1996, prior to the sampling.

Northern Oriole (USFWS 1986): this model is deemed appropriate by the Service for use in the project's riparian habitat, reflecting large trees and the overstory layer of the canopy. The model is sensitive to age structure of the riparian area and riparian width. The species is present throughout the project area as a permanent resident.

Pacific Coast Flycatcher (USFWS 1984a): this model is deemed appropriate by the Service for use in the project's riparian habitat, and includes variables which give value to moderate tree density and size. This species is found in deciduous or coniferous forests and woodlands, especially near water, and prefers well shaded areas; it is thus an appropriate choice for the project area. In an 1986 survey of the project area (unpublished MS thesis, Syndie Meyer), this species was considered a common, permanent resident, and was observed in spring, summer, and fall.

Rufous-sided Towhee (USFWS 1984b): this model is deemed appropriate by the Service for use in the project area. The model emphasizes ground and shrub quality variables that represent this species' use of the lower canopy. This species utilizes a variety of environments, including forest edge and riparian thickets such as found in the project area, and has been documented as a rare, but permanent resident in the project area (brown towhee is the more common species).

Downy Woodpecker (Schroeder 1982b): this species is associated with riparian soft-woods like willow and cottonwood in lowland stream bottoms; this habitat is present in the project area, and this bird is a common, permanent resident in all of the project area subreaches. The Service developed and validated this model for general use throughout this species' range. The model emphasizes values of older, moderate density riparian and forest systems.

Yellow Warbler (Schroeder 1982a): the preferred habitat of this species is a deciduous, riparian assemblage of willows, cottonwoods, sycamores, and alders. It is a common, summer resident species within the project area. The Service developed and validated this model for use throughout this species' range; the model includes shrub variables representing the middle canopy, and the preference of this species for hydrophytic shrubs. Slight modification of the model to include tall trees is consistent with forage beats ranging up to 40 feet above the ground, the presence of such trees in the project area, and the impact of the project on tall trees with a shrub understory..

Baseline Methods

Field sampling of the riparian forest cover-type was conducted on November 24-26, 1996 by Steve Schoenberg (Service), Bill DeJager (Corps) and Nina Kogut (SCVWD). Prior to field work, impact maps for the bypass/widening and widening alternatives were examined, and tentative sample sites identified to correspond with the impact areas; larger and/or more sites were established for larger (or longer) impact sites, which varied considerably in vegetative density and quality. In general, plots randomly chosen within an impact site, and were about 100-200 feet long and of varying width (0.1-0.2 acre). Cover measurements for tree and shrub categories were made using the line intercept measurement where possible, otherwise, in very steep terrain, visual estimates were made in subplots. All trees were surveyed for height and diameter. Basal area was determined using the Bitterlich method (Hays et al. 1981) with a "cruz-all". Representative riparian scrub-shrub areas identified in the mitigation and impact areas were photographed, and parameters for the two models (yellow warbler and rufous-sided towhee) which were not strictly dependent on tree presence, estimated from the photographs and May 1996 blue-line aerial photography supplied by the Corps.

HSIs were then calculated for plot-specific data, with the exception of snag density in the woodpecker model. Snags appeared to be non-randomly distributed, resulting in excessively high calculated HSIs in some impact areas, and nil HSIs in most others since the model involves selection of a minimum value of the suitability indices. Therefore, the snag value used was the impact-area weighted SI across all plots applied to each individual plot. To calculate an overall HSI for the baseline of the impact area, each plot was weighted by its representative impact area; plots with large areas received greater weights, and a different set of weights was determined for each alternative because the impact areas differed between alternatives. The alternative baseline HSI was then equal to the sum of the products of the plot-specific HSIs and weights. All baseline data, formulas, and calculations are provided in lines 1-367 (riparian forest) and lines 665-730 (riparian scrub-shrub) of the spreadsheet labeled "UGTERHEP.XLS" in Appendix B.

Impact areas that were used were the totals from September 18, 1996 preliminary draft maps and tables prepared for the bypass/widening alternative by Jones and Stokes Associates for an upcoming EIR/EIS, and communicated verbally by Bill DeJager (Corps) on December 16, 1996, for the widening alternative. These totals were then corrected for slope, as recommended in the 1987 HEP, using 1993 topographic maps. A good portion of the mitigation for both alternatives occurs on relatively level land, either bench plantings or top of slope plantings (e.g., Reaches 7 and 12). A rough, Corps-provided estimate of the proportion of such level plantings was used to obtain a slope-correction for the mitigation areas (see lines 665-677 of the spreadsheet, Appendix B).

Future Assumptions

For purposes of this analysis, it is assumed that construction of each element of the project will take two years. Although the overall construction may be staggered considerably over time, each element of the project will have a life of 100 years, and a period of analysis is 103 years. We evaluated the project as if construction occurred concurrently in all project reaches. In addition, we assumed the measured, baseline conditions adequately represent the future without the project in both the impact and mitigation sites.

Weightings of futures for the mitigation sites were established based on an approximate distribution of the riparian mitigation area among five plant pallettes as follows (supplied by memo from Tim Messick, Jones and Stokes Associates, Sacramento; listed in order of most hydric to most xeric): 15% willow, 20% cottonwood/willow, 35% mixed species, 5% sycamore valley oak, and 25% oak. This distribution was used for both alternatives, despite the fact that the bench height distribution may be different, requiring different distributions for the two alternatives. Weighted mean baseline variable measurements (Appendix B, cells AI369-AJ385) were used as a reference condition indicative of a 30-year old stand of unmanaged riparian forest. Separate futures for each of the five palletes were drafted by the Service representative and distributed to the HEP team for review in early January 1997. Comments recieved at the January 10, 1997 meeting from HEP-team members, a February 4, 1997 meeting with a Corps consultant (Tim Messick, Jones and Stokes Associates, Sacramento), and additional comments received from the Corps on February 12, 1997, as well as internal Service review, were used to develop the revised values. Below are the specific assumptions used for the futures of each SI variable:

Northern Oriole Variable 1 (NO-V1)-mean tree height: The criterion in setting futures for this variable is the TY in which the height of the dominant canopy stratum reaches a minimum of 35 feet or otherwise setting a maximum value for pallettes which do not attain this minimum; the more xeric pallettes are assumed to take longer to reach this than the hydric pallettes:

	TY
Willow	43 (maximum of 25')
Cott/Will	53
Mixed	43
Syc/Oak	63
Oak	73

Northern Oriole Variable 2 (NO-V2)-percent deciduous crown cover: Cover values were assumed to increase linearly to a maximum at a given target year:

	TY	max cover(%)
Willow	33	90
Cott/Will	33	90
Mixed	43	90
Syc/Oak	73	80
Oak	103	70

Northern Oriole Variable 3 (NO-V3)-stand width category: All palletes were assumed to be in the category of more than one tree, and less than 300 feet wide at the widest point.

Pacific Coast Flycatcher Variable 1 (PCF-V1)-Tree density: Trees are considered to be at least 5 meters tall. The TY in which there are not trees, the target year in which this height is first attained, the initial planting density, and final density are assumed to vary with pallette (values in trees per acre):

	No trees	Max density at TY:	Final density at TY:
Willow	TY1-13	160 @ TY18	95 @ TY43
Cott/Will	TY1-8	160 @ TY13	95 @ TY43
Mixed	TY1-8	130 @ TY15	80 @ TY53
Syc/Oak	TY1-10	110 @ TY23	65 @ TY73
Oak	TY1-23	100 @ TY33	50 @ TY103

Pacific Coast Flycatcher Variable 2 (PCF-V2)-average diameter at breast height: Due to the SI curve for this variable, the criterion of interest is setting the year at which average tree diameter first exceeds the optimal value of 10 inches:

	TY
Willow	23
Cott/Will	23
Mixed	33
Syc/Oak	43
Oak	53

Rufous-sided Towhee Variable 1 (RST-V1)-% shrub cover: Shrubs are assumed to reach a maximum, then thin out as tree cover increases. Criteria were set for each pallette for the TY of maximum shrub cover, and the TY of final, minimum shrub cover:

	Max % at TY:	Final % at TY:
Willow	90 @ TY13	40 @ TY73
Cott/Will	90 @ TY13	40 @ TY73
Mixed	50 @ TY33	80 @ TY53
Syc/Oak	40 @ TY53	40 @ TY53
Oak	30 @ TY53	30 @ TY53

Rufous-sided Towhee Variable 2 (RST-V2)-shrub height: Due to the SI curve, it is only of interest to know the first TY at which shrub height (independent of density), first exceeds 3 feet. For all pallettes, this is assumed to occur not later than 3 years after planting (i.e., TY6).

Rufous-sided Towhee Variable 3 (RST-V3)-lateral screening class: This variable consists of the combined influence of shrubs and low hanging branches, thus, replacement of shrubs by trees is assumed not to alter the value. The criteria used was the average class (0=low, 0.5=medium, 1.0=high), assumed as if multiple plots were being sampled at the mitigation sites; the maximum value at target year are as follows:

	max at TY:
Willow	0.8 @ TY23
Cott/Will	0.8 @ TY23
Mixed	0.6 @ TY43
Syc/Oak	0 throughout
Oak	0 throughout

(note: will and cott/will assumed to experience some loss of lateral screening due to floodflow scour of low benches)

Rufous-sided Towhee Variable 4 (RST-V4)-% tree cover: By assuming no evergreens in the mitigation pallette, this variable becomes equivalent to NO-V2, above.

Rufous-sided Towhee Variable 5 (RST-V5)-% ground cover: This was assumed to be a function of the pallette productivity (both trees and shrubs).

	max % at TY:
Willow	60 @ TY33
Cott/Will	85 @ TY33
Mixed	80 @ TY43
Syc/Oak	75 @ TY103
Oak	70 @ TY103

(note: will and cott/will assumed to experience some loss of ground cover due to floodflow scour of low benches, the effect is assumed to be larger than on lateral screening.)

Rufous-sided Towhee Variable 6 (RST-V6)-humus layer thickness: This variable, expressed in inches, was assumed to covary with RST-V5 but was more sensitive to differences in productivity than RST-V5:

	max % at TY:
Willow	0.5 @ TY33
Cott/Will	1.7 @ TY33
Mixed	1.5 @ TY43
Syc/Oak	1 @ TY103
Oak	1 @ TY103

(note: will and cott/will assumed to experience some loss of ground cover due to floodflow scour of low benches)

Yellow Warbler Variable 1 (YW-V1)-% deciduous shrub cover: This was set to be equivalent to RST-V1.

Yellow Warbler Variable 2 (YW-V2)-Average height deciduous shrubs: The criterion of interest is knowing the target year in which this attains 2 meters (as opposed to 3 feet for RST-V2):

	TY	
Willow	6	
Cott/Will	6	
Mixed	8	
Syc/Oak	8	(max of 1.5 meters)
Oak	10	(max of 1.5 meters)

Yellow Warbler Variable 3 (YW-V3)-% shrub canopy as hydrophytic shrubs: This is assumed to be a constant percentage throughout the project life. Some non-hydrophytic shrubs are assumed to invade designated willow areas.

	%
Willow	80
Cott/Will	25
Mixed	0
Syc/Oak	0
Oak	0

Yellow Warbler Variable 4 (YW-V4)-% canopy as tall trees (>30 feet): This is an introduced variable which was modified from the 1987 HEP to have a minimum value of 0.5 at 0%, maximum from 50-75%, and 0.75 at 100%. By setting a minimum value of 0.5, absence of such cover decreases the overall HSI by no more than 29%.

Downy Woodpecker Variable 1 (DW-V1)-Basal Area: It was assumed that overall tree basal area would, over time, significantly exceed baseline impact area values. Although the overall average was around 60 square feet per acre for the impact area, values ranged up to 186 square feet per acre in the best sites with minimal disturbance, adequate water, and least bank protection. The futures at TY33 were designed to approximately correspond to undisturbed field conditions, and then, over time, approach optimal values assuming sustained management and appropriate water supplies. Beyond 131 sq ft/ac, the SI was assumed to be constant at 0.5. The target years at which 131 sq ft/ac is first attained are:

	TY
Willow	43
Cott/Will	43
Mixed	73
Syc/Oak	73
Oak	103

Downy Woodpecker Variable 2 (DW-V2)-Snag Density: As with the calculations for the baseline, a single value was calculated from the snag densities of each pallette weighted by the proportion of the pallette in the mitigation area (defined above). The rationale for the futures of each pallette are as follows:

Willow: Assumed maximum of 2.5/acre, less than the baseline and less than cott/will because willow snags rot quickly and are less persistent than cottonwood. Snags are first produced at TY18 and achieve a maximum by TY33.

Cott/will: Assume fast growth and early thinning produces snags by TY13, these snags are more persistent thus the maximum density of 5/acre, and the maximum is achieved later (TY38).

Syc/oak: Fewer snags are produced by thinning owing to reduced planting density and more open cover; this occurs beginning much later (TY33) owing to drier site conditions and slower growth, and is maximized at a lower value (2.5/ac) by TY73.

Oak: Combined slow growth, very long-lived species, and minimal thinning is expected in this pallette resulting in snag production beginning later (TY33) and an even lower maximum value (2/ac) by TY103.

Input Data

Input data consisted of four PAs and four MPs:

PA1: Impact area for the bypass/widening alternative, without project conditions

PA2: Impact area for the widening alternative, without project conditions

PA3: Impact area, bypass/widening alternative, with project conditions without mitigation

PA4: Impactarea, widening alternative, with project conditions without mitigation

MP1: Mitigation area for the bypass/widening alternative, without project conditons

MP2: Mitigation area for the widening alternative, without project conditions

MP3: Mitigation area for the bypass/widening alternative, with project conditons

MP4: Mitigation area for the widening alternative, with project conditions

For the baseline and without project PAs and MPs, both riparian and scrub-shrub components were considered together using a weighted HSI which takes into consideration the existing values of scrub shrub. This was not necessary for the with-project mitigation scenarios (MP3 and MP4), as all mitigation was specified to be riparian forest. These calculations are shown in lines 721-730 of the spreadsheet (Appendix B).

Results

HEP runs were done for both in-kind and equal compensation methods (*see* "Form H" outputs, Appendix D). With in-kind compensation, full mitigation is achieved by setting the mitigation area equal to the maximum area among all evaluation species. In-kind compensation is more conservative, has been applied to other projects by the Sacramento Field Office, and ensures that in-kind values are replaced for all evaluation species. For the bypass/widening alternative, about 20.7 acres is needed to offset impacts to 11.26 acres of riparian forest and 6.2 acres of riparian scrub-shrub. This can be traced primarily to the downy woodpecker model, which gives greatest value to moderately mature riparian forest. With equal compensation, values may be "traded off" between species; for example, surplus scrub-shrub values are considered equivalent to mature forest values. For the bypass/widening alternative, equal compensation would require about 14.8 acres to offset impacts.

The widening alternative impacts less habitat due to the less extensive construction and siting of mitigation areas mainly within impact areas. However, nearly the same acreage, 19 acres, would be required to offset impacts in-kind. This is due primarily to a modestly higher baseline HSI for four of the five models when applied to the area impacted by the widening alternative versus the bypass/widening alternative (cells M722-N726 of the spreadsheet, Appendix B). Equal compensation would require about 12.3 acres for this alternative.

Discussion

The revised terrestrial HEP addresses several concerns about the original study by evaluating only impact areas specific to the alternatives, including scrub-shrub, slope-correcting impact and mitigation areas, and utilizing standardized cover measures. As with any predictive model, the accuracy of the results is directly related to the assumptions. We applied what we believed are realistic future values for development of a managed riparian mitigation area. However, in order to ensure that these values are attained, we recommend that key tree and shrub cover and growth characteristics be included in a mitigation and monitoring plan, similar to the draft plan developed for the Lower Guadalupe Flood Control Project.

In addition, HEP does not consider important characteristics of the mitigation area geometry and position which could be important in replacing equivalent habitat diversity and corridor functions of the impact area. Much of the impacted habitat is on steep banks close to the river edge; areas which certainly are true "riparia" in that they are supported by shallow groundwater or surface runoff characteristic of the position near the stream channel. At least 30% of the mitigation (the oak and syc/oak pallettes), and possibly more of the overall mitigation area (i.e, the mixed riparian), is located on high benches or areas which are under more limited (if any) influence of the stream channel. Based on information presented at meetings for the Lower Guadalupe Flood Control Project, groundwater depths can increase or decrease significantly during successive years of drought or above-normal precipitation. After initial irrigation has ceased, as is typically done after 3-5 years for most mitigation areas, the mitigation area may be subject to failure due to dropping of groundwater. This is of concern in Reach 10b, owing to anecdotal observations of very dry conditions in the summer of 1993 during the SRA suvey, failed past attempts to mitigate in this area, and its position immediately downstream of the percolation area which would limit both baseflows and urban runoff accretions. The model results for the widening alternative could be significantly altered with a different set of revegetation pallettes than that assumed for the bypass/widening alternative.

The results of the HEP indicate that about 20 acres would be needed to replace all lost riparian values in-kind. This would approximate a 2:1 mitigation ratio (exclusive of scrub-shrub), consistent with our 1993 preliminary recommendation. If all riparian cover-types are considered, the mitigation ratio would be about 1.4-1.5:1, depending on the alternative. Such a mitigation ratio may be considered relatively low for a riparian corridor, but is consistent with the relatively long project life (100 years) and moderate age (about 30 years) for the impact areas.

Recommendations

1. Develop a comprehensive mitigation and monitoring plan to ensure that habitat value objectives are achieved, through monitoring of key vegetative cover and growth characteristics. The plan should include a hydrologic analysis of mitigation sites like Reach 10b, which currently lack surface waters. The Corps should clearly state hydrologic criteria such as soil moisture and depth of the groundwater table which will be maintained in perpetuity through natural flows or, if necessary, upstream releases past streamgage 23b. The biological basis for such criteria should be clearly stated and be consistent with the needs for riparian growth as specified in the mitigation plan. The plan should include specific remedial actions and timetables in the event of mitigation failures, and such actions should be a legally binding responsibility of the local sponsor.

2. Riparian subtypes, equivalent to the "pallettes" of the proposed revegetation plan, should be determined for the impact areas for both alternatives. This will allow an objective evaluation of the ecological equivalence between the impacted sites and mitigation sites. The Corps should further state any differences in mitigation pallette distribution between the bypass/widening and widening alternatives, given apparent differences in the location of mitigation sites for these alternatives.

AQUATIC HEP:

Model

Shaded Riverine Aquatic Cover (Fris and DeHaven 1993): This model was developed for use on the lower Sacramento River, but includes general features characteristic of many watercourses, especially those with vegetative shade and erosive bank cover features. These features were recognized as being particularly important to anadromous fishes, as well as to warmwater native fishes, mammals, and many bird species. Such features are considered key attributes which maintain the diverse resource assemblage on the Guadalupe River, including chinook salmon and steelhead trout. In the preliminary draft of this report, we modified the model to reflect losses of topographic shade in widened areas. Following comments by the Corps, and due to time limitations, we omitted the topographic shade component and applied the model unmodified from the published version.

One important consideration in use of this model to the subject project is that it may not be sensitive to seasonal absence of water. The Sacramento River has perrenial flows whose seasonal variation cause reduced stream width, thus, absence of water at the measurement point (five feet from bank) for water depth (variable V6) receives a minimum value of 0.5. For the Guadalupe River, absence of water at this same point may be construed as a dry streambed. Certain portions of the mitigation site (Reach 10b), have less persistent standing or flowing water than others. While this draft report does not explicitly consider this feature, several runs were done varying the HSI in Reach 10b to evaluate the potential importance of sustaining habitat quality, including perrenial water, in this area.

Baseline Methods

The HEP evaluated conditions for each subreach of stream in its entirety, rather than considering just the impact areas. This differs from the approach used in the terrestrial HEP, which considered just the impact areas. The reasoning in using a different method for the stream was because of the highly corpuscular nature of the construction (e.g., ramps), impacts which affect not only conditions at the point of impact, but, because of the continuity of stream systems, affect average conditions of the surrounding habitat.

Overhead shade (variable V1) was determined by mapping the projected canopy over water onto blueline maps with the water edge; this was done in March 1993, and applying the reach average shade to the transect data on other variables (Appendix E). In August 1993, the stream was resurveyed for the remaining variables. Ninety-eight transects were distributed in 16 subreaches (of which 14 are in the Federally-funded portion), with a minimum of 4 transects per subreach and minimum distance of 150 feet between transects. Sampling was conducted by the (Steve Schoenberg), a CDFG (Margeret Roper), the local sponsor (Dennis Cheong, Terry Neudorf), and the local sponsor's consultant, Jones and Stokes Associates (Jeff Kozlowski). These data are provided in Appendix C (spreadsheet HEPDATA4.XLS). To estimate the "mean high-water flows" needed as input data, it was decided to use the observed water depth plus one-third the difference between the bankful stage (estimated from deposition/erosion features, equivalent to about the 1.5 year event) and the observed depth. The transect averages were then calculated and applied to the SI curves to obtain the mean SIs (lines 195-210 in the spreadsheet). With one exception (i.e, the downstream portion of Reach 10b), the widths used were the bankful area, as delineated on the 1993 maps; for a portion of Reach 10b the stream exhibited braiding which resulted in artificially high interaction variable scores due to herbaceous vegetation that we expected to be scoured by winter flows. Here, we evaluated the cover for the major low-flow channel only, rather than the full width.

In addition to transect data, continuous data on both banks were taken on the location and lengths of undercut banks throughout the project area. These data, as well as a summary of both undercut losses and natural bank hardening ratios used in the futures, below, are provided in Appendix F (spreadsheet UNDCUTB.XLS).

Future Assumptions

As with the terrestrial HEP, it is assumed that construction of each element of the project will take two years. Although the overall construction may be staggered considerably over time, each element of the project will have a life of 100 years, and a period of analysis is 103 years. We evaluated the project as if construction occurred concurrently in all project reaches. In addition, we assumed the measured, baseline conditions adequately represent the future without the project.

In the aquatic HEP, the impact and mitigation areas were assumed to be represented by a constant, the existing stream area, with the exception of Reach 10b. There, we used an average stream width of 30 feet, which resulted in slightly less area than the baseline area groundtruthed in spring of 1993.

For the aquatic HEP, separate baseline and futures were developed for fourteen subreaches, which differed in existing habitat quality, construction, and/or mitigation methods. Of the six model variables, V5 (substrate composition), and V6 (water depth) were assumed to be constants. Overhead cover (V1) was evaluated individually. The remaining variables, V2 (instream cover quantity), V3 (instream cover quality), and V4 (instream/overhead cover interaction) had futures which were scaled by a reach-specific instream feature correction factor (denoted as CF, below), that is based partially on the ratio of post-project:pre-project natural bank, and partially on any mitigation features (e.g., rock weirs) that would enhance these variables. Overhead shade losses were determined by superimposing the impact and vegetation maps; for a few reaches where 6-foot bench cuts were proposed (e.g., Reach 10a), the local sponsor and consultant reviewed individual trees and provided estimates of any trees saved. After preparation of the June 1996 revised plans for the bypass/widening alternative, each of about 35 elements of the Federal portions were again re-examined, mapped onto the vegetation maps, and the losses retotalled (Appendix E, spreadsheet OVERHEAC.XLS). The following are assumptions used in calculation of the instream CFs:

Reach Specific Assumptions for Instream Feature Correction Factors:

Bypass/widening Alternative:

Reach 7 (741-753):
Minor shade loss occurs due to a westbank ramp, which is permanent as no mitigation is proposed at the bank edge. Ramp access affects about 10% of the bank (CF = 0.9). Since it is in the bypass reach, we assume reduced maintenance will be done and shade will exceed existing conditions (max =40%)

Reach 7 (753-763):
Some shade is lost due to a westbank ramp and biotechnical bank stabilization near STA 763 (included in entirety in this reach; CF = 0.8 at TY1,). Losses of natural bank are ~10%, but, due to biotechnical features, exceed baseline (CF = 1.0 at TY33). Shade assumed to increase as above.

Reach 7 (763-773):
Ramp downstream of Alma ~10% natural bank loss (CF = 0.9); shade unaffected at impact location.

Reach 7 (773-781):
Ramp upstream of Alma affects ~14% of natural bank (CF = 0.86 TY3-33). Shade losses are not recovered (no mitigation opportunity).

Reach 8:
Bypass entrance features affect 13% of the banklength, and woody vegetation is not allowed there (CF = 0.87 TY1-33).

Widening Alternative:

Reach 7 (741-753):
Larger shade loss occur due toextensive eastbank widening. However, mitigation will cause vegetation to exceed existing conditions. The same access impact is assumed, although not shown explicitly on the plans

Reach 7 (753-763):
Larger shade loss due to extensive eastbank widening (CF = 0.4 at TY3). Mitigation in ruderal scrub area on eastbank will produce same shade/instream features as bypass alternative (CF = 1.0 at TY33).

Reach 7 (763-773):
Same ramp, and eastbank widening leaves 45% of natural bank (CF = 0.45 at TY3); onsite mitigation returns CF to 0.9 at TY33.

Reach 7 (773-781):
Same ramp, plus half of the remaining river is affected by eastbank widening, which recovers due to mitigation (CF = 0.43 at TY3, 0.86 at TY33).

Reach 8:
No streamside work--same as baseline

Bypass/widening Alternative:

Reach 9:
Various gabions for erosion control and the bypass entrance affect 17% of the natural bank length (CF = 0.83). High bench (6 feet) minimizes shade losses, and up to 40% shade returns by TY33 (slightly less than original).

Reach 10a:
One-sided floodway cut reduces values without bank hardening (CF=0.5 at TY3, 1.0 at TY33. Shade returns to baseline.

Reach 10b:
Doubling of V2-V4 due to bankedge plantings and rock weir features. Very high shade (50%) for planted areas, slightly less for gabion plantings.

Reach 10c (888-906):
Floodway construction widening of eastbank reduces instream features by CF = 0.6, less than widening alternative due to lower value next to prune packing plant. TY33 CF returns to 0.96, less 4% hardening features.

Reach 10c (906-913):
Floodway construction and maintenance reduces instream features initially, but gets back to baseline due to one-sided mitigation. (CF=0.5 at TY3, 1.0 at TY33)

Reach 11a:
Excavation of 70% eastbank except for Chard bypass, the net result of impacts is a ~20% increase in riparian forest at expense of scrub-shrub (CF = 0.5 at TY3, 1.2 at TY33).

Reach 11b:
Rampwork, other hardscape results in loss of 30% riparian border, returning 81% of original due to 19% hardscape.

Widening Alternative:

Reach 9:
No Work--same as baseline

Reach 10a:
Same as bypass except slightly higher post-project shade due to bankedge mitigation.

Reach 10b:
Same as bypass.

Reach 10c (888-906):
Widening plan affects half of vegetation, and some of higher quality on westbank (CF=0.5) and assume return to CF=0.96 with similar ramp access as bypass (different location).

Reach 10c (906-913):
Both side widening reduce instream features more, but mitigation on both sides increases instream features beyond baseline (CF=0.1 at TY3, 1.2 at TY33)

Reach 11a:
Excavation less extensive than bypass, but net result of impacts and mitigation about the same (CF=0.7 at TY3, then since about ~20% increase shade, have CF=1.2 for instream features at TY33).

Reach 11b:
More extensive, ~70% impact on riparian border, returning 81% of original due to 19% hardscape.

Bypass/widening Alternative:

Reach 11c:
Westbank excavation, maintained as earthen floodway, results in a loss of about 30% of riparian bank contact, a portion of which is recovered (CF=0.7 at TY3, 0.8 at TY33).

Reach 12:
Restoration of 20% of length due to edge planting improves instream features.

Widening Alternative:

Reach 11c:
Entire east bank is impacted, but more extensive mitigation that achieves preconstruction values (CF=0.4 at TY3, 1.0 at TY33).

Reach 12:
Same as bypass

Results

Two runs were performed: (1) a *standard run* with no scaling between reaches (Reach 10b future HSI of 0.39) and (2) a *modified-10b run* with the future gains in Reach 10b reduced by 50% (i.e., an HSI of 0.345). This modified-10b run is intended to show reduced gains that could result due to the fact that Reach 10b has less seasonally persistent water than the impact reaches, and, as a result, could have lower realized use by aquatic species. For the standard run, the results (Appendix D) indicate that 30% of the loss of habitat value would occur in Reach 9, and another 27% would occur in Reaches 10a and 11a. Only a third of the losses are regained on-site in Reach 9, and the majority of the habitat value gains are achieved through mitigation in Reach 10b. If the future conditions for Reach 10b are met in their entirety, compensation would be adequate for the widening alternative, and slightly inadequate for the bypass/widening alternative, as shown by a compensation area 12% larger than the stream area.

The modified 10b run effectively reduces the management plan gains in that reach by one half. Under this scenario, the mitigation for the widening alternative would still be adequate, while the mitigation for the bypass/widening alternative would grossly undercompensate habitat losses. The difference in compensation needs is largely due to the fact that the widening plan does not affect Reach 9.

The modest HSIs for Reach 10b are, in part, a consequence of future assumptions which cannot consider additional mitigation in this area that may (or may not) be installed in concert with the proposed Lower Guadalupe Flood Control Project (Contract 3), designation of portions of the bank for wetland revegetation which would not provide overhead cover, and hardscape which limits overhead cover in the downstream half of the reach..

Recommendations

1. Incorporate critical performance elements of SRA cover into the mitigation and monitoring plan, such as (a) persistence of surface water in the mitigation sites equivalent to the impact sites, (b) shade cover by vegetation and undercut banks compared to target levels, (c) mitigation of instream temperature impacts to pre-project levels.

2. Investigate additional mitigation opportunities, as outlined in the "modifications" section of this report.

3. Provide information on any overlap in or separate mitigation areas in Reach 10b which may occur due to construction of the Lower Guadalupe River Flood Control Project.

4. Use the modified Reach 10b HEP runs as a conservative scenario for assessing mitigation success and needs.

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U. S. Fish and Wildlife Service (USFWS). 1984a. Draft Habitat Suitability Model, Western Flycatcher (Empidonax difficilis). Sacramento Field Office. Unpublished mimeo report. 7 pp.

USFWS. 1984b. Draft Habitat Suitability Model, Rufous-Sided Towhee (Pipilio erythrophthalmus). Sacramento Field Office. Unpublished mimeo report. 8 pp.

USFWS. 1986. Draft Habitat Suitability Model, Northern Oriole (Icterus spurius) Breeding Habitat, Central Valley California. Sacramento Field Office. Unpublished mimeo. 3 pp.

USFWS. 1996. Final Fish and wildlife Coordination Act Report for the Sacramento Bank Protection Project Lower American River contract River Park Site (Site3). September 1996. Sacramento Field Office. ~100 pp.

APPENDIX B: Terrestrial HEP data, futures, and calculations

(Available upon request)

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
333 MARKET ST.
SAN FRANCISCO, CALIFORNIA 94105-2197

December 12, 1997

Planning Branch

Mr. Wayne S. White, Field Supervisor
U.S. Fish and Wildlife Service
Division of Ecological Services, Sacramento Field Office
3310 El Camino Avenue
Sacramento, California 95821-6340

Dear Mr. White:

The San Francisco District Office of the U.S. Army Corps of Engineers is conducting a feasibility study of flood control alternatives for the upper Guadalupe River, California. Your office completed a Revised Draft Coordination Act Report (CAR) in April 1997 for this study. The attachment conveyed with this letter provides the Corps of Engineers comments on the Revised Draft CAR.

If you have any questions regarding these comments, please contact Mr. Bill DeJager of my office at (415) 977-8670.

Sincerely,

Peter E. LaCivita
Chief, Environmental Planning Section

Attachment

Upper Guadalupe River Feasibility Study

CORPS COMMENTS ON REVISED DRAFT COORDINATION ACT REPORT

Page 1, Last paragraph:

Please change "privately" to "locally".

Page 5, First paragraph:

Construction in reach 6 would be locally-funded and should be included with the discussion of reach A. Mitigation plantings for the channel widening plan would total 12.10 acres without correcting for slope. Please review the mitigation areas depicted in the draft EIR/S to note the changes in reaches 9 and 12.

Page 6, reach 8:

Change wording to "bypass entrance". Reach 9: the Willow Glen Way bridge would be replaced under both alternatives.

Page 7, reach 10b:

Reconfiguration of the low-flow channel should be included.

Page 9:

The reference cited is the only evidence that Coho salmon occurred in the Guadalupe River, and it supplies no documentation. Mr. Ian Gilroy of the National Marine Fisheries Service (NMFS) has indicated in a recent telephone conversation that he does not believe that this species historically occurred here. He also indicated that recent anecdotal accounts of Coho salmon are believed to be misidentification of Chinook salmon. Refer also to San Francisco Estuary Project (1997). Also, update the discussion to include the identification of several juvenile trout, probably steelhead trout, found in reach A in September 1997.

We agree that discharges of cool water from urban basements may have a positive effect on salmonid habitat in the downtown area. However, we question whether air-conditioner or artesian discharges are significant factors. In particular, the aquifer being recharged elsewhere in the valley is confined beneath an impermeable layer in the downtown area.

We disagree with the statement that increased peak flows may be reducing the normal time requirement for stream rearing. Young anadromous fish are well equipped to maintain their position in a stream during flood events by utilizing edge areas where flows are slower. Also, while urban runoff has increased, upstream dams also act to reduce some peak flows, so the overall impact of hydrologic changes on fisheries is uncertain. In any event, there is no evidence, should juvenile anadromous fish be swept downstream prematurely, that normal requirements for stream rearing could be effectively shortened.

Page 11:

Surveys for the red-legged frog have been completed, and no individuals were found. No impact on this species is expected. Information on steelhead trout reproduction should be updated.

Page 12:

Reach 10b does receive some urban runoff, as there is an outfall in the upper part of the reach. However, this does not seem to provide significant water in the summer. It is not clear that additional water is needed to assure mitigation success. This reach had riparian forest prior to channelization but after upstream percolation began. An analysis by Jones and Stokes indicates that there is adequate water to assure the success of riparian restoration. Also, a recent agreement between the Santa Clara Valley Water District (SCVWD) and the California Department of Fish and Game (CDFG) regarding in-stream flows at gauge 23b may provide a small amount of additional water in this reach. Discussions are under way among local agencies regarding the feasibility of using reclaimed water to enhance flows in various reaches of the Guadalupe River.

Regarding the types of vegetation planned in mitigation areas, most mitigation areas would eventually develop large trees and old-growth attributes such as snags, nest cavities, etc. Some of the existing habitat to be removed is composed of young bushy willows. The areas to be maintained as low, bushy willows will provide currently-existing habitat attributes that would eventually be lost elsewhere as mitigation plantings mature.

Page 15, Table 2:

We question the revetment figures for the channel widening plan. How did the Service derive these figures? They appear to be projections of the revetment figures for the bypass channel plan. No revetments are planned under this alternative; given the low bench heights under this plan, large ramps as in the bypass channel plan should not be needed.

Page17 (aquatic HEP):

The Corps and the SCVWD are concerned over the accuracy of the aquatic HEP. These figures are being re-examined by Jones and Stokes. Compensation for any confirmed minor shortfall of mitigation will be negotiated with the resource agencies during the detailed design phase of the study.

Page 18:

A full planting palette can not be provided at this time. If this alternative is selected for construction, this information would be developed during the detailed design phase. However, based upon the distribution of mitigation areas on low benches, 6.62 acres would be willow plantings. The remainder would be divided among palettes ranging from relatively wet to relatively dry.

Pages 22-24 (project modifications):

Modification 1: All these modifications would add to the cost of the project. The modifications having the greatest benefit would be very expensive, such as a bypass under Almaden Road. Removal of a lane from the Almaden Expressway would not be acceptable to the City of San Jose, as high-occupancy lanes are proposed to be added to this section of road.

Modification 2: This modification is not needed as mitigation for this project. This possibility is being considered as mitigation for SRA impacts associated with the downtown project; if this concept were to be implemented, this cost would be borne by the downtown project.

Modifications 3 and 5: These minor modifications will be considered during the detailed design phase.

Modification 4: This proposal has been referred to the SCVWD for comment.

Modification 6: Items a and c have already been included in the plan. Items b and d will be considered.

Pages 24-26 (acceptability of alternatives):

Widening alternative:

Should this alternative be selected for construction, the issue of bench height would be given consideration during detailed design.

Bypass/widening alternative:

Regarding aquatic mitigation, Jones and Stokes is currently examining the aquatic HEP to determine whether planned mitigation will be adequate. We disagree with the FWS regarding the likely success of mitigation in reach 10b, and we will continue to use the assumption, based upon work by Jones and Stokes, that mitigation in this reach will be fully successful as planned. In the event that any mitigation effort is not fully successful, remedial work would be appropriate.

The statement that "...the habitat value will be redistributed, with impacts in highest quality areas, and mitigation in lowest quality areas." is only partially true. Most high quality areas would not be directly impacted. Impacts would be distributed across the range of habitat values, ranging from poor to very good. Mitigation, by necessity, would have to be placed in locations with seriously deficient habitat values at present. The goal is to improve these habitat values.

Regarding the water supply issue in reach 10b, see answer regarding page 12, above.

Regarding the types of vegetation in impact areas and mitigation areas, both impact areas and mitigation areas would include a cross-section of riparian vegetation types ranging from fairly wet to fairly dry. This alternative has been devised to minimize impacts to lower-bank areas to the extent practical.

There have been no Corps projects constructed on the Guadalupe River prior to the downtown project. The only other possible Federal funding that may have affected the river is transportation funding. With the exception of the two new freeways (State Routes 85 and 87), all other roadway improvements appear to be either locally-funded, or (like the Almaden Expressway in reach 10b) to have occurred prior to the passage of Section 404 of the Clean Water Act, which would have been the basis for mitigation requirements for Federally-permitted actions.

While this alternative reduces impacts at considerable expense, due to cost constraints it does not minimize impacts.

Pages 26-28 (Service recommendations):

1. These concepts have been incorporated to the extent feasible. Additional features suggested here could be incorporated as mitigation for the SRA cover impacts of the downtown project, but no decision has been made yet.

2. a. During the detailed design phrase, the riparian forest palettes will be determined in terms of composition, location, and extent. The planned locations of the various palettes will be based in part upon criteria suggested here.
   b. Existing surveys have been updated incrementally to reflect current conditions. The information requested by the FWS is more detailed than is needed. The parameters mentioned will be considered in devising the detailed mitigation plan.
   c. The winter of 1992-93 was wetter than normal, so SRA cover surveys the following summer should not be disadvantaged. While 1984 was a relatively dry year, if the terrestrial surveys done at that time were done during slightly higher water conditions, the difference would only represent streambank areas lacking in trees and shrubs.
   d. This work has been done for reach 10b. Additional soil testing will be done at other mitigation sites.

e. Thermal modeling will be completed shortly for the upper Guadalupe project. The issue of how to best mitigate the impacts of the downtown project has not yet been resolved; this will require coordination between the two projects. We agree that it is important to clearly distinguish between mitigation areas for the two projects.
f. Jones and Stokes will be conducting thermal modeling for the upper Guadalupe River project shortly.

3. a. We believe that planned mitigation will adequately compensate for impacts. If further analysis indicates that minor modifications are required to improve aquatic mitigation, these modifications will be implemented if practical.
   b. This criterion is met.
   c. Meeting all these criteria exactly would be nearly impossible. Treating all these criteria as minimum standards would mean that some of them would be exceeded, leading to more mitigation than is required to meet overall mitigation needs.
   d. Riparian forest mitigation has been located within 100 feet of the low-flow channel to the maximum extent practical. Some existing riparian forest vegetation is over 20 feet above the channel invert.
   e. This will be considered during detailed design.
   f. Proposed mitigation would meet the FWS recommendations for terrestrial mitigation acreage under the Bypass/Widening Alternative and aquatic mitigation acreage under the Widening Alternative.

   The acreage figures suggested by the FWS for terrestrial mitigation are based upon in-kind compensation. Using equal compensation instead, both alternatives would fully mitigate terrestrial habitat impacts according to the HEP study.

   The FWS-recommended figure of 19.0 acres for the Widening Alternative is based upon full in-kind compensation of habitat impacts for the downy woodpecker, according to the HEP. Riparian forest losses under this alternative would total about 8 acres according to the FWS. Riparian scrub-shrub is not good habitat for this species, so it is not relevant to mitigating impacts on this species. Since little riparian forest that would be affected by this alternative is more than 50 years old (with much of it is significantly younger), while the period of analysis is 100 years, it is very surprising that the compensation ratio for this species was determined to be about 2.4:1.

   The Corps does not believe that such a high compensation ratio can be justified under these conditions, especially considering that the entire acreage of riparian forest acreage would have habitat values better than current values in the impact area during the entire second half of the evaluation period. A compensation ratio of 2:1 should more than mitigate impacts over this period. Therefore, we suggest that equal compensation is a more appropriate way to determine mitigation needs for this project.

Regarding the adequacy of aquatic mitigation, see comments above.

4. A comprehensive mitigation and monitoring plan will be developed during the detailed design phase.

5. We agree that this is appropriate.

6. Informal Section 7 consultation over the red-legged frog will be completed shortly; this species would not be affected by the project. Formal consultation with the NMFS regarding the steelhead trout is in progress.

Reference

San Francisco Estuary Project (1997) *State of the Estuary 1992-1997*, page 19.

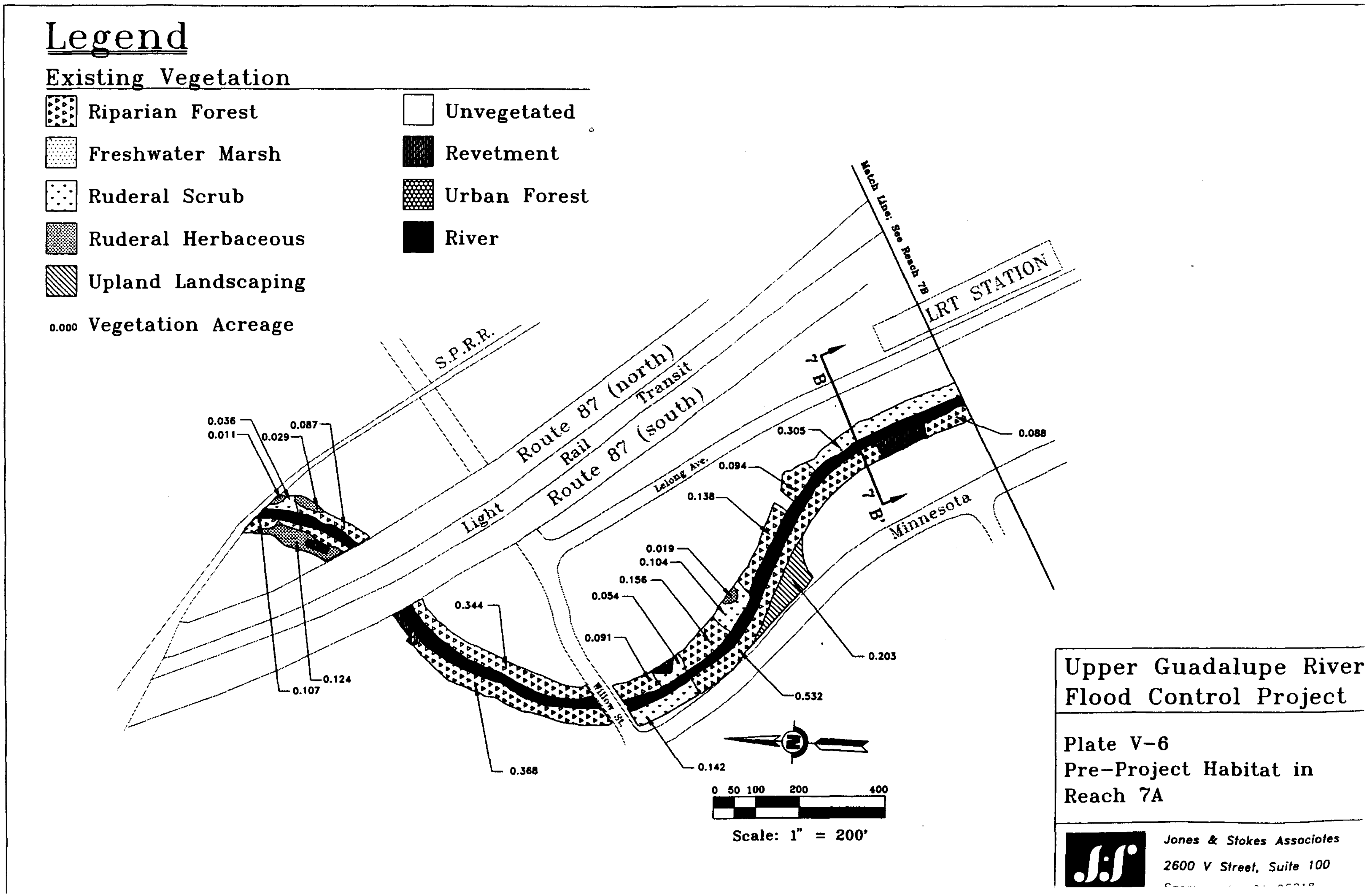
APPENDIX E

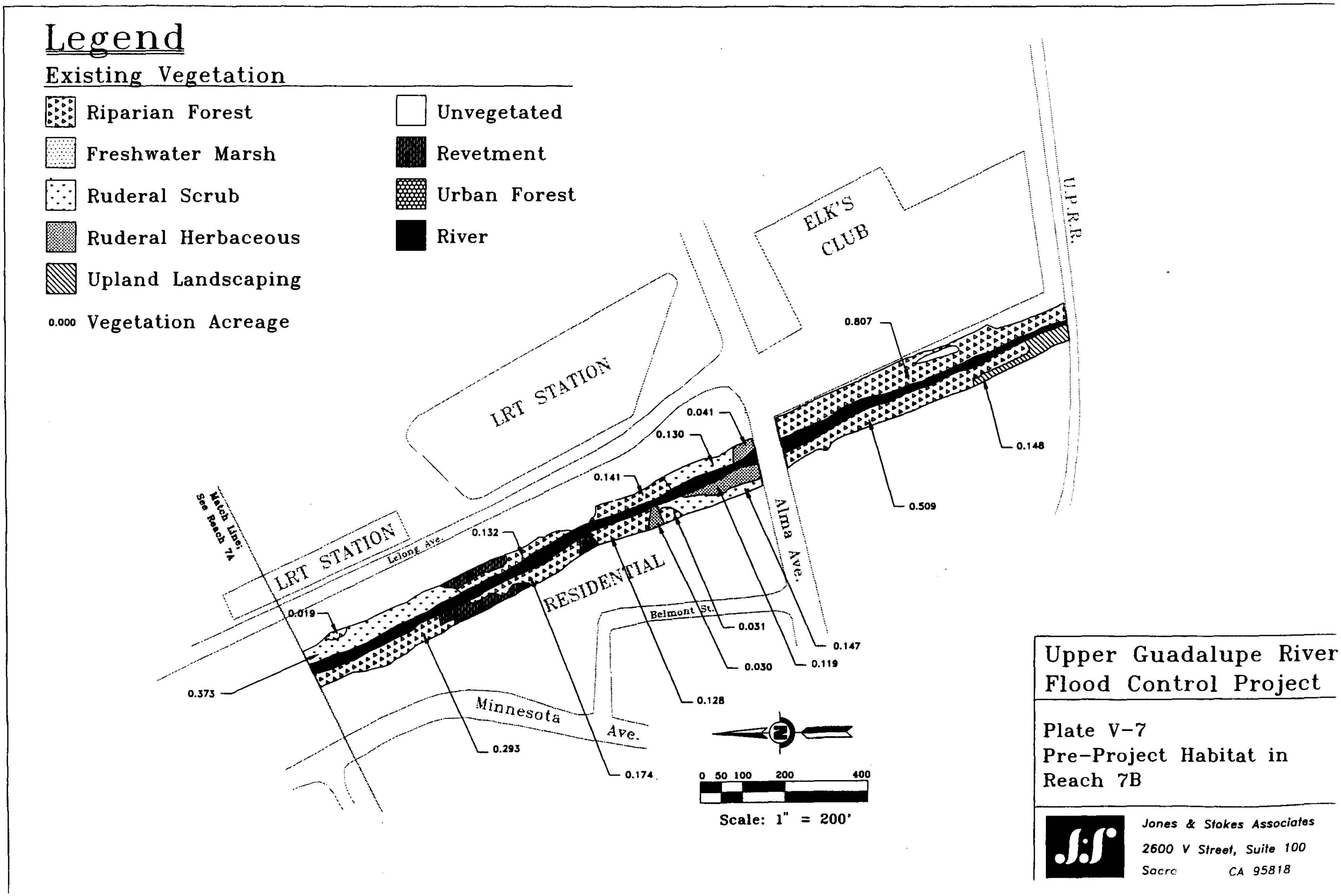
EXISTING HABITATS AND IMPACTS OF THE CHANNEL WIDENING AND BYPASS CHANNEL ALTERNATIVE PLANS

(Source: Parsons Engineering Science 1997
[original maps prepared by Jones & Stokes] except as noted)

Existing Habitats

(Source: Parsons Engineering Science 1997
[original maps by Jones & Stokes])


Legend
Existing Vegetation
Riparian Forest
Freshwater Marsh
Ruderal Scrub
Ruderal Herbaceous
Upland Landscaping
0.000 Vegetation Acreage
Unvegetated
Revetment
Urban Forest
River
S.P.R.R.
Route 87 (north)
Light Rail Transit
Route 87 (south)
Lelong Ave.
Minnesota
Willow St.
LRT STATION
Match Line: See Reach 7B
7 B
7 B'
0.036
0.011
0.029
0.087
0.124
0.107
0.344
0.368
0.305
0.094
0.138
0.019
0.104
0.156
0.054
0.091
0.142
0.532
0.203
0.088
0 50 100 200 400
Scale: 1" = 200'
Upper Guadalupe River Flood Control Project
Plate V-6
Pre-Project Habitat in Reach 7A
Jones & Stokes Associates
2600 V Street, Suite 100

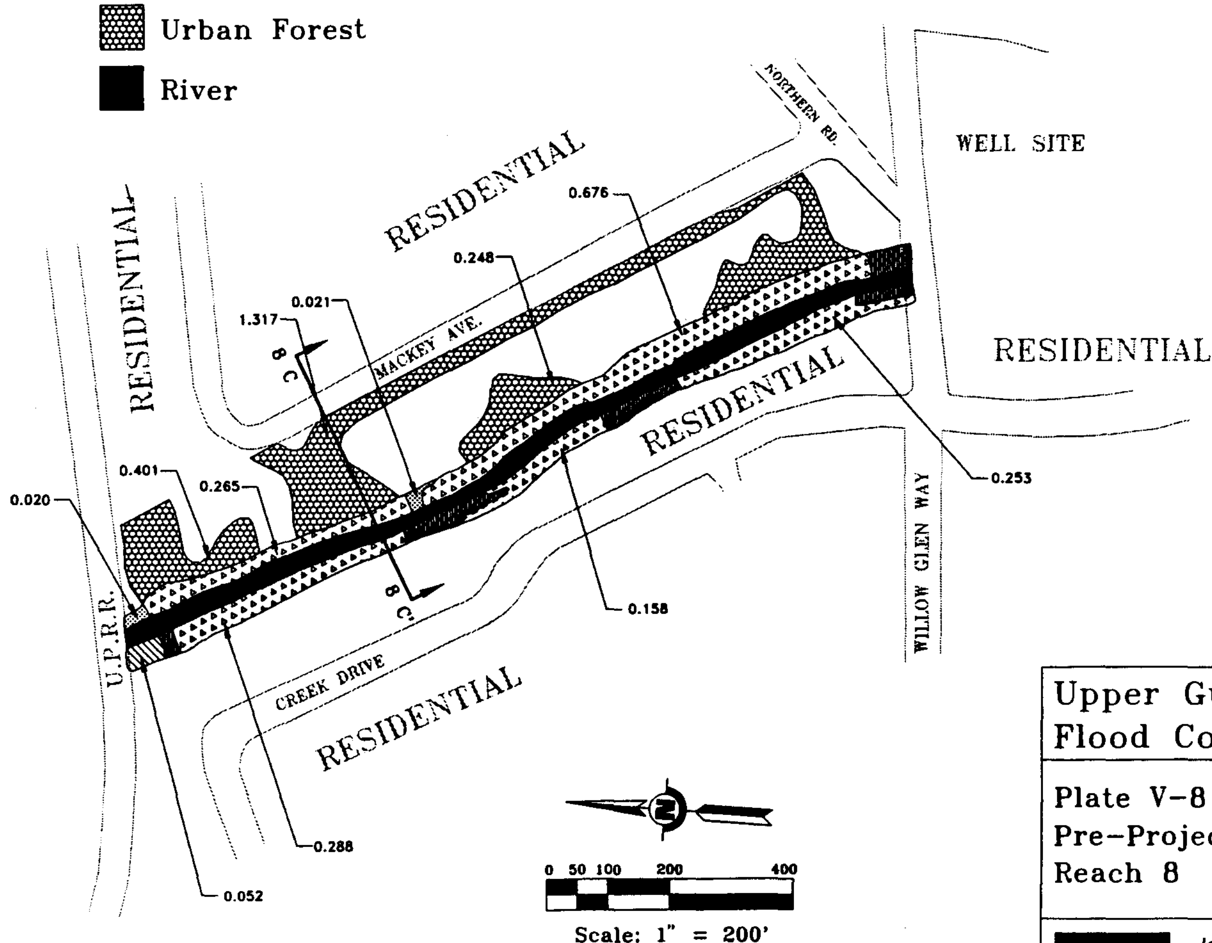


Legend
Existing Vegetation
Riparian Forest
Freshwater Marsh
Ruderal Scrub
Ruderal Herbaceous
Upland Landscaping
0.000 Vegetation Acreage
Unvegetated
Revetment
Urban Forest
River
ELK'S CLUB
U.P.R.R.
LRT STATION
LRT STATION
Lelong Ave.
Match Line; See Reach 7A
RESIDENTIAL
Belmont St.
Alma Ave.
Minnesota Ave.
0.807
0.148
0.509
0.041
0.130
0.141
0.132
0.019
0.373
0.293
0.174
0.128
0.030
0.031
0.119
0.147
0 50 100 200 400
Scale: 1" = 200'
Upper Guadalupe River Flood Control Project
Plate V-7
Pre-Project Habitat in Reach 7B
Jones & Stokes Associates
2600 V Street, Suite 100
Sacra CA 95818

Legend

Existing Vegetation

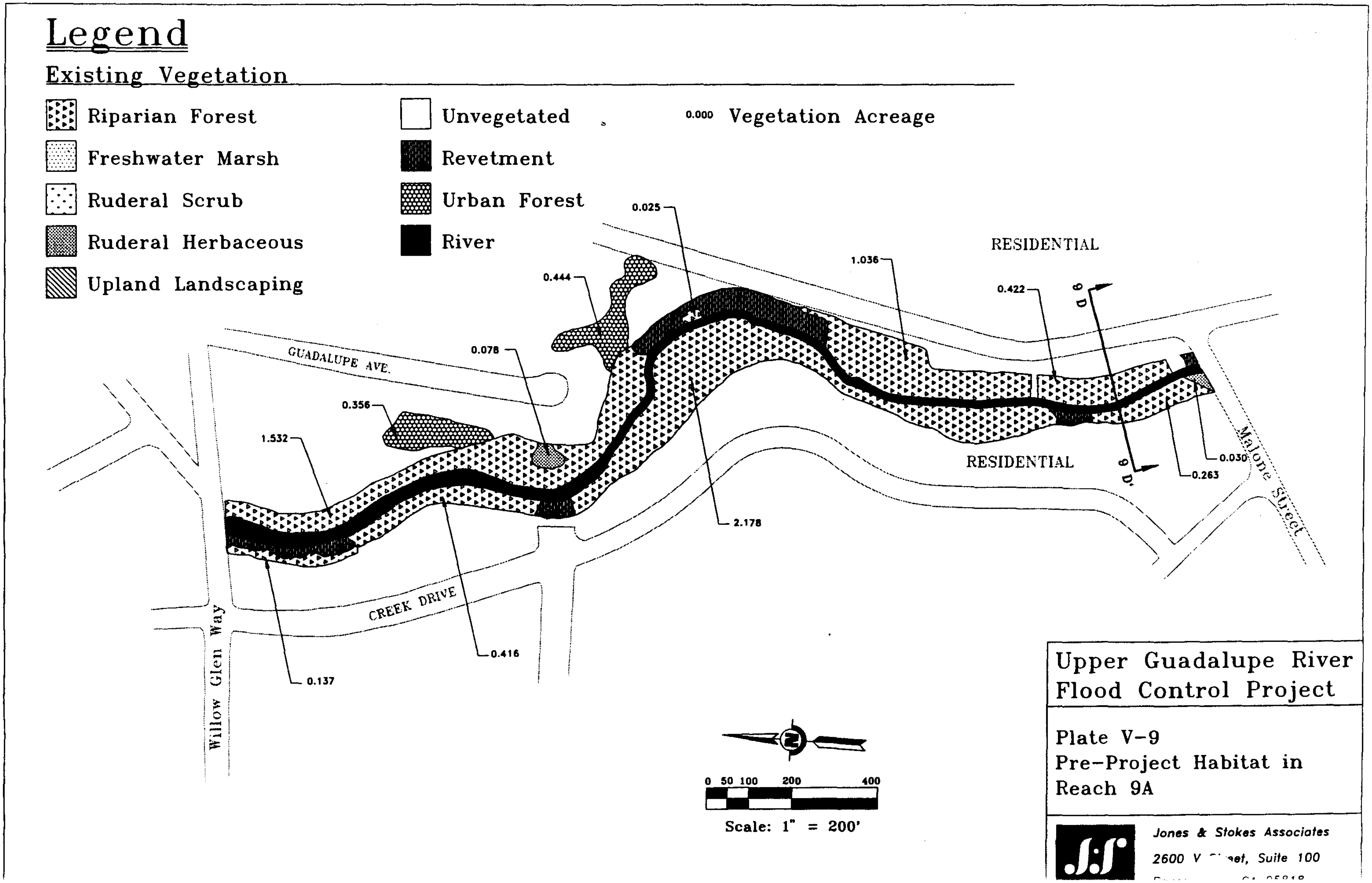
- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Unvegetated
- Revetment
- Urban Forest
- River
- 0.000 Vegetation Acreage

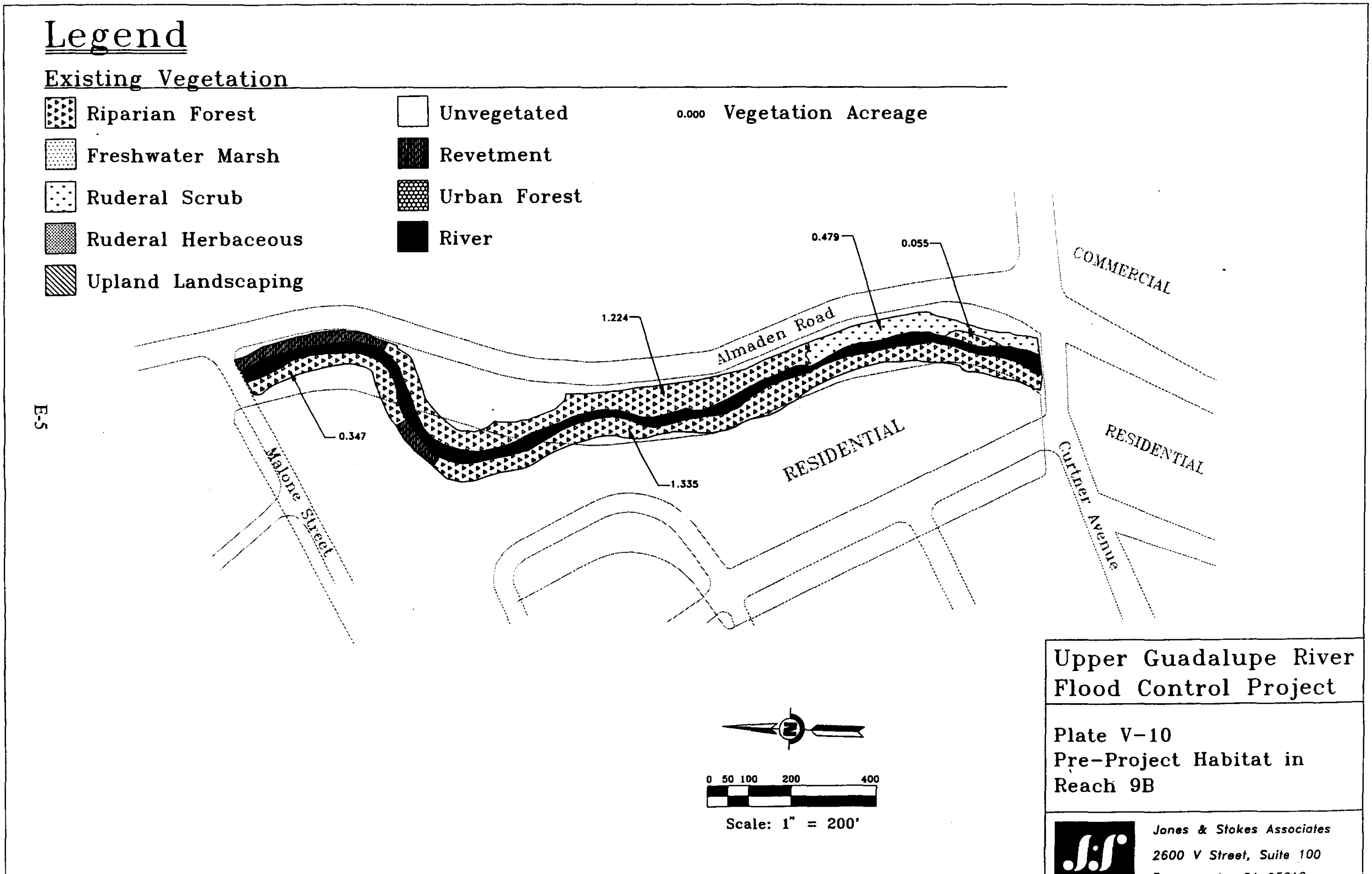


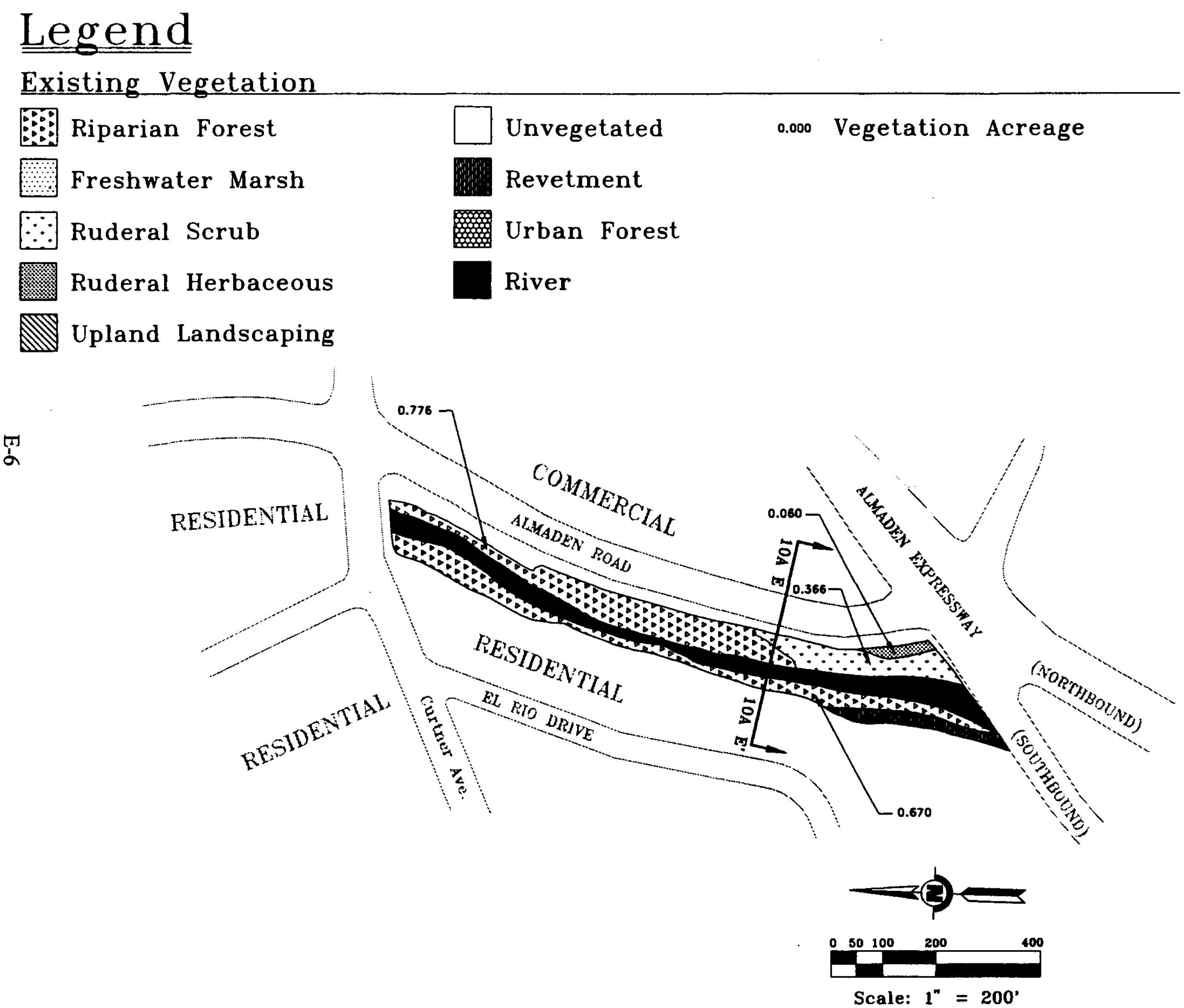
Upper Guadalupe River Flood Control Project

Plate V-8
Pre-Project Habitat in Reach 8

Jones & Stokes Associates
2600 V Street, Suite 100
Sacramento, CA 95818


Legend
Existing Vegetation
Riparian Forest
Freshwater Marsh
Ruderal Scrub
Ruderal Herbaceous
Upland Landscaping
Unvegetated
Revetment
Urban Forest
River
0.000 Vegetation Acreage
RESIDENTIAL
RESIDENTIAL
GUADALUPE AVE.
CREEK DRIVE
Willow Glen Way
Malone Street
9 D
9 D'
0.025
1.036
0.422
0.444
0.078
0.356
1.532
2.178
0.030
0.263
0.137
0.416
0 50 100 200 400
Scale: 1" = 200'
Upper Guadalupe River Flood Control Project
Plate V-9
Pre-Project Habitat in Reach 9A
Jones & Stokes Associates
Suite 100

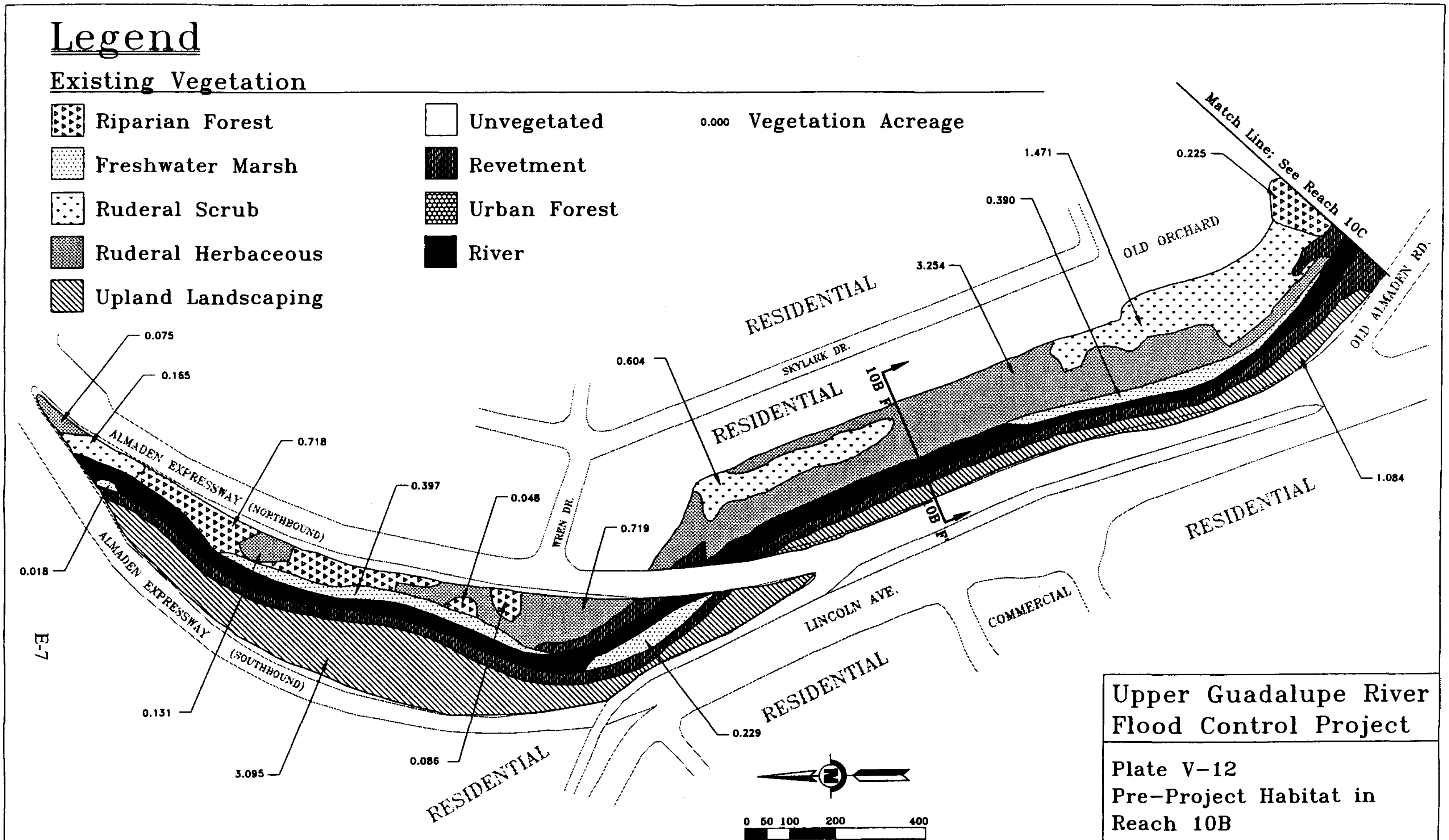

Legend
Existing Vegetation
Riparian Forest
Freshwater Marsh
Ruderal Scrub
Ruderal Herbaceous
Upland Landscaping
Unvegetated
Revetment
Urban Forest
River
0.000 Vegetation Acreage
Almaden Road
COMMERCIAL
RESIDENTIAL
RESIDENTIAL
Malone Street
Curtner Avenue
0.347
1.224
1.335
0.479
0.055
0 50 100 200 400
Scale: 1" = 200'
Upper Guadalupe River Flood Control Project
Plate V-10
Pre-Project Habitat in Reach 9B
Jones & Stokes Associates
2600 V Street, Suite 100
Sacramento, CA 95818



Upper Guadalupe River Flood Control Project

Plate V-11
Pre-Project Habitat in Reach 10A

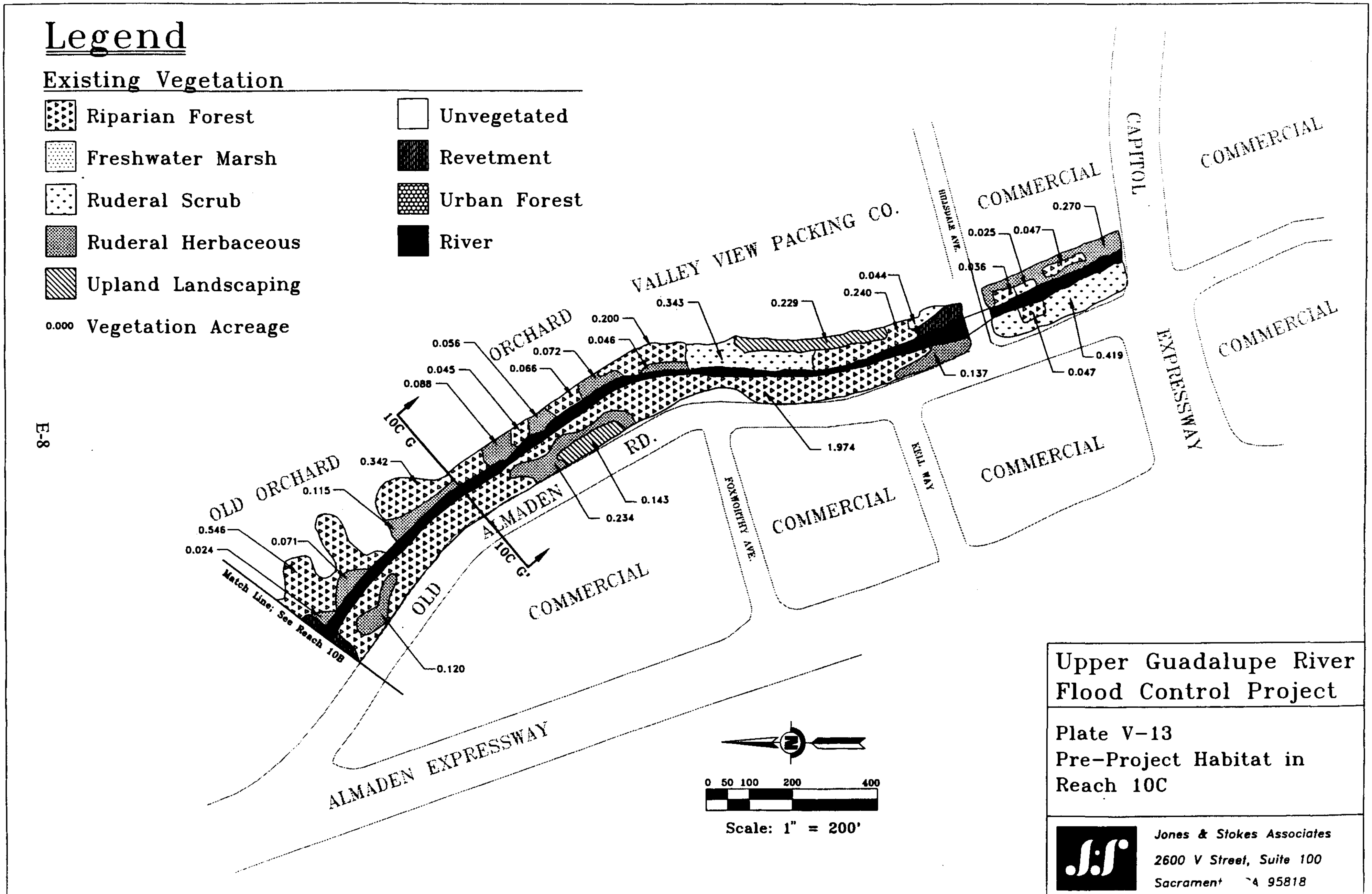
Jones & Stokes Associates
2600 V Street, Suite 100
Sacram[illegible] A 95818



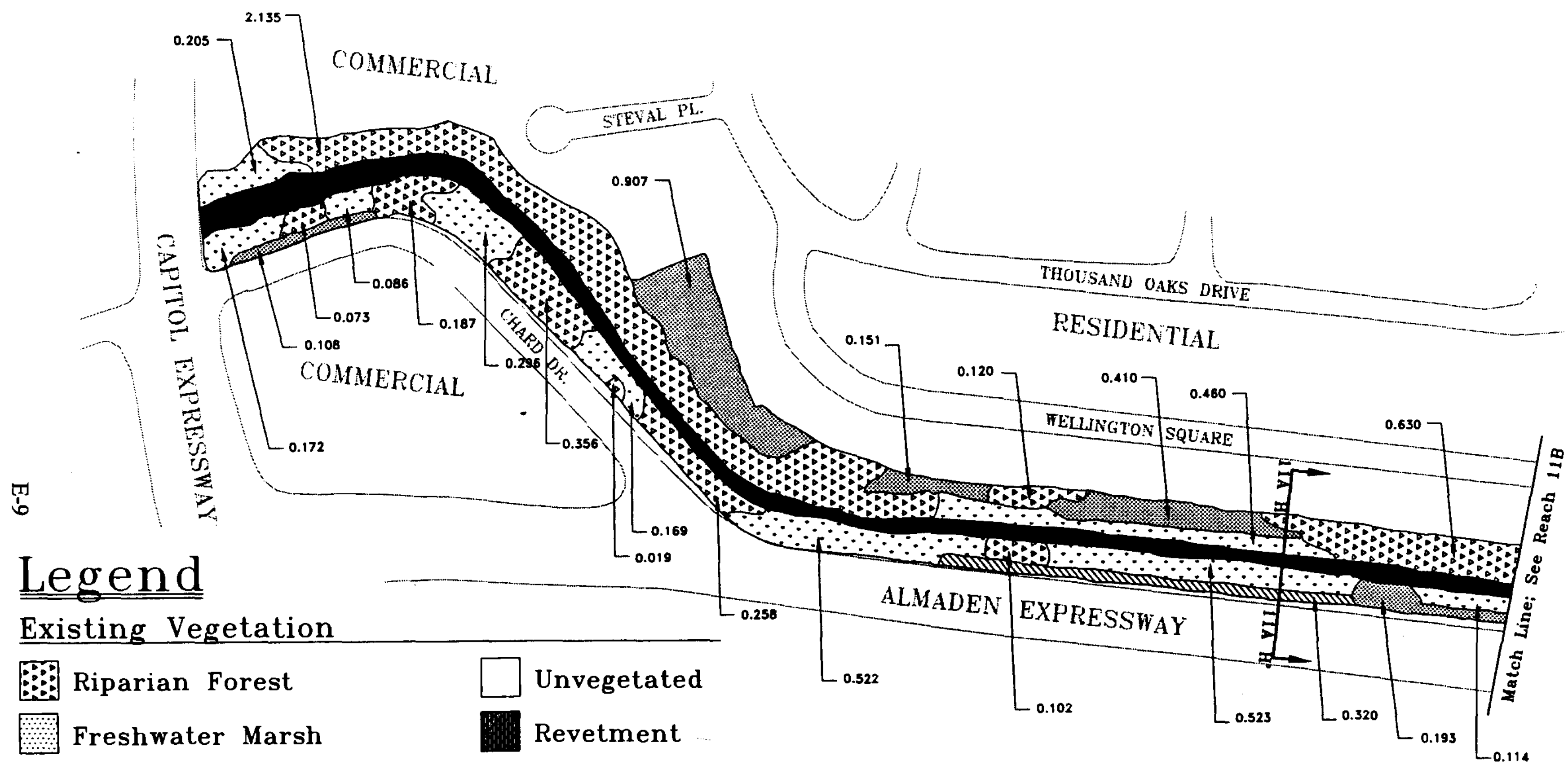
Upper Guadalupe River Flood Control Project

Plate V-12
Pre-Project Habitat in Reach 10B

Jones & Stokes Associates
2600 V Street, Suite 100
Sacramento, CA 95818



Legend
Existing Vegetation
Riparian Forest
Freshwater Marsh
Ruderal Scrub
Ruderal Herbaceous
Upland Landscaping
0.000 Vegetation Acreage
Unvegetated
Revetment
Urban Forest
River
VALLEY VIEW PACKING CO.
OLD ORCHARD
ORCHARD
OLD ALMADEN RD.
ALMADEN EXPRESSWAY
CAPITOL EXPRESSWAY
FOXWORTHY AVE.
KEIL WAY
COMMERCIAL
COMMERCIAL
COMMERCIAL
COMMERCIAL
COMMERCIAL
COMMERCIAL
10C G
10C G'
Match Line; See Reach 10B
0.546
0.024
0.071
0.115
0.342
0.088
0.045
0.056
0.066
0.072
0.046
0.200
0.343
0.229
0.240
0.044
0.036
0.025
0.047
0.270
0.419
0.047
0.137
1.974
0.143
0.234
0.120
0 50 100 200 400
Scale: 1" = 200'
Upper Guadalupe River Flood Control Project
Plate V-13
Pre-Project Habitat in Reach 10C
Jones & Stokes Associates
2600 V Street, Suite 100
Sacrament 95818



E-9

Legend

Existing Vegetation

- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Unvegetated
- Revetment
- Urban Forest
- River
- 0.000 Vegetation Acreage

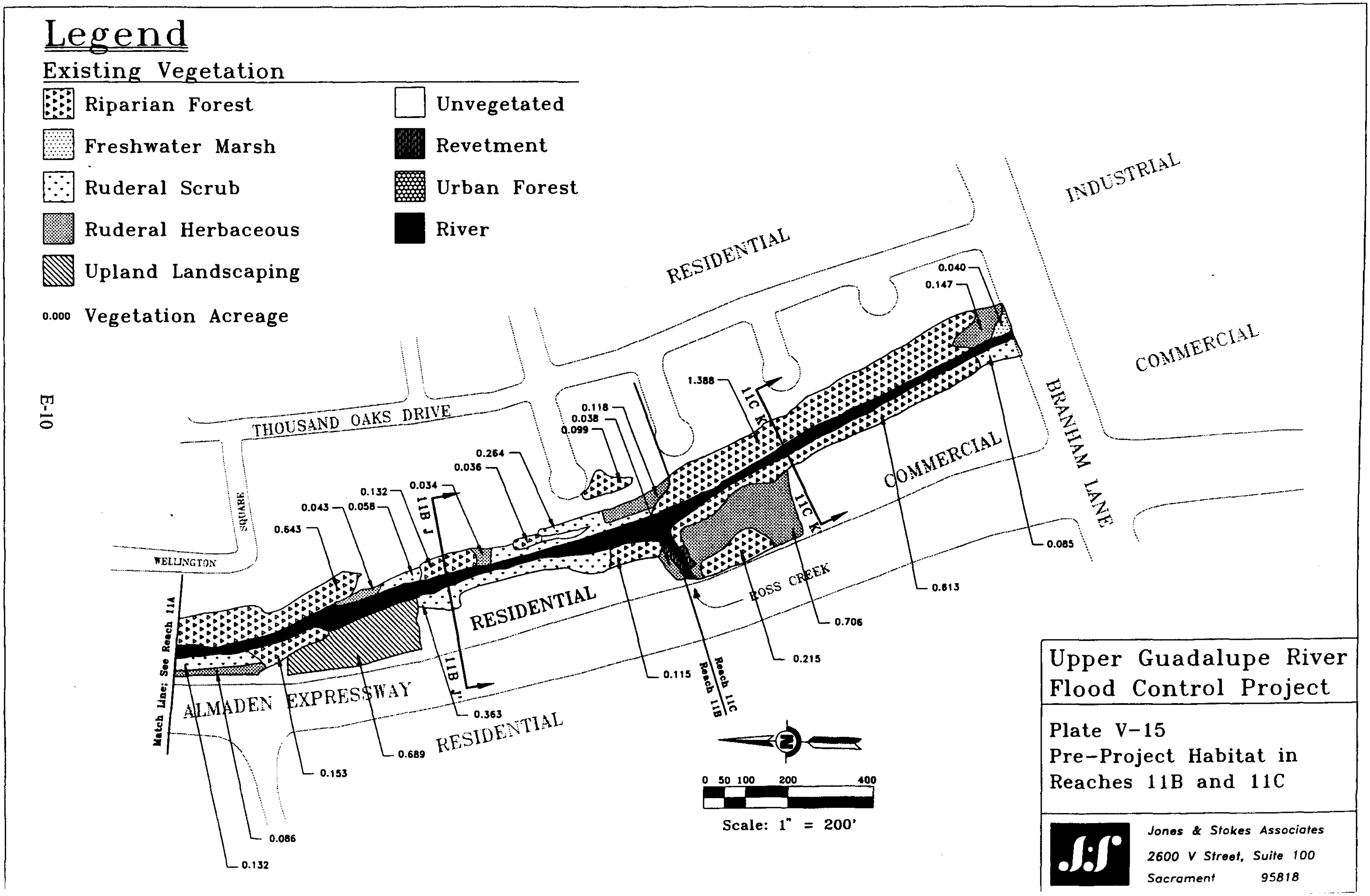
0 50 100 200 400

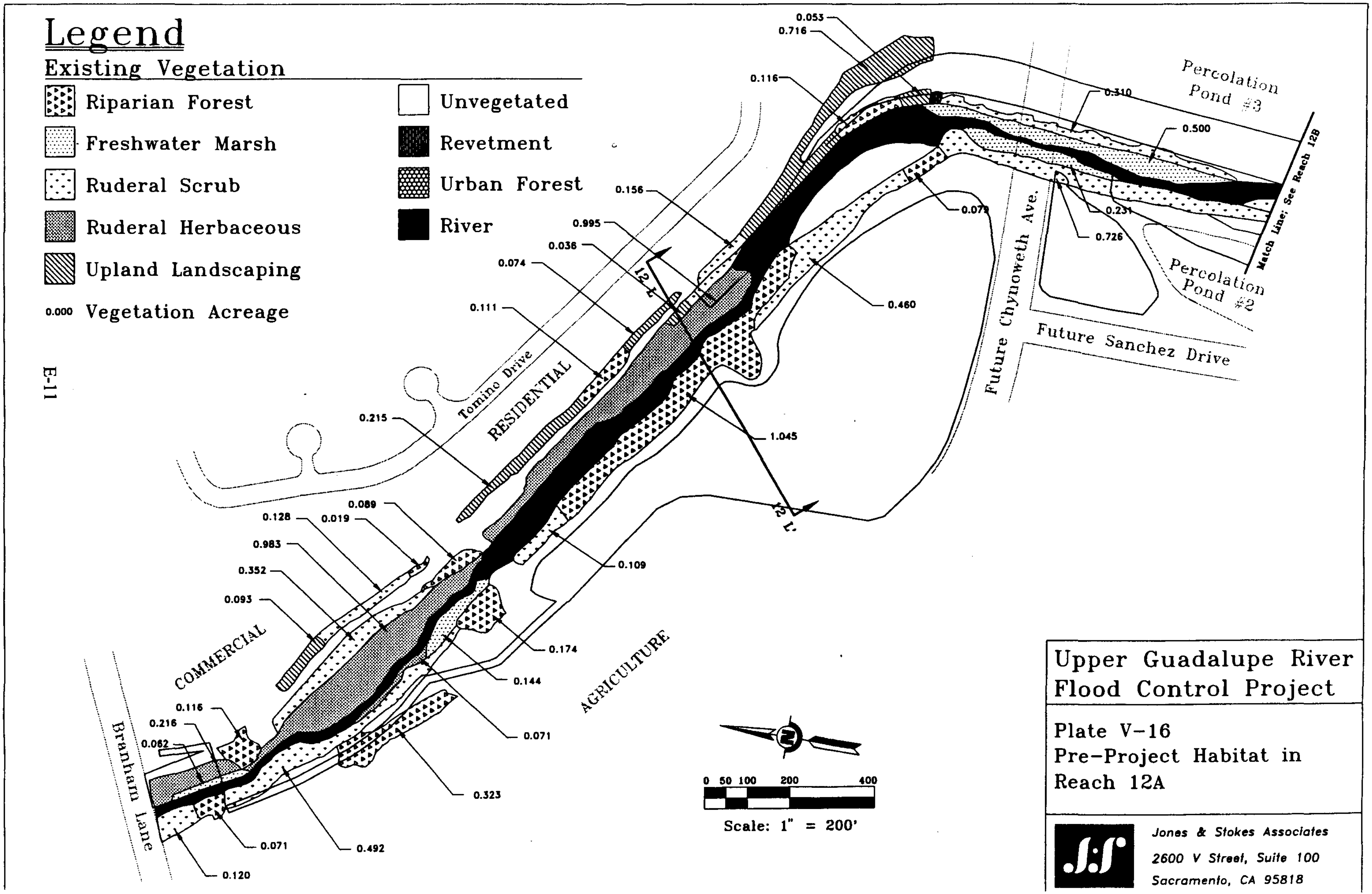
Scale: 1" = 200'

Upper Guadalupe River Flood Control Project

Plate V-14
Pre-Project Habitat in Reach 11A

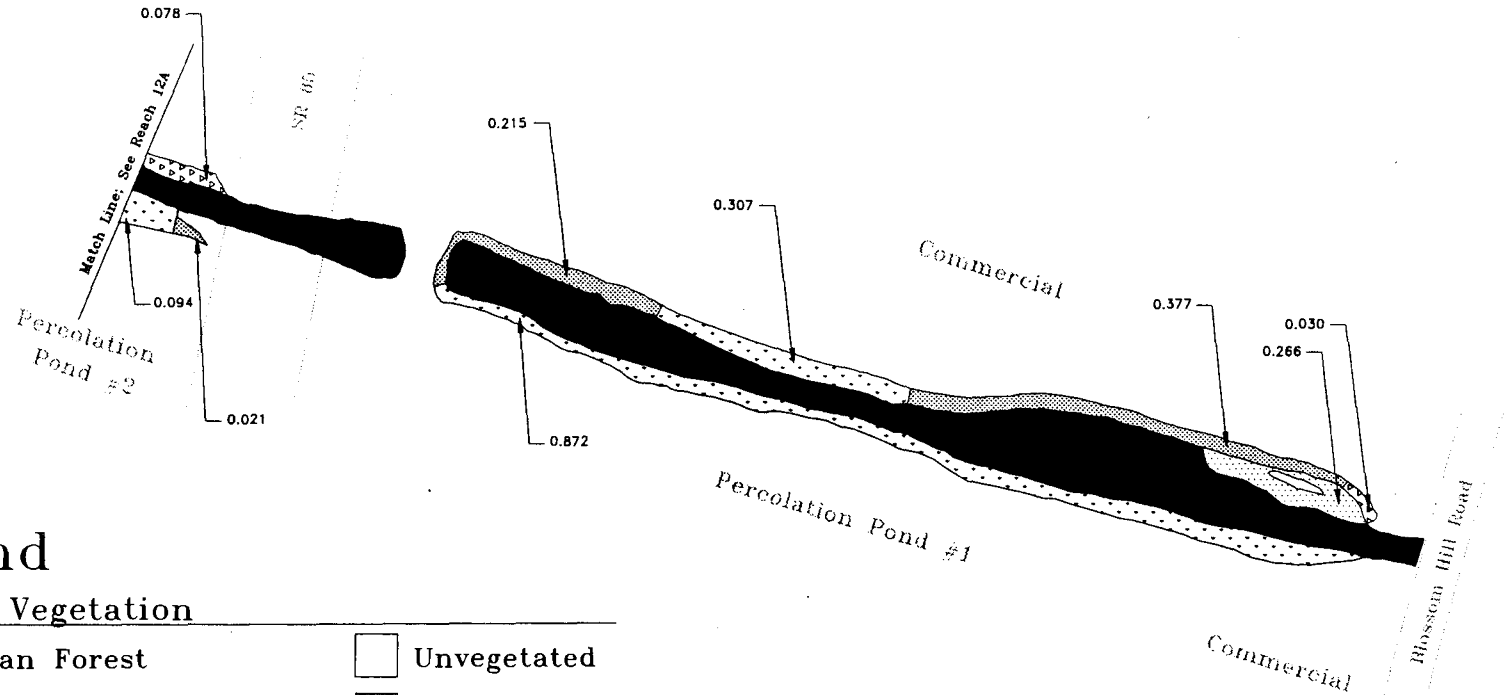
Jones & Stokes Associates
2600 V Street, Suite 100
Sacramento, CA 95818


Legend
Existing Vegetation
Riparian Forest
Freshwater Marsh
Ruderal Scrub
Ruderal Herbaceous
Upland Landscaping
Unvegetated
Revetment
Urban Forest
River
0.000 Vegetation Acreage
INDUSTRIAL
RESIDENTIAL
COMMERCIAL
THOUSAND OAKS DRIVE
SQUARE
WELLINGTON
BRANHAM LANE
ROSS CREEK
ALMADEN EXPRESSWAY
Match Line; See Reach 11A
Reach 11C
Reach 11B
11B J
11B J'
11C K
11C K'
0.040
0.147
1.388
0.118
0.038
0.099
0.264
0.036
0.034
0.132
0.043
0.058
0.643
0.085
0.813
0.706
0.215
0.115
0.363
0.689
0.153
0.086
0.132
0 50 100 200 400
Scale: 1" = 200'
Upper Guadalupe River Flood Control Project
Plate V-15
Pre-Project Habitat in Reaches 11B and 11C
Jones & Stokes Associates
2600 V Street, Suite 100
Sacrament 95818



Upper Guadalupe River Flood Control Project

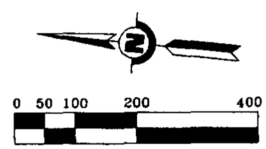
Plate V-16
Pre-Project Habitat in Reach 12A



Legend

Existing Vegetation

Riparian Forest
Freshwater Marsh
Ruderal Scrub
Ruderal Herbaceous
Upland Landscaping
Unvegetated
Revetment
Urban Forest
River
0.000 Vegetation Acreage



Scale: 1" = 200'

Upper Guadalupe River Flood Control Project

Plate V-17.1
Pre-Project Habitat in Reach 12B

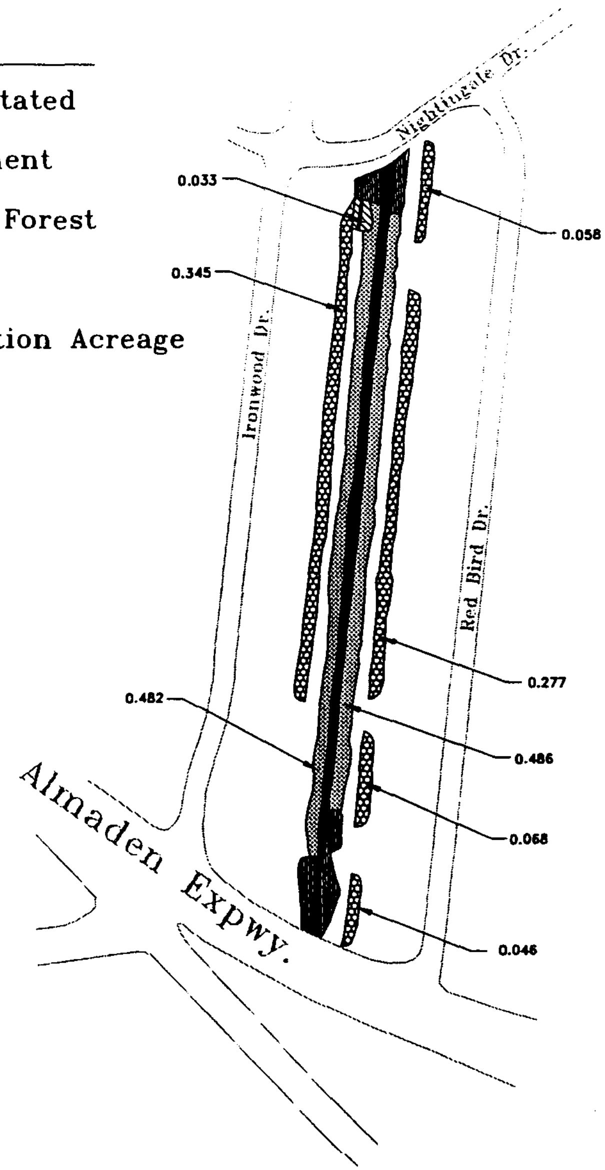
Jones & Stokes Associates
2600 V Street, Suite 100
Sacram CA 95818

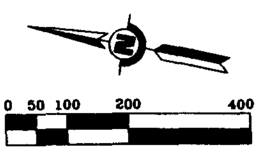
Legend

Existing Vegetation

- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Unvegetated
- Revetment
- Urban Forest
- River
- 0.000 Vegetation Acreage

No vegetation occurs within project limits upstream of Nightingale Drive.

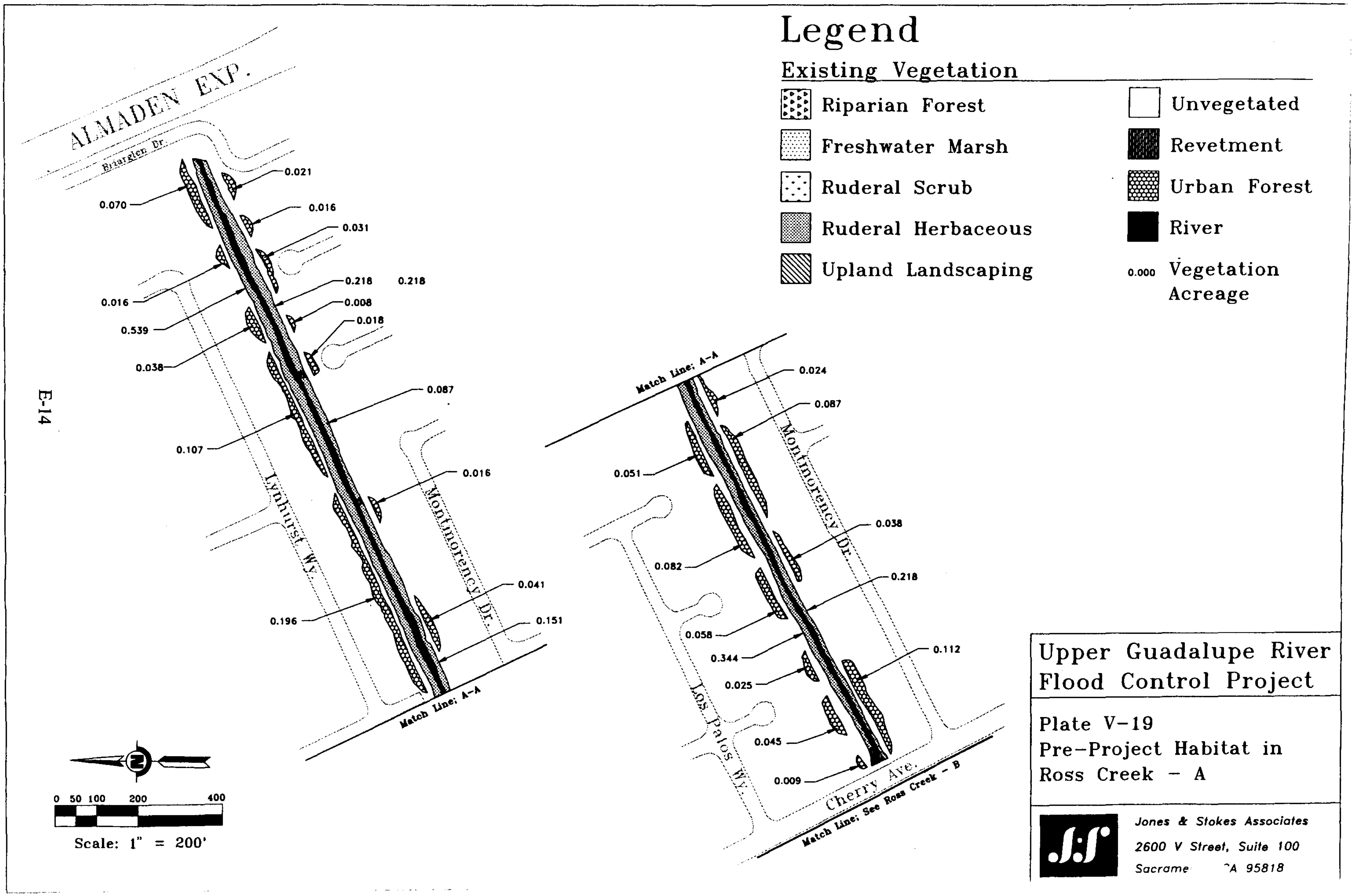




Upper Guadalupe River Flood Control Project

Plate V-18
Pre-Project Habitat in Canoas Creek

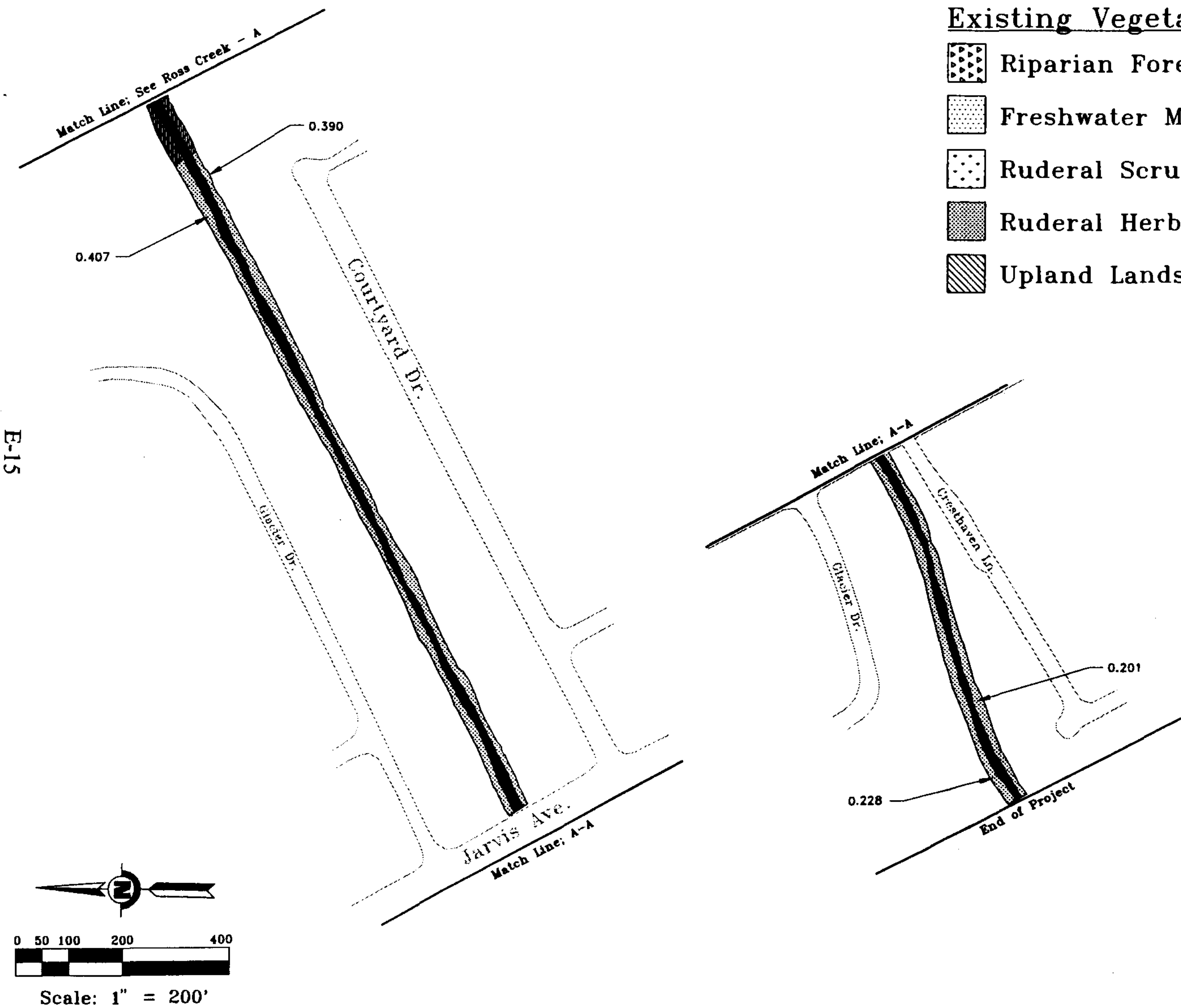
Jones & Stokes Associates
2600 V Street, Suite 100
Sacramento, CA 95818



Upper Guadalupe River Flood Control Project

Plate V-19
Pre-Project Habitat in Ross Creek - A

Jones & Stokes Associates
2600 V Street, Suite 100
Sacrame ˜A 95818



Legend

Existing Vegetation

- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Unvegetated
- Revetment
- Urban Forest
- River
- 0.000 Vegetation Acreage

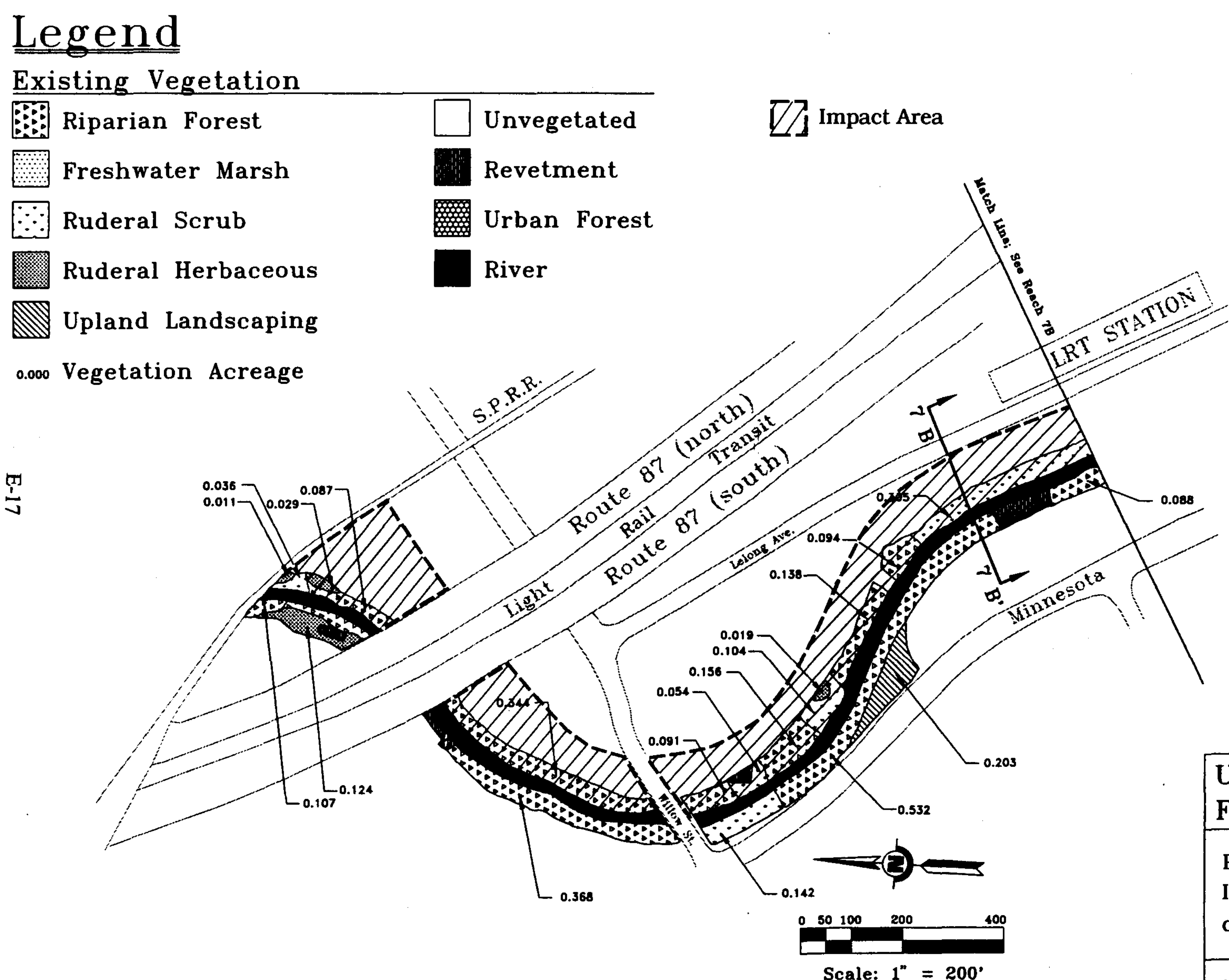
Upper Guadalupe River Flood Control Project

Plate V-20
Pre-Project Habitat in Ross Creek - B

Jones & Stokes Associates
2600 V Street, Suite 100
Sacramento, CA 95818

Channel Widening Plan Construction Impacts
(Reaches 7, 8, 10A, 10C, 11A, 11B, 11C, Canoas Creek, and Ross Creek)

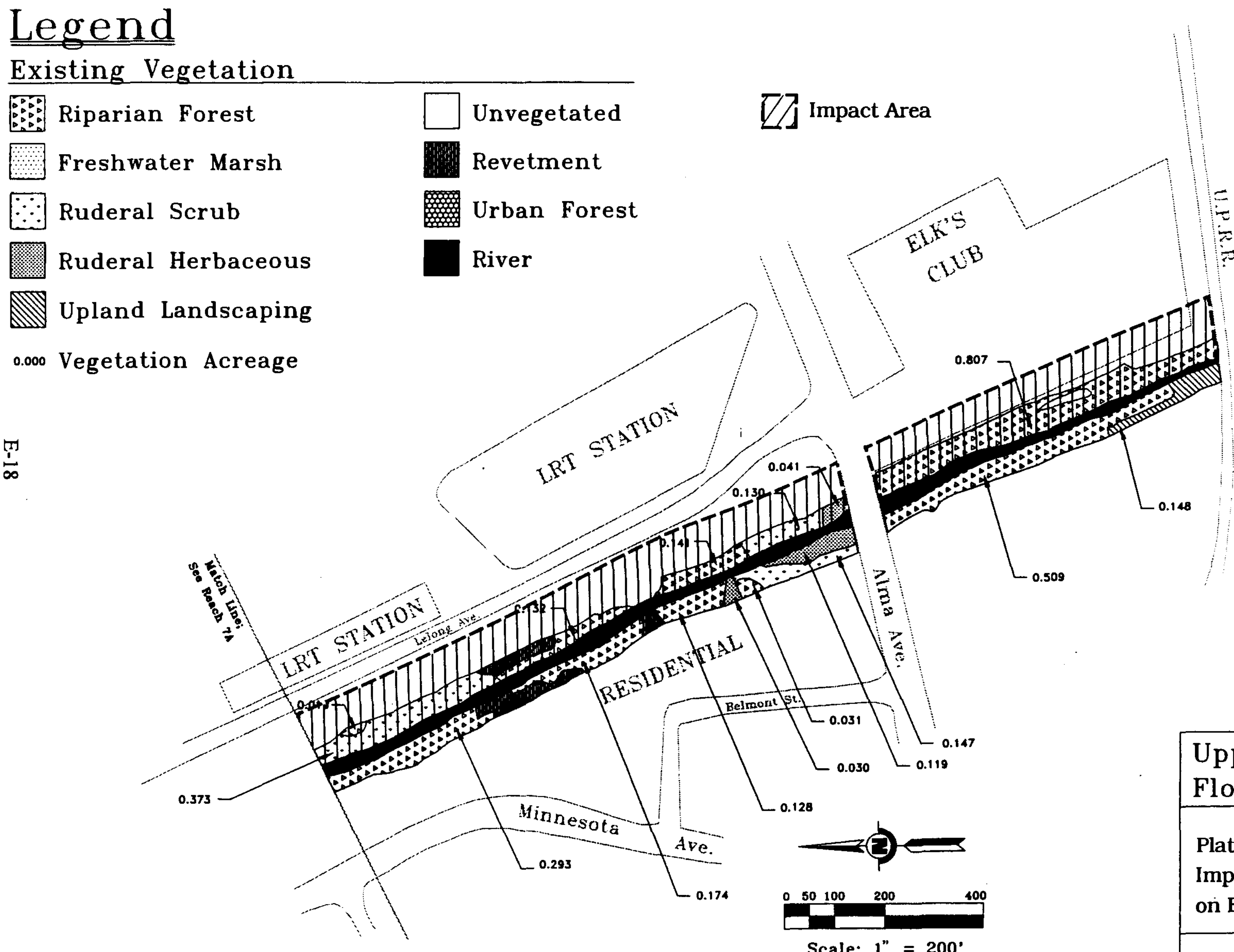
(Source: USACE information transposed onto maps from
Parsons Engineering Science 1997 [original maps
by Jones & Stokes])



Upper Guadalupe River
Flood Control Project

Plate V-6
Impacts of Channel Widening Plan on Existing Habitats in Reach 7A

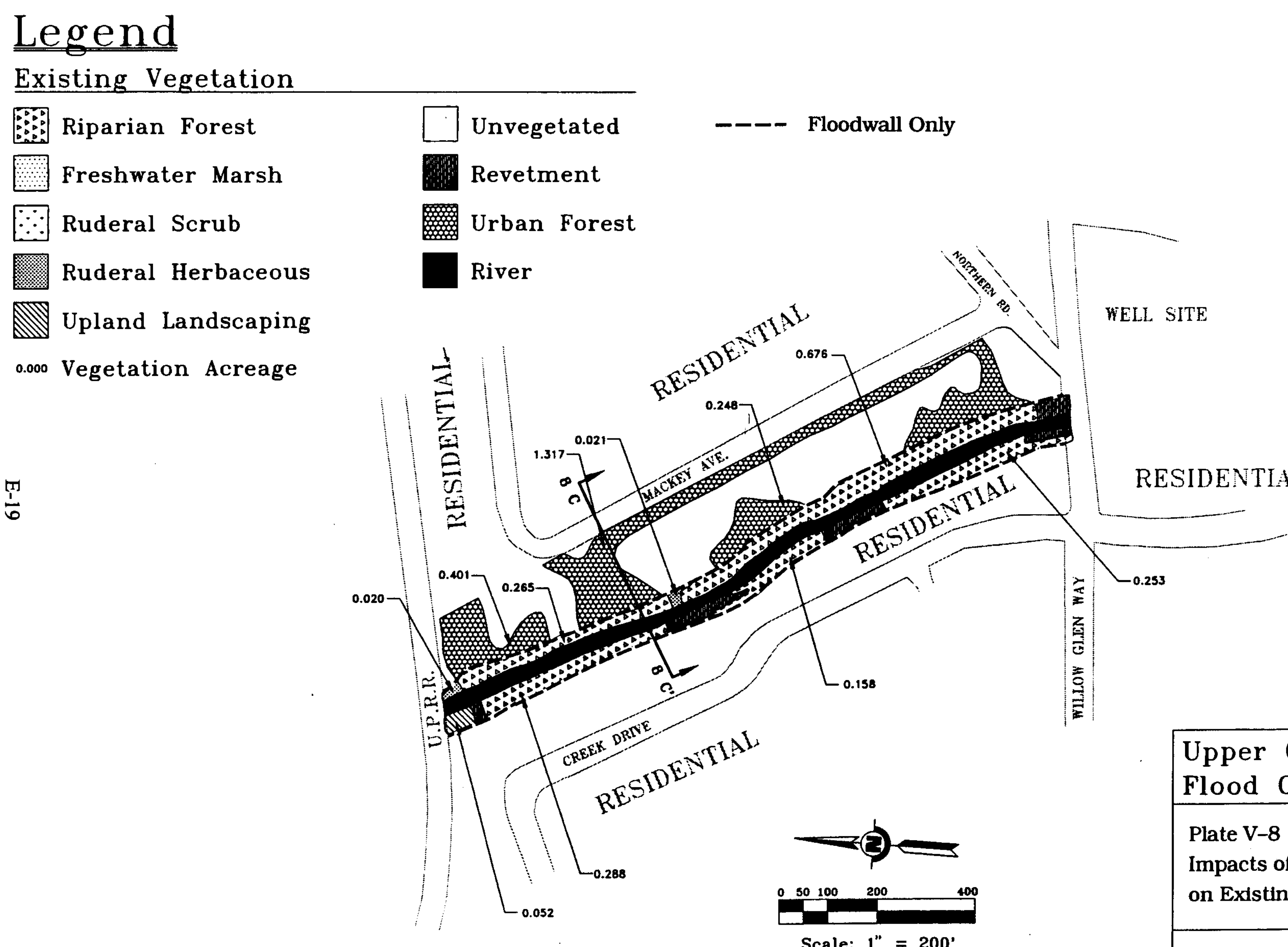
(Modified from Jones & Stokes Associates 1997)



Upper Guadalupe River Flood Control Project

Plate V-7
Impacts of Channel Widening Plan on Existing Habitats in Reach 7B

(Modified from Jones & Stokes Associates 1997)



Upper Guadalupe River Flood Control Project

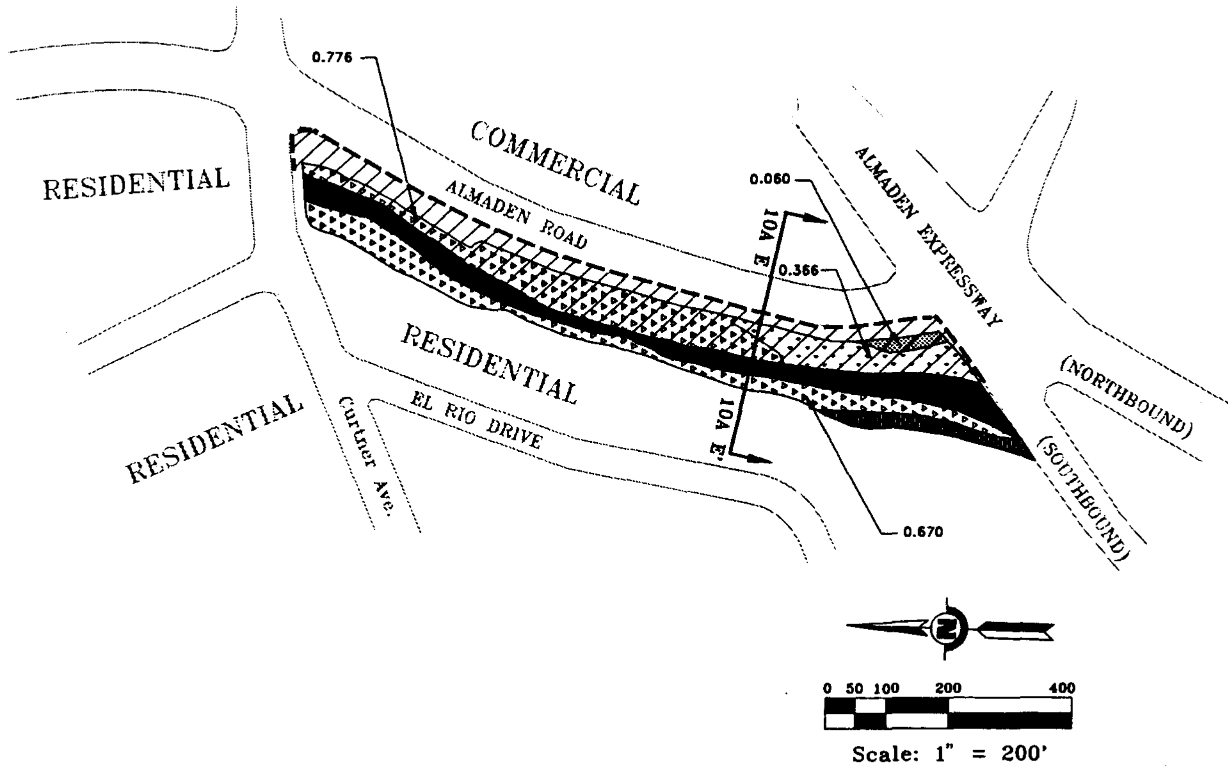
Plate V-8
Impacts of Channel Widening Plan on Existing Habitats in Reach 8

(Modified from Jones & Stokes Associates 1997)

Legend

Existing Vegetation

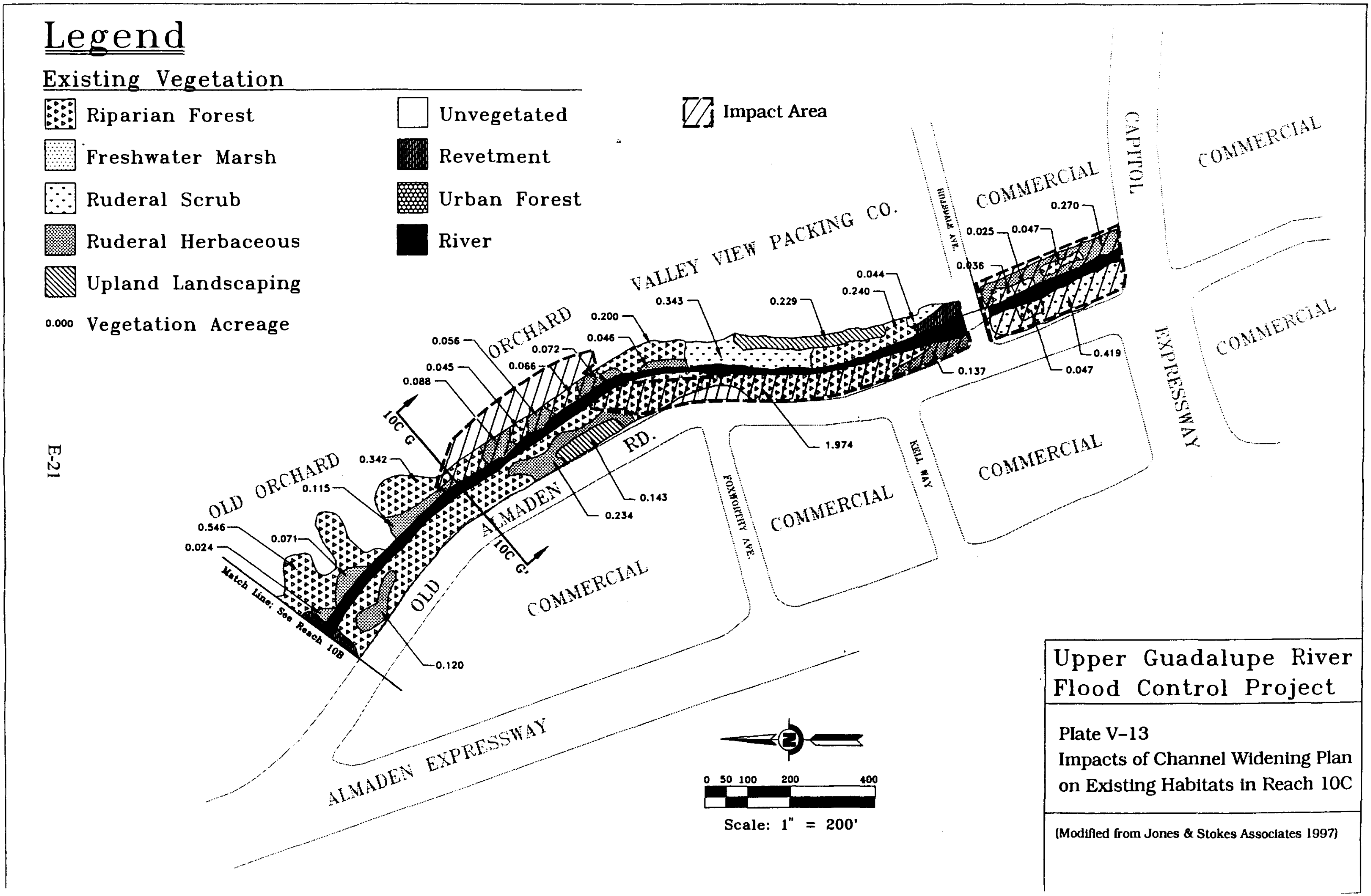
- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Unvegetated
- Revetment
- Urban Forest
- River
- 0.000 Vegetation Acreage
- Impact Area



Upper Guadalupe River Flood Control Project

Plate V-11
Impacts of Channel Widening Plan on Existing Habitats in Reach 10A

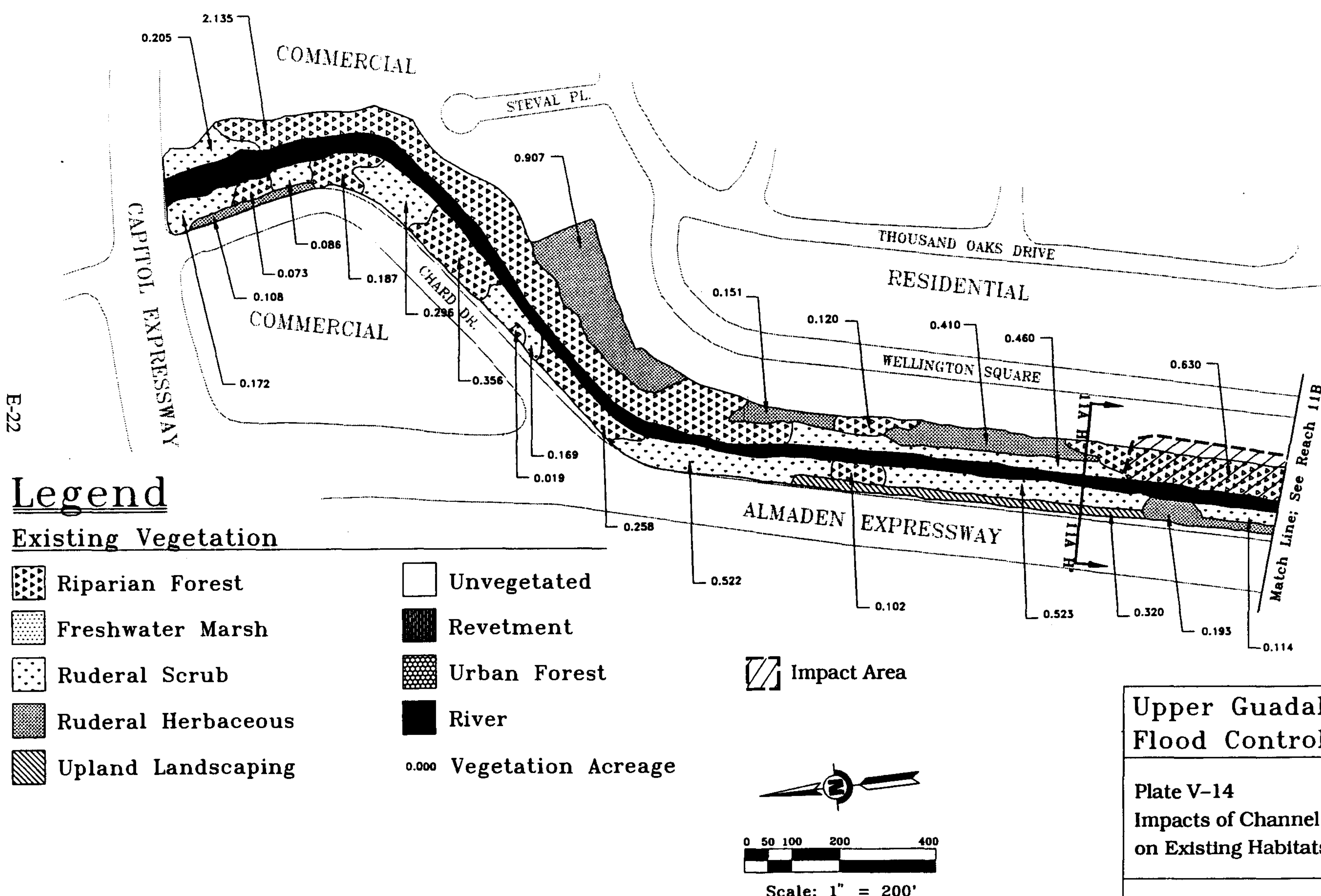
(Modified from Jones & Stokes Associates 1997)



Upper Guadalupe River Flood Control Project

Plate V-13
Impacts of Channel Widening Plan on Existing Habitats in Reach 10C

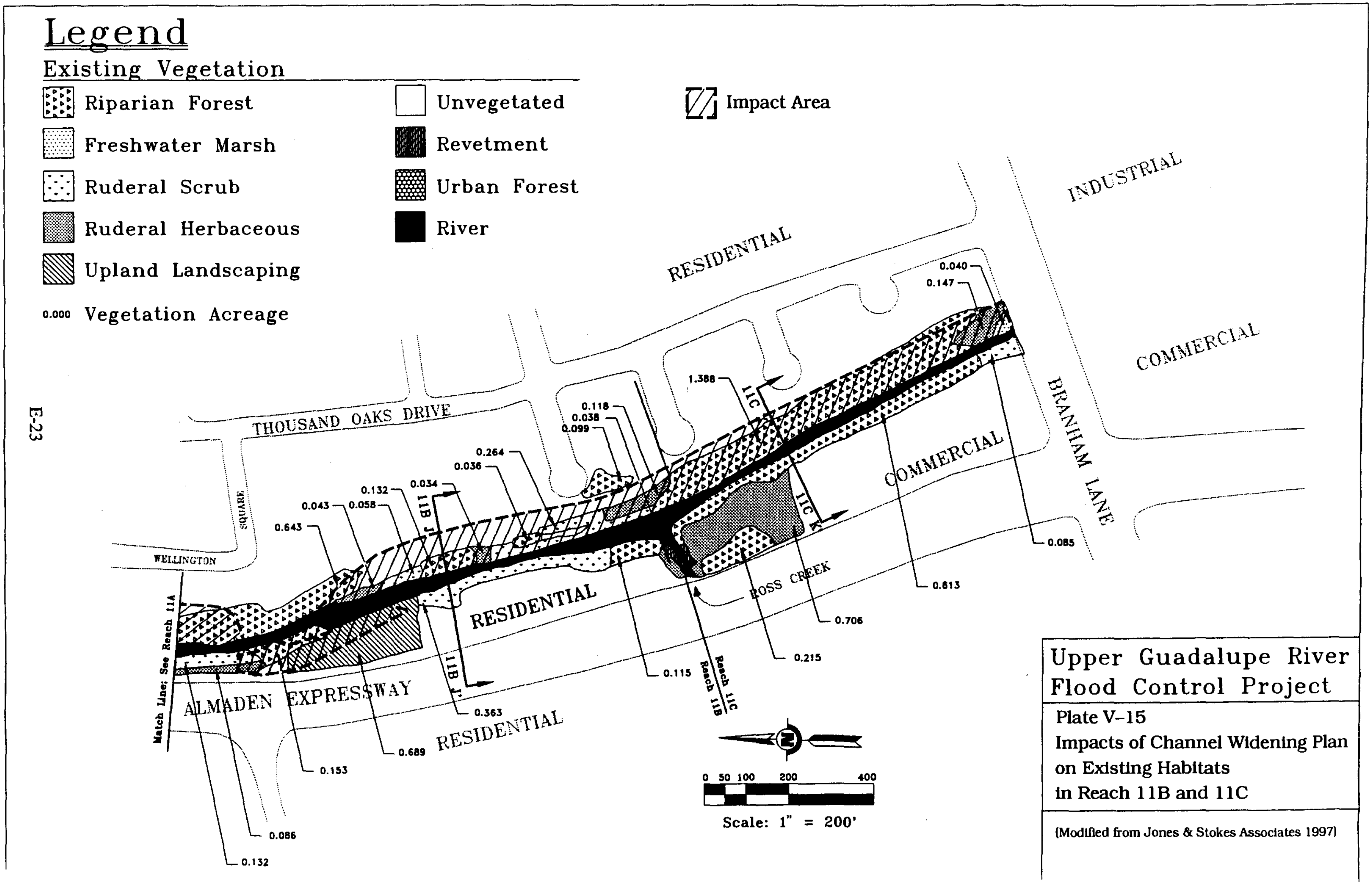
(Modified from Jones & Stokes Associates 1997)



Upper Guadalupe River Flood Control Project

Plate V-14
Impacts of Channel Widening Plan on Existing Habitats in Reach 11A

(Modified from Jones & Stokes Associates 1997)



Upper Guadalupe River Flood Control Project

Plate V-15
Impacts of Channel Widening Plan on Existing Habitats in Reach 11B and 11C

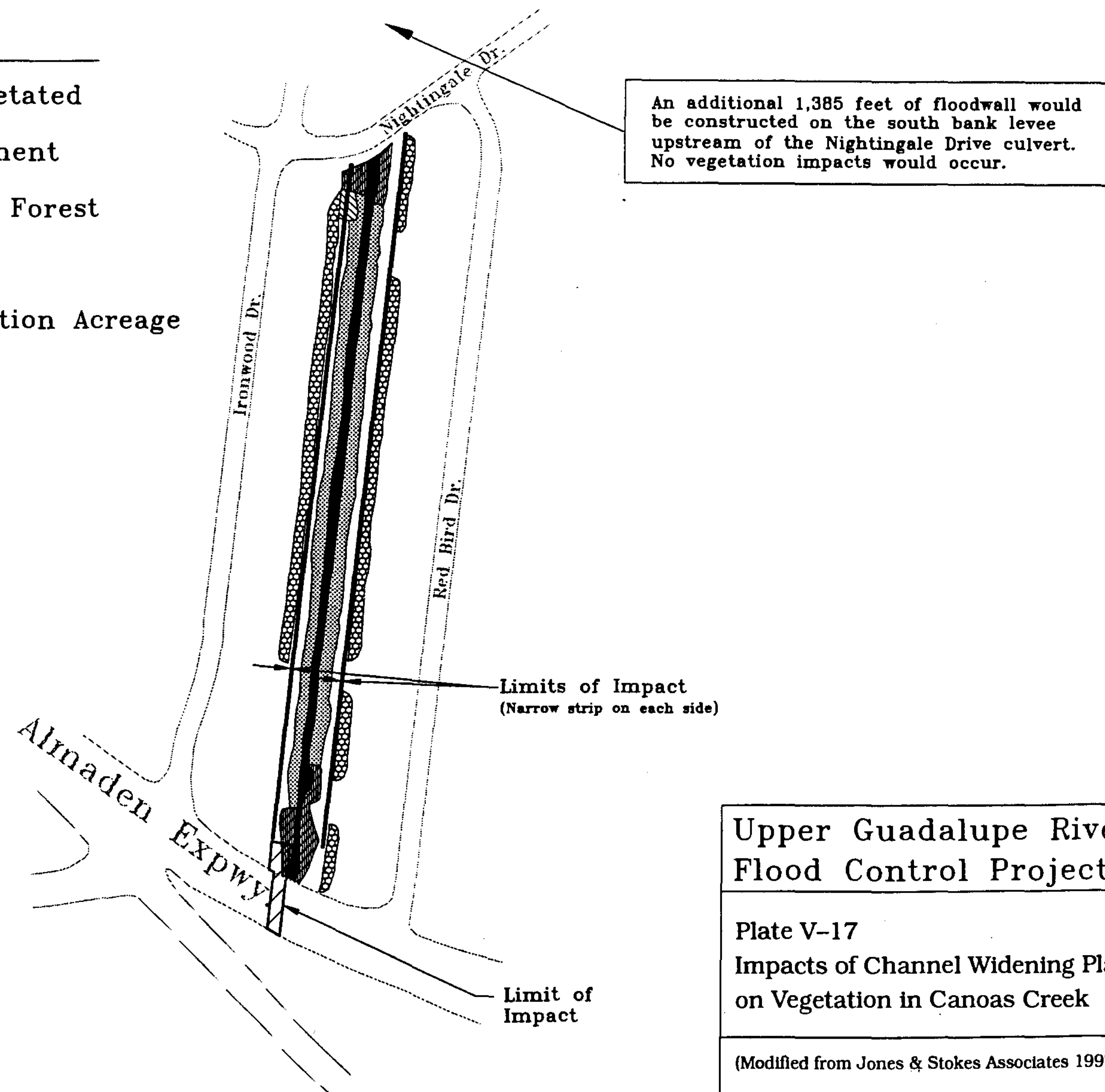
(Modified from Jones & Stokes Associates 1997)

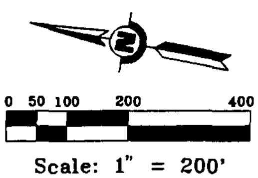
Legend

Existing Vegetation

- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Construction Impact Area
- Unvegetated
- Revetment
- Urban Forest
- River

Vegetation Acreage

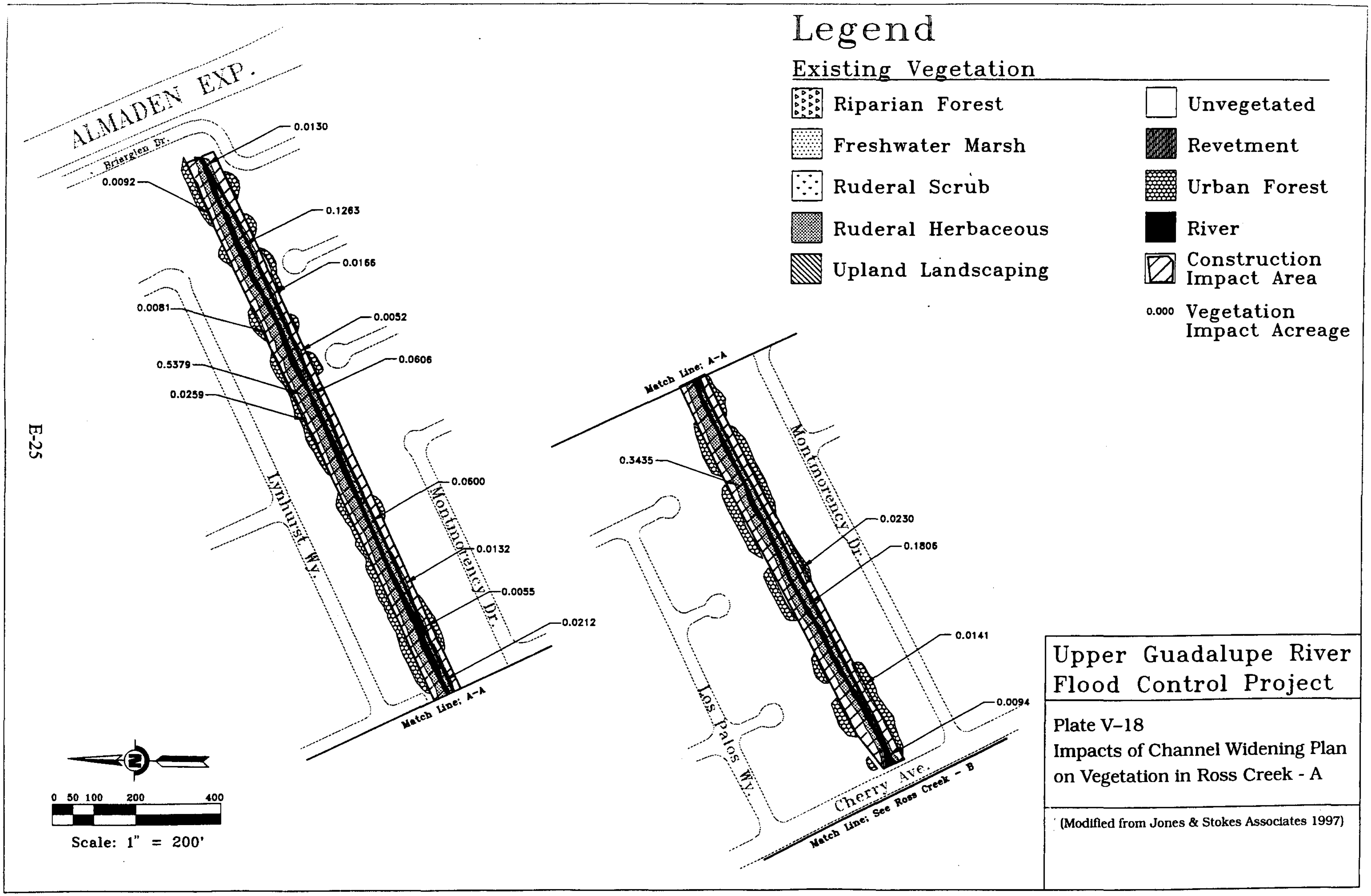




Upper Guadalupe River Flood Control Project

Plate V-17
Impacts of Channel Widening Plan on Vegetation in Canoas Creek

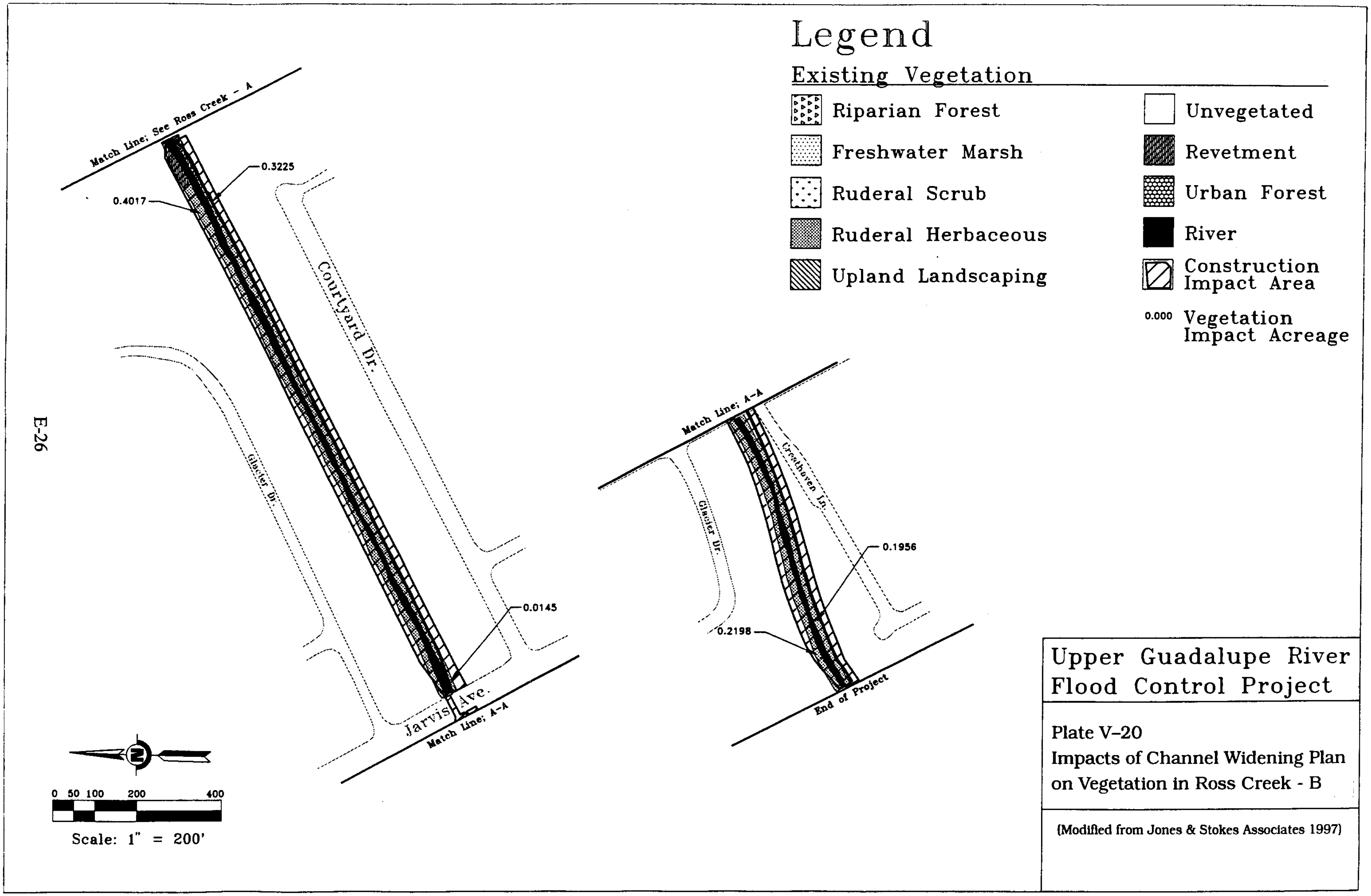
(Modified from Jones & Stokes Associates 1997)



Upper Guadalupe River Flood Control Project

Plate V-18
Impacts of Channel Widening Plan on Vegetation in Ross Creek - A

(Modified from Jones & Stokes Associates 1997)



Upper Guadalupe River Flood Control Project

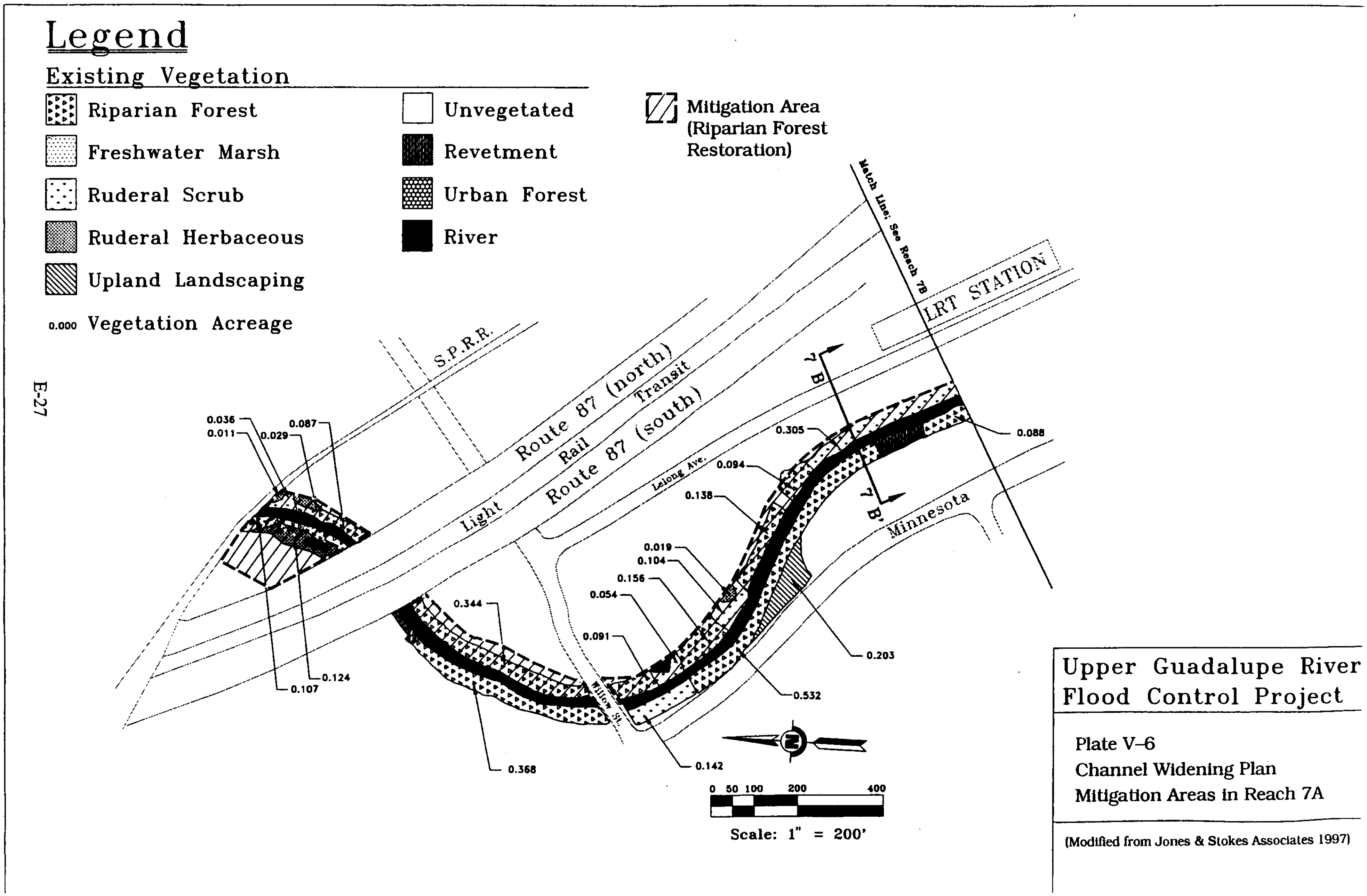
Plate V-20

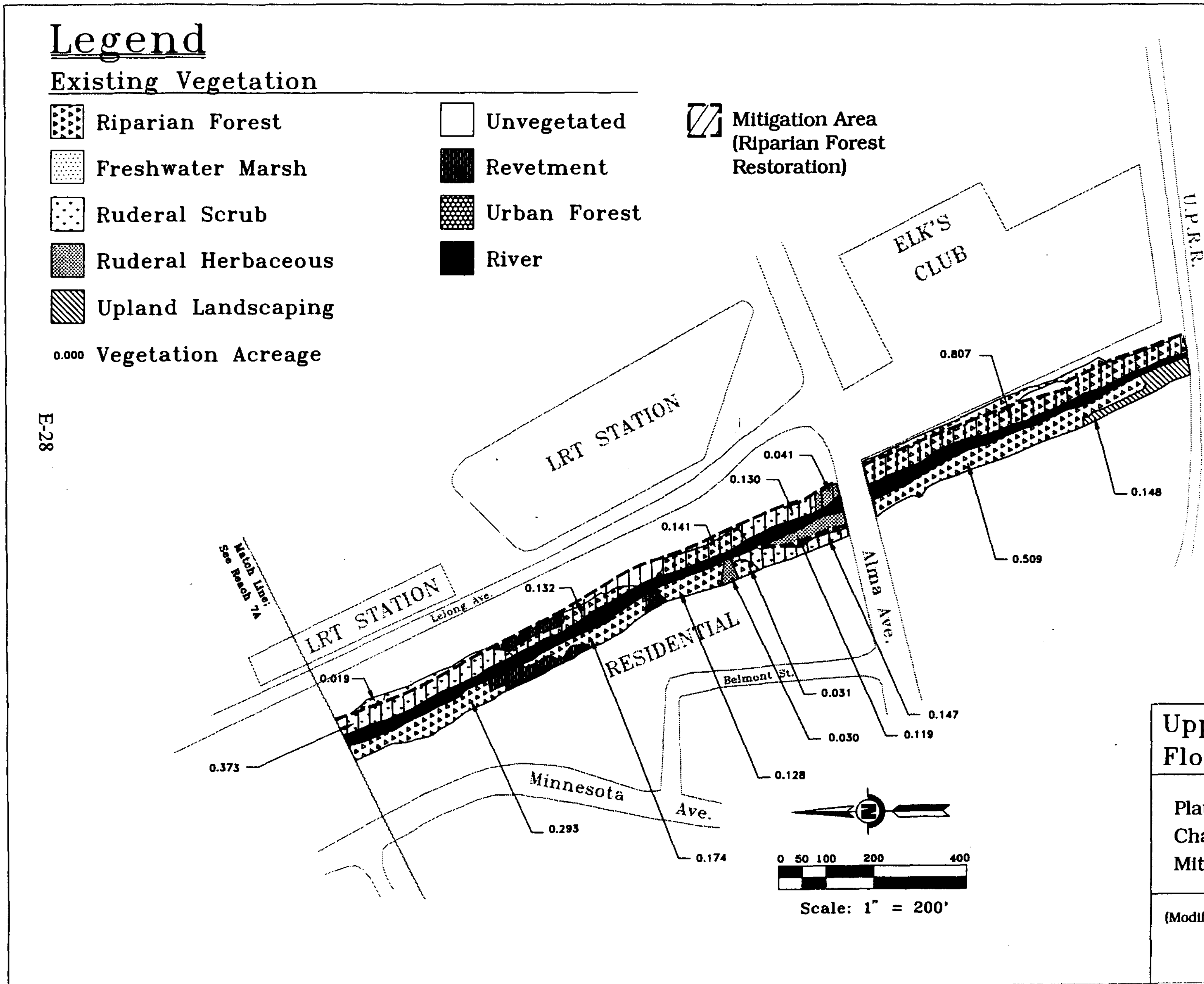
Impacts of Channel Widening Plan on Vegetation in Ross Creek - B

(Modified from Jones & Stokes Associates 1997)

Channel Widening Plan Mitigation Areas
(Reaches 7A, 7B, 9B, 10A, 10B, 10C, 11A, 11B, 11C, and 12A)

(Source: USACE information transposed onto maps from
Parsons Engineering Science 1997 [original maps
by Jones & Stokes])


Legend
Existing Vegetation
Riparian Forest
Freshwater Marsh
Ruderal Scrub
Ruderal Herbaceous
Upland Landscaping
0.000 Vegetation Acreage
Unvegetated
Revetment
Urban Forest
River
Mitigation Area (Riparian Forest Restoration)
Match Line: See Reach 7B
LRT STATION
S.P.R.R.
Route 87 (north)
Light Rail Transit
Route 87 (south)
Lelong Ave.
Minnesota
Willow St.
7B
7B'
0.036
0.011
0.029
0.087
0.107
0.124
0.344
0.368
0.305
0.094
0.138
0.019
0.104
0.156
0.054
0.091
0.142
0.532
0.203
0.088
0 50 100 200 400
Scale: 1" = 200'
Upper Guadalupe River Flood Control Project
Plate V-6
Channel Widening Plan
Mitigation Areas in Reach 7A
(Modified from Jones & Stokes Associates 1997)



Upper Guadalupe River Flood Control Project

Plate V–7
Channel Widening Plan
Mitigation Areas in Reach 7B

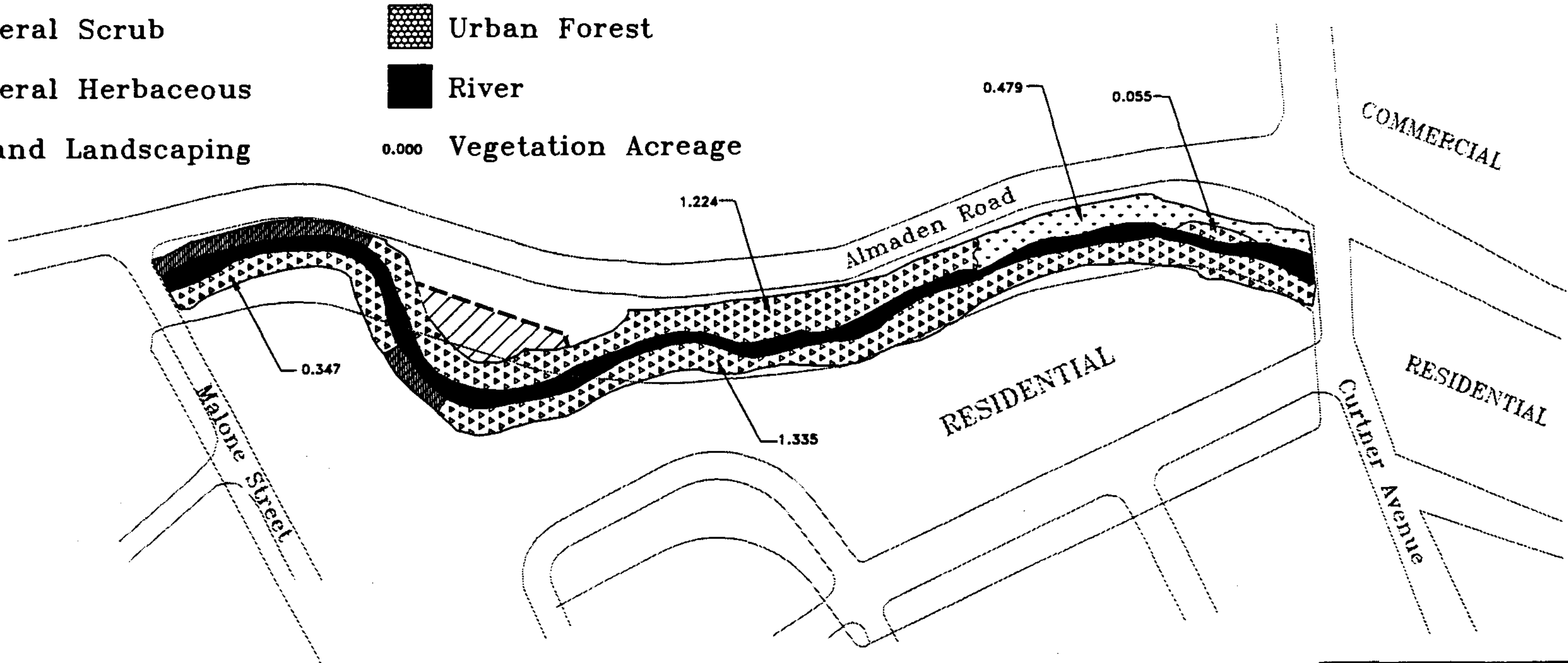
(Modified from Jones & Stokes Associates 1997)

Legend

Existing Vegetation

- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Unvegetated
- Revetment
- Urban Forest
- River
- 0.000 Vegetation Acreage
- Mitigation Area (Riparian Forest Restoration)

E-29



0 50 100 200 400

Scale: 1" = 200'

Upper Guadalupe River Flood Control Project

Plate V-10
Channel Widening Plan
Mitigation Areas in Reach 9B

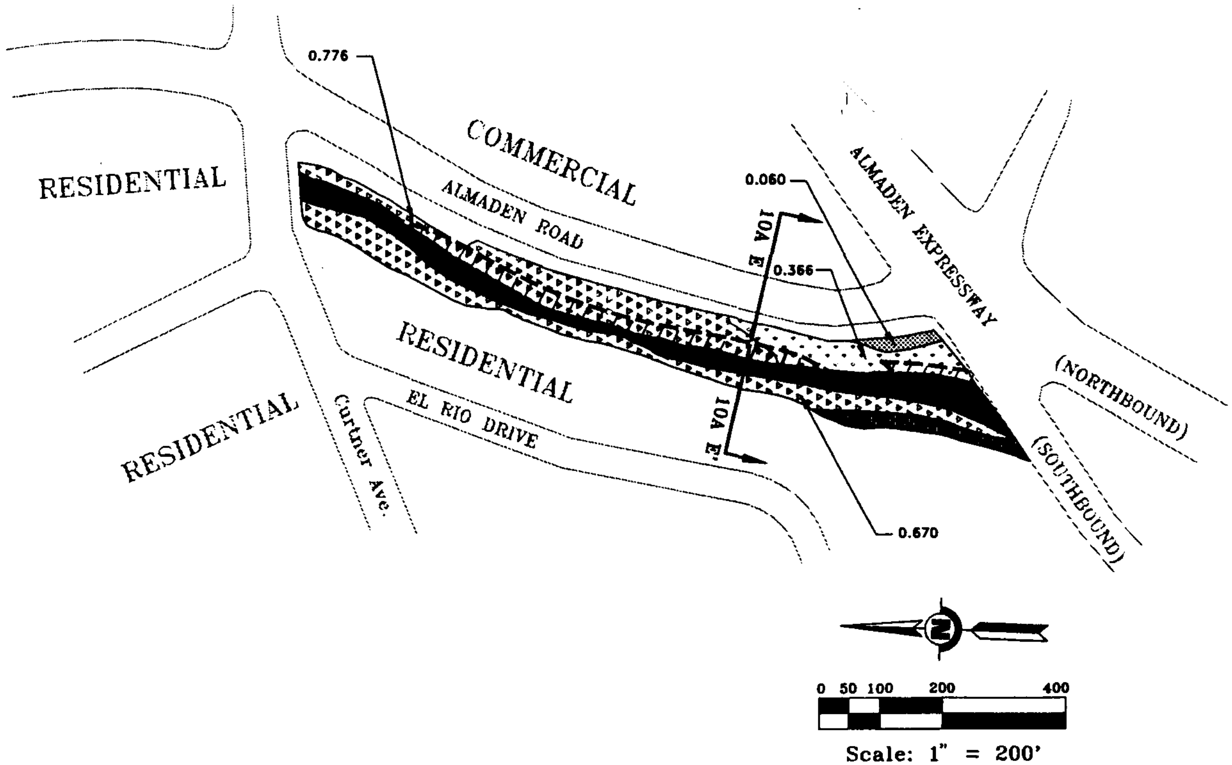
(Modified from Jones & Stokes Associates 1997)

Legend

Existing Vegetation

- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Unvegetated
- Revetment
- Urban Forest
- River
- 0.000 Vegetation Acreage

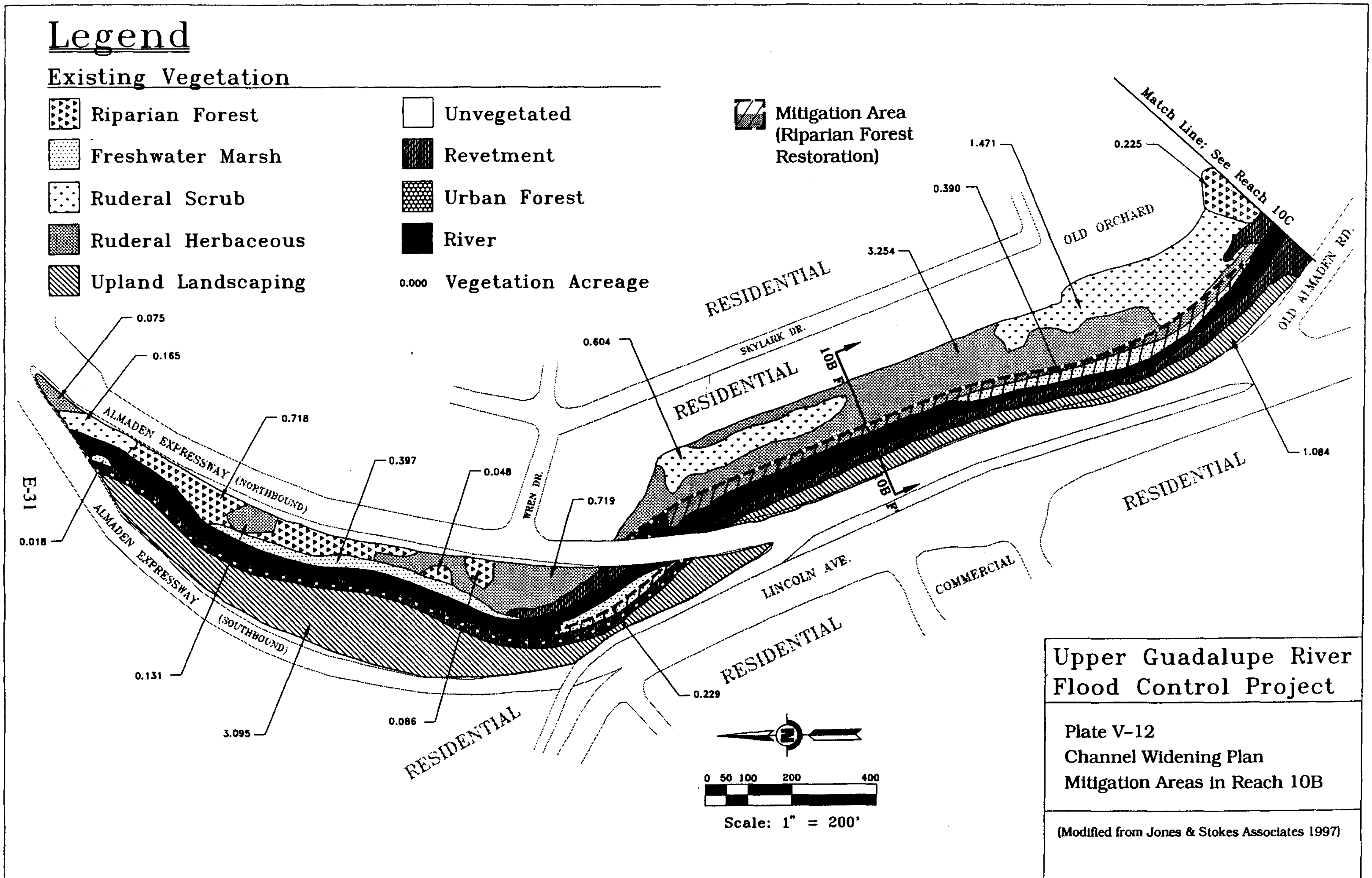
Mitigation Area (Riparian Forest Restoration)



Upper Guadalupe River Flood Control Project

Plate V-11
Channel Widening Plan
Mitigation Areas in Reach 10A

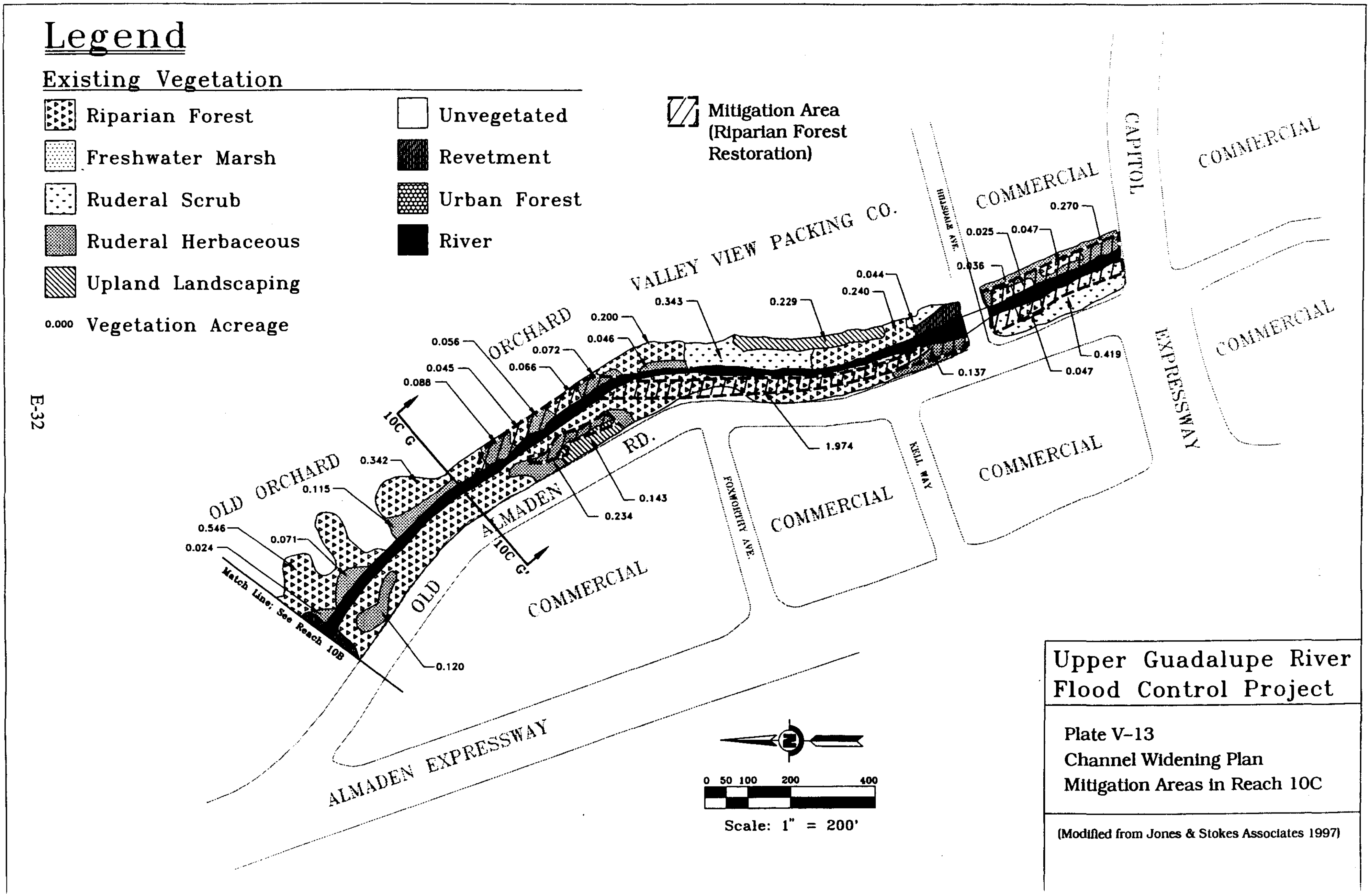
(Modified from Jones & Stokes Associates 1997)



Upper Guadalupe River Flood Control Project

Plate V-12
Channel Widening Plan
Mitigation Areas in Reach 10B

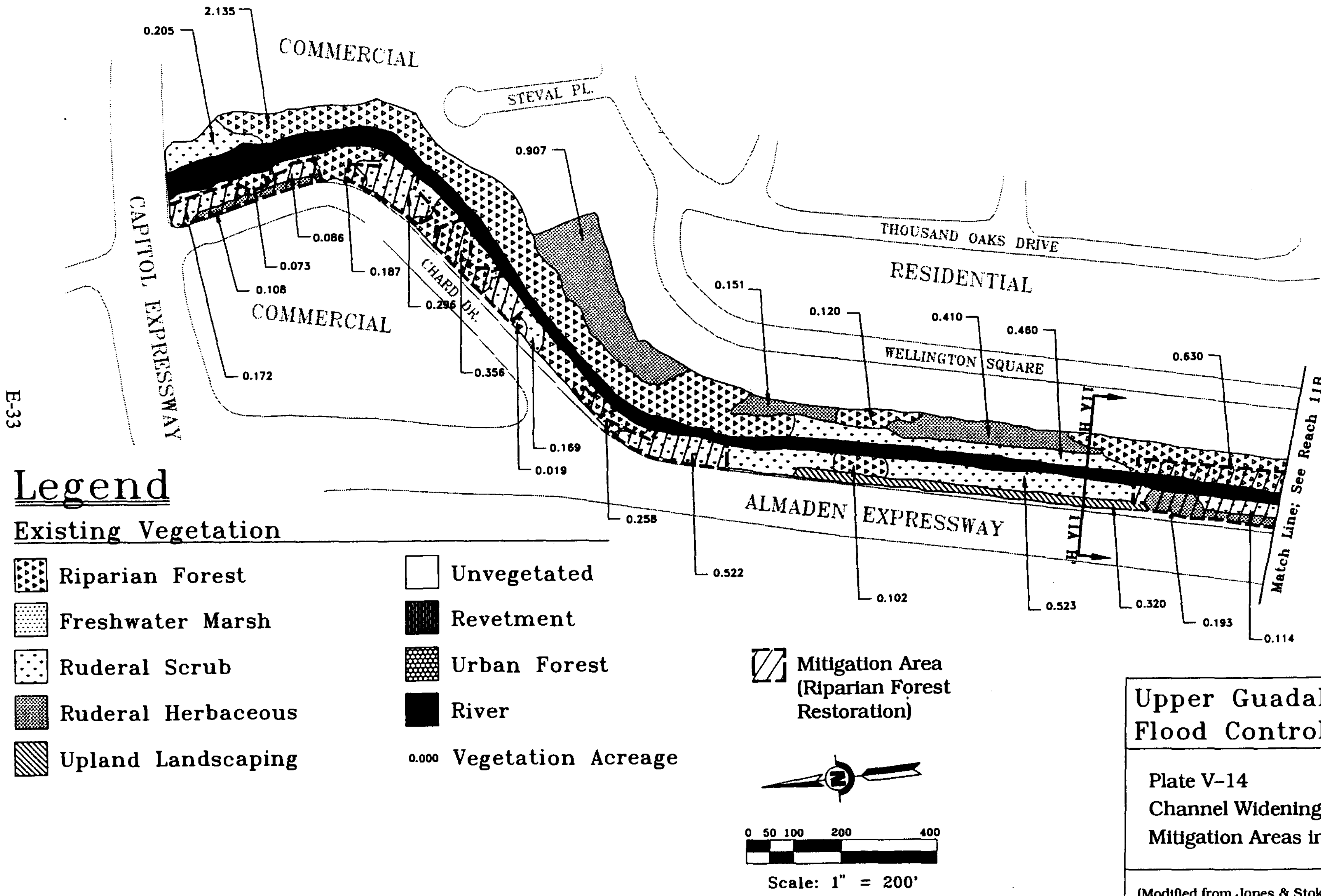
(Modified from Jones & Stokes Associates 1997)



Upper Guadalupe River Flood Control Project

Plate V-13
Channel Widening Plan
Mitigation Areas in Reach 10C

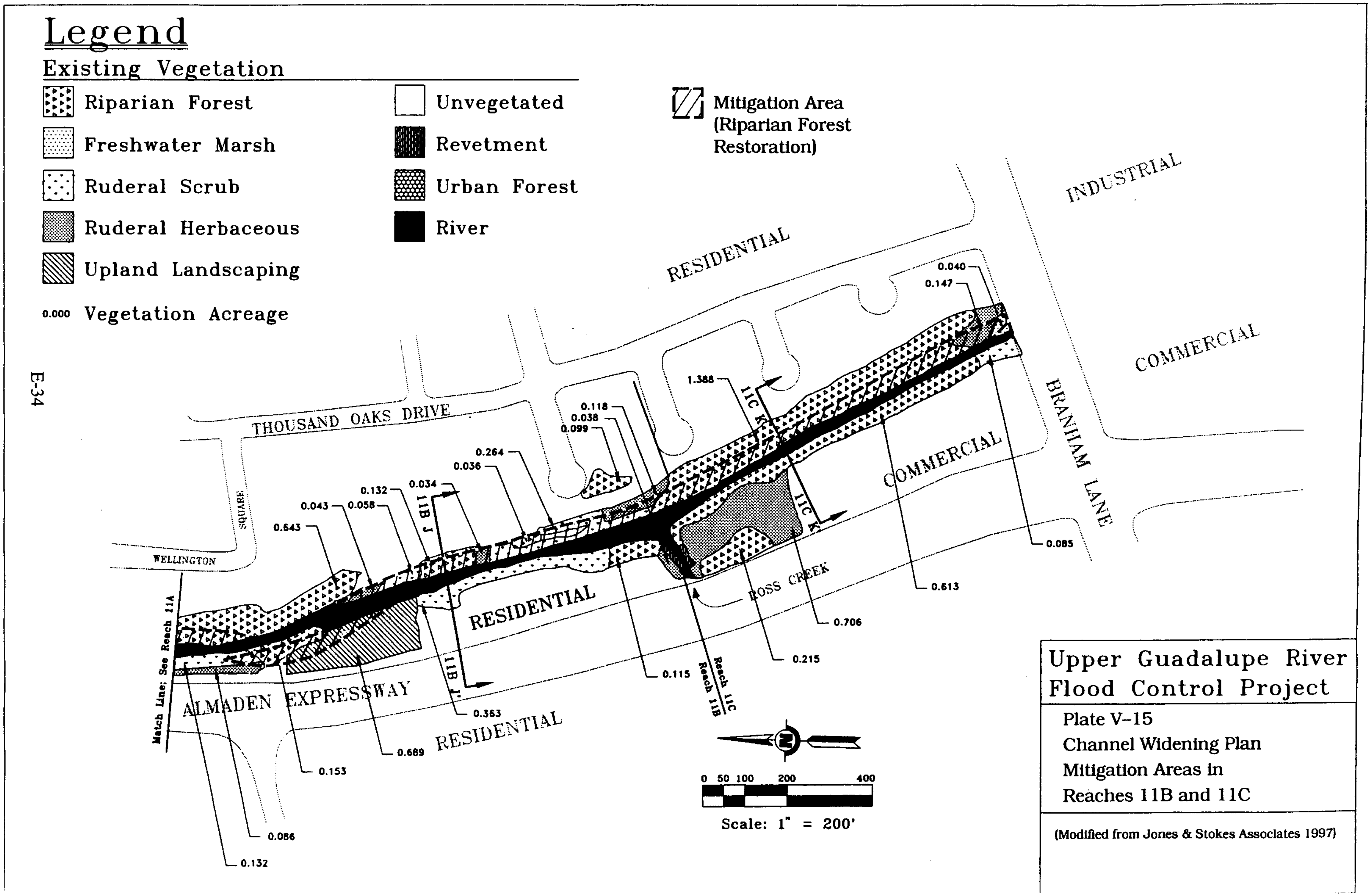
(Modified from Jones & Stokes Associates 1997)



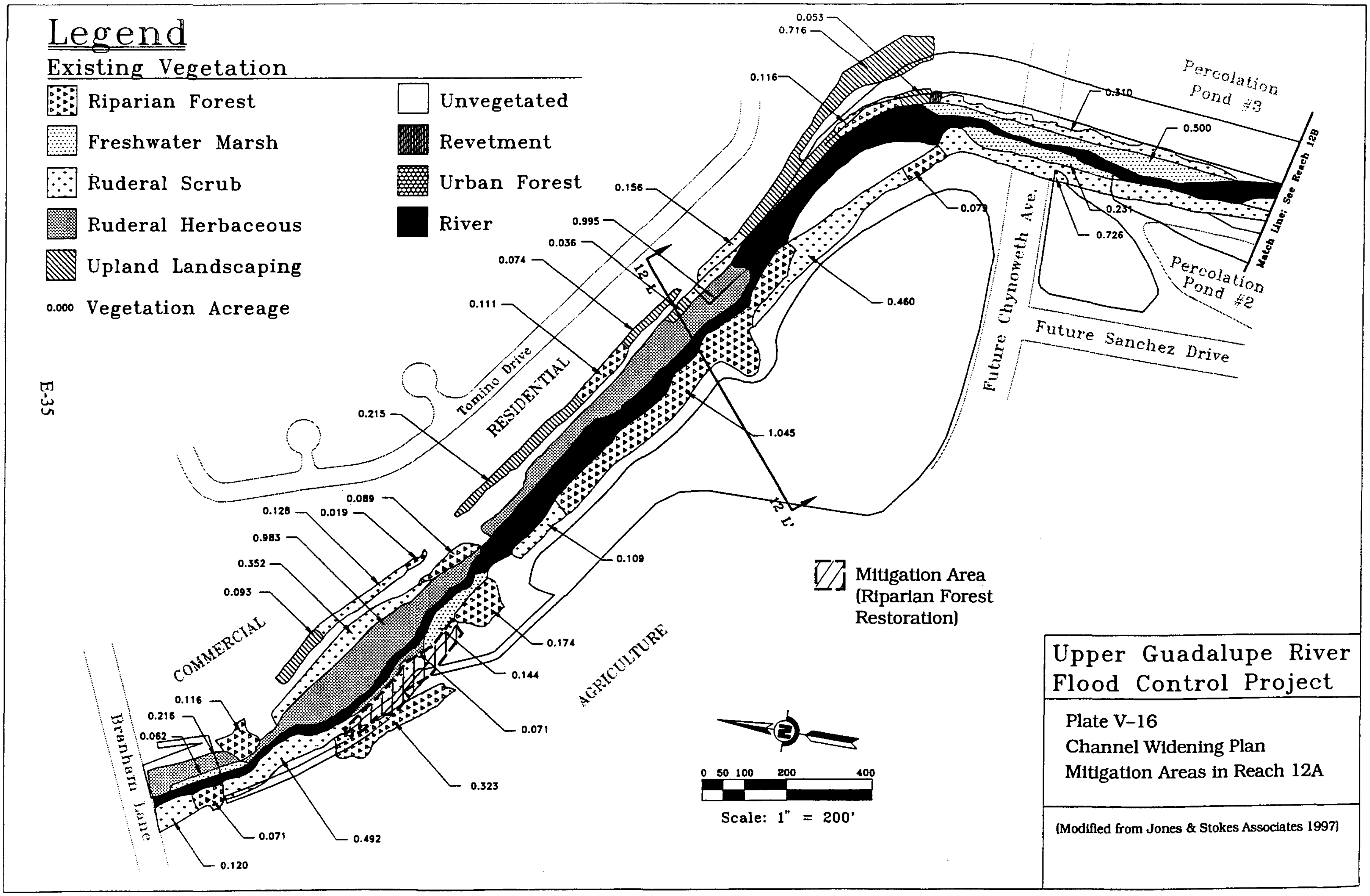
Upper Guadalupe River Flood Control Project

Plate V-14
Channel Widening Plan
Mitigation Areas in Reach 11A

(Modified from Jones & Stokes Associates 1997)



Legend
Existing Vegetation
Riparian Forest
Freshwater Marsh
Ruderal Scrub
Ruderal Herbaceous
Upland Landscaping
0.000 Vegetation Acreage
Unvegetated
Revetment
Urban Forest
River
Mitigation Area (Riparian Forest Restoration)
INDUSTRIAL
RESIDENTIAL
COMMERCIAL
BRANHAM LANE
THOUSAND OAKS DRIVE
SQUARE
WELLINGTON
ALMADEN EXPRESSWAY
RESIDENTIAL
RESIDENTIAL
COMMERCIAL
ROSS CREEK
Match Line; See Reach 11A
Reach 11C
Reach 11B
11B J
11B J'
11C K
11C K'
0.040
0.147
1.388
0.118
0.038
0.099
0.264
0.036
0.132
0.034
0.043
0.058
0.643
0.085
0.613
0.706
0.215
0.115
0.363
0.689
0.153
0.086
0.132
0 50 100 200 400
Scale: 1" = 200'
Upper Guadalupe River Flood Control Project
Plate V-15
Channel Widening Plan
Mitigation Areas in
Reaches 11B and 11C
(Modified from Jones & Stokes Associates 1997)


Legend
Existing Vegetation
Riparian Forest
Freshwater Marsh
Ruderal Scrub
Ruderal Herbaceous
Upland Landscaping
0.000 Vegetation Acreage
Unvegetated
Revetment
Urban Forest
River
Mitigation Area (Riparian Forest Restoration)
Tomino Drive
RESIDENTIAL
COMMERCIAL
AGRICULTURE
Branham Lane
Future Chynoweth Ave.
Future Sanchez Drive
Percolation Pond #3
Percolation Pond #2
Match Line: See Reach 12B
12 L'
0.053
0.716
0.116
0.310
0.500
0.156
0.995
0.036
0.074
0.111
0.215
0.079
0.231
0.726
0.460
1.045
0.109
0.089
0.128
0.019
0.983
0.352
0.093
0.174
0.144
0.071
0.116
0.216
0.062
0.323
0.071
0.492
0.120
0 50 100 200 400
Scale: 1" = 200'
Upper Guadalupe River Flood Control Project
Plate V-16
Channel Widening Plan
Mitigation Areas in Reach 12A
(Modified from Jones & Stokes Associates 1997)

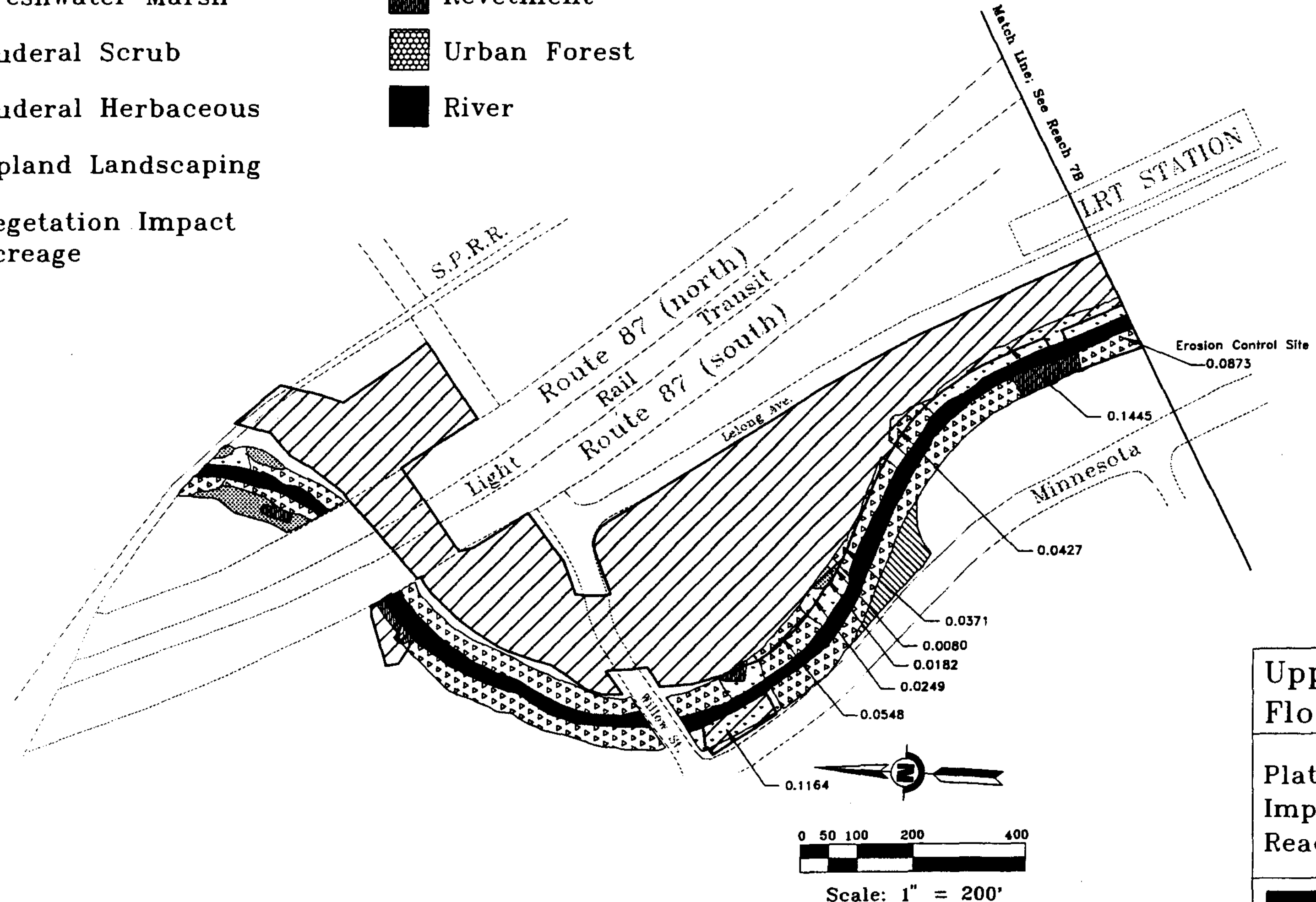
Bypass Channel Plan Construction Impacts

(Source: Parsons Engineering Science 1997
[original maps by Jones & Stokes])

Legend

Existing Vegetation

- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- 0.0000 Vegetation Impact Acreage
- Unvegetated
- Revetment
- Urban Forest
- River
- Construction Impact Area



Upper Guadalupe River Flood Control Project

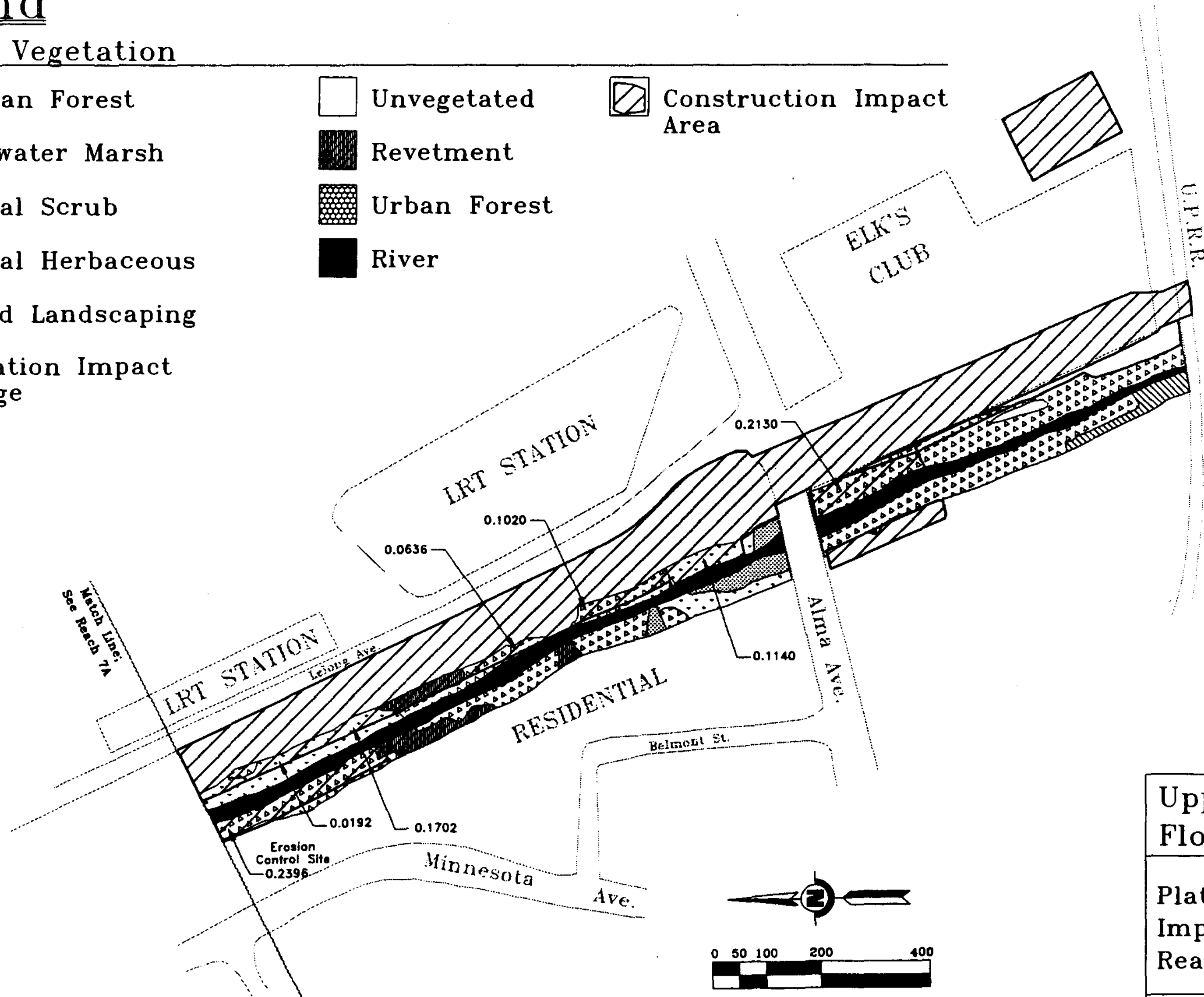
Plate V-26
Impacts on Vegetation in Reach 7A

Jones & Stokes Associates
2600 V Street, Suite 100

Legend

Existing Vegetation

- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- 0.0000 Vegetation Impact Acreage
- Unvegetated
- Revetment
- Urban Forest
- River
- Construction Impact Area



Upper Guadalupe River Flood Control Project

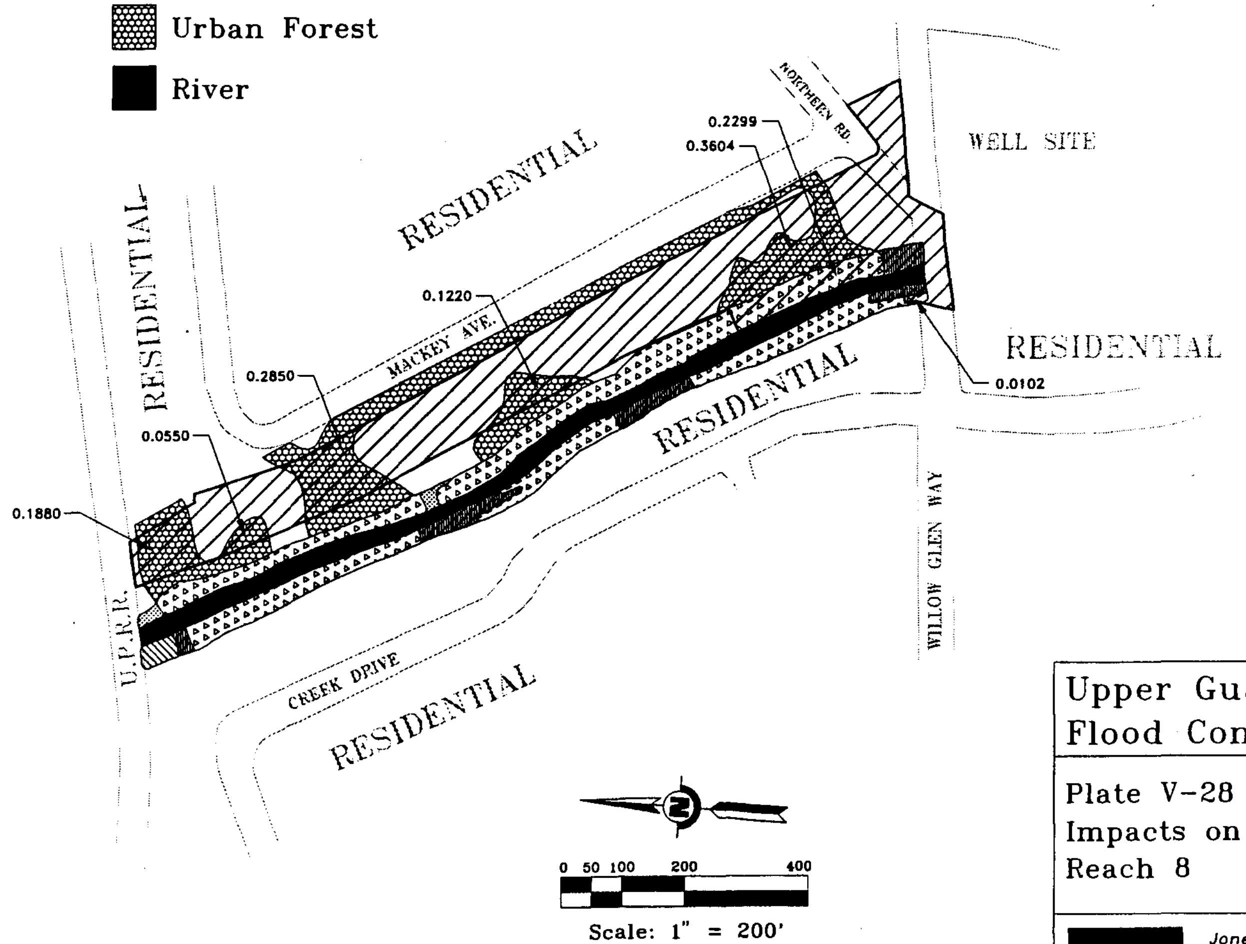
Plate V-27
Impacts on Vegetation in Reach 7B

Jones & Stokes Associates
2600 V Street, Suite 100
Sacr... CA 95818

Legend

Existing Vegetation

- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Unvegetated
- Revetment
- Urban Forest
- River
- Construction Impact Area
- 0.0000 Vegetation Impact Acreage



Upper Guadalupe River Flood Control Project

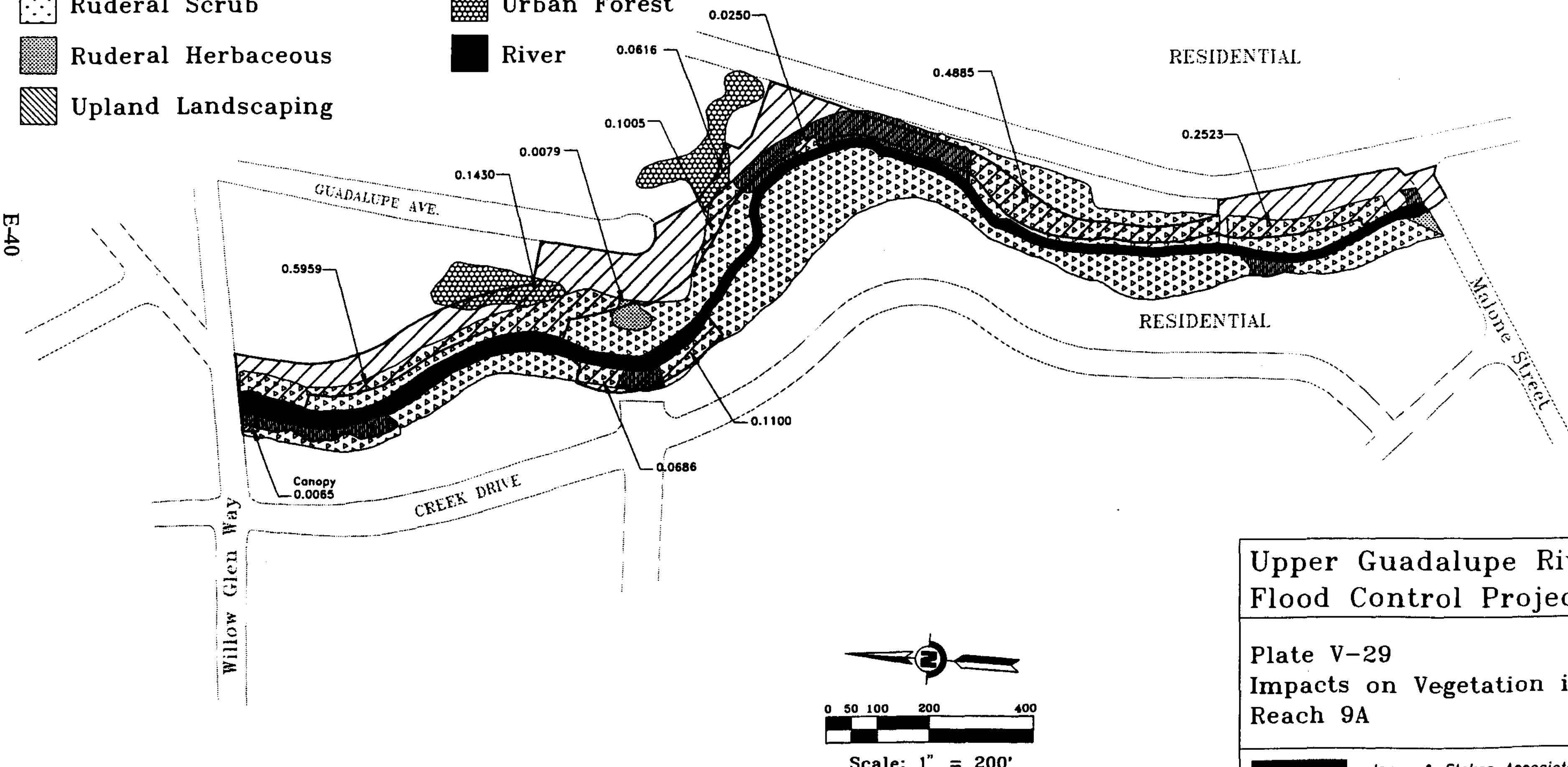
Plate V-28
Impacts on Vegetation in Reach 8

Jones & Stokes Associates
2600 V Street, Suite 100
Sacramento, CA 95818

Legend

Existing Vegetation

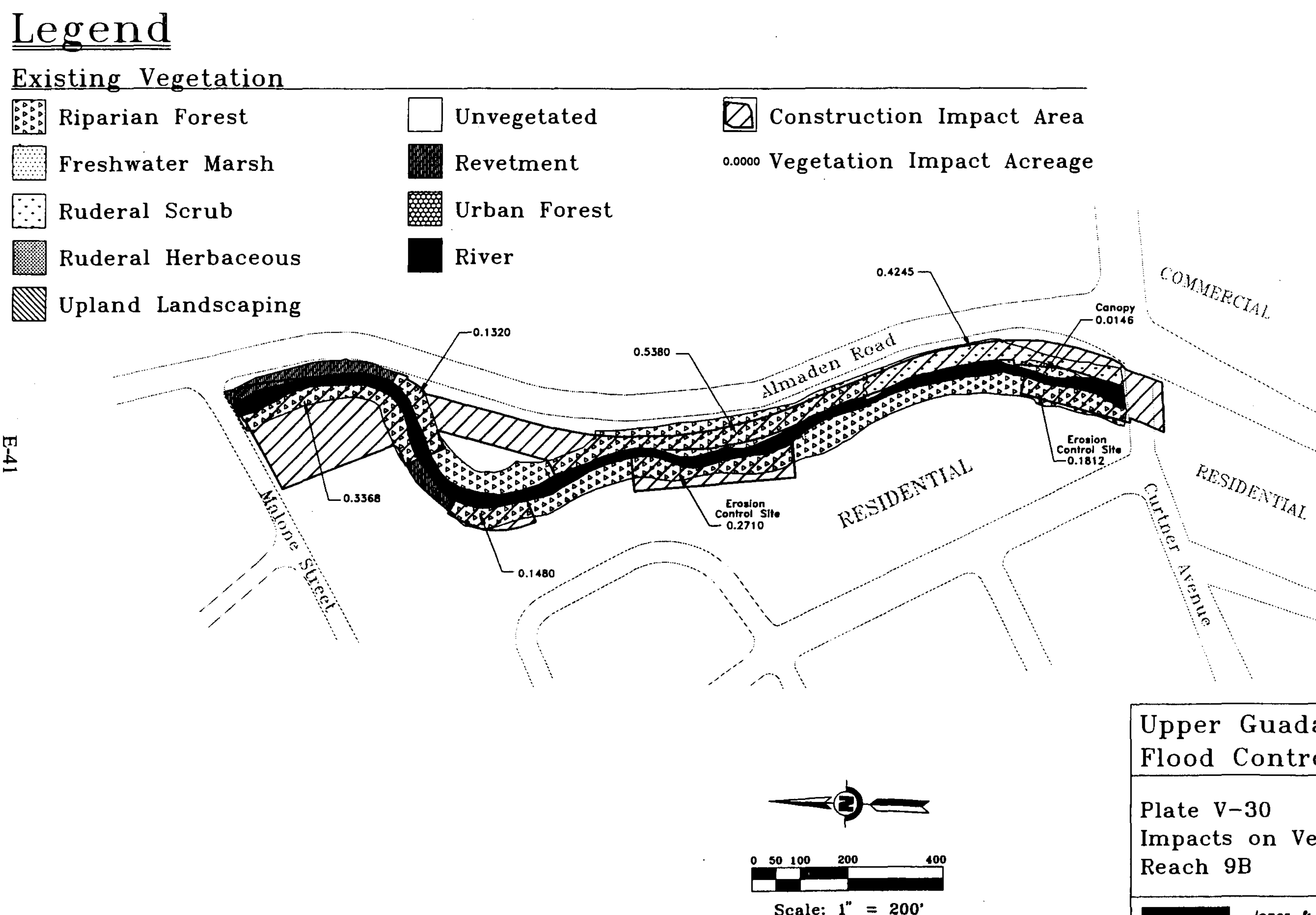
- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Unvegetated
- Revetment
- Urban Forest
- River
- Construction Impact Area
- 0.0000 Vegetation Impact Acreage



Upper Guadalupe River
Flood Control Project

Plate V-29
Impacts on Vegetation in
Reach 9A

Jones & Stokes Associates
2600 V Street, Suite 100
Sacra... CA 95818



Upper Guadalupe River Flood Control Project

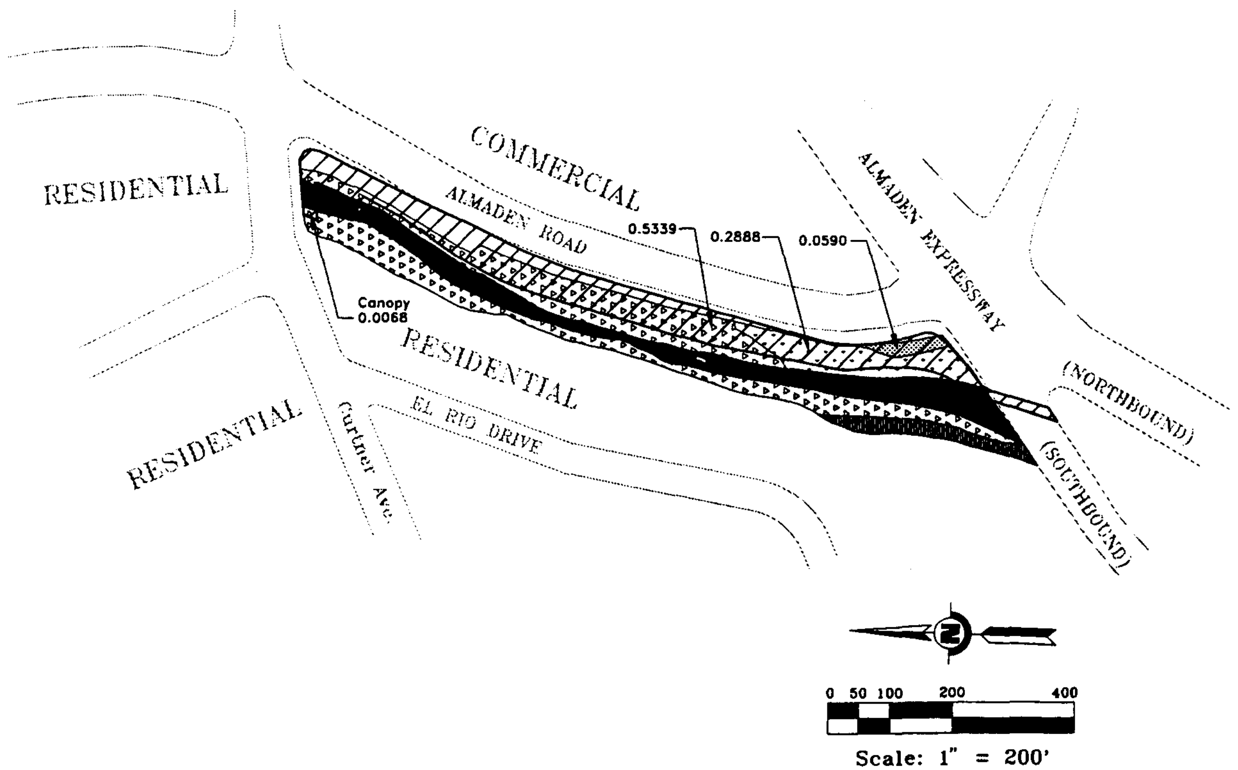
Plate V-30
Impacts on Vegetation in Reach 9B

Jones & Stokes Associates
2600 V Street, Suite 100

Legend

Existing Vegetation

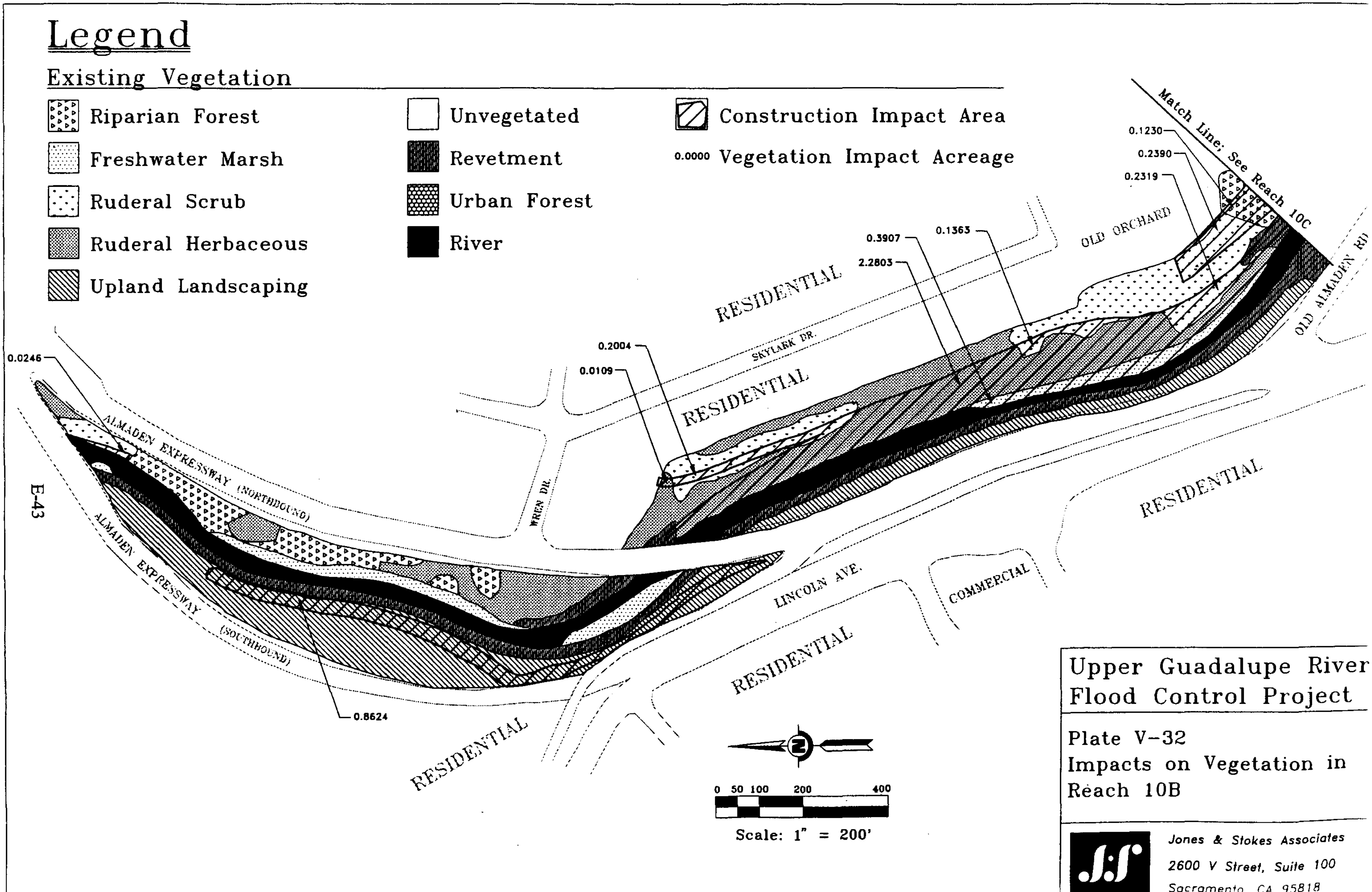
- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Unvegetated
- Revetment
- Urban Forest
- River
- Construction Impact Area
- 0.0000 Vegetation Impact Acreage



Upper Guadalupe River Flood Control Project

Plate V-31
Impacts on Vegetation in Reach 10A

Jones & Stokes Associates
2600 ' ·eet, Suite 100



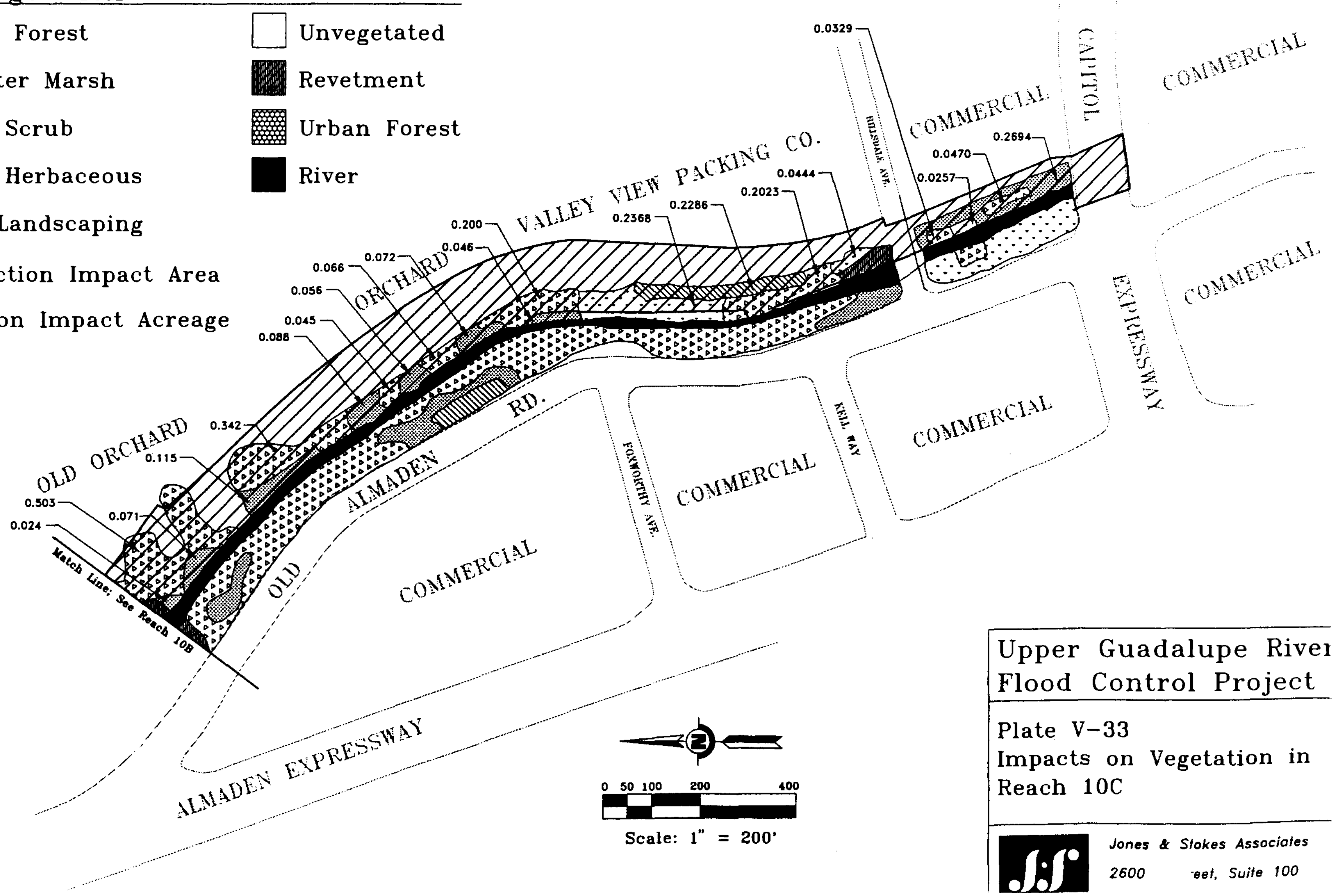
Upper Guadalupe River Flood Control Project

Plate V-32
Impacts on Vegetation in Reach 10B

Legend

Existing Vegetation

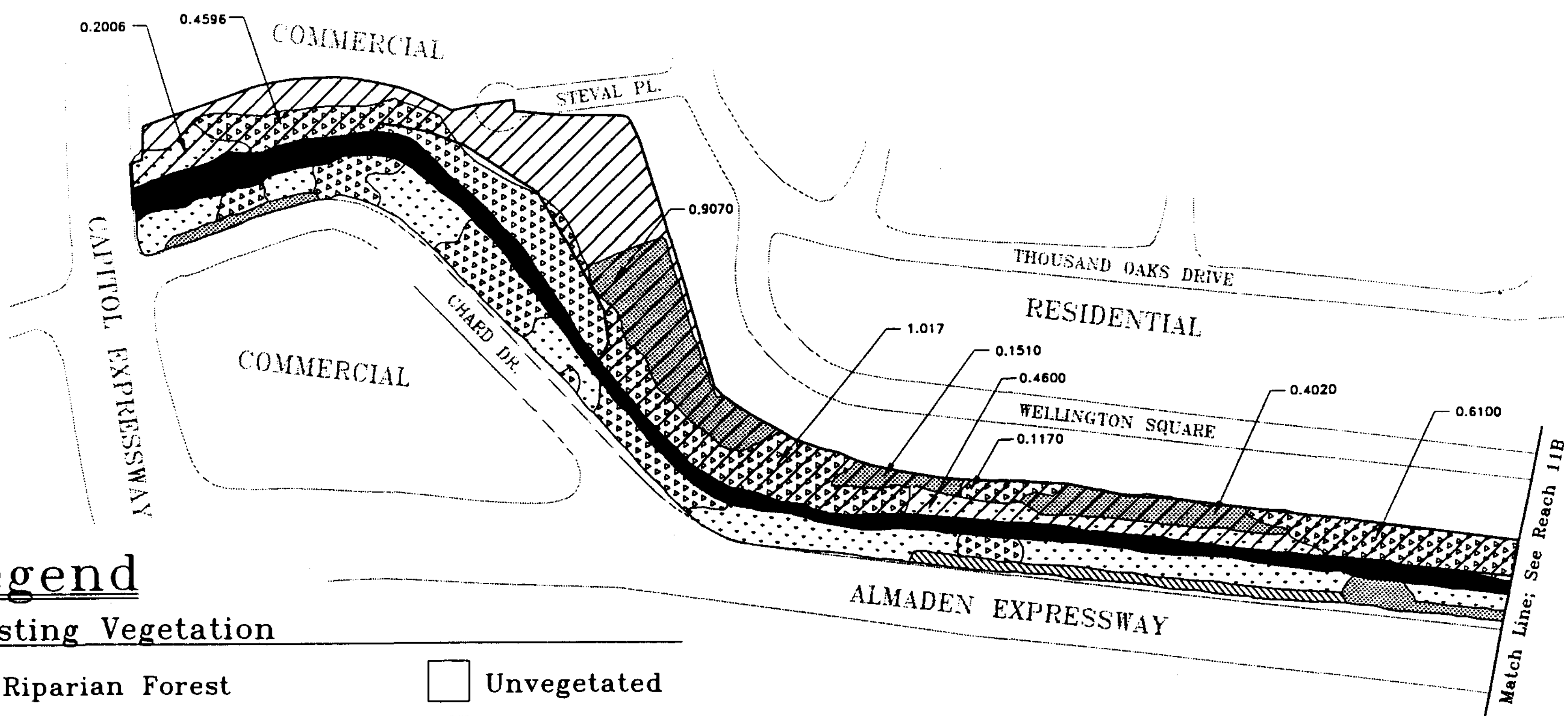
- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Construction Impact Area
- 0.0000 Vegetation Impact Acreage
- Unvegetated
- Revetment
- Urban Forest
- River



Upper Guadalupe River
Flood Control Project

Plate V-33
Impacts on Vegetation in
Reach 10C

Jones & Stokes Associates
2600 ·eet, Suite 100



Legend

Existing Vegetation

- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Construction Impact Area
- 0.0000 Vegetation Impact Acreage
- Unvegetated
- Revetment
- Urban Forest
- River

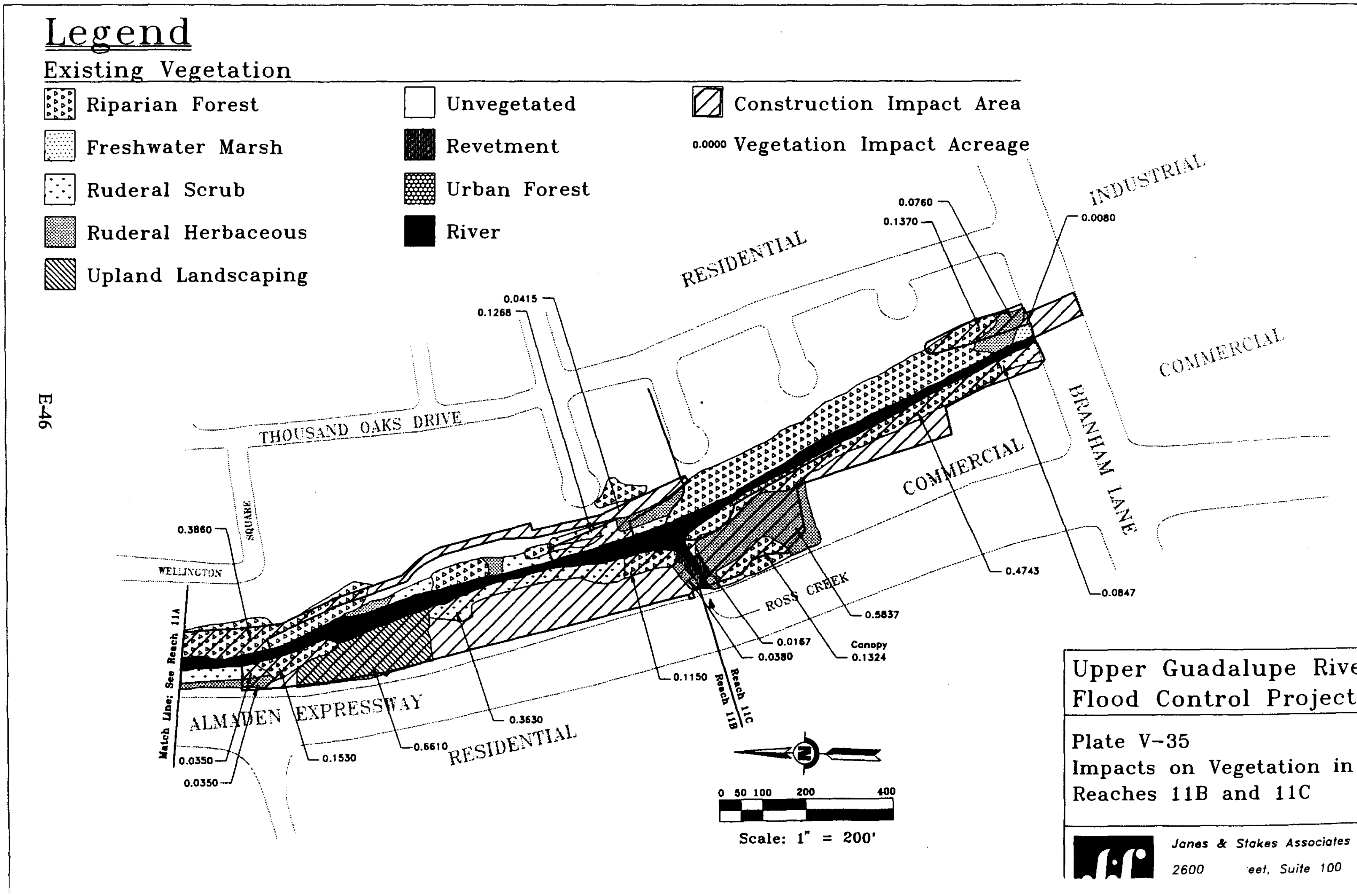
0 50 100 200 400

Scale: 1" = 200'

Upper Guadalupe River Flood Control Project

Plate V-34
Impacts on Vegetation in Reach 11A

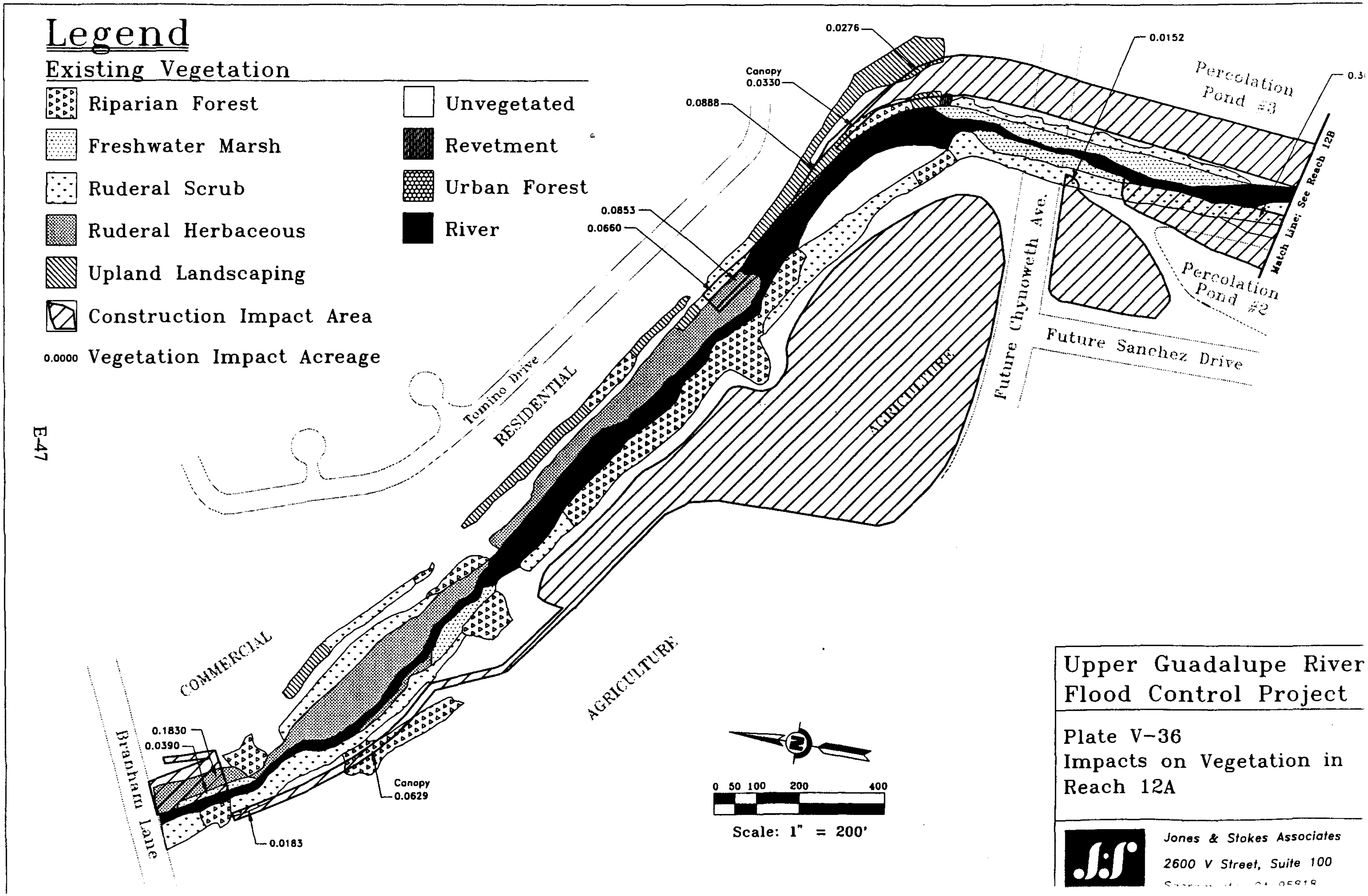
Jones & Stokes Associates
2600 V Street, Suite 100
Sacramento, CA 95818



Upper Guadalupe River
Flood Control Project

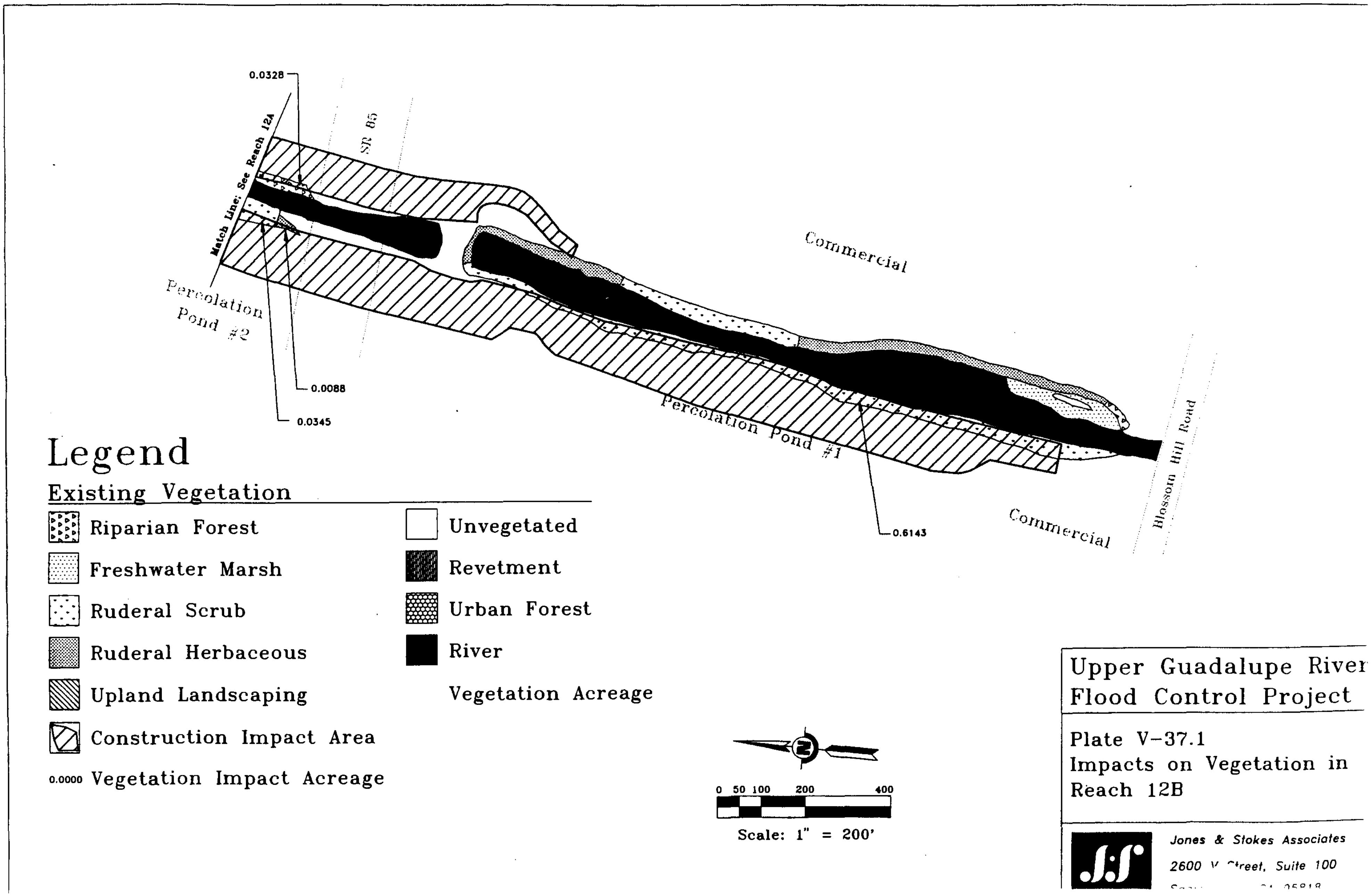
Plate V-35
Impacts on Vegetation in
Reaches 11B and 11C

Jones & Stokes Associates
2600 eet, Suite 100



Upper Guadalupe River Flood Control Project

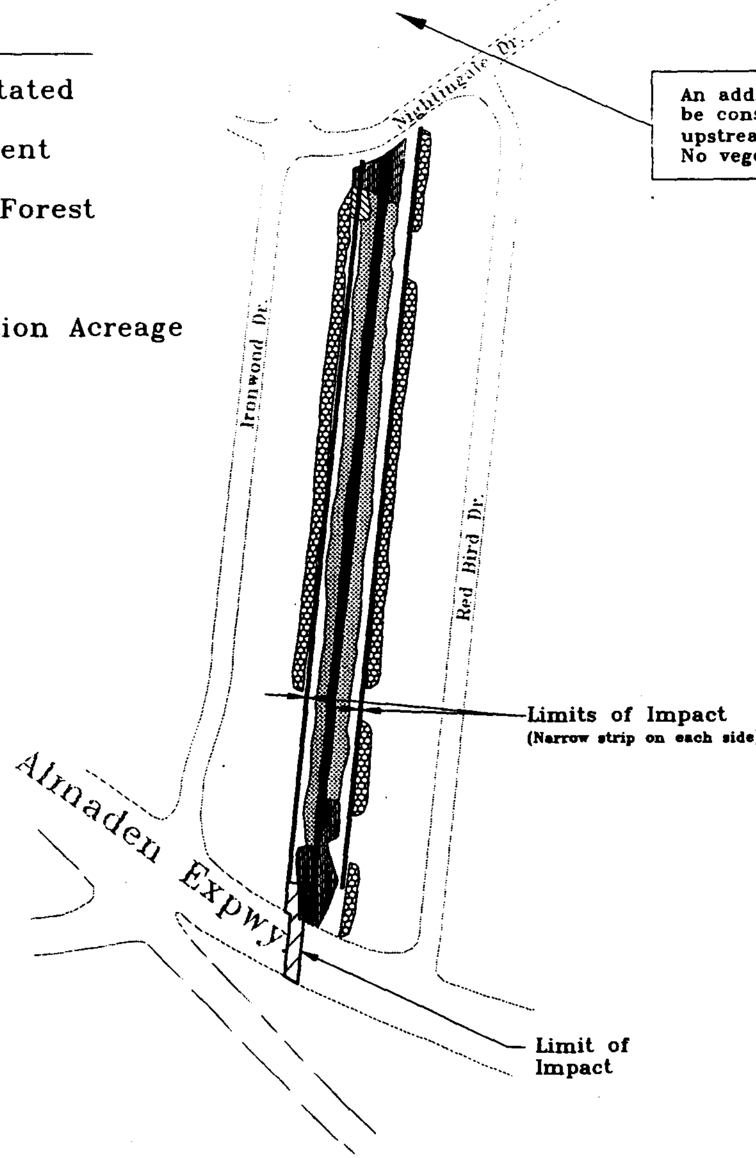
Plate V-36
Impacts on Vegetation in Reach 12A

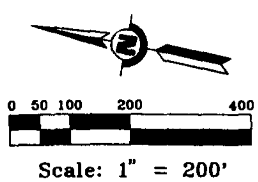

0.0328
Match Line; See Reach 12A
SR 85
Commercial
Percolation Pond #2
0.0088
0.0345
Percolation Pond #1
0.6143
Commercial
Blossom Hill Road
Legend
Existing Vegetation
Riparian Forest
Freshwater Marsh
Ruderal Scrub
Ruderal Herbaceous
Upland Landscaping
Construction Impact Area
0.0000 Vegetation Impact Acreage
Unvegetated
Revetment
Urban Forest
River
Vegetation Acreage
0 50 100 200 400
Scale: 1" = 200'
Upper Guadalupe River Flood Control Project
Plate V-37.1
Impacts on Vegetation in Reach 12B
Jones & Stokes Associates
2600 V Street, Suite 100

Legend

Existing Vegetation

- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Construction Impact Area
- Unvegetated
- Revetment
- Urban Forest
- River
- Vegetation Acreage

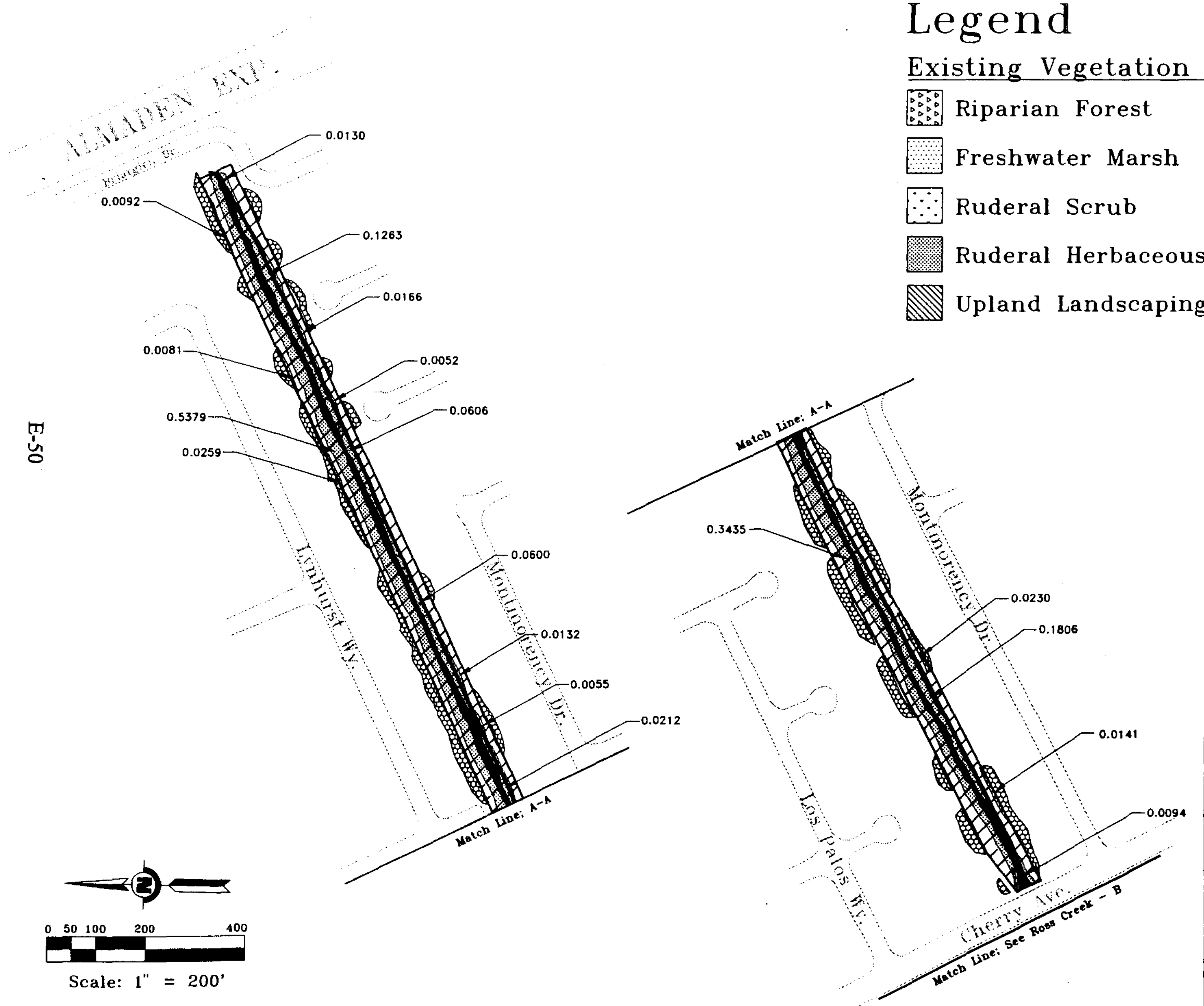




Upper Guadalupe River Flood Control Project

Plate V-38
Impacts on Vegetation in Canoas Creek

Jones & Stokes Associates
2600 V Street, Suite 100



Legend

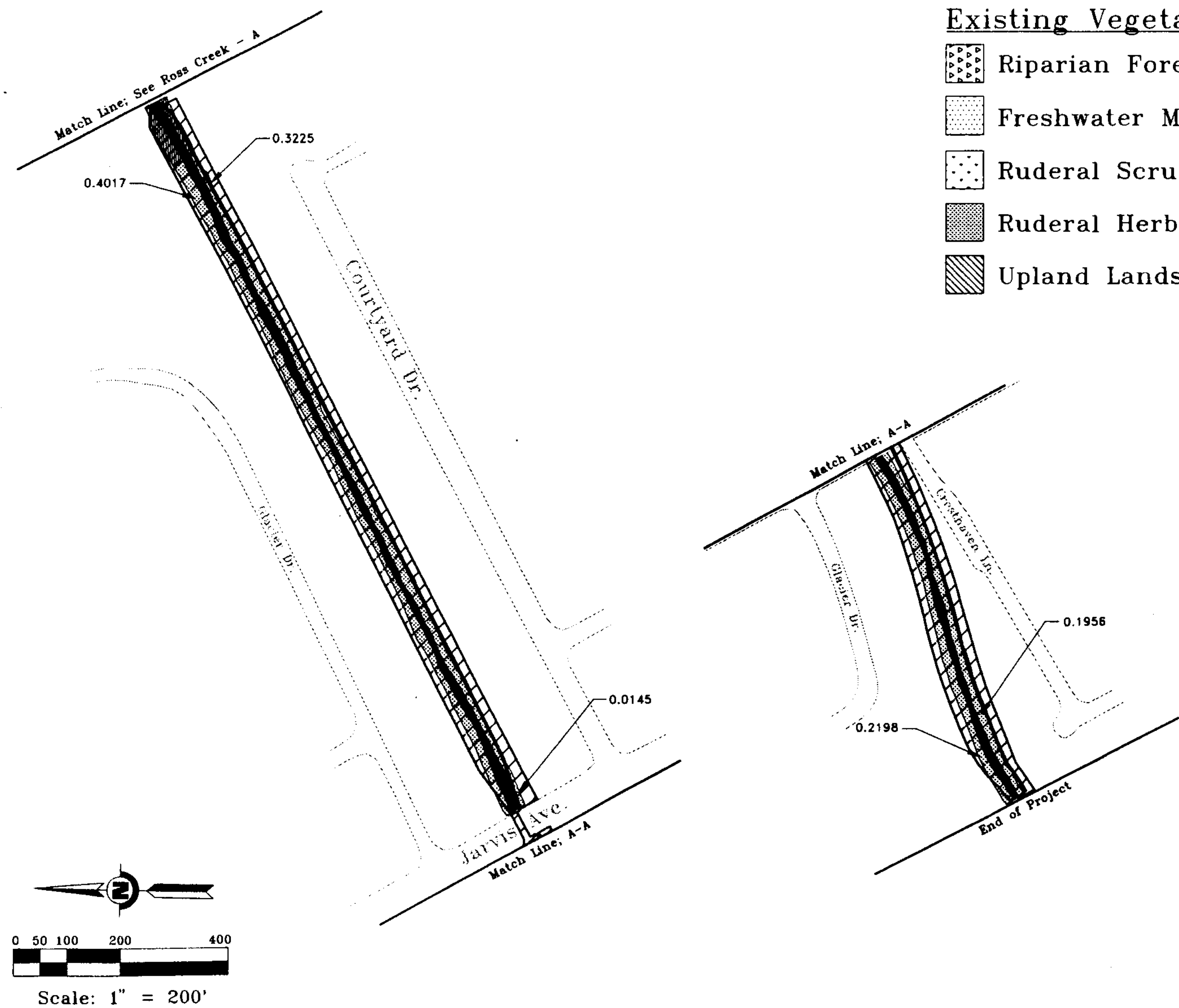
Existing Vegetation

- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Unvegetated
- Revetment
- Urban Forest
- River
- Construction Impact Area
- 0.000 Vegetation Impact Acreage

Upper Guadalupe River Flood Control Project

Plate V-39
Impacts on Vegetation in Ross Creek - A

Jones & Stokes Associates
2600 V Street, Suite 100
Sacrame 95818



Legend

Existing Vegetation

- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Unvegetated
- Revetment
- Urban Forest
- River
- Construction Impact Area
- 0.000 Vegetation Impact Acreage

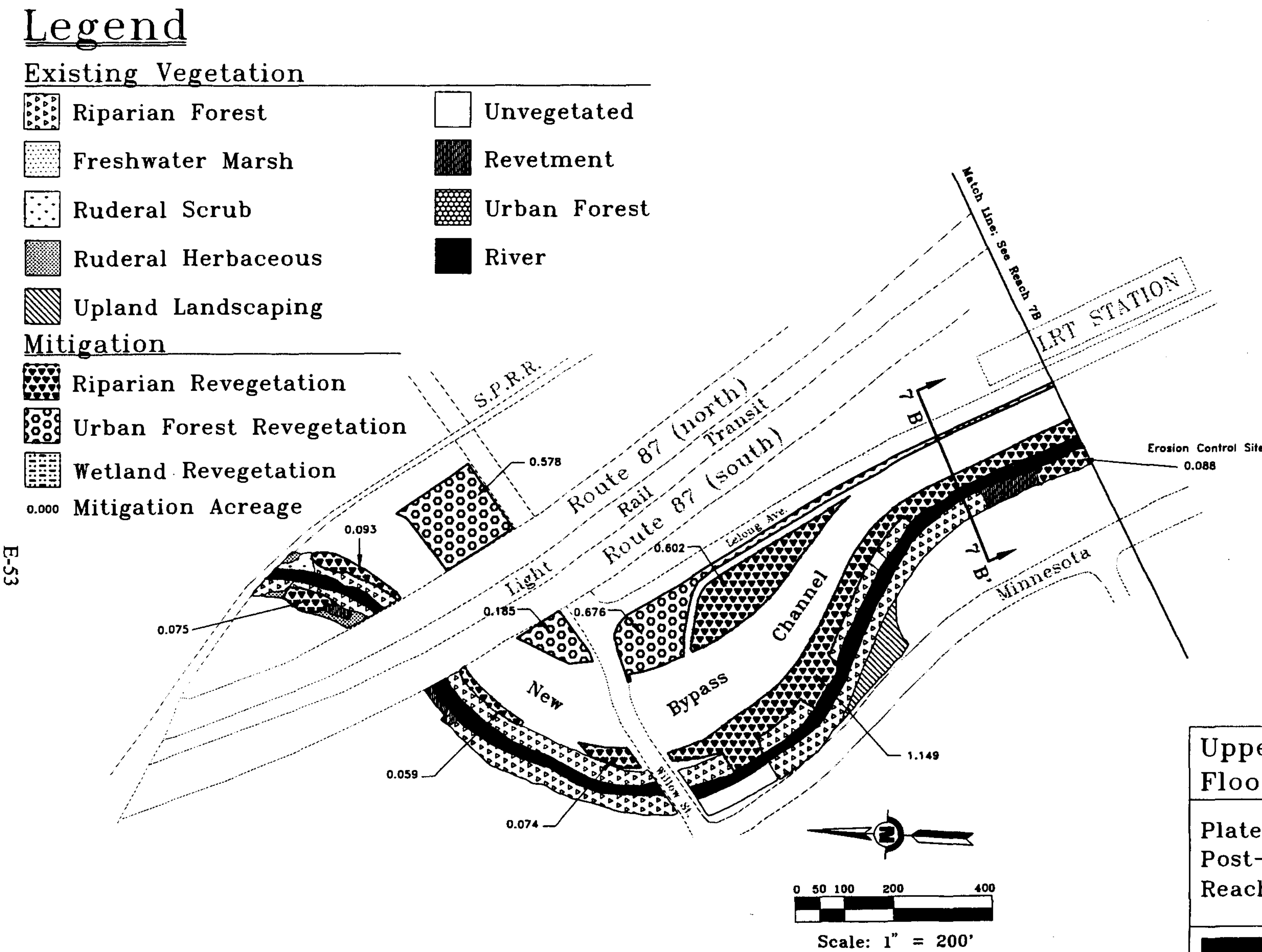
Upper Guadalupe River Flood Control Project

Plate V-40
Impacts on Vegetation in Ross Creek - B

Jones & Stokes Associates
2600 V Street, Suite 100
Sacramento, CA 95818

Post-Project Conditions for the Bypass Channel Plan

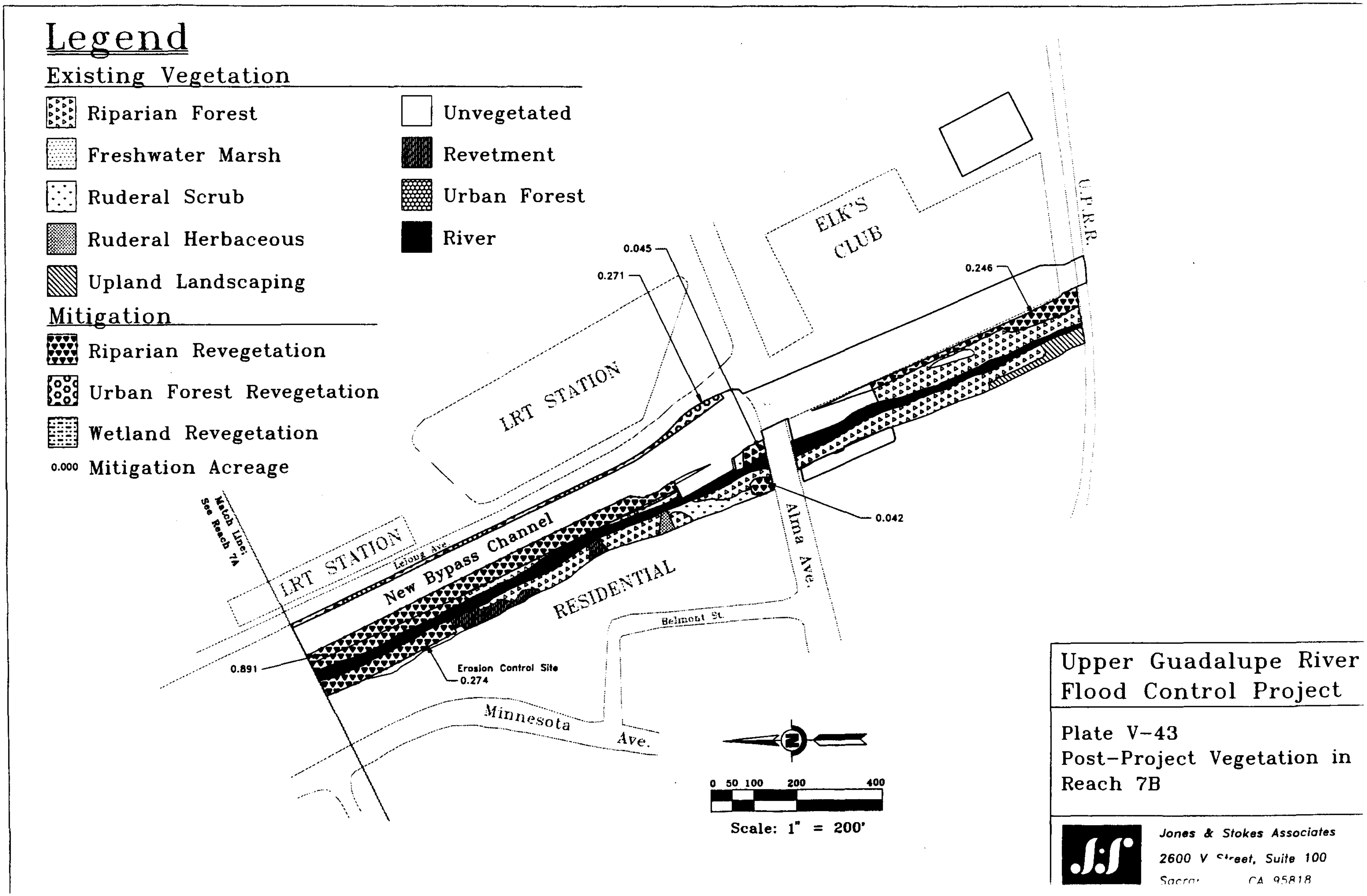
(Source: Parsons Engineering Science 1997
[original maps by Jones & Stokes])



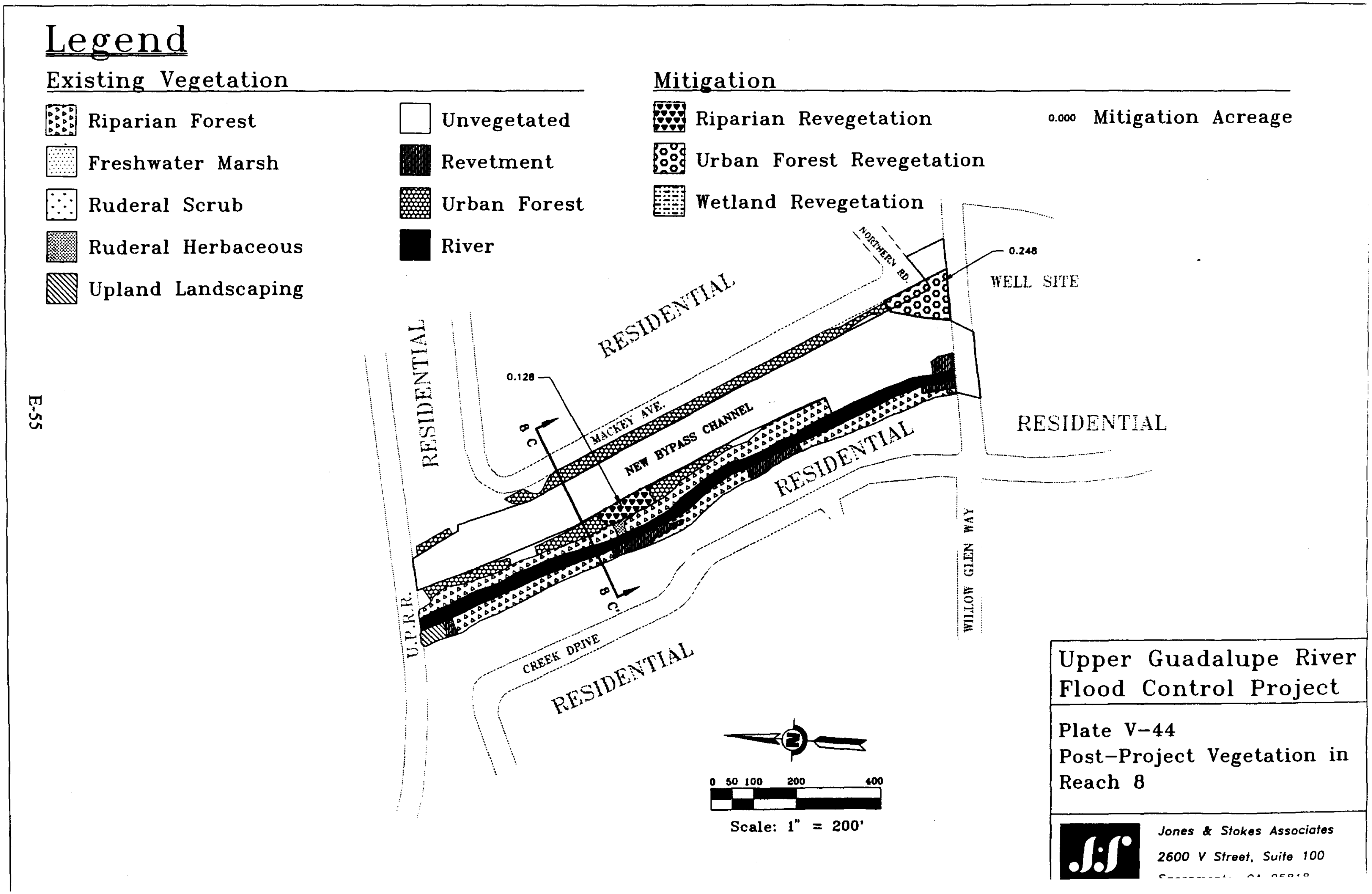
Upper Guadalupe River Flood Control Project

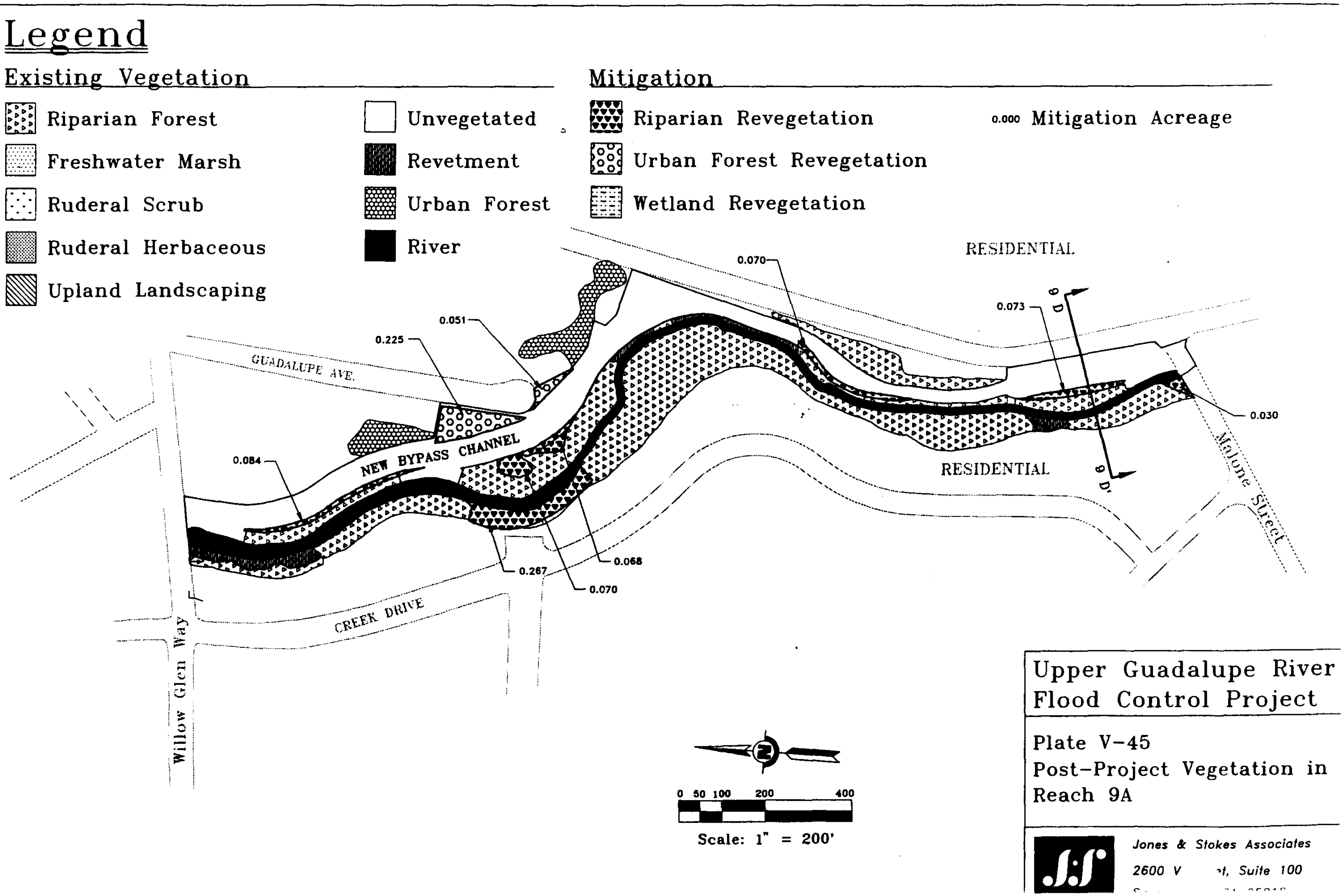
Plate V-42
Post-Project Vegetation in Reach 7A

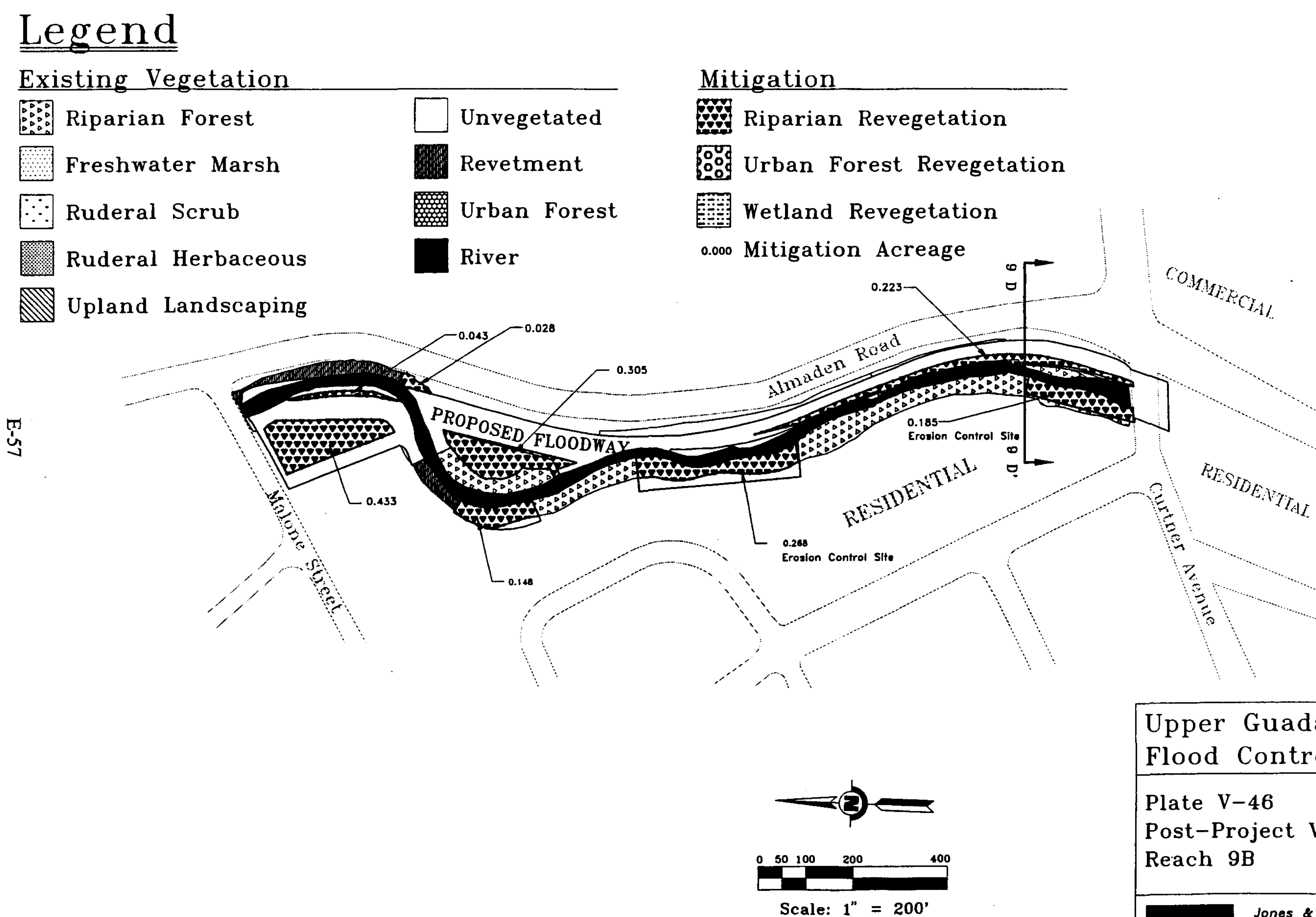
Jones & Stokes Associates
2600 V Street, Suite 100
Sacramento, CA 95818



Legend
Existing Vegetation
Riparian Forest
Freshwater Marsh
Ruderal Scrub
Ruderal Herbaceous
Upland Landscaping
Unvegetated
Revetment
Urban Forest
River
Mitigation
Riparian Revegetation
Urban Forest Revegetation
Wetland Revegetation
0.000 Mitigation Acreage
ELK'S CLUB
U.P.R.R.
LRT STATION
LRT STATION
Lelong Ave.
New Bypass Channel
RESIDENTIAL
Belmont St.
Alma Ave.
Minnesota Ave.
Match Line: See Reach 7A
0.045
0.271
0.246
0.042
0.891
Erosion Control Site
0.274
0 50 100 200 400
Scale: 1" = 200'
Upper Guadalupe River
Flood Control Project
Plate V-43
Post-Project Vegetation in
Reach 7B
Jones & Stokes Associates
2600 V Street, Suite 100


Legend
Existing Vegetation
Riparian Forest
Freshwater Marsh
Ruderal Scrub
Ruderal Herbaceous
Upland Landscaping
Unvegetated
Revetment
Urban Forest
River
Mitigation
Riparian Revegetation
Urban Forest Revegetation
Wetland Revegetation
0.000 Mitigation Acreage
RESIDENTIAL
RESIDENTIAL
RESIDENTIAL
RESIDENTIAL
RESIDENTIAL
NORTHERN RD.
0.248
WELL SITE
0.128
MACKEY AVE.
NEW BYPASS CHANNEL
8 C
8 C
U.P.R.R.
CREEK DRIVE
WILLOW GLEN WAY
0 50 100 200 400
Scale: 1" = 200'
Upper Guadalupe River Flood Control Project
Plate V-44
Post-Project Vegetation in Reach 8
Jones & Stokes Associates
2600 V Street, Suite 100


Legend
Existing Vegetation
Riparian Forest
Freshwater Marsh
Ruderal Scrub
Ruderal Herbaceous
Upland Landscaping
Unvegetated
Revetment
Urban Forest
River
Mitigation
Riparian Revegetation
Urban Forest Revegetation
Wetland Revegetation
0.000 Mitigation Acreage
RESIDENTIAL
RESIDENTIAL
GUADALUPE AVE.
NEW BYPASS CHANNEL
CREEK DRIVE
Willow Glen Way
Malone Street
9 D
9 D'
0.070
0.073
0.051
0.225
0.084
0.030
0.068
0.267
0.070
0 50 100 200 400
Scale: 1" = 200'
Upper Guadalupe River Flood Control Project
Plate V-45
Post-Project Vegetation in Reach 9A
Jones & Stokes Associates
Suite 100



Upper Guadalupe River Flood Control Project

Plate V-46
Post-Project Vegetation in Reach 9B

Jones & Stokes Associates
2600 V Street, Suite 100
Sacramento, CA 95818

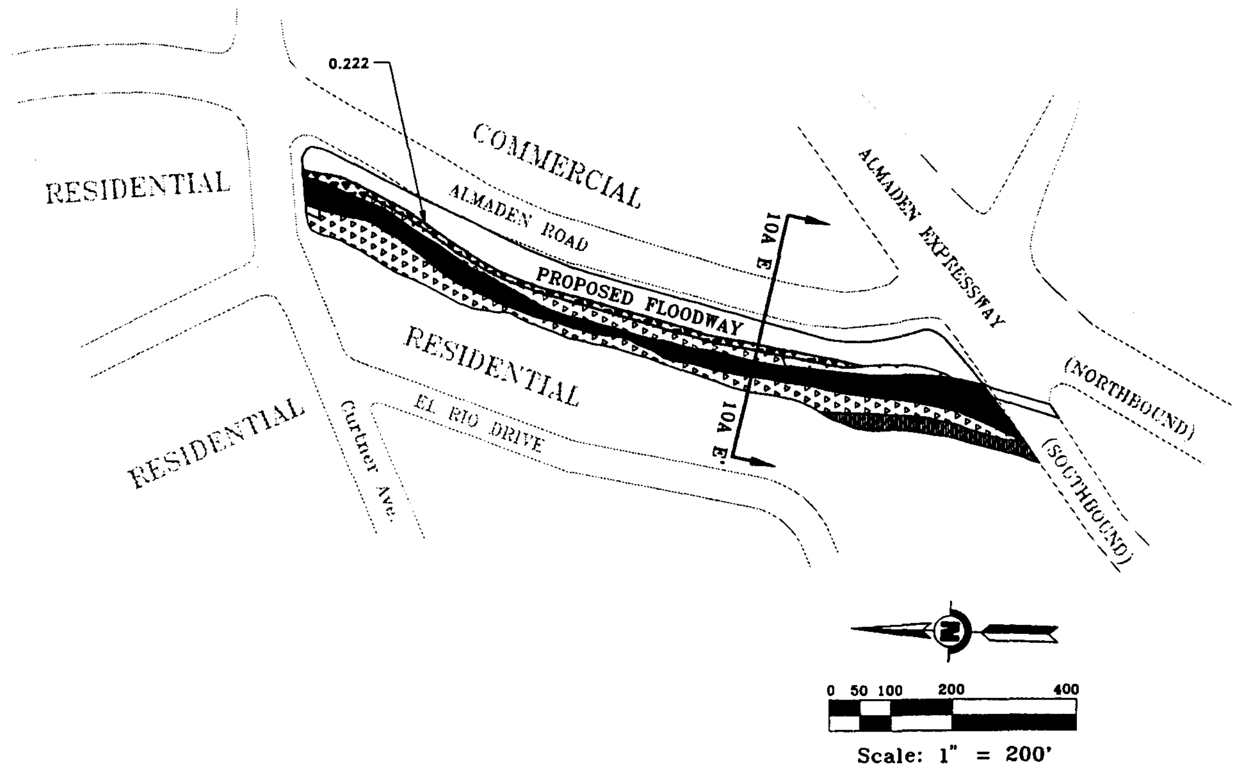
Legend

Existing Vegetation

- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Unvegetated
- Revetment
- Urban Forest
- River

Mitigation

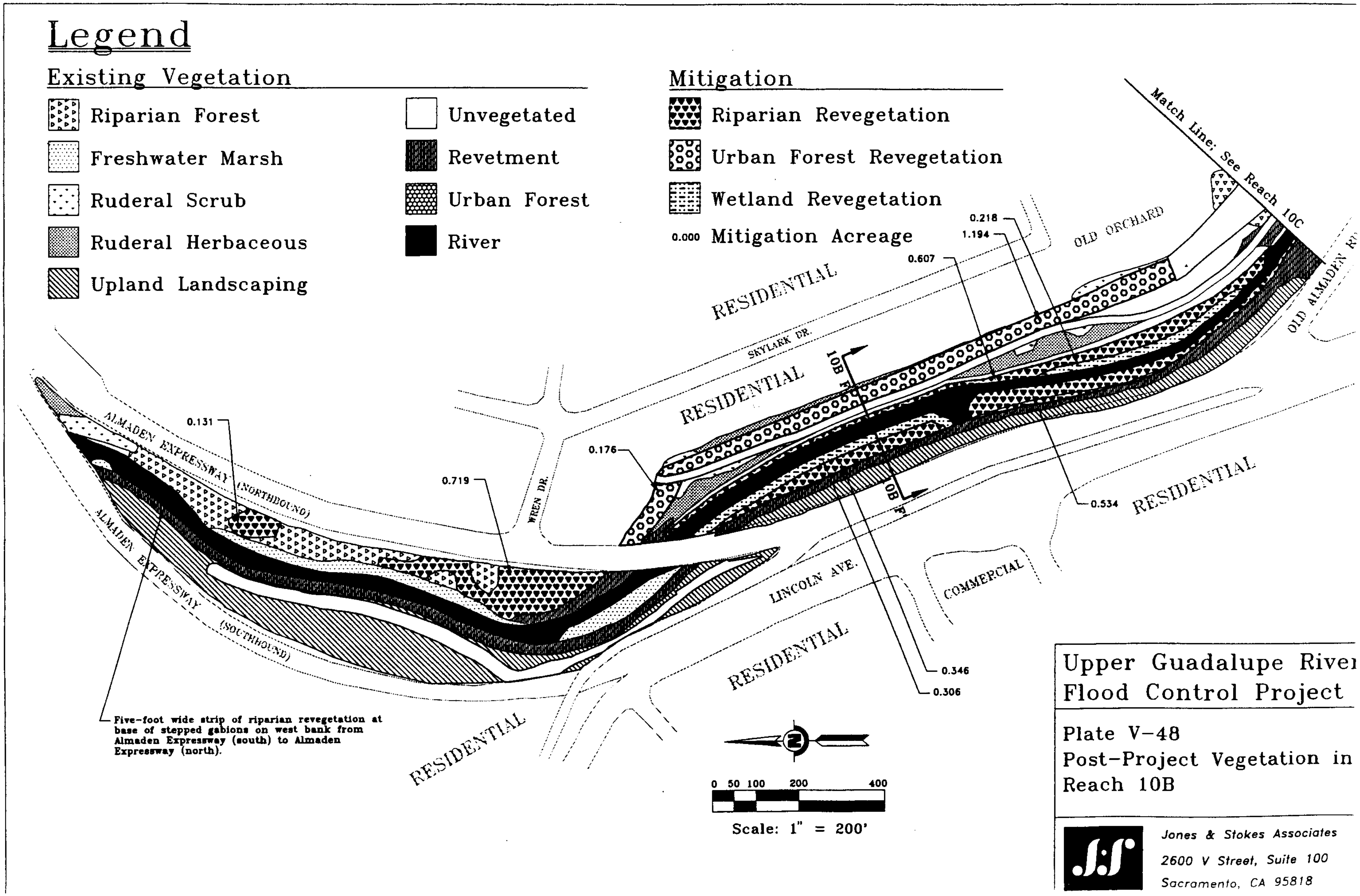
- Riparian Revegetation
- Urban Forest Revegetation
- Wetland Revegetation
- 0.000 Mitigation Acreage



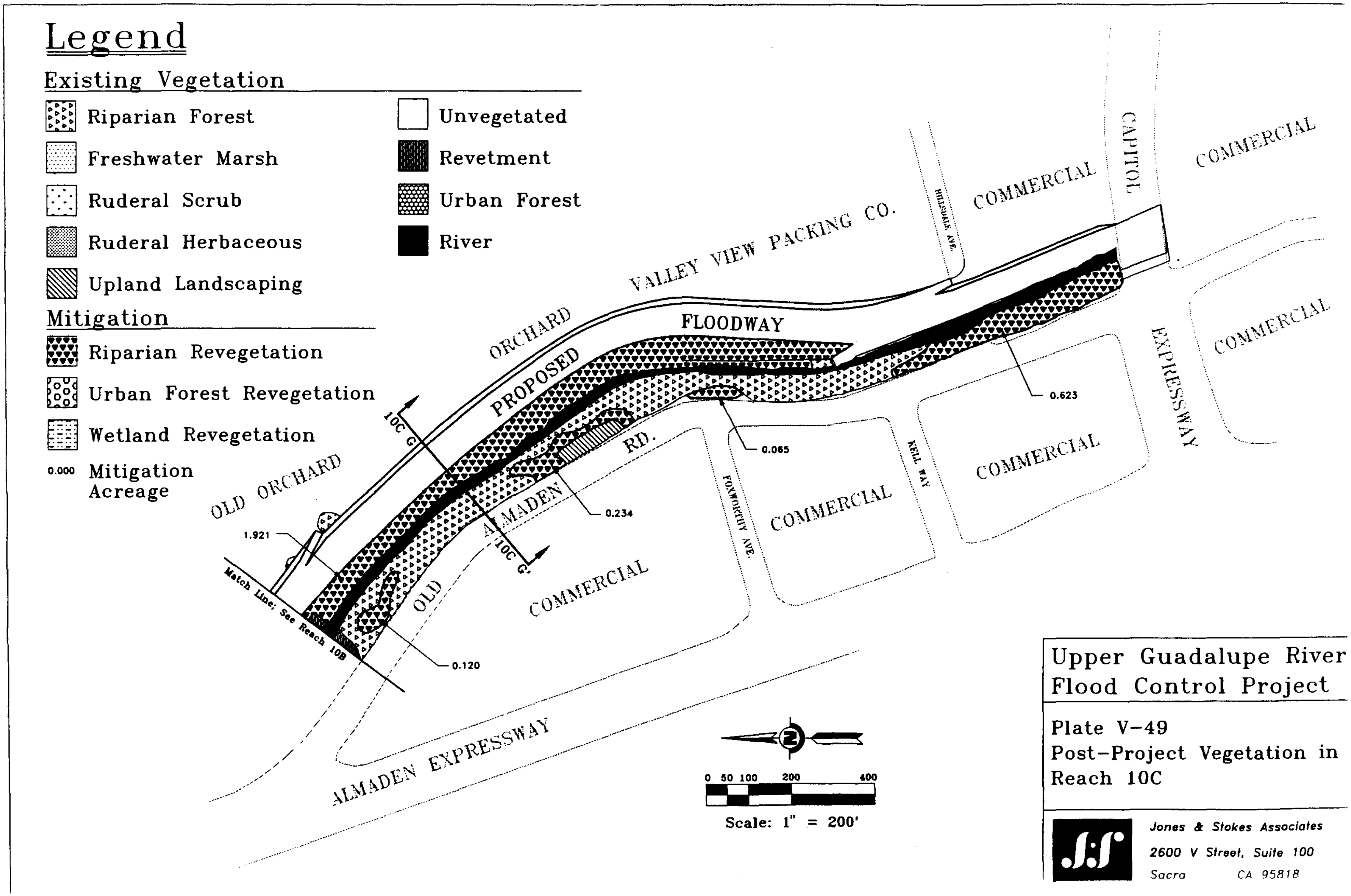
Upper Guadalupe River Flood Control Project

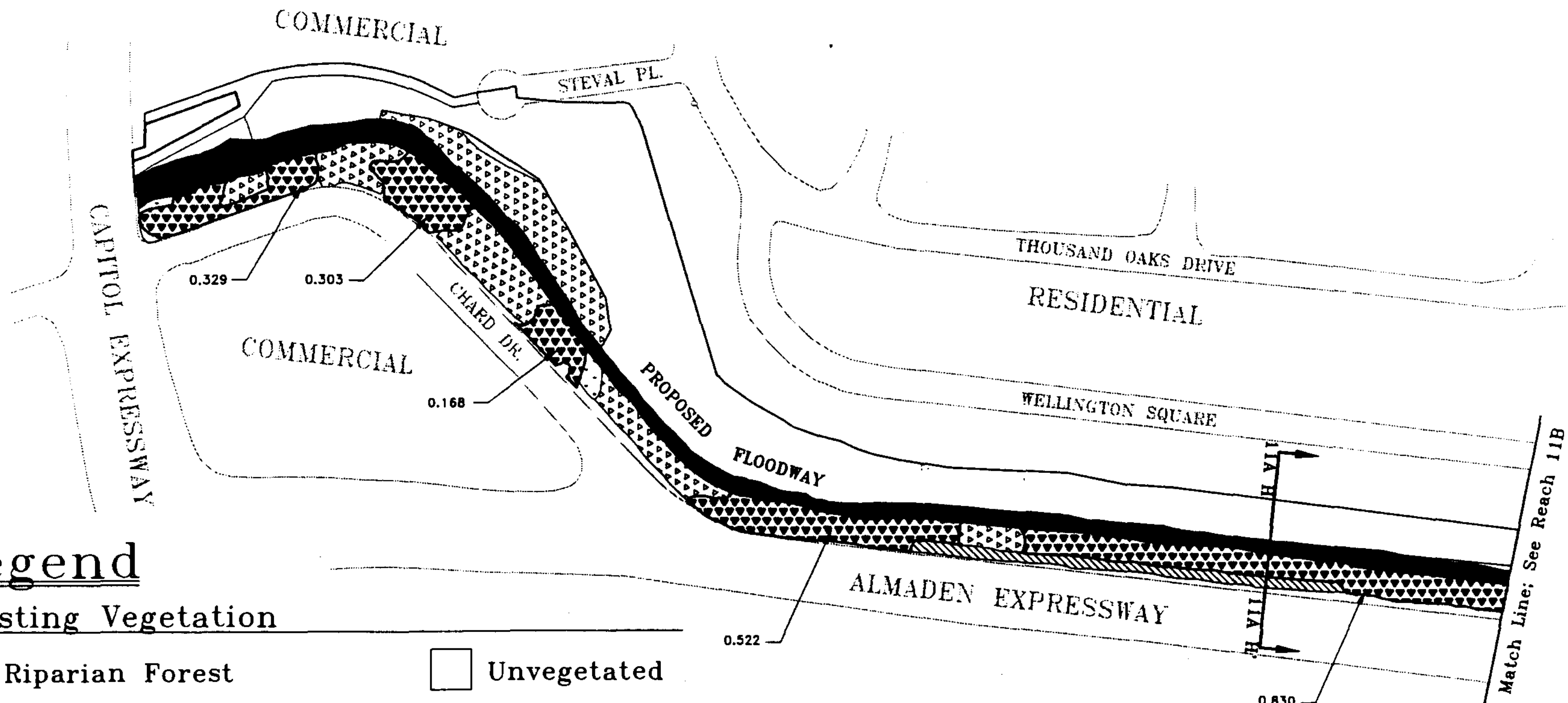
Plate V-47
Post-Project Vegetation in Reach 10A

Jones & Stokes Associates
2600 V [illegible]eet, Suite 100



Legend
Existing Vegetation
Riparian Forest
Freshwater Marsh
Ruderal Scrub
Ruderal Herbaceous
Upland Landscaping
Unvegetated
Revetment
Urban Forest
River
Mitigation
Riparian Revegetation
Urban Forest Revegetation
Wetland Revegetation
0.000 Mitigation Acreage
Match Line; See Reach 10C
OLD ORCHARD
OLD ALMADEN RD
RESIDENTIAL
SKYLARK DR.
RESIDENTIAL
RESIDENTIAL
RESIDENTIAL
RESIDENTIAL
COMMERCIAL
LINCOLN AVE.
WREN DR.
ALMADEN EXPRESSWAY (NORTHBOUND)
ALMADEN EXPRESSWAY (SOUTHBOUND)
10B
10B
0.218
1.194
0.607
0.176
0.131
0.719
0.534
0.346
0.306
Five-foot wide strip of riparian revegetation at base of stepped gabions on west bank from Almaden Expressway (south) to Almaden Expressway (north).
N
0 50 100 200 400
Scale: 1" = 200'
Upper Guadalupe River
Flood Control Project
Plate V-48
Post-Project Vegetation in
Reach 10B
Jones & Stokes Associates
2600 V Street, Suite 100
Sacramento, CA 95818


Legend
Existing Vegetation
Riparian Forest
Freshwater Marsh
Ruderal Scrub
Ruderal Herbaceous
Upland Landscaping
Unvegetated
Revetment
Urban Forest
River
Mitigation
Riparian Revegetation
Urban Forest Revegetation
Wetland Revegetation
0.000 Mitigation Acreage
VALLEY VIEW PACKING CO.
ORCHARD
PROPOSED
FLOODWAY
OLD ORCHARD
COMMERCIAL
CAPITOL
EXPRESSWAY
HILLSDALE AVE.
KELL WAY
FOXWORTHY AVE.
ALMADEN
RD.
OLD
ALMADEN EXPRESSWAY
Match Line; See Reach 10B
10C
G
1.921
0.120
0.234
0.065
0.623
0 50 100 200 400
Scale: 1" = 200'
Upper Guadalupe River Flood Control Project
Plate V-49
Post-Project Vegetation in Reach 10C
Jones & Stokes Associates
2600 V Street, Suite 100
Sacra CA 95818



Legend

Existing Vegetation

- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Unvegetated
- Revetment
- Urban Forest
- River

Mitigation

- Riparian Revegetation
- Urban Forest Revegetation
- Wetland Revegetation
- 0.000 Mitigation Acreage

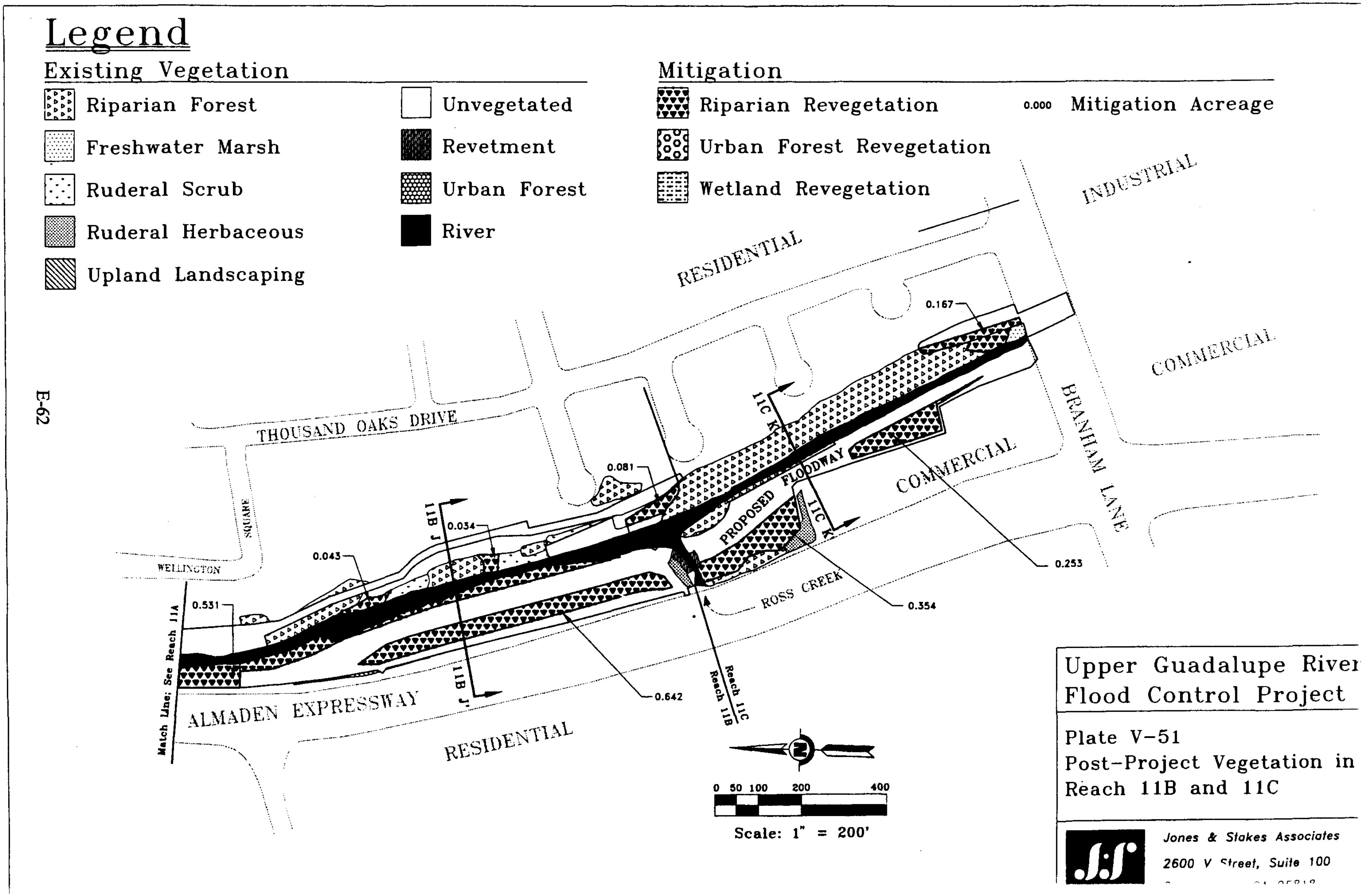
0 50 100 200 400

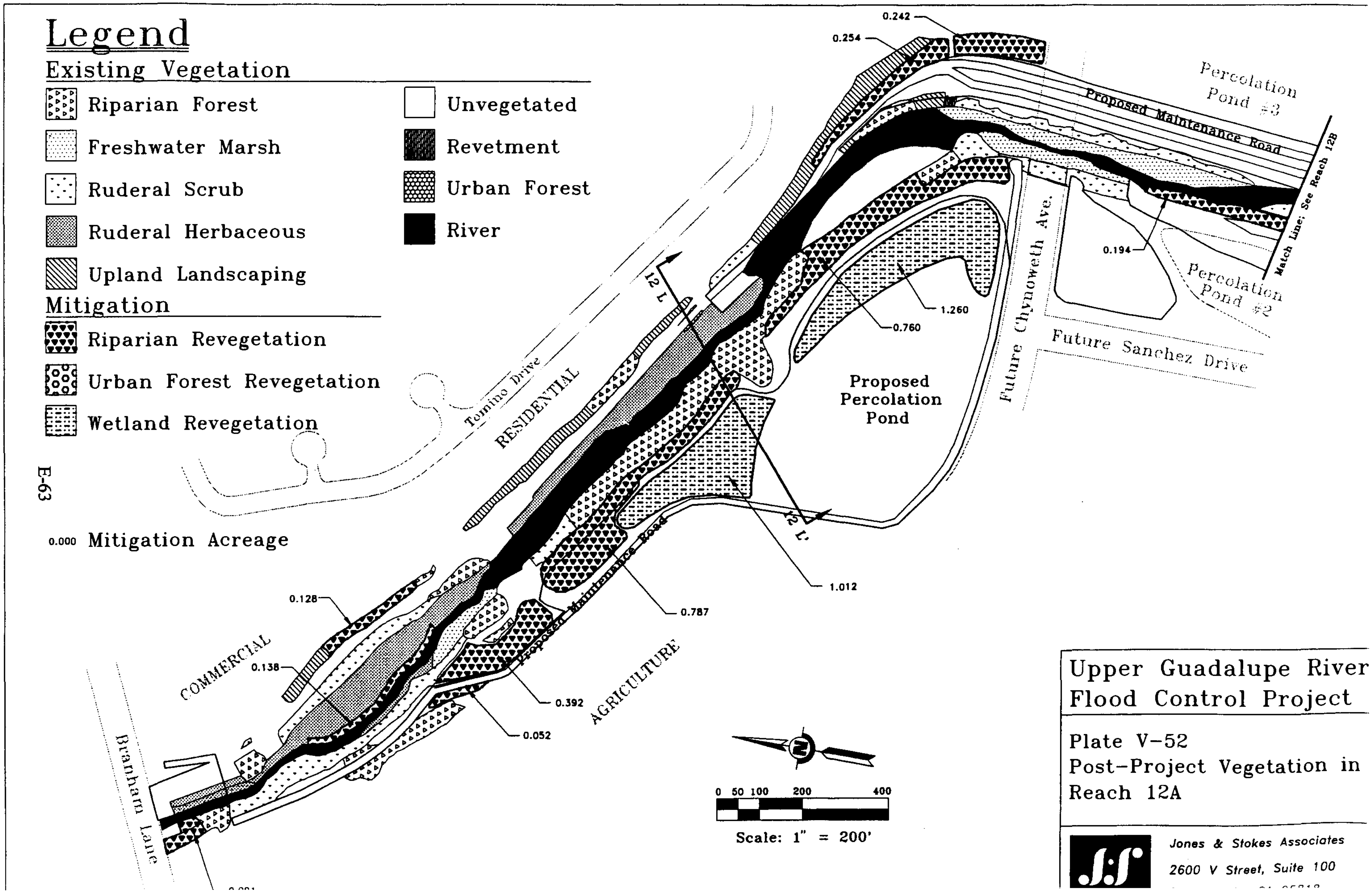
Scale: 1" = 200'

Upper Guadalupe River Flood Control Project

Plate V-50
Post-Project Vegetation in Reach 11A

Jones & Stokes Associates
2600 V Street, Suite 100

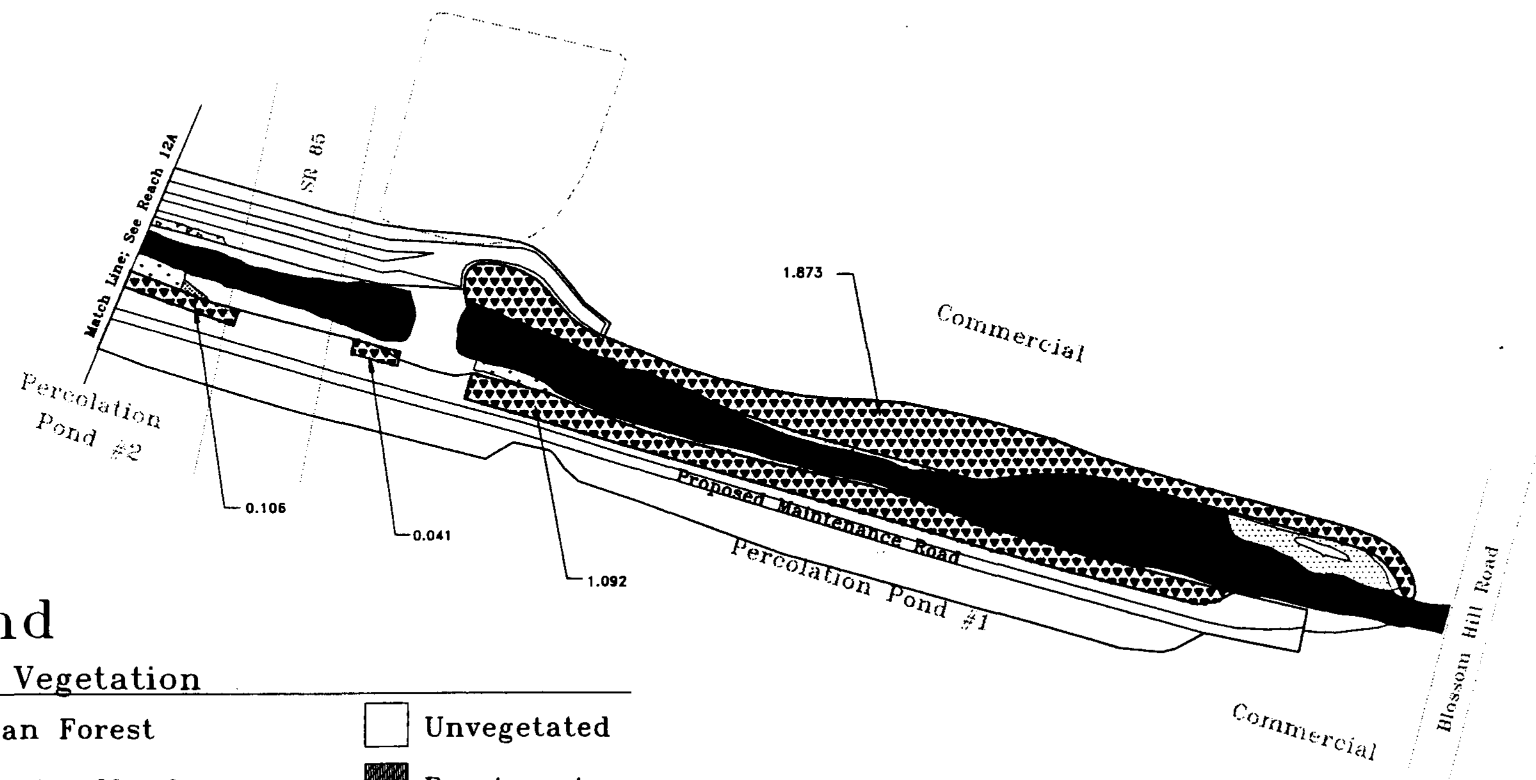

Legend
Existing Vegetation
Riparian Forest
Freshwater Marsh
Ruderal Scrub
Ruderal Herbaceous
Upland Landscaping
Unvegetated
Revetment
Urban Forest
River
Mitigation
Riparian Revegetation
Urban Forest Revegetation
Wetland Revegetation
0.000 Mitigation Acreage
INDUSTRIAL
RESIDENTIAL
COMMERCIAL
BRANHAM LANE
THOUSAND OAKS DRIVE
SQUARE
WELLINGTON
PROPOSED FLOODWAY
COMMERCIAL
ROSS CREEK
ALMADEN EXPRESSWAY
RESIDENTIAL
Match Line; See Reach 11A
11B J
11B J'
11C K
11C K'
Reach 11C
Reach 11B
0.167
0.081
0.034
0.043
0.531
0.253
0.354
0.642
0 50 100 200 400
Scale: 1" = 200'
Upper Guadalupe River
Flood Control Project
Plate V-51
Post-Project Vegetation in
Reach 11B and 11C
Jones & Stokes Associates
2600 V Street, Suite 100



Upper Guadalupe River Flood Control Project

Plate V-52
Post-Project Vegetation in Reach 12A

Jones & Stokes Associates
2600 V Street, Suite 100



Legend

Existing Vegetation

- Riparian Forest
- Freshwater Marsh
- Ruderal Scrub
- Ruderal Herbaceous
- Upland Landscaping
- Unvegetated
- Revetment
- Urban Forest
- River

Vegetation Acreage

Mitigation

- Riparian Revegetation
- Urban Forest Revegetation
- Wetland Revegetation

0.(Mitigation Acreage

0 60 100 200 400

Scale: 1" = 200'

Upper Guadalupe River Flood Control Project

Plate V-53
Post-Project Vegetation in Reach 12B

Jones & Stokes Associates
2600 V Street, Suite 100
Sacr CA 95818

Checklist of Vascular Plants

CHECKLIST OF VASCULAR PLANTS
GUADALUPE RIVER

SPECIES	COMMON NAME	INDICATOR STATUS
* **ACERACEAE**		
Acer negundo ssp. *californicum*	California Box Elder	FacW
Acer saccharinum[2]	Silver Maple	
* **AGAVACEAE**		
Agave sp.[1]	Century Plant	
Dracaena sp.[2]	Dracaena	
* **AMARANTHACEAE**		
Amaranthus retroflexus[1]	Green Amaranth	FacU
* **ANACARDIACEAE**		
Cotinus coggygria[2]	Smoke Tree	
Pistacia chinensis[2]	Chinese Pistache	
Schinus molle[1]	California Pepper Tree	
Toxicodendron diversilobum	Poison Oak	
* **APIACEAE (UMBELLIFERAE)**		
Conium maculatum[1]	Poison Hemlock	Upl
Foeniculum vulgare[1]	Sweet Fennel	FacU
Sanicula crassicaulis	Pacific Sanicle	
* **APOCYNACEAE**		
Vinca major[1]	Periwinkle	
Nerium oleander[1]	Oleander	
* **ARALIACEAE**		
Hedera helix[1]	English Ivy	
Hedera canariensis[1]	Algerian Ivy	
* **ASTERACEAE**		
Achillea millefolium	Common Yarrow	
Ambrosia psilostachya	Ragweed	
Anthemis cotula[1]	Mayweed	
Artemisia biennis[1]	Sagewort	
Artemisia californica	California Sage	

Artemisia douglasiana	California Mugwort	FacW
Aster chilensis	Aster	Fac
Aster subulatus	Slim Aster	FacW
Baccharis douglasii	Douglas' Baccharis	
Baccharis pilularis ssp. *consanguinea*	Coyote Brush	
Baccharis viminea	Mule Fat	FacW
Bidens frondosa	Stick Tight	FacW
Brickellia californica	Brickellia	
Carduus pycnocephalus [1]	Italian Thistle	Upl
Centaurea solstitialis [1]	Yellow Star Thistle	
Chrysanthemum parthenium [1]	Feverfew	
Cirsium vulgare [1]	Common Thistle	
Conyza canadensis	Horseweed	
Gnaphalium californicum	California Cudweed	
Hemizonia luzulaefolia ssp. *rudis*	Hayfield Tarweed	
Heterotheca oregona	Golden Aster	Upl
Jaumea carnosa	Fleshy Jaumea	
Lactuca serriola [1]	Prickly Lettuce	
Lactuca virosa [1]	Wild Lettuce	
Matricaria matricarioides [1]	Pineapple Weed	
Picris echioides [1]	Bristly Ox-tongue	Fac+
Senecio mikanioides [1]	German Ivy	
Senecio vulgaris [1]	Common Groundsel	
Silybum marianum [1]	Milk Thistle	
Sonchus asper [1]	Prickly Sow Thistle	
Sonchus oleraceus [1]	Common Sow Thistle	
Tragopogon sp. [1]	Salsify	
Xanthium spinosum [1]	Clotbur	
Xanthium strumarium [1]	Cocklebur	Fac
* **BETULACEAE**		
Alnus rhombifolia	White Alder	
Betula pendula [2]	White Birch	
* **BIGNONIACEAE**		
Catalpa sp. [1]	Catalpa	
* **BRASSICACEAE**		
Brassica campestris [1]	Mustard	
Brassica nigra [1]	Black Mustard	Upl
Heliotropium curassavicum	Heliotrope	
Lepidium latifolium [1]	Perennial Peppergrass	
Lepidium nitidum	Pepper Grass	
Lobularia maritima [1]	Sweet Alyssum	

Nasturtium officinale [1]	Watercress	
Raphanus sativus [1]	Wild Radish	Upl
*** CACTACEAE**		
Opuntia occidentalis [1]	Prickly Pear	
*** CAPRIFOLIACEAE**		
Sambucus mexicana	Blue Elderberry	
Symphoricarpos albus	Snowberry	
Viburnum sp. [2]	Viburnum	
*** CARYOPHYLLACEAE**		
Stellaria media [1]	Chickweed	
*** CASUARINACEAE**		
Casuarina cunninghamiana [1]	Beefwood	
*** CELASTRACEAE**		
Euonymus japonica [2]	Evergreen Burning Bush	
Maytenus boaria [2]	Mayten Tree	
*** CHENOPODIACEAE**		
Atriplex patula var. *hastata*	Fat Hen	FacW
Beta vulgaris [1]	Swiss Chard	
Chenopodium album [1]	Lambsquarters	
Chenopodium ambrosioides var. *ambrosioides* [1]	Mexican Tea	
Chenopodium sp. [1]	Goosefoot	
Salsola kali var. *tenuifolia* [1]	Tumbleweed	
*** CONVALLARIACEAE**		
Asparagus densiflorus var. *sprengeri* [1]	Asparagus Fern	
*** CONVOLVULACEAE**		
Convolvulus arvensis [1]	Bindweed	Upl
*** CUCURBITACEAE**		
Marah fabaceus	Wild Cucumber	
*** CUPRESSACEAE**		
Cupressus sp. [1]	Cypress	
Juniperus sp. [2]	Juniper	
Thuja occidentalis [2]	American Arborvitae	
Thuja orientalis [2]	Oriental Arborvitae	

* **CYPERACEAE**		
Carex sp.	Sedge	
Cyperus esculentus	Nut Grass	FacW
Cyperus sp. [2]	Cyperus	
Cyperus alternifolius [1]	Papyrus	
Scirpus acutus	Common Tule	
Scirpus californicus	California Tule	Obl
Scirpus microcarpus	Panicled Bulrush	Obl
* **DIPSACACEAE**		
Dipsacus fullonum [1]	Teasel	Upl
* **EBENACEAE**		
Diospyros virginiana [2]	Persimmon	
* **EQUISETACEAE**		
Equisetum arvense	Common Horsetail	Fac
* **ERICACEAE**		
Xylosma congestum [2]	Xylosma	
* **EUPHORBIACEAE**		
Eremocarpus setigerus	Turkey Mullein	
Euphorbia lathyris [1]	Gopher Spurge	
Ricinus communis [1]	Castor Bean	
* **FABACEAE (LEGUMINOSAE)**		
Albizia julibrissin [2]	Silk Tree	
Ceratonia siliqua [2]	Carob	
Cercis canadensis [1]	Eastern Redbud	
Cytisus sp. [1]	Broom	
Lotus corniculatus [1]	Bird's Foot Trefoil	
Lotus scoparius	Deerweed	
Medicago polymorpha [1]	Bur Clover	
Melilotus albus [1]	White Sweet Clover	FacU
Melilotus indica [1]	Yellow Sweet Clover	
Psoralea physodes	California Tea	
Robinia pseudo-acacia [1]	Black Locust	Fac
Trifolium obtusiflorum	Clover	
Trifolium tridentatum	Tomcat Clover	
Vicia americana	American Vetch	
Vicia dasycarpa [1]	Thick-fruited Vetch	

* **FAGACEAE**		
Quercus agrifolia	Coast Live Oak	
Quercus douglasii	Blue Oak	
Quercus ilex [1]	Holly Oak	
Quercus lobata	Valley Oak	
Quercus wislizenii	Interior Live Oak	
* **FUMARIACEAE**		
Fumaria parviflora [1]	Small-flowered Fumitory	
* **GERANIACEAE**		
Erodium botrys [1]	Long-beaked Filaree	
Erodium cicutarium [1]	Red-stemmed Filaree	
Geranium dissectum [1]	Cut-leaved Geranium	Upl
Pelargonium dissectum [2]	Geranium	
* **GINKGOACEAE**		
Ginkgo biloba [2]	Maidenhair Tree	
* **HAMAMELIDACEAE**		
Liquidambar styraciflua [2]	Sweet Gum	
* **HIPPOCASTANACEAE**		
Aesculus californica	California Buckeye	
* **HYDROPHYLLACEAE**		
Pholistoma auritum	Fiesta Flower	
* **IRIDACEAE**		
Iris sp.	Iris	
* **JUGLANDACEAE**		
Juglans hindsii	California Black Walnut	
Juglans regia [1]	English Walnut	
* **JUNCACEAE**		
Juncus effusus	Bog Rush	
* **LAMIACEAE**		
Marrubium vulgare [1]	Horehound	
Mentha arvensis var. *lanata*	Field Mint	
Stachys sp.	Hedge Nettle	

* **LAURACEAE**	
Cinnamomum camphora[2]	Camphor Tree
Laurus nobilis[1]	English Bay
Persea americana[2]	Avocado
Umbellularia californica	California Bay
* **LILIACEAE**	
Chlorogalum pomeridianum	Soap Root
* **LOGANIACEAE**	
Buddleia davidii[1]	Summer Lilac
* **LYTHRACEAE**	
Lagerstroemia indica[2]	Crape Myrtle
Lythrum sp.	Loosestrife
* **MAGNOLIACEAE**	
Liriodendron tulipifera[2]	Tulip Tree
Magnolia grandiflora[2]	Magnolia
Magnolia tripetala[2]	Umbrella Tree
* **MALVACEAE**	
Malva neglecta[1]	Mallow
Malva parviflora[1]	Mallow
Sidalcea malvaeflora	Checker Bloom
* **MIMOSACEAE**	
Acacia decurrens[2]	Green Wattle
Acacia longifolia[2]	Golden Wattle
Acacia melanoxylon[2]	Black Acacia
Mimosa sp.[1]	Mimosa
* **MORACEAE**	
Ficus carica[2]	Fig
Morus nigra[2]	Black Mulberry
* **MYOPORACEAE**	
Myoporum laetum[2]	Myoporum
* **MYRTACEAE**	
Callistemon lanceolatus[2]	Lemon Bottlebrush
Eucalyptus globulus[1]	Blue Gum
Eucalyptus sp.[1]	Eucalyptus
Eugenia myrtifolia[2]	Brush-cherry
Myrica cerifera[2]	Wax-myrtle

Myrica gale [2]	Sweet Gale	
Myrica pensylvanica [2]	Bayberry	
Psidium guajava [2]	Guava	
*** OLEACEAE**		
Fraxinus uhdei [2]	Evergreen Ash	
Fraxinus velutina [2]	Ash	
Ligustrum lucidum [1]	Glossy Privet	
Olea europaea [1]	Willow-leaved Olive	
Olea sp. [1]	Olive	
*** ONAGRACEAE**		
Epilobium sp.	Willow Herb	
Epilobium paniculatum	Panicled Willow Herb	Upl
Ludwigia peploides	Creeping Water-primrose	Obl
Oenothera hookeri	Hooker Evening Primrose	
Zauschneria californica	California Fuschia	
*** OXALIDACEAE**		
Oxalis pes-caprae [1]	Bermuda Buttercup	
*** PALMAE**		
Washingtonia sp. [1]	Palm	
Phoenix sp. [1]	Date Palm	
*** PAPAVERACEAE**		
Eschscholzia californica	California Poppy	
*** PINACEAE**		
Cedrus deodara [1]	Deodar Cedar	
Pinus sp. [1]	Pine	
Pinus radiata [1]	Monterey Pine	
*** PITTOSPORACEAE**		
Pittosporum sp. [1]	Pittosporum	
*** PLANTAGINACEAE**		
Plantago lanceolata [1]	English Plantain	
Plantago major [1]	Broad Leaf Plantain	FacW
*** PLATANACEAE**		
Platanus racemosa	Sycamore	

* **POACEAE (GRAMINEAE)**		
Arundo donax [1]	Giant Reed	FacW
Avena barbata [1]	Wild Oat	
Avena fatua [1]	Wild Oat	
Avena sativa [1]	Oat	
Bambusa sp. [2]	Bamboo	
Bromus carinatus	California Brome	
Bromus diandrus [1]	Ripgut Brome	Upl
Bromus mollis [1]	Soft Chess	
Cortaderia selloana [1]	Pampas Grass	
Crypsis schoenoides [1]	Swampgrass	
Cynodon dactylon [1]	Bermuda Grass	Fac
Echinochloa crusgalli [1]	Barnyard Grass	FacW
Elymus triticoides	Alkali Rye Grass	Fac
Glyceria leptostachya	Manna Grass	
Hordeum leporinum [1]	Farmer's Foxtail	
Leptochloa fascicularis	Sprangle Top Grass	Obl
Lolium perenne [1]	Italian Ryegrass	Fac
Melica californica	Western Melica	
Oryzopsis miliacea [1]	Ricegrass	Upl
Paspalum dilatatum	Dallis Grass	Fac
Paspalum distichum [1]	Knot Grass	
Phalaris paradoxa [1]	Canary Grass	
Poa annua [1]	Annual Bluegrass	
Polypogon monspeliensis [1]	Rabbitsfoot Grass	FacW
Setaria sp. [1]	Brittle Grass	
Sorghum halepense [1]	Barnyard Grass	FacW
Stipa lepida	Small-flowered Stipa	
Vulpia myuros [1]	Rattail Fescue	
* **PODOCARPACEAE**		
Podocarpus gracilior [2]	Fern Pine	
Podocarpus macrophyllus [2]	Yew Pine	
* **POLYGONACEAE**		
Eriogonum sp.	Buckwheat	
Polygonum aviculare [2]	Common Knotweed	Fac
Polygonum coccineum var. *pratincola*	Smartweed	
Polygonum hydropiper	Smartweed	Obl
Polygonum hydropiperoides	Swamp Smartweed	Obl
Polygonum punctatum	Water Smartweed	Obl
Rumex conglomeratus	Green Dock	FacW
Rumex crispus [1]	Curly Dock	FacW
Rumex pulcher [1]	Fiddle Dock	

* **PORTULACACEAE**		
Montia perfoliata	Miner's Lettuce	
Portulaca oleracea	Purslane	
* **PRIMULACEAE**		
Anagallis arvensis [1]	Scarlet Pimpernel	
* **PROTEACEAE**		
Grevillea robusta [2]	Silk-oak	
* **RANUNCULACEAE**		
Ranunculus californicus	California Buttercup	
Clematis ligusticifolia	Virgin's Bower	
* **RHAMNACEAE**		
Rhamnus alaternus [1]	Italian Buckthorn	
Rhamnus californica	Coffeeberry	
Rhamnus crocea	Red-berry	
* **ROSACEAE**		
Cydonia oblonga [2]	Quince	
Cotoneaster sp. [1]	Cotoneaster	
Eriobotrya japonica [1]	Loquat	
Heteromeles arbutifolia	Toyon	
Malus sylvestris [2]	Apple	
Photinia sp. [2]	Photinia	
Prunus amygdalus [1]	Almond	
Prunus armeniaca [1]	Apricot	
Prunus cerasifera [2]	Cherry Plum	
Prunus persica [1]	Peach	
Prunus sp. [1]	Flowering Plum	
Pyracantha sp. [1]	Firethorn	
Pyrus kawakamii [2]	Evergreen Pear	
Rosa sp. [2]	Rose	
Rosa californica	California Rose	
Rubus procerus [1]	Himalaya Berry	Fac
Rubus ursinus	Blackberry	
* **RUBIACEAE**		
Galium aparine [1]	Bedstraw	
* **RUTACEAE**		
Citrus limon [2]	Lemon	
Citrus sinensis [2]	Orange	

* **SALICACEAE**		
Populus fremontii	Fremont Cottonwood	FacW
Populus nigra [1]	Lombardy Poplar	
Salix babylonica [1]	Weeping Willow	FacW
Salix hindsiana	Sandbar Willow	
Salix laevigata	Red Willow	
Salix lasiandra	Yellow Willow	Obl
Salix lasiolepis	Arroyo Willow	FacW
* **SAXIFRAGACEAE**		
Escallonia sp. [1]	Escallonia	
* **SCROPHULARIACEAE**		
Kickxia spuria [1]	Round-leaved Fluellin	
Scrophularia californica	California Bee Plant	
Verbascum thapsus [1]	Mullein	
Veronica persica [1]	Persian Speedwell	
Veronica anagallis-aquatica	Brooklime	
* **SIMARUBACEAE**		
Ailanthus altissima [1]	Tree-of-Heaven	
* **SOLANACEAE**		
Datura stramonium	Jimson Weed	
Lycopersicon esculentum [1]	Tomato	
Nicotiana glauca [1]	Tree Tobacco	
Solanum nodiflorum [1]	White-flowered Nightshade	
Solanum umbelliferum	Blue Witch	
Solanum sp. [2]	Blue Potato Plant	
* **SPARGANIACEAE**		
Sparganium eurycarpum	Broad-fruited Burreed	Obl
* **TAMARICACEAE**		
Tamarix parviflora [1]	Tamarisk	
* **TAXODIACEAE**		
Sequoia sempervirens [2]	Coast Redwood	
* **TYPHACEAE**		
Typha angustifolia	Narrow-leaved Cat-tail	Obl
Typha latifolia	Broad-leaved Cat-tail	Obl

* **ULMACEAE**		
Ulmus carpinifolia [1]	Smooth Leaf Elm	
Ulmus procera [1]	English Elm	
* **URTICACEAE**		
Parietaria floridana	Florida Pellitory	
Parietaria judaica [1]	Judean Pellitory	
Urtica holosericea	Hoary Nettle	FacW
* **VISCACEAE (LORANTHACEAE)**		
Phoradendron flavescens var. *villosum*	Oak Mistletoe	
* **VITACEAE**		
Vitis californica	California Wild Grape	

Notes: This checlist was prepared in July 1991.

[1] - indicates non-native plant species

[2] - indicates non-native plant species observed only in the urban forest and/or upland landscape habitats

Key to the Wetland Indicator Status

Obl - Obligate Wetland. In natural conditions, these species nearly always occur in wetlands (99% probability).

FacW - Facultative Wetland. Plants usually occur in wetlands, but may occur in nonwetland areas (67% - 99% probability).

Fac - Facultative. These species will occur in wetlands and nonwetlands equally (50% probability).

FacU - Facultative Upland. Plants predominately occur in nonwetlands, but are occasionally found in wetlands (1% - 33% probability).

Upl - Upland. These species almost always occur in nonwetlands in natural conditions (99% probability) within the specified region, yet may occur in wetlands of another region.

APPENDIX F

BIOLOGICAL DATA

Table F-1. Acreages of Existing Habitat

	Riparian and Upland Habitats					Jurisdictional Waters	
Reach	*Riparian Forest*	*Urban Forest*	*Ruderal Scrub*	*Ruderal Herbaceous*	*Upland Landscaping*	*Wetlands*	*Other Waters*
7	4.24	--	1.29	0.37	0.35	0.03	3.88
8	1.64	1.97	--	0.04	0.05	0.02	1.06
9	8.97	0.80	0.48	0.11	--	0.06	4.68
10A	1.45	--	0.37	0.06	--	0.18	1.14
10B	1.08	--	2.24	4.18	4.18	2.34	2.67
10C	3.54	--	0.83	1.23	0.37	0.08	2.18
11A	3.88	--	2.55	1.77	0.32	0.15	2.84
11B	1.06	--	0.82	0.32	0.69	0.03	0.98
11C	2.22	--	0.09	0.85	--	0.02	1.18
12	2.25	--	4.13	2.88	1.19	1.50	9.79
Guadalupe River Subtotal	30.32	2.77	12.78	11.82	7.14	4.41	30.40
Canoas Creek	--	0.79	--	0.97	0.03	0.05	1.34
Ross Creek	--	1.33	--	2.63	--	0.39	1.41
Project Total	30.32	4.89	12.78	15.42	7.17	4.85	33.15

Notes: From Parsons Engineering Science (1997). Habitat types not included in this table are: unvegetated, revetment, river (included in "other waters"), and marsh (included in "wetlands").
Acreages of jurisdictional waters are from the wetland delineation prepared by the District (SCVWD 1995).

Table F-2. Number of Existing Trees $\geq$ 2 inches dbh within the Upper Guadalupe River Feasibility Study Area

Habitat Type Trees	*7*	*8*	*9*	*10*	*11*	*12*	*Ross & Canoas Creeks*	*Total*
Riparian Corridor Trees	938	451	1,825	1,520	1,632	625	---	6,991
Urban Forest Trees	60	226	nd	nd	nd	nd	510	796
Total	998	677	1,825	1,520	1,632	625	510	7,787

Source: Parsons Engineering Science 1997.

Notes: dbh = diameter at breast height
nd = no data
Urban Forest trees were inventoried only in Reaches 7 and 8.

Table F-3. Summary of Trees by Size Class within the Upper Guadalupe River Feasibility Study Area

Size Class	*Range (inches)*	*7*	*8*	*9*	*10*	*11*	*12*	*Ross & Canoas Creeks*	*Total*
2.0	2 to <6	369	203	441	587	717	416	383	3,106
3.0	6 to <11	319	169	648	510	501	104	90	2,341
4.0	11 to <24	266	255	599	369	333	82	35	1,939
	24 to <50	39	50	125	48	68	15	2	347
6.0	50 +	5	0	12	6	13	8	0	44
Total		998	677	1,825	1,520	1,632	625	510	7,789
Ordinance Trees		74	85	190	83	130	37	2	601

Source: Parsons Engineering Science 1997.

Notes: All size classes are inches of dbh (diameter at breast height)
The data for trees in Reaches 9-12 are for riparian corridor trees only; no data for urban forest trees in these reaches.
Trees along Ross and Canoas creeks consist entirely of urban forest trees.
Ordinance Trees are those trees >20 inches dbh.
The data provided for Ordinance Trees are for riparian corridor trees only, not for urban forest trees.

Table F-4. Locations of Riparian Habitat Trees within the Upper Guadalupe River Feasibility Study Area

Stream Bank	*Bank Location*	*7*	*8*	*9*	*10*	*11*	*12*	*Ross & Canoas Creeks*	*Total*
East Bank	Channel Bottom	0	4	8	3	0	0		15
	Toe of Slope	62	37	116	35	48	0		298
	Lower Slope	108	83	92	107	110	28		528
	Mid Slope	120	102	272	262	510	140		1,406
	Upper Slope	137	41	331	183	326	33		1,051
	Top of Bank	96	239	35	71	211	114	126	766
Sub-Total		523	506	854	661	1,205	315	126	4,190
West Bank	Channel Bottom	0	1	0	26	14	0		41
	Toe of Slope	43	3	45	114	6	1		212
	Lower Slope	90	25	253	146	54	24		592
	Mid Slope	177	83	417	177	174	165		1,193
	Upper Slope	141	51	223	146	76	47		684
	Top of Bank	24	8	33	250	103	73	384	487
Sub-Total		475	171	971	859	427	310	384	3,597
Total		998	677	1,825	1,520	1,632	625	510	7,787

Source: SCVWD and COE 1994.

Notes: Trees along the Top of Bank in Reaches 7 and 8 include Urban Forest trees set back from the top of the bank.
Canoas Creek trees are included in East Bank, Ross Creek trees in West Bank; all are Urban Forest trees set back from the top of the bank.

Table F-5. Fish Species of the Upper Guadalupe River Study Area

Common Name	Scientific Name
Anadromous Species:	
Chinook (king) salmon	*Oncorhynchus tsawytscha*
Steelhead trout	*Oncorhynchus mykiss*
Pacific lamprey	*Lampetra tridentata*
Resident Species:	
Sacramento sucker	*Catostomus occidentalis*
California roach	*Lavinia symmetricus*
Prickly sculpin	*Cottus asper*
Riffle sculpin	*Cottus gulosus*
Hitch	*Lavinia exilicauda*
Largemouth bass*	*Micropterus salmoides*
Brown bullhead*	*Ictalurus nebulosus*
Green sunfish*	*Lepomis cyanellus*
Pumpkinseed*	*Lepomis gibbosus*
Mosquitofish*	*Gambusia affinis*
Goldfish*	*Carassius auratus*
Carp*	*Cyprinus carpio*

Source: Parsons Engineering Science 1997.

Notes: * = Non-native species.

Anadromous species spend their adult life in the ocean and migrate up the river to spawn. Steelhead trout are the sea-run population of *O. mykiss*; rainbow trout are the resident population of *O. mykiss* and occur above the project study area, above Blossom Hill Road.

Table F-6. Approximate Temporal Occurrence and Inferred Temperature Preferences of Chinook Salmon and Steelhead Trout in the Guadalupe River

Life Stage	*Time of Year*	*Water Temperature Preferences*
Chinook salmon:		
Migratory adults	June to mid-January	<64°F
Eggs/embryos	November to February	<57°F
Juveniles	January to June	54°-64°F
Steelhead trout:		
Migratory adults	December to May	<64°F
Eggs/embryos	December to May?	40°-60°
Juveniles	All year	43°-65°F

Source: Parsons Engineering Science 1997; Leidy et al. 1987.

Notes: The time of year indicated is approximate only and may vary from year to year.
Some chinook salmon juveniles remain in the Guadalupe River for a year.
Although optimum temperatures are lower, juvenile chinook salmon can tolerate temperatures up to 75.2°F
Survival of juvenile steelhead trout through the summer in the Guadalupe River, when water temperature often exceeds 70°F, is undetermined. Steelhead juveniles can survice at temperatures >70°F based on their occurrence in other streams (Parsons Engineering Science 1997).

Table F-7. Streambed and Shaded Riverine Aquatic (SRA) Characteristics of the Upper Guadalupe River Feasibility Study Area

Habitat Type Descriptions	*7*	*8*	*9*	*10*	*11*	*12*	*Ross & Canoas Creeks*	*Total*
Stream Length (feet)	4,289	1,484	4,953	7,136	4,640	5,706	nd	28,208
Riffle Length (feet)	746	600	1,342	376	710	1,039	nd	4,813
Pool Length (feet)	3,406	826	2,619	6,271	2,169	5,825	nd	21,116
Run Length (feet)	114	54	877	359	0	0	nd	1,404
Riffle:Pool Ratio	0.22:1	0.73:1	0.51:1	0.06:1	0.33:1	0.18:1	nd	0.24:1*
Shaded Length East Bank (feet)	1,900	625	2,379	1,507	876	137	nd	7,424
Shaded Length West Bank (feet)	2,266	792	3,184	1,340	1,007	0	nd	8,589
Undercut Length East Bank (feet)	2,000	440	785	595	95	0	nd	3,915
Undercut Length West Bank (feet)	2,265	410	1,305	705	90	0	nd	4,775
Bridge Length East Bank (feet)	412	39	71	333	50	191	nd	1,096
Bridge Length West Bank (feet)	394	44	66	330	49	191	nd	1,074
Protected Length East Bank (feet)	911	61	1,474	3,905	0	0	nd	6,351
Protected Length West Bank (feet)	725	713	711	3,967	66	0	nd	6,182
Stream Area (acres)	1.973	0.696	1.886	4.348	2.687	4.552	nd	16.142
Shaded Area East Bank (acres)	0.344	0.070	0.398	0.162	0.161	0.001	nd	1.136
Shaded Area West Bank (acres)	0.328	0.137	0.512	0.158	0.272	0.000	nd	1.408
Percent Shaded Area (%)	34.07	29.80	48.24	7.36	16.12	0.03	nd	16.56*

Source:Parsons Engineering Science 1997.
Notes:nd = no data (SRA Cover is lacking along Ross and Canoas creeks); * = Weighted average, includes Reach 6.

Table F-8. Special-Status Wildlife Species Observed or Expected to Occur (other than as a Rare Transient) within the Upper Guadalupe River Feasibility Study Area

Common Name	*Scientific Name*	*Status*
Mammals		
Small-footed myotis bat	*Myotis ciliolabrum*	FSC
Long-eared myotis bat	*Myotis evotis*	FSC
Long-legged myotis bat	*Myotis volans*	FSC
San Francisco dusky-footed woodrat	*Neotoma fuscipes annectens*	FSC
Birds		
Western burrowing owl*	*Athene cunicularia*	FSC, SSC
Little willow flycatcher	*Empidonax traillii*	FSC, ST
Yellow warbler*	*Dendroica petechia*	SSC
Yellow-breasted chat	*Incteria virens*	SSC
Tricolored blackbird	*Agelaius tricolor*	FSC, SSC
Amphibians		
California red-legged frog	*Rana aurora draytoni*	FT, SSC
Fishes		
Steelhead trout	*Oncorhynchus mykiss*	FPT
Chinook salmon	*Oncorhynchus tshawytscha*	FC
Insects		
San Francisco fork-tailed damselfly	*Ischnura gemina*	FSC

Sources: Biological Assessment prepared by COE (Appendix K); Parsons Engineering Science 1997.
Notes: * Observed

Federal Status

FE Federally Endangered: taxa in danger of extinction throughout all or a significant portion of its range.
FT Federally Threatened: taxa likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
FPE/T Federal Proposed Endangered/Threatened: taxa proposed for listing as endangered or threatened.
FC Federal Candidate Species, taxa under review for possible listing as an endangered or threatened species.
FSC Federal Species of Concern, formerly candidates

State Status

SE California Endangered: a native species or subspecies of animal in serious danger of extinction throughout all or a significant portion of its range.
ST California Threatened: a native species or subspecies likely to become an endangered species in the foreseeable future, although not presently threatened with extinction.
SSC California Species of Special Concern: species not officially state listed, but vulnerable to extirpation given population declines or restricted geographic ranges.
SFP California Fully Protected.

Table F-9. Impacts of the Channel Widening Plan on Vegetation and Section 404 Jurisdictional Waters

	Riparian and Upland Habitats					Jurisdictional Waters	
Reach	Riparian Forest	Urban Forest	Ruderal Scrub	Ruderal Herbaceous	Urban Landscaping	Wetlands	Other Waters
7	2.00	--	0.95	0.10	--	--	0.98
8 (see notes)	0	--	--	--	--	--	--
9	--	--	--	--	--	--	--
10A	0.78	--	0.37	0.06	--	--	0.10
10B	--	--	0.30	2.00	--	0.28	1.25
10C	1.17	--	0.44	0.62	--	--	0.17
11A	0.57	--	--	--	--	--	--
11B	0.58	--	0.35	0.18	0.21	--	0.05
11C	1.39	--	0.15	0.04	--	--	0.09
12	--	--	--	2.50	--	--	--
Temporary Coffer Dams	--	--	--	--	--	--	--
Ross and Canoas Creeks	--	--	--	--	--	--	--
Project Total	6.49	--	2.56	5.50	0.21	0.28	2.64

Notes: These estimates are based on the overlay of project construction impacts on existing habitats (see Appendix E of this document). Acreages of impacts on wetlands and jurisdictional waters have been estimated by the Corps based on the accepted delineation. Habitat types not included in this table are unvegetated, revetment, river (included in "other waters"), and marsh (included in "wetlands"). For Reach 8, habitat impacts associated with the floodwall are assumed to be zero, although some localized clearing may be necessary.

Impacts annotated on Plates V-21 through V-40 as "canopy" were excluded. Ground disturbance in these areas will not cause removal of overhanging riparian canopy.

Table F-10. Impacts of the Bypass Channel Plan on Vegetation and Section 404 Jurisdictional Waters

	RIPARIAN AND UPLAND HABITATS					JURISDICTIONAL WATERS	
Reach	Riparian Forest	Urban Forest	Ruderal Scrub	Ruderal Herbaceous	Urban Landscaping	Wetlands	Other Waters
7	0.53	--	0.58	0.02	--	--	1.82
8	0.24	1.01	--	--	--	--	0.25
9	2.80	0.20	0.42	0.01	--	0.02	1.16
10A	0.53	--	0.29	0.06	--	0.03	0.08
10B	0.12	--	0.83	2.29	0.86	0.28	1.25
10C	1.44	--	0.31	0.74	0.23	0.04	0.35
11A	2.20	--	0.66	1.46	--	0.10	0.75
11B	0.55	--	0.84	0.11	0.66	--	0.59
11C	0.63	--	0.08	0.66	--	--	0.35
12	0.03	--	1.05	0.28	0.12	0.02	0.88
13	--	--	--	--	--	--	--
Temporary Coffer Dams	--	--	--	--	--	--	1.06
Guadalupe River Subtotal	9.08	1.21	5.06	5.63	1.87	0.50	8.52
Ross Creek	--	0.08	--	2.55	--	0.39	1.41
Canoas Creek	--	--	--	--	--	--	--
PROJECT TOTAL	9.08	1.29	5.06	8.18	1.87	0.89	9.93

Source: Parsons Engineering Science 1997

Notes: Habitat types not included in this table are unvegetated, revetment, river (included in "other waters"), and marsh (included in "wetlands").

Impacts annotated on Plates V-21 through V-40 as "canopy" were excluded. Ground disturbance in these areas will not cause removal of overhanging riparian canopy.

Impacts annotated on Plates V-26, -27, and -30 as "erosion control sites" were excluded from this table. Some of the riparian vegetation in these sites was lost to erosion during the floods of January and March 1995. These losses and any impacts associated with the erosion control treatments (maximum 0.63-acre altogether) will be mitigated onsite on a 1:1 basis.

APPENDIX G

CLEAN WATER ACT SECTION 404(B)(1) DETERMINATION

Modified from Parsons Engineering-Science (1997)

APPENDIX G

SUMMARY

PURPOSE OF THE ANALYSIS

Section 404 of the Clean Water Act requires project proponents to obtain a permit from the U.S. Army Corps of Engineers (Corps) for activities that involve placement of dredged or fill material into waters of the United States (33 USC 1344). While the Corps of Engineers does not issue permits to itself under this provision of law, for Corps projects which affect the water of the United States, the Corps nevertheless evaluates its projects as if this permit requirement applied. The Clean Water Act requires the Corps, when considering a project, to follow the requirements of the U.S. Environmental Protection Agency, Specification of Disposal Sites for Dredged or Fill Material, 40 CFR Part 230, Section 404(b)(1). For water-dependent and non-water dependent projects, the Guidelines prohibit discharges of dredged or fill material into waters of the United States if a practicable alternative to the proposed project exists that would have less adverse impacts on the aquatic ecosystem, including wetlands, and does not have other significant environmental consequences (40 Code of Federal Regulations [CFR] 230 [a]). This alternatives analysis for the Upper Guadalupe River Feasibility Study Environmental Impact Report/Environmental Impact Statement (EIR/EIS) and other available data will provide input to facilitate the permitting decision, pursuant to EPA's Guidelines, for the Corps.

DESCRIPTION OF THE PROPOSED PROJECT

The Guadalupe River Flood Control Project is proposed by the Corps to control flooding along the Guadalupe River within the City of San Jose. The Guadalupe River currently cannot contain either the 50- or 100-year flood. To increase the capacity of the Guadalupe River, channel modifications are proposed along six sections, or reaches, of the Guadalupe River that cover approximately 5.5 miles. Modifications also are proposed on adjacent portions of two tributaries, Canoas Creek and Ross Creek. Channel modifications proposed by the two alternatives, the Bypass Channel plan and the Channel Widening plan, include constructing bypass channels (Bypass Channel plan only), widening the channel, adding benches, lining portions of the channel with gabions and cribwalls, and constructing floodwalls and levees.

RESULTS OF THE ALTERNATIVES ANALYSIS

The Corps has evaluated several alternative means of achieving flood control on the upper Guadalupe River. Alternatives were explored in terms of economic feasibility, flood control effectiveness, and environmental accceptability per Corps planning guidance. Screening proceeded from the consideration and elimination of general plans that were clearly inferior according to the screening criteria to the detailed consideration of two practicable alternatives, the Bypass Channel plan and the Channel Widening plan, which, along with the no-action alternative, were identified for further evaluation in the Corps' Feasibility Study and EIR/S (this document). The Bypass Channel plan evaluated herein is part of a larger project currently proposed by the Santa Clara Valley Water District (SCVWD). The SCVWD's Draft EIR/S (Parsons Engineering Science 1997) addressing that project is the primary source of information for the analyses contained in this document.

Wetland Impacts for the Bypass Channel and Channel Widening Plans

Field surveys were conducted on April 16 and 22, 1996 to verify the results of a previous field evaluation that identified waters of the U.S. Total jurisdictional waters amount to 38 acres, including 4.85 acres of wetlands and 33.15 acres of other waters of the U.S. Correspondence regarding the wetlands delineation is included in Attachment 1.

The following is a summary of pre-mitigation and post-mitigation impacts on wetlands for the Bypass Channel plan and the Channel Widening plan.

Bypass Channel Plan

Pre-Mitigation Impacts. The Bypass Channel plan would result in the permanent removal or temporary disturbance of approximately 0.89 acre of jurisdictional wetlands and 9.93 acres of other waters of the United States. A portion of the impact on the wetlands (not quantified) would be the result of temporary disturbance or minor grading. Narrow strips of seasonal wetland affected in many such areas are expected to reestablish naturally, because natural recovery of seasonal wetland vegetation has been observed on some banks and bars on the lower Guadalupe River. Impacts on portions of the other wetlands (particularly in Reaches 10B, and 12) will be permanent.

Most or all of the impacts on other waters of the United States will be temporary occurring only during construction. Following construction, ordinary high waters will occupy equal or greater areas in every reach and will remain in essentially their original locations (except in the middle of Reach 10B, where the low flow channel will shift slightly eastward).

Post-Mitigation Impacts. The Bypass Channel plan would result, with the implementation of mitigation measures, in no net loss of wetlands or other jurisdictional waters of the United States. The Bypass Channel plan would actually create additional wetland habitat beyond that required for mitigation (1.54 acre net increase within the study area [some of this acreage would be used by the SCVWD to mitigate wetland losses caused by their proposed project in adjacent reaches up- and downstream of the study area]). Mitigation for wetlands and other jurisdictional waters of the United States includes the following measures:

- Establish at least 0.89 acre of constructed jurisdictional wetlands to provide no net loss of wetlands within the project area, including construction of new wetlands in Reaches 10B and 12.

- Restore as much as possible of the temporarily disturbed wetlands on-site.

- Use native plant species such as grasses, sedges (*Carex* spp.), and water-plantain (*Alisma* spp.), that are flexible enough to be minimally disturbed by channel maintenance activities and minimize obstruction of flood flows.

- Use jurisdictional wetland delineation criteria as a basis for success criteria for constructed wetlands.

- Provide at least 9.93 acres of constructed and restored other waters (at least a 1:1 replacement ratio) to compensate for other waters that are either disturbed or eliminated during project construction.

Channel Widening Plan

Pre-Mitigation Impacts. The Channel Widening plan would result in the permanent removal or temporary disturbance of approximately 0.28 acre of jurisdictional wetlands and 2.64 acres of other waters of the United States. A portion of the wetland impact (not quantified) would be the result of temporary disturbance or minor grading. Narrow strips of seasonal wetland affected in many such areas are expected to reestablish naturally, because natural recovery of seasonal wetland vegetation has been observed on some banks and bars on the lower Guadalupe River.

Post-Mitigation Impacts. Reliable acreage figures for the increase in wetlands and waters of the U.S. under the Channel Widening plan are not available due to the difficulty in determining which portions of the low bench constructed under that plan would become wetlands or waters of the U.S. Mitigation measures for the Channel Widening plan parallel those described previously with regard to ensuring no net loss of jurisdictional wetlands and waters of the U.S.

CHAPTER 1. INTRODUCTION

PURPOSE OF THE ANALYSIS

Section 404 of the Clean Water Act requires project proponents to obtain a permit from the U.S. Army Corps of Engineers (Corps) for activities that involve placement of dredged or fill material into waters of the United States (33 USC 1344). While the Corps of Engineers does not issue permits to itself under this provision of law, for Corps projects which affect the water of the United States, the Corps nevertheless evaluates its projects as if this permit requirement applied. The Clean Water Act requires the Corps, when considering a project, to follow the requirements of the U.S. Environmental Protection Agency, Specification of Disposal Sites for Dredged or Fill Material, 40 CFR Part 230, Section 404(b)(1). For water-dependent and non-water dependent projects, the Guidelines prohibit discharges of dredged or fill material into waters of the United States if a practicable alternative to the proposed project exists that would have less adverse impacts on the aquatic ecosystem, including wetlands, and does not have other significant environmental consequences (40 CFR 230 [a]).

Before approving a project, the Corps requires it be shown that there are no practicable, less damaging alternatives. The purpose of this report is to provide the Corps and EPA with information regarding the availability of practicable alternatives to the proposed project that are not analyzed in detail in the EIR/EIS and to summarize the analysis contained in the EIR/EIS regarding those alternatives that may be considered practicable after preliminary stages of screening. The Corps is responsible for making the formal determination of compliance with the 404 (b)(1) Guidelines. This alternatives analysis for the Upper Guadalupe River Feasibility Study EIR/EIS and other available data will provide input to facilitate the permitting decision of the Corps.

SECTION 404 (B)(1) GUIDELINES

EPA's Guidelines (40 CFR 230 et seq.), the Corps regulatory guidelines (33 CFR 320 et seq.), and the National Environmental Policy Act (NEPA) and NEPA Guidelines (40 CFR 1500 et seq.) are the substantive environmental criteria used by the Corps to evaluate permit applications. When the Corps evaluates a request for a permit, an analysis of practicable alternatives is the primary screening mechanism used to determine the appropriateness of permitting a discharge. The Corps' evaluation also includes a public interest review and a review for NEPA compliance.

Under EPA's Guidelines, an alternative is considered practicable if it is "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the project purpose" (40 CFR 230.10 [a][2]).

If a project is not water dependent (i.e., does not require access to or siting in special aquatic sites to fulfill the basic purpose) and the project proposes a discharge into a special aquatic site, EPA's Guidelines presume that a less environmentally damaging practicable alternative exists, unless the project applicant can clearly demonstrate otherwise (40 CFR 230.10 [a][2]). Special aquatic sites include sanctuaries and refuges, wetlands, mud flats, vegetated shallows, coral reefs, and riffle and pool complexes. Thus, if a project is not water dependent and proposes to discharge dredged or fill material into a special aquatic site, the project applicant must clearly refute the regulatory presumption that a less environmentally damaging practicable alternative exists to obtain a permit for the project.

EPA's Guidelines suggest a sequential approach to project planning in which mitigation measures are considered only after the project applicant shows that no practicable alternative is available to achieve the basic purpose with less environmental impact. After it has been determined that no practicable alternative is available, EPA's Guidelines require that appropriate and practicable steps be taken to minimize potential adverse impacts on the aquatic ecosystem (40 CFR 230.10 [d]). Such steps may include actions controlling discharge location; material to be discharged, or fate of material after discharge or method of dispersion; and actions related to technology, plant and animal populations, or human use (40 CFR 230.70-230.77).

CHAPTER 2. PURPOSE OF AND NEED FOR PROJECT

PROJECT PURPOSE AND NEED

The objective of the Feasibility Study is to identify a feasible project providing flood protection along the upper Guadalupe River while fulfilling federal interest requirements and meeting the needs of the non-federal sponsor (SCVWD).

PUBLIC NEED FOR FLOOD CONTROL

A one percent or 100-year flood is the largest flood normally considered in flood control planning. Along the upper Guadalupe River, such a flood could cause the inundation of approximately 7,200 residential units, six public schools, 340 acres of commercial and industrial properties, and 114 acres of agricultural land located near the river and portions of two tributaries, Ross Creek and Canoas Creek. The Bypass Channel plan would contain the 100-year flood, preventing these damages and also substantially reducing the need for mandatory flood insurance that currently is required for areas prone to flooding during a one percent flood. A two-percent or 50-year flood would cause somewhat lesser, but still substantial damages. The Channel Widening plan would contain the 50-year flood.

Severe flooding occurred in Santa Clara County as a result of storms in January 1995. On January 9, 1995, the amount of rainfall recorded in the County ranged from 1 to 4.55 inches in 24 hours. The rainfall intensities in January were up to a 5% (20-year) return period (i.e., a flood of this magnitude has a statistical change of occurring once in every 20 years). The mayor of the City of San Jose declared a state of emergency, and the President of the United States declared Santa Clara County a federal disaster area. Estimated flood damage was $2.2 million for the County, with more than 150 homes damaged by flooding or downed trees. During this storm, mudslides and torrents of rain resulted in the closure of sections of several major highways, including SR 87, and forced evacuation of the area. Among the hardest hit areas were those flooded by the Guadalupe River.

The Guadalupe River spilled over its banks on the night of January 9, 1995, at three locations in central San Jose. During this storm, water depth in some areas reached 15 feet. The Guadalupe River forced its way into homes and pushed 50 feet along sidewalks. Water was overtopping banks, seeping through embankments, and cascading onto the roadway that had become a flood channel. Approximately 25 acre-feet (8 million gallons) of water inundated SR 87, resulting in the closure of the southbound lanes of the highway for two days and the northbound lanes for three days.

Flooding also occurred during storms in March 1995. On March 10, the Guadalupe River and Los Gatos Creek combined to produce the highest flow on record. The flow rate in March was estimated at 10,500 cubic feet per second (cfs), with a 25-year return period. Because streets were flooded, residents and workers in office buildings were forced to evacuate. Between 200 and 300 houses and buildings were flooded from four separate breakouts along the Guadalupe River. The mayor of the City of San Jose declared a state of emergency on March 10, 1995. On March 13, 1995, the President of the United States declared a state of national emergency. SR 87 was closed for the second time in two months. Preliminary damage estimates exceeded $5 million.

CHAPTER 3. GENERAL METHODOLOGY OF ALTERNATIVES ANALYSIS

INTRODUCTION

The Section 404(b)(1) Guidelines are the substantive criteria used in evaluating projects that would discharge dredged or fill material into waters of the U.S. Review for conformance with the Guidelines is an essential component of the Corps' project evaluation. The objective of the alternatives analysis is to identify practicable alternatives that meet the basic project purpose and also to describe the environmental impacts associated with each practicable alternative. The Corps' process, referred to as Plan Formulation, is summarized in Chapter 2 of this EIS/R and in more detail in the Draft Report on the Feasibility Study (COE 1998).

ALTERNATIVES ANALYSIS

General categories of flood damage prevention measures were analyzed to determine whether they met the project objectives. If project objectives for flood control were met, a category would be explored further to assess whether it was practicable and would result in fewer adverse environmental impacts. The general categories analyzed included both structural and nonstructural measures, among them the following (COE 1998):

Construct New Upstream Reservoir(s)
- Modify Existing Reservoirs
- Channelization
- Bypass Channel
- Levees
- Floodwalls
- Channel Clearing
- Floodplain Regulation
- Relocation of Existing Structures in the Floodplain
- Flood Warning System

Individual flood reduction measures in these categories were combined to provide preliminary alternative plans for the study area (COE 1998).

Screening Criteria

The screening criteria used were economic feasibility, flood control effectiveness, and environmental acceptability, as per Corps planning guidance. Alternatives that clearly did not meet the screening criteria were eliminated from consideration whereas those that did were refined and subject to more detailed cost, engineering, and environmental analyses. As a result of this process, two feasible alternatives, the Bypass Channel plan, providing 100-year flood protection, and the Channel Widening plan, providing 50-year flood protection were identified and, along with a No-Action alternative, subject to detailed analysis in the Feasibility Study EIR/S (this document). The Bypass Channel plan is a subset of the SCVWD's preferred plan for flood control on the upper Guadalupe River, which is evaluated in a separate EIR/S (Parsons Engineering Science 1997).

CHAPTER 4. SCREENING EVALUATION RESULTS

FORMULATION OF CONCEPTUAL ALTERNATIVE PLANS

The consideration of general plans early in the study process is summarized in Chapter 2 of this document and described in more detail in the Feasibility Study Draft Report (COE 1998). Measures considered but rejected, and reasons for their rejection, are as follows:

Nonstructural Measures

Flood Forecast, Warning and Evacuation. This measure was rejected because of the difficulty in predicting floods and the uncertain success of evacuation. Due to the nature of the watershed, floods can be expected to happen too quickly for this measure to be effective.

Temporary or Permanent Closures of Structure Openings. This measure would not have adequately protected the wood-frame structures that would be inundated during floods.

Raising Existing Structures. This measure was eliminated due to the costs associated with raising a large number of structures in the floodplain.

Small Walls and Levees Around Existing Structures. This alternative was determined to be economically infeasible.

Rearranging or Protecting Damageable Property Within a Structure (Floodproofing). This alternative was eliminated because the costs of relocating property to less accessible areas were too high.

Purchase or Removal of Existing Structures and/or Contents from the Flooplain. This measure was eliminated because, if implemented for the floodplain as a whole, it would have been socially disruptive, causing losses of tax revenues, and not alleviating residual impacts to remaining infrastructure and buildings that would still have to be cleaned up following floods.

Structural Measures

Upstream Reservoirs. Consideration was given to constructing new upstream reservoirs on Guadalupe Creek and Alamitos Creek. This approach was rejected as being too costly and having unacceptable environmental impacts.

Offstream Storage. An offstream storage pond was considered but rejected because of the high cost of land and the limited effectiveness of such a pond in reducing peak flows.

Channel Modification. The costs and benefits associated with several alternative types of channel modification have been considered (see Chapter 2.2 of this document; COE 1998). Among the alternatives rejected because of costs and/or environmental impacts were a concrete covered bypass channel; full channelization of the river; and the construction of floodwalls or levees the full length of the river.

Additional discussion of alternative plans incorporating the above measures that were considered and rejected is provided in Jones & Stokes (1996).

Formulation of Candidate Plans

The formulation of alternative candidate plans proceeds by identifying "breakout" areas where channel capacity is limited; and by formulating the least costly measures of protection that are socially and environmentally acceptable (Chapter 2.3 of this document; COE 1998). Measures providing a specified level of protection are then combined into comprehensive plans, which are subject to cost-benefit and environmental analyses (COE 1998). This process resulted in two structural plans, the Channel Widening plan and the Bypass Channel plan, along with the No-Action alternative, being carried forward for detailed analysis in the Feasibility Study.

Project Descriptions

No-Project Alternative

Under the No-Project Alternative, the District would not take any direct action to reduce the flood hazard from Guadalupe River. Residents and businesses within the floodplain would continue to face potential hardships as a result of flooding. Private properties immediately adjacent to the Guadalupe River and its tributaries would continue to be at risk from streambank failure and blockage by debris. In the event of the one percent flood, approximately 2,200 acres would be inundated. Over 7,200 homes, 230 businesses, 11 public buildings, and 1,390 automobiles would be inundated by floodwaters from the Guadalupe River.

Channel Widening Plan Alternative

The Channel Widening plan incorporates a widened channel—primarily along the east bank only, and the installation of low floodwalls at strategic locations along the river and along Ross Creek, providing protection against an approximate 50-year flood. Levees on Canoas Creek would be raised to a 20-year level of protection. Section 2.4.1 of this document provides a reach-by-reach description of this alternative.

Bypass Channel Plan Alternative

The Bypass Channel plan incorporates a bypass channel, channel widening, levee and floodwalls designed to contain a 100-year flood along the upper Guadalupe River and Ross Creek. Levees on Canoas Creek would be improved to a 20-year level of protection. A reach-by-reach description of the Bypass Channel plan is provided in Section 2.4.2 of this document (see also COE 1998; Parsons Engineering Science 1997).

SCREENING RESULTS

The following table presents the results of the Draft EIR/S evaluation of the Channel Widening plan, Bypass Channel plan, and No-Action alternative.

Alternative	Meets Purpose & Need?	Feasible & Available?	Environmental Impacts	Jurisdictional Constraints
Channel Widening	Partially: only provides 50-year flood protection	Yes	Removal of 6.49 acres of riparian forest; excavation or filling of 0.28 acre of wetlands and 2.64 acres of other section 404 jurisdictional waters; loss of SRA cover through removal of 4,034 linear feet of overwater vegetation and 2,535 feet of undercut banks. Proposed mitigation would eventually result in 12.10 acres of new riparian forest habitat, fully compensating for the initial removal. Wetlands may reestablish naturally; if not, sufficient acreage would be re-created within the channel. Impacts on other jurisdictional waters would be temporary and minimized through Stormwater Pollution Prevention Plan; no net losses would occur. Initial losses of undercut banks would be reduced where possible; undercut banks would reestablish naturally over time in impacted areas. Overwater vegetation would be reestablished through mitigation plantings on benches created by this alternative.	None
Bypass Channel	Yes	Yes	Removal of 9.08 acres of riparian forest; excavation or filling of 0.89 acre of wetlands and 9.93 acres of other section 404 jurisdictional waters; loss of SRA cover through removal of 4,958 linear feet of over-water vegetation and 1,100 linear feet of undercut banks. Proposed mitigation would eventually result in 21.16 acres of new riparian forest and 2.42 acres of wetland habitat, fully compensating for the initial impacts. Impacts on other jurisdictional waters would be temporary and minimized through Stormwater Pollution Prevention Plan; no net losses would occur. Proposed mitigation for impacts on SRA cover in combination with measures to enhance fisheries habitat would compensate for SRA cover impacts over time.	None
No Action	No	Yes	No change in existing conditions. Periodic flood damage would continue to occur.	None

CHAPTER 5. FINAL SCREENING EVALUATION RESULTS

No comments on this preliminary 404(b)(1) analysis were received during review of the Public Draft EIR/S. The Corps will continue the evaluation of project alternatives, and will consider relevant agency and public input, as part of the 404 permit review process.

Because of the fact that it provides only a 50-year level of flood protection, the Channel Widening Plan does not fully achieve the purpose and need for the project, which is to provide economic benefits associated with flood protection. These benefits are substantially greater for 100-year than 50-year protection. Although the Bypass Channel Plan's adverse impacts are greater in magnitude than those of the Channel Widening Plan, the Bypass Channel Plan provides greater mitigation acreage to compensate for these impacts, and would likely result in greater overall net benefits to the ecosystem. As a result, the preliminary conclusion is that the Bypass Channel Plan, with mitigations identified in the EIR/S, would be the least damaging practicable alternative means of achieving the project purpose and need for flood protection.

Attachment 1: Wetland Delineation Information

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
333 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94105-2197

SCUWD6SEP26'96PM 2:18

JUL 22 1996

REPLY TO
ATTENTION OF.

Regulatory Branch (1145b)

SUBJECT: File Number 17776S18

Ms. Louisa Squires
Santa Clara Valley Water District
Environmental Planning Division
5750 Almaden Expressway
San Jose, California 95118-3686

Dear Ms. Squires:

Thank you for your submittal of 28 August, 1995, requesting confirmation of the extent of Corps of Engineers jurisdiction for the Upper Guadalupe River Flood Control Project in the City of San Jose, Santa Clara County, California.

Enclosed are the maps showing the extent and location of Corps of Engineers jurisdiction on April 23, 1996.

We have based this jurisdictional delineation on the current conditions of the site. A change in those conditions may also change the extent of our jurisdiction. This jurisdictional delineation will expire in five years from the date of this letter. However, if there has been a change in circumstances which effects the extent of Corps jurisdiction, a revision may be done before that date.

If you have any questions, please call Bob Smith of our Regulatory Branch at telephone 415-977-8450. Please address correspondence to the District Engineer, Attention: Regulatory Branch, and refer to the file number at the head of this letter.

Sincerely,
ORIGINAL SIGNED
By
Calvin C. Fong
For
Max R. Blodgett
Chief, Construction-Operations Division

Enclosure

APPENDIX H

WATER RESOURCES DATA

TABLE H-1

Mean Average Annual Wet Weather Loads by Watershed (Based on arithmetic average of 12 years estimated annual load)

Watershed	Total Area (miles)	Flow (acre-feet)				Cadmium (lbs/year)				Chromium (lbs/year)			
		Ind	Res	Open	Total	Ind	Res	Open	Total	Ind	Res	Open	Total
Adobe, Barron, and Matadero	34	0	6,485	1,511	7,997	0.0	38.8	3.1	42.0	0	713	79	791
Calabazas	21	0	5,071	663	5,734	0.0	30.4	1.4	31.7	0	557	35	592
Coyote	123	1,357	6,085	5,904	13,345	27.7	36.4	12.3	76.4	276	669	307	1,252
Guadalupe	90	2,170	15,649	8,108	25,927	44.3	93.7	16.8	154.9	442	1,719	422	2,583
Los Gatos	18	0	2,764	283	3,047	0.0	16.6	0.6	17.1	0	304	15	318
Permanente	18	0	1,567	3,146	4,713	0.0	9.4	6.5	15.9	0	172	164	336
San Francisquito	8	0	552	846	1,398	0.0	3.3	1.8	5.1	0	61	44	105
San Tomas	27	1,332	5,694	979	8,005	27.2	34.1	2.0	63.4	271	626	51	948
Saratoga	17	0	938	4,634	5,572	0.0	5.6	9.6	15.2	0	103	241	344
Stevens Creek	12	0	1,415	130	1,546	0.0	8.5	0.3	8.7	0	155	7	162
Sunnyvale East	7	0	1,677	0	1,677	0.0	10.0	0.0	10.0	0	184	0	184
Sunnyvale West	5	0	1,320	1	1,321	0.0	7.9	0.0	7.9	0	145	0	145
TOTAL	380	4,859	49,218	26,205	80,283	99.3	294.8	54.4	448.5	989	5,407	1,364	7,761

Watershed	Total Area (miles)	Copper (lbs/year)				Lead (lbs/year)				Nickel (lbs/year)			
		Ind	Res	Open	Total	Ind	Res	Open	Total	Ind	Res	Open	Total
Adobe, Barron, and Matadero	34	0	1,339	56	1,395	0	1,354	21	1,375	0	1,663	174	1,838
Calabazas	21	0	1,047	24	1,072	0	1,059	9	1,068	0	1,300	77	1,377
Coyote	123	293	1,257	217	1,767	622	1,271	81	1,974	459	1,560	681	2,701
Guadalupe	90	469	3,232	298	3,999	995	3,268	111	4,375	735	4,013	935	5,683
Los Gatos	18	0	571	10	581	0	577	4	581	0	709	33	741
Permanente	18	0	324	116	439	0	327	43	371	0	402	363	765
San Francisquito	8	0	114	31	145	0	115	12	127	0	142	96	239
San Tomas	27	288	1,176	36	1,500	611	1,189	13	1,814	451	1,460	113	2,024
Saratoga	17	0	194	171	364	0	196	64	260	0	241	535	775
Stevens Creek	12	0	292	5	297	0	296	2	297	0	363	15	378
Sunnyvale East	7	0	346	0	346	0	350	0	350	0	430	0	430
Sunnyvale West	5	0	273	0	273	0	276	0	276	0	338	0	339
TOTAL	380	1,051	10,164	964	12,179	2,228	10,279	360	12,867	1,645	12,622	3,023	17,290

TABLE H-1 (continued)

Mean Average Annual Wet Weather Loads by Watershed (Based on arithmetic average of 12 years estimated annual load)

Watershed	Total Area (miles)	Zinc (lbs/year)				NO3-N (lbs/year)				TKN (lbs/year)			
		Ind	Res	Open	Total	Ind	Res	Open	Total	Ind	Res	Open	Total
Adobe, Barron, and Matadero	34	0	3,598	33	3,632	0	14,232	853	15,085	0	32,673	3,807	36,480
Calabazas	21	0	2,814	15	2,828	0	11,128	374	11,502	0	25,546	1,670	27,216
Coyote	123	4,407	3,377	130	7,914	2,552	13,353	3,332	19,237	5,533	30,655	14,871	51,059
Guadalupe	90	7,050	8,684	179	15,913	4,083	34,342	4,575	43,000	8,851	78,837	20,423	108,112
Los Gatos	18	0	1,534	6	1,540	0	6,065	160	6,225	0	13,924	712	14,637
Permanente	18	0	870	69	939	0	3,439	1,775	5,214	0	7,895	7,925	15,820
San Francisquito	8	0	306	19	325	0	1,211	477	1,689	0	2,781	2,131	4,912
San Tomas	27	4,327	3,160	22	7,509	2,506	12,498	552	15,555	5,433	28,687	2,466	36,586
Saratoga	17	0	521	102	623	0	2,060	2,615	4,675	0	4,728	11,672	16,400
Stevens Creek	12	0	785	3	788	0	3,104	74	3,179	0	7,129	328	7,458
Sunnyvale East	7	0	931	0	931	0	3,680	0	3,680	0	8,448	0	8,448
Sunnyvale West	5	0	732	0	732	0	2,896	1	2,897	0	6,648	2	6,651
TOTAL	380	15,784	27,311	579	43,674	9,141	108,009	14,788	131,937	19,818	247,952	66,009	333,778

Watershed	Total Area (miles)	POP4-P (lbs/year)				BOD (lbs/year)				TSS (lbs/year)			
		Ind	Res	Open	Total	Ind	Res	Open	Total	Ind	Res	Open	Total
Adobe, Barron, and Matadero	34	0	13,737	2,028	15,765	0	187,408	22,448	209,857	0	4,897,439	1,274,789	6,172,228
Calabazas	21	0	10,741	890	11,630	0	146,528	9,850	156,378	0	3,829,129	559,356	4,388,485
Coyote	123	6,705	12,889	7,920	27,514	49,789	175,834	87,689	313,312	2,042,272	4,594,967	4,979,611	11,616,851
Guadalupe	90	10,727	33,148	10,877	54,752	79,652	452,206	120,427	652,284	3,267,171	11,817,256	6,838,700	21,923,126
Los Gatos	18	0	5,854	379	6,234	0	79,868	4,201	84,068	0	2,087,145	238,537	2,325,682
Permanente	18	0	3,319	4,221	7,540	0	45,284	46,730	92,014	0	1,183,381	2,653,663	3,837,044
San Francisquito	8	0	1,169	1,135	2,304	0	15,950	12,568	28,517	0	416,800	713,700	1,130,500
San Tomas	27	6,585	12,061	1,313	19,959	48,892	164,545	14,540	227,978	2,005,462	4,299,972	825,713	7,131,147
Saratoga	17	0	1,988	6,216	8,204	0	27,122	68,824	95,946	0	708,769	3,908,307	4,617,076
Stevens Creek	12	0	2,998	175	3,172	0	40,894	1,936	42,830	0	1,068,669	109,932	1,178,600
Sunnyvale East	7	0	3,552	0	3,552	0	48,460	0	48,460	0	1,266,371	0	1,266,371
Sunnyvale West	5	0	2,795	1	2,797	0	38,134	14	38,148	0	996,534	793	997,328
TOTAL	380	24,017	104,292	35,155	163,424	178,333	1,422,233	389,226	1,989,792	7,314,906	37,166,432	22,103,102	66,584,439

'ource: 1991 Loads Assessment Report

TABLE H-2
SELECTED HISTORICAL WATER QUALITY DATA FOR THE GUADALUPE RIVER
U.S. GEOLOGICAL SURVEY WATER QUALITY FOR WATER YEARS
1949, 1968, 1969, 1979 to 1983, 1987 to March 1994

	Feb 8 1949	Nov 6 1967	Mar 7 1968	Oct 29 1968	May 20 1969	Aug 1 1979	Feb 19 1980	Sep 10 1980	Mar 27 1981	Sep 1 1981	Jan 5 1982	Sep 8 1982
Streamflow (cfs)	NA	1	14	2	NA	NA	7,900	0.53	3.7	728	943	2.8
Temperature (Celsius)	NA	14	14	15	10	NA	12.5	18	15.5	19.5	11	23
pH	NA	NA	NA	NA	NA	NA	6.8	7.8	8	8	7.9	7.5
Turbidity (NTUs)	NA	NA	NA	NA	NA	NA	800	4	16	2.6	270	1.5
Dissolv. Oxygen (mg/l)	NA	NA	NA	NA	NA	NA	NA	NA	84	9.8	10.5	116
Chemical Oxy. Demand (mg/l COD)	NA	NA	NA	NA	NA	NA	280	39	43	69	47	30
Hardness (mg/l $CaCO_3$)	140	NA	NA	NA	NA	NA	68	350	130	NA	113	200
Total Nitrogen (mg/l N)	NA	NA	NA	NA	NA	2.1	0.93	1.2	0.82	1.4	1.8	0.4
Total Phosphorus (mg/l P)	NA	NA	NA	NA	NA	0.07	2.8	0.22	0.21	0.24	0.25	0.09
Dissolv. Arsenic (µg/l As)	NA	NA	NA	NA	NA	NA	2	4	10	2	2	2
Dissolv. Cadmium (µg/l CD)	NA	<1.4	<1.4	<1.4	<1.4	<1	0	0	1	0	1	<1
Dissolv. Chromium (µg/l Cr)	NA	<1.4	<1.4	<1.4	<1.4	0	0	0	10	0	<10	<10
Dissolv. Copper (µg/l Cu)	NA	<1.4	<1.4	<1.4	<1.4	2	2	2	6	2	2	5
Dissolv. Lead (µg/l Pb)	NA	<1.4	<1.4	<1.4	<1.4	0	0	2	3	5	6	<1
Dissolv. Manganese (µg/l Mn)	NA	171	19	15	20	30	10	0	20	0	20	20
Dissolv. Mercury (µg/l Hg)	NA	NA	NA	NA	NA	0	0	0	0	0.36	<0.1	<0.1
Dissolv. Nickel (µg/l N)	NA	234	9.7	43	37	0	0	0	0	0	<100	<100
Dissolv. Selenium (µg/l Se)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolv. Silver (µg/l Ag)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolv. Zinc (µg/l Zn)	NA	<5.7	<5.7	<5.7	<5.7	6	190	10	20	40	10	30

ND = Not Detectable

NA = Not Available

Source: Engineering-Science 1994

Note: Data for Arsenic, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Silver, and Zinc are in total values from February 1992 to March 1994.

TABLE H-2 (continued)
SELECTED HISTORICAL WATER QUALITY DATA FOR THE GUADALUPE RIVER
U.S. GEOLOGICAL SURVEY WATER QUALITY FOR WATER YEARS
1949, 1968, 1969, 1979 to 1983, 1987 to March 1994

	Jan 27 1983	Aug 30 1983	Feb 9 1985	Sep 11 1985	Jan 28 1987	Aug 11 1987	Nov 17 1987	Aug 17 1988	Jul 25 1989	Oct 25 1989	Jan 13 1990	Feb 17 1990
Streamflow (cfs)	1,540	20	116	20	36	16	47	4.3	1	29	608	210
Temperature (Celsius)	NA	NA	10	17.5	13	22	16	21	21	16	NA	10
pH	7.9	8.3	8.2	8.4	8.1	8.4	8.1	8.2	7.8	7.6	7.3	8.1
Turbidity (NTUs)	350	4.5	30	24	17	8	17	5	4.4	44	76	42
Dissolv. Oxygen (mg/l)	10.6	10.6	10.8	9.4	92	10.4	8.6	7.9	8.6	8.1	NA	10.2
Chem. Oxy. Demand (mg/l COD)	46	24	27	10	24	<10	29	47	16	39	110	62
Hardness (mg/l $CaCO_3$)	99	350	220	340	180	340	220	350	380	110	52	120
Total Nitrogen (mg/l N)	0.8	2.9	2.1	3.2	1.7	2.3	2.8	2	1.2	1.2	2.1	2.1
Total Phosphorus (mg/l P)	0.6	0.05	0.1	0.05	0.1	0.09	0.13	0.06	0.07	0.19	0.27	0.25
Dissolv. Arsenic (µg/l As)	1	1	<1	1	2	1	1	1	1	NA	NA	NA
Dissolv. Cadmium (µg/l CD)	<1	<1	<1	1	<1	<1	<1	<1	<1	NA	NA	NA
Dissolv. Chromium (µg/l Cr)	<10	<10	<10	NA	<1	2	2	<1	<1	NA	NA	NA
Dissolv. Copper (µg/l Cu)	2	1	3	<1	2	<1	5	1	<1	NA	NA	NA
Dissolv. Lead (µg/l Pb)	<1	<1	2	1	<5	<5	<5	<5	<1	NA	NA	NA
Dissolv. Manganese (µg/l Mn)	10	12	8	20	10	9	13	12	16	NA	NA	NA
Dissolv. Mercury (µg/l Hg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA	NA
Dissolv. Nickel (µg/l N)	<100	<100	<100	<100	<1	<1	5	3	1	NA	NA	NA
Dissolv. Selenium (µg/l Se)	NA	NA	NA	NA	1	3	1	3	3	NA	NA	NA
Dissolv. Silver (µg/l Ag)	NA	NA	NA	NA	<1	<1	<1	<1	<1	NA	NA	NA
Dissolv. Zinc (µg/l Zn)	70	9	<3	<10	8	<3	12	10	10	NA	NA	NA

ND = Not Detectable

NA = Not Available

Source: Engineering-Science 1994

Note: Data for Arsenic, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Silver, and Zinc are in total values from February 1992 to March 1994.

TABLE H-2 (continued)
SELECTED HISTORICAL WATER QUALITY DATA FOR THE GUADALUPE RIVER
U.S. GEOLOGICAL SURVEY WATER QUALITY FOR WATER YEARS
1949, 1968, 1969, 1979 to 1983, 1987 to March 1994

	Aug 27 1990	Mar 24 1991	Feb 11 1992	Dec 5 1992	Jan 5 1992	Feb 7 1993	Feb 17 1993	Mar 23 1993	Dec 14 1993	Jan 23 1994	Feb 7 1994	Mar 25 1994
Streamflow (cfs)	1.8	1,120	897	1.3	6	52	62	158	119	22	300	55
Temperature (Celsius)	20	11.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
pH	7.8	8	NA	NA	NA	7.7	7.7	7.6	NA	NA	NA	NA
Turbidity (NTUs)	1.5	33	NA	260	110	90	250	80	70	27	130	100
Dissolv. Oxygen (mg/l COD)	7.5	10.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chem. Oxy. Demand (mg/l COD)	22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hardness (mg/l $CaCO_3$)	310	160	NA	120	110	150	130	140	98	240	120	120
Total Nitrogen (mg/l N)	5.8	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Phosphorus (mg/l P)	0.11	0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolv. Arsenic (µg/l As)	NA	NA	***2.5***	***4***	***1.7***	***2.2***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***
Dissolv. Cadmium (µg/l CD)	NA	NA	***0.7***	***1.3***	***0.3***	***0.2***	***0.4***	***0.8***	***0.2***	***0.6***	***0.4***	***0.5***
Dissolv. Chromium (µg/l Cr)	NA	NA	***40***	***56***	***7.3***	***5.5***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***
Dissolv. Copper (µg/l Cu)	NA	NA	***33***	***54***	***18***	***7.9***	***20***	***24***	***19***	***15***	***20***	***26***
Dissolv. Lead (µg/l Pb)	NA	NA	***43***	***63***	***21***	***13***	***30***	***34***	***30***	***19***	***32***	***31***
Dissolv. Manganese (µg/l Mn)	NA	NA	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***
Dissolv. Mercury (µg/l Hg)	NA	NA	***ND***	***0.6***	***ND***	***ND***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***
Dissolv. Nickel (µg/l N)	NA	NA	***77***	***160***	***9.4***	***19***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***
Dissolv. Selenium (µg/l Se)	NA	NA	***0.22***	***0.47***	***0.43***	***0.43***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***
Dissolv. Silver (µg/l Ag)	NA	NA	***ND***	***ND***	***ND***	***ND***	***ND***	***ND***	***ND***	***ND***	***ND***	***ND***
Dissolv. Zinc (µg/l Zn)	NA	NA	***150***	***210***	***70***	***45***	***65***	***120***	***64***	***62***	***88***	***98***

ND = Not Detectable

NA = Not Available

Source: Engineering-Science 1994

Note: Data for Arsenic, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Silver, and Zinc are in total values from February 1992 to March 1994. These data appear in bold/italic typeface.

TABLE H-3
Guadalupe River Permitted Outfalls

Creek Station	Study Reach	Creek Bank and Location	Size, Type	District I.D.	Invert elev.	Comments
740+50	7	W. Bank U/S of SPRR	30"RCP		93.0	
743+00	7	E. Bank at Hwy 87	30"RCP		88.5	Permit # 85326
745+10	7	W. Bank U/S of Hwy 87	33"[1]		88.5	Not found.
749+20	7	W. Bank D/S of Willow St	42"RCP		92.5	
749+30	7	E. Bank at Willow St	30"CMP	099GAC110	93.0	
749+95	7	E. Bank at Willow St	15"RCP	099GAC130	100.0	
750+05	7	W. Bank at Willow St	48"RCP	099GAC120	92.0	Permit # 87304
760+75	7	E. Bank U/S of Willow St	24"RCP	099GAC140	97.0	Permit # 88338
761+05	7	W. Bank U/S of Willow St	10"CMP		89.0	
767+50	7	W. Bank D/S of Alma Ave	24"CMP	099GAC180	97.5	
767+50	7	W. Bank D/S of Alma Ave	8"CMP		103.5	Permit # 89322
772+70	7	E. Bank D/S of Alma Ave	15"CMP	099GAC200	100.5	Permit # 90306
772+90	7	W. Bank at Alma Ave	30"CMP	099GAC220	103.5	
775+60	7	W. Bank U/S of Alma Ave	48"CMP	099GAC230	98.5	Permit # 83308
780+75	7	E. Bank D/S of UPRR	54"CMP	099GAC240	98.5	Permit # 68328, not found.
781+90	8	W. Bank U/S of UPRR	15"CMP	099GAC260	100.0	
781+90	8	W. Bank U/S of UPRR	24"CMP	099GAC250	103.5	Permit # 88317
783+40	8	E. Bank U/S of UPRR	10"CMP		110.0	
788+75	8	W. Bank U/S of UPRR	18"CMP		113.0	
795+00	8	E. Bank at Willow Glen Way	54"RCP	099GAC500	110.0	
803+75	9	W. Bank at Pine Ave	18"CMP	099GAC600	115.5	
812+00	9	E. Bank D/S of Malone Rd	18"CMP	099GAC630	116.5	
820+00	9	W. Bank D/S of Malone Rd	10"CMP		125.5	
821+50	9	W. Bank at Malone Rd	33"CMP	099GAC710	112.0	
823+80	9	E. Bank U/S of Malone Rd	66"CMP	099GAC720	111.0	Permit # 77320
830+95	9	W. Bank U/S of Malone Rd	12"CMP	099GAC760	128.0	Permit # 85303
835+00	9	E. Bank U/S of Malone Rd	15"CMP	099GAC800	127.5	

TABLE H-3 (continued)
Guadalupe River Permitted Outfalls

Creek Station	Study Reach	Creek Bank and Location	Size, Type	District I.D.	Invert elev.	Comments
838+10	9	E. Bank D/S of Curtner Ave	6'X6' RCB		121.5	May be old and no longer in use.
841+45	9	E. Bank D/S of Curtner Ave	15"CMP	099GAC830	133.0	Permit # 78345
842+50	10A	W. Bank at Curtner Ave	42"CMP	099GAC850	118.5	
842+60	10A	W. Bank at Curtner Ave	8"CMP	099GAC860	124.0	
844+50	10A	E. Bank U/S of Curtner Ave	10"ABS		137.0	Not found.
853+00	10A	E. Bank D/S of S. Bound Almaden Expwy	18"CMP		134.0	Approximate elevation, not found.
854+00	10A	E. Bank D/S of S. Bound Almaden Expwy	18"CMP		136.0	Approximate elevation, not found.
858+75	10B	E. Bank U/S of S. Bound Almaden Expwy	12"CMP		135.0	
868+50	10B	W. Bank D/S of N. Bound Almaden Expwy	36"RCP		129.0	
872+00	10B	E. Bank at N. Bound Almaden Expwy	18"CMP		137.5	
880+00	10B	W. Bank U/S of N. Bound Almaden Expwy	66"RCP	114GAC245	131.5	
882+00	10B	W. Bank U/S of N. Bound Almaden Expwy	Two 18"CMP		145.5	Permit # 69344
885+20	10B	W. Bank U/S of N. Bound Almaden Expwy	18"CMP		137.0	Not found; may have been removed.
886+30	10B	W. Bank U/S of N. Bound Almaden Expwy	24"CMP		140.5	
899+05	10C	W. Bank D/S of Hillsdale Ave	18"CMP	114GAC400	146.0	New rip-rap protection
904+20	10C	W. Bank D/S of Hillsdale Ave	48"CMP	114GAC440	140.0	
906+50	10C	E. Bank at Hillsdale Ave	30"CMP	114GAC460	143.5	Not found.
909+40	10C	W. Bank D/S of Capitol Expwy	54"CMP	114GAC470	141.5	
909+80	10C	W. Bank D/S of Capitol Expwy	36"CMP	114GAC480	141.5	
911+50	11	E. Bank U/S of Capitol Expwy	48"[1]		140.5	Not found.
916+50	11	E. Bank U/S of Capitol Expwy	27"[1]		144.0	Permit # 71312, not found.
925+00	11	W. Bank U/S of Capitol Expwy	15"[1]		150.0	Not found.
929+10	11	W. Bank U/S of Capitol Expwy	15"[1]		150.0	Permit # 73302, approximate elevation

TABLE H-3 (continued)
Guadalupe River Permitted Outfalls

Creek Station	Study Reach	Creek Bank and Location	Size, Type	District I.D.	Invert elev.	Comments
934+00	11	W. Bank U/S of Capitol Expwy	15"[1]		151.5	Approximate elevation
939+00	11	W. Bank D/S of Branham Lane	60"CMP		148.5	
953+50	11	W. Bank D/S of Branham Lane	18"CMP		162.0	Permit # 84309
959+00	11	W. Bank at Branham Lane	48"CMP	114GAC890	156.0	
959+10	11	E. Bank at Branham Lane	36"CMP	114GAC880	156.0	
966+00	12	E. Bank U/S of Branham Lane	12" and 15"CMP	114GAC950	166.5	
968+90	12	E. Bank U/S of Branham Lane	15"CMP	114GAC970	168.5	Not found.
970+35	12	W. Bank U/S of Branham Lane	48"CMP		159.5	Permit # 71317
984+00	12	E. Bank D/S of Hwy 85	36"CMP	128GAC190	163.0	Permit # 86304
988+50	12	W. Bank D/S of Hwy 85	36"RCP		161.0	Permit # 86304
988+70	12	W. Bank D/S of Hwy 85	12'X10' RCB	128GAC200	162.0	Gated opening
997+50	12	E. Bank at Hwy 85	Two 36"CMP	128GAC300	165.0	Percolation pond outlets
997+75	12	W. Bank at Hwy 85	36"CMP	128GAC310	164.0	Perc. pond outlet
1000+50	12	E. Bank D/S of Blossom Hill Rd	12"CMP		172.0	Permit # 76357
1006+50	12	E. Bank D/S of Blossom Hill Rd	48"CMP	128GAC400	165.0	Permit # 68319
1014+60	12	E. Bank D/S of Blossom Hill Rd	36"CMP	128GAC490	170.0	
1014+95	12	W. Bank D/S of Blossom Hill Rd	48"CMP	128GAC500	175.5	
1015+05	12	E. Bank at Blossom Hill Rd	48"CMP		171.5	Permit # 68324

[1] Unknown size or type

Source: SCWD 1994

TABLE H-4
Guadalupe River Unpermitted Outfalls

Creek Station	Study Reach	Creek Bank and Location	Size, Type	District I.D.	Invert elev.	Comments
741+50	7	E. Bank D/S of Hwy 87	12"CMP		94.0	
749+00	7	E. Bank D/S of Willow St	6"IP	099GAC100	101.5	
749+40	7	E. Bank at Willow St	30"CMP	099GAC110	93.0	
750+40	7	E. Bank U/S of Willow St	12"CMP		103.5	
757+40	7	E. Bank U/S of Willow St	24"[1]		97.5	
762+50	7	E. Bank D/S of Alma Ave	24"CMP	099GAC150	98.0	
763+00	7	E. Bank D/S of Alma Ave	24"CMP	099GAC160	103.0	
765+60	7	E. Bank D/S of Alma Ave	30"CMP	099GAC170	98.5	
766+00	7	E. Bank D/S of Alma Ave	20"[1]		99.5	Not found.
768+00	7	E. Bank D/S of Alma Ave	27"[1]		99.0	Not found.
772+60	7	E. Bank at Alma Ave	30"CMP	099GAC190	96.0	
772+90	7	E. Bank at Alma Ave	30"CMP	099GAC210	96.0	
795+25	9	E. Bank at Willow Glen Way	10"SP	099GAC510	111.5	
795+50	9	E. Bank at Willow Glen Way	15"CMP	099GAC520	115.5	
797+00	9	E. Bank U/S of Willow Glen Way	Two 8"IP	099GAC560 099GAC570	121.5 (both)	
797+70	9	W. Bank U/S of Willow Glen Way	10"CMP	099GAC540	117.5	
798+90	9	E. Bank U/S of Willow Glen Way	8"IP		121.0	
814+60	9	E. Bank D/S of Malone Rd	8"IP	099GAC650	126.5	
817+00	9	E. Bank D/S of Malone Rd	8"IP	099GAC670	126.5	
818+60	9	E. Bank D/S of Malone Rd	6"IP	099GAC680	127.0	
842+00	9	W. Bank D/S of Curtner Ave	2"PVC		137.0	Not found.
842+50	10A	W. Bank at Curtner Ave	8"CMP	099GAC860	123.5	
842+60	10A	W. Bank at Curtner Ave	15"[1]		125.0	Not found.
855+00	10A	W. Bank D/S of S. Bound Almaden Expwy	12"CMP		134.5	Not found.

TABLE H-4 (continued)
Guadalupe River Unpermitted Outfalls

Creek Station	Study Reach	Creek Bank and Location	Size, Type	District I.D.	Invert elev.	Comments
859+50	10B	W. Bank U/S of S. Bound Almaden Expwy	12"CMP		141.5	
860+00	10B	E. Bank U/S of S. Bound Almaden Expwy	12"CMP		141.5	Not found.
862+00	10B	E. Bank U/S of S. Bound Almaden Expwy	18"CMP		140.0	Not found.
863+00	10B	E. Bank U/S of S. Bound Almaden Expwy	12"CMP		139.5	Not found.
869+50	10B	W. Bank D/S of N. Bound Almaden Expwy	18"CMP		138.0	
874+00	10B	W. Bank U/S of N. Bound Almaden Expwy	18"CMP		143.5	
875+50	10B	W. Bank U/S of N. Bound Almaden Expwy	18"CMP	114GAC210	144.5	
876+00	10B	W. Bank U/S of N. Bound Almaden Expwy	24"CMP	114GAC230	132.5	
878+00	10B	W. Bank U/S of N. Bound Almaden Expwy	18"CMP		133.0	
881+00	10B	E. Bank U/S of N. Bound Almaden Expwy	24"CMP	114GAC260	127.5	
901+00	10C	W. Bank D/S of Hillsdale Ave	6"IP	114GAC410	150.0	Water discharged from packing plant.
940+00	11	W. Bank D/S of Ross Creek	12"CMP	114GAC680	151.0	
940+45	11	E. Bank D/S of Ross Creek	12"RCP	114GAC690	151.5	
940+90	11	E. Bank D/S of Ross Creek	12"RCP	114GAC700	151.5	
944+90	11	E. Bank D/S of Ross Creek	18"[1]		148.5	Not found.
949+50	11	W. Bank at Ross Creek	18"CMP	114GAC800	160.0	
960+40	12	E. Bank U/S of Branham ln	12"CMP		160.0	
962+60	12	E. Bank U/S of Branham ln	8" Steel	114GAC920	169.0	
962+95	12	E. Bank U/S of Branham ln	8" Steel	114GAC940	169.0	
969+00	12	E. Bank U/S of Branham ln	Two 8"CMP	114GAC970	169.0	
970+40	12	E. Bank U/S of Branham ln	10" Steel	114GAC986	156.0	Under water.
1014+90	12	W. Bank D/S of Blossom Hill Rd	24"[1]		166.0	Under water; not found.
1015+10	12	E. Bank at Blossom Hill Rd	9"CMP	128GAC505	165.0	

[1]Unknown size or type

Source: SCWD 1994

TABLE H-5
Ross and Canoas Creeks Outfalls

Creek Station	Study Reach	Creek Bank and Location	Size, Type	District I.D.	Invert elev.	Comments
PERMITTED OUTFALLS						
ROSS CREEK						
4+55	-	S. Bank U/S of Almaden Expwy	12"[1]		164.0	
7+70	-	S. Bank U/S of Almaden Expwy	15"[1]		163.0	
10+10	-	S. Bank U/S of Almaden Expwy	18"[1]		158.5	
13+30	-	S. Bank U/S of Almaden Expwy	18"[1]		163.0	
18+10	-	N. Bank D/S of Cherry Ave	12"[1]		160.0	
18+35	-	S. Bank D/S of Cherry Ave	36"[1]		158.5	Permit # 74312
20+85	-	S. Bank D/S of Cherry Ave	24"[1]		158.5	
24+35	-	S. Bank D/S of Cherry Ave	12"[1]		160.5	
28+95	-	S. Bank @ Cherry Ave	18"[1]		162.5	
31+95	-	S. Bank U/S of Cherry Ave	24"[1]		163.0	
34+40	-	N. Bank U/S of Cherry Ave	12"[1]		165.0	
43+45	-	S. Bank D/S of Jarvis Ave	42"[1]		165.5	
43+45	-	S. Bank D/S of Jarvis Ave	18"[1]		171.0	Permit # 68336
CANOAS CREEK						
3+05	-	N. Bank U/S of N. Bound Almaden Expwy	12"[1]		134.5	
UNPERMITTED OUTFALLS						
ROSS CREEK						
26+40	-	S. Bank D/S of Cherry Ave	12"CMP		167.5	Not shown on city plans.
CANOAS CREEK						
		No Unpermitted outfalls for Canoas Creek.				

[1] Unknown size or type

Source: SCWD 1994

APPENDIX I

TRANSPORTATION LEVEL OF SERVICE DEFINITIONS

Table I-1

Level of Service and Operating Speeds

	Level of Service (LOS) Description	APPROXIMATE OPERATING SPEEDS *Multi-Lane Roads*	*Two-Lane Roads*
A	Free flow, low volume, and high	50 mph or more	57 mph or more speed
B	Stable flow, operating speeds beginning to be restricted somewhat by traffic conditions	48-49 mph	54-56 mph
C	Stable flow, speed and maneuverability are more closely controlled by the higher volumes	44-47 mph or more	51-53 mph
D	Approaching unstable flow with tolerable operating speeds being maintained, though considerably affected by change in operating conditions	40-43 mph or more	49-50 mph
E	Unstable flow, low speed, capacity	30-39 mph or more	40-48 mph
F	Forced flow, low speed	Less than 30 mph	Less than 30 mph

Source: Transportation Research Board, National Academy of Sciences, National Research Council *Highway Capacity Manual*, 1985.

APPENDIX J

HAZARDOUS MATERIALS DATA

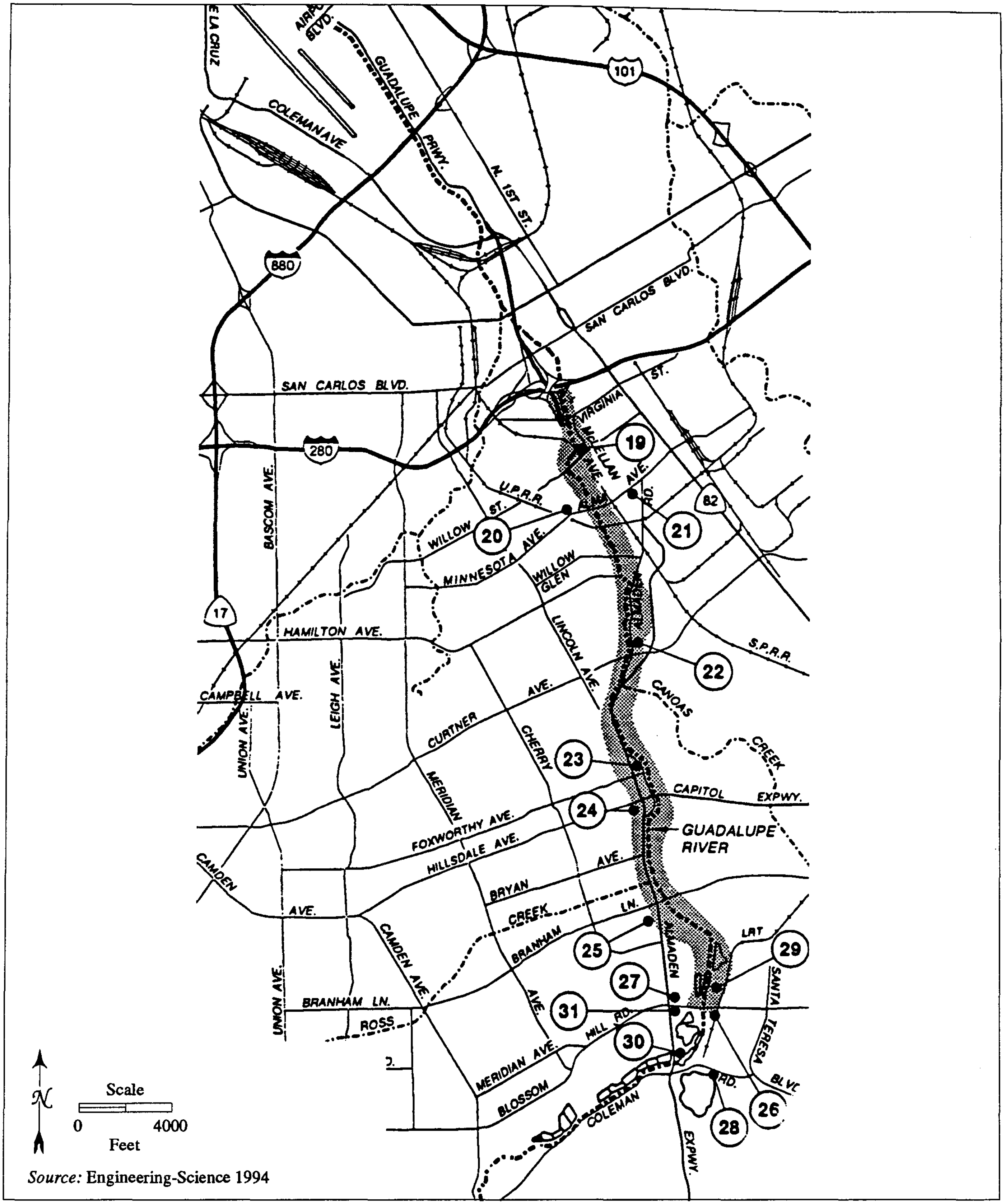


Figure J-1. Reported Releases of Hazardous Materials Near the Guadalupe River

TABLE J-1

REPORTED RELEASES OF HAZARDOUS MATERIALS

Site #	Site Name/ Address	Impacted Reach	Source of Contamination	Identified Contaminant(s)	Maximum Soil Concentration	Groundwater Impacted?	Potential Impact to Project
19	Bennett's Auto Shop 385 Willow Street	7	LUST	waste oil	2,700 ppm	unknown	Yes
20	Arco #5384 545 Alma Avenue	7	LUST	gasoline	1,517 ppm	69,000 ppb	Yes
21	Almaden Property (a.k.a. Louis Smith) 1545 Almaden Road	7	LUST	solvents	unknown	2,700 ppb	Yes
22	Chevron #9688 2302 Almaden Road	9	LUST	waste oil	17,000 ppm	unknown	Yes
23	Paragon Imports 1095 Foxworthy Avenue	10C	unknown	gasoline	118 ppm	unknown	Yes
24	Chevron #90481 1190 Hillsdale Avenue	11	LUST	gasoline waste oil	86 ppm	unknown	None

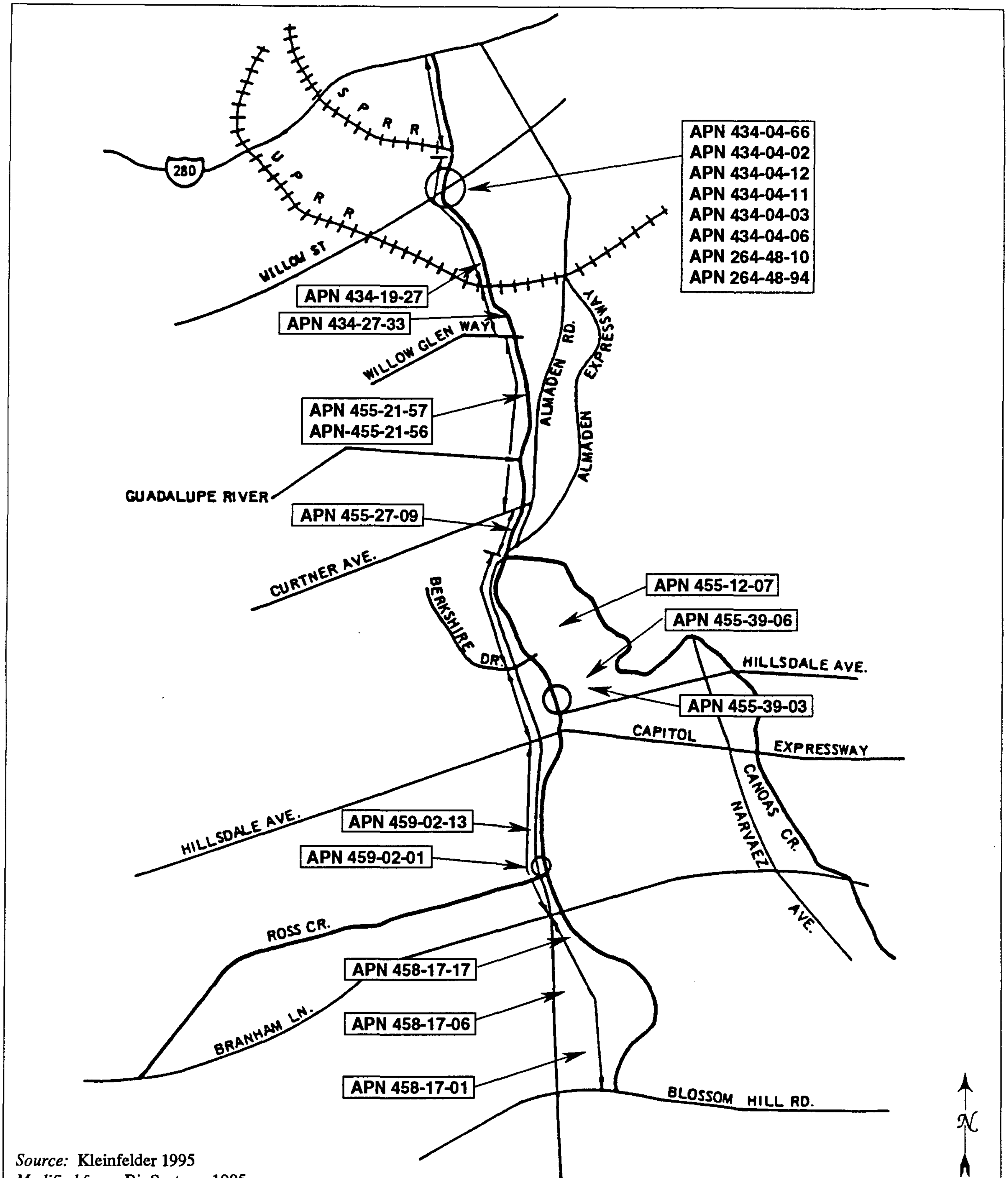
TABLE J-1 (Continued)

Site #	Site Name/ Address	Impacted Reach	Source of Contamination	Identified Contaminant(s)	Maximum Soil Concentration	Groundwater Impacted?	Potential Impact to Project
25	Arco #2114 4995 Almaden Expressway	12	LUST	gasoline aromatic hydrocarbons	4,300 ppm	3,800 ppb 200 ppb	Yes
26	Blossom Hill Goodyear 970 Blossom Hill Road	12	surface spillage	waste oil	20 ppm	unknown	None
27	Mobil 1099 Blossom Hill Road	12	LUST	waste oil diesel gasoline aromatic hydrocarbons	6,500 ppm 390 ppm 120 ppm unknown	NA 3.8 ppb 2.9 ppb 4.4 ppb	None
28	Park Almaden Coleman Road and Winfield Blvd	12	LUST	diesel	12,000 ppm	unknown	None
29	Taylor Development 999 Blossom Hill Road	12	LUST	gasoline	57 ppm	unknown	None
30	Santa Clara Valley Water District Corporation Yard 5750 Almaden Expressway	12	LUST	gasoline diesel	unknown	5,700 ppb	None
31	Kaiser Development Blossom Hill Road	12	surface spillage	waste oil	175 ppm	unknown	None

Notes:

LUST = Leaking Underground Storage Tank
ppm = Parts Per Million (equivalent to mg/Kg)
ppb = Parts Per Billion (equivalent to µg/L)
NA = Not Analyzed

Source: BioSystems 1995



Source: Kleinfelder 1995
Modified from: BioSystems 1995

Figure J-2. Locations of Potential HTRW Site Locations

Table J-2. List of Potential HTRW Sites

Assessor's Number	*Address*	*Site Description*	*Reach Number*
264-48-094 & 264-48-010	S.R. 87 Overpass	Visible soil staining	7
434-04-002	Undeveloped	Commercial/industrial	7
434-04-003	456A Willow Street	Office & auto repair	7
434-04-006	450 Willow Street	Office & auto repair	7
434-04-011	1127 Lelong Street	Roofing & auto repair	7
434-04-012	1143 Lelong Street	Boat motor service	7
434-04-066	456-458 Willow Street	Auto service	7
434-19-027	520 Alma Avenue	Restaurant	7
434-27-033	1555 Mackay Avenue	Residential	8
455-21-056	1891 Almaden Road	Farr Construction	9
455-21-057	1891 Almaden Road	Golden State Builder	9
455-12-007 & 455-39-006	Vacant	Agricultural	10
455-27-009	Undeveloped	Abandoned well on site	10
455-39-003	Valley View Packing Plant	Petroleum hydrocarbon contamination	10
459-02-001	3978 Almaden Expressway	Known hydrocarbon contamination	11
459-02-013	3969 Wellington Square	Residential	11
458-17-001	Vacant	Agricultural, commercial, & residential	12
458-17-006	Vacant	Agricultural, commercial, & residential	12
458-17-017	Vacant	Agricultural	12

APPENDIX K

BIOLOGICAL ASSESSMENT

UPPER GUADALUPE RIVER FEASIBILITY STUDY
BIOLOGICAL ASSESSMENT

Army Corps of Engineers, San Francisco District
January 9, 1998

1.0 INTRODUCTION

The Army Corps of Engineers, San Francisco District, is conducting a feasibility study of possible flood control projects along the upper portion of the Guadalupe River, Santa Clara County, California. The study area is shown in figures 1 and 2. The Santa Clara Valley Water District (SCVWD) is the local sponsor for this Corps study. The local sponsor is also conducting their own flood control study, which covers a larger area than the Corps study. The Upper Guadalupe study is separate from the Guadalupe River flood control project now under construction in downtown San Jose, just downstream from the study area.

The local sponsor has issued an Environmental Impact Report/Environmental Impact Statement (EIR/EIS) (SCVWD, 1997) for their preferred alternative, which would use bypass channels and channel widening to provide sufficient capacity for a 100-year flood to be contained within the river channel along the entire length of their study area.

The Corps of Engineers EIR/EIS has two action alternatives. The bypass channel plan consists of the portion of the local sponsor's preferred plan within the study area, and the channel widening plan is the Corp's National Economic Development (NED) plan, the plan with the greatest net economic benefits. The channel widening plan would widen portions of the river channel to provide protection against flood events of up to approximately a 50-year recurrence interval.

At this time, it is expected that the local sponsor's plan (as described in their EIR/EIS) will be constructed, with the cost of the Corps NED plan being used as the basis for federal cost-sharing of construction within the Corps study area, and construction outside of the Corps study area being entirely locally funded.

This Biological Assessment (BA) examines the possible impacts of the Corps channel widening alternative on listed, proposed, and candidate species under the Endangered Species Act of 1973 (ESA), as well as on species of concern. The species discussed are those which the U.S. Fish and Wildlife Service (FWS) indicated may be present in the U.S.G.S. San Jose East and San Jose West quadrangles, in a letter dated March 25, 1997 (Appendix A). This letter also included a list of additional listed, proposed, and candidate species, and species of concern, which may be found in Santa Clara County; however those species included on this list which were not included in the quadrangle lists are not discussed, as none of these species is considered to occur in the study area.

As the local sponsor's EIR/EIS discusses the impacts of their preferred alternative on listed, proposed, and candidate species and therefore functions as a BA for that alternative, the local sponsor's EIR/EIS is hereby incorporated by reference, and this BA will not duplicate that document's discussion of the impacts of the locally preferred alternative inside of or outside of the Corps study area.

2.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

Following is a description of the affected environment. More comprehensive information is available in SCVWD (1997).

2.1 PHYSICAL ENVIRONMENT

The study area for the Corps study extends along the Guadalupe River from the Southern Pacific Railroad Bridge (north of Willow Street) upstream to Blossom Hill Road. The river reaches under study include nearly all of the upstream portion of the river proper, but does not include the upper portion of the watershed through which flow several sizable creeks which make up the headwaters of the Guadalupe River.

Within the study area, the Guadalupe River flows in an incised channel on an alluvial plain. Much of the channel is natural, but portions have been channelized. The channelized sections have dirt banks for the most part, although small segments of river are lined by gabions or various forms of concrete revetment. Some stretches of river adjacent to Almaden Road in Reach 9 are channelized on one side with a concrete lining, while the other side retains its riparian forest. The uppermost section of the river within the study area (Reach 12) is used for in-stream percolation ponds during the summer. Adjacent to this reach are a number of off-stream percolation ponds, some of which are former gravel pits.

The reaches of the river downstream from Canoas Creek (7-10a) flow year-round. Upstream reaches (primarily 10b through 11) may be dry for up to several months, primarily during dry years. In-stream percolation ponds in reach 12 maintain standing water through the summer. Water quality is probably degraded by urban runoff and homeless encampments. However, oxygen levels typically are near saturation (SCVWD, 1997).

The short portions of Ross and Canoas creeks within the study area have been channelized and primarily have dirt or concrete banks with no woody vegetation. Aquatic habitat value is minimal.

The floodplain of the upper Guadalupe River begins below Blossom Hill Road, with the primary potential breakouts of floodwaters occurring near the Branham Lane bridge and on the north bank of Ross Creek. Northward, the floodplain moves away from the river on both sides, but remains parallel to the river due to the presence of low-profile natural levees on both banks. The east and west floodplains rejoin the river in Reach 7.

2.2 BIOLOGICAL ENVIRONMENT

Terrestrial and Wetland Habitats and Wildlife

The floodplain of the river has been almost entirely urbanized. Relatively natural habitats are only found in a narrow corridor along the river. In most locations, buildings, roads, parking lots, and landscaped areas encroach within 100 feet of the edge of the incised channel, and often right up to this edge.

Riparian forest is found along most of the length of the river within the study area. These forests have generally been degraded and fragmented by human activities. Nevertheless, parts of the riparian forest in the study area may be among the best remaining in the Santa Clara Valley. None of this forest appears to be fully mature. However, some of this forest is mature enough to provide good avian habitat (including habitat for species which prefer mature forests) as well as SRA cover. The best-developed riparian forests in the study area are in portions of reaches 7 and 9. Other portions lack continuous canopy coverage and large trees, and include substantial components of exotic shrub and tree species, as in much of reaches 10c and 11. Portions of the river channelized in recent decades (reaches 10b and 12) have little or no riparian forest.

Other terrestrial habitats in the study area, such as scrub, ruderal, and urban forest, are of lesser value to wildlife. Ross and Canoas creeks have ruderal vegetation, with small amounts of seasonal freshwater marsh in the channelized bed of Ross Creek. Freshwater marsh is also found in the bed of the Guadalupe River in reaches 10b and 12.

Field studies confirm a high diversity and abundance of bird life within the study area, with 90 species noted (not including species only noted in the off-stream percolation ponds). However, surveys show a low diversity and abundance of terrestrial vertebrates (SCVWD, 1997). This may be due to habitat fragmentation, and predation by domestic and feral cats and dogs.

The local sponsor has completed a delineation of jurisdictional wetlands and other waters of the U.S. Within the study area, these categories are generally limited to the bottom parts of river and creek channels and off-stream percolation ponds.

Aquatic Habitat and Fisheries

The non-estuarine portions of the Guadalupe River system are currently inhabited by a total of 28 fish species, of which ten are native. The only salmonids present are Chinook salmon and rainbow/steelhead trout.

Chinook salmon and their redds have been observed at various locations along the Guadalupe River, especially in the downtown reach of the river (SCVWD, 1997). Overall reproductive habitat conditions in the Guadalupe River are generally marginal for salmon, and only two juveniles have been found to date within the study area.

While steelhead trout redds have been observed in the study area, summer water temperatures within this portion of the river system are often too high for steelhead/rainbow trout, and migration barriers preclude access by steelhead trout to better habitat upstream (SCVWD, 1997). As a result, rainbow trout are not normally found within the study area, and the steelhead trout observed here may not represent a self-sustaining population. However, juveniles found in reach A (downstream of downtown San Jose) in September 1997 suggest that successful reproduction and rearing may occur.

Within the aquatic ecosystem of the Guadalupe River, one major habitat concern is shaded riverine aquatic (SRA) cover, which is associated with riparian forest along the river banks. The riparian forest and SRA cover in the Guadalupe River are believed to have been considerably degraded and reduced in extent relative to pre-European settlement conditions, although based on historical photographs portions within the study area appear to have improved during the last half-century.

The other major habitat concern is barriers to the migration of anadromous fish. The highest quality salmonid habitat in the Guadalupe River watershed is found upstream of the study area along portions of several tributaries. Some of these upstream areas have better habitat conditions, presently harbor year-round populations of rainbow trout, and offer potential spawning and rearing habitat for anadromous salmonids (although some other portions have inferior habitat conditions).

However, there are several obstacles to fish passage that limit the ability of fish to move up the river. The most significant of these is a 13.5-foot-high drop-structure located above Blossom Hill Road, which largely or completely prevents anadromous fish from reaching habitat farther upstream. Steelhead trout may be able to surmount this barrier under unusually high flow conditions, but it is normally a complete barrier to upstream migration of salmonids. The local sponsor plans to remove or modify these barriers to allow migration of anadromous fish to better spawning and rearing habitat upstream.

3.0 DESCRIPTION OF ALTERNATIVES

3.1 INTRODUCTION

Two alternatives are considered in the Corp's EIR/EIS, other than no action. One alternative is the portion of the SCVWD preferred alternative that would be constructed within the Corps study area. For the purposes of this BA, this alternative will be called the bypass channel plan. The other plan (the Corp's NED plan) will be called the channel widening plan.

The local sponsor's complete plan includes a bypass channel from the Southern Pacific railroad downstream to I-280 (Reach 6), floodway modifications along the portion of the river between U.S. 101 and I-880 (Reach A), and fish passage improvements upstream of Blossom Hill Road (Reach 13). The Corp's feasibility study does not include these reaches, but assumes that the local sponsor will construct these projects regardless of what the Corps does. Construction of these other projects, along with the downtown Guadalupe River project, is therefore relevant to the analysis of cumulative impacts of flood control projects in the watershed.

As part of the channel widening plan, a recreation trail for pedestrian and bicycle use would be provided along the entire length of the project. This trail would be located on maintenance roads within the project right-of-way, except in Reaches 9 and 10a where the trail would be located on the shoulders of Almaden Road. This recreation trail is not discussed in detail in the local sponsor's EIR/EIS because it is not a part of their proposal, but is discussed in the Corps EIR/EIS.

Plans are now being developed for the mitigation of impacts to SRA cover caused by construction of the downtown Guadalupe River flood control project. These plans may include additional improvements to fish passage conditions farther upstream in the watershed, to allow anadromous salmonids access to quality habitat higher up in the watershed. In addition, further fishery habitat improvements in Reach 12 are a possibility. As these plans have not been finalized, they are not discussed further here. In any case, mitigation measures for the two projects will be determined separately, even if some measures for both projects are to be implemented in close proximity.

As discussed above, this Biological Assessment will not further analyze the impacts of the bypass channel plan. The analysis of this alternative's impacts in the SCVWD's EIR/EIS is hereby incorporated by reference.

3.2 CHANNEL WIDENING PLAN

This plan would widen portions of the river banks to increase the capacity of the river to carry flood flows. Widening would result in creation of a flat bench next to the existing channel bottom at an elevation of three feet above the local average of the channel invert. This bench would typically range from 15 to 60 feet in width. From the edge of the bench farther away from the existing channel, there would be a 2:1 slope rising up to the existing grade level. This slope would be internally stabilized.

Excavation for this bench would remove nearly all vegetation on that bank. However, mitigation plantings would be placed along most of the length of the benches. These plantings would be placed next to the low-flow channel and would restore both riparian forest habitat and SRA cover over time. Additional mitigation plantings would be located in currently barren areas in the study area and would allow complete replacement of lost SRA cover values over time.

Table 1 shows the proposed channel modifications referenced by river station.

Table 1: Description of Channel Widening Plan

River Reach	Approximate River Station	Description of Measures
7	740 - 781 750 773 773 - 781 781	East bank widening Replace Willow Street bridge Replace W. Alma Street bridge 2 - 4 foot high floodwall on the east bank Replace the UPRR bridge
8	781-793 795	1 - 3 foot high floodwalls on the east and west banks Replace the Willow Glen Way bridge
10a	843 - 855	East bank widening
10c	895 - 897.5 897.5 - 906 906 - 912 906	East bank widening West bank widening East and west bank widening Replace Hillsdale Ave. bridge
11	935 - 938 938 - 942 942 - 960	East bank widening West bank widening East bank widening
Canoas Creek	856	Improve bridge and raise existing levees (20-year LOP*)
Ross Creek	950	Trapezoidal channelization from the confluence with the main channel to 750 feet upstream of Jarvis Avenue. 27-ft bottom width. Additional culverts under the Almaden Expressway and Jarvis Avenue and 2,800 feet of floodwall (1 to 3 ft high) on the both banks. (50-year LOP*)

* LOP - Level of Protection

Starting at the downstream end of the study area, this alternative would widen the east bank of the river from the lower end of the study area upstream to the Union Pacific Railroad bridge (Reach 7), with replacement of that bridge. Floodwalls from 2-4 feet high would be constructed along a short section of the east bank in this reach. Low floodwalls from 1 - 3 feet in height would be constructed on the east and west banks of the river from the UPRR bridge upstream to Willow Glen Way (Reach 8). The east bank would also be widened from the Curtner Avenue bridge upstream to the south end of Almaden Road (Reach 10a). In Reach 10b (the general area where the Almaden Expressway crosses the river), the riparian forest/wetland portions of the local sponsor's mitigation plan would be constructed as part of this plan. Portions of the east and west banks would be widened from near Foxworthy Avenue upstream to Branham Lane (Reaches 10c and 11). The Hillsdale Avenue bridge would be replaced. No work would be done upstream of Branham Lane (Reach 12) except for some mitigation plantings.

Fish passage improvements within the Corps study area under this alternative would be the same as those under the bypass channel plan, including placement of vortex rock weirs, with the exception of proposed vortex rock weirs in Ross Creek and further modification of stream gauge 23B, which would not be done under this alternative.

The SCVWD has an ongoing maintenance program for the upper Guadalupe River. Activities include clearing of vegetation and debris, removal of dead trees, herbicide use, repair of erosion sites, and sediment removal. Major portions of the river are not maintained except on an emergency basis due to the lack of access easements.

Construction of the channel widening plan would result in the implementation of a revised maintenance plan similar to that proposed by the SCVWD for their bypass channel plan. Areas disturbed by project construction would be maintained afterwards to maintain the project's channel capacity, structures and roads, and mitigation areas.

The types of management activities would be similar to those utilized at present, but the mix of activities and their locations would change. Herbicide spraying would decrease in some areas but would increase in maintained floodway areas. Removal of woody vegetation would decrease except for a 25-foot strip centered on the middle of the low-flow channel; removal of woody vegetation within this strip would increase due to acquisition of maintenance and access easements in portions of the project area currently lacking maintenance access. Erosion repairs would probably decrease due to reduced current speeds during high water events. Sediment removal would increase, primarily in reaches 9 and 11 and on benches.

4.0 SPECIES ACCOUNTS, PROJECT IMPACTS, AND MITIGATION MEASURES

All species included on the above-referenced species list are discussed here, even if they are not present in or near the study area. The California Natural Diversity Database was consulted prior to completion of this report.

4.1 ANADROMOUS FISH

Fish Species

Chinook salmon *Oncorhynchus tshawytscha*, Sacramento River winter run, federally listed as endangered

Coho salmon *Oncorhynchus kisutch,* Central California Coast Evolutionarily Significant Unit (ESU), federally listed as threatened
Steelhead trout *Oncorhynchus mykiss,* Central California Coast ESU, federally listed as threatened

The Sacramento River winter-run Chinook salmon is a federally listed endangered population. In February 1995, a petition was filed for a coast-wide status review of all Chinook populations. That status review is currently being conducted by the National Marine Fisheries Service (NMFS). To date, there is no evidence that the endangered Sacramento River winter-run Chinook salmon occur in the Guadalupe River. However, while the Chinook salmon in the Guadalupe River are not currently listed, proposed for listing, or a candidate species, they will be discussed in this section as they are of concern to regulatory agencies and the public.

Historically, the Guadalupe River probably supported self-sustaining populations of steelhead trout. Skinner (1962) suggested that Coho salmon also occurred in this river, but this has not been documented (Leidy, 1984; Ian Gilroy, National Marine Fisheries Service, personal communication 11/6/97). Chinook salmon were probably not native to the streams of south San Francisco Bay, but have been known from the Guadalupe River since at least 1986. This may be due to smolt releases into the Sacramento-San Joaquin system by the California Department of Fish and Game (CDFG). Small runs of adult Chinook salmon and steelhead trout are present in the Guadalupe River today, but Coho salmon are not present. The extent to which the present-day anadromous fish runs are self-sustaining populations or strays from other rivers is not well documented.

A preliminary study of the genetic structure of 29 Guadalupe River Chinook salmon indicated that 21 of the 29 were probably derived from known Merced and Feather River hatchery stocks, while the other eight could represent either a wild population or strays from another hatchery that has not yet been sampled (Nielson, 1995). As noted below, two juvenile Chinook salmon were recently collected in the upper Guadalupe River. One specimen has been frozen for investigation of its genetic affinities.

Most anadromous salmonid spawning in the Guadalupe River occurs downstream of the study area; none is known to occur above Reach 13 (upstream of Blossom Hill Road) because of a barrier to fish passage above Blossom Hill Road. Barriers at the mouths of Ross and Canoas creeks and poor habitat conditions limit salmonid migration up these tributaries. Under current conditions, populations of anadromous salmonids in the river probably fluctuate in response to the occurence of the moderate-to-high precipitation years that create better environmental conditions for upstream migration of adults, adult spawning, and possible juvenile survival.

There is good documentation for anadromous salmonid spawning attempts in the study area, but evidence for successful reproduction is limited to the capture of several juveniles. Adult salmonids are seen annually in the Guadalupe River in the reaches downstream of the study area. Chinook salmon were observed spawning in the Guadalupe River near Willow Glen

Way (Reaches 8 and 9) in November of both 1986 and 1987, and salmon were observed near the mouth of Los Gatos Creek (downstream of the study area). The presence of adult Chinook salmon was documented in the Guadalupe River in December 1993 and January 1994. In March 1996, two positively identified juvenile Chinook salmon were captured under the Branham Lane bridge, immediately downstream of where redds had been found earlier in the winter.

It is not known whether steelhead trout juveniles are commonly able to survive summer conditions in those portions of the river that are accessible to spawning adults. Three juvenile trout were found in Reaches 9 and 10 in April and May 1995 (The Habitat Restoration Group, 1995), but it is not known if these were juvenile steelhead trout, or rainbow trout washed downstream by high winter flows. In September 1997, several juvenile trout (probably steelhead trout) were found downstream of the study area, suggesting that successful reproduction and rearing may occur in the river. Nevertheless, the paucity of juveniles suggests that habitat conditions for these fish are marginal.

Fishery Habitat Conditions

GENERAL. Anadromous fish utilize the Guadalupe River under present conditions. Although the physical conditions of the study area provide some favorable habitat attributes, these value of these reaches for spawning and rearing is limited by poor substrate conditions, seasonal flows, and partial migration barriers, all of which occur in portions of the river, as well as excessive summer water temperatures (SCVWD, 1997).

The streambed and SRA cover in Reaches 7 through 10a of the study area provide some suitable habitat features for juvenile salmonid rearing, with an overhanging riparian forest canopy, undercut banks, exposed roots, and pools. However, much of the length of these reaches has a muddy channel bottom and little habitat diversity. These reaches generally lack suitable spawning gravel, so the spawning habitat is poor. Also, summer water temperatures may generally be high enough to exclude summer steelhead rearing, although Chinook salmon juveniles could use this area for rearing in the spring.

Reaches 10b through 12 have a lower potential as rearing habitat because the channel is wider and more shallow, the riparian forest canopy is less well developed or even absent, undercut banks are scarce, water temperatures are probably higher, and flows are often minimal or absent during the summer months. However, portions of these upper reaches do provide suitable spawning gravel.

The portions of Ross and Canoas creeks within the study area have been channelized, lack woody vegetation and habitat diversity, and have minimal aquatic habitat value. While the remainder of Canoas Creek is of no value to salmonids, the upper portions of Ross Creek are potential spawning habitat for steelhead trout. Access to both creeks is limited by drop structures where they join the Guadalupe River.

Better salmonid habitat exists in portions of the headwater tributaries to the river, upstream of the study area, but migration of anadromous fish up to these reaches is generally prevented by existing barriers. The headwater tributaries below the dams represent a total of approximately 18 miles of potentially suitable salmonid spawning and rearing habitat that is not presently available to the anadromous steelhead trout or Chinook salmon (Parsons Engineering Science, 1997). While some of this habitat is of low quality, other portions have resident trout populations, indicating that they contain suitable salmonid habitat. Downstream of the study area, anadromous salmonid habitat in the Guadalupe River is present and accessible to adults migrating upstream.

STREAMFLOW. Winter flow regimes in the upper Guadalupe River are regulated to some extent by the three reservoirs (Calero, Almaden, and Guadalupe) in the headwater tributaries. There is perennial flow in the Guadalupe River downstream to the percolation ponds in Reach 12. Water is percolated in these ponds and in the river channel behind gravel dams for groundwater recharge.

In dry years, low water flows combined with partial barriers to migration may in some cases completely prevent adult salmonids from migrating through the study area reaches. During some summers, flows in the river can cease between Branham Lane and Canoas Creek. Records from a stream gauge in the Guadalupe River upstream of Canoas Creek at the upper end of Reach 10c (Gauge Station No. 23B) reveal that periods of no flow in this reach have occurred in every month of the year (although they are unusual during the winter months) and often exceed 50 percent of the time during the summer. These records indicate that the low flows are typically less than 5 cfs when there is flow.

Flows in the lower reaches (7 through 10a) are more reliable during summer months. From 1983 through 1991, streamflows in these reaches were augmented by groundwater pumping releases as part of a toxic waste cleanup program at the IBM and Fairchild Semiconductor properties along Canoas Creek. This program of discharges sustained relatively good year-round flows in the Canoas Creek and these lower reaches for several years and may have helped salmonid populations persist during the drought. However, discharges from the cleanup program have been greatly reduced in recent years and are now minimal.

Ross Creek is not regulated by a reservoir and is an intermittent stream. Some groundwater percolation is also performed in the Ross Creek channel (with water released into Ross Creek from pipelines operated by the SCVWD). Downstream of the study area, Los Gatos Creek is a major tributary to the Guadalupe River; winter flows on this stream are also regulated by reservoirs and instream percolation is carried out in the summer.

WATER QUALITY. Water temperatures and turbidity levels in the upper Guadalupe River are problematic for salmonid spawning and rearing. Oxygen levels do not appear to be a limiting factor. Water temperature is largely influenced by ambient air temperatures, streamflow and the amount of shade over the water surface. Relatively low flows (compared to watersheds with more favorable precipitation and base flow characteristics) and areas of reduced or minimal shading by vegetation within the study area reaches result in increased water temperatures that are less than optimal to support spawning and rearing of salmonids.

Excessive water temperatures can negatively influence the growth rate, swimming ability, and disease resistance of salmonids, leading to increased mortality of juveniles. Even higher temperatures can be lethal. Acceptable water temperatures would need to be maintained year-round for the river to support juvenile steelhead trout, while Chinook salmon only require suitable temperatures from the time that adults enter the river in the fall until the time juveniles leave the river in the spring.

Under current conditions, summer water temperatures within the study area can reach 80°F, which can be lethal to juvenile salmonids. Water temperatures during the fall may exceed 57°F and preclude spawning migrations of adult Chinook salmon. Summertime temperatures in the water maintained behind gravel dams in the percolation ponds of Reach 12 can range up to 77°F at the surface and would likely exceed the acceptable range for rearing steelhead trout.

In addition, turbidity levels can be undesirably high. This high turbidity may result from sediments in the stream from bank erosion, or could be related to inputs of fine sediment and nutrients from urban runoff.

MIGRATION BARRIERS. Several barriers to fish passage are present within the Guadalupe River channel and in the upstream tributaries. The most important barrier to fish passage is a 13-foot-high drop structure (the Alamitos drop structure) in the river located above Blossom Hill Road at the upper end of Reach 13 (upstream from the study area). This structure is unladdered and effectively prevents any appreciable upstream migration of anadromous salmonids (although steelhead trout may be able to surmount the structure during very high flows). This drop structure was built to control the bottom profile of the river bed and reduce velocities to protect the stream banks, and it is used to divert flows into the groundwater percolation ponds.

Other partial barriers within the study area include an apron and weir structure at Hillsdale Avenue (Reach 10c) and an abandoned concrete vehicle crossing downstream of Ross Creek (Reach 11). These partial barriers appear to mainly be a problem for fish passage during low flows. The weir at the stream gauge station (Station No. 23B) above Canoas Creek (Reach 10), previously a partial barrier, has been modified to enhance upstream fish passage and it is not considered by the SCVWD to have a significant deleterious impact on fish passage at present.

In Ross Creek, excessive water velocities and shallow water depths in a 200-foot-long culvert located under Almaden Expressway may exceed fish swimming capabilities when the water surface elevation in the Guadalupe River is lower than the culvert invert. A steep-sloped, concrete lined channel immediately downstream of the culvert invert may also act as a barrier. Fish passage into Ross Creek may be possible when the creek is inundated by a backwater effect from the Guadalupe River, which is predicted to occur when flows approach 925 cfs (a 2-year event).

In Canoas Creek, the channel invert at the mouth is over 5 feet above the Guadalupe River channel, but fish passage into Canoas Creek may also be possible during backwater effects from the Guadalupe River when flows approach 1,754 cfs at that location (also a 2-year event). However, the California Department of Fish and Game (CDFG) has indicated that Canoas Creek is not favorable for salmonid reproduction and that fish passage into the creek should be discouraged.

SPAWNING SITES. Spawning sites are determined by the locations of adequate gravels and shallow riffle habitats in the stream channel. The reservoirs in the headwater tributaries act as sediment traps and reduce gravel supplies downstream, affecting the abundance, quality, and relative composition of gravels in the upper Guadalupe River. Natural gravels are scarce downstream of Canoas Creek, except for a few gravel bars in Reach 9. The riffle substrate of most reaches is considered poor, often consisting of relatively large pieces of concrete.

Still, some suitable spawning sites do occur within the study area. During a 1987 survey by The Habitat Restoration Group, 13 potential spawning sites were identified from West Virginia Street upstream to Malone Road, with as many as 31 redds observed at these sites. In 1995 and 1996, SCVWD biologists surveyed the river from the Montague Expressway (downstream of downtown San Jose) upstream to the Alamitos drop structure. Of the 57 redds located, 10 were located within the study area (SCVWD, 1997). Suitable spawning sites are present in the headwater tributaries, above the study area, but are not accessible due to existing barriers.

STREAMBED AND SHADED RIVERINE AQUATIC (SRA) COVER. The study area reaches are predominantly pool habitats with a riffle:pool ratio ranging from 0.73:1 for Reach 8 to 0.06:1 for Reach 10, with a ratio of 0.24:1 for the entire study area. This is below the optimal ratio for an anadromous salmonid fishery, which should have a 1:1 ratio for spawning and rearing habitat. Only about 6 percent (1,784 feet) of the river is run habitat. About 29 percent (17,692 feet) out of the 61,520 feet of the stream bank length is shaded by overhanging riparian vegetation. Slightly more of the west bank is shaded than the east bank in all reaches except Reaches 10 and 12. In terms of surface area, about 16 percent (2.7 acres) of the 16.7 acres of total stream area is shaded, but this ranges from over 48 percent shaded area in Reach 9 to less than 0.1 percent shading in Reach 12 (U.S. Fish and Wildlife Service, 1993).

Undercuts occur along 18 percent of the stream banks, again with more of the west bank undercut than the east bank. Nearly all undercuts are in reaches 7-9. The shaded stream channel and undercut banks help to keep water temperatures down and provide cover for salmonids. These habitat features are virtually absent along the 25 percent (15,380 feet) of the total bank length that has already been modified by manmade structures for bridge abutments (2,350 feet; 4

percent) and bank protection (13,030 feet; 21 percent) using riprap, sacked concrete, rock-filled gabions, and concrete linings (U.S. Fish and Wildlife Service, 1993).

Assumptions

CONSTRUCTION-RELATED IMPACTS:

- All existing vegetation would be eliminated along the banks of the river in areas that are graded to provide a wider channel. Floodwalls are assumed to require a 10-foot wide clearing, although larger tree trunks within this clearing could probably be saved.

- Cofferdams would likely be needed for construction activities. Cofferdams are temporary structures necessary to dewater the creek and allow access across the creek during construction. For this sort of structure, typically, a driving hammer and crane are operated from the banks of the creek to place the fill. A bypass pipe would be used to maintain downstream flows. Materials and the method of placement would be selected to prevent erosion or an increase in creek water turbidity. Upon completion of construction, all material used for the cofferdams would be removed and the bed and banks would be returned to preconstruction contours. The California Construction Best Management Practices (BMP) would be implemented.

  Relatively open locations would be selected for placement of the cofferdams. As a result, overall impact should be minor. Since the cofferdams would be removed after construction, no long-term effects are expected. The locations of cofferdams for the channel widening plan would be determined during final design.

- Certain proposed channel modifications, including the removal or modification of partial and complete fish barriers, would result in a long-term benefit to fisheries resources (particularly anadromous species such as steelhead trout and Chinook salmon) by increasing the availability of spawning and rearing habitat for these species. Presently, portions of the upper tributary streams (i.e., Alamitos, Calero, and Guadalupe Creeks) contain better conditions for salmonid spawning and rearing than does the Guadalupe River.

- Permanent loss of riparian vegetation from channel widening and bank stabilization activities would result in short- and long-term loss of physical habitat features (e.g., loss of vegetative cover and undercut banks), possibly increasing mean water temperature from loss of shade and reducing habitat complexity. Mitigation plantings in currently barren areas would offset this impact in the long term as determined by the HEP study.

- In-channel construction activities would be limited to the summer low-precipitation period (April 15-October 15), with the condition that construction requiring stream dewatering or work in the channel invert not commence until May 1 (provided that stream monitoring criteria are satisfied). Should stream monitoring criteria not be met, channel invert work and stream dewatering would not be allowed to commence until June 1. Additionally, the contractor would be required to implement an erosion control plan. These actions would minimize the potential for occurrence of temporary increases in turbidity and suspended particles resulting from in-channel construction and nonpoint-source runoff to the river. Limiting in-channel construction activities to the summer low-precipitation period would also minimize impacts on juvenile and adult salmonids.

- The construction contractor would be required to implement a hazardous materials control and response plan to minimize the potential for accidental spills of petroleum-based products associated with the operation of heavy machinery.

OPERATIONAL IMPACTS:

- Existing channel maintenance tasks include: removing accumulated sediment; cleaning debris from in-channel structures; controlling erosion by placing riprap, sacked concrete, or other materials where needed; using pre-emergent and post-emergent herbicides on maintenance roads and floodways, and selectively in revegetation areas; removing trash and debris; inspecting and monitoring conditions; removing dead trees and pruning live trees that could be hazardous in floods; trimming brush that could impede flood flows; mowing or discing weeds; using herbicides on invasive weeds, noxious plants, and woody plants that could obstruct flood flows or cause structural damage; manual trimming of branches overhanging roadways; manual trimming or herbicide application in areas inaccessible to mechanical equipment; maintaining access roads; and repairing fences.

- Existing channel maintenance activities that affect native vegetation have been approved and monitored through Memoranda of Understanding (MOU) between the SCVWD and CDFG. It is assumed that the local sponsor's proposed maintenance program would supersede the existing MOU. Differences between existing and proposed channel maintenance procedures are minor. The most notable changes under the this alternative include more extensive sediment removal; less use of sacked concrete for erosion control; newly constructed roads and ramps that would be treated with pre-emergent and postemergent herbicides in accordance with applicable regulations; maintenance for new irrigation systems and mitigation plantings; and less mechanical and chemical vegetation control.

Beneficial Impacts

INCREASE IN HABITAT AVAILABILITY FOR MIGRATING STEELHEAD TROUT AND CHINOOK SALMON RESULTING FROM REMOVAL OF PARTIAL FISH BARRIERS. Proposed channel modifications include removing an abandoned stream gauge, consisting of a concrete apron and weir, at Hillsdale Avenue (Reach 10C) and a low-flow vehicle crossing (ford) downstream of Ross Creek (Reach 11B). Both structures are partial barriers to upstream migration by adult salmon and steelhead trout and require high flows (over 200 cfs at Hillsdale Avenue and 50-100 cfs at the ford) for successful fish passage. Only during peak urban storm runoff or prolonged watershed runoff do flows allow successful fish passage under existing conditions. Removing the barriers would enable access for migrating fish from the San Francisco Bay upstream to the drop structure above Blossom Hill Road at flows of approximately 10-15 cfs. These structures would be replaced with vortex rock weirs to maintain grade control while enabling fish passage.

The Blossom Hill drop structure is a barrier to fish migrating to the upper tributary streams of the Guadalupe River (i.e., Alamitos, Calero, and Guadalupe creeks). The SCVWD proposes to construct a fishway at the Blossom Hill drop structure. In accordance with a September 1995 settlement agreement, the SCVWD has committed to constructing the fishway by October 15, 1999 (SCVWD, 1997). The fishway would provide access to an additional 2.9 miles of fish habitat from the drop structure to potential fish barriers at Mason Dam on Guadalupe Creek and the gabion structure at Alamitos Creek upstream of Mazzone Drive. While this proposal is not part of either alternative in the Corps study, it would have a significant positive impact on fish passage and would magnify the positive impacts of downstream improvements in fish passage.

Impacts to be Mitigated to Insignificance

POTENTIAL FOR ACUTE AND CHRONIC TOXICITY TO FISHERIES AND REDUCED FISH PRODUCTIVITY RESULTING FROM CONSTRUCTION-RELATED ACTIVITIES. In the absence of preventative measures, activities associated with excavation, channel widening, bridge replacement, floodwalls, maintenance roads, and access ramps could increase erosion processes, thereby increasing sedimentation and turbidity in downstream waterways and causing negative impacts on fisheries. In addition, construction materials, such as concrete, sealants, oil and paint, could adversely affect water quality and aquatic life if accidental spills occurred during project construction.

To prevent these impacts, the construction contractor would be required to implement a Stormwater Pollution Prevention Plan (as required by the Clean Water Act) to minimize the potential for sedimentation of aquatic habitats, including possible steelhead trout and Chinook salmon spawning and rearing habitats. Measures in the plan would include but would not be limited to:

- Conducting all construction work according to site-specific construction plans that minimize the potential for sedimentation of aquatic habitat;

- Identifying all areas requiring clearing, grading, revegetation, and recontouring and minimizing the areas to be cleared and graded;

- Grading spoil sites to minimize surface erosion;

- Avoiding riparian and wetland vegetation, whenever reasonably possible, and identifying and fencing specific trees for riparian habitat maintenance;

- Covering bare areas with mulches and revegetating all cleared areas with native species;

- Preventing equipment operation in flowing water when performing in-channel activities by constructing cofferdams and diverting all streamflows around construction sites; and

- Constructing sediment catch basins across the stream channel immediately below the construction site when performing in-channel construction to prevent sediment-laden water from traveling downstream, and periodically removing accumulated sediments from the catch basin.

Similarly, the Channel Widening Plan would require the contractor to implement a hazardous materials control and spill response plan to reduce the potential for impacts on the aquatic ecosystem in general, as well as spawning, rearing, and egg incubation stages of anadromous salmonids. The plan would control the use of hazardous materials, such as petroleum-based products used in heavy equipment and other potentially toxic materials used during construction. Measures would include but would not be limited to:

- Preventing raw cement, concrete or concrete washings, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to aquatic life from contaminating the soil or entering watercourses;

- Establishing a spill prevention and countermeasure plan before project construction that includes strict on-site handling rules to keep construction and maintenance materials out of drainages and waterways;

- Cleaning up all spills immediately according to the spill prevention and countermeasure plan and notifying the CDFG immediately of any spills and cleanup procedures;

- Providing staging and storage areas located outside the stream's normal high-water area for equipment, materials, fuels, lubricants, solvents, and other possible contaminants;

- Removing vehicles from the normal high-water area of the stream before refueling and lubricating; and

- Preventing operation of equipment in flowing water.

With implementation of these measures, no significant impacts are expected from sediments or toxic materials entering project area waterways during or after construction.

DIRECT IMPACTS OF CONSTRUCTION ACTIVITIES ON FISH. To further reduce the likelihood of construction impacts on fish, construction would be limited to the April 15 to October 15 period. Construction in the channel invert or other construction activities requiring stream dewatering, heavy equipment operation in the channel, or stream crossings would be limited to the May 1 to October 15 period with the stipulation that such activities can commence before June 1 only if field surveys (consisting of a minimum of 3 days of sampling) indicate that no juvenile salmonids are present in the project vicinity and that average daily water temperatures have exceeded 64°F for a minimum of 3 days in a row at that location (generally, conditions for steelhead trout and Chinook salmon decline when water temperatures exceed 64°F in spring).

By limiting construction to the April 15 to October 15 period, two goals would be achieved: limiting construction to periods when migrating and spawning Chinook salmon and steelhead trout are less likely to be affected, and maximizing the construction period, thereby reducing the number of years required to construct the project (and, specifically, the number of years that impacts on fishery resources could occur).

The proposed construction period, which focuses on protecting migrating and spawning adult Chinook salmon in fall and rearing steelhead trout and Chinook salmon juveniles in spring, was developed by comparing the known life history and habitat requirements for these species with available streamflow and water temperature data for the Guadalupe River. As stated earlier under "Existing Fisheries Resources," adult Chinook salmon enter the lower Guadalupe River as early as August and have been observed in the study area as early as November, when seasonal rains and cooler weather result in improved stream conditions. Measured streamflows and water temperature data further substantiate that optimal conditions for Chinook salmon migration and spawning typically do not occur in the study area until November. Consequently, proposed in-channel construction activities occurring up through October 15 would not affect adult Chinook salmon migration and spawning.

Although construction activities in October would not affect adult steelhead trout migration (adults would not enter the river until December, at the earliest), the potential exists for construction activities occurring in spring to adversely affect steelhead trout migration and spawning, as well as possibly affecting juvenile steelhead trout and Chinook salmon rearing and outmigration. Adult steelhead trout begin migrating up coastal streams in December and continue into May, although the majority of adults typically migrate prior to mid-April (Shapovalov and Taft 1954). Raleigh et al. (1984) report that optimal conditions for adult migration occur when average maximum water temperatures are between 37.5°F and 64.5°F. Optimal conditions for steelhead trout embryos and smolts occur at water temperatures below 55°F (Raleigh et al. 1984). For Chinook salmon juveniles, optimal conditions for smoltification occur when average maximum water temperatures are between 53.6°F and 64.5°F (Raleigh et al. 1986). In general, conditions for steelhead trout and Chinook salmon decline when water temperatures exceed 64°F in spring.

A review of available water temperature data for the Guadalupe River indicates that mean monthly water temperatures for April 1994 and 1995 averaged 61.5°F. It should be noted that mean water temperatures warmed to 66°F (73°F was the maximum water temperature recorded for the month) in May, despite the higher streamflow conditions and cooler weather that prevailed in spring 1995. Based on these data, the optimal water temperatures for juveniles were exceeded in 1994 and 1995 by late-April to early-May. These limited data suggest that water temperatures can exceed the acceptable range for salmonid eggs and embryos in March and April, and may create suboptimal conditions for smolts by late April and early May.

Because of the variability in environmental conditions from year to year and the lack of a long-term database on Guadalupe River fisheries and water temperature data, it is difficult to accurately predict when conditions in the Guadalupe River become less than favorable for salmonids for any given year. Consequently, the construction period of April 15 to October 15 includes the conditional statements discussed above for in-channel construction activities affecting the channel invert during the April 15 to May 31 period. Adherence to these measures would minimize the potential for adverse impacts on steelhead trout and Chinook salmon populations, while also reducing the number of years required to construct the project. This impact is therefore less than significant, and no further mitigation is required.

POTENTIAL FOR REDUCED FISH MIGRATION AND SPAWNING SUCCESS IN THE GUADALUPE RIVER RESULTING FROM CHANGES IN HYDRAULIC CHARACTERISTICS. Construction of the Channel Widening Plan would widen the existing channel, thereby reducing current velocities and water depths in all or portions of Reaches 7, 10, and 11 during most flood events. The modification of channel geometry may also affect the quality and quantity of spawning gravels because of the reduction in the incidence and magnitude of channel maintenance flows, gravel flushing flows, and sediment transport flows in general.

The Guadalupe River is generally deficient in sediment due to upstream dams that intercept sediment from the upper watershed. A sediment modeling study (Philip Williams and Associates, 1996) has determined that neither the Channel Widening Plan nor the Bypass Channel Plan would result in appreciable sedimentation due to this sediment-starved condition.

Therefore, neither of these plans is likely to significantly increase sedimentation in salmonid habitats, as reductions in water velocity would not be sufficient to cause sediment loads to exceed the sediment carrying capacity of the river.

Field surveys show that the river is deficient in gravel downstream from Canoas Creek (reaches 7-10a). Gravel transport could be reduced in some areas by the Channel Widening Plan, as the low bench height would allow relatively low flows to overflow onto the bench, reducing the velocity and gravel carrying capacity of these flows. However, the capacity of much larger flows to move gravel would be unchanged. In any event, the remaining low flow channel in widened areas would tend to create an area of relatively fast flows (relative to the largely vegetated bench) that would encourage gravel transport in this part of the channel during high flow events.

Gravel transport is not expected to be a problem in Reaches 7 through 10a. This portion of the river has almost no spawning habitat at present. The existing low flow channel would remain to provide fish passage. On the average, water in the low flow channel would reach a depth of three feet before spilling over onto the bench. Instream cover lost due to channel widening would be reestablished through mitigation plantings.

In Reach 10b, a new low flow channel would be created which would improve fish passage and spawning potential, so negative impacts on spawning are not expected in this area. In widened portions of reaches 10c and 11, a low flow channel averaging three feet in depth would remain and would provide fish passage as in lower reaches. It is not known if channel widening in portions of these reaches would affect gravel quantity and quality downstream in Reach 10b. Reach 12 would be unchanged from current conditions.

The net consequences of these changes are uncertain, but any negative impacts on gravel availability that may occur are expected to be offset by improved habitat access for anadromous fish due to removal of, and modification of, barriers to migration. If this alternative is selected, then additional sediment modeling would be appropriate to determine the likely impacts on gravel characteristics in the river.

REDUCED OPPORTUNITY FOR FISH PASSAGE INTO ROSS CREEK. Increases in channel capacity in reach 11b would lower the water surface elevation during even small flood events. The frequency with which water in the Guadalupe River would rise high enough to allow steelhead trout access past the existing barrier and into Ross Creek would be decreased. To mitigate this impact, the local sponsor's plan for improving fish access to Ross Creek would be adopted for this plan. This plan would involve construction of a fish ladder so fish could surmount the sudden gradient drop at the mouth of Ross Creek, and installation of Washington baffles in the new culvert under Almaden Expressway. These mitigation measures would fully mitigate the impact described above and would improve fish passage opportunities over their present condition.

Impacts Not Mitigated to Insignificance

TEMPORARY REDUCTION IN SHADED RIVERINE AQUATIC (SRA) COVER RESULTING FROM THE REMOVAL OF OVERWATER VEGETATION AND UNDERCUT BANKS ALONG THE GUADALUPE RIVER, AND CONSEQUENT REDUCTION IN HABITAT QUALITY AND INCREASES IN WATER TEMPERATURE. Construction activities associated with grading and excavation of streambanks and bank protection activities would result in the removal of overhead cover in the form of overwater riparian forest vegetation along the entire east bank of Reaches 7 and 10a, and portions of the east and west banks in Reaches 10c and 11. Undercuts on banks to be widened would be lost over a period of years following project construction, as the roots that hold these overhanging banks together decay. These losses would primarily be in Reach 7. Table 2 compares SRA impacts by reach.

These losses of SRA cover would adversely affect salmonids in the Guadalupe River by reducing fish egg survival through increased water temperatures, increasing juvenile fish mortality through decreased escape habitat and reduced habitat complexity, and by decreasing juvenile fish growth and survivorship through increased water temperatures. The upstream migrations of adult fish could also be affected by higher water temperatures

The primary mitigation measure for these impacts would be plantings of riparian forest in two types of locations: (1) on the edge of the bench adjacent to the low flow channel, and (2) in currently non-forested areas along the river. The exact acreage of these plantings will be revised based on the results of a recently completed SRA HEP. Riparian forest mitigation plantings would be located preferentially next to the river's low flow channel, to maximize positive impacts on SRA cover. These plantings would extend along nearly the entire length of the benches, and would also extend along much of the length of currently non-forested river bank.

While the full re-creation of all lost riparian forest and SRA cover attributes in these mitigation areas would take up to several decades, significant overhead shade would begin to appear within 5 years and would continue to rapidly improve thereafter. Mitigation planting along currently barren river banks would speed the recovery process. Undercut banks would also be expected to begin to appear within the first decade of vegetation growth. Habitat values and temperature conditions would improve as overhead shade and undercut banks become more extensive over time.

Mitigation plantings are expected to fully compensate for lost annualized SRA cover habitat values over the life of the project. While significant short-term reductions in aquatic habitat values would occur, in the long term mitigation plantings would cause aquatic habitat values to improve over present conditions. Additional improvements in aquatic habitat conditions would occur due to improvements in fish passage conditions and increased cover and habitat complexity resulting from the removal and modification of migration barriers and the installation of vortex rock weirs. Therefore, the only unmitigated impacts would be the temporary loss of SRA cover and consequent habitat quality and water temperature impacts.

TABLE 2: SRA COVER IMPACTS BY REACH
(before mitigation)

REACH	LOCATION OF IMPACTS	LOSS OF AQUATIC SHADE (ACRES)	LOSS OF SHADED STREAMBANKS (FEET)
7	Entire east bank	0.33	1900
8	No impacts	0.00	0
9	No impacts	0.00	0
10a	Entire east bank	0.11	598
10b	No impacts	0.00	0
10c	Portions of each bank	0.09	735
11a	No impacts	0.00	0
11b	Portions of each bank	0.10	465
11c	Entire east bank	0.04	246
12	No impacts	0.00	0

Source: U.S.F.W.S. (1997)

4.2 NON-ANADROMOUS FISH

Delta smelt *Hypomesus transpacificus*

This species occurs from Suisun Bay upstream to the Delta. It is not known from the Guadalupe River, and would not be affected by this alternative.

4.3 WILDLIFE

Endangered species

San Joaquin kit fox, *Vulpes macrotis mutica*

This species occupies areas of open vegetation, primarily grassland, in the San Joaquin Valley and the South Coast Ranges. Each mated pair will typically occupy about one square mile of territory.

No suitable habitat for this species exists within the study area, and no foxes of any species have been seen or trapped within the study area. The only known siting in this general part of Santa Clara County was in 1972-75, seven miles west-northwest of Morgan Hill. There would be no impacts on this species.

American peregrine falcon *Falco peregrinus anatum*

The peregrine falcon rarely visits the study area, and only during winter months. There would be no impacts on this species.

California clapper rail *Rallus longirostris obsoletus*

This species inhabits salt marshes around San Francisco Bay. No suitable habitat is known from the vicinity of the study area. There would be no impacts on this species.

Threatened species

California red-legged frog *Rana aurora draytoni*

The California red-legged frog inhabits streams and rivers, as well as adjacent riparian habitat. Areas with water at least two feet deep and dense bordering vegetation are preferred. This species was once the most common frog in riparian and wetland areas in most lowland portions of California. However, habitat loss and degradation, as well as predation from introduced fish and bullfrogs, have extirpated this species from most of its previous range.

The California red-legged frog is not presently known to occur on the Guadalupe River. However, it is known from the headwaters of Los Gatos Creek, a tributary of the Guadalupe River downstream of the study area, and Alamitos Creek just below Guadalupe Dam, upstream of the study area. Both locations are many miles from the study area.

The upper Guadalupe River does provide possible habitat for California red-legged frogs, with deep pools, vegetated slopes, and undercut banks in some sections. However, numerous predatory introduced fishes such as bluegill and bass occur in the river, and bullfrogs are abundant. Bullfrogs and predatory introduced fishes are known to eat tadpoles and young California red-legged frogs and, therefore, their presence in Guadalupe River severely reduces the value of the habitat for the frogs.

Surveys according to the USFWS recommended survey protocol were conducted in the study area by the Santa Clara Water District biologists in 1997. No red-legged frogs were observed during the survey. Five nights of surveys following the USFWS draft recommended protocol dated January 13, 1995 were conducted by Santa Clara Water District biologists in the Guadalupe River downstream from the study area during the spring and summer of 1996; no California red-legged frogs were found in that area.

Based on the survey results and on the abundance of bullfrogs in the study area, and given the strong tendency for bullfrogs to displace and eliminate red-legged frogs from otherwise suitable habitat, as well as the deleterious impact of exotic predatory fish (USFWS 1996), it is very unlikely that this species occurs in the study area. Therefore, the channel widening plan will not have any effects on this species.

Bay checkerspot butterfly *Euphydryas editha bayensis (Occidryas e. b.)*

The Bay checkerspot butterfly is currently restricted to areas of serpentine soil in the San Francisco Bay Region, where its larval food plants have survived the invasion of introduced grasses and forbs. The nearest known population is located west of Calero Reservoir. No suitable habitat is within the study area, and there would be no impacts on this species.

Alameda striped racer *Masticophis lateralis euryxanthus*

This geographically-limited subspecies of the common striped racer is known from Alameda and Contra Costa Counties and could occur in the Mt. Hamilton Range in Santa Clara County. It primarily inhabits coastal scrub or chaparral near water. This snake is also listed by the State of California as threatened.

It is not known to occur in the study area, and surveys and extensive field work have failed to locate any individuals. This species is not expected to occur in the study area, and it would not be affected by this alternative .

Proposed Threatened Species

Sacramento splittail *Pogonichthys macrolepidotus*

This large cyprinid fish was formerly common in rivers and streams in the Central Valley, Delta, and portions of the San Francisco estuary. It is now largely restricted to the Delta, Suisun Bay and Suisun Marsh, and the Napa River marshes. Fish surveys have failed to find any individuals of this species in the Guadalupe River. There would be no impacts on this species.

Candidate Species

Riparian brush rabbit *Sylvilagus bachmani riparius*

This rare subspecies of the common brush rabbit only occurs at one known location, in the Central Valley. It is not known to occur in the study area, and field trapping surveys have failed to uncover any individuals. There would be no impacts on this species.

California tiger salamander *Ambystoma californiense*

The California tiger salamander formerly ranged through much of the lowland portion of cismontane California, from the central Sacramento Valley south to Santa Barbara County. It uses animal burrows for cover, and breeds in water bodies lacking fish (such as vernal pools). The nearest known population occurs in the U.S.G.S San Jose East 7.5' quadrangle, in and near an active quarry located on the northeast side of the large hill complex located east of Canoas Creek. However, suitable reproductive habitat does not exist in or near the study area, and surveys have failed to find this species. Therefore, there would be no impacts on this species.

Federal Species of Concern

Greater western mastiff-bat *Eumops perotis californicus*

This large bat occurs in the southern half of California, usually in arid, open areas with suitable roosting habitat (high cliffs) nearby. Suitable habitat is not found in the study area. There would be no impacts on this species.

Pacific western big-eared bat *Plecotus townsendii townsendii*

This bat species roosts in caves and buildings and prefers xerophytic vegetation. Suitable habitat is not found in the study area. There would be no impacts on this species.

Small-footed myotis bat *Myotis ciliolabrum*

This bat species occurs through most of California in a variety of habitats. It is usually solitary. This species could occur in the study area. Temporary disturbance and loss of some roosting and feeding habitat (riparian vegetation) could result from project construction. Mitigation plantings would eventually increase the total habitat available for this species.

Long-eared myotis bat *Myotis evotis*

The long-eared myotis ranges throughout California, often in montane forests. It roosts individually. This species could occur in the study area. Temporary disturbance and loss of some roosting habitat (riparian vegetation) and feeding habitat could result from project construction. Mitigation plantings would eventually increase the total habitat available for this species.

Fringed myotis bat *Myotis thysanodes*

This myotis species occurs in a variety of habitats, most commonly in coastal and montane forests. It forms nursery colonies in old buildings and caves. No bat colonies are known in the study area. There would be no impacts on this species.

Long-legged myotis bat *Myotis volans*

The long-legged myotis occurs throughout California in brushy and forested areas. It roosts in cliffs, buildings, and trees. This species may occur in the study area. Temporary disturbance and loss of some roosting habitat (riparian vegetation) and feeding habitat could result from project construction. Mitigation plantings would eventually increase the total habitat available.

Yuma myotis bat *Myotis yumanensis*

This species is widespread in California, and prefers wooded canyon bottoms. It roosts in large colonies. No bat colonies are known in the study area. There would be no impacts on this species.

San Francisco dusky-footed woodrat *Neotoma fuscipes annectens*

This large rodent inhabits forested and brushy habitats. Like other woodrats, it builds large nests of sticks and other debris. Woodrats have not been found during field surveys and trapping programs in the study area, nor have their nests been noted. However, they could exist in riparian forest or ruderal scrub habitats within the study area.

Temporary disturbance, loss, and fragmentation of some habitat for this species could result from project construction, should it be present in the area. Mitigation plantings would eventually increase the total habitat available and reduce habitat fragmentation (SCVWD, 1997), if the area is utilized by this species.

Tri-colored blackbird *Agelaius tricolor*

This bird inhabits freshwater marshes but also forages in fields. Field surveys did not note any individuals, but it could occur on an occasional basis in the study area, primarily in reaches 10b and 12 during the spring months. Construction of planned mitigation areas in reach 10b could have minor impacts on this species.

Bell's sage sparrow *Amphispiza belli belli*

Bell's sage sparrow inhabits dry brush such as chaparral and sage scrub. Suitable habitat is not found within the study area. There would be no impacts on this species.

Western burrowing owl *Athene cunicularia hypugea*

Contrary to its name, the burrowing owl does not actually dig its own burrows. Instead, it inhabits burrows abandoned by other animals such as ground squirrels. Unlike most owls, it is often active during the day. This species has been declining in the Pacific Coast region, possibly due to poisoning resulting from efforts to control rodents, as well as the expansion of agriculture.

Burrowing owls have been observed in Reach 12 in the past. Between 1988 and 1991, at least one pair was a resident on the banks of the Guadalupe River and percolation ponds of Reach 12. Nesting was not confirmed, but was suspected due to the continued presence of the owls. More recent surveys have failed to find any nesting in the area. However, this species could again utilize habitat in this reach.

The channel widening alternative could result in the temporary disturbance of nesting burrowing owls, if they are present at the time of construction of mitigation areas in Reach 12. This impact would be considered significant because the CDFG includes the burrowing owl on its list of species of special concern and any disturbance of this species could contribute to its decline. However, any impacts would be temporary and localized.

To avoid this potential impact, burrowing owl surveys would be conducted in planned mitigation areas in reach 12 during the nonbreeding season (September-January) and no more than 2 weeks before construction begins, to determine whether burrowing owls are occupying the construction site before construction.

Within 30 days of conducting the survey(s), the results shall be forwarded to the CDFG. If no burrowing owls exist at the construction site, no additional mitigation measures shall be required. If survey results reveal the presence of burrowing owls, monitoring by a qualified wildlife biologist shall be required during construction activities, and a report of monitoring activities shall be forwarded to the CDFG.

The following mitigation measures would be implemented, depending on when construction is scheduled to occur.

- If construction occurs during the nonbreeding season (September-January), construction would be avoided within 160 feet of the active burrow to avoid disturbing or killing the burrowing owls, until the burrow is vacated and destroyed as indicated below. This schedule would comply with laws under the California Fish and Game Code, the federal Migratory Bird Treaty Act, and CDFG's burrowing owl guidelines.

- Monitoring of potential wintering burrows would be necessary to ensure that no owls were killed during grading. A qualified wildlife biologist would survey the affected area within 2 weeks before construction activity begins to determine if active burrows are present. After determining that active burrows are unoccupied, the burrows would be destroyed to prevent reoccupancy during construction.

- If construction occurs during the breeding season (February-August), the owls would be excluded from the construction area before the breeding season begins and prevented from returning by the following actions:

    - Examining all potential burrows in Reach 12 during the previous nonbreeding season (September-January) to determine the presence or absence of owls,

    - Destroying or collapsing unoccupied burrows to prevent their use during the nonbreeding and breeding seasons, and

    - Monitoring the construction site and continuing to destroy burrows until grading begins to ensure that new burrows constructed by ground squirrels are not occupied by owls and used as dens.

- If no other options are available, relocate burrowing owls. The Corps would prepare a relocation and habitat protection plan in coordination with CDFG and USFWS and obtain permits from both CDFG and USFWS.

Within 60 days of completion of construction activities in Reach 12, a letter report would be submitted to CDFG that includes results of the preconstruction survey, monitoring and preventive actions taken during construction, and postconstruction conditions. With implementation of these mitigation measures, there would be no impact on this species unless relocation becomes necessary.

Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*

This species winters in salt marshes and breeds in fresh to brackish marshes in the spring, inhabiting areas of continuous dense vegetation. There is no record of this species in the study area. Seasonal marsh habitat in reach 10b is marginal at best. Impacts are therefore unlikely.

Ferruginous hawk *Buteo regalis*

This large hawk inhabits open country such as grasslands. It is widespread across much of the U.S., but has declined sufficiently to cause concern. Field surveys failed to note any individuals of this species; however, it could occur on a transient basis, especially in Reach 12. There would be no impacts on this species.

Little willow flycatcher *Empidonax traillii brewsteri*

The little willow flycatcher is the subspecies of the willow flycatcher which occurs in this region of California. This bird favors riparian habitats, mainly in canyons. It is known to occur in the study area, and the channel widening plan would remove some habitat for this species. As this is one of the species used in the terrestrial HEP, project impacts would be fully mitigated by riparian forest plantings. Short-term habitat fragmentation would be mitigated by these plantings (SCVWD, 1997).

Silvery legless lizard *Anneilla pulchra pulchra*

This snake-like lizard inhabits areas of loose soil, especially sand. It is not known from the study area, and no suitable habitat exists in the area due to the texture and structure of local soils. There would be no impacts on this species.

Northwestern pond turtle *Clemmys marmorata marmorata*

The northwestern subspecies of this widespread turtle is found north of San Francisco Bay, so it is not expected to occur in the study area. There would be no impacts on this species.

Southwestern pond turtle *Clemmys marmorata pallida*

This subspecies is generally less common than the northwestern subspecies. It occurs from San Francisco Bay southward in the South Coast Ranges. Foraging habitat in the study area is marginal, and there is no breeding habitat. Surveys have failed to locate any turtles in the study area. Anecdotal reports suggest that individuals can occur there, but due to the poor habitat conditions they have probab;y dispersed from better habitat upstream. The nearest documented occurrence is in the Santa Teresa Hills south of Calero Reservoir. There would be no impacts on this species.

California horned lizard *Phrynosoma coronatum frontale*

This species prefers areas with loose soil. It occurs in a variety of vegetation types, including grassland and open forests and woodland. Habitats in the study area have limited suitability for this species, and surveys have not located any individuals. There would be no impacts on this species.

Foothill yellow-legged frog *Rana boylii*

This species prefers streams with shallow riffles and sandy or rocky banks. Potential habitat exists in the study area, but surveys have failed to find any individuals of this species. The nearest known occurrences are in the Morgan Hill and Laurel 7.5' quadrangles. There would be no impacts on this species.

Western spadefoot toad *Scaphiopus hammondi*

This toad inhabits relatively arid habitats including drier parts of the South Coast Ranges. Historically, it may have occurred in the vicinity of study area. However, current habitat conditions are unfavorable due to the absence of loose soils and breeding habitat. No individuals were seen during field surveys. There would be no impacts on this species.

Opler's longhorn moth *Adela oplerella*

The larvae of this moth feed on cream cups *Platystemon californicus*. This native wildflower has not been noted in the study area and does not compete well against non-native ruderal herbaceous grasses and forbs. At the IBM facility in nearby Santa Teresa, cream cups only occur on serpentine substrates. This moth is not expected to occur in the study area, and there would be no impacts on this species.

Ricksecker's water scavenger beetle *Hydrochara rickseckeri*

This insect inhabits slow-moving water in streams and ponds. It is not known to occur in Santa Clara County and is considered unlikely to occur in the study area. There would be no impacts on this species.

Unsilvered fritillary butterfly *Speyeria adiaste adiaste*

This butterfly inhabits mixed coniferous forest and redwood forest in the northern portion of its range (the South Bay). No suitable habitat is found in the study area, and there would be no impacts on this species.

San Francisco forktail damselfly *Ischnura gemina*

This relative of the dragonflies occurs in scattered locations in the San Francisco Bay Area. It was inadvertently omitted from the most recent FWS species list, but is discussed here as it has a limited distribution and occurs near the study area.

Potential habitat for this species exists along the river where there is emergent vegetation. However, there are no records of this species occurring in the study area, although it is known from a location three miles away on Coyote Creek. Mitigation work in reach 10b could affect this species if it is present, although the seasonal nature of the marsh vegetation in this reach makes this less likely.

State Species of Concern

Yellow warbler *Dendroica petechia*

The yellow warbler utilizes riparian forest throughout California. Yellow warblers were found nesting in the riparian forest habitat of Reach 6 through 11, placing their nests in shrubs and low trees. The nesting population consists of approximately 10 to 20 pairs.

This species would experience some habitat loss and fragmentation under the channel widening plan. However, as it is used in the terrestrial HEP as a basis for determining mitigation needs for riparian forest, impacts would be fully mitigated. Temporary habitat fragmentation would be mitigated though riparian forest plantings (SCVWD, 1997)

Merlin *Falco columbarius*

This falcon winters in California and forages in grasslands, savannas, and wetlands. It is an uncommon migrant and winter visitor. There would be no impacts on this species.

Sharp-shinned hawk *Accipiter striatus*

The sharp-shinned hawk is an inhabitant of open woodlands and forests as well as edge habitat. It is a rare migrant and winter visitor in the study area. There would be no impacts on this species.

Cooper's hawk *Accipiter cooperii*

The Cooper's hawk generally prefers coniferous forests and woodlands, but can also nest in riparian forest and oak woodland. It has rarely been sighted in the study area, and there are no records of it nesting here. There would be no impacts on this species.

Osprey *Pandion haliatus*

This bird of prey has not been observed in the study area. It may occur as an aerial transient. There would be no impacts on this species.

Prairie falcon *Falco mexicanus*

The prairie falcon inhabits plains and prairies. Suitable habitat is not present in the study area. One falcon, possibly of this species, was sighted during field surveys; however, this species is at most an occasional transient in the study area. There would be no impacts on this species.

Black swift *Cyposeloides niger*

This species prefers mountainous and coastal areas. It may be an occasional aerial transient in the study area. There would be no impacts on this species.

Willow flycatcher *Empidonax traillii*

This taxon encompasses the little willow flycatcher, described above, which is the only form of this species to occur in or near the study area.

Yellow-breasted chat *Incteria virens*

This bird favors thickets, such as riparian thickets. Field surveys failed to find any individuals of this species, but it could be present on an occasional basis. Minor impacts could occur from project construction. These impacts would be mitigated through riparian forest plantings.

State fully protected species

Black-shouldered (white-tailed) kite *Elanus caeruleus*

This small hawk prefers coniferous forests and woodlands. While it has been sighted in the study area as an uncommon winter visitor, this area is outside of its breeding range. There would be no impacts on this species.

4.4 PLANTS

Federally listed as endangered

Santa Clara Valley dudleya *Dudleya setchellii,*

This succulent perennial occurs in valley grassland with a serpentinite substrate. Known populations nearby are located on the hills east of Canoas Creek and in the upper Canoas Creek watershed east of Highway 82. No suitable habitat occurs within the study area, so this species is not expected to occur here. There would be no impacts on this species.

Metcalf Canyon jewelflower *Streptanthus albidus ssp. albidus*

This annual occurs in valley and foothill grassland with a serpentinite substrate. No suitable habitat occurs in the study area, so this species is not expected to occur here. One old collection (1938) was from the vicinity of Canoas Creek north of what is now Capitol Expressway, and a nearby collection was made in 1994. There would be no impacts on this species.

Contra Costa goldfields *Lasthenia conjugens*

This annual occurs in mesic valley grassland and vernal pools in Napa and Solano counties. It is extirpated in Santa Clara County, and is not expected in the study area. There would be no impacts on this species.

Federal species of concern

Mt. Hamilton thistle *Cirsium fontinale var. campylon,*

This perennial occupies serpentinite seeps in chaparral, woodland, and valley grassland. Suitable habitat does not exist in the study area, so this species is not expected to occur here. The nearest known occurrences are in the Santa Teresa Hills, northwest of Calero Reservoir, and in the Silver Creek area east of Highway 101. There would be no impacts on this species.

South Bay clarkia *Clarkia concinna ssp. automixa*

This annual occurs in woodlands in Alameda and Santa Clara counties. The only known occurrence in the San Jose East 7.5' quadrangle is in the Alum Rock area of San Jose. Several other populations have been found in the upper watershed of the Guadalupe River. However, it has not been found in the study area, and is unlikely to occur there. There would be no impacts on this species.

Fragrant fritillary *Fritillaria liliacea*

This member of the lily family occurs in coastal prairie, coastal scrub, and valley grassland, often on serpentinite. Populations are known from the vicinity of Calero Reservoir and Almaden Quicksilver County Park south of the study area. The only occurrence known from the San Jose East 7.5' quadrangle is in the Evergreen area of southeast San Jose. It is not known from the study area and is unlikely to occur there. There would be no impacts on this species.

Pappose spikeweed *Hemizonia parryi ssp. congdonii*

This annual occurs in alkaline locations in valley grassland. No locations are known near the study area. Suitable habitat does not exist in the study area, so this species is not expected to occur here. There would be no impacts on this species.

5.0 RECREATIONAL TRAIL IMPACTS

This discussion is intended to supplement the discussion of endangered species impacts in the SCVWD's EIR/EIS for the bypass channel plan. Only the potential for additional incremental impacts associated with construction and operation of the planned recreation trail is covered.

Construction of this trail would not have any impacts on listed, proposed, or candidate species. The entire length of the trail would be located either on maintenance roads on project lands, or off-site on non-habitat lands. Three federal species of concern (the little willow flycatcher, the small-footed myotis bat, and the long-legged myotis bat) and one state species of concern (the yellow warbler) may be temporarily disturbed by project construction; the minimal additional construction work associated with trail installation could cause minor and temporary additional impacts to these species. No construction impacts are expected on aquatic resources given the mitigation measures (erosion control and control of potential contaminants during construction) specified above in the section on anadromous fish.

Operation of the trail (recreational use and maintenance) would not affect any listed, proposed, or candidate species. The yellow warbler is likely to experience some degree of disturbance from recreational use adjacent to portions of its habitat. Repeated human intrusion into forest habitat has been shown to have a negative impact on breeding songbirds (Riffell et al., 1996), but it is not known whether this species would be affected, especially considering that the local population is probably at least somewhat acclimated to human disturbance under current conditions. The little willow flycatcher does not breed in this area and would not experience impacts. There would be no operational impacts on anadromous fish.

6.0 CUMULATIVE IMPACTS

Fisheries

Other projects under construction or proposed for the Guadalupe River watershed would affect anadromous salmonids.

Fish passage improvements proposed by the SCVWD in the vicinity of the Blossom Hill drop structure and farther upstream would allow salmon and steelhead trout access farther up the Guadalupe River watershed, allowing access to additional spawning and rearing habitat.

The downtown Guadalupe River flood control project, now under construction, would have significant negative impacts on SRA cover and salmonids. Mitigation measures for these impacts are now being determined, and could include a number of possible measures to reduce and/or compensate for impacts. Any excess SRA mitigation within the boundaries of the upper Guadalupe River project area will be credited towards the downtown Guadalupe project. Given the recent listing of steelhead trout as endangered, anadromous fisheries impacts of the downtown project will need to be fully mitigated to ensure compliance with the Endangered Species Act.

Flood control measures proposed by the SCVWD for Reach A (between U.S.101 and I-880) would not affect the river's low-flow channel or SRA cover, and would not affect fisheries. The bypass channel exit and maintenance access ramp proposed by the SCVWD for Reach 6 (between I-280 and the Corps study area) would remove minimal quantities of SRA cover in this reach, and fisheries impacts would be insignificant.

Changes in maintenance activities under the channel widening plan would not have an appreciable impact on fisheries.

To summarize, the downtown Guadalupe River project and the upper Guadalupe River project will have significant negative short-term impacts on habitat conditions for Chinook salmon and steelhead trout. Planned mitigation measures are expected to fully mitigate these impacts over time. Implementation of mitigation measures should be completed as quickly as practicable to minimize the temporary negative impacts of these projects. Upon completion of all these projects and full implementation of their mitigation measures, habitat conditions for salmonids our expected to be better than at present.

Other Species

No cumulative impacts would occur on other listed, proposed, or candidate species. Impacts on several species of concern (little willow flycatcher, yellow warbler, yellow-breasted chat, long-eared myotis, long-legged myotis, and small-footed myotis would be insignificant after mitigation.

7.0 CONCLUSION

The channel widening alternative would have temporary negative impacts on Chinook salmon and steelhead trout. Loss of some SRA cover would result in decreased overwater shade, increased water temperatures, decreased aquatic cover and habitat complexity, and degradation of spawning and rearing habitats. Mitigation measures would compensate for these impacts over time, resulting eventually in improved habitat conditions. While spawning and rearing conditions within the study area would be temporarily degraded, improved access to upstream spawning and rearing habitat would provide immediate mitigation for these impacts.

No other listed, proposed, or candidate species would be affected by the channel widening alternative. Impacts to species of concern would be mitigated over time.

8.0 REFERENCES

Habitat Restoration Group (1995) *Salmonid Study of the Guadalupe River, Coyote Creek, and Selected Tributaries; 1994-95 Report of Fieldwork.* August 1995.

Leidy, R.A. (1984), Distribution and ecology of stream fishes in the San Francisco Bay drainage, *Hilgardia* 52 (8):1-175.

Nielson, Dr. Jennifer L. (1995). *Salmon from the Sacramento-San Joaquin Basin and Guadalupe River 1992-1994.*

Phillip Williams & Associates (1995) *Sediment Transport Modeling Study of the Upper Guadalupe River, Phase 2.*

Riffell, Samuel K., Kevin J. Gutwiller, and Stanley H. Anderson (1996). Does repeated human intrusion cause cumulative declines in avian richness and abundance? *Ecological Applications* 6(2):492-505.

Santa Clara Valley Water District (1997). *Draft Environmental Impact Report/Statement for the Upper Guadalupe River Flood Control Project.* Prepared by Parsons Engineering Science, Oakland, California.

Skinner, John E. (1962) *An Historical Review of the Fish and Wildlife Resources of the San Francisco Bay Area.* California State Department of Fish and Game, Water Projects Branch Report No.1.

U.S. Fish and Wildlife Service (1993). *Draft Coordination Act Report, Upper Guadalupe River Flood Control Project.* Ecological Services Sacramento Field Office, October 1993.

U.S. Fish and Wildlife Service (1997). *Revised Draft Fish and Wildlife Coordination Act Report for the Guadalupe River Flood Control Project, Upper Reaches.* Ecological Services Sacramento Field Office, April 1997.

U.S. Fish and Wildlife Service (1996). Final Rule for Listing, in *Federal Register*, page 25817, May 23.

APPENDIX A: U.S. FISH AND WILDLIFE SERVICE SPECIES LIST

United States Department of the Interior

FISH AND WILDLIFE SERVICE

IN REPLY REFER TO:

Ecological Services
Sacramento Field Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95821-6340

1-1-97-SP-962

March 25, 1997

Mr. Peter E. LaCivita
Chief, Environmental Planning Section
Department of the Army
San Francisco District, Corps of Engineers
ATTN: Bill DeJager
333 Market Street
San Francisco, California 94105-2197

Subject: Updated Species Lists for Upper Guadalupe River, Santa Clara County, CA

Dear Mr. LaCivita:

As requested by fax from your agency dated March 14, 1997, you will find enclosed lists of sensitive species that may be present in *or may be affected by* projects in the subject project area (see Enclosure A). These lists fulfill the requirement of the Fish and Wildlife Service (Service) to provide species lists pursuant to section 7(c) of the Endangered Species Act of 1973, as amended (Act).

The animal species listed in Enclosure A are those species we believe may occur within, *or be affected by projects within*, the USGS San Jose East and San Jose West Quads, where your project is planned.

The plants listed in Enclosure A are those *that have actually been observed* in the project quads. Plants on the enclosed county list may also occur in the quads where your project is planned.

Some of the species listed in Enclosure A may not be affected by the proposed action. A trained biologist or botanist, familiar with the habitat requirements of the listed species, should determine whether these species or habitats suitable for these species may be affected by the proposed action. For plant surveys, the Service recommends using the enclosed Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Species.

Some pertinent information concerning the distribution, life history, habitat requirements, and published references for the listed species is available upon request. This information may be helpful in preparing the biological assessment for this project, if one is required. Please see Enclosure B for a discussion of the responsibilities Federal agencies have under section 7(c) of the Act and the conditions under which a biological assessment must be prepared by the lead Federal agency or its designated non-Federal representative.

Formal consultation, pursuant to 50 CFR § 402.14, should be initiated if you determine that a listed species may be affected by the proposed project. If you determine that a proposed species may be adversely affected, you should consider requesting a conference with our office pursuant to 50 CFR § 402.10. Informal consultation may be utilized prior to a written request for formal consultation to exchange information and resolve conflicts with respect to a listed species. If a biological assessment is required, and it is not initiated within 90 days of your receipt of this letter, you should informally verify the accuracy of this list with our office.

Candidate species are currently being reviewed by the Service and are under consideration for possible listing as endangered or threatened. Candidate species have no protection under the Endangered Species Act, but are included for your consideration as it is possible that one or more of these candidates could be proposed and listed before the subject project is completed. Should the biological assessment reveal that candidate species may be adversely affected, you may wish to contact our office for technical assistance. One of the potential benefits from such technical assistance is that by exploring alternatives early in the planning process, it may be possible to avoid conflicts that could otherwise develop, should a candidate species become listed before the project is completed.

In the Federal Register of February 28, 1996, the Service changed its policy on candidate species. The term *candidate* now strictly refers to species for which the Service has on file enough information to propose listing as endangered or threatened. Former *category 2* candidate species - species for which listing is possibly appropriate but for which the Service lacks sufficient information to support a listing proposal - are now called *species of concern*. They are no longer monitored by the Service. However we have retained them on the enclosed list for general information. We encourage consideration of them in project planning, as they may become candidate species in the future.

Please contact Michael Thabault at (916) 979-2725 if you have any questions regarding the enclosed list or your responsibilities under the Endangered Species Act. For the fastest response to species list requests, address them to the attention of the section 7 office assistant at this address. If you have any questions about possible impacts to other fish and wildlife, please contact Mike Fris at (916) 979-2107.

Sincerely,

Cay C. Goude

for Wayne S. White
Field Supervisor

Enclosures

cc: Corps Branch, SFO, Sacramento, CA

ENCLOSURE A

Endangered and Threatened Species that May Occur in
or be Affected by Projects in the Following Selected Quads
March 24, 1997

QUAD : 427C SAN JOSE WEST

Listed Species

Birds

American peregrine falcon, *Falco peregrinus anatum* (E)

California clapper rail, *Rallus longirostris obsoletus* (E)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

delta smelt, *Hypomesus transpacificus* (T)

Invertebrates

bay checkerspot butterfly, *Euphydryas editha bayensis* (T)

Plants

robust spineflower, *Chorizanthe robusta* (E)

Proposed Species

Fish

Central California steelhead, *Oncorhynchus mykiss* (PE)

Sacramento splittail, *Pogonichthys macrolepidotus* (PT)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Species of Concern

Mammals

greater western mastiff-bat, *Eumops perotis californicus* (SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)

QUAD : 427C SAN JOSE WEST

Species of Concern

Mammals

Pacific western big-eared bat, *Plecotus townsendii townsendii* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)

Bell's sage sparrow, *Amphispiza belli belli* (SC)

western burrowing owl, *Athene cunicularia hypugea* (SC)

ferruginous hawk, *Buteo regalis* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (SC)

saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)

Reptiles

silvery legless lizard, *Anniella pulchra pulchra* (SC)

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

southwestern pond turtle, *Clemmys marmorata pallida* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)

western spadefoot toad, *Scaphiopus hammondii* (SC)

Invertebrates

Opler's longhorn moth, *Adela oplerella* (SC)

Ricksecker's water scavenger beetle, *Hydrochara rickseckeri* (SC)

unsilvered fritillary butterfly, *Speyeria adiaste adiaste* (SC)

QUAD : 427D SAN JOSE EAST

Listed Species

Mammals

San Joaquin kit fox, *Vulpes macrotis mutica* (E)

Birds

American peregrine falcon, *Falco peregrinus anatum* (E)

QUAD : 427D SAN JOSE EAST

Listed Species

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

delta smelt, *Hypomesus transpacificus* (T)

Invertebrates

bay checkerspot butterfly, *Euphydryas editha bayensis* (T)

Plants

Santa Clara Valley dudleya, *Dudleya setchellii* (E)

Metcalf Canyon jewelflower, *Streptanthus albidus ssp. albidus* (E)

Proposed Species

Fish

Central California steelhead, *Oncorhynchus mykiss* (PE)

Sacramento splittail, *Pogonichthys macrolepidotus* (PT)

Plants

Contra Costa goldfields, *Lasthenia conjugens* (PE)

Candidate Species

Mammals

riparian brush rabbit, *Sylvilagus bachmani riparius* (C)

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Species of Concern

Mammals

greater western mastiff-bat, *Eumops perotis californicus* (SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

QUAD : 427D SAN JOSE EAST

Species of Concern

Mammals

Yuma myotis bat, *Myotis yumanensis* (SC)

San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)

Pacific western big-eared bat, *Plecotus townsendii townsendii* (SC)

Birds

Bell's sage sparrow, *Amphispiza belli belli* (SC)

western burrowing owl, *Athene cunicularia hypugea* (SC)

ferruginous hawk, *Buteo regalis* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (SC)

Reptiles

silvery legless lizard, *Anniella pulchra pulchra* (SC)

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

southwestern pond turtle, *Clemmys marmorata pallida* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)

western spadefoot toad, *Scaphiopus hammondii* (SC)

Invertebrates

Opler's longhorn moth, *Adela oplerella* (SC)

Ricksecker's water scavenger beetle, *Hydrochara rickseckeri* (SC)

Plants

Mt. Hamilton thistle, *Cirsium fontinale var. campylon* (SC)

South Bay clarkia, *Clarkia concinna ssp. automixa* (SC)

fragrant fritillary, *Fritillaria liliacea* (SC)

pappose spikeweed, *Hemizonia parryi ssp. congdonii* (SC)

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
(*)		Possibly extinct.
	Critical Habitat	Area essential to the conservation of a species.

ENCLOSURE A

Endangered and Threatened Species that May Occur in or be Affected by
Projects in the Area of the Following California County or Counties

March 24, 1997

SANTA CLARA COUNTY

Listed Species

Mammals

salt marsh harvest mouse, *Reithrodontomys raviventris* (E)

San Joaquin kit fox, *Vulpes macrotis mutica* (E)

Birds

American peregrine falcon, *Falco peregrinus anatum* (E)

California brown pelican, *Pelecanus occidentalis californicus* (E)

California clapper rail, *Rallus longirostris obsoletus* (E)

California least tern, *Sterna antillarum (=albifrons) browni* (E)

marbled murrelet, *Brachyramphus marmoratus* (T)

western snowy plover, *Charadrius alexandrinus nivosus* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

blunt-nosed leopard lizard, *Gambelia (=Crotaphytus) silus* (E)

San Francisco garter snake, *Thamnophis sirtalis tetrataenia* (E)

giant garter snake, *Thamnophis gigas* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

tidewater goby, *Eucyclogobius newberryi* (E)

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

delta smelt, *Hypomesus transpacificus* (T)

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

bay checkerspot butterfly, *Euphydryas editha bayensis* (T)

Plants

Tiburon paintbrush, *Castilleja affinis ssp. neglecta* (E)

Coyote ceanothus, *Ceanothus ferrisae* (E)

SANTA CLARA COUNTY

Listed Species

Plants

Santa Clara Valley dudleya, *Dudleya setchellii* (E)

Metcalf Canyon jewelflower, *Streptanthus albidus ssp. albidus* (E)

robust spineflower, *Chorizanthe robusta* (E)

California sea blite, *Suaeda californica* (E)

Proposed Species

Fish

Central California steelhead, *Oncorhynchus mykiss* (PE)

South Central California steelhead, *Oncorhynchus mykiss* (PE)

Sacramento splittail, *Pogonichthys macrolepidotus* (PT)

Plants

Contra Costa goldfields, *Lasthenia conjugens* (PE)

showy Indian clover, *Trifolium amoenum* (PE)

Candidate Species

Mammals

riparian brush rabbit, *Sylvilagus bachmani riparius* (C)

Birds

mountain plover, *Charadrius montanus* (C)

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Species of Concern

Mammals

greater western mastiff-bat, *Eumops perotis californicus* (SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

SANTA CLARA COUNTY

Species of Concern

Mammals

San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)

Pacific western big-eared bat, *Plecotus townsendii townsendii* (SC)

salt marsh vagrant shrew, *Sorex vagrans halicoetes* (SC)

Sierra Nevada red fox, *Vulpes vulpes necator* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)

Bell's sage sparrow, *Amphispiza belli belli* (SC)

western burrowing owl, *Athene cunicularia hypugea* (SC)

ferruginous hawk, *Buteo regalis* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (SC)

saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)

black rail, *Laterallus jamaicensis* (SC)

Alameda (South Bay) song sparrow, *Melospiza melodia pusillula* (SC)

Reptiles

silvery legless lizard, *Anniella pulchra pulchra* (SC)

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

southwestern pond turtle, *Clemmys marmorata pallida* (SC)

San Joaquin whipsnake, *Masticophis flagellum ruddocki* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)

western spadefoot toad, *Scaphiopus hammondii* (SC)

Fish

green sturgeon, *Acipenser medirostris* (SC)

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Opler's longhorn moth, *Adela oplerella* (SC)

Ricksecker's water scavenger beetle, *Hydrochara rickseckeri* (SC)

unsilvered fritillary butterfly, *Speyeria adiaste adiaste* (SC)

SANTA CLARA COUNTY

Species of Concern

Plants

Mt. Hamilton harebell, *Campanula sharsmithiae* (SC)
Mt. Hamilton thistle, *Cirsium fontinale var. campylon* (SC)
South Bay clarkia, *Clarkia concinna ssp. automixa* (SC)
Mt. Hamilton coreopsis, *Coreopsis hamiltonii* (SC)
clustered lady's-slipper, *Cypripedium fasciculatum* (SC)
interior California larkspur, *Delphinium californicum ssp. interius* (SC)
Brandegee's wooly-star, *Eriastrum brandegeae* (SC)
Hoover's button-celery, *Eryngium aristulatum var. hooveri* (SC)
San Francisco wallflower, *Erysimum franciscanum* (SC)
talus fritillary, *Fritillaria falcata* (SC)
fragrant fritillary, *Fritillaria liliacea* (SC)
delta tule-pea, *Lathyrus jepsonii var. jepsonii* (SC)
smooth lessingia, *Lessingia micradenia var. glabrata* (SC)
Gairdner's yampah, *Perideridia gairdneri ssp. gairdneri* (SC)
Mt. Diablo phacelia, *Phacelia phacelioides* (SC)
Salinas Valley popcornflower, *Plagiobothrys uncinatus* (SC)
rock sanicle, *Sanicula saxatilis* (SC)
most beautiful (uncommon) jewelflower, *Streptanthus albidus ssp. peramoenus* (SC)
Mt. Hamilton jewelflower, *Streptanthus callistus* (SC)
alkali milk-vetch, *Astragalus tener var. tener* (SC)
valley spearscale, *Atriplex joaquiniana* (SC)
northcoast bird's-beak, *Cordylanthus maritimus ssp. palustris* (SC)
caper-fruited tropidocarpum, *Tropidocarpum capparideum* (SC)
pappose spikeweed, *Hemizonia parryi ssp. congdonii* (SC)
San Francisco Bay spineflower, *Chorizanthe cuspidata var. cuspidata* (SC)

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
(*)	Possibly extinct.	
	Critical Habitat	Area essential to the conservation of a species.

Enclosure B

FEDERAL AGENCIES' RESPONSIBILITIES UNDER
SECTIONS 7(a) and (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a) Consultation/Conference

Requires: (1) federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species; (2) Consultation with FWS when a federal action may affect a listed endangered or threatened species to insure that any action authorized, funded, or carried out by a federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The process is initiated by the federal agency after determining the action may affect a listed species; and (3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat.

SECTION 7(c) Biological Assessment-Major Construction Activity[1]

Requires federal agencies or their designees to prepare a Biological Assessment (BA) for major construction activities. The BA analyzes the effects of the action[2] on listed and proposed species. The process begins with a Federal agency requesting from FWS a list of proposed and listed threatened and endangered species. The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the list, the accuracy of the species list should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may proceed; however, no construction may begin.

We recommend the following for inclusion in the BA: an on-site inspection of the area affected by the proposal which may include a detailed survey of the area to determine if the species or suitable habitat is present; a review of literature and scientific data to determine species' distribution, habitat needs, and other biological requirement; interviews with experts, including those within FWS, State conservation departments, universities and others who may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of indirect effects of the proposal on the species and its habitat; an analysis of alternative actions considered. The BA should document the results, including a discussion of study methods used, and problems encountered, and other relevant information. The BA should conclude whether or not a listed or proposed species will be affected. Upon completion, the BA should be forwarded to our office.

---

[1]A construction project (or other undertaking having similar physical impacts) which is a major federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U.S.C. 4332(2)C).

[2]"Effects of the action" refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action.

Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants

(September 23, 1996)

These guidelines describe protocols for conducting botanical inventories for federally listed, proposed and candidate plants, and describe minimum standards for reporting results. The Service will use, in part, the information outlined below in determining whether the project under consideration may affect any listed, proposed. or candidate plants, and in determining the direct, indirect, and cumulative effects.

Field inventories should be conducted in a manner that will locate listed, proposed, or candidate species (target species) that may be present. The entire project area requires a botanical inventory, except developed agricultural lands. The field investigator(s) should:

1. Conduct inventories at the appropriate times of year when target species are present and identifiable. Inventories will include all potential habitats. Multiple site visits during a field season may be necessary to make observations during the appropriate phenological stage of all target species.

2. If available, use a regional or local reference population to obtain a visual image of the target species and associated habitat(s). If access to reference populations(s) is not available, investigators should study specimens from local herbaria.

3. List every species observed and compile a comprehensive list of vascular plants for the entire project site. Vascular plants need to be identified to a taxonomic level which allows rarity to be determined.

4. Report results of botanical field inventories that include:

   a. a description of the biological setting, including plant community, topography, soils, potential habitat of target species, and an evaluation of environmental conditions, such as timing or quantity of rainfall, which may influence the performance and expression of target species

   b. a map of project location showing scale, orientation, project boundaries, parcel size, and map quadrangle name

   c. survey dates and survey methodology(ies)

   d. if a reference population is available, provide a written narrative describing the target species reference population(s) used, and date(s) when observations were made

   e. a comprehensive list of all vascular plants occurring on the project site for each habitat type

   f. current and historic land uses of the habitat(s) and degree of site alteration

   g. presence of target species off-site on adjacent parcels, if known

   h. an assessment of the biological significance or ecological quality of the project site in a local and regional context

APPENDIX L

MITIGATION MONITORING AND REPORTING PLAN

Table L-1
Mitigation Monitoring and Reporting Plan for the Proposed Project
(page 1 of 9)

Note: This table addresses the significant or potentially significant impacts of the proposed Upper Guadalupe River flood control project. If no significant impact is expected for a given resource, that resource does not appear in the table.

Significant Impact	*Mitigation Measure*	*Monitoring Action*	*Responsible Party*	*Timing*
Air Quality				
Fugitive dust emissions due to ground disturbing and earthmoving activities.	The following measures should not conflict with the goals of the biological restoration program: (1) water all active construction areas at least twice daily, (2) cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard, (3) apply water three times daily on all unpaved access roads, parking areas, and staging areas at construction sites, (4) sweep daily (preferably with water sweepers) all paved access roads, parking areas, and staging areas at construction sites, (5) sweep streets daily (preferably with water sweepers) if visible soil material is carried onto adjacent public streets, (6) hydroseed or apply soil stabilizers (non-toxic) to inactive construction areas, (7) enclose, cover, water twice daily, or apply soil stabilizers (non-toxic) to exposed stockpiles, (8) limit traffic speeds on unpaved roads to 15 mph, and (9) replant vegetation in disturbed areas as quickly as possible.	Designate personnel to monitor fugitive dust control measures.	Corps	Daily during construction.

Table L-1
Mitigation Monitoring and Reporting Plan for the Proposed Project

Note: This table addresses the significant or potentially significant impacts of the proposed Upper Guadalupe River flood control project. If no significant impact is expected for a given resource, that resource does not appear in the table.

Significant Impact	*Mitigation Measure*	*Monitoring Action*	*Responsible Party*	*Timing*
Geologic Resources				
Increased erosion and excessive sedimentation of the Guadalupe River due to project construction activities.	Proper management of exposed or excavated soils including the following: • Immediate removal of excavated soils or use of silt fences where removal is infeasible. • Stabilization of exposed soils using standard erosion control techniques. • Limit major earthwork necessary to the non-rainy season (i.e., May - October).	Construction monitoring ensuring implementation of proper erosion control measures, where applicable.	Corps	Monitoring throughout construction.
Improper design or placement of shoring resulting in lateral movement and settlement of the adjacent ground surface.	Use standard engineering and construction techniques for installation of shoring.	Construction monitoring to assure adequate shoring techniques are employed.	Corps	Monitor throughout construction.
Slope failure due to unstable slopes and/or seismic activity.	Cut slopes shall be reinforced internally to provide stability. Gabions shall be used to protect against erosion at locations with high water flood velocities. Cribwall construction shall be used where cut slopes are nearly vertical.	Review and approve final project grading plans. Inspect construction to ensure consistency with approved final design.	Corps	Finalize plan prior to project permitting. Periodic inspection throughout construction.

Table L-1
Mitigation Monitoring and Reporting Plan for the Proposed Project

Note: This table addresses the significant or potentially significant impacts of the proposed Upper Guadalupe River flood control project. If no significant impact is expected for a given resource, that resource does not appear in the table.

Significant Impact	*Mitigation Measure*	*Monitoring Action*	*Responsible Party*	*Timing*
Water Resources				
Construction-related impacts on water quality in the River.	Project construction procedures shall conform wherever possible to EPA's Pollution Prevention/Environmental Impact Reduction Checklist for Flood Control Projects, and comply with Basin Plan standards to protect water quality. The Corps shall consult with the RWQCB to confirm acceptable use of herbicides for maintenance purposes. Other measures that further reduce potential impacts shall be implemented as required by the NPDES permit program.	Review and approve SWPPP. Inspect construction to ensure compliance with approved SWPPP.	SF-RWQCB and Corps	Prior to issuance of NPDES construction permit.

Table L-1
Mitigation Monitoring and Reporting Plan for the Proposed Project

Note: This table addresses the significant or potentially significant impacts of the proposed Upper Guadalupe River flood control project. If no significant impact is expected for a given resource, that resource does not appear in the table.

Significant Impact	*Mitigation Measure*	*Monitoring Action*	*Responsible Party*	*Timing*
		Biological Resources		
1: Removal of riparian forest. 2: Removal of trees protected by City Ordinance. 3: Disturbance of riparian forest adjacent to construction areas. 4: Excavation or filling of section 404 waters, including wetlands. 5: Impacts on wildlife (7 through 10) are also to be mitigated through vegetation measures	1: Prepare and implement an integrated vegetation mitigation plan. 2: Prepare and implement a public education program 3: Prepare and implement a riparian habitat protection plan.	Establish site-specific performance criteria consistent with those developed for the LPP.	Corps prepares and implements plan, SCVWD monitors and ensures vegetation establishment and maintenance	Finalize plans prior to construction; implement protective measures before and during construction; monitor for a minimum of 5 years to establish success.
6: Potential for reduced fish migration and spawning success.	6: Conserve, restore, and create additional undercut banks; improve conditions for fish passage.	Monitoring as proposed for the Bypass Channel Plan.	Corps prepares and implements plan, SCVWD monitors and ensures fish passage establishment and maintenance	Pre-construction and post-construction assessments, with CDFG and NMFS input; annual monitoring of fish habitat for minimum of 5 years to establish successful mitigation.

Table L-1
Mitigation Monitoring and Reporting Plan for the Proposed Project

Note: This table addresses the significant or potentially significant impacts of the proposed Upper Guadalupe River flood control project. If no significant impact is expected for a given resource, that resource does not appear in the table.

Significant Impact	*Mitigation Measure*	*Monitoring Action*	*Responsible Party*	*Timing*
		Aesthetics and Recreation		
Visually sensitive views of natural river habitat would be impacted during pipeline construction.	Move all equipment, materials, and transported soils from construction area in the event diversion pipeline construction is interrupted for periods of over 2 weeks. Replant native vegetation within significant public view corridors as soon as possible. Locate staging, heavy equipment storage, and construction material storage areas outside visually sensitive areas. Screen visually sensitive areas. Minimize graded areas and vegetation removal. Reestablish views of vegetation of high visual interest or aesthetic value. Screen visually incongruous elements in visually sensitive areas with vegetation. Include in revegetation plan planting pockets. Incorporate materials with earth tone colors (e.g., shades of brown, tan, and gray), with generally coarse and varied textures in flood control structures and ground stabilization, allowing for establishment of vegetation.	Approval of construction procedures.	Corps	Prior to project construction

Table L-1
Mitigation Monitoring and Reporting Plan for the Proposed Project

Note: This table addresses the significant or potentially significant impacts of the proposed Upper Guadalupe River flood control project. If no significant impact is expected for a given resource, that resource does not appear in the table.

Significant Impact	*Mitigation Measure*	*Monitoring Action*	*Responsible Party*	*Timing*
Aesthetics and Recreation				
Under the Bypass Channel Plan, at flows over 1,500 cubic feet per second (cfs), water would flow over the top of the proposed 190-foot long weir drop structure downstream of Willow Glen Way into the bypass channel in Reach 8, creating a waterfall.	Post public warnings to not use watercraft on the river during high flows.	Review and approve final design plans that include location of signs. Inspect construction to ensure consistency with approved final sign design and location.	Corps prepares and implements plan, SCVWD monitors and ensures presence of signs.	Finalize plans prior to construction. Monitor to ensure continued presence of signs during operations.
Recreational access to the river would be limited during construction.	Coordinate development of recreational opportunities with local interests during all phases of project development.	Plan approval	SCVWD, Corps, and City of San Jose	Prior to project construction
Noise				
Residents on streets within 1,000 feet of construction locations may be exposed to noise levels (L_{eq}) over 62 dBA during construction.	Implement Noise Mitigation Plan.	Plan approval	Corps	Prior to construction
Transportation				
Traffic flow on local roads, bridges, mass transit, and pedestrian ways would be adversely impacted by construction traffic and temporary road and bridge closures.	Implement Construction Traffic Management Plan.	Plan approval	Corps	Prior to construction

Table L-1
Mitigation Monitoring and Reporting Plan for the Proposed Project

Note: This table addresses the significant or potentially significant impacts of the proposed Upper Guadalupe River flood control project. If no significant impact is expected for a given resource, that resource does not appear in the table.

Significant Impact	*Mitigation Measure*	*Monitoring Action*	*Responsible Party*	*Timing*
		Land Use		
Fifty-four (54) homes along McLellan Avenue and 23 homes along Mackey Avenue would be removed under the Bypass Channel Plan; the loss of this many homes would cause a loss of community cohesion.	Neighbors of the project and the affected households shall be notified of the project by mail and by posted notice of the following: the project's importance, its exact location in their vicinity, the location where homes will be removed, detailed street maps showing changes in traffic flow, and the project's expected timetable. Such notification shall include a map of the affected area and shall occur at least 3 months, and preferably 6 months, before construction begins. Notification shall be coupled with community information meetings on the nature and expected results of the project.	SCVWD to monitor that adequate notification is provided to affected residents within the specified timeframe.	Corps	Prior to construction
Fifty-four (54) homes along McLellan Avenue and 23 homes along Mackey Avenue would be removed under the Bypass Channel Plan; the loss of this many homes would cause a loss of community cohesion.	Residents shall be fully compensated for all expenses associated with having to relocate.	Develop written agreement with affected property owners and tenants stating provisions for relocation.	Corps	Prior to construction
		Public Services & Utilities		
Construction traffic and temporary road and bridge closures would affect response times of police and fire protection services.	Provide 60-day advance notice to police and fire departments of all road closures and other planned traffic delays.	Written evidence that appropriate notice was delivered.	Corps	Throughout construction period
Water Company well(s) would be destroyed by construction.	Relocate well(s) prior to construction.	Approval of utility agreements and excavation permits.	Corps	Prior to construction

Table L-1
Mitigation Monitoring and Reporting Plan for the Proposed Project

Note: This table addresses the significant or potentially significant impacts of the proposed Upper Guadalupe River flood control project. If no significant impact is expected for a given resource, that resource does not appear in the table.

Significant Impact	*Mitigation Measure*	*Monitoring Action*	*Responsible Party*	*Timing*
Public Services & Utilities				
Various utility lines and other utility facilities would be destroyed by construction.	Relocate utility lines and other utility facilities prior to construction.	Approval of utility agreements and excavation permits.	Corps	Prior to construction
Cultural Resources				
Construction activity could encroach within boundaries of four prehistoric sites, some of which contain human remains.	Prepare Cultural Resources Treatment Plan providing treatment for each identified site including possible avoidance, significance assessment, mitigation, and evaluation and treatment of unexpected resource encountered during construction, and periodic monitoring in areas of greatest archaeological resource potential.	Approval of plan, implementation including periodic monitoring.	Corps	Prior to construction
Bypass Channel Plan would require demolition of residences not eligible for National Register of Historic Places, but with local historical merit.	Offer architectural elements and/or structures to San Jose Historical Museum, the Victorian Preservation Association, or other interested parties.	Evidence of contact with San Jose Historical Museum, the Victorian Preservation Association, or other interested parties.	Corps	Prior to construction
Hazardous Materials				
Contaminant migration from previously unknown hazardous waste sites within or adjacent to the project area.	Development of a Construction Contingency Plan addressing any contaminated soils encountered, protecting workers and the public from contamination exposure, and preventing contamination migration.	Approval of plan, periodic monitoring visits in field.	Corps	Plan review prior to construction, field check during construction

Table L-1
Mitigation Monitoring and Reporting Plan for the Proposed Project

Note: This table addresses the significant or potentially significant impacts of the proposed Upper Guadalupe River flood control project. If no significant impact is expected for a given resource, that resource does not appear in the table.

Significant Impact	*Mitigation Measure*	*Monitoring Action*	*Responsible Party*	*Timing*
Public Services & Utilities				
Various utility lines and other utility facilities would be destroyed by construction.	Relocate utility lines and other utility facilities prior to construction.	Approval of utility agreements and excavation permits.	Corps	Prior to construction
Cultural Resources				
Construction activity could encroach within boundaries of four prehistoric sites, some of which contain human remains.	Prepare Cultural Resources Treatment Plan providing treatment for each identified site including possible avoidance, significance assessment, mitigation, and evaluation and treatment of unexpected resource encountered during construction, and periodic monitoring in areas of greatest archaeological resource potential.	Approval of plan, implementation including periodic monitoring.	Corps	Prior to construction
Bypass Channel Plan would require demolition of residences not eligible for National Register of Historic Places, but with local historical merit.	Offer architectural elements and/or structures to San Jose Historical Museum, the Victorian Preservation Association, or other interested parties.	Evidence of contact with San Jose Historical Museum, the Victorian Preservation Association, or other interested parties.	Corps	Prior to construction
Hazardous Materials				
Contaminant migration from previously unknown hazardous waste sites within or adjacent to the project area.	Development of a Construction Contingency Plan addressing any contaminated soils encountered, protecting workers and the public from contamination exposure, and preventing contamination migration.	Approval of plan, periodic monitoring visits in field.	Corps	Plan review prior to construction, field check during construction

Table L-1
Mitigation Monitoring and Reporting Plan for the Proposed Project

Note: This table addresses the significant or potentially significant impacts of the proposed Upper Guadalupe River flood control project. If no significant impact is expected for a given resource, that resource does not appear in the table.

Significant Impact	*Mitigation Measure*	*Monitoring Action*	*Responsible Party*	*Timing*
Hazardous Materials				
Exposure of nearby residents or construction personnel resulting from unearthing contaminated soils or groundwater during construction.	Require part of construction specifications, procedures for the fueling and maintenance of construction vehicles to minimize the potential for accidental release of hazardous materials in sensitive areas.	Approval of construction specifications, periodic monitoring visits in field.	Corps	Specifications review prior to construction, field check during construction
Release of fuel or petroleum lubricants during construction from construction equipment fueling and maintenance operations.	Evaluation of known hazardous waste sites in the area and monitoring of shallow groundwater before, during, and after construction, where necessary.	Periodic monitoring visits in field.	Corps	During construction
Public Safety				
Construction areas, construction traffic, and the reconstructed flood control facility will create potential public safety hazards or attractive nuisances.	Prepare and implement Construction Public Safety Mitigation Plan for short-term impacts and Operational Public Safety Plan for long-term impacts.	Plan implementation.	Corps prepares and implements plans. SCVWD monitors and enforces operational plan.	Prior to construction
Socioeconomics				
Channel Widening Plan construction would result in the removal of four businesses and possible temporary dislocation of residents, Bypass Channel Plan would remove 63 single-family residences and 20 businesses.	Implement the Relocation Assistance and Last Resort Housing Plan	Plan implementation	Corps	Prior to construction

APPENDIX M

COMMENTS AND RESPONSES TO COMMENTS ON THE DRAFT EIR/S

APPENDIX M

COMMENTS AND RESPONSES TO COMMENTS

A. Gary Bentson, San Jose Water Company. October 2, 1997

B. Captain Lewis A. Lapine, U.S. Department of Commerce National Oceanic and Atmospheric Administration. October 6, 1997.

C. David Hembry, Los Gatos High School Science Club. October 13, 1997.

D. Robert and Harriet Jakovina. October 18, 1997.

E. Carolyn H. Flanagan, Hacienda Environmental Science Magnet. October 20, 1997.

F. Keith R. Anderson, Streams for Tomorrow. October 22, 1997.

G. Patricia Sanderson Port, U.S. Department of the Interior. October 23, 1997.

H. Julie Caporgno, City of San Jose. October 24, 1997.

I. Suzanne Lowd, Hacienda Environmental Science Magnet. October 24, 1997.

J. Lawrence M. Johmann, Western Waters Canoe Club. October 26, 1997.

K. Thomas Rountree, Santa Clara Valley Transportation Authority. October 27, 1997.

L. Libby Lucas. October 27, 1997.

M. Rick Bernardi, Lifeweb. October 27, 1997.

N. David Ferrel, U.S. Environmental Protection Agency. November 3, 1997.

O. Ashok Vyas, Roads and Airports Department, County of Santa Clara. November 13, 1997.

P. William T. Hogarth, National Marine Fisheries Service. November 17, 1997.

Q. Draft EIR/S Public Hearing Minutes, October 9, 1997.

San Jose
Water
Company

374 West Santa Clara St.
San Jose, CA 95196-0001

Engineering and Operations Department
1221 S. Bascom Ave., San Jose, CA 95128
Writer's Direct Dial: (408) 279-7850
Facsimile: (408) 292-5812

October 2, 1997

Mr. William DeJager
Army Corps of Engineers
Environmental Planning Section
333 Market St., Seventh Floor
San Francisco, CA 94105-2197

Subject: Comment on Draft EIR for the Upper Guadalupe River Feasibility Study

Dear Mr. DeJager:

The San Jose Water Company (SJWC) has reviewed the draft EIR. With the extent of this project, the SJWC will be required to relocate piping and well facilities at our existing stations. The amount of relocation will be determined by your scope of your flood control construction at each of our sites. The SJWC will design and construct these facilities. **A-1**

Please note in paragraph 4.9.2, that the SJWC operates the water system in the area of this study and not the City of San Jose. **A-2**

Sincerely

Gary Bentson

Gary Bentson, P.E.
Planning Supervisor

cc: Pardini
Mello

A. Gary Bentson, San Jose Water Company. October 2, 1997

A-1. Mitigation measure 3. in section 4.9.4, Public Services & Utilities, has been revised to indicate that the SJWC will design and construct the relocated piping and well facilities.

A-2. Section 4.9.2, Public Services & Utilities, has been revised to state that the SJWC operates the water system in the feasibility study area.

UNITED STATES DEPARTMENT OF COMMERCE
Office of the Under Secretary for
Oceans and Atmosphere
Washington, D.C. 20230

October 7, 1997

Mr. William DeJager
Army Corps of Engineers
Environmental Planning Section
333 Market Street, Seventh Floor
San Francisco, California 94105-2197

Dear Mr. DeJager:

Enclosed are comments on the Draft Environmental Impact Statement for Upper Gaudalupe River Flood Control Feasibility Study San Jose, California. We hope our comments will assist you. Thank you for giving us an opportunity to review this document.

Sincerely,

Susan B. Fruchter

Susan B. Fruchter
Acting NEPA Coordinator

Enclosure

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
National Geodetic Survey
Silver Spring, Maryland 20910-3282

OCT 6 1997

MEMORANDUM FOR: Susan B. Fruchter
Acting NEPA Coordinator

FROM: Captain Lewis A. Lapine, NOAA
Director, National Geodetic Survey

SUBJECT: DEIS-9709-04--Upper Guadalupe River Flood Control Feasibilty Study, San Jose, California

The subject statement has been reviewed within the areas of the National Geodetic Survey's (NGS) responsibility and expertise and in terms of the impact of the proposed actions on NGS activities and projects.

B-1 All available geodetic control information about horizontal and vertical geodetic control monuments in the subject area is contained on the NGS home page at the following Internet World Wide Web address: http://www.ngs.noaa.gov. After entering the NGS home page, please access the topic "Products and Services" and then access the menu item "Data Sheet." This menu item will allow you to directly access geodetic control monument information from the NGS data base for the subject area project. This information should be reviewed for identifying the location and designation of any geodetic control monuments that may be affected by the proposed project.

If there are any planned activities which will disturb or destroy these monuments, NGS requires not less than 90 days' notification in advance of such activities in order to plan for their relocation. NGS recommends that funding for this project includes the cost of any relocation(s) required.

For further information about these monuments, please contact John Spencer; SSMC3, NOAA, N/NGS; 1315 East West Highway; Silver Spring, Maryland 20910; telephone: 301-713-3169; fax: 301-713-4175.

B. Captain Lewis A. Lapine, U.S. Department of Commerce National Oceanic and Atmospheric Administration. October 6, 1997.

B-1. Section 4.9.2 and 4.9.3, Public Services & Utilities, has been revised to include potential impacts on NOAA geodetic control monuments and required consultation with the National Geodetic Survey (NGS). If any monuments would be disturbed or destroyed by project construction, the Corps shall notify the NGS no less than 90 days prior to this activity in order to plan for their relocation. The Corps will be responsible for the cost of any relocation(s) required.

October 13, 1997

David Hembry
President
Los Gatos High School Science Club
c/o Mrs. Vicki Wendell
Los Gatos High School
20 High School Court
Los Gatos, California 95032

Army Corps of Engineers
Environmental Planning Section
333 Market Street, Seventh Floor
San Francisco, California 94105-2197

Dear Army Corps of Engineers:

C-1 My name is David Hembry, and I am president of the Los Gatos High School Science Club for the 1997-1998 school year. As students and teachers, we in the Science Club are concerned about environmental impacts on the Guadalupe River watershed and request a copy of the Draft Feasability Report and EIR/EIS for review and discussion. We apologize for requesting a copy of the reports indicated at so late a time. Thank you for your cooperation.

Sincerely,

David Hembry

David Hembry
President
Los Gatos High School Science Club

C. David Hembry, Los Gatos High School Science Club. October 13, 1997.

C-1. A copy of the Draft Feasibility Report and EIR/S was sent to the Los Gatos High School Science Club, as requested. The club's interest in the project is appreciated.

October 18, 1997

William R. DeJager
U.S. Army Corps of engineers
333 Market St., 7th floor
San Francisco, CA 94105-2197

Dear Mr. DeJager and Corps,

We attended the meeting in San Jose regarding the Guadalupe River Flood Control Project on Oct. 9, 1997. We own three affected pieces of property; 1760, 1784 and 1874 Creek Drive. All will face the proposed flood control project in various manners. We have long been concerned about this project and our concerns remain the same.

D-1 First, the environmental concerns remain high.. Work on the river disrupts the salmon and other water animals. Many water birds and raptors feed in and along the Guadalupe. Silt and contamination during the life of the project must be considered. Old concrete and obstructions that prevent the salmon migration need to be removed and river returned to a more natural state. Why aren't we considering off stream storage as a solution to flood control?

D-2 Second, the disruption of trees cannot always be mitigated in the manner shown on paper alone. Cottonwoods for example spout from the old roots. They need to remain in the stream bed undisturbed. Re plantings of trees removed during the life of the project need to be done at the same locations, not in acre blocks in another Reach or area. If a tree goes out, a new tree must go in , and at the same place, please!

D-3 Last we have been concerned about the supervision of the work crews. Various schools, organizations and homeowners have developed or are working to develop plantings along the river. The" adopt a creek program" is in place (see Santa Clara Valley Water District) They (plantings, etc.) can easily be destroyed in a day by the work crew of the lowest bid; always the group picked by this city to do projects. We need to spend that extra penny and have a good job for all. Only if this project can be a real showplace, can we support it. Otherwise, we prefer NO PROJECT at all.

Respectfully submitted,

Robert and Harriet Jakovina
1760 Creek Dr.
San Jose, CA 95125
ph:408-265-4595 fax: 408-445-2188

cc Zoe Lofgren
cc Santa Clara Valley Water District

D. Robert and Harriet Jakovina. October 18, 1997.

D-1. The EIR/S describes fish and wildlife resources and addresses potential impacts on them in section 4.4. Impacts will be avoided or mitigated. Silt and contamination are addressed in sections 4.2.3, 4.3.3, and 4.11.3; impacts will be avoided. Obstacles to fish migration, such as the low-flow crossing in reach 11B, will be removed. Concrete rubble will be removed from some locations, and the practicality of removing concrete rubble from other areas will be investigated in the detailed design phase. Offstream storage was investigated and found to not be feasible due to the absence of suitable sites of sufficient size (see section 2.2).

D-2. Mitigation for riparian forest habitat losses is designed to provide replacement at feasible locations that can support riparian forest revegetation, given flood control design constraints. These constraints do not allow all mitigation plantings to be at the same location as the impact. In general, seedling-sized trees, including cottonwoods, would be planted. Cottonwoods can reproduce either by root sprouts or by seeds, depending on site conditions.

D-3. All activities, construction, and planting will have supervision and inspection.

HACIENDA ENVIRONMENTAL SCIENCE MAGNET

SAN JOSE UNIFIED
SCHOOL DISTRICT

Susan Olsen, Principal

All Students Can Learn.. All Students Can Succeed!

October 20, 1997

William R. Dejager
Environmental Planner, Planning Branch
US Army Corps of Engineers
333 Market Street, 7th floor
San Francisco, CA 94105-2197

Dear Mr. Dejager:

E-1 It has been brought to my attention by a San Jose resident who attended the October 9th Upper Guadalupe River Flood Control Project that this project may affect Hacienda Science Magnet School's"Adopt-A-Creek" site located on the Guadalupe River between Hillsdale Avenue and Wren Drive. This program is sponsored by the Santa Clara Valley Water District. In addition, Hacienda School is part of the River Alliance Consortium which includes a total of five schools, community resources, and businesses united under a Joint Venture grant. Each school has adopted part of the Guadalupe River and in conjunction with our curriculum, "Adopt a Watershed", we are to participate in riparian corridor rehabilitation.

We would like to know what the plans are for this section to the river and how our school could be part of the restoration.

E-2 I wish there had been more publicity for your meeting as our school community would have liked to attend. It puzzles me that the Santa Clara Valley Water District did not notify the groups that had adopted the sections of the river in the project area of this public hearing.

I am now hoping to be kept informed by you in the future of further meetings and plans.

Sincerely yours,

Carolyn H. Flanagan

Carolyn H. Flanagan
Science Resource Teacher

E. Carolyn H. Flanagan, Hacienda Environmental Science Magnet. October 20, 1997.

E-1. A letter has been sent to Ms. Flanagan detailing effects of the Channel-Widening and Bypass Channel plans between Hillsdale Avenue and Wren Drive. Proposed restoration subsequent to construction would result in eventually greater areas of forest and better habitat than at present. Construction is expected to last less than one year at any one location. After construction, the school would be able to resume its involvement in restoration.

Regarding the section of river that the Hacienda Environmental Science Magnet School is helping with, the following is proposed:

From Wren Drive upstream to the stream gauging station, the river would be rehabilitated to improve terrestrial and aquatic habitats. The channel would not need to be expanded as it is already nearly big enough; the only modification for flood control would be a low levee along a portion of the west bank. However, the bottom of the channel would be reconfigured to help create better habitat conditions, after which trees would be planted. From the stream gauging station upstream to Hillsdale Drive, the east bank would be widened to increase channel capacity. Trees on the upper portion of the east bank and on top of the bank would be removed. New tree plantings on the east bank would eventually create a denser forest than now exists in that area, but it would take time for the trees to grow. Both sections of river would ultimately have more forest and better habitat than it currently does. This site is for compensation for impacts in other portions of the river where not all impacts can be mitigated on-site.

It is expected that the Hacienda Environmental Science Magnet School could continue its program, except when this section of river is being reworked. The downstream portion of your river section would probably be done fairly early, while the upper portion would be done later; however, this determination will be made during the detailed design phase of the study.

E-2. The commentor's address is being forwarded to the Santa Clara Valley Water District and being added to the Corps mailing list to ensure future noticing of activities related to this project.

SANTA CLARA COUNTY
STREAMS FOR TOMORROW
Post Office Box 1409
San Martin, California 95046

October 22, 1997

Mr. William DeJager
Environmental Planning Section
U.S. Army Corps of Engineers
333 Market Street, 7th Floor
San Francisco, CA 94105

Dear Mr. DeJager:

Upper Gualalupe River Feasibility Study
Draft Environmental Impact Statement/Report
Santa Clara County

We submit the following comments and recommendations for your consideration on subject Draft EIS/EIR:

F-1 We support the decision to adopt an alternative that provides 100-year flood protection in this highly urbanized area. Providing this level of protection and concomitant economic benefits in the nation's eleventh largest city is in the national interest and warrants federal cost-share participation.

F-2 The Bypass Channel Plan, although improved over past designs, still fails to afford the maximum possible impact avoidance, riparian habitat preservation and on-site mitigation within the constraints of the basic design. The opportunities for additional impact avoidance, riparian preservation and on-site mitigation are identified and discussed - with specific recommendations for action - in the April 1997 "Revised Draft Fish and Wildlife Coordination Act Report for the Guadalupe River Flood Control Project, Upper Reaches." We advocate that the recommendations of this Draft Coordination Act Report, Recommendations Number 1 through 6, be adopted in their entirety as conditions of approval for the Draft EIS/EIR. Implementing these recommendations is essential for the full protection and mitigation of the River's valuable public trust fish and wildlife resources.

Thank you for the opportunity to provide comments on the Draft EIS/EIR. If you have questions, please phone me at (408)683-4330 (voice and fax.)

Sincerely,

Keith R. Anderson

Keith R. Anderson
Regulatory Issues

cc: SCCSFT Reading File

F. Keith R. Anderson, Streams for Tomorrow. October 22, 1997.

F-1. Comment noted. Your support for a 100-year level of flood protection is appreciated.

F-2. This comment is addressed in the Corp's response to the Revised Draft Coordination Act Report (Appendix D). The recommended concepts have been incorporated to the extent feasible. This includes updated information that will support the mitigation plan. The Corps will consider USFWS recommendations as well in developing a final design for the project. The Corps believes that the currently planned mitigation adequately compensates for impacts.

KST
Plan Foundation

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
600 Harrison Street, Suite 515
San Francisco, California 94107-1376

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▶ 17

To COL. RICHARD THOMPSON	From PATRICIA PORT (DOI)
Dept./Agency CORPS OF ENGINEERS	Phone # (415) 427-1477
Fax # (415) 977-8524	Fax # (415) 744-4421

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

October 23, 1997

ER 97/0511

Colonel Richard Thompson, District Engineer
U.S. Army Corps of Engineers
San Francisco District (DESPM-DE)
333 Market Street, Suite 801
San Francisco, California 94105-2197

Dear Colonel Thompson:

The Department of the Interior (Department) has reviewed the Draft Feasibility Report (Draft Report) and Environmental Impact Statement (DEIS) for the Upper Guadalupe River Flood Control Project (Project), Santa Clara County, California. The following comments are provided for your information and use when preparing the Final Feasibility Report (Final Report) and the Final Environmental Impact Statement (FEIS).

GENERAL COMMENTS

The project includes channel modifications which increase floodway capacity to the 100 year level of protection. The modifications would permit limited potential for near-stream vegetation with higher bench cuts through the use of partial bypass and cribwall features in some areas. Nevertheless, the project proponent's desire to maintain certain project reaches within existing flood easements may result in significant thinning of the riparian corridor, permanent hardscaping, and/or revegetation off-site or away from the stream edge. To avoid these impacts while maximizing corridor quality, the Department recommends the modifications described in specific comments below be considered. The FEIS or attendant engineering report should quantitatively evaluate the susceptibility of the mitigation areas to erosion under design conditions. G-1

The DEIS does not sufficiently document distributional changes in important vegetative features which would occur with the project, specifically, the type of vegetation allowed, corridor width, elevation above the invert, distance from the stream edge, and local soil and groundwater availability. In addition, the proposed designation of top-of-bench plantings as "riparian" and the prospective success on such terraces is uncertain. Over the long term, mitigation plantings will be subject to natural variation in groundwater levels that may recede G-2

G-2 below the roots of shrubs and some trees, causing death or inhibited growth. Such areas between floodways and the stream will also lack significant surface runoff influence. These higher plantings are intended to be composed of more xeric species like oak and sycamore that are resistant to drought. This portion of the mitigation (30 percent of the total), while expected to provide sufficient habitat value, is different from the lost vegetation near the channel invert and slopes. Second, the willow riparian plantings on low benches (15 percent of the total) maximize floodway capacity but would affect habitat components associated with large trees: perches, input of large woody debris, undercuts, snag formation, and arboreal habitat volume. Differences between the impact and mitigation vegetation distribution and quality should be fully discussed in the FEIS. Scrub-shrub, albeit lower value, is partially riparian in the impact area, and should be included in the habitat loss and mitigation analyses. The FEIS should account for riparian scrub-shrub losses and prescribe appropriate mitigation actions.

G-3 The monitoring plan (Plan) for long-term mitigation success beyond the minimum five years suggested in the DEIS should be revised to ensure that habitat mitigation goals are met. The Plan should include: (1) key characteristics of the riparian and stream cover, soil moisture, streamflow, and water temperature; and (2) an agreement with the Fish and Wildlife Service (FWS) on monitoring parameters and protocols.

G-4 Performance criteria for Shaded Riverine Aquatic (SRA) cover should also be incorporated into the Plan. Essential criteria should include: (a) persistence of surface water in the mitigation sites equivalent to the impact sites, (b) shade cover by vegetation and undercut banks compared to target levels, and (c) mitigation of instream temperature impacts to pre-project levels. The FEIS should state hydrologic criteria such as soil moisture and depth of the groundwater table which will be maintained in perpetuity in all mitigation areas through naturally-occurring flows or, if necessary, upstream releases past stream gage 23b. The biological basis for such criteria should be stated and be consistent with the needs for riparian growth as specified in the mitigation plan. The Plan should include specific remedial actions and timetables in the event of mitigation failures; such actions should be a legally binding responsibility of the local sponsor.

G-5 The assessment of cumulative impacts section does not provide sufficient information on bank hardening, small projects, and changes in distribution and quality of riparian habitat. We believe one of the most significant impacts of bank protection is the conversion of natural bank, which has high aquatic and terrestrial habitat values, to hardened bank, which cannot support vegetation or other habitat features. This conversion needs to be fully addressed in the FEIS. In addition, the DEIS considers only major projects, and neglects to address smaller projects which have undoubtedly contributed to the overall loss of stream edge habitat. The cumulative impacts section of the FEIS should provide an accurate accounting of the existing lengths of natural and hardened bank in the project area due to all activities (major projects and minor activities) and the additional bank hardening due to the subject project. Also, the FEIS should provide a similar cumulative impacts analysis on changes in distribution and quality of riparian habitat.

The following additional information should be provided in the FEIS:

A reach-specific summary of anticipated mitigation conditions classified by plant composition (pallette distribution), elevation above the channel invert, distance from the channel edge, and relevant corridor parameters. The corridor parameters should include: (a) contact length with riparian forest cover and (b) basal area of large trees (e.g., fitting criteria such as at least 30 feet tall and diameter of at least 15 cm) at the water edge and within 40 feet of the low-flow channel edge; G-6

An updated reach-specific baseline survey of terrestrial cover-types in the impact areas with slope-corrected areas for comparing the condition of the impact areas with the proposed mitigation types. Comparative criteria should include: plant composition, elevation above the channel invert, distance from the channel edge (assuming a stream edge at the one-third bankful stage), and appropriate corridor parameters (see below); G-7

The corrections made to the SRA and riparian areas due to the differences in water levels between those assumed for the 1984 terrestrial cover-typing (completed by a consultant, Habitat Restoration Group) and those from the 1993 SRA survey conducted by the FWS; G-8

An evaluation of soil types, groundwater depths and groundwater responses in different water-year types, and soil types in proposed mitigation sites, especially regarding Reach 10b. Such studies are needed to evaluate the probable long-term (not to exceed five years) success of vegetation on these sites when irrigated; and G-9

An evaluation of impacts on riparian areas and associated stream temperatures of the proposed project in combination with impacts of the Lower (downtown) Guadalupe Flood Control Project. The FEIS should clearly distinguish the mitigation areas of the upper and lower project. G-10

SPECIFIC COMMENTS

Draft Feasibility Report

Page 81. Recreational Impacts Not Discussed The document refers to a comprehensive recreation network *in and around* the study area (italics added). The impacts of such recreation within specified habitat areas should be discussed in the Final Report. G-11

Draft Environmental Impact Statement

Pages 4.4-3 and 4.4-23 The importance of riparian scrub habitat is understated in the cover-type definitions on these pages and elsewhere in the DEIS, and riparian scrub impacts have not been quantified. Riparian scrub habitats are, in many cases, soft-bank areas that are transitional to riparian tree cover as, indeed, many of their species are the same. Since the DEIS reports only the forest values (pages 4.4-47 and 4.4-52), the FEIS should expand the G-12

G-13 discussion on impacts and mitigation. Mitigation should be planned for impacts to this cover-type and discussed in the FEIS.

G-14 Page 4.4-7. Chinook Salmon The upper lethal limit of 77 degrees F is ambiguous. Salmon can only tolerate this exposure briefly, and thermal tolerance is not indicative of where this species is found. The FEIS should clarify the thermal tolerance of salmon.

G-15 Pages 4.4-7, Last Paragraph (Genetic Analysis) and Continuing on Page 4.4-8 The purpose of the brief discussion of straying and genetic affinity should be clarified. These data have not been reviewed, and the degree of straying has not been a factor in the determination of impacts and mitigation.

G-16 Page 4.4-9. Suitability of Reach 10b Mitigation If, as stated, the stream is dry 50 percent of the time in this reach, mitigation measures should be taken to ensure that the flow and wetted portion of this area is not different from that of the impact areas downstream. The FEIS should provide mitigation measures to address this issue.

G-17 Page 4.4-19. Special-Status Animals (Inadequacy of Red-legged Frog Surveys) The DEIS infers since frogs are not downtown, they probably aren't in the adjoining 6 miles of stream. However, the frogs do exist in upper portions of this watershed, and they may occasionally be distributed in the lower reaches. The statement that existing populations are "many" miles from the study area should be replaced with the number of miles in the FEIS.

G-18 Pages 4.4-23, 4.4-31, and 4.4-34 (Inconsistency of Riparian Impact Areas with FWS Evaluation) Throughout the document, the acreage values derived for riparian impact are lower than those determined by the FWS. For example, the Corps of Engineers (Corps) states 6.5 acres of riparian forest are impacted. However, the FWS' evaluation of the same plans and cover-type maps shows that 7.96 acres of riparian forest and 5.54 acres of riparian scrub-shrub would be impacted [refer to page 13 of 1993 Fish and Wildlife Coordination Act Report (FWCA Report) in Appendix D of the DEIS]. For the Bypass alternative, the DEIS indicates nine acres of riparian forest would be impacted, but the FWS' FWCA Report states that 11.3 acres of riparian forest and six acres of riparian scrub shrub would be impacted. The Mitigation Plan (Appendix L) without reference reports only seven acres. The FEIS should resolve these inconsistencies prior to the issuance of an FEIS.

G-19 Page 4.4-24. Fisheries Impacts (Assumption that Barriers Limit Salmonid Use) The assumption that fish would benefit by barrier removal is only partially true. Most salmon spawn in the downtown and "airport" reaches, below the Guadalupe's confluence with Los Gatos Creek, probably because the river is larger and flows more consistent there. Fish would benefit to the extent that they attempt to move upstream. The FEIS should make the appropriate corrections.

G-20 Page 4.4-25 (Beneficial Impacts Not Result of Project) Although habitat potential is improved by barrier removal, no requisite relationship exists between the flood control project features and these barriers. The FEIS should state they could be removed without the flood control project.

Page 4.4-27. Potential Impacts on Fish Migration and Spawning Due to Channel Construction (Construction Window) The mid-April construction start and the 64 degree F temperature criteria do not provide sufficient protection. For consistency with the FWS' comments on the permit application (PN 17776S) for the previous DEIS which was submitted by the local sponsor, the FEIS should state that project construction should commence not before May first, based on 7 days of sampling and a 68 degree F criterion. G-21

Page 4.4-43. Removal and Fragmentation of riparian Wildlife Habitat (Disputed HEP Results, Rationale for HEP) This section states the SCVWD "did not participate in the HEP process." While the FWS feels this new HEP better characterizes the habitat values to be affected, the SCVWD "disagrees." In fact, the SCVWD participated as a member of the HEP team, was fully informed of the rationale for the HEP and model assumptions prior to sampling, attended meetings with the FWS on preliminary results, and was given opportunities to comment on the HEP and the revised FWCA Report. As of the date of these comments, the FWS has not received any official response or comments from the SCVWD to indicate any disagreement with the HEP process. Moreover, the DEIS incorrectly asserts that the HEP was necessary only because background data could not be located. As the FWS states in the FWCA Report, the HEP was necessary because nearly nine years had elapsed since previous measurements were taken and the data taken previously were not obtained from impact areas and were not obtained by appropriate methods. These apparent misunderstandings should be corrected in the FEIS. G-22

Pages 4.4-46 and 47 Riparian Forest and Page 4.4-52. Riparian Forest (Improper Use of Equal Compensation) We object to 1) using equal compensation for this project and 2) the inference that this method of compensation was determined by the HEP. The FWS provided results for both in-kind and equal compensation but recommended the more conservative in-kind approach for several reasons. Several of the models used generated excess habitat value by virtue of an inherent reliance on shrub layer values that are maximized early in the project life. Others, such as the woodpecker model, require more mature forest characteristics (i.e., snag production) to show value. Application of equal compensation trades off the easily obtained, seral stage values of riparian forest for the values obtained by more valuable older stages. The need for in-kind compensation is particularly important for a project with an assumed life of 100 years (although this extended life does reduce the overall mitigation ratio). As a result of applying equal compensation, the calculated acreage needs are so low (12.27 acres for the channel alternative, 14.58 for the bypass alternative) that they do not even replace the total riparian acreage (forest and scrub-shrub) impacted by the project (13.5 acres for the channel alternative, 17.3 acres for the bypass alternative). G-23

As we have indicated in the FWCA Report, the in-kind compensation method produces (for the bypass alternative) a reasonable 1.4 to 1.5:1 mitigation ratio when all riparian habitats (forest and scrub-shrub) are considered. We believe in-kind compensation, where the area is chosen, is clearly justified and would at least compensate all species. The Corps needs to reconsider its use of equal compensation in its planning for this project, and should correct the inference that this method of compensation was determined by the HEP in the FEIS. G-24
Page 4.4-49. Fisheries 4. (Hardscaping Impacts Neglected) The statement that SRA cover attributes, including undercuts, would return over a period of 30 years is assumed in the

G-24 Habitat Evaluation Procedures (HEP) for only those portions that are not hardbanked. Areas with a hardened toe would obviously not form undercut banks, and the HEP discounts the instream cover correction factor accordingly. This assumption should be clarified in the FEIS.

G-25 Page 4.4-52. Shaded Riverine Aquatic Habitat (SRA) (Inconsistency in SRA Losses and Mitigation Adequacy) The 4,958 feet of replacement vegetative cover is slightly greater than the 4,775 feet calculated by the FWS for overstream length (Table 3 of the FWCA Report, p. 15 of DEIS Appendix D), and somewhat less than the 5,930 feet of riparian forest contact length with stream edge lost (Table 4 of the FWCA Report, p. 16 of the DEIS Appendix D). Determination of the SRA replanting on exact lengths of stream edge losses would not likely result in adequate mitigation because 1) not all such plantings form overstream cover and 2) some loss is due to incomplete success and gaps which form naturally during higher river flows. A contributing factor towards the existing condition (i.e., about 80 percent of contact of riparian vegetation with the stream edge actually extends over the water) may also be maintenance practices.

G-26 Overstream vegetative shade varies from year-to-year, and has been increasing since time of the last maintenance and time of the last major flood event. Both events can reduce the extent of such vegetation. Moreover, vegetation close to the bank (especially within 5 feet) has high potential to provide overstream shade even if it does not do so currently. However, it does provide side shade. By limiting evaluation of impacts and mitigation to overhead shade only, losses of potential for shade and side shade may not be mitigated. Similarly, it should not be assumed that bank edge mitigation would provide overstream shade on a 100 percent basis.

G-27 To assess the need for bank edge vegetation, the FWS evaluated two additional parameters: (1) actual intersection with the stream bank and intersection with a line parallel to the stream bank, five feet away, and (2) contact length with riparian forest cover. For the bypass alternative, FWS determined the ratio of intersection with stream edge to the five foot offset line was about 0.81. Thus, we believe the 1:1 mitigation for 1,000 feet of loss of overstream shade would require planting at least 1,190 feet, all within the five feet of the stream edge. The contact length with riparian (independent of width or pallette type) is predicted, based on the original vegetation survey by the local sponsor, to increase by about 4,000 feet with the project, with most of the losses occurring in Reaches 9 and 11b-c, and the gains occurring in Reaches 10b-c and 11a. This calculated improvement in SRA is inconsistent with the suggestion in the DEIS that only 1:1 replacement of lost overstream cover with plantings is necessary. The FEIS should clarify the adequacy of the 1:1 ratio.

G-28 Page 4.4-54. Riparian Forest Fragmentation (Gap Analysis, Corridor Degradation) The use of mean gap length (presumably on one side of the bank), without regard for stand width, distance from edge of bank, species composition, opposite bank vegetation, or vegetation height, and with exclusion of scrub-shrub, gives the false impression that certain reaches, such as Reach 9 and 10a, are not adversely impacted. The continuous vegetation on both sides would be replaced by narrow bands of vegetation and some willows would have lower maximum height and trunk diameter than those present. The resulting effect would be a degradation of the corridor which is not revealed by the presence/absence of woody vegetation. Also, we believe Reaches 10b and 10c should not be combined for this analysis because they have completely different existing and future project conditions. The evaluation of corridor impacts should be expanded in the FEIS. G-28

Appendix D. Pages 22 to 24. The FWCA Report identifies six modifications to the locally preferred bypass/widening alternative for conservation purposes. These specific modifications, numbered from 1 through 6 should be addressed in the FEIS G-29

Thank you for the opportunity to comment on this document.

Sincerely,

Patricia S Port

Patricia Sanderson Port
Regional Environmental Officer

cc:
Director, OEPC, w/original incoming
Regional Director, FWS, Portland

G. Patricia Sanderson Port, U.S. Department of the Interior. October 23, 1997.

G-1 Responses to the Department's specific comments are provided below.

Maintenance of the integrity of the preserved creek banks and new construction features is a project element. Detailed planning for mitigation to address any site-specific erosion problems will occur during final design.

G-2. The Final EIR/S clarifies the extent of impacts on riparian forest sub-communities with respect to elevation above the river channel. For example, most of the vegetation to be removed under the Bypass Channel Plan would be on the middle-to-upper portions of the banks; lower bank riparian trees (adjacent to the channel) would be left mostly intact. Riparian forest mitigation plantings would occur in a variety of settings. Plantings on top of the existing bank (15-20 feet above the channel invert) will be composed of species that are adapted to this topographic position, such as oaks and sycamores. Large individuals of these species are now present at the top of the bank in various locations, indicating that they can survive once they become established. Mitigation for the habitat value of riparian scrub-shrub is included in proposed riparian forest plantings.

G-3. The Final EIR/S recommends a phased reduction in monitoring, subject to the attainment of acceptable performance objectives, beginning at 5 years following construction. Monitoring and corrective actions would occur as necessary beyond this time to meet mitigation requirements. The Corps will consider USFWS recommendations on long-term monitoring.

G-4. SRA cover performance criteria would be identified during final design, with due consideration given to USFWS recommendations. The SCVWD has analyzed soil and groundwater conditions and concluded that the success of mitigation for vegetation and SRA cover does not depend on additional releases.

G-5. The cumulative impact analysis is focused on present and reasonably foreseeable projects affecting the feasibility study area in concert with the proposed action. The project will provide equivalent habitat for areas converted to hardbank protection. The proposed action's contribution to cumulative bank hardening and associated impacts are discussed under cumulative impacts (section 6.0) in the Final EIR/S.

G-6. Existing baseline information, including the Final EIR/S appendices and other referenced documents, adequately describe the extent and significance of the impacts and do not need to be updated for the Final EIR/S. Final mitigation plans, prepared as part of the final design, would address the need for specific habitat replacement criteria in mitigation areas. Regarding the use of slope-corrected acreages as recommended by USFWS and already included in the CAR, the Corps accepts their use in that context in association with the HEP analysis. We do not agree with the necessity of revising the EIR/S to incorporate slope-corrected acreages. See additional comments on the CAR in Appendix D.

G-7. See response to comment G-6.

G-8. Although the terrestrial habitat maps are based on the 1984 analysis, the EIR/S relies upon the 1993 evaluation of SRA cover. In each case, data were not unduly influenced by recent drought or flooding. Therefore, we do not expect that updating the terrestrial habitat maps would significantly affect the results.

G-9. Some additional information is contained in the SCVWD EIR/S (Parsons Engineering Science 1997), and that document has been cross-referenced for the benefit of the reader. Additional detail would be developed as part of the final design mitigation plans.

G-10. Additional studies of thermal effects are being conducted by the SCVWD's consultant. Mitigation areas for the upper project are clearly identified in the EIR/S. Mitigation areas for the downtown project are identified to the extent that they are known and of particular relevance to this project.

G-11. Project-related impacts within the feasibility study area are described in the EIR/S. Most of the "comprehensive recreation network" mentioned would be outside of the study area. Proposed recreation features within the study area would be limited to a through trail and minor associated facilities (picnic tables, restrooms, etc.). The recreation trail extends downstream of the feasibility study area in Reach 6. Impacts in this reach, for example, are outside the scope of the project proposed by the Corps.

G-12. As discussed in the Final EIR/S section 4.4.3, the Corps does not consider losses of non-wetland riparian (ruderal) scrub vegetation along the river banks to be significant under NEPA, or to require mitigation under the Clean Water Act. The Corps' mitigation plan, however, does provide mitigation for overall habitat impacts.

G-13. See response to comment G-12.

G-14. The subject discussion of Chinook salmon in section 4.4.2 has been modified to add that Chinook salmon can only briefly tolerate exposures to 77 degrees. Elsewhere throughout this section, it is already made clear that salmonids prefer, and exhibit higher survival and growth at, temperatures that are substantially lower than their thermal tolerances.

G-15. An introductory rationale for the discussion of genetic affinity under chinook salmon in section 4.4.2 has been added.

G-16. See response to comment G-4. The practicality of providing supplemental flows via use of reclaimed water is being investigated by the City of San Jose. The SCVWD has concluded that augmenting flows will not be necessary for vegetation and SRA cover mitigation in Reach 10B. The cessation of surface flows during summer months is not unusual in a central California riparian system. Once established, through supplemental irrigation if necessary, it is expected that riparian forest vegetation will be able to tap into shallow subsurface flows to survive through normal summer drought conditions. Also refer to the Mitigation and Monitoring Plan, Appendix L.

G-17. The known occurrence of red-legged frogs in the watershed has been clarified in section 4.4.2 under Rare, Threatened, and Endangered Species. Red-legged frog surveys were conducted according to the USFWS protocol; no individuals of this species were found within the study area.

G-18. The discrepancies result largely from USFWS's use of slope-corrected acreages. See the Corps' comments on the USFWS Revised Draft CAR, Appendix D. Revision of the document based on USFWS' slope-corrected acreages is not necessary. The cited figure in Appendix L was for the Channel Widening Plan and should have read 6.5 acres for consistency, as pointed out by USFWS. Appendix L has been revised to refer to the impact generically.

G-19. The Final EIR/S (section 4.4.3) has been clarified as suggested. Local habitat conditions would improve for both species, whereas access to upstream spawning areas would probably be improved mainly for steelhead.

G-20. The larger barriers are acting as grade-control structures which are important for stabilizing the river in some areas. They cannot be removed independently of the project without further study and analysis, and possible remedial designs for fish passage.

G-21. The recommendation is under consideration by the Corps and local sponsor for construction activities within the river.

G-22. The discussion referenced in section 4.4.3 under Bypass Channel Plan, Construction Impacts--Wildlife has been clarified. The SCVWD has recently provided a comment letter explaining their disagreements with the HEP process.

The statement that the new HEP was needed due to the age of the old HEP is not correct. In 1996, the USFWS had agreed that modifying the old HEP was acceptable, and had agreed to a scope of work providing for this modification. When background documentation for the previous HEP could not be located, the USFWS suggested doing a new HEP. As a result, a revised scope of work, a new schedule for this work, and additional funds were required for the coordination process under the Fish and Wildlife Coordination Act.

G-23. See the Corps' comments on the USFWS CAR in Appendix D. The Corps has reservations about the assumptions and conclusions of the HEP, and in particular with the downy woodpecker model, which may not appropriately reflect the increase in habitat values that would occur through time in the mitigation areas. In this regard, one of the paradoxical features of the downy woodpecker model is that mitigation habitat values peak at moderate vegetation ages and then decline as mitigation plantings mature. The SCVWD does not agree with the HEP methodology by which the Bypass Channel Plan was evaluated. SCVWD comments have been provided under separate cover to the Corps, for discussion with USFWS.

G-24. The document does not state that USFWS endorses equal compensation as mitigation for this project. The Corps has reviewed the HEP conclusions regarding in-kind compensation and believes that they do not accurately reflect the improved habitat values that would occur over time due to mitigation. This problem is due almost entirely to the downy woodpecker model. The downy woodpecker model penalizes mature riparian forest for being too dense, thereby inappropriately increasing the compensation ratio. This model does not reflect the habitat preferences of most species that prefer mature riparian forest.

See the Corps' comments on the USFWS Revised Draft CAR (Appendix D) for additional discussion. The discussion of SRA cover reestablishment has been corrected as suggested by the USFWS.

G-25. The figure of 4,958 linear feet of overhead cover is equal to the total calculated in the local sponsor's EIR/S minus Reach 6, which is not part of the Corps' project (Parsons Engineering Science 1997 [Table 4.14-5]). We have no explanation as to why the DEIR/S impact calculation is larger than that of USFWS, but are willing to accept the larger figure, unless it is inaccurate, as a basis for mitigation. This may result in mitigation slightly in excess of requirements. Because of the irregular shape of the overhead canopy, it is inevitable that the forest contact edge calculated by USFWS is larger than the simple linear distance. Mitigation plantings would have a similarly irregular forest contact edge and thus adequately compensate. The fact that where overhead cover exists, it typically shades about 80% of the streambank length, has been taken into account in developing mitigation plans for the project.

G-26. The 1993 measurements of overhead cover, upon which the EIR/S relies, provide a reasonably good basis for impact assessment and mitigation planning, since at the time of measurement, riparian vegetation had recovered from previous drought and had not been recently removed by severe flooding. Side shade would be provided by mitigation plantings. As noted in the previous response, 100% bank coverage is not assumed.

G-27. The EIR/S uses the HEP, which integrates several variables, as the basis for mitigation. The EIR/S clarifies the need to take into account the gaps in overstream cover that are likely to exist in plantings. Riparian forest mitigation plantings may result in excess mitigation for overhead shade losses. The EIR/S states the minimum requirement for successful mitigation, which will be followed.

G-28. The comment overstates the impact on reaches 9 and 10A. Construction impacts generally affect only one side of the corridor through these reaches, leaving the forest intact on the opposite bank. There are also significant mitigation plantings in these reaches that would lessen forest fragmentation through time. We do not agree with the implication that there is an additional adverse impact that has not been accounted for and adequately discussed, or that a detailed discussion of differences between reaches 10B and 10C is needed in support of the conclusion that these reaches, and others, would experience a net reduction in forest fragmentation.

G-29. Refer to the Corps comments on these recommendations in Appendix D.

CITY OF SAN JOSÉ, CALIFORNIA

DEPARTMENT OF PLANNING, BUILDING AND CODE ENFORCEMENT
801 NORTH FIRST STREET
SAN JOSE, CALIFORNIA 95110-1795

JAMES R. DERRYBERRY
DIRECTOR

October 24, 1997

Army Corp of Engineers
Environmental Planning Section
333 Market Street, 7th Floor
San Francisco, CA 94105-2197

Dear Sir:

RE: EIR/EIS REPORT FOR UPPER GUADALUPE RIVER FEASIBILITY STUDY COMMENTS

The City of San José has reviewed the Draft Feasibility Report and Environmental Impact Statement/Report for the Upper Guadalupe River Feasibility Study and has the following comments.

H-1 Proposed floodwalls have the potential to block existing overland drainage release (flow) from adjacent neighborhoods, hence causing or aggravating localized flooding. Additionally, these walls will raise the hydraulics grade line in the river which will result in increased tailwater at existing storm drain outfalls. This will cause diminished storm drain capacity and the likelihood of discharge of both storm and river water onto local streets. The above-listed conditions are considered significant and any available mitigation should be identified or the EIR/EIS should conclude the impact is significant and unavoidable.

If you have any questions or need additional information, please contact me at (408) 27-4576.

Sincerely,

Julie Caporgno
Senior Planner

CORPENG.LTR/JC/PL/HD

H. Julie Caporgno, City of San Jose. October 24, 1997.

H-1. Local drainage impacts resulting from the Bypass Channel Plan have been addressed with the City of San Jose. Features to address impact issues have been coordinated with the City's Hydrology Department in the development of this plan. If the Channel Widening Plan were to be implemented, additional money would need to be included with the project's costs to address the impacts associated with the inclusion of floodwalls in Reach 8 and along Ross Creek. This discussion in included in the revised section 4.3.3, Water Resources.

HACIENDA ENVIRONMENTAL SCIENCE MAGNET

SAN JOSE UNIFIED
SCHOOL DISTRICT

Susan Olsen, Principal

All Students Can Learn. All Students Can Succeed!

October 24, 1997

William R. DeJager
US Army Corps of Engineers
333 Market Street, 7th Floor
San Francisco, CA 94105-2197

Dear Mr. DeJager:

I-1 As a teacher at Hacienda Environmental Science Magnet School, I am interested in your plans for the Upper Guadalupe River Flood Control Project. We have officially adopted a section of the river south of Wren Drive and are planning lessons and projects for our students concerning this area. I have a few questions about your involvement in the Guadalupe River:

What plans does the Army Corps have that would include this area directly or that would affect this area indirectly?

Are there any opportunities for public input before your plans are finalized?

If we want to plant trees or make other improvements do we need to get your permission, as well as that of the Santa Clara Valley Water District?

Besides having these questions answered, I would also appreciate receiving all future information concerning this project.

Thank you very much.

Sincerely yours,

Suzanne Lowd

Suzanne Lowd

1290 KIMBERLY DRIVE • SAN JOSE, CALIFORNIA 95118 • (408) 535-6259

I. Suzanne Lowd, Hacienda Environmental Science Magnet. October 24, 1997.

I-1. Please see response to comment E-1. A letter has been sent to Ms. Lowd identifying opportunities for continued participation in river restoration.

From Wren Drive south to the gauging station, the river channel has nearly enough capacity to handle floods up to the size of a 100-year flood. The only action proposed in this area for flood control is construction of a low levee at the top of the west bank. However, this section of river has poor habitat conditions at present due to past channelization. Therefore, the bottom of the channel would be reconfigured to provide several terraces; this would mimic natural river channel morphology and optimize the potential for habitat improvement. Riparian forest would be planted in much of the area afterwards. The intent is to provide high-quality riparian and aquatic habitats in this section of river, although achieving this goal would probably take a couple of decades.

From the gauging station south to Hillsdale Avenue, the river channel is too small to handle large floods. Therefore, the upper portion of the east bank would be excavated to provide a widened channel. The west bank and the lower portion of the east bank would be largely unchanged. Plantings of riparian forest would be established on the widened east bank and some currently barren areas on the west bank, and would eventually result in improved habitat conditions.

Improvement of habitat conditions along both these sections of river would compensate in part for project impacts in other areas having better habitat.

The SCVWD can be contacted regarding any improvements including tree planting that the school wishes to do in this area (permission from the Corps is not needed unless a wetland area is disturbed). Otherwise, one runs the risk that improvements may be removed during construction. There are places on the west bank of the river that are not presently forested and which would not be disturbed by the project. Many of these areas are proposed for tree planting and may be suitable for your use if the SCVWD provides permission. After completion of the project, the school may wish to not only continue trash cleanup, but to also monitor vegetation regrowth and changes in habitat conditions and wildlife use of the area.

When the Corps Final EIR/S and the SCVWD Final EIR/S are released, there will be an additional public comment period during which the school may respond to this proposal.

WESTERN WATERS CANOE CLUB

40 Redding Road
Campbell, CA 95008

October 26, 1997

Mr. William DeJager
Army Corps of Engineers
333 Market Street, Seventh Floor
San Francisco, CA 94105-2197

Subject: Draft Feasibility Report & Environmental Impact Statement/Report, Upper Guadalupe River Feasibility Study, prepared by the U.S. Army Corps of Engineers San Francisco District and the Santa Clara Valley Water District.

Ref. 1: Draft Environmental Impact Report/Environmental Impact Statement, Upper Guadalupe River Flood Control Project, Dated January 1997, prepared by the Santa Clara Valley Water District & the U.S. Army Corps of Engineers.

Ref. 2: Western Waters Canoe Club Comments on Ref. 1 dated April 17, 1997

Dear Mr. DeJager:

J-1 Our club has reviewed the subject document and recognize that a lot of work has gone into its generation and publication. Unfortunately, we strongly feel that the effort was a total waste of taxpayers money. The subject report which actually consists of two reports with the same title covers the same project as the Ref. 1 report which was published by the same two agencies, only seven months ago, at substantial cost. Oddly, both of the subject reports use different names for the different options evaluated and provide different cost data than the referenced report which is very confusing and makes cross referencing very difficult. In addition, the subject reports do not cover all of the options or areas covered by the earlier report. The subject Reports do not address a Stream Restoration Alternative at all, as well as some other very important topics. For example, they totally fail to address water related recreation issues, such as fishing, boating, aquatic life observation or studies and do not discuss property value impacts as a result of the project. They also either do not adequately address or contain many incorrect statements regarding many matters of concern. Because of the magnitude of both efforts, we want to know exactly how much each one of these separate studies and reports cost the taxpayers. We not only would like to know the cost of the publications themselves but also the cost for the research, meetings and mailings associated with them. Agencies responsible for these duplicate efforts are not only sucking up large sums of tax dollars but are also wasting the time and money of the public and other agencies who are obligated to respond to them. In view of this we also would like to know how much has been squandered to date on the Guadalupe River Flood Control Projects, including all of studies conducted to date and the actual costs of all of the projects which have been completed or are currently underway, along with all of the costs associated with trying to repair and maintain them. J-1

We have very grave reservations regarding the workability of either of the proposed projects. The Project's plans and designs are neatly detailed on paper and are backed by text stating how beneficial the project will be in the future. But, no objective evidence or data are provided to give any kind of assurance that the projects will work as described. The Downtown Flood Control Project is not working as designed or in accordance with the conditions of it's permits. The Flood Control Project Downstream of Highway 101 is not working as designed, see Overflow Channel discussion on pages 5-7 of Ref. 2. In view of these dismal track records, we feel there is every reason to fear that the proposed project, which is very similar in design, will only continue this destructive trend of the river's ecosystem. We feel very strongly that not one bit of new flood control work, using hardscape methods, should be permitted any place on the river until the current or recently completed projects are at least working as promised and in compliance with their permits. The sections of the river covered by the proposed projects are recognized by every environmental study and publication addressing our river systems, including this EIR/EIS, as critical for our declining and threatened aquatic/wild life. The Project areas are recognized by all knowledgeable sources as having some of the last remaining quasi natural riparian corridors in Santa Clara County. They not only must be protected, they must be restored and enhanced in accordance with local and state policies as described in this report. J-2

Unfortunately because there are enough differences in the subject and referenced reports we feel it necessary to provide detailed comments on each report. However, because of the similarities in the projects and the subject report deficiencies we frequently refer to our comments on the Ref. 1 report which we have identified as Ref. 2 and are including a copy of it as part of our comment package. J-3

Comments On
DRAFT EIR/EIS - UPPER GUADALUPE RIVER FEASIBILITY STUDY

PUBLIC INPUT AND PREFERENCES

Para. 3 on page 4 of the Report states a public information brochure was released in 1976 with a questionnaire soliciting public preferences for flood control alternatives. What were the results of this survey? Public comments at each of the recent project meetings held in Willow Glen were overwhelmingly opposed to both projects as recommended. Public comments were heavily in favor of less costly and more quickly implemented flood protection efforts, such as riparian corridor restoration and debris clean up as well as other watershed management methods. The Report J-4.

J-4 states, on page 58, that the public prefers bypass channels to channel widening measures and that these preferences were responsible, in part, for the bypass features in the proposed design. Please provide data to support this statement. We believe the public prefers, as we do, a bypass option to a concrete channel option or in cases where no more environmentally friendly or less costly alternatives exist, such as in the Contract 3 section of the Downtown Guadalupe River Flood Control Project (FCP). But, bypass channels are not required in this project area, nor were they required in the Contract 1 and 2 areas of the Downtown FCP. Our Club and most people we have talked to prefer a riparian restoration alternative for this project area as well as for the remainder for the Guadalupe watershed. Both the Santa Clara County and San Jose General Plans mandate that riparian corridors be preserved and restored, not degraded or destroyed. There are also a host of local environmental agencies, conservation, recreational and sport groups which support a riparian restoration alternative. In addition, the Regional Water Quality Control Board has initiated a pilot program to identify negative impacts to our watersheds and to come up with a plan to eliminate further impacts, while enhancing the waterways, riparian areas and all beneficial uses of them. This program is known as the Santa Clara Basin Watershed Management Initiative and there is a large and diverse group of stockholders working on the initiative to enhance our waterways.

2.2 EXISTING/ENVIRONMENTAL CONDITIONS

J-5 WATER SUPPLY - The Report states that the Santa Clara Valley Water District (SCVWD) operates instream groundwater recharge facilities in the waterways. **This is incorrect.** The District lost its permits for operating these recharge dams on the Guadalupe and other streams in 1995 partly because they were seriously degrading our waterways and they have not been in operation since.

J-6 WATER QUALITY - The Report states that there is a threat of nonpoint source pollution in the river, which includes pesticides and herbicides due to stormwater runoff. It doesn't address the fact that the SCVWD has a program for regularly spraying herbicides along many riparian areas and that this spraying will be greatly increased as a result of the project due to all the maintenance roads and hardscaped bypass channels being proposed. This will have a significant negative environmental
J-7 impact on the river and its wild and aquatic life. The Report doesn't address the pollution caused by vagrants and homeless living along the river's banks and using it as their bathrooms and garbage
J-8 dump with full knowledge of city and SCVWD officials. While the Report correctly states that there are increased water temperatures due to the lack of shade along the riverbank, it fails to state the reasons for the lack of shade, thus the increased temperatures. It fails to identify the removal of the riparian and SRA habitat by the SCVWD and ACOE flood control projects, the San Jose redevelopment and park construction efforts and other riverside construction projects as one of the prime causes of this temperature problem. It also does not address the destructive impacts caused by the SCVWD's diversion of water or the blockage of water flows down the natural channel, the other prime cause of high water temperature. While the Report correctly states that the upper reaches, 10-12, of the river have less shade cover and thus provide poor habitat for anadromous fish, it fails to state that Reach 10 has some good gravel areas and numerous salmon have been observed spawning in this reach for at least the last 10 years, and that several chinook juveniles had been captured in this area in 1994, Ref. Attachment I, as well as in 1997. The Report also fails to point out that the better salmonid spawning areas, from Curtner Ave. to I-880 are either threatened

by this FCP or Contract 3 of the Downtown FCP, or have already been destroyed by Contracts 1 and 2 of the Downtown Guadalupe FCP, Ref. 2 Attachments I to IV. J-8

AQUATIC HABITAT - The Report correctly states that shaded riverine aquatic, SRA, habitat is essential for the maintenance of self sustaining populations of salmonids and there is considerable potential for it's improvement along the river's banks. However, it doesn't state that the proposed projects will do little, if anything, to improve the SRA habitat. Contrarily, the proposed projects will most likely have an adverse impact on it. The proposed projects have no plans to remove the concrete rubble that chokes most of the riparian corridor and limits riparian and SRA growth. This rubble also adversely affects river hydrology, causing erosion and bank failure. Bypass channels have constantly failed in the downtown area. This is adversely impacting the little SRA habitat which was not removed by the construction of those projects and there is no assurance that the same thing will not happen in the proposed project area as well. J-9

FISHERY RESOURCES - The Report states that the only salmonids in the Guadalupe River system are chinook salmon and rainbow/steelhead trout. According to history books, the Guadalupe River also once supported coho salmon runs, Skinner 1962 & Ref. 2, Appendix D. Also, local long time resident, business owner and fisherman G. Garbarino stated he caught and/or observed silver salmon in Los Gatos Creek directly behind his business on Autumn St. almost every January up until a few years ago, when his age and decreased mobility prevented him venturing down into the creek. In early February 1995 while canoeing Los Gatos Creek, the writer and his partner observed a large pinkish salmonid, believed to be a coho, in a rapid on Los Gatos Creek just below Bascom Avenue. Video tape seen of a fairly fresh, light colored 22 to 26 inch salmon caught on the Guadalupe River in January 1994 could well have been a coho, as the size and color of the fish and timing of the catch were not consistent with the chinook salmon that have been observed. In view of the above, there is a very good possibility that a few coho salmon may still try to spawn in the Guadalupe River system, at least on occasion. Therefore, we feel this possibility needs to be recognized and addressed by this Report. J-10

The Report states that there have been unconfirmed reports of steelhead redds in the study area. There have been many sightings of steelhead and redds in the Guadalupe River in the past ten years. The Habitat Restoration Group has documented steelhead redds in the project area as a result of their spreader dam studies for the SCVWD, and the California Dept. of Fish & Game has documented steelhead redds in the river. The writer and Roger Castillo observed and video taped steelhead trying to jump the 15 ft dam just behind the SCVWD facility off Almaden Expressway for the past several years, and the SCVWD captured several young steelhead in the river this past spring. Numerous steelhead were also observed and photographed in the river this year at St. John St. by contractors working on the Italian Village restoration project in the area. J-11

While the temperatures in the Guadalupe River System are very warm in the summer and early fall, it is inappropriate to speculate they are above the lethal limits for salmonids in all areas. Temperatures in the Guadalupe River system vary greatly depending on where they are taken. Computerized data loggers recording temperatures at hourly intervals at different locations along shallow sections of the Guadalupe River System show these wide differences in temperature. In the J-12

J-12 upper reaches, where the river is wide, shallow and devoid of cover, the temperatures are very high, the mid 80's is not uncommon in the summer and this would certainly be lethal to young salmonids. But, in the sections of the river where there is good SRA cover and deep pools, temperatures are far lower and can stay in the sixties even on the hottest days. In the downtown area, there are many sections of the river where water is up welling. This provides cool pockets of water for fish to hold in. Also, cool ground water is constantly being pumped into the river from basements of the larger buildings and wells under some freeway underpass areas in the downtown area. This is another source of cool water the fish can use. We believe fish will seek out the cooler waters and can survive in these areas when the other parts of the river are too warm for them.

J-13 The Report **incorrectly states** that the highest quality salmonid habitat is found in tributaries upstream of the study area. Immediately upstream of the study area there is a wide open river corridor, devoid of riparian habitat, above that is a virtually impassable 15 foot high dam. Above the dam there is a wide unshaded water storage/percolation area in the summer months and a wide shallow unshaded river channel in the winter. Above this area is the confluence of Guadalupe Creek just below Lake Almaden. Guadalupe Creek runs only several inches deep in this area in the summer and sometimes doesn't flow all of the way to the river because of SCVWD water management policies, Ref. Attachment II. It contains no riparian habitat and its temperature fluctuates greatly depending on air temperature and amount of sunlight. Temperatures in the 60's are possible on sunny days even in the winter. In the summer temperatures reach into the mid 80's, no salmonid would survive in this area. About two miles upstream of its confluence with the Guadalupe River the creek is blocked by the double drop structure, the Mason Dam. It's only above the Mason dam that creek conditions start to improve, but no migrating salmonid can reach this area. Above Lake Almaden, which serves to warm the water in the hot sun, there are several rocky drops which would impede fish migration. Above these blockages, Alamitos Creek has either no or very poor riparian cover for quite a distance. As a result, water temperatures in this area can reach into the low sixties in the winter and low seventies in the summer, which is very marginal for salmonids. There is also a channelization project in progress on the upper part of this creek which is destroying riparian habitat and hardscaping the creek's banks. Currently Alamitos and the lower part of Guadalupe Creek do not have good habitat for salmonids. Why does the Report state that they do? Both creeks have potential for being restored but there has been no mention of doing so in either the subject or referenced project.

J-14 ENDANGERED & THREATENED SPECIES - The Report fails to state that southwestern pond turtles have been observed and video taped in Reach 9 of the project area and downstream of the project area. The species potentially exists all along the study area. Why doesn't the Report address the pond turtles? Steelhead have been observed and video taped in the study area and steelhead
J-15 redds have be documented in the study area. Numerous steelhead were video taped trying to jump the dam behind the SCVWD headquarters the past two years in February and March and young steelhead were captured in the river system this year by the SCVWD. Why doesn't the Report recognize that steelhead spawn and survive in the river?

2.4 EXISTING WATER RESOURCES PROJECTS

In describing existing projects, the Report states that due to prior flood control projects which widened the river corridor between US Highway 101 and the Bay that this area will convey the 100 year event. **This is incorrect.** Due to the failure of the Downtown Flood Control project and other bank failures all along the river, the lower Guadalupe will not convey the 100 year flood. Even after emergency action was taken by the SCVWD to raise the levee's along the lower Guadalupe last year in an attempt to better protect property in the area experts state the channel will still not carry the 100 year flow, Ref. 2, Appendix C & Attachment 4.

In describing the Downtown Flood Control Project, the Report states the project is ongoing and is expected to cost 138 million dollars. **This is incorrect.** The project is currently stopped because it is failing. It is not in compliance with it's permits and now officials admit it can not meet the permit requirements, Ref. 2, Appendix A & B and Attachments A, B & C. The project is also reportedly way over budget. In view of the above, we would like to know exactly how much has been spent to date on this project. **J-17**

3.1 FLOODING

The Report provides estimates of how much flood damage could be expected in events of various magnitudes for each economic area without the proposed project. There are no estimates provided of how much damage could be expected within the project area in a 500 year or 100 + year event after the project has been completed or in the event of a flood wall or other type of project failure at any level. Since flood damage is always substantially higher when flood waters exceed project capacity or in the event of flood control project failure, please provide a table of such estimates and information on how the estimates were derived for each economic area. We believe such figures need to be included in any type of national economic development analysis (NED). **J-18**

Also, please provide estimates of additional flood damage which will be caused downstream by the project. With the completion of the proposed project, storm waters will be moved to the downtown area and lower reaches of the Guadalupe much faster than they would have reached the area if allowed to flow in a restored natural river channel. Flash flows from the upper Guadalupe along with the runoff from the streets, buildings, parking areas and the expanded airport in the downtown area will cause the river to peak faster downstream and will most likely breach the already inadequate levees. How much damage and loss of life will this cause in view of the fact that development is being permitted right next to levees which now can't even handle a 50 year event? Ref. Attachment III and Ref. 2 Appendix C. **J-19**

3.3 FISH AND WILDLIFE HABITAT NEEDS

The Report correctly states that human actions have caused severe cumulative loss of riparian & SRA habitat in the San Francisco Bay Area. It fails to mention that losses along the Guadalupe River are primarily the result of ACOE, SCVWD and San Jose Redevelopment Agency actions. **J-20**

Again, the Report **incorrectly states** that the highest quality salmonid habitat exists upstream of

J-20 Blossom Hill Road. Removal of or laddering the dam above Blossom Hill Rd will provide no additional habitat for salmonids unless a project is undertaken immediately to restore the creeks to their natural shaded condition.

3.4 RECREATION OPPORTUNITIES

J-21 The Report addresses the need to provide greater public access to the river corridor. It talks about providing trails and hiking, biking, equestrian and disabled access. However, the report does not address river recreation activities such as boating, fishing, aquatic studies etc. The Guadalupe River is listed as a navigable river and is navigable by small watercraft such as canoes and kayaks at moderate to high flows from the dam above Blossom Hill Rd. to Alviso. The San Francisco Bay Basin Plan also lists non contact water recreation as a beneficial use of the Guadalupe River. Evidence of this use is provided in Ref. 2, Appendix G & Attachment 5. We not only want to see no further negative impacts to water recreation on the river, we want any work on the upper Guadalupe River to remove all of the concrete construction rubble dumped into the river in the guise of Flood Control. This rubble is dangerous with its protruding rebar, it snags debris, changes river hydrology, causes erosion, impedes riparian growth, blocks navigation at lower flows and impedes fish migration. River related activities and how they will be provided for need to be addressed in the Report.

4.2 PLANNING OBJECTIVES & CONSTRAINTS

J-22 The Report states that avoidance of negative impacts to habitat was a major constraint for all of the plans considered and that attempts were made to avoid removal of additional riparian forest in the development of each alternative. It also states that alternatives were developed to avoid, to the maximum extent practicable, impacts on salmonids. We do not agree with these statements. We believe the design proposed, which is similar to the downtown design will not function properly but will cause the same problems that are being realized in the downtown area.

Attempting to avoid negative impacts and avoiding impacts as much as possible is not satisfactory. The Downtown FCP is severely impacting the environment contrary to assurances that it was going to enhance it. SCVWD Flood Control projects have destroyed most of the waterways and riparian habitats in Santa Clara County, including such habitat on the lower Guadalupe River. Less than 5 miles of marginal habitat remain on the river. This habitat can not be further impacted in anyway, we must start restoring the riparian and SRA habitat already lost.

4.4 PLAN FORMULATION RATIONALE

J-23 This Report lists three options that were evaluated and recommends the Bypass Channel Plan. This option is very similar to the Preferred Alternative in the Ref. 1 report and is not acceptable for all of the reasons listed in Para. 3.3 of Ref. 1. The river restoration alternative was not even discussed in this EIR/EIS. The Ref. 1 report at least mentions this alternative and states that the **objective of this option is the re-establishment of the functions and values of the historic riparian corridor. The goal of the geomorphologic approach is to restore the natural sinuosity of the Guadalupe**

River channel; enhance sediment transport ; and provide for long term stabilization of the banks by restoring the plan, profile, and geometry of the active channel. It further states that "this alternative would provide an opportunity for significant new riparian vegetation to re-establish and strives to create a functional physical and biological river system that allows natural processes to occur while restoring and maintaining habitat values for fish and wildlife." We believe this is truly a get well prescription for our waterways. It is exactly what is necessary and the only alternative which can satisfy all of the stated policies and goals of the Santa Clara County and San Jose General Plans. These Plans clearly mandate the protection and restoration of our waterways and riparian habitats while at the same time providing flood protection and reducing maintenance costs. We believe this alternative is the only one which will satisfy the goals of the newly established Santa Clara Basin Watershed Management Initiative and succeed in the conservation of our resources in accordance with the goals of the Environmental Protection Agency (EPA), Guadalupe Coyote Resource Conservation District (GCRCD), California Dept. of Fish & Game (CDF&G), National Marine Fisheries Service (NMFS), US Fish and Wildlife Service (USF&WS), San Francisco Regional Water Quality Control Board, (SFRWQCB), the CA Public Trust Doctrine, conservation, recreation and sports fishing groups, and the wishes of the majority of our citizens. J-23

We believe the cost of the Stream Restoration Option to be far less expensive in both construction and maintenance cost than any of the other options proposed by the subject or referenced reports. National renowned hydrologist, Dave Rosgen, visited the upper and study area reaches of the river while teaching applied fluvial geomorphology classes sponsored by the GCRCD each year for the past three years and did not indicate the need for bypass channels in these areas. Regarding construction costs for his Stream Restoration methods, Mr. Rosgen stated in a telephone conversation with the writer on 3/25/97, and again in face to face conversations on April 7-9, 1997, that his construction costs for restoration projects ranges from $6 to $60 per linear foot (Rosgen 1997). At $60 per foot, the construction costs for the entire project would amount to a little over $2 million dollars. Even if the costs were 10 times this amount, the project's construction price tag would only amount to $20 million. It is recognized that this cost does not include construction expenses for bridge replacements, land acquisition and the like. But, even with these fees added, the Stream Restoration Option would be significantly less expensive than the Bypass Channel Plan. J-24

The EIR needs to describe the Stream Restoration Option in the same amount of detail as the Recommended Project. The designs need to be reviewed and validated and their estimated costs justified by a stakeholder team of engineers, hydrologists, biologists and geomorphologists. Only when the viable options and all of their related construction, mitigation and maintenance costs, as well as other impacts, are objectively presented, evaluated and compared can the best project be selected. J-25

5.2 NED ANALYSIS

The Report provides an NED analysis but we question this analysis. All of the figures listed are hypothetical and based on the project working according to plans. But past FCP's on this river have not worked as planned. There are no costs listed for the enviornmental damages which will be J-26

J-26 created by the project, or for excess flood damages created if the project fails or has it's capacity exceeded. Estimates for such damages need to be listed and factored into the NED. We take issue with the basis for some of the other figures provided and believe it is irresponsible to list others as savings. We believe, based on the experiences of the Downtown FCP, that maintenance cost for the proposed project to be significantly higher than predicted and which are being expended on present projects. All of the maintenance roads and hardscape structures of the proposed projects have to be continually maintained. Therefore, there will be not cost savings for maintenance, rather there will be a negative cost impact. How can the report state there will be a maintenance savings? The Report also lists a flood insurance cost savings. Constructing a flood control project doesn't change land contours. Property in a flood plain will still be in the flood plain when the project is completed, no matter where the flood boundary lines on a map are drawn. These properties will still get flooded, most likely more seriously, if the project fails or it's capacity is exceeded. People living in the flood plain are ill advised to reduce their flood insurance if this or any other flood control project is implemented. They would be far better advised to increase their flood insurance coverage to pay for increased damages which can be expected in event of a failure, so the flood insurance savings claimed in Table 19 is questionable at best.

J-27 Again, we feel as if the Stream Restoration Alternative would be the alternative which would maximize the net public benefits for any of the options discussed in either the subject or referenced reports and needs to be evaluated in this report for NED purposes.

J-28 It is also interesting to note that cost estimates listed in this Report for the Bypass Channel Option are substantially higher than the cost estimates listed in the Ref. 1 report for the Preferred Alternative even though the Bypass Channel Option does not include work on Reach A, Reach 6 or Reach 12 areas or the work on Canoas Creek. Which cost estimates are correct? Why the disparity?

7.7 Operation, Maintenance Repair, Replacement and Rehabilitation

J-29 This Report and the Ref. 1 report have vastly different costs listed for maintenance. How is this possible? What are the correct cost estimates? What have the maintenance costs of the Downtown Flood Control Projects been for each year for the past five years including the Project downstream of Hwy 101.?

Comments On

DRAFT EIR/EIS - UPPER GUADALUPE RIVER FEASIBILITY STUDY

Prepared by Science Applications International Corporation - dated August 1997

J-30 This report starts off by stating that this EIR/S fulfills regulations of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). We disagree. Both NEPA and CEQA guidelines require that a range of reasonable alternatives to the proposed project which could feasibly attain the objectives of the project, be described and evaluated in comparative fashion. The CEQA guidelines also require that the environmentally superior alternative be identified. The Stream Restoration Alternative which is a reasonable alternative and which would surely be the environmentally superior alternative was not even described, much less evaluated in this report. J-30

This Report uses the term Channel Widening Plan instead of the Valley View Plan when discussing the various plan options. Why is this the case? This just adds another confusion factor to this very complex matter. J-31

2.4.2 BYPASS CHANNEL PLAN

This Report states that a detailed description of this option can be found in the SCVWD EIR/S. Our comments on this option, which is identified as Preferred Alternative by the SCVWD, is contained in the Ref. 2 document which is part of this comment package. J-32

3.3 COMPLIANCE REQUIREMENTS

This Report lists the environmental requirements of a number of laws and regulations which affect the proposed project.

We believe the proposed project will not comply with the Clean Water Act's stated objective as it will not restore and maintain the biological integrity of the Guadalupe River, rather it will further degrade it. The Downtown FCP started to dump tons of fill material into our aquatic ecosystem soon after construction began and continues to do so with each storm contrary to this law and it's permit requirements. Promised low flow channels have not been provided and the riparian & SRA mitigation promised has not happened. J-33

The Federal Water Project Recreation Act of 1965 states that projects must give full consideration to the opportunities for outdoor recreation and for fish & wildlife enhancement. Recreational boating, fishing and aquatic studies have not been addressed by the Report as required by this law. J-34

Executive Order 11988, Floodplain Management states that each federal agency must provide leadership in restoring and preserving the natural and beneficial values of floodplains. The proposed project does not do this. Natural floodplains are being turned into hardscaped bypass channels which will most likely be kept clear of habitat by spraying with herbicides. This is destruction of the natural floodplain and habitat, not restoring and preserving it. J-35

As stated above we feel the CEQA guidelines have not been complied with on the proposed project as the Stream Restoration Alternative, the most environmentally friendly alternative, has not been evaluated as required. J-36

The Report lists the environmental requirements of the Santa Clara County General Plan, and the San Jose General Plan. We feel the proposed project will not comply with either of these two Plans J-37

J-37 and the Report acknowledges the project would conflict with land use policies related to the protection of streams and natural habitats.

J-38 The Report does not list the Rivers and Harbors Act in this section. We believe that Sections 9 and 10 of this act apply to the project area of the Guadalupe River and permits must be obtained under this act for any work done in the main river channel. The Report also does not list the State Lands Commission. The Lands Commission has exclusive jurisdiction over the bed of all navigable waterways in the State and reviews all projects affecting these waterways for consistency with the Public Trust Doctrine. There is no doubt that the proposed project will further degrade the last remaining salmonid and riparian habitat on the river and, therefore, will violate the doctrine.

4.4 BIOLOGICAL RESOURCES

J-39 FISH POPULATIONS - The comments concerning fish populations which we provided for the above report are also applicable to this report. Also reference our comments on fisheries in Ref. 2.

6. CUMULATIVE IMPACTS

J-40 This chapter discusses the cumulative impacts of many of the projects along the river but it does not discuss them all. It doesn't discuss the planned development project downstream of Highway 237, the Lower Guadalupe River Flood Control Project and how it and its mitigation is failing or the SCVWD's stated plans to reapply for permits to construct in stream spreader dams along the river and creeks.

J-41 Most of the mitigation plantings along the Trimble Ave. to Monteque Expressway Reach of the Lower Guadalupe Flood Control Project have failed and they have yet to be replaced, (Ref. 2, Attachment 4). The report talks about the Downtown Guadalupe River Flood Control Project but it does not state that the majority of its riparian mitigation in Contracts 1 and 2 has either not been planted or is failing, (Ref. 2, Attachments 1 - 3), (Ref. 2, Appendix A & B). It does not state how it has not provided the low flow channel for fish as required and that the bypass channels are both silting up and eroding. There has not been one riparian tree re-planted along Contracts 1 and 2 as yet although some upland mitigation is starting to take hold. The statement that mitigation for the SRA habitat is now being reevaluated only means that the promised mitigation is a long way off. The EIR addresses the River Park Project but it doesn't say the mitigation plantings along the west bank gabions in the southern end of the Contract 3 have failed and have not been replanted. The report does not discuss all of the trees recently cut down at the top of the levees along the west bank of the river in Reach A of this project.

J-42 The EIR describes many of the impacts to the Guadalupe River System and lists them in Table 6.2. However, it doesn't list them all. It doesn't list the dumping of concrete rubble all along the river and creeks. It doesn't list the operation of the in-stream spreader dams which drowns upstream vegetation and water starves down stream vegetation. It doesn't list the dams and drop structures built along Los Gatos Creek, below Vasona Reservoir or the Mason Dam on Guadalupe Creek. It doesn't list all of the concrete, concrete sacks, gabions and other hardscape materials used all along the rivers and creeks. The negative impacts listed in Table 6.2 and the above leaves no doubt that more than enough damage has already been done to this small river system. It just can not tolerate any more degradation and still provide a home for native fish and wildlife as it does now. Our rivers and creeks have continually been devastated by man's irresponsible actions and it is long past the time to correct these misdeeds. This last remaining section of the Guadalupe River must be protected and restored. It can not be further degraded by flood control methods that are not working or are unproven. J-42

The EIR states the loss of SRA habitat in the Downtown area will be fully mitigated. But, it doesn't say when or where this will happen. Mitigation for the SRA and riparian losses in the Downtown area have not even started yet and no one will commit as to when they will. It is our position that no other losses should be permitted until the mitigation for the current projects are in place and prove to be successful. J-43

The EIR restates that mitigation will be provided on the creeks upstream of the Blossom Hill Dam. Again, we restate, that at present, these areas are **not suitable** for salmonids as there is no shade cover, the temperatures are far too warm and the water flows are far too low. The EIR does not state how the areas will be made suitable. It is also questionable if Chinook salmon would or could use these small, low flowing creeks. J-44

SUMMARY

Because of all of the inconsistencies, discrepancies, omissions and erroneous statements in this EIR as detailed above it must be corrected. The fact that the Stream Restoration Alternative is potentially the most environmentally superior alternative and the likelihood that it would also be the most cost effective mandates that it must be equally addressed so it can be objectively evaluated with the Bypass Channel Alternative in this EIR. The EIR must be revised to correct the listed problems and thoroughly address the Stream Restoration Alternative. J

ALTERNATE PROPOSAL

Our club believes that the Bypass Channel Option as described in this EIR/S is unworkable. It will be extremely expensive, both in the cost of construction and in the cost of maintenance and will continue to degrade the river, eventually destroying it completely as evidenced by the failures on the Lower and Downtown Guadalupe River Flood Control Projects. We believe there is a far better way. We need to restore our waterways and watersheds in accordance with the goals of the Santa Clara County and San Jose General Plans and the Public Trust Doctrine and we should begin this task as soon as possible. J-46

We propose that a demonstration Stream Restoration Project be undertaken without delay on the two and a half mile stretch of Guadalupe Creek from just upstream of Camden Ave. to its confluence with the Guadalupe River. A crash effort should be undertaken to get such a project

J-46 planned, designed, approved, permitted and started. The project would use the fluvial geomorphological approach, as described in the Ref. 1 EIR's Stream Restoration Alternative. Work could be done throughout the winter, with the only breaks coming for inclement weather, as salmonid migration into this area is blocked by the Blossom Hill Dam. It is anticipated that the actual construction work could be completed in less than a year.

This project would demonstrate the superior environmental values and low cost of this alternative. It would restore an area that is extremely degraded, and one with little to no riparian corridor or shade cover. It would fix portions of the creek which are threatening the Camden Ave. Bridge and parts of Coleman Road. It would provide salmonid habitat and cool waters where they now do not exist, before areas of the Guadalupe River are impacted. A goal of the project would also be to percolate water via the natural stream bed at nearly equivalent levels as the previously employed gravel spreader dams. An EIR for this project should be relatively easy to complete as the SCVWD would have to be working on one at present to satisfy requirements for their planned mitigation for salmonid use of this area.

It is estimated that this project would cost less than $500 K and could be funded, in the most part, by grants and donations. Dave Rosgen roughly estimated construction cost for the project to be around $400 K when he briefly surveyed the area on April 8, 1997. Other innovative funding methods such as contributions by businesses, environmental, conservation and fishing groups, as well as individuals, coupled with volunteer work, could substantially reduce the costs.

The immediate restoration of this area would provide substantial benefits to the river. Erosion in the area would be eliminated, reducing siltation problems downstream. Flash runoff would be reduced by a more natural meandering creek which reduces the potentially of flooding downstream. Percolation would be provided via the natural creek bed and/or off stream ponds instead of the expensive and environmentally damaging gravel spreader dams. As soon as riparian vegetation started to grow it would provide more and more shade to the now unshaded creek reducing the high temperature water being dumped into the river. It would provide immediate added habitat for land locked native trout which inhabit the upstream areas of the creek. It would also provide potential habitat for salmonids once a bypass is constructed around the Blossom Hill Dam. And, the new riparian area would provide a home for birds and wildlife displaced from the destruction of their habitat in the downstream areas. In addition, the project would demonstrate that the Stream Restoration Alternative is the only viable and cost effective alternative for the Upper Guadalupe Flood Control Project. The project would provide only beneficial impacts, at no cost to the downstream flood control project. If this project could be undertaken and completed within a year and initial indications showed it was meeting its cost, schedule, design and implementation goals, then a follow on project could be immediately undertaken in Reaches 12 and 13 of the Upper Guadalupe Flood Control Project.

Reaches 12 and 13 are similar in nature to Guadalupe Creek. It is devoid of good riparian habitat and shade cover and a dam will have to be removed or bypassed. Plans for using the Stream Restoration Alternative for this area should have already been completed as a result of the EIR process. According to D. Rosgen's estimates, construction costs for this 1.5 mile stretch of river from the Guadalupe Creek confluence to Branham Lane would be less than $500 K. Even if this figure were doubled, it would still be less than a fifth of the cost listed for the Bypass Channel Option. The projected savings would be substantial. J-46

Once the above projects are completed and are working properly, which could be a early as the winter of 1999. Reaches 10 and 11 could be tackled the following spring. The riparian habitat in these areas is also marginal but aquatic habitat is fairly good. Salmon have been using these areas to spawn at least for the past six years. The goal of the restoration alternative is to improve both the aquatic and riparian habitat in these areas which should not be difficult.

Once the upper reaches of the river are restored the most difficult reaches, 9 through 6, would be tackled. It is recognized that restoration efforts in these areas will have a heavy impact on the river channel and riparian corridor for the short term. But it is strongly felt that it will substantially benefit the river in the long run. By restoring the upper sections of the river first, salmonids will be able to use the restored upper reaches, including Guadalupe Creek, if they so desire by the time the lower reaches are disturbed for restoration and flood protection. Again, it should be emphasized that restoration efforts of the upper reaches would **not** increase the chances of flooding downstream. D. Rosgen categorically stated that proper design and restoration would decrease the potential for flooding in the restored areas and decrease flood flows thus reducing the chance of flooding and erosion downstream.

Using the above plan, in the remote likelihood if any of the restoration efforts were to fail, it would not be difficult to implement one of the other alternatives, discussed in the EIR, on the downstream reaches of the river. We feel this will not be the case. We believe the strategy outlined above to be a winning one for all. The river will be restored in accordance with government policies and environmental goals providing local recreation opportunities for the public, wild and aquatic life will benefit, the cost of the flood prevention project will be substantially less and, therefore, it can be completed in far less time to the benefit of all citizens.

Lawrence Johmann

Lawrence M. Johmann, PE, CQE, CRE

SUNDAY

Making a home for salmon

ATTACHMENT I

JASON M. GROW — MERCURY

Two baby Chinook salmon held by Roger Castillo of Silichip Chinook came from the Guadalupe River, a spawning ground for the fish.

Guadalupe River gets a little help from friends

BY BARRY WITT
Mercury News Staff Writer

Sharks weren't the only fish on San Jose's menu Saturday: Chinook salmon — and the hopes of establishing a flourishing spawning grounds in the city's urban center — brought several dozen volunteers out to help clean up a stretch of the Guadalupe River.

To the surprise of biologists, small numbers of the impressive fish have been spotted in the river over the past eight years, battling for survival against encroaching development and loads of garbage carelessly tossed into the narrow channel.

"It's amazing they continue to survive despite all the adversity," said Scott Stevenson, 42, of San Jose, part of the crew that pulled everything from sofas to a bowling ball from a strip of the river south of Curtner Avenue. "It's real exciting to see something indigenous here in the city."

The volunteers said they were drawn to the project by their fascination with wildlife and the thought of bringing a bit of the

See CLEAN SALMON, Page 7B

Dozens of volunteers cleared debris Saturday from the Guadalupe River near Almaden Expressway in San Jose.

ATTACHMENT II

Guadalupe Creek   Flow - High   January 14, 1995
Looking Upstream. Upstream of Almaden Expressway, San Jose, CA
Very Poor Riparian Habitat & Shade Cover, Evidence of Bank Erosion
Spreader Dam Site, Concrete Slabs on Banks

Guadalupe Creek Flow - None April 1997
Looking Downstream Towards the Guadalupe River From the Almaden Expressway Bridge
No Shade Cover or Riparian Habitat

Guadalupe Creek Flow - Low June 1997
Looking Towards Coleman Road, Showing Bank Erosion
No Shade Cover, Scant Riparian Habitat

ATTACHMENT III

Guadalupe River Flow - Low/Low Tide August 1997
Looking Downstream from Tasman Ave. Bridge
Development Next to Levee, Ground Floor of Housing is
Below the High Tide of the River

J. Lawrence M. Johmann, Western Waters Canoe Club. October 26, 1997.

J-1. Several public comments have suggested what is known as fluvial geomorphic restoration, which involves regrading the stream channel to re-create a natural channel shape that is in balance with the hydrology of the river. This would involve removing much existing vegetation. Even though disturbed areas would be replanted and in the long term vegetation would increase over current levels, short-term impacts would be considerable. Stream restoration could be accomplished by excavating adjacent earthen bypass channels (as in the Stream Restoration Alternative in the SCVWD's EIR/S), or through restoring natural stream morphology. However, in the latter case substantial flood control could only be achieved by also creating a new floodplain excavated below the grade level of the existing floodplain. In either case, far more land and houses would need to be acquired than under the proposed plan, thus costing much more and displacing far more people than currently proposed. This situation is discussed further in the responses to comments J-24 and J-30, and Section 2.2 of the EIR/S.

J-2. The downtown project is designed and constructed to provide protection against up to a 100-year event. The reach of the river from I-880 downstream currently does not have sufficient capacity to carry a 100-year flood. One of the preconditions for completion of the downtown Guadalupe project is additional work by the SCVWD along that section of river to bring the capacity up to the same level as is proposed downtown.

The proposed Bypass Channel alternative incorporates a design in which the channel's entrance is elevated well above the natural channel. In contrast, the portion of the downtown project already constructed consists of a widened channel, with the widened portion functioning to some extent like a bypass channel with a low-level entrance. Under the Bypass Channel Plan, the natural channel will be capable of handling flows up to 1,500 cfs. This design will minimize the amount of sediment entering the bypass channel from the natural channel, reducing the potential need for sediment removal (personal communication, Dennis Cheong SCVWD). The bypass channel would allow for less maintenance and disturbance in the natural channel than under current conditions.

J-3. Response to comments made in the Western Waters Canoe Club letter of April 17, 1997 on the SCVWD draft EIR/S are included following the response to comment J-46. Comments on the SCVWD EIR/S have been considered as they relate to this EIR/S, such that the responses address only those issues related to the proposed Bypass Channel Plan alternative that do not duplicate other public comments. Other responses to comments on the SCVWD EIR/S will be provided as part of that Final EIR/S.

J-4. Measures proposed by speakers at these meetings would not provide substantial flood control. Stream restoration in an alluvial plain environment will not generally prevent flooding unless a large enough area. See responses to comments J-1, J-24, and J-30 regarding stream restoration. Because nearly all of the floodplain is developed land, there are unavoidable tradeoffs between flood protection, displacement of residents, and riparian corridor restoration. The extremely high costs of land acquisition in the now-developed floodplain make it infeasible to acquire the land needed to implement a riparian corridor restoration alternative that would provide a 50- or 100-year level of flood protection comparable to the two alternatives analyzed in detail in the EIR/S.

This approach however, has been incorporated in Reach 10B in both the Channel Widening Plan and in the Bypass Channel Plan, where land acquisition costs would not be significant.

J-5. The in-stream percolation ponds in Reach 12 were operated for many years. They have not been operated in the last two years as a permit was not obtained from the California Department of Fish and Game. The SCVWD expects to resume operation of these ponds for percolation purposes in the future.

J-6. Herbicide use along proposed Bypass Channel maintenance road and bypass channels would not impact the natural river channel. Only EPA-approved herbicides would be used. The use of herbicides as proposed is considered an insignificant impact on water quality as discussed in section 4.3.3.

J-7. Homeless individuals living along the river's banks are outside the scope of the proposed flood control improvements. Because their use of the area is not permitted, potential affects of the project on these people also are not addressed. Further investigation of this issue would not affect the decision to be made.

J-8. City redevelopment and park construction efforts, and Corps and SCVWD flood control projects have not removed significant amounts of riparian vegetation within the study area, although vegetation has been removed farther downstream by various projects over a period of decades. Losses of riparian vegetation within the study area have been due to major removal of riparian forest by agricultural interests prior to urbanization: urbanization, past erosion control efforts (for example, to protect Almaden Road), the channelization of Reach 10B, and gravel mining in Reach 12. Herbicide spraying by the SCVWD has prevented forest from reestablishing in some areas previously cleared by others, but it has not been used to remove existing forest. The removal of riparian vegetation in Reach 12 was by gravel mining.

Summer flows in the river are due largely to controlled releases from upstream dams and imported water, as well as urban runoff. Under natural conditions the river would carry less flow, and during summer months some sections would be drier and warmer than they are at present. We agree that salmonids do spawn in the study area, and the EIR/S reflects this position. The document also accurately reflects the uncertainty regarding the extent of successful reproduction, since only a few juveniles have been found to date.

J-9. The EIR/S discloses the impacts on SRA cover. Mitigation plans for both of the primary alternatives address SRA cover protection and restoration. Nothing constructed downtown to date resembles the bypass channels proposed for this project. Floods that occurred shortly after construction washed away some mitigation plantings, which will be restored shortly.

J-10. As stated under existing conditions for Biological Resources (section 4.2.2), there are anecdotal accounts, but no reliable documentation that coho salmon have occurred historically or in recent years in the Guadalupe River, which lacks appropriate habitat for this species. The National Marine Fisheries Service agrees that Coho salmon do not occur in this river.

J-11. Since steelhead versus chinook salmon redds are difficult to distinguish, the EIR/S correctly refers to the reasonable likelihood that either or both species may spawn in some reaches of the study area.

J-12. The possibility that microhabitat variation allows salmonids to persist during warm summer months is acknowledged in section 4.2.2.

J-13. The Final EIR/S clarifies that habitat quality varies upstream of the study area, but affirms that suitable habitat exists, as evidenced by the presence of resident rainbow trout (section 4.2.2). The Mason Dam will be made passable to fish as a separate project, rendering upstream habitat available to these fish.

J-14. Given that southwestern pond turtles have not been detected in previous surveys and breeding habitat is poor, the affected reaches of the river do not support a significant population. The possible occurrence of individual immigrants from up- or downstream areas is acknowledged in the Final EIR/S. Under these circumstances, project construction would not significantly affect the species.

J-15. The Final EIR/S summarizes additional information bearing on steelhead reproduction in the river.

J-16 See comment J-2 regarding the level of flood protection along the lower Guadalupe River. Periodic erosion occurs along flood channels and sometimes may require corrective actions. The erosion does not jeopardize the ability of the improved flood channels to provide the planned level of protection (personal communication, Dennis Cheong SCVWD).

J-17. Planning for the Downtown Flood Control Project is ongoing. The SCVWD and the Corps are consulting with interested parties to discuss incorporation of project features to address local concerns (personal communication, Dennis Cheong SCVWD).

As of 20 December 1997, approximately $2,392,000 has been spent on project final design. Approximately $33,130,500 in construction costs has been shared by the Corps and the local sponsor (SCVWD). Additional funds for recreational betterment totaling approximately $2,218,000 have been expended by the local sponsor that are not eligible for federal cost-sharing (personal communication, Kenneth Myers 1998).

J-18. The project would reduce damages from a 500-year event. The project has been designed to have an equal probability of failure at any one point should its capacity be exceeded. Since nearly all of the flood protection would be provided through bypass channels and channel widening (the levees in reach 12 only protect percolation ponds), in the event that the project's capacity is exceeded, flooding would most likely occur as shallow overland flow. This flooding would be far less severe (in area and depth) than an equivalent flood under current conditions. Only minor use of levees and floodwalls is proposed elsewhere.

J-19. It is standard procedure in designing a Corps of Engineers flood control project to assume that all flood flows upstream of the study area will remain within the channel rather than spreading over adjacent floodplains. This assumption allows a flood control project to not have its capacity exceeded if another project providing the same level of protection is later constructed upstream.

For this reason, the proposed project would not cause the capacity of the downtown project to be exceeded for any flood up to the 100-year event. Existing and proposed development within the watershed is not expected to have a major impact on runoff. Should major additional urban development occur in the upper watershed, this would affect all projects downstream.

While a fully natural channel might convey floodwaters more slowly than the proposed channel, if designed to keep a 100-year flood within the channel, it would still convey these flows much faster than under current conditions, where there would be substantial storage of water on the urbanized floodplain.

J-20. Refer to the responses to comments J-8 and J-13, which cover the same subjects. Some good-quality salmonid habitat with resident rainbow trout exists in upstream areas.

J-21. Physical constraints and Corps of Engineers policy directives severely limit the type and extent recreational facilities that could be provided on a cost-shared basis. The recreational facility with the greatest potential recreational benefits and which the local sponsors are most interested in cost-sharing is a multi-use recreation trail linking the feasibility study area with existing trails along the Guadalupe River in downtown San Jose and upstream of Blossom Hill Road. This trail would also provide a critical link in a planned regional trail network, which would enhance its economic value. However, recreational access to the river must be balanced against goals of biological protection and concerns of human encroachment.

Proposed rock weirs that would enhance migrating fish passage could significantly affect small water craft passage during moderate and high flows (see revised section 4.5.3, Aesthetics and Recreation). A mitigation measure has been added to the EIR/S to require signs along the trail identifying these water hazards during high water flows, and directing recreationists to avoid use of the river during these conditions (see section 4.5.4, Bypass Channel Plan). Under the Bypass Channel Alternative, concrete rubble would be removed in Reach 9, 10A, 10C, and 11A, and a concrete low flow crossing would be removed in Reach 11B. The channel bottom would also be deepened in Reach 11B. These activities would enhance existing canoeing and kayaking recreational activities. This discussion is incorporated in the revised section 4.5.3.

J-22. The proposed Bypass Channel alternative is not "similar to the downtown design." The downtown design calls for single-side low-bench channel widening (already mostly constructed), two-sided widening with gabions (contract 3), and an underground bypass at the upstream end. The channel widening area already constructed somewhat resembles a bypass channel due to a berm that was retained along the edge of the widened area. The Bypass Channel alternative provides high-bench channel widening and bypass channels. This alternative incorporates a design in which the channel's entrance is elevated above the natural water surface at bankfull elevation, which minimizes the amount of sediment entering the bypass channel from the natural channel, and reduces the potential need for removal of sediment (personal communication, Dennis Cheong SCVWD) (see response to comment J-2). The Bypass Channel would allow for less maintenance and disturbance to the natural channel than under current conditions. The Corps has determined that a restoration alternative that also provides substantial flood control is not practical due to prohibitively expensive real estate costs. Restoration is offered in some reaches (10B and 12) under both project alternatives.

J-23. See responses to J-1 and J-30.

J-24. We agree that stream restoration would have smaller construction costs. The high expense of a stream restoration alternative that also provides substantial flood control is due to real estate and relocation costs.

Classic stream restoration approaches (which could use much less land than proposed in the SCVWD's stream restoration alternative) do not necessarily provide greatly expanded flood carrying capacity to restored stream channels. The usual relationship of a natural stream channel to an adjacent alluvial valley environment is for the channel to not hold larger stream flows, which therefore overflow onto the adjacent floodplain. In a natural fluvial system, this process has benefits such as reduction of flooding downstream and nutrient deposition on the floodplain. However, this natural process is no longer acceptable in the feasibility study area as the floodplain has become almost entirely urbanized. Restoring a more natural stream morphology would not change this relationship and therefore would not provide flood control unless a substantial floodplain were excavated.

J-25. Discussion of the Stream Restoration Alternative has been added to Section 2.2, Formulation of Conceptual Plans.

J-26. The Corps does not place dollar values on environmental damages or benefits.

Regarding flood insurance benefits, the area where flood insurance is strongly encouraged is the area that would be covered by the 100-year flood. The extent of this area will depend upon the hydrology of the river, the capacity of the channel, and floodplain topography. Changes in any of these factors can change the floodplain boundary. If a river channel is enlarged sufficiently for any reason (natural or artificial), the 100-year flood will stay within the channel and the boundaries of the floodplain will change to only include the channel itself. Therefore, the project would remove substantial areas from the 100-year floodplain. As stated above, damages in the event that the project's capacity is exceeded would be reduced from what would be expected under current conditions.

Regarding maintenance costs, the Corps is required by law to evaluate alternative plans based on the National Economic Development (NED) analysis methodology. The NED analysis is the Corps of Engineers' method of comparing costs and economic benefits using a standard method so that projects in different parts of the country can be compared in a standard way. This is a two-part analysis including an economic benefit analysis and a cost analysis.

Currently, the channel experiences erosion which can be severe during large events. Current maintenance work consists of blockage removal (such as downed trees), cleaning bridge pier noses of debris, and emergency erosion repair of failing and failed banks. A flood control project will change the way in which the channel is currently maintained. Implementation of the Bypass Channel Plan would substantially reduce this type of maintenance, thus, these costs will be saved. These savings are included as an economic benefit.

On the other hand, there will be costs associated with maintaining the Bypass Channel Plan. It is estimated that $482,000 in average annual maintenance costs will be required for the Bypass

Channel Plan. These costs will pay for annual inspections of bridges, maintenance roads, floodwalls, rock weirs, and channel slopes. They will also cover routing maintenance of these structures as well as routine repairs for gabions and cribwalls (bank stabilization structures), fencing, and recreation facilities (including daily maintenance of restrooms). Vegetation, sediment, and trash and debris removal are also covered by these costs.

On an average annual basis, there will be a savings of erosion and debris related maintenance of $200,000. There will be an increase of $482,000 associated with the Bypass Channel Plan components. Thus, there will be an average annual net maintenance cost increase of approximately $282,000. This cost increase is accounted for in the benefit-to-cost ratio and the net benefit calculation for all of the costs and benefits associated with the Bypass Channel Plan.

J-27. See response to comment J-1 and response to J-23.

J-28. Table 3.1 of the SCVWD Draft EIR/s (Parsons Engineering Science 1977) states that the total cost of the Preferred Project Alternative would be $113.5 million, including rights of way, construction, and mitigation costs. This includes Reaches A and 6 ($20.6 million) which are not included in the Corps' Bypass Channel Plan. Excluding the costs of Reaches A and 6, the comparable total cost would be reduced to $92.9 million. If the rights of way costs are deducted, the construction costs for the Preferred Project Alternative (less Reaches A and 6) are $72.6 million. The rights of way costs do not include acquisition of real estate.

As a Federal agency, The Corps of Engineers is required to estimate costs in a standard method so that projects in different parts of the country can be compared in a standard way. Thus, the Corps and the SCVWD have different cost components which may or may not be considered. The Corps is required to estimate financial costs and economic costs. Therefore, Table 52 of the Corps' Draft Feasibility Report lists a total cost of $153.2 million, which includes rights of way, land acquisition, construction, traffic delays associated with bridge closures, and interest during construction. Note that land acquisition, traffic delays, and interest during construction are not included in the SCVWD cost estimate. Further note that the Corps study includes $55.8 million in lands and damages (which include land acquisition and right of way costs). In order to compare SCVWD and Corps cost estimates in a meaningful way, one must compare the construction costs. Table 20 of the Corps Draft Feasibility Report (COE 1998) states that the construction costs would be approximately $77.7 million. This is in relative agreement with the SCVWD estimate of $72.6 million. The six percent difference may be accountable to several factors, including variations on contingency factors, price levels, and cost estimating methodologies.

J-29. Disparities in maintenance costs between projects may occur due variations on contingency factors, price levels, and cost estimating methodologies, as discussed in response to comment J-28. Average annual maintenance costs for the Bypass Channel Plan are estimated to be $482,000 (see response to comment J-26). Historical maintenance costs of the downtown flood control project are not readily available. The estimated maintenance costs for the Bypass Channel Plan are restricted to activity within the feasibility study area, rather than the Guadalupe River as a whole. Due to the fact that the downtown project is only partially constructed, a comparison of the downtown project costs to those estimated for the upper Guadalupe River proposal is inappropriate.

J-30. Discussion of the Stream Restoration Alternative has been added to Section 2.2, Formulation of Conceptual Plans. The alternative is discussed and shown to not be capable of achieving project objectives or fulfilling the project need, as it would require acquisition of substantially more land at extremely high cost, displacing approximately 200 households. If it used substantially less land to reduce land acquisition costs, it would not provide greatly expanded flood carrying capacity to restored stream channels.

Section 5.0, Recommendations, has been revised to identify the Channel Widening Alternative, which provides 50-year flood protection, as the Environmentally Superior Alternative. This alternative would require less construction disturbance of biological habitat, and would avoid significant, unavoidable impacts on land use and residential character on the west side of Mackey Avenue, and parts of Willow Glen Way to Malone Road. See response to comment J-1 for discussion of the Stream Restoration Alternative.

J-31. The feasibility study examined two different channel widening plans. The name "Valley View Plan" is used in the feasibility study to distinguish this plan from the other channel widening considered in the study. The name "Channel Widening Plan" was used in the EIR/S as it more appropriately defines the morphology of the alternative, making comparison to the Bypass Channel plan more understandable. Section 2.2, Formulation of Conceptual Alternative Plans, discusses the development of the channel widening alternative.

J-32. Response to comments made in the Western Waters Canoe Club letter of April 17, 1997 on the SCVWD draft EIR/S are included following the response to comment J-46. Comments on the SCVWD EIR/S have been considered as they relate to this EIR/S, such that the responses address only those issues related to the proposed Bypass Channel Plan alternative that do not duplicate other public comments. Other responses to comments on the SCVWD EIR/S will be provided as part of that Final EIR/S.

J-33. Some riparian forest mitigation has been done and additional plantings will occur in the near future.

J-34. Compliance with the Federal Water Project Recreation Act of 1965 is included in section 3.3.1, Federal Regulations. The act does not require that all possible outdoor recreational uses be provided. The Corps Upper Guadalupe River Flood Protection Study Feasibility Report states that Corps policy directives and physical constraints severely limit the type and extent recreational facilities that could be provided on a cost-shared basis. The recreational facility with the greatest potential recreational benefits and which the local sponsors are most interested in cost-sharing is a multi-use recreation trail linking the feasibility study area with existing trails along the Guadalupe River in downtown San Jose and upstream of Blossom Hill Road. This trail would also provide a critical link in a planned regional trail network, which would enhance its value. As stated in response to comment J-21, recreational access to the river must be balanced against goals of biological protection and concerns regarding human encroachment. The project reasonably balances the goals of flood protection with outdoor recreation by providing a pedestrian/bicycling trail and amenities described in section 2.4, Recreation Plan.

J-35. Because the floodplain throughout nearly all the feasibility study area is already urbanized, a flood control project is not capable of preserving or restoring natural floodplain values without excessive land acquisition costs and relocation of residential populations. Because the natural function of the floodplain as a water storage area is no longer acceptable due to urbanization, prevention of flooding inherently requires either upstream storage, floodproofing, or removal of all development from the floodplain (none of which are feasible), or floodway enlargement. Floodway enlargement requires either a non-geomorphic approach (as proposed) that uses some hardscape but requires much less land, or a geomorphic approach (stream restoration), which would require so much land and displacement of people (in this particular location) as to be prohibitively expensive and disruptive. A smaller stream restoration alternative that uses much less land would not by itself provide substantial flood control.

Herbicides would be used primarily for maintaining the bypass channel and maintenance corridors. Total habitat acreage would increase due to mitigation plantings.

J-36. Discussion of the Stream Restoration Alternative has been added to Section 2.2, Formulation of Conceptual Plans. The alternative is discussed and shown to not be capable of achieving project objectives, as it would require acquisition of substantially more land at extremely high cost, and cause significant socioeconomic impacts by displacing approximately 200 households. If substantially less land were used to reduce land acquisition costs, the alternative would only minimally provide expanded flood carrying capacity. The stream restoration alternative would therefore not be capable of feasibly attaining the basic project objectives of increased flood protection. It would substantially impede the attainment of this objective, so that it is not considered a reasonable project alternative under CEQA Section 15126. See response to comment J-25.

J-37. Although either the Channel Widening or Bypass Channel Alternative would be inconsistent with some policies regarding protection of biological habitats, Section 3.3.4, Local Regulations, concludes that either of the flood protection alternatives would be consistent with City and County policies calling for restoration of unavoidable impacts on streams and riparian corridors. City and County governments have not indicated any project inconsistency with their plans. Total restoration of the river corridor is not a project goal of the Corps due to prohibitively expensive real estate costs.

J-38. The River and Harbors Act has been added to section 3.3, Compliance with Environmental Requirements. The Corps does not issue itself a permit for Corps-proposed projects, but all Corps projects are planned and implemented to conform with the requirements of Section 10 of the Rivers and Harbors Act. Therefore, there are no Corps permits that are issued for the proposed actions in the feasibility study area. The State Lands Commission (SLC) is responsible for administration of state public trust lands in coastal waters (within the 3-mile territorial limit) and other tidal and submerged areas. The state's interest in these land consists of sovereign fee ownership, or a Public Trust easement, implicitly retained by the state over sovereign lands sold into private ownership. Since the Guadalupe River within the feasibility study area is not in coastal waters, or other tidal and submerged areas, the SLC has no jurisdiction over the project.

J-39. Response to comments made in the Western Waters Canoe Club letter of April 17, 1997 on the SCVWD draft EIR/S are included following the response to comment J-46. Comments on the SCVWD EIR/S have been considered as they relate to this EIR/S, such that the responses address only those issues related to the proposed Bypass Channel Plan alternative that do not duplicate other public comments. Other responses to comments on the SCVWD EIR/S will be provided as part of that Final EIR/S.

J-40. Section 6.1.1 describes the downtown project accurately as being in progress. Mitigation for that project has not been completed. The scope of the cumulative analysis is based on projects proposed, under construction, or recently completed at the time the DEIR/S was being prepared. Projects not proposed but under contemplation are not considered reasonably foreseeable, and therefore are outside the scope of the cumulative analysis.

J-41. Most of these plantings were washed away in floods in 1995, and they will be replaced. Lessons learned in the downtown project would be applied in developing final mitigation plans for this project.

J-42. This comment addresses aspects of the environmental setting resulting from past activities, including flood control management practices. The effects of these past activities are reflected in the description of the affected environment. We believe the Final EIR/S adequately addresses the project's direct, indirect, and cumulative impacts, and identifies appropriate mitigation to avoid additional deterioration of the river ecosystem.

J-43. The comment identifies an issue with the downtown project rather than the project evaluated in this EIR/S. Replanting of flood-damaged mitigation areas will occur in the near future. No additional construction for the downtown project will be allowed by regulatory agencies until a satisfactory plan for mitigating associated impacts is approved.

J-44. The comment implies that all habitat above the drop structure is unsuitable, but this is inaccurate. As described in section 4.2.2, habitat quality varies and includes some degraded sections. Suitable habitat does exist upstream, as indicated by the presence of resident trout in some areas. Both steelhead trout and chinook salmon have been observed at the drop structure and are expected to use suitable upstream areas once access is provided.

J-45. We respectfully disagree, noting that a restoration alternative like the one alluded to does not meet key planning objectives.

J-46. Constructing upstream flood control projects (assuming that the proposal would provide some measure of flood control) prior to protection of downstream areas would make these downstream areas temporarily more vulnerable to flooding, and is therefore not acceptable. If the proposal did not significantly reduce flooding, this would not be a problem, but then the proposal would not be responsive to the purpose of the Corps feasibility study.

Western Waters Canoe Club letter of April 17, 1997.

The following text responds only to comments that do not duplicate other public comments. Comments on the SCVWD draft EIR/S will be addressed in their final EIR/S.

The design for Reach 12 should include riparian forest and SRA cover restoration.

The design for Reach 12 provides space for seasonal in-stream percolation ponds that have been used here in the past and which the SCVWD intends to use again in the future. The SCVWD considers these in-stream ponds to be an important part of its groundwater recharge program. However, these ponds limit the amount of riparian forest and SRA cover that can be established in this reach. The USFWS does not consider riparian forest adjacent to a percolation pond to provide SRA cover.

Removal of riparian forest adjacent to roads and the addition of maintenance roads will enable much more polluted street runoff to enter the river without being filtered by riparian forest in Reaches 9, 10A, 11B, and 11C. This is a significant impact.

Construction of Reaches 9 and 10A will be coordinated with the City of San Jose and its planned widening of Almaden Road. The widened road will include a recreation trail. Detailed designs have not been prepared so it is not known how street runoff will be handled, but is expected to be handled through existing storm drains and outfalls. In Reaches 11B and 11C, riparian forest between the Almaden Expressway and the river will be increased in width at most locations.

This impact would not be significant.

Overflow channels for the downtown Guadalupe project are failing and should not be used on this project until they can be shown to work. Problems include erosion and sedimentation.

The designs of the downtown project and this project are quite different. The overflow area in the downtown project was originally conceived as a widened channel, but during construction a berm was left between the bench and the main channel as a way of reducing impacts on SRA cover. The problem mentioned has been addressed by construction of a berm upstream. The bench area was designed with a secondary channel.

In contrast, the bypass channels proposed for this project would seldom contain water. These are set at an elevation above the geomorphological "bankfull" channel such that they would act as a floodplain and confine sediment transport to the natural channel. Sediment modeling has shown that sediment accumulations should generally be minor.

Maintenance roads are not needed. Natural rivers do a very good job of maintaining themselves.

Natural rivers have broad floodplains which absorb and mitigate the impacts of large floodflows. In a natural system, debris accumulations and unrestricted vegetation growth can constrict the flow of the river and encourage its overflow onto the adjacent floodplain. Such overflow is not harmful in a natural system, but is undesirable in an urban setting. The proposed bypass design is restricted in size by adjacent urban development and cannot fully replicate the function of the floodplain, nor can it reliably convey flood flows without continuing maintenance to clear obstructions. In addition, access is needed for any necessary repair work and for removal of sediment should it be needed.

SANTA CLARA
Valley Transportation Authority

October 27, 1997

Army Corps of Engineers
Environmental Planning Section
333 Market Street, Seventh Floor
San Francisco, CA 94105-2197

Attention: Mr. William DeJager

Subject: Upper Guadalupe River Feasibility Study

Dear Mr. DeJager:

Santa Clara Valley Transportation Authority (VTA) staff have reviewed the *Draft Feasibility Report (Report)* and *Environmental Impact Statement/Report (DEIS/DEIR)* prepared by the Corps of Engineers, San Francisco District (Corps) and the Santa Clara Valley Water District (SCVWD) to evaluate the impacts associated with the proposed upper Guadalupe River flood control project (Project) in Santa Clara County. Our comments are presented below:

VTA's operates *Bus Lines 25, 26, 27, 37, 38, 64, 67, 82*, and Light Rail (*LRT*) and maintains numerous bus stops and park-and-ride lots in the vicinity of the Project. Another transit service provided in part by VTA, operating in the vicinity of the Project and affected by the Project, is CalTrain.

<u>General Comments</u>

- VTA staff support the efforts to coordinate with the City of San Jose on recreational facilities and uses in the area. K-1

- Santa Clara County Transit is now Santa Clara Valley Transportation Authority. References to *"Santa Clara County Transit"* found throughout the *Report* and *DEIS/DEIR* should be changed to *"Santa Clara Valley Transportation Authority"* or *"VTA."* K-2

- VTA staff support the Bypass Channel alternative for the following reasons: K-3
  * The alternative will remove the Tamien Station area and our vacant six-acre parcel from the 50-year flood plain. After construction of the Bypass Channel alternative, Tamien will be within the 500-year flood plain.

K-4 * The alternative will facilitate the construction of improvements--funded by the City of San Jose--to create a continuous recreational trail along the length of the river. This will allow for the connection of the recreational trail proposed for the Project area with existing trails along the Guadalupe River, in downtown San Jose and upstream of Blossom Hill Road, providing a critical link in the regional trail network.

K-5 * VTA staff recommend that the *Final EIS/EIR* clarify the policy of the Corps/SCVWD regarding providing unimpeded public access to the trail. Fencing and gates can preclude convenient public access and severely limit the benefits of such a trail.

<u>Transit Service</u>

K-6 • In Section *4.7.2, Existing Conditions*, of the *DEIS/DEIR*, on Page 4.7-1, the list of streets which are affected by the project and which are used by VTA's bus lines should include the following:

Branham: Line #68	Hillsdale: Line #37
Blossom Hill: Line #27	Malone: Line #67

K-7 • In Section *4.7-3, Environmental Effects*, of the *DEIS/DEIR*, on Pages 4.7-6 and 4.7-9, there are discussions of the impacts to *"Mass Transit"* and *"Transit Lines."* The discussions indicate that construction activities will significantly impact transit service; however, the *"significant short-term impact"* would be *"mitigated to insignificance by providing early notification to the Transit district to allow for bus line rerouting and to minimize the need for rescheduling."*

* Early notification alone will not mitigate the impact. All changes that require either rescheduling, additional operators and/or vehicles will have a significant cost impact to VTA and may inconvenience riders. VTA staff recommend that the additional operating costs and direct costs associated with notifying the public, including the staff time required to prepare new schedules and the cost to print new schedules both before and after the changes, be included in the Project budget and paid by the Corps/SCVWD.

K-8 • Section *4.7.3, Environmental Effects*, of the *DEIS/DEIR*, on Pages 4.7-5 to 4.7-10, refers to a *"Traffic Mitigation Plan"* (TMP), including a *"Construction Traffic Management Plan"* (CTMP), as a measure to mitigate traffic and transit impacts to a level of insignificance. Section *4.7.4, Mitigation Measures*, on Pages 4.7-10 to 4.7-12, further discusses the measures constituting the TMP and states that *"1. During design of the construction plans, a detailed Construction Traffic Management Plan shall be developed and implemented."* and that *"4. Santa Clara County Transit shall be notified of any bridge closures and need for rerouting."*

* To assure good coordination between VTA Operations and the Project, VTA staff request that VTA be involved in the development of the details of the TMP and CTMP and/or be given the opportunity to review and approve the TMP and CTMP. Plans for providing line re-routes and other mitigation measures, if necessary, should be included in the TMP and CTMP to ensure that transit service will be minimally disrupted during construction. K-8

- To state VTA's involvement in the development of the TMP and CTMP, Section *4.7.4, Mitigation Measures*, should include language that describes who will develop and how the TMP and CTMP will be developed, the process and timeline for approving the TMP and CTMP and who will bear the cost of developing the TMP and CTMP. K-9

- Tables *4.7-2, Bridge Construction for the Bypass Channel Plan*, and 4.7-3, *Affected Traffic Arteries*, identify the bridges and major streets affected by the Project. Section *4.7.3, Environmental Effects*, includes assessments of the Project impacts to local roads. The section should also include assessments of the impacts to transit service, including travel time delays and operating cost increases. K-10

- An access permit is required for all work in and around the light rail operating right-of-way. Please contact Ron Saxbury at (408) 321-5856 for issuance of the access permit. K-11

- Please contact Ron Wong, VTA Bus Stop Maintenance Coordinator at (408) 321-7054 a minimum of 72 hours prior to the start of any construction work which will affect existing bus stops or transit operations including, but not limited to, road closures and detours and bus stop relocations. K-12

<u>Caltrain Service</u>

- VTA staff also recommend that Project impacts to existing and future train service using the SPRR bridge be more thoroughly discussed in the *Report* and *Final EIS/EIR*. K-13
  * *Table 27: Utility Replacements & Modifications*, on Page 70 of the *Report*, identifies *"Temporary railroad relocation for culvert"* and *"SPRR Bridge"* under *"Type"* and *"Approx. Location"* for Reach 7A. However, there is no discussion within the associated text of Section 7.4, *Project Impacts and Mitigation*, regarding this listing. This bridge handles a fair amount of traffic, including freight and Amtrak service on rather unreliable schedules, and Caltrain service to Gilroy. A detailed discussion of the impacts to service and of the railroad relocation should be included in the *Final EIS/EIR*.

K-14 * In Section *4.7.3, Environmental Effects*, on Pages 4.7-7 and 4.7-10 of the *DEIS/DEIR*, *"SPRR and UPRR Operations"* are discussed. The discussion, however, downplays the impacts of the Project on train service and on the Project's budget and schedule. This issue needs to be discussed more thoroughly and must consider a planned expansion of Caltrain service to Gilroy with an increased number of trains traveling to and from San Jose. As part of the increased service, VTA will likely be asked to put in track improvements, including double-tracks at certain segments of the route. This element of expanded train service must also be considered when discussing *"SPRR and UPRR Operations"* and determining the Project's approach at the SPRR bridge.

We appreciate the opportunity to review this project. If you have any questions, please call Lauren Bobadilla of my staff at (408) 321-5776.

Sincerely,

Roy Molseed for

Thomas Rountree
Environmental Program Manager

TDR:LGB:kh

K. Thomas Rountree, Santa Clara Valley Transportation Authority (VTA). October 27, 1997.

K-1. VTA staff support of project efforts to coordinate with the City of San Jose on developing recreational facilities and uses within the feasibility study area is appreciated.

K-2. References in the EIR/S to Santa Clara County Transit have been changed to Santa Clara Valley Transportation Authority (VTA).

K-3. The relative flood protection benefits of the Channel Widening Plan and the Bypass Channel Plan for the Tamien Station area have been incorporated into section 4.7.3. under both alternatives.

K-4. The beneficial aspects of the Bypass Channel on development of the recreational trail are discussed in section 2.4.2, Bypass Channel Plan, under the subsection titled Recreation Plan.

K-5. Design and construction of public works projects often require consideration of competing interests. In the case of fencing along the recreational trail, the interest of public safety may compete with the interest of unimpeded public access. The Corps has determined that in order to ensure public safety, it would be necessary to install protective fencing along selected portions of the trail. However, no gates are planned that would prevent public access to the trail.

K-6. Three of the indicated bridges (Branham Lane, Hillsdale Avenue, and Malone Road) used by VTA bus lines have been added to the list in section 4.7.2. The Blossom Hill Road bridge at the southern end of Reach 12 would not be impacted by the project, hence it was not added to the list.

K-7. Compensation for costs incurred by VTA during construction, such as costs associated with notifying the public of bus route/schedule changes or costs associated with operation of additional vehicles, would be a matter of negotiation between SCVWD and VTA. Mitigation Measure No. 4 in section 4.7.4 has been expanded to include this information. Also in response to this comment, the discussions in section 4.7.3 under the Channel Widening Plan regarding "Mass Transit" and under the Bypass Channel Plan regarding "Transit Lines" have been expanded and renamed to more specifically address both "Bus Service" and "Light Rail Transit Service".

K-8. The Corps concurs that VTA should be invited to participate in development of the Construction Traffic Management Plan (CTMP) and that provisions for transit line reroutes should be included in the CTMP to ensure that transit service would be minimally disrupted during construction. Mitigation Measure No. 1 in section 4.7.4 has been revised to include these points. VTA staff time for participation in the planning effort, however, cannot be compensated by the Corps.

The "Traffic Mitigation Plan" mentioned in section 4.7.4 of the Draft EIR/S was intended to refer to the overall traffic impact mitigation planning effort, which includes not only the CTMP, but many other measures that would be the responsibility of the Corps, the SCVWD, the City of San Jose Public Works, and the various contractors performing the construction work. To avoid confusion in the Final EIR/S, all references to a plan for traffic impact mitigation have been changed to "Construction Traffic Management Plan".

K-9. VTA would be invited to participate in development of the CTMP, which would occur during the same time period as development of the construction plans. Mitigation Measure No. 1 in section

4.7.4 has been expanded to include this information. The Corps and SCVWD would bear the cost of developing the CTMP, except for the cost of staff time incurred by any participating agencies and organizations.

K-10. The mass transit discussion in section 4.7.3 has been retitled "Bus Service" and has been expanded to specifically refer to the possibility of travel time delays and operating cost increases.

K-11. Construction work in or around the light rail operating right-of-way is not anticipated. Nevertheless, the requirement for an access permit from VTA for such work, if it should be necessary, has been added to section 4.7.3.

K-12. The specific requirement to contact the VTA Bus Stop Maintenance Coordinator at least 72 hours prior to the start of any construction work affecting bus stops or bus transit operations has been added to Mitigation Measure No. 4, in section 4.7.4.

K-13. The Corps does not anticipate that a "temporary relocation" of either the SPRR or the UPRR would be necessary for construction of box culverts under the railroad bridges in Reach 7 with the bore and jack construction method. The approach described for the Bypass Channel Plan (see section 4.7.3, SPRR and UPRR Operations) would apply for the Channel Widening Plan as well. The Channel Widening Plan discussion in section 4.7.3 has been expanded to reflect this.

K-14. Construction at the SPRR and UPRR crossings in Reach 7 is identified in section 4.7.3 as a "significant, short-term impact" for both the Channel Widening Plan and the Bypass Channel Plan. Mitigation Measure No. 7 in section 4.7.4 describes the efforts that are proposed to minimize the impact on rail service. In response to this comment, discussions of the existing Caltrain service on the SPRR track have been added to sections 4.7.2 and 4.7.3. Information regarding the planned expansion of Caltrain service to Gilroy with an increased number of trains traveling daily between Tamien Station and Gilroy has been incorporated into section 4.7.2.

FAX 415 977-8483

October 27, 1997

Lieutenant Colonel Richard G. Thompson
District Engineer, San Francisco District
US Army Corps of Engineers, Regulatory Branch
333 Market Street, San Francisco, CA 94105-2197

Attention: William DeJager, Environmental Planning Section

Dear Colonel Thompson,

In regards to the Draft Feasibility Report & Environmental Impact Statement/Report (EIS/EIR), Upper Guadalupe River Feasibility Study, I would like to reference all my previous correspondence on the environmental constraints of the project and the entire project region.

In addition there are areas of continuing concern that I do not believe have received due consideration by you and your staff.

I In your June 1977 Hydrologic Engineering Office Report Guadalupe River and Coyote Creek Santa Clara County, California it was documented in TABLE II that the unimpaired peak discharge - cfs of Guadalupe River at San Jose for the Standard Project Flood and One Percent Chance Flood was 33,700 cfs with 18,100 cfs above the Los Gatos Creek confluence. L-1

Future conditions were estimated to be 17,000 cfs and 14,600 cfs due to the presence of upstream reservoirs. "The existing reservoirs can have a great effect on flood discharges in the basin even though they are operated strictly as part of a conjunctive-use water-supply system. Water stored in the reservoirs each winter is released for percolation into yhe groundwater basin during the summer months. This conjunctive-use system, as opposed to operating the surface water system on a firm annual yield basis with carryover storage in the reservoirs from year to year, results in many of the reservoirs being empty or nearly empty at the start of each rainy season."

These conditions on which the "balanced" hydrograph method was based and the volume-frequency curves established have been dramatically altered by the importation of water, from the Central Valley, which doubles the base for the historic supply volume. This alters, I believe, your base flow data and makes your future conditions 17,000 cfs for San Jose inaccurate.

The presence of reservoirs was referenced in your lower Guadalupe River project as being a basic element of the entire flood control project design. It is imperative that the US COE reestablish this hydrologic evaluation of Guadalupe River flows with the present water supply regimen.

II As the downstream Guadalupe River from #280 to San Francisco Bay is flood oriented to a 100 year flow of 21,000 cfs it would appear to be more economical to delay storm events in the upper watershed until the peak flows have been passed downstream; That is if the FEMA 100 year flood program is to be the yardstick. (This is similar to the requirement for the City of San Francisco to construct an underground vault for flood water detention to keep from swamping the water treatment plant in storm events.) L-2

This alternative to upper watershed detention could use the Almaden Mines (well lined to protect from mercury/quicksilver), the quarry in Signal Hill, or rely on flood closure of Highway #85 and turn off the dewatering pumps. But am sure your engineers could devise more sophisticated alternatives.

L-3 III This is not a complete watershed study in that it does not account for the flora and fauna of the upper watershed, the importance of the continuity of the riparian corridor to the wildlife of the upper watershed and the Sierra Azul of the Pacific Flyway. The Riparian Brush Rabbit and the Mountain Plover, the Northwestern and Southwestern Pond Turtles, should all be considered as Candidate Species and Species of Concern.

As the cost for mitigation for loss of environmental integrity of this prime Guadalupe River habitat is getting to be economically unviable, it would be best for the US COE to return to the Federal mandate on "avoidance of impact". This was not done on the Lower Guadalupe River flood control project reaches and the cost has overwhelmed the design.

If a real upper watershed retention capability is found then mush of the riparian losses downstream should be lessened if not avoided in toto.

I enclose (again) the percolation potential map for the Guadalupe area in hopes that you will note the high percolation value of Ross Creek, especially where it flows into the Guadalupe River. This should not be cemented in but left an open marsh interface. Upstream retention is also possible on Ross Creek.

Canoas Creek is also in need of its former marsh, visable on this map and the site of Canoas Gardens; and perhaps a garden of canals could be reestablished here as a form of detention basin. When the Guadalupe River is in flood stage, neither of these two rivers can drain into the main stem anyway so something special has to be devised.

I believe the property that has been considered for a bypass at the site of the old cannery has been sold for development and so is no longer available. This is sad to have happen along so much of this corrodor, that the options are all disappearing.

It is also imperative that a proper sediment transfer analysis be done for this project. Sediment is drowning the downstream bypass channels. At the same time, the streams need natural bottoms, earthen channels, to agrade or degrade as conditions decree. A cement base can only agrade.

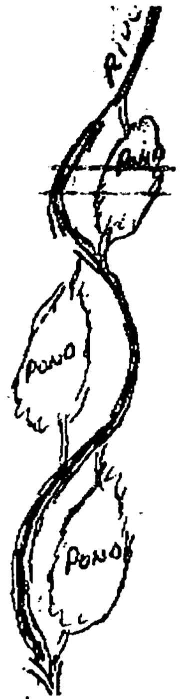
In consideration of lack of time to re-review these two volumes, I beg your forbearance if I enclose my comments on the earlier documentation as most of the areas of concern still apply.

Sibcerely,

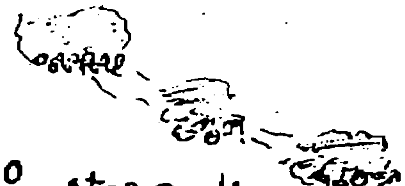
Libby Lucas

Libby Lucas
174 Yerba Santa Ave.
Los Altos, CA 94022

L-4 PS The thermal impacts of this flood control project cannot be mitigated, if any salmon or steelhead are to survive in this river system. This is just one more reason why the watershed retention alternative must be taken very seriously.



* off stream perc pond sites



O step pools

ᑭ infiltration galleries for streams modified over prime percolation gravels.

ALTERNATIVES

FOR IMPROVED INSTREAM RECHARGE PROGRAM

EXHIBIT A

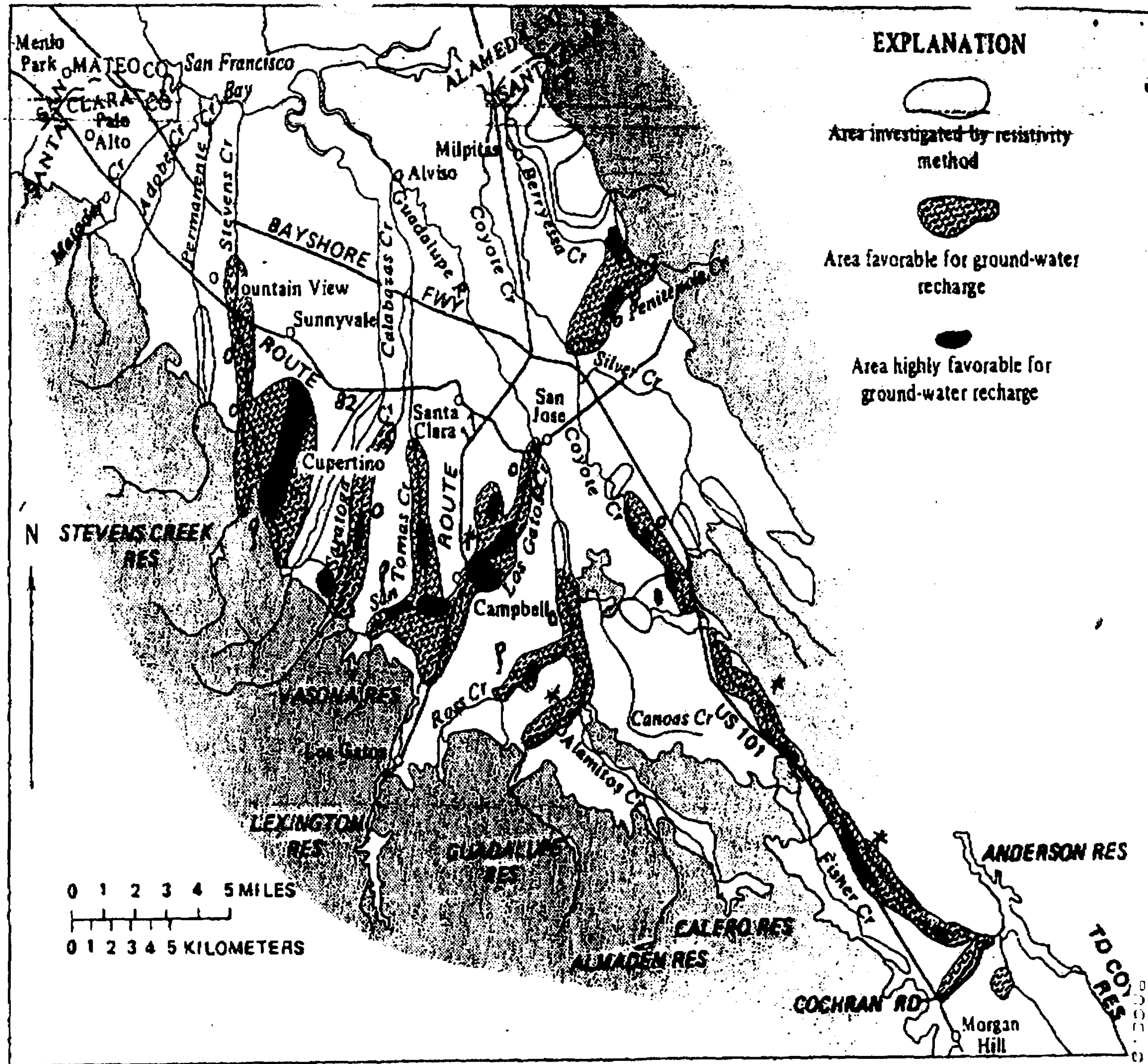


FIGURE 48.—Areas favorable for ground water recharge in ~~nor~~southern Santa Clara County. After Page and Wire (1969).

FAX 415 977-8483

April 23, 1997

Lieutenant Colonel Richard G. Thompson
District Engineer, San Francisco District
US Army Corps of Engineers, Regulatory Branch
333 Market Street, San Francisco, Ca 94105-2197

Attention: Regulatory Branch PUBLIC NOTICE #17776S

Dear Colonel Thompson,

The application by the Santa Clara Valley Water District for a 404 Permit from the US COE to construct the Upper Guadalupe River Flood Control Project, to excavate and place fill in 1.85 acres of wetlands and 10.6 acres of the Waters of the United States in the Guadalupe River, I find deficient in its assessment of irreversable impact to those wetlands and waters.

There are aspects of the flood control project that are not in compliance with the environmental mandate for avoidance of alteration of a stream's wetlands and waters as the preferred alternative. (Inflatable dams not coffer?)

This project has impacts to fisheries that are improperly assessed and that it is possible to avoid in the extent of the planned project.

The extent of thermal pollution is not accurately assessed and the proposed mitigation will not assure the survival of species that are extant in the main stem of the Guadalupe River. Species of particular concern or in need of protection are steelhead, and the chinook and coho salmon.

The integrated watershed management ascribed to the San Francisco Estuary Basin Plan and which the District supports should demand that the upper Guadalupe watershed be incorporated into the environmental assessment of this flood control project which it is not. And yet mitigation is planned beyond the parameters of the project in tributary streams of this upper watershed without biotic support data.

The design of wiers and inchannel gradient controls limit the constitutional right of the public to use these navigable waters for recreation.

The placement of fencing along the banks of this river and tributary streams is in violation of Public Resources Code 6301 and Civil Code Section 803, as it restricts the public and wildlife from access to the waterways.

There is a built-in design of the 'improved' stream beds that incorporates a maintenance road into the floodway. This may be convenient for the vegetation management but removes shaded riverine aquatic habitat and the vegetative buffer that is vital to reduce non-point source pollution of the stream. It would also contribute to bank erosion, through spraying maintenances practices, and sediment transfer to the base stream flow.

Finally, there is the concern that the original COE scoping document in 1976, for flood control of the Guadalupe River was assessing the historic watershed hydrograph, whereas present water supply practices double the volume of water that is stored in reservoirs and percolated into the aquifers, with Delta and Central Valley water imports. Alamitos and Los Gatos Creeks are conveyors of this new supply which should be evaluated for the 1% flood event.

Upper Guadalupe River Flood Control Project, Number 17776S p.2

1. Introduction: "1.85 acres of wetlands" I find is in error, first from the standpoint that loss of linear riparian wetlands should be assessed in linear feet, not acres, should be computed for both sides of the stream bank (times 2) and should be valued as of high value (times 3) for mitigation, and that mitigation should be in kind and in place, not uplands or on another river or in San Francisco Bay. My figures for riparian wetlands loss are somewhat staggering and I would like a continuance to submit them within three weeks. The 10.16 acres of Waters of the United States is also understated, I feel, and request continuance on that point also, and a review of the tree count.

2. Project Description: Second paragraph, line 6, refers to 1995 floods. The flood surge came from the Los Gatos Creek system that swamped downtown San Jose which is not within the scope of this project environmental review, though it probably should be if this was a complete integrated watershed plan.
Third paragraph, first line, says the project would convey flows up to the 100-year flood. I feel that this is optimistic with the build-out and imported water. Last line of first page references step pool fish ladder at 15-foot Blossom Hill structure which is part of entirely separate implementation of Fish & Game Code.

Page 2, line 2, I disagree with the statement that these access roads are needed and that the present District practices of weed control are consistent with the criteria of the Clean Water Act. With the extent of vegetation removal this proposed project will increase simple bank erosion and sedimentation, though it can indeed stabilize undercut and sloughing off steep banks in some of the reaches. The statement that the project will improve biotic resources by removing fish barriers is true only in that Fish & Game insist that the barriers go, but the loss of riparian cover and wetlands and the attendant thermal pollution do not improve biotic resources. The construction of these flood control facilities, as designed, I feel will immeasurably reduce the survival of significant species.

The project construction period of 25 years is too long. The potential impacts of ongoing vegetation removal is giving maintenance a blank check to harass the habitat and contributes to continual destabilization, if the downtown flood control project is any example. In-channel construction has an extremely thin window of opportunity if it is not to seriously impact either incoming salmon or outgoing fry. The May 1 to October 15 is completely inappropriate in this South Bay river system and this criteria should be edited out at all references.

If the river is functional it should be able to carry its own sediment load and sediment removal and vegetation removal should be minimal. The removal of fish barriers in the main stem of the Guadalupe River provides no benefit to fish if there is not a tributary to go to that does not have a reservoir at the head of it, Not enough water and not enough shade will be lethal to the species of concern, the steelhead and the salmon. This applies equally to Reach A and to Reach 13, and the upper tributary streams are not biotically assessed so can not be considered an option at this time? (I don't have Vol. III)

I would like to state that the fishery biologist of Natural Resource Conservation Service for the West did briefly survey two tributaries and the Guadalupe River a year and a half ago. She found the heavily shaded reaches in the River, downtown near the railroad bridges, fine for salmon. Guadalupe Creek was feasible for the steelhead with the appropriate water regimen. Alamitos Creek, however, was too warm and murky for either. The brown trout seem comfortable there but she warned not to let them get to the other two water bodies as they are predators on the steelhead and the salmon redds and fry. This would mean that if modifications were made to Almaden Lake to allow steelhead and salmon access, the brown trout should all be removed.

At this point I would like to digress to the Fisheries: paragraph on the second to last page of this text. The mitigation here proposed for the cumulative impacts on fisheries habitat by the District is highly deficient in water quality, shade and refugia of biotic value. I would request that our fishery expert visit the stream for proper scientific review before this mitigation habitat is seriously considered. She was quite definite that the Alamitos Creek was not a steelhead stream, but am sure she would like to make her report in the appropriate scientific style of the Service.

To recondition the Coleman Road/Guadalupe Creek reach so that cooler refugia could be utilized by steelhead, would require considerable planting which might well be undertaken at this time. If the District is wedded to the prospect of the 10.7 miles of Alamitos Creek being viable, they could embark on a major planting spree there too. But both these sites demand the assured base flows from the reservoirs and I'm not at all certain that the District Board has any intention of providing that supply..This should be spelled out in the mitigation package before this 404 permit is given approval of any sort.

In this upstream watershed there is the extensive old Almaden Quicksilver Mines complex that impacts both Guadalupe Creek and Alamitos Creek with water quality point and non-point pollution from the mine tunnels (miles of them) runoff and the tailings instream. This needs scientific evaluation.

The thermal pollution on both Alamitos and Guadalupe Creeks is a watershed concern that should be spelled out in the District data as they must have the readings over the past two years. (Is this in the elusive Volume III that the District omitted to circulate?) This is essential data for any consideration or assessment of the steelhead or chinook habitat and the sustainability of runs. But 13.3 miles "of more suitable upstream..habitat" it is not!!!

Almaden Lake and the District percolation ponds above Reach 13 are an even more serious thermal pollution source and it is essential to review the instream management of these facilities in evaluating Reach 13 fishery potential and riparian integrity. At present most trees above the drop structure are dead from drowning in the percolation lake.

Ross Creek:
Thermal review of Ross Creek and Canoas Creek should also be included into the assessment of any wetlands or vegetation removal. Here again I feel the District should be planting assiduously, taking out concrete and maintenance roads and inviting the neighborhood to adopt-a-creek. There is at present a maintenance road on both banks and not a tree in sight of this nice stream.

Attached please find a map of areas favorable for groundwater recharge and note the value of Ross Creek in this regards. To line this prime percolation creek with 8,600 linear feet of articulated concrete matting is not a good watershed management integration with flood control. Great songbirds here also!!!

The increase in the use of herbicides to control preemergent vegetation along new access ramps and maintanance roads is an avoidable toxic impact. When you see almonds on a tree by a creek maintenance road you know dead squirrels mean dead burrowing owls and probably not too healthy pond turtles or red-legged frogs. This District practice has to stop in a wildlife corridor, so don't put in the access ramps and roads. This should be considered only in extreme conditions. This chemical spraying regimen is extremely unpopular with the public, as health concerns are valid. The pond turtles, osprey, steelhead, chinook salmon, owls, coho salmon (possibly) and red-legged frog are threatened or species of special concern that must be protected in project area! Libby Lucas, 174 Yerba Santa, Los Altos 94022

Libby Lucas

PS. Summary of Cumulative Impacts: There have been more projects on the Guadalupe River than you include here. Woz Way, pedestrian bridges, Confluence Point bridges, bank contouring and observation tower, light rail crossing, railroad bridge removal, hard edge treatment (removal of riparian vegetation) for Lincoln Towers, Adobe Systems, IBM Headquarters, Children Discovery Museum rock outcropping.... the list is endless and Highway #87 hasn't even begun. I estimate the tree loss at over 85% and it was you at the US Corps who gave out the permits. Initially your project as scoped left the old natural riparian corridor intact, more or less, for two thirds of the three-mile downtown project area. Redevelopment is remorseless!

FAX

January 23, 1997

Department of the Army
U.S. Army Engineer District,
Corps of Engineers,

In my January 17 response on the Guadalupe River Project, Draft Habitat Evaluation Procedure (HEP) Report, I requested a slight extension for a more thorough review of any pre-dam Guadalupe stream flow data.

What little there is to be found, with my resources, is interesting but is not enough to match a twenty year hypothetical low flow year analysis. However it does make a very strong point that all subsequent flows in the Guadalupe River system are artificial, as they are District controlled, to maximize percolation potential to the aquifer.

Water year October 1929 to September 1930 had 19 days of flow: # 11169000 (daily mean values)

1-5	15 cfs	3-4	1110 cfs	3-8	199 cfs			3-15	84 cfs
1-12	10 cfs	3-5	3030 cfs	3-9	107 cfs	3-12	4.6 cfs	3-16	39 cfs
1-13	1 cfs	3-6	1290 cfs	3-10	48 cfs	3-13	.4 cfs	3-17	14 cfs
1-16	9.5 cfs	3-7	461 cfs	3-11	21 cfs	3-14	66 cfs	3-18	1.8 cf

October 1930 to September 1931 had 0 days of flow

October 1931 to September 1932 had 45 days of flow

12-24	1800 cfs	1-1	185 cfs	1-15	476 cfs	2-1	115 cfs	2-11	296 cfs
12-25	156 cfs	1-2	259 cfs	1-16	105 cfs	2-2	69 cfs	2-12	200 cfs
12-26	25 cfs	1-3	149 cfs	1-17	50 cfs	2-3	34 cfs	2-13	151 cfs
12-27	3740 cfs	1-4	71 cfs	1-18	30 cfs	2-4	24 cfs	2-14	108 cfs
12-28	2650 cfs	1-5	32 cfs	1-19	23 cfs	2-5	24 cfs	2-15	79 cfs
12-29	749 cfs	1-6	17 cfs	1-20	14 cfs	2-6	739 cfs	2-16	71 cfs
12-30	256 cfs	1-7	6 cfs	1-21	4.9 cfs	2-7	639 cfs	2-17	37 cfs
12-31	265 cfs	1-8	.4 cfs	1-22	.6 cfs	2-8	951 cfs	2-18	10 cfs
				1-31	8.5 cfs	2-9	1090 cfs	2-19	3.5 cf
						2-10	494 cfs	2-20	.4 cf

October 1932 to September 1933 had 28 days of flow

12-28	.1 cfs	1-10	.10 cfs	1-16	.10 cfs	1-25	15 cfs	1-5	.10 cfs	3-23	.10 cf
12-29	.2 cfs	1-11	.10 cfs	1-17	.20 cfs	1-27	22 cfs	1-6	.30 cfs	3-24	.10 cf
12-30	.2 cfs	1-12	.20 cfs	1-18	.40 cfs	1-28	4.6 cfs	3-15	.10 cfs	3-29	.10 cf
12-31	.1 cfs	1-13	.20 cfs	1-19	.20 cfs	1-29	110 cfs	3-16	.10 cfs		
12-24	.2 cfs	1-14	.20 cfs	1-24	9.5 cfs	1-30	8.0 cfs	3-17	.20 cfs		

October 1933 to September 1934 had 19 days of flow

12-12	88 cfs	12-30	277 cfs	1-4	34 cfs	2-26	528 cfs
12-13	86 cfs	12-31	58 cfs	1-5	2.8 cfs	2-27	188 cfs
12-14	.1 cfs	1-1	1380 cfs	2-23	133 cfs	2-28	70 cfs
12-29	14 cfs	1-2	462 cfs	2-24	236 cfs	3-1	16 cfs
		1-3	109 cfs	2-25	54 cfs	3-2	1.8 cfs

October 1934 to September 1935 had 45 days of flow

1-4	70 cfs	1-17	15 cfs	3-26	4.6 cfs	4-13	46 cfs
1-5	62 cfs	1-18	7 cfs	3-27	.2 cfs	4-14	34 cfs
1-8	92 cfs	1-19	29 cfs	4-3	69 cfs	4-15	297 cfs
1-9	626 cfs	1-20	1.2 cfs	4-4	197 cfs	4-16	245 cfs
1-10	566 cfs	3-7	248 cfs	4-5	100 cfs	4-17	146 cfs
1-11	83 cfs	3-8	50 cfs	4-6	42 cfs	4-18	93 cfs
1-12	2.0 cfs	3-9	8 cfs	4-7	163 cfs	4-19	60 cfs
1-14	18 cfs	3-23	122 cfs	4-8	750 cfs	4-20	35 cfs
1-15	2.3 cfs	3-24	40 cfs	4-9	356 cfs	4-21	20 cfs
1-16	24 cfs	3-25	18 cfs	4-10	194 cfs	4-22	14 cfs
				4-11	117 cfs	4-23	8.0 cfs
				4-12	57 cfs	4-24	5.5 cfs
						4-25	1.0 cfs

This last month of flow of 1935 is out of character for previous years and is not as favorable, for salmon or steelhead survival as was 1931-32, another 45 day flow year.

These water flow readings in the Guadalupe River previous to the 1935 dam installations give a more realistic flow regimen under 'natural' conditions, that is with the agricultural diversions and groundwater levels of the day lowered.

Since 1956, the District permitted users located on lands within the District to divert storage releases from District conduits and natural channels for beneficial use. "The purpose of the program is two-fold, (1) it reduces the pumping draft on the underground reservoir and (2) increases the District's capacity to beneficially utilize the water impounded in its reservoirs."

In 1956-57	8,390 ac. ft.	agriculture water delivered by direct diversion
1957-58	10,710 ac. ft.	
1958-59	9,600 ac. ft.	
1959-60	11,270 ac. ft.	
1960-61	10,200 ac. ft.	
1961-62	2,080 ac. ft.	

Even before the Santa Clara Valley Water District management practiced its stream percolation program, farmers had long tapped the streams of the County for their farms and orchards. In most years, attraction flows for salmon and steelhead were at a minimum, which might further explain the illusive aspect of these fish. But good years like the winter of 1931-32 and the spring of 1930 sustained some remnant populations.

This water regimen for the Guadalupe River should be modeled for the years that copious records were kept and that a significant management routing was followed, ie pre-dam conditions, 1935 to 1955, 1956 to imported water supplemental infusions into the system from the East pipeline and then the San Luis-Santa Clara conduit connection.

Then to contrast what is modeled for 10b, 23b, and 20 on the Upper Guadalupe River, you have to provide a more realistic hypothetical flow for the Los Gatos Creek for the confluence with the Guadalupe and below, at present time.

The Los Gatos Creek has more imported water poured into the system because it has the highest percolation potential in the Valley. Its flood flow rate is set at a third of the Guadalupe flood flow rate, 7000 cfs of 21,000 cfs, but this is not a realistic appraisal of its low flow percentage of the flow. When I checked a couple of times, there was technically no flow in the main Guadalupe River (as it had slowly percolated away), 2 cfs was allowed by SCVWD to remain in Los Gatos and 4 cfs welled up in main stem at confluence.

Again, I will attempt to go back on old records for the Los Gatos Creek, pre-dams, but your 1994 and 1995 measured flows will not give you the necessary scientific base line as the SCVWD says they plan to allow no more over-run, so no 2 cfs to wet the system.

The temperatures of any streamflow coming from Los Gatos Creek are lower than the Guadalupe because of remaining tree cover. However, as the future Redevelopment Agency of San Jose plans always entail extensive tree removal, some evaluation for this thermal pollution should be incorporated in your hypothetical analysis. Also the continuing bridge removals and Highway 87 expansion are going to entail extensive tree loss that has never been factored into the COE flood control project. This, if counter to the CEQA and NEPA guidelines, should be quantified in this SRA document as they are approved, overlapping state and federal projects. The Vasona light rail will also cross both streams, I believe, at least once.

The consequences of designing this river for public access at all points, I believe is highly unrealistic and flies in the face of conservation of any natural resources, the State mandate of no net loss of wetlands, and the International commitment to the biodiversity treaty that the U.S. agreed to. Shaded, fully protected deep pools with overhanging high banks must be left, and in their natural state. The public could view from a high rise or a new recreation railroad bridge, but at least a mile of this project must be kept for wildlife and for the historic Guadalupe River, as a natural corridor.

Thank you for your patience and fortitude in this extended effort.

Sincerely,

Libby Lucas

Libby Lucas
174 Yerba Santa Avenue,
Los Altos, CA 94022

FAX

January 17, 1997

[illegible], Planning Division
Department of the Army
U.S. Army Engineer District,
Corps of Engineers, [illegible]

Dear Mike,

In regards the Guadalupe River Project, Draft Habitat Evaluation Procedure (HEP) Report, thank you for making this process available to the public and for the extensive year-long review of the shaded riverine aquatic SRA plan.

The constraints on the flood control project in downtown San Jose are unique and considerable. The Guadalupe River is essential to the health of fisheries and wildlife of the South San Francisco Bay, of the Estuary, of the Pacific Flyway and ultimately the estuary resource for the Pacific Ocean. As its link in the food chain of our Bay region cannot be underestimated, so it is of utmost importance that the food chain within the Guadalupe be viable.

When this project was first undertaken by the San Francisco Corps, they did a scoping study in September 1976, Guadalupe River Alternative Proposals for Flood Control & Allied Purposes, that was competent and sensitive to the river as a "valuable environmental resource".

> "The Guadalupe River channel supports a rich and varied ecosystem. Fish swim in the waters of the river and birds and other wildlife find food and homes in the trees and thick vegetation along its banks. This riverbank or 'riparian' vegetation provides some of the best, and in some cases, essentially the only habitat for many species of wildlife in this area."

In July 1985, the US Army Corps of Engineers, San Francisco District, Final Guadalupe River Interim Feasibility Report and Environmental Impact Statement Guadalupe River and Adjacent Streams Investigation was published, (after the required public hearings)with the total flood control project cost of $44,056,000. The earth channel bypass in the Coleman Loop area, while environmentally preferable as it preserved the west bank, was rejected as too expensive as it added $4.4 million to the project costs.

The Fish & Wildlife Service data base mentioned peregrine falcon, saltmarsh yellowthroat and the San Francisco garter snake as present in these basins.

In the fall of 1986, California Department of Fish and Game noted 262 redds (potential) of chinook salmon on the Guadalupe River, with the greatest numbers downstream of Highway 280, in the project area. This background data was not made public until the US Department of the Interior Fish & Wildlife Service draft of "Guadalupe River Flood Control Project Habitat Evaluation Procedures: Analysis of Aquatic Resources for Contracts 1-3" in October 1993.

In the Sacramento COE Environmental Assessment in 1990-91 of the combined San Jose Guadalupe River Park and 1985 COE Guadalupe River Flood Control projects, under fishery concerns it states: "the FR/FEIS reported no spawning or runs of these species (steelhead and chinook salmon) in the river". This statement is deficient in light of the Fish & Game sightings made in the river in 1986-7.

The combined projects also resulted in more extensive tree loss, from 50% to 85%, in the three mile corridor that should have been environmentally assessed and public hearings held. The project costs rose $100 million, another serious public concern. Maintenance costs and sediment transfer were not studied, in depth.

It should be noted here that streams are salmon streams or they are not.(ie all efforts to establish salmon in the Hudson River have proven futile.) The water management of the Guadalupe River for the past 100 years has not been conducive to significant runs of salmon. Salmon instinctively come in on good water years and are flexible on return years by instinct. Routine minimal water regulation is neither natural or beneficial to their survival. However, in years of drought, the deep shaded pools of the lower Guadalupe River captured groundwater flow and stayed cool enough to provide the necessary refugia for resident species.

California Environmental Quality Act and the National Environmental Protection Act have strong guidelines to protect riverine systems and wetlands. A project is supposed to have the least damaging action plan and be the most practical alternative. Endangered species must be considered. Special considerations are given to ecologically valuable features such as riffles and pools. Significant degradation of a resource is to be avoided, and if not, then it must be shown that there is no less damaging way to accomplish a necessary project. All loss must be adequately mitigated for in kind and in like value.

The alternatives that have been implemented in Contract 1 and 2 in the Guadalupe River flood control project are the most damaging to the riverine ecosystem and are the most expensive. It is questionable as to whether they are even safe as a flood control design. In the most recent high water of January 2, 1997, the surge of flood flow to the western overflow area in the Coleman Loop did direct waters away from downtown San Jose but perhaps too close to the airport.

The environmentally preferred alternative of the bypass was initially intended to preserve the majority of one mile of the west bank intact. This would have preserved the best of the stretch where the chinook salmon redds were found by California Department of Fish and Game in 1986-7. It was high ground, some of it above the 100-year flood plain, refugia for the Southwestern Pond Turtle, and the Belted Kingfisher. The lush vegetation would have kept the river waters cool from worst heat of drought years. Pools and riffles would be preserved.

However this alternative was modified to a severely cut down bank that floodwaters overtopped easily and eroded all plantings and bank improvements. The amount of sediment that this has contributed to the river has never been evaluated. Unnecessary loss of mature remnant riparian cover to be retained continues as the root structure lacks the necessary protection. The old river allignment through the airport is encouraged to reestablish itself if flood waters follow the old gravels of the river bed.

The maintenance cost of this environmentally enhanced alternative continues to be excessive, and this is above and beyond the new $144 million price tag. The excess purchase of land for this greatly widened bypass bowl was ostensibly for purposes of recreation, but the airport expansion appears to not favor public access in this entire area.

To summarize, it is my concern that the Rubicon has already been crossed. There is no way to compensate for the destabilization of the river that has occurred by unnecessary tree removal in the upper mile and in the lower mile of this flood control project. These are the two areas that in your 1976 scoping document were to remain natural with the necessary bypasses in place.

The middle mile which was to have been the focus for the most drastic channel modifications, appears to me to be all that is holding the river in place and with any capability of sustaining salmon habitat.

Therefore, I feel the scoping document of the viability of this project has been so seriously compromised that an entirely new assessment must be made. To continue with the design, in consideration of the cumulative effect and piecemealing of attendant Redevelopment Agency highway, bridge and river park projects in the COE project three mile area, is to assuredly wipe out salmon survival in the Guadalupe River and South San Francisco Bay.

A second opinion of the handling of flood control in the middle mile should be sought. It is the only remaining option. Los Gatos Creek might be used as the supplemental upstream spawning zone. Natural armoring of the mid-section of the project area with large boulders might retain the riparian cover to a degree that would keep thermal impact under lethal limits.

The reasons that I discount the extensive efforts that you and your consultants have gone to establish viable off-site mitigation for the salmon in the upper reaches of the Guadalupe River is that any and all guarantee for fish flows in that river system rests with the Santa Clara Valley Water District. The District directors have stated most clearly that they have no intention of providing any flows for fisheries. The project design that you were directed to assimilate with the City of San Jose's park called for a base flow of 10 cfs, (it was 20 cfs in the River Park EIR). This is the same environmental assessment that they have presumably reviewed and agreed to so their position is not entirely valid.

In regards the stream/thermal model developed by Jones & Stokes Associates for the Guadalupe River system, I feel there is a problem in modeling any data on the rate of flow as it is entirely manipulated by the District.

District declarations in regards Guadalupe Creek gage readings; "flow entirely regulated from Guadalupe Dam", regarding Alamitos Creek readings "Alamitos Creek flow regulated by releases from Almaden Reservoir", and mid-Guadalupe River, "flow extensively regulated by reservoirs in headwaters (combined capacity 15,050 acre feet) Up to 50 cfs may be introduced into the Guadalupe River from the Coyote River".

Jones & Stokes made some adjustments to flows from 1983 to 1988 to factor in the contributions of IBM groundwater cleanup operations pumping to Canoas Creek. However in that period there was some permitting of construction firms to pump water from Canoas Creek for their construction needs, especially due to drought. So there is no way that any of this data can be fine tuned to be scientific stream system analysis.

The hypothetical low flow year analysis of 21 years of historic flow would be equally flawed for water years 1973-1993. I would like to submit some pre-District dam data for comparison. (Have been down with flu so request 2 weeks).

In this discussion it should also be referenced that the Santa Clara Valley Water District Board of Directors to date have expressed no willingness for any flow allocation for purposes of fisheries or wildlife. This would be especially true in any years of drought concern. Since mid-winter releases would be premature in assessing if the reservoirs would be full at the end of Spring, this water management criteria would almost be guaranteed to be permanent.

In recent years 2cfs was allowed to run over the percolation operations in Los Gatos Creek to supplement the Guadalupe River flow but even that now a Director said was unlikely to occur.

Incidental flows in the lower Guadalupe River will continue to be enhanced by the pumping from the underground garages of all the highrises that have been constructed on the banks of the Guadalupe. So the original prime redd locations in Contract 1 and 2 would be viable if they only had riparian cover. This is a far more reliable scenario than anything that can be hoped for up the main stem of the Guadalupe to Guadalupe Creek.

Therefore, my recommendation is that the western bank of the Guadalupe River be replaced in Contract 1 & 2 to its original height and configuration, with double the depth of the riparian corridor to insure stability.

As there will be at least a 25 year growth period before any worthwhile shade and habitat can be realized, there should be a moratorium placed on removal of any trees or undercover on the rest of the project area (ie all of Contract 3).

At the same time a second opinion should be sought to find some way to anchor the remnant middle section of the project between Coleman and Santa Clara, so that the river banks can withstand flood flows without further destabilization.

A last concern is the calibre of wetlands that will sustain wildlife in this three miles of urban riparian corridor. There are three components that are deemed essential in defining wetlands 1. water hydrology 2. vegetation and 3. soils. What I would like to know is what is the linear footage of valid wetlands that will be available for flora and fauna and fish? There is a legal consideration here as to the real boundary of areas that are regulated by the Corps and the Clean Water Act and areas that are not.

Also, it should be noted what the water quality of the Guadalupe River is at the prime pool and riffle and spawning locations. Guadalupe Creek and Alamitos Creek have problems with old mercury mine tailings and this needs analysis, both as to sediments and to the residual in fish flesh samplings.

Sincerely, Libby Lucas, 174 Yerba Santa Avenue, Los Altos, CA 94022

Libby Lucas

L. Libby Lucas. October 27, 1997.

L-1. Hydrologic calculations in the Hydrologic Engineering Office Report for the Guadalupe River and Coyote Creek assumed that the reservoirs would be coincidently nearly full at the time a flood would occur based on past reservoir operations. Water imports would not increase river flows during floods. Water is only added to the river for the purpose of percolation into ground water, so any additional water added to the river during a flood would be wasted.

L-2. Additional upstream storage has been determined to not provide adequate protection and to not be economically or environmentally feasible. The SCVWD has determined that an off-stream storage site should have a capacity of at least 6,250 acre-feet. No sites remain with this capacity, even with excavation down to the water table. The options you suggest would not provide more than a fraction of the needed capacity. New or expanded reservoirs would not be strategically located hydrologically, would not be economically feasible, and would cause greater habitat losses including upstream riparian forest.

L-3. This EIR/S is not intended to serve as a comprehensive watershed study. The primary ecological significance of the study area's habitats to other areas is via anadromous fish and migratory birds that spend part of their life cycle in the area. Unfortunately, upstream barriers, habitat impacts, and development have largely isolated the study area from upstream habitats except from the standpoint of birds. Due to the fragmented and narrow nature of the river corridor, it is not likely to serve as a major corridor for terrestrial wildlife. However, the habitat values here merit protection (or if necessary, mitigation) on their own merits. All the species mentioned in the comment are considered in the Biological Assessment (Appendix K).

Regarding mitigation costs, the severe lack of available land for flood control means that avoidance of impacts requires construction of bypass channels, which in turn requires purchase of and removal of structures which is very expensive. Mitigation is also very expensive. The proposal is a compromise developed by the SCVWD to optimize tradeoffs between these two types of expenses. Minimization of impacts (the SCVWD's Minimize Vegetation Impacts alternative) would cost more than the proposed plan.

Regarding Canoas Creek, the SCVWD will conduct a flood control study in the future. Land prices may make detention infeasible, however.

Regarding sediment issues, a sediment study has already been completed by Philip Williams and Associates, Inc., and it was determined that net sediment deposition would not be a serious problem.

L-4. Thermal modeling is planned to better quantify the impacts and the expected success of the mitigation plan.

Libby Lucas, April 23, 1997

This letter commented on the SCVWD draft EIR/S. The following text responds only to comments relevant to the Corps study. Comments on the SCVWD draft EIR/S will be addressed in their final EIR/S. The letter of January 17, 1997 comments on the downtown Guadalupe River project so is not addressed here.

<u>The proposed mitigation will not assure the survival of species such as the steelhead trout, chinook salmon, and coho salmon.</u>

Consultation with the National Marine Fisheries Service (NMFS) under Section 7 of the Endangered Species Act is required. The project will not be allowed to proceed if it would cause the loss of the local runs of steelhead trout. Coho salmon do not occur in this river. Mitigation for steelhead trout will also help the chinook salmon.

<u>Mitigation is proposed in upstream tributaries without biological support data.</u>

The intent of the mitigation plan is to mitigate as much as possible within the study area. The Habitat Evaluation Procedures (HEP) study shows that nearly all aquatic habitat impacts would be mitigated within the study area, and this study did not take into account all recent modifications of the proposed plan which further reduced impacts. Mitigation in upstream areas is a relatively minor supplement to mitigation within the feasibility study area.

<u>Proposed weirs and fencing limit the right of the public (under the California state constitution and legal code) to access and use the river.</u>

The proposed recreation trail, acquisition of project lands, and removal of barriers would provide greater recreation access to the river.

<u>The proposed maintenance road would remove vegetation and SRA cover. It would also contribute to erosion and sedimentation.</u>

The proposed maintenance road would be placed where there is room in the excavated channel. The size of the proposed channel is based upon the amount of water that would flow through the channel in a given flood. The channel would not enlarged to accommodate the maintenance road. Therefore, the road would not have any habitat impact, as it would be essentially an overlay on areas that would be impacted anyway for construction of the channel. These impacts will be fully mitigated.

The maintenance road would be surfaced with gravel, with a portion of its width paved for the recreation trail. Therefore, it would not be a sediment source.

<u>The loss of riparian cover and wetlands, and attendant thermal pollution do not improve biotic resources.</u>

In the long term, these impacts would be mitigated. In the short term, there would be some unavoidable negative habitat impacts.

If the river is functional it should be able to carry its own sediment load, and removal of sediment and vegetation should be minimal.

Agreed. The proposed project is designed to accommodate the sediment transport needs of the river. Ongoing removal of vegetation growth will only be done to maintain the flood-carrying capacity of selected parts of the channel. This is necessary due to the constricted nature of the channel, which in turn results from severe space constraints caused by adjacent development.

There is an inherent conflict between the dynamic behavior of a natural river and a city's need for a stable physical environment. Unfortunately, given the close proximity of urban development, allowing the river to behave in a fully natural manner would cause unacceptable damage to the adjacent development over the long term. For this reason, the proposed alternative would allow some natural processes to continue, but would also control other processes such as flooding, sedimentation, and bank erosion.

Trees should be planted along Ross Creek to provide shade.

The existing channel of Ross Creek is far too small to contain even moderate floods. The proposed alternative would widen this channel to provide sufficient capacity. Planting of trees in this widened channel would benefit the stream but would reduce its capacity to carry floods. Unfortunately, adjacent residential development precludes the creation of a wider riparian corridor that could provide both flood control and riparian forest habitat.

Lining Ross Creek with articulated concrete matting will prevent groundwater recharge.

The articulated concrete matting would only be placed on the slopes of the channel. The channel bottom would remain available for groundwater recharge.

Herbicide spraying is damaging and unpopular with the public.

All spraying will be done in accordance with regulations promulgated by the U.S. EPA and the San Francisco Regional Water Quality Control Board. Manual clearing of vegetation would be far more expensive.

pci-mari ... 3/26

LIFEWEB

7500 Tierra Sombra Ct.
San Jose, CA 95120

Contact: Rick Bernardi
(408) 997-6067

October 27, 1997

Mr. William DeJager
Army Corps of Engineers
Environmental Planning Section
333 Market Street, Seventh Floor
San Francisco, CA 94105-2197

Subject: Draft Feasibility Report and Environmental Impact Statement/Report, Upper - Guadalupe River Feasibility Study, August 1997

Dear Mr. DeJager;

On behalf of Lifeweb, I have reviewed the *Draft Feasibility Report and Environmental Impact Statement/Report, Upper Guadalupe River Feasibility Study, August 1997* (DEIR/EIS) for the Upper Guadalupe River Flood Control Project (hereinafter referred to as "the project").

There are several areas which we feel the DEIR/EIS inadequately addresses. Since this is a draft document, circulated for public comment before revision into a Final EIR/EIS, Lifeweb wishes to submit the following questions and comments for your response and inclusion in the *Final Environmental Impact Report/Environmental Impact Statement* (FEIR/EIS); thank you for the opportunity to comment. For your ease in responding, I have organized my comments and questions by DEIR/EIS chapter headings; where I use the terms "you" and "your" I am referring to the U.S. Army Corps of Engineers.

Page 17, *2.3 Fishery Resources*: Your contention that summer water temperatures are too high for steelhead trout is unsubstantiated. Where are your temperature studies? What data do you have on which you base such a statement? I have been involved in a long-term study of water temperatures of the Guadalupe River, and can attest from my field observations that water temperatures in the river vary according to the degree of riparian forest present. I have not yet observed temperatures which would be lethal for salmonids in areas where there is riparian forest **M-1**

M-1 cover. Do you maintain that juvenile steelhead trout do not seek refuge in these shaded riparian areas from the higher summer water temperatures to which you refer? Or do you maintain that there are no areas along the river which provide suitable refuge for juvenile steelhead trout during periods of higher water temperatures? Do you have data to substantiate your position?

M-2 **Page 20,** *2.3 Endangered and Threatened Species*: The EIR should be corrected to note that the steelhead trout is a federally listed threatened species. As a listed species, steelhead are subject to certain protections under federal law, particularly sections 7 and 9 of the Endangered Species Act. In addition, Table 6 lists a number of special-status species, including listed and candidate species, which have been observed or potentially occur within the subject area. What limitations and responsibilities are placed upon the U.S. Army Corps of Engineers, in regards to this project, under the Endangered Species Act? To what extent is the Corps obligated, under federal law, to either (A) design a project with no impacts to potentially occurring special-status species, or (B) determine conclusively which special-status species do occur, and which do not occur, within the subject area?

M-3 **Page 29,** *3.1 Historical Flooding*: What was the average depth of the 1958 flood in downtown San Jose? What was the duration of that event? What was the average depth of the March 1982 flood, not including the undercrossing of the Southern Pacific railroad? What was the duration of that event? The Southern Pacific Railroad undercrossing is said to have been flooded to a depth of ten feet; what is the depth below ground level of that undercrossing? Would you expect that areas which are excavated below surrounding ground level would fill with water during periods of high precipitation, or during flood events? Do you maintain that the depth of water in areas excavated below ground level establishes a need for flood control measures? The photograph on page 30 is presented with no context. Was the flooding which is depicted at ground level, on a surface street? Or was it below ground level, at an undercrossing? Without appropriate context, it is impossible to determine anything about what the photo depicts. Please explain the scene depicted in the photo.

M-4 **Page 31,** *3.1 Existing Floodplains*: Table 11 notes the varying capacities of the channel and bridges. This table seems to indicate that a major cause of reduced channel capacity is the design of certain bridges. Is this correct? If existing bridges reduce the channel capacity, and could be rebuilt to increase channel capacity, would that be an appropriate component of a flood control project?

M-5 You also note that during flood events floodwaters flow parallel to the river, inundating approximately 2310 acres, before reentering the river at the downstream end of the study area. According to the description you provide, the 100 year floodplain is confined to a relatively narrow band along the Guadalupe River. If this is correct, then one possible alternative to the construction of a project within the river channel would be to remove structures from the 100 year floodplain. However, this was not presented as one of your alternatives; why was this alternative excluded? In terms of cost, how does the removal of structures compare with (A) no project and (B) the preferred project (total cost, including maintenance for the life of the project)? Would the removal of structures from the floodplain be consistent with federal goals, policies, and regulations regarding flooding and floodplain development?

Page 32; *3.2 Existing Flood Damages*: Table 12 presents the approximate damages expected during a flood event. However, no information is presented as to how those figures were calculated. Do they represent only actual damage to property? Do they include numbers for lost productivity? Please explain what the figures in table 12 represent. **M-6**

We also note that no discussion is presented in the entire Introduction regarding the need for a project. True, mention is made of past flood damages, and expected future flood damages, but this in itself does not present an argument for any sort of flood protection, let alone for a specific project. In particular, there is no discussion of why this is a project which should be financed by tax dollars (we recognize that a public safety benefit is referred to on page 5.1). As you noted, the flood damages are confined to a relatively narrow band along the Guadalupe River. Persons who choose to locate their homes and businesses within this floodplain do so of their own free will, without coercion from the government. And yet, the taxpayers are being asked to finance a project to safeguard the properties of these persons from flood damages to which they have willingly exposed themselves. There is almost no discussion in this EIS of why the project should be built, and thus, the need for this project has not been established in this EIS. **M-7**

Our understanding of economics leads us to conclude that there are two options in response to the problem of inundated floodplains: one option is to allow market forces to prevail, in which case people will either choose not to locate within a floodplain, or they will choose to locate within a floodplain only if (A) they can afford to bear the cost of floodproofing, or (B) they can afford to bear the cost of flood insurance and flood damages, or (C) the opportunity cost of locating within a floodplain is low (in which case, the person would perceive the probability of damages from flooding to be relatively low, and outweighed by the potential savings from locating on floodplain land, which, in free market conditions, would be less expensive than land outside of the floodplain). The second option is for the public to provide flood protection for those who choose to locate within a floodplain. This EIS implicitly assumes that the public should provide flood control protection, without offering so much as an explanation why. **M-8**

Historically, government has mitigated free market inefficiencies by providing services to society whose benefits are social or collective, and which cannot be profitably provided by the free market. These public or social benefits include military, police, and fire protection, transportation infrastructure, public education, and parks; because they are collective benefits they are enjoyed by all members of society. Generally, government services have been provided to benefit society at large. In some cases, social benefits have been provided for smaller segments of society, such as dependent children of the poor, the elderly, and the infirm with the understanding that some members of society, through no fault of their own, need public assistance to survive. Examples of these programs include the recently dismantled AFDC, Social Security, and Medicare. **M-9**

However, this project appears to benefit a small segment of society by subsidizing the cost of building and locating within a floodplain, and spreading that cost to all of society. At the public meeting of April 3, 1997, one homeowner argued that the project should proceed with all haste, so that he could stop paying for flood insurance. Please explain why the taxpayers should fund a flood control project to subsidize those who choose to build or locate their homes and **M-10** businesses within a floodplain, rather than allowing market forces to prevail.

M-11 **Page 34;** *3.4 Recreation Opportunities*: Lifeweb supports in concept the construction of recreation trails; we are opposed to the haphazard construction of trails through biologically sensitive areas. The principles of trail construction through sensitive areas have been well established, and yet local government has ignored those principles when approving trail construction. As you note, this project proposes to include trails on maintenance access roads and mitigation benches, without discussing the impacts of those trails upon biologically sensitive habitat and dependent species. We note that in later sections the Corps states that trails will avoid sensitive areas. How does the Corps propose to avoid impacting sensitive habitat and species? What features of trail construction can be incorporated into this project to reduce trail impacts? How does the Corps propose to "enforce" proper trail design if the trail will be designed and built by the City of San Jose, which is notorious for placing trails in sensitive areas (e.g., at Confluence Point).

M-12 **Page 37;** *4.3 Description of Preliminary Flood Protection Measures*: Is the alternative identified by the Santa Clara Valley Water District as the *Stream Restoration Alternative* consistent with one or more of the alternatives described in Table 13? Why does the Corps EIS use different terminology for project alternatives than the Santa Clara Valley Water District EIR? As you may appreciate, this can lead to some confusion when comparing EIS/EIR's. Please include a discussion of Army Corps alternatives which identifies them with their Water District analogue. It is also our understanding that the *Stream Restoration Alternative* was not included as one of the alternatives the Army Corps considered; is our understanding correct? If the *Stream Restoration Alternative* was not considered, please explain why.

M-13 Furthermore, in our comments on chapter 3.2 (above), we noted that, generally, government provides public benefits for the enjoyment of all members of society, while this project proposes to provide a benefit for the enjoyment of a few members of society, to be paid for by all taxpayers. We believe that the *Preferred Project* does not provide sufficient benefits to all members of society to justify it's expense; the benefit provided is to a relatively small segment of society, and amounts to a public subsidy of the costs incurred by building or locating within a floodplain. However, we believe that the public benefits of the *Stream Restoration Alternative* (a flood control project which actually restores the riparian ecosystem) are of sufficient significance as to justify the expenditure of public funds on the project; all members of society benefit from the *Stream Restoration Alternative*. The benefit of a restored ecosystem transforms what was a subsidy into a true public benefit.

M-14 As you may now appreciate, we have serious concerns about your omission of the *Stream Restoration Alternative* from consideration. We urge you to include the *Stream Restoration Alternative* within the range of alternatives considered in the DEIR/EIS, and to direct substantial attention to discussion of this alternative.

M-15 **Page 64;** *6.5 Changes to Local Planning Environment*; you note that the floodplain is essentially fully developed, and thus a project would not encourage large-scale development of a previously undeveloped floodplain. In light of this, of what significance is your *Floodplain Management* alternative listed in Table 13, and as described in chapter 8.2(s)?

You also state that reduction of the floodplain may encourage "proper redevelopment in sections of the eastern floodplain." What does this statement mean? What do you mean by "proper redevelopment?" Would the floodplain be redeveloped with the "no project" alternative? Does the project serve as an inducement for redevelopment of the floodplain? Would redevelopment occur without a flood control subsidy? Is this consistent with federal policies regarding floodplain development (is there a difference, in federal eyes, between floodplain development and floodplain redevelopment)? On page 4.13-4, you note that "tenants are paying significantly lower rents than those advertised in the San Jose area:" are those lower rents the result of market conditions, reflected in lower land values? Would a flood control project tend to raise property values in the floodplain? Will lower income families be forced to relocate due to changed market conditions associated with higher property values and subsequent redevelopment? **M-16**

Page 2-11; *Channel Widening Plan*: You state on page 2-11 that "the SCVWD will construct the bypass channel plan"; how does the Army Corps know this? No EIR has been approved, and no vote has been taken to approve that alternative, since the EIR must first be approved. Does the Army Corps have information which indicates that the SCVWD has already selected an alternative? Have the Army Corps and the SCVWD reached an agreement regarding this project before the EIS/EIR has been completed? Please explain your statement. **M-17**

Page 3-3; *3.3 Clean Water Act of 1977*: The SCVWD has been served with notice of intent to sue for violations of the Clean Water Act in regard to the downtown flood control project. In light of this, it seems odd that there is no discussion in the EIS/EIR of Clean Water Act impacts, particularly concerning thermal pollution resulting from loss of riparian forest. We recognize that any project, including our preferred *Stream Restoration Alternative*, will result in at least a temporary vegetative loss. However, the EIS/EIR should address this issue, and compare the short-term and long-term impacts of the proposed alternatives. Please discuss Clean Water Act thermal impacts and mitigation related to the construction of this project. **M-18**

Page 4.4-18; *Special-Status Animals*: The EIS/EIR provides no discussion of the Southwestern Pond turtle, which is listed in Table 6. In a report prepared for the Guadalupe-Coyote Resource Conservation District by Dr. Dan Holland, and distributed to various entities, including the Santa Clara Valley Water District, the Guadalupe River was identified as a potential habitat for these turtles. Specifically, Dr. Holland wrote that he did not observe any turtles during a visual inspection of the river, but that based on his experience, it was probable that turtles are present. Yet the EIS/EIR neither discusses the habitat requirements, impacts, or mitigation measures for this species. Please provide an analysis of this special status species, discussing the factors listed above, at appropriate locations in the EIS/EIR. **M-19**

Page 4.12-1; *Public Safety*: We object to the characterization of streams as "attractive nuisances to children." While we agree that there is a hazard potential associated with streams, we note that many of life's daily activities (riding in an automobile, or riding a bicycle, for instance) provide similar, or even greater hazards. Rather than a "nuisance," we consider healthy streams to be an integral part of childhood discovery. As such, stream exploration should be promoted at appropriate locations. We further object to the mitigation measures for recreation which will prevent "unauthorized" access to the stream. Specifically, we feel that the river can support a low **M-20**

M-20 level of boating recreation (canoes, kayaks, and rafts, regulated, if necessary, to maintain a low volume of traffic) without significant impact to sensitive areas and species; yet, this recreational use is not discussed, and is actively mitigated against. Please provide a discussion of boating as a public safety issue, and as a recreation issue in section 4.5.

M-21 **Page 6-12;** *Blocked Access to Optimum Fishery Habitat Upstream*: The removal of barriers is proposed as a mitigation for project impacts upon the fishery. The obstacles referred to are illegal under California law, and are the subject of a petition placed before the State by the Guadalupe-Coyote Resource Conservation District, asking that the SCVWD be ordered to comply with state law and provide fish passage at those barriers. In other words, we expect that those barriers will be removed, with or without a flood control project. Do you maintain that those barriers will remain without the construction of this project? We further note that the SCVWD has an existing legal obligation to remove barriers to fish migration, and thus, that existing legal obligation cannot be considered as mitigation for the impacts of a proposed project. Please discuss this proposed mitigation in relation to the existing legal obligations of the SCVWD.

Conclusion

M-22 We are concerned that the Army Corps and the SCVWD may have illegally reached an agreement to construct a project before an EIS/EIR has been approved. Although both NEPA and CEQA provide for the identification of a preferred alternative, they do not permit projects to be approved, either formally or by informal agreement, before the EIS/EIR has been approved. Yet your statement that the SCVWD will construct a specific project indicates that a preferred project has not only been identified, but has been informally approved, or agreed upon, by the SCVWD *before* the circulation of an EIR for public comment, and before approval of said EIR. This informal approval goes beyond the tentative selection which characterizes a preferred alternative, since a preferred alternative may be subject to revision, or even rejection, depending upon the information provided in the EIS/EIR. In contrast, the statement that a preferred alternative will be constructed indicates that a decision has already been reached. The decision to construct a specific project before an EIS/EIR has been approved violates both NEPA and CEQA, and any agreement between two agencies to informally approve a specific project constitutes criminal conspiracy to violate the law. Given the apparent willingness of the SCVWD to violate the law in other matters, your statement regarding an apparent decision on the part of the SCVWD leaves us with grave concerns about the integrity of the EIS/EIR process for this project.

M-23 Further, Lifeweb has serious questions about the appropriateness of providing a public subsidy to mitigate floodplain conditions for those who choose to locate there. We believe that, in general, the risk and impacts of flooding on the Guadalupe River are overstated. Yes, flooding has occurred, but we do not believe that the flooding problem on the Guadalupe is as severe as in other areas of the country. We believe that a public subsidy can become a public benefit only when benefits to the general public are achieved. Elimination of flooding does not benefit all members of the public. Eliminating flooding and restoring the riparian ecosystem does benefit everyone. We are therefore extremely disappointed to discover that the Army Corps has not even considered an alternative analogous to the *Stream Restoration Alternative* identified by the

SCVWD. We feel that the EIS/EIR is woefully inadequate, given that the range of alternatives consisted of two channel-widening plans, and a bypass-channel plan. Even if the Army Corps prefers the bypass-channel plan, a discussion of the *Stream Restoration Alternative* would provide the opportunity for comparison between the Army Corps preferred alternative and the alternative which we feel provides the most benefits over the long term. This, after all, is the rationale behind NEPA and CEQA: to provide sufficient information to evaluate a project. We urge that the EIR/EIS be rewritten to include the *Stream Restoration Alternative*; we add that we would encourage the Army Corps to consider adopting this alternative as the Preferred Project. M-23

Sincerely,

Rick Bernardi

M. Rick Bernardi, Lifeweb. October 27, 1997.

Note to the reader: Comments M-1 through M-15 refer to sections of the Corps' Draft Feasibility Report (COE 1998).

M-1. We agree that water temperatures vary in different microhabitats along the river. Section 4.2.2 of the EIR/S reflects this perspective.

M-2. Regarding the responsibilities of the Corps of Engineers under the Endangered Species Act, the Corps is required to: (1) Request a list of endangered, threatened, and proposed species (which will also include candidate species and species of concern), (2) Prepare a Biological Assessment regarding possible impacts of the proposed action on these species and submit this document to the U.S. Fish and Wildlife Service (USFWS) and the NMFS, and (3) initiate formal consultation with the appropriate agency if a listed species may be affected by the proposed action.

Formal consultation is not required if the reviewing agency agrees that a species is not likely to be affected by the proposed action. In that event, the Corps would not be affected by the Endangered Species Act in regard to that particular species and that particular project. If formal consultation is required, then the Corps is bound by the Biological Opinion issued by the USFWS or the NMFS.

Regarding the burden of proof for the presence of special-status species, the Corp's determination regarding the likely presence or absence of the species is subject to the review and concurrence of the USFWS or NMFS. If a project is determined to affect a listed species but would not jeopardize the continued existence of this species, then the USFWS or NMFS will include in its Biological Opinion an Incidental Take Statement with binding measures to mitigate impacts on this species. A project need not be designed to avoid all impacts on listed species, but mitigation for endangered species impacts is usually quite strict.

M-3. Information on the average depth and duration of the 1958 and 1982 floods is not kept by the SCVWD. According to the SCVWD (personal communication, Dennis Cheong, SCVWD), the critical criterion of flooding event severity is measured in damage repair dollars. Inundation area cover is the accepted means of estimated flooding extent.

The SPRR undercrossing at Willow Street/Alma Street is approximately 8 feet deep. Excavated areas usually have drains, and often pumps, to prevent flooding during rainy periods. These measures sometimes are overwhelmed during heavy rainstorms, and can not effectively respond to floods. Excavated areas are a very small part of the overall floodplain and their flooding alone, while disruptive to transportation, would not justify this project. Nearly all of the floodplain is essentially at grade level. The photograph on page 30 shows a flooded underpass.

M-4. Some bridges do constrict the flow of the river. Removing these constrictions is part of both alternatives that were considered in detail. However, while this action by itself would reduce the flood danger in some locations, due to channel size limitations there would still be serious flood dangers.

M-5. The "relatively narrow" floodplain you cited contains about 7,500 homes and businesses. Removal of these properties would be prohibitively expensive, probably costing in excess of $1 billion for real estate acquisition alone. The environmental consequences (from natural resource consumption) resulting from demolishing and rebuilding so many structures (or constructing new urban infrastructure at a different location and moving the structures there), would be considerable. In addition, the Silicon Valley area has been producing far more jobs than housing in recent years, causing export of urban sprawl to other areas. Wholesale removal of housing in this area would exacerbate this process and the attendant environmental problems caused by urban sprawl and long-distance commuting.

Removal of structures from the floodplain is not a federal mandate. In cases where such removal is clearly not economically feasible, such an alternative would be contrary to Congressional direction to the Corps to select an economically feasible plan.

M-6. Table 12 of the Corps' Draft Feasibility Report (COE 1998) presents the damages that would be expected to occur within the flood plain during various storm events. These damages reflect property damage to buildings, building contents, and automobiles. They are calculated based on the elevation of the first floor of each building and property values. The figures in Table 12 do not account for lost productivity. These figures are converted to annualized sums before being included in the total average annual benefits attributed to any proposed project. Total annual average benefits are shown in Table 19 of the Draft Feasibility Report. Note that the figures in Table 12 appear as annualized sums under the category of "Flood Damage Reduction" in Table 19.

M-7. Regarding the need for the project, Congress has indicated that flood protection should be provided to existing developments when it is economically feasible to do so, regardless of to whom the economic benefits accrue.

M-8. It appears from public comments that some residents of the floodplain are not aware of any flood danger or do not believe that it is serious. It is not clear whether the long-term consequences of the decisions to place developments in the floodplain have been widely understood by the general public, or that floodplain location has affected property values.

M-9. The federal government's role in providing flood protection is well-established, and is reinforced by Executive Order 11988, Floodplain Management. This directive is summarized in section 3.3, Compliance with Environmental Requirements, and states that each federal agency shall provide leadership and take action to reduce the risk of flood loss, and to minimize the impact of floods on human safety, health, and welfare. Historical flooding within the feasibility study area has clearly resulted in flood losses, and impacts on human safety, health, and welfare. Therefore, the proposed action is consistent with federal practice.

M-10. Now that the decision has been made to locate structures and urban infrastructure in these areas, failing to provide flood protection has ramifications that extend far beyond the financial well-being of the individuals who live in the floodplain. Allowing these property improvements to be damaged by floods creates numerous costs to society as a whole: emergency assistance, disaster relief, transportation disruptions, and economic inefficiencies created by damage to property improvements and infrastructure. The urbanized floodplain is not separate from the rest of the city, but is linked by relationships (economic, financial, and otherwise) to other areas. A flood-control project here would particularly benefit floodplain residents, but would also provide substantial economic benefits to society as a whole.

M-11. The proposed Recreation Plan proposes to achieve a balance between recreational needs and wildlife protection, consistent with the City Land Use Element of the Comprehensive Plan. As discussed in section 3.3, whenever trail placement could adversely affect the riparian corridor habitat value, the trail would avoid those portions sensitive to human intrusion. Features such as additional fencing, signage, and ground cover that would physically discourage human encroachment (such as thorny blackberry) would be used. The Corps would be responsible for constructing the trail, and maintenance would be the responsibility of the SCVWD. Trail maintenance would be in accordance with federal criteria to ensure receipt of federal funding.

M-12. The Stream Restoration Alternative is a form of channel widening, using a geomorphic approach. Different terminology was used in these two EIR/Ss in order to best describe and contrast the alternatives within a given document. The only overlap between alternatives considered in detail in the two documents is with the SCVWD's *Preferred Project* and the Corp's *Bypass Channel Plan*. The SCVWD's *Stream Restoration Alternative* was not included in the Corp's EIR/S because it is not acceptable to the local sponsor for reasons explained in their EIR/S (expense, greater habitat impacts, and regulatory uncertainty). However, due to the interest expressed in this alternative, a discussion regarding this alternative is provided in the Final EIR/S (see section 2.2, Formulation of Conceptual Alternative Plans).

M-13. The Stream Restoration Alternative discussed in the SCVWD's EIR/S is a combined stream restoration/flood control project. In order to achieve both objectives, expenditures and impacts would be far greater than in the case of a stream restoration project that does not provide flood control. This substantial increment of cost would still qualify as a subsidy under the commentor's criteria. On the other hand, if a stream restoration project did not provide flood control, it would not meet study objectives even though it could be environmentally beneficial in the long term.

M-14. Discussion of a Stream Restoration Alternative has been expanded in section 2.2, Formulation of Conceptual Alternative Plans. The Corps has considered a Stream Restoration Alternative with required flood control and determined that it would require widening the floodplain by as much as a few hundred feet to make it capable of carrying high channel flows. It would result in major impacts to existing native riparian vegetation, fisheries, and adjacent homes, where present. See response to comment J-1. Since other alternatives would be less environmentally damaging, a permit cannot be issued for this alternative under the Clean Water Act section 404(b). This approach however, has been incorporated into both plans in Reach 10B, where impacts would not be significant. See responses to comments J-1, J-24, and J-30.

M-15. Floodplain management would only prevent or reduce the worsening of flood dangers, but would not solve the existing problem.

M-16. The redevelopment cited is the proposed transit village around the Tamien light-rail station. The intent of this land-use plan change is the encouragement of high-density housing in the vicinity of this light-rail station. This sort of development pattern would result in definite environmental benefits and is often advocated by environmentalists. This redevelopment could occur in the absence of a flood-control project, but would be more difficult and more expensive.

In respect to average rents in the area, no conclusive statement can be made regarding the reasons why tenants presently pay lower than average rents in the area cited. This situation could be due to the relatively high number of long-term tenants; some landlords do not raise rents to full market value when they have a good tenant. There is no indication that land or home prices in the Mackey/Malone/Almaden Road area are depressed, and much of this area is not in the floodplain.

M-17. It is not known at this time precisely what action (if any) the SCVWD will actually choose to implement, or be able to implement. The Corps has proceeded based upon what has appeared to be the most likely course of action by the local sponsor; this approach does not constitute Corps approval of the SCVWD proposal, nor is it an agreement to construct a project. The San Francisco District of the Corps has proposed federal cost-sharing of the portion of this proposal within the boundary of the Corps feasibility study area. This proposal is under review by Corps headquarters and is subject to revision or reversal by that office or higher authorities.

The SCVWD has a general policy of providing flood protection for 100-year floods to areas within its jurisdiction. Construction of a project providing 100-year protection to Reach 6 is essential to the success of the Corps project, but the type of channel modification provided in this reach is not so important. Both alternatives considered in detail in the SCVWD draft EIR/S would construct a gabion bypass on the east bank in Reach 6, so the Corps proposal is not dependent upon which of these alternatives is selected.

Over the course of the Corps feasibility study, no outcome has been certain. During this period, the SCVWD proposal has evolved in response to feedback from regulatory agencies. The tentative determination of the Corps NED plan has been uncertain until very recently, and it has not been certain and is still not certain that federal funding would even be provided. For these reasons, the SCVWD has been proceeding with its own parallel study. The Corps can decide to not fund or not construct its proposal without breaking any formal or informal commitment. In this event, the SCVWD would be free to construct any project that can achieve the required regulatory approvals, political support, and local funding.

To summarize, with respect to the SCVWD, implementation of the Corps proposal for cost-sharing is only dependent on: (1) construction by the SCVWD of a 100-year project of some sort in Reach 6 in accordance with their agency policy, and (2) the willingness of the SCVWD to provide cost-sharing and other support that is normally provided in a cost-shared Corps project.

The EIR/S has been revised to eliminate this ambiguity.

M-18. Thermal impacts are considered in the EIR/S. Please note that the Clean Water Act does not protect shade trees as such, but applies to more direct influences on the aquatic ecosystem, e.g., discharges.

M-19. The Final EIR/S (see Biological Assessment) recognizes the possible occurrence of turtles, but the potential impact is not significant.

M-20. The term "attractive nuisance" is a legal term which refers to a feature which may attract children or adults but which also contains hazards which may generate liability. Desirable features such as a swimming pool, a scenic overlook, or a river channel can qualify as attractive nuisances despite their desirability to society. The characterization of this river as an "attractive nuisance" refers to issues of potential legal liability rather than general social or environmental desirability. As the taxpayers are ultimately liable for claims against government agencies, this is an important issue.

The Corps has received other comments criticizing the amount of public access proposed as being excessive and deleterious to wildlife. The Corps proposal for recreation access is designed to provide access to areas having minimal habitat value. Additional access beyond that proposed year could be socially desirable (as the commentor states) but could also entail additional impacts on wildlife. Local agencies could provide additional public access at 100% local cost, to the extent allowed by the law and regulatory agencies. However, if such access would impact the mitigation obligations of the SCVWD and/or the Corps, permission would be denied or the local agency would be required to mitigate any impacts.

Regarding boating use, the EIR/s has been revised to state that proposed rock weirs in Reach 8 that would enhance migrating fish passage could significantly affect small water craft passage during moderate and high flows (see revised section 4.5.3, Aesthetics and Recreation). A mitigation measure has been added to the EIR/S to require signs along the trail identifying these water hazards during high water flows, and directing recreationists to avoid use of the river during these conditions (see section 4.5.4, Bypass Channel Plan).

M-21. The Final EIR/S distinguishes between existing legal requirements and discretionary actions regarding barrier removal.

M-22. See response to comment M-17.

M-23. Regarding the statement that the flood danger has been overstated, no evidence or documentation has been provided to support this statement. Any specific criticism of the methodology or computations used in the feasibility study and the EIR/S to derive the river hydrology, floodplains, or expected frequency of flooding should be provided for consideration. It should be noted that the extent, frequency, and severity of flooding in the study area over the past 30 or 40 years do not provide an adequate sample of what can be expected over a longer period of time. See response to comments M-12 and M-14.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

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To Lynne Galal	From David Tomsovic
Co. Army Corps	Co. EPA
Dept.	Phone # 415-744-1575
Fax # 415-977-8695	Fax # 415-744-1598

William DeJager
Environmental Planning Section
U.S. Army Corps of Engineers
333 Market Street, 7th floor
San Francisco, California 94105

Dear Mr. DeJager:

The U.S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement/Report (DEIS/R) for the **UPPER GUADALUPE RIVER FEASIBILITY STUDY, Santa Clara County, California.** We appreciate the individual extension granted to us by Ms. Lynne Galal of your office allowing EPA to provide comments by November 3 (from October 27). Our comments on the DEIS/R are provided pursuant to the National Environmental Policy Act (NEPA), Section 309 of the Clean Air Act, and the Council on Environmental Quality's NEPA Implementing Regulations. In addition, our comments on Clean Water Act (CWA) Section 404 issues are advisory since the proposed project needs to be consistent with the requirements of CWA Section 404 and the 404(b)(1) Guidelines.

The DEIS/R was prepared to determine whether the United States should fund part of the cost of a flood control project on the upper portion of the Guadalupe River in Santa Clara County, California. The local project sponsor (Santa Clara Valley Water District, SCVWD) has conducted other studies on the upper Guadalupe River system as well, including a February 1997 Corps' Draft EIS/R for a proposed SCVWD project in the area (the February 1997 EIS was associated with a Section 404 regulatory permit action rather than Federal funding). The Corps' study assumes that the SCVWD will construct those portions of its preferred alternative which lie outside of the Corps study area.

This Draft EIS/R assesses in detail two action alternatives, a Channel Widening Plan and a Bypass Channel Plan, as well as the No Action Alternative required under NEPA. According to the DEIS/R Summary, these two action alternatives provide the greatest net economic benefit in terms of providing flood protection on the Upper Guadalupe. The Channel Widening Plan would provide protection for all floods to approximately the 50-year flood event, while the Bypass Channel Plan would provide protection from all floods to approximately the 100-year flood. The Corps has determined that the Channel Widening Plan is the National Economic Development (NED) Plan. In terms of biological resource impacts, construction of the Channel Widening Plan would remove 6.5 acres of riparian forest while the Bypass Channel would remove 9 acres of riparian forest; the Channel Widening

Plan would excavate or fill 0.28 acre of wetlands and 2.64 acres of Section 404 jurisdictional waters, while the Bypass Channel Plan would remove 0.88 acre of wetlands and 9.93 acres of Section 404 jurisdictional waters. According to Table S-1, the Channel Widening Plan would have "potential" adverse effects on fisheries due to the removal and loss of shaded riverine aquatic (SRA) habitat, while the loss of SRA cover under the Bypass Plan would adversely affect fishes.

We have rated the DEIS/R as Category EC-2, Environmental Concerns - Insufficient Information. Please refer to the "Summary of Rating Definitions and Follow-Up Action" (attached) for a more detailed explanation of EPAs rating system for Draft EISs. We have environmental concerns with the proposed project and its impact documentation for the following reasons:

N-1 1) there is no specific discussion about which of the two action alternatives is the least environmentally damaging practicable alternative, in terms of direct, indirect and cumulative impacts to the aquatic environment. We recommend that the Final EIS/R (FEIS/R) provide a brief discussion about which of the two action alternatives is less environmentally damaging to the aquatic environment. On a related matter, we ask that the FEIS/R discuss whether a combination of structural and non-structural alternatives may be both reasonable (under NEPA) and practicable (under CWA Section 404), which may avoid and reduce adverse impacts to Section-404 protected resources.

N-2 2) we are concerned that the Corps issued two DEISs for what is essentially one project, flood control on the Upper Guadalupe River. As noted, the February 1997 DEIS was issued in regard to a Section 404 regulatory permit action, while this DEIS/R is a decision-making tool in terms of Federal funding for the same project. In order to reduce confusion among agencies and the public, and for purposes of establishing a clear historic record, we recommend that both EISs be consolidated into <u>one</u> FEIS that would address both Federal actions being evaluated by the Corps (i.e., Section 404 permit and possible Federal funding). Should the Corps decide to combine both EISs into one FEIS, the Notice of Availability printed by EPA Headquarters in the *Federal Register* could notice that fact.

N-3 3) there is no specific discussion about whether the project would comply with State-adopted, EPA-approved Water Quality Standards and protect beneficial uses for the Guadalupe River and its tributary or downstream waters. The FEIS/R should address whether the project is consistent with Water Quality Standards for surface waters in the project area.

N-4 4) there is no discussion on environmental impacts and mitigation measures associated with the use of herbicides to control vegetation under the Channel Bypass Plan. In keeping with comments we made on April 18, 1997 in connection with the DEIS for the Upper Guadalupe River Flood Control Project, we believe that the FEIS/R should discuss impacts associated with the use of herbicides and identify appropriate mitigation measures. We believe that a discussion of herbicide-related issues is a matter of NEPA public disclosure should the final preferred alternative provide for herbicides use. N-4

5) we are concerned that the DEIS/R did not address pollution prevention mechanisms to the extent recommended in guidance to Federal agencies by the Council on Environmental Quality. This should be done in the FEIS/R. N-5

We appreciate the opportunity to comment on the DEIS/R. Please send one copy of the FEIS/R to me at the letterhead address (code: CMD-2) when the document is filed with EPAs Washington, D.C. office. If you have any questions, please call me or my staff reviewer for this document, David Tomsovic, at 415-744-1575.

Sincerely,

David Farrel, Chief
Federal Activities Office

Attachments: 3
(a) Summary of Rating Definitions and Follow-Up Action
(b) EPA comments on DEIS/R
(c) Pollution prevention checklist

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION

Environmental Impact of the Action

LO-Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC-Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO-Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU-Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of environmental quality, public health or welfare. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommend for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1-Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2-Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3-Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From: EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

EPA Comments on Upper Guadalupe River DEIS/R

CLEAN WATER ACT (CWA)

NOV 3 1997

Section 404

We commend the Corps for its discussion of CWA Section 404 regulatory requirements in the DEIS/R (particularly Appendix C) and the discussion on the 404-related impacts of the two action alternatives. In keeping with the 404(b)(1) Guidelines, we believe that the Final EIS/R (FEIS/R) should identify which of the action alternatives assessed in detail (Channel Widening Plan, Bypass Channel Plan) is the least environmentally damaging practicable alternative in terms of impacts to the aquatic environment. Based upon the documentation presented in the DEIS/R, it appears that the Bypass Channel Plan has more adverse impacts to aquatic resources than the Channel Widening Plan, for example: N-6

Channel Widening Plan: construction removal of 6.5 acres of riparian forest; loss of 1,700 trees; excavation or filling 0.28 acre of wetlands and 2.64 acres of Section 404 waters of the U.S.

Bypass Channel Plan: construction removal of 9 acres of riparian forest; loss of 3,100 trees; removal of 0.88 acre of wetlands and 9.93 acres of Section 404 waters of the U.S.

Combination of Structural & Non-Structural Alternatives

Neither the Draft Feasibility Report (e.g., Table 13) nor the DEIS/R indicates whether a combination of structural and non-structural alternatives may be a viable project alternative, either for purposes of NEPA analysis or in terms of the CWA Section 404 alternatives analysis. There is no indication whether a combination of structural and non-structural alternatives, if determined to be reasonable under NEPA and practicable under CWA Section 404, may avoid and reduce adverse project-related impacts to wetlands, waters of the United States and related aquatic resources. The FEIS/R should briefly discuss whether such a combination may be reasonable and practicable. If so, we encourage the Corps and the SCVWD to integrate such considerations in their decision-making for Upper Guadalupe flood control. This would be in keeping with language in "Sharing the Challenge: Floodplain Management into the 21st Century" (Report of the Interagency Floodplain Management Review Committee, June 1994), e.g., the discussion on p. 118 of the 1994 report on expanding nonstructural measures. The 1994 report defines "nonstructural measures" quite broadly, including methods such as watershed management, land use planning, floodplain acquisition, N-7

N-7 flood-proofing techniques and other construction practices, and flood warning, contrasting non-structural measures from "more traditional structural methods" such as dams, levees and channels.

Detention/Water Storage Basins

N-8 We recently reviewed a DEIS from the Corps Los Angeles District on **Tucson Drainage Area, Arizona** (April 1997) which proposes several detention basins within the Tucson Arroyo/Arroyo Chico basin study area. In addition to acting as flood water detention facilities, the basins would serve other purposes, including habitat restoration and recreational uses (Tucson DEIS, p. 2-5). The Tucson DEIS (p. S-8) indicated that the design of the detention alternatives was developed to minimize the amount of natural vegetation removal in response to community concerns about protecting natural communities.

N-9 The Upper Guadalupe DEIS (p. 2-6) indicates that an "offstream storage facility [to] receive diverted river water during peak flow events" was dropped from detailed consideration due to high costs and associated environmental impacts. However, there is no discussion about whether storage/detention basins may lessen adverse impacts to Section 404-protected resources, for example, by minimizing the amount of channelization and placement of structures in the Guadalupe River. We note that the Upper Guadalupe Draft Feasibility Report (Table 13 - *Summary of Flood Damage Prevention Measures Considered*) does not include offstream storage/detention basins as a flood control measure that was initially considered. We recommend that the FEIS/R briefly discuss the feasibility of offstream storage/detention basins, particularly in areas where such basins may help to reduce adverse impacts to vegetative communities proposed for excavation or filling under the current proposal.

Water Quality Standards

N-10 The DEIS/R identifies several impacts to water quality projected to occur with project implementation: increased erosion and sedimentation during construction; remobilization of contaminants in soil during construction; and use of herbicides to control vegetation under the Bypass Channel Plan. The DEIS/R indicates that the Stormwater Pollution Prevention Plan would ensure that adverse water quality impacts are reduced to less than significant levels. The DEIS/R also indicates that herbicide-related water quality impacts are "insignificant" (p. 4.3-14), but no documentation is provided to support this conclusion.

N-11 We believe that the FEIS/R should clearly indicate whether the construction and operation of the proposed project would comply with State-adopted, EPA-approved Water Quality Standards as contained in the Basin Plan. The Basin Plan contains specific parameters and criteria for a variety of water pollutants, including turbidity (waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses); temperature (changes in temperature shall not adversely affect beneficial uses such as fisheries); and toxicity (waters shall be maintained free of toxic substances in concentrations lethal to or that produce detrimental responses in aquatic organisms). Appropriate commitments to protect water quality and beneficial uses should also be contained in the Record of Decision. N-11

HERBICIDE USE

Potential Impacts & Mitigation

The DEIS/R contains a brief reference to the use of herbicides in connection with the Bypass Channel Plan. Specifically, page 4.3-14 states that the Bypass Channel Plan "would include using appropriate herbicides to control vegetation growth in some areas, such as along the maintenance road. This would not significantly alter water quality..." We are concerned that this brief reference to herbicides use provides little substantive information to the public in terms of NEPA public disclosure regarding the nature of the herbicides proposed for use, possible non-herbicide alternatives and the environmental consequences associated with using herbicides. For example, the DEIS/R does not disclose what herbicides(s) may be used; how frequently they would be used; potential impacts associated with their use such as uptake by plants, fish and aquatic species; mitigation measures to be adopted by the SCVWD to avoid adverse impacts to water quality, nontarget species, wildlife, fisheries and public health; and whether the Corps and the SCVWD evaluated non-herbicide alternatives that may be reasonable for purposes of NEPA analysis. Such information should be contained in the FEIS/R, in accord with NEPAs public disclosure requirements. N-12

The DEIS/R did not indicate if the SCVWD would notify the potentially-affected public before using herbicides. We encourage the SCVWD to consider public notification such as posting areas where herbicide use would occur to inform the public of potential risks due to exposure. We recommend that herbicide use postings be in the language(s) common to area residents. Commitments regarding the use of herbicides, including public notice provisions, should be in the FEIS/R and Record of Decision.

Herbicides, Water Quality & CWA Requirements

The Water Quality Control Plan (Plan) provides that "All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms...." The Plan provides that there shall be no chronic toxicity in ambient waters. The DEIS/R contains no reference about whether the use of herbicides would be consistent N-13

N-13 with the requirements in the Plan except that herbicide use "would not significantly alter water quality conditions in the river and is an insignificant impact." (p. 4.3-14). The FEIS/R should discuss whether herbicides use would be in accord with the Plan and whether herbicides would adversely affect existing or potential uses such as fish spawning and migration, protection of rare species, etc. We recommend that the Corps and the SCVWD contact the Regional Water Quality Control Board to ensure the projects consistency with the Plans requirements on toxicity and herbicides. Measures to protect water quality and beneficial uses should be in the FEIS/R and Record of Decision.

TOXIC AND HAZARDOUS MATERIALS

N-14 The DEIS/R (p. S-11) states that the Channel Widening Plan would remove four businesses, while the Bypass Channel Plan would remove 63 single-family residences and 20 businesses. There is no indication about whether any of the structures may contain lead-based paint, leaded water pipes, asbestos-containing materials or, in the case of the businesses, polychlorinated biphenyls (PCBs). We recommend that the FEIS/R discuss hazardous and toxic waste issues associated with the removal of the structures, including mitigation measures to protect worker health and safety during future demolition work, measures to prevent/minimize public exposure during demolition, and disposal of the materials at authorized waste disposal facilities.

POLLUTION PREVENTION OPPORTUNITIES

N-15 The DEIS/R did not address pollution prevention features in the proposed project to the extent recommended by the Council on Environmental Quality (CEQ) in the January 29, 1993 *Federal Register*. We believe that the proposed project could be strengthened by specifically designing and constructing it with pollution prevention features as an integral element. Weve enclosed a pollution prevention checklist for your use in developing the final project documentation and Record of Decision. Although several items on the checklist have been included in the DEIS/R or may prove inapplicable, other measures may be feasible as the project proceeds. We suggest that appropriate pollution prevention commitments be included in the FEIS/R and Record of Decision.

AIR QUALITY - GENERAL CONFORMITY

N-16 The DEIS/R (p. 4.1-5) indicates that because the San Francisco Bay Area is a maintenance area for ozone, a project alternative would trigger a general conformity analysis under Clean Air Act Section 176(c)(c) if the emissions exceeded 50 tons per year of volatile organic compounds (VOCs). The FEIS/R should recognize that any conformity analysis, including the applicability determination, would also need to address oxides of nitrogen (N0x), which is also an ozone precursor. Please refer to the November 30, 1993 *Federal Register* (p. 63249) which provides for a de minimum level of 100 tons per year of N0x in ozone maintenance areas such as the San Francisco Bay Area. The applicability analysis found in the "Air Quality Conformity Determination" (Appendix C) should be amended to reflect N0x emissions from the project in addition to the projects VOC and carbon monoxide emissions. N-16

POLLUTION PREVENTION/ENVIRONMENTAL IMPACT REDUCTION CHECKLIST FOR FLOOD CONTROL PROJECTS

How Can Flood Control Projects Affect the Environment?

Flood control projects can include channelization and channel modification activities and levee construction. Such activities can change the ability of natural systems to filter pollutants from surface waters; alter the rates and paths of sediment erosion, transport, and deposition; increase the movement of pollutants from the upper reaches of watersheds into coastal waters; lower dissolved oxygen levels; increase salinity in marshes; reduce freshwater availability; and accelerate the delivery rate of pollutants to downstream sites. Pollution prevention techniques can reduce or eliminate some environmental effects.

Also see checklists on Ecosystem Preservation and Protection, Siting, Building/Housing Construction, Dredging Projects, Dams, Hydropower, and Water Supply Reservoirs.

What Questions Should Be Asked To Ensure That These Effects Are Minimized or Eliminated?

Ecosystem Concerns

- Has the use of alternatives involving levee setbacks or the use of floodways been considered?
- Will the flood control project lead to land use changes in the watershed, particularly those changes that result in increased surface water runoff and nonpoint source pollution?
- Have modifications to existing flood control structures been evaluated to determine if they can eliminate the need for the new channelization or channel modification project?
- Have all environmentally sensitive areas been characterized? Have attempts been made to avoid construction in environmentally sensitive areas? *
- Does the project minimize construction parallel to rivers or streams to reduce the potential for direct runoff discharge from the roadway?
- Does the project make use of existing roadway alignments (if possible) to reduce the amount of waste generated as a result of clearing and construction activities?
- Has the project incorporated mitigation measures to reduce the impact of pollution runoff from the roadway? These measures may include stabilizing cut and fill slopes, shoulders, and medians with perennial vegetation and non-erosive materials, such as rip-rap or geotextiles, or establishing permanently controlled discharge points for storm water.
- Does the plan include native plant revegetation of areas disturbed by construction to minimize erosion and sedimentation?
- Have safe wildlife crossing structures and appropriate fencing been incorporated into the project to accommodate the movements and needs of resident wildlife and mitigate habitat fragmentation? *

* Indicates an environmental impact reduction opportunity.

Project Design and Planning. Flood control projects can affect the physical characteristics of surface waters and modify in-stream and riparian habitat.

- Have alternatives, such as upstream watershed management and floodplain widening, been considered? *
- Are land use and agricultural practices, as well as their potential for contributing pollutants to surface waters, considered in channel design? *
- Will building be prohibited within a defined distance from the streambed to protect the streambank?
- Are streambank protection measures, such as stone riprap, vegetation, erosion control fabrics, cellular concrete blocks, and gabions, included in the design?
- Will levees and flood walls be sited outside riparian areas and wetlands?
- Are channel slopes graded so that animals can crawl or climb out? *

Construction. Construction activities for channel modification include vegetation clearing, soil and rock excavation and placement, equipment operations, and energy, water, and hazardous materials use, all of which can cause pollution. Effects on river and coastal area ecology from increased sediment loads and the release of hazardous constituents can occur during construction. Pollution prevention techniques can reduce or eliminate some pollutants.

- Will measures be taken to prevent surface water from entering construction areas?
- Will construction take place during dry seasons?
- Will site access routes and equipment storage areas be planned and located to minimize erosion potential? Will existing roadways be used to gain site access?
- Will construction workers be required to limit activities to designated, controlled areas to prevent vegetation destruction and soil disturbance? *
- Will secondary containment be provided in equipment fueling areas to control fuel spills? Is a spill control plan specified?
- Will access to materials and equipment storage areas be controlled and limited? Will material storage areas be covered? Will materials be ordered only when necessary to prevent inventory from expiring?
- Will the cleaning of construction equipment be conducted in a controlled area away from surface water? Will the washwater be prevented from entering the stream?

* Indicates an environmental impact reduction opportunity.

- Will reclaimed and/or recycled construction materials be used, including aggregate, rebar, lumber, and asphalt? *

- Are alternative materials available to reduce hazardous and toxic materials use during construction?

- Will construction and storage areas be sited away from critical habitats? *

- Will biotechnical methods, such as vegetated gabions, be used to stabilize levee and channel banks?

Maintenance. Pollution prevention can reduce or eliminate the environmental effects of flood control project maintenance. Maintenance generally consists of vegetation management, burrowing animal control, upkeep of recreational areas, and levee repairs. In-stream and riparian habitats, which provide soil erosion protection, and pollutant filtering can be affected by maintenance activities.

- Will vegetation removal methods that use chemicals, grazing, or burning be prohibited? Chemical herbicide residuals and animal wastes can be washed into waterways during rainy periods. Burning can negatively affect air quality.

- Will burrowing animals be controlled by non-chemical means? Burrowing animals can affect the integrity of structures, leading to significant reconstruction requirements.

- Will native plant species be used for revegetation of disturbed areas? *

- Will marina fueling areas be regularly maintained and checked for leaks? Will boat owners be required to remove their craft from waterways before conducting engine and other boat repairs using hazardous materials?

- Will measures be taken to prevent downstream sediment loading during dredging operations?

- Will dredging spoils be evaluated for nutrient and contaminant content before they are applied to land areas? *

Other References

Federal Interagency Floodplain Management Review Committee. August 1994. "Sharing the Challenge: Floodplain Management into the 21st Century."

Federal Interagency Floodplain Management Task Force. 1992. "Floodplain Management in the United States: An Assessment Report."

U.S. EPA, Office of Water. January 1993. *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters.* 840-B-92-002.

* Indicates an environmental impact reduction opportunity.

N. David Ferrel, U.S. Environmental Protection Agency. November 3, 1997.

N-1. See response to comment J-30. A combination of structural and non-structural alternatives is considered infeasible, as non-structural alternatives would not provide sufficient flood control protection improvements (e.g., off-stream storage in Reach 12), as they would not enable the Corps to avoid channel modifications in sensitive areas such as Reach 9.

The Channel Widening Plan would be less damaging but provide a lesser degree of flood protection. Non-structural alternatives have been considered in the screening process. Refer to chapter 2 of the EIR/S.

N-2. The two projects are not "essentially the same," as the project discussed in the SCVWD's EIR/S includes features outside the limits of the Corps study area. The SCVWD study looks at different ways of providing protection against a 100-year flood. The Corps study looks at whether the Federal government should cost-share a project here, and if so, what level of flood protection should be cost-shared. The two studies are responsive to different policies and goals. It would be very difficult to integrate these two studies into one document.

N-3. The EIR/S has been revised in section 4.3.3, Water Quality, to indicate that the SCVWD would only use EPA-approved herbicides, and certified personnel would use them according to accepted procedure. Therefore, the project would be consistent with Water Quality Standards for surface waters within the feasibility study area.

N-4. The SCVWD has stated that all herbicides used would be EPA-approved and used according to accepted procedure by certified personnel. This compliance with existing federal regulations as incorporated in the project description is considered a standard operating procedure that would reduce any potential water quality impacts from herbicide use to insignificance. Therefore, no mitigation measures are required. The EIR/S has been revised to include this discussion.

N-5. Mitigation measures identified in the EIR/S address the Pollution Prevention/Environmental Impact Reduction Checklist for Flood Control Projects.

Mitigation measures in the Final EIR/S now reference these guidelines.

N-6. See response to comment J-1, N-1.

N-7. See response to comment J-1. Discussion of a Stream Restoration Alternative has been expanded in section 2.2, Formulation of Conceptual Alternative Plans. The Corps has considered a Stream Restoration Alternative with flood control and determined that it would require widening the floodplain by as much as a few hundred feet to make it capable of carrying high channel flows. It would result in major impacts to existing native riparian vegetation, fisheries, and adjacent homes, if present. Since other alternatives would be less environmentally damaging, a permit cannot be issued for this alternative under the Clean Water Act section 404(b). This approach however, has been incorporated in the Channel Widening in the Bypass Channel Plan in Reach 10B, where impacts would not be significant.

N-8. Detention basins are not a feasible option for flood control in the study area, since the land needed for the volume of floodwaters is extensive.

N-9. Use of percolation ponds as water storage basins would be possible, but their development would be expensive and they would lose their beneficial function for groundwater recharge. The only other large open space in the feasibility study area, the Valley View property in Reach 10, is only 97 acres, capable of providing only a portion of the area needed to provide 6,000 acre-feet of storage. Assuming the area could be excavated to a 20 foot depth, only 1,800 acre feet of storage would result, which would be grossly inadequate for flood control purposes. Importantly, this measure would not allow the Corps to avoid impacting sensitive areas such as in Reach 9. Therefore, use of the Valley View property would be infeasible as a flood control measure.

N-10. According to the SCVWD (personal communication, Dennis Cheong 1997), herbicide use along proposed Bypass Channel maintenance road and bypass channels would not impact the natural river channel. Only EPA-approved herbicides would be used and applied according to approved specifications by certified personnel. Section 4.3.3, Water Quality, has been revised to incorporate this information.

N-11. Consistent with all projects where federal funding is involved, the project would comply with State-adopted, EPA-approved Water Standards as contained in the Basin Plan. Section 4.3.3, Water Quality, has been revised to incorporate this information.

N-12. Discussion of proposed herbicide use is presented in response to comment N-3, N-4, and N-10. Public notification for each herbicide use would be infeasible given the small areas and applications involved with routine maintenance.

N-13. All herbicides used would be EPA-approved. Herbicide application would be consistent with the Basin Plan. See response to comment N-3, N-4, N-10, and N-11.

N-14. Section 4.11.2, Hazardous Materials, discusses the assessment of contaminants within the feasibility study area. The thirteen areas are identified. Potential impacts are identified in section 4.11.3, and mitigation measures are provided in section 4.11.4 to address identification of contaminated soils during construction, protection of workers and public from contaminant exposure, agency notification, and remediation. The components of the Construction Contingency Plan are standard operating procedures used to address hazardous material impacts.

Properties will be analyzed for any hazards.

N-15. Mitigation measures identified in the EIR/S address the Pollution Prevention/Environmental Impact Reduction Checklist for Flood Control Projects.

N-16. The Bay Area Air Quality Management District (BAAQMD) showed in their *Ozone Maintenance Plan* that control of volatile organic compounds (VOCs) alone would demonstrate attainment of the national ozone standard for the next 10 years (through 2006) in the San Francisco Bay Area Air Basin (SFBAAB). This plan was approved by the EPA in May 1996 and included an exemption from controlling NOx emissions (the other component to ozone formation) for the purpose of attainment planning, assuming that the region remains in compliance with the ozone standard. Consequently, this NOx exemption also applies to ozone conformity determinations in the SFBAAB and only VOC emissions need to be analyzed for this analysis. This issue is included in the Final EIR/S.

County of Santa Clara

Roads and Airports Department
Land Development and Permits

101 Skyport Drive
San Jose, California 95110

November 13, 1997

Mr. William DeJager
Army Corps of Engineers
Environmental Planning Section
333 Market Street, Seventh Floor
San Francisco, CA 94105-2197

Subject: Draft Feasibility Report and Environmental Impact Statement Report (EIS/EIR) Upper Guadalupe River Feasibility Study Almaden Expressway

Dear Mr. DeJager:

Your undated "Notice of Availability and Public Hearing" concerning the subject Draft EIS/EIR has been reviewed.

O-1 Our file information has indicated that our April 16, 1997 letter (please see the attachments) included our comments on the proposed project.

We have no additional comments/concerns at this time.

Please call me at (408) 573-2462 if you have any questions. We thank you for the opportunity to review this matter.

Sincerely,

Ashok Vyas
Project Engineer

AAV:rtj
Attachments
cc: Dennis Cheong, SCVWD
RBP, DEC, MA, File

County of Santa Clara

Roads and Airports Department
Land Development and Permits

101 Skyport Drive
San Jose, California 95110

April 16, 1997

Mr. Dennis Cheong
Guadalupe River Planning Study
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Subject: Guadalupe River Draft Environmental Impact Report/ Environmental Impact Statement and Engineer's Report Almaden Expressway

Dear Mr. Cheong:

Your February 19, 1997 letter along with the attachments has been reviewed. Our comments are as follows:

1) A review of our file information has indicated that our January 8, 1991 letter included our comments on the Notice of Preparation of the proposed project. Please see the attachment. **O-1a**

2) From a quick review of the Draft EIR, it is observed that the Item Nos. (1), (2) and (3) of our January 8, 1991 letter are not addressed. This should be done.

3) The County should review and approve the improvement plans of the project relative to Almaden Expressway. We will offer specific comments at the time of reviewing improvement plans. **O-1b**

4) A County encroachment permit should be obtained prior to the beginning of any work within the County's Almaden Expressway right-of-way. **O-1c**

Mr. Dennis Cheong
Page 2
April 16, 1997

O-1d 5) As you are aware, the County of Santa Clara and Santa Clara Valley Transportation Authority (VTA) are now separate entities. VTA should review and comment upon the proposed Draft EIR.

Please call me at (408) 573-2462 if you have any questions.

We thank you for the opportunity to review this matter.

Sincerely,

Ashok Vyas
Project Engineer

AV:rtj
Attachments
cc: TDR/JRR, VTA
RBP
DEC
MA
File

Santa Clara County Transportation Agency
An Agency of the County of Santa Clara
P.O. Box 611900, San Jose, CA 95161-1900

January 8, 1991

Dr. Bernard H. Goldner
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Subject: Notice of Preparation of a Draft Environmental Impact Report (EIR)
Guadalupe River Flood Control Project - Almaden Expressway

Dear Mr. Goldner:

Your November 19, 1990 Notice of Preparation along with the attachments has been reviewed. Our comments are as follows:

The stipulated response date of the subject referral was December 21, 1990. As discussed with Mr. George Fowler of the Water District staff during the phone conversation on January 7, 1991, we can send in our comments on or before January 11, 1991. We appreciate your consideration in this matter.

(1) The proposed project would require the addition of a reinforced concrete box (RCB) culvert at Canoas Creek and Ross Creek crossings of Almaden Expressway. As stated in your November 19, 1990 letter, a cut and cover i.e., open trench construction technique is planned to be used. Normally, open trench excavation across Expressway is not allowed. However, based upon "Amendment No. 21 to the County Expressway Policy Resolution (as Amended): Transverse Underground Utility Encroachment", an open cut across an expressway can be considered, if bore and jack method is impracticable. We have attached a copy of the County Board of Supervisors' November 3, 1980 Policy regarding the open cut method for the installation of transverse utilities, listing the procedure to be followed. It is recommended that the Engineer's Report discuss the procedure to be followed as outlined in the May 13, 1990 list for open cut method and demonstrate the following:

- The additional construction costs and/or delays due to boring and jacking.
- That alternative routes are impractical.
- That the proposed construction operation will maintain public safety, minimize public inconvenience and minimize additional long term operational and maintenance costs.
  The outline dated May 13, 1980 may help you in formulating your request for the use of a open cut method to cross Almaden Expressway.

  We will be prepared to issue an Encroachment Permit to open cut Almaden Expressway after the provisions of the Board's November 3, 1980 policy have been met and we have approved your construction documents (e.g. plans, specifications, traffic control measures and other items listed on the May 13, 1980 outline).

(2) It is observed that the enclosed plans do not include the portion of work near the bridge on Guadalupe River at Capitol Expressway. Please note that we have an existing operational traffic problem at the bridge location easterly of Chard Drive due to inadequate return radius. It is recommended that the Engineer's Report address this issue and include the necessary mitigation measure.

(3) This Agency is in the process of planning and designing High Occupancy Vehicles (HOV) lanes along Almaden Expressway. Typical right-of-way necessary to install HOV lane is 79 feet half street. It is, therefore, recommended that the project plan provide for a minimum length of 79 feet for the new box culvert and also the lengthening of the existing culvert so as to enable the County to install HOV lanes at a future date.

(4) We have an existing bus stop southbound Almaden Road farside Curtner Avenue which will be impacted due to the project. At the time of the project plan review, we may require transit-related improvements for the bus stop impacted due to the project.

(5) At the time of project plan review, this Agency will require that a traffic control plan be submitted for this Agency's review and approval. The traffic control plan should be based upon Caltrans' "Manual of Traffic Controls for Construction and Maintenance Work Zones" - latest edition.

(6) A County encroachment permit should be obtained prior to beginning any work within the County's Almaden Expressway right-of-way.

(7) We may have additional comments at the time of future reviews.

(8) A Copy of the Engineer's Report and Environmental Impact Study should be furnished for our review and comments.

Please call me at 299-4205 if you have any questions.

We thank you for the opportunity to review this matter.

Sincerely,

1/8/'91

ASHOK VYAS
PROJECT ENGINEER

AV:kh

Attachment

cc: VCH
WLK
RKW
RGH

August 29, 1980

STAFF REPORT
TO THE
TRANSPORTATION MODES COMMITTEE

Subject: Amendment Number 21 to the County Expressway Policy Resolution (as Amended): Transverse Underground Utility Encroachments

Introduction

Since the inception of the County Expressway System in the early 1960's the County's (unwritten) policy has been to require transverse underground utility crossings of expressways to be "bored and jacked" as opposed to allowing open cuts of the expressway pavement.

During the past year two requests were made through the Modes Committee and the Transportation Commission to the County Board of Supervisors for encroachment permits to "open cut" a County expressway for the purpose of installing underground utilities. As a result of these two requests, which were granted by the Board, County staff was authorized to: "develop a proposed amendment to the County Expressway Policy Resolution regarding "Transverse Utility Encroachments" by working with the city-owned and privately-owned public utilities".

The specific issue to be investigated in this study is as follows:

At what level of additional cost and/or delay in construction due to "boring and jacking requirements" should the County consider the "open cut" alternative, as a viable mitigation measure for the requesting city-owned or privately-owned public utility.

Representatives from most of the public utilities and cities (for city-owned utilities) have conferred with Transportation Agency staff on several occasions to address this issue. The following report addresses this problem.

Background - General

The "County of Santa Clara Expressway Policy Resolution (as amended) is a composite of the original expressway policy resolution (adopted by the Board of Supervisors on December 27, 1960) and eighteen (18) amendments formally adopted by the Board (18th amendment adopted on December 16, 1969). A copy of this composite resolution is contained in Section 6 of the Transportation Commission Handbook.

The purpose of the Expressway Policy Resolution was to provide the Board of Supervisors, the County Transportation Policy Committee (forerunner to the County Transportation Commission) and County staff with general policy statements for administering the Phase I County Expressway Program. Although the Phase I Bond Program ($70 million) was exhausted several years ago, the County has continued the Expressway Program wi County gas tax revenues. During these later years the Expressway Pol y Resolution has continued to serve the County as a policy guide for matter pertaining to the County Expressway System.

In 1975 the Municipal Public Works Officials (MPWO) of Santa Clara County requested three amendments to the "Expressway Resolution (as amended)". Two of these modifications were approved by the County Board of Supervisors on October 27, 1975.

Background - Specific

Neither the "Expressway Policy Resolution (as amended)" nor the subsequent amendments to this document specifically address the issue of additional transverse utility encroachments under an existing expressway. Since the inception of the expressway system in the early 1960's the County's (unwritten) policy has been to deny requests to "OPEN CUT" an expressway and instead require the facility to be "BORED AND JACKED" under the expressway.

The reason for this special treatment or requirement is that the County Expressway System provides a special or unique service to the general public - similar to the State's freeway and expressway system. The primary considerations that have been instrumental in developing this policy are:

1. Cost of the expressway facility.

2. Cost to repair future failing sections of pavement, if any.

3. Cost to provide satisfactory trench and structural section replacement and construction detours.

4. Safety of the general public during construction and future failure periods, if any.

5. Convenience of the general public during construction and future failure periods, if any.

Infrequent exceptions have occurred when a partial crossing has been required to "tie in" to an existing utility under an expressway, or for emergency repairs to an existing utility under an expressway.

Discussion

The issue of "open cutting" versus "boring and jacking" has become, over the past few years, an extremely sensitive issue. On the one hand, significant construction delays and/or increased construction costs may be required under the present "bore and jack" policy. On the other hand, County staff is concerned about safety and convenience to the general public and the potential costs to repair pavement failures if "indescriminate" open cutting of the expressways is allowed.

During the past few months representatives from the privately-owned public utilities, the city-owned utilities and the County Transportation Agency have discussed the "open cut" alternative on several occasions. The main issues developed in these discussions were as follows:

1. How to quantify the additional time and/or costs due to "boring and jacking" requirements?

2. What level of additional time and/or costs due to "boring and jacking" requirements should be considered "excessive"

and, therefore, introduce the "open cut" alternative?

3. How rigid should the proposed policy revision be so as to both protect all the parties and, at the same time, minimize additional "bureaucratic" red tape requirements?

County staff's concern is to convey the principle that "not every request to transversely cross a County expressway with underground utilities will qualify for the "open cut" alternative", as the routine requests will continue to be required to be "bored and jacked" under the expressway (present policy).

County staff's approach has been to propose general criteria and procedures for administering the "transverse underground utility encroachments" policy with the utility companies. It is the utility company that will initiate a request to "open cut" an expressway; and the County staff will review the written request and supporting information. County staff is prepared to cooperate with the utility companies to determine which requests warrant further investigation as legitimate situations to apply the "open cut" alternative procedure, and developing specific requirements that are consistent with the site specific information, public safety and overall economy.

On May 22, 1980 the Utilities Committee submitted its revised draft procedure for implementing the "open cut" policy. County staff is satisfied that the procedure as submitted (with Part B-7 added by County staff) is a common sense plan that will both communicate the responsibilities of each party (requesting utility and County) and pr vide an opportunity for "early-on" staff communication in developing "site specific" problems and solutions to those problems. A copy of the draft procedure, dated May 13, 1980, as modified by County staff on August 11, 1980 is attached.

Finally, the only way to find out if this type of policy change (and related administrative procedure) will work is to "try it". The intentions of the staffs of the requesting utility companies and County staff will determine the effectiveness of the proposed policy and procedure.

Recommendation

It is recommended that the Transportation Modes Committee approve the policy and procedure to allow transverse underground utility encroachments to "open cut" the County expressways, as follows, and that this policy and procedure then be forwarded to the County Transportation Commission and to the County Board of Supervisors for similar action:

1. Policy: Amendment Number 21 to the County Expressway Policy Resolution (as amended): Transverse underground utility encroachments (attached).

2. <u>Procedure</u>: As submitted by the Utilities Committee on May <u>22, 1980</u> (dated May 13, 1980) and modified by County staff on August 11, 1980 (attached).

Submitted by:

Scotty A Bruce

SCOTTY A. BRUCE, Staff Liaison

SAB:vlt

attachments

cc: Each Member of the Transportation Modes Committee
Each Member of the Board of Supervisors
William Siegel
Clerk of the Board of Supervisors
Each City Engineer/Director of Public Works
Lance C. Morgan, PG&E
JHG
LM
RMS
NLC

May 13, 1980

Subject: Conference to develop an "Open-cut" policy for utility encroachments of the County Expressway System

The following "Open-cut" policy is suggested by the Cities and Utilities of Santa Clara County, in response to the County's Expressway Crossing Proposal. It is to be considered only when boring of the Expressway is impractical.

A. GENERAL CRITERIA FOR GRANTING AN "OPEN-CUT" PERMIT

1. Unusual Site Conditions

   A. Soil/Weather Conditions

   B. Availability of R/W

   C. Utility Conflicts

   D. Number/Location of Inspection/Receiving Pits

   E. Cost of Boring vs. Cost of Trenching

   F. Project Time Delays Due to Method of Construction

B. RESPONSIBILITIES OF REQUESTING UTILITY COMPANY

1. Written Report Indicating Difficulties in a "Bore and Jack" Operation, to Justify Trenching (Siting Criteria A-f Above).

2. Formal Engineer Drawings and Specifications

   A. Construction Methods

   B. Construction Phasing

   C. Traffic Control-Detours

   Formal report describing existing conditions and impact open cut will have and a recommendation as to how to minimize impact on traffic.

   D. Schedule of Operations

   Days — Hours, etc.

   E. Striping, Signing, Safety Device

3. Alerting Other Utilities of a Joint-Trench Operation

4. Proposing to Oversize for Future Growth Potential

5. Providing for Continuous County Inspection

6. Proposing Innovative Construction Methods, etc., to Minimize Start-to-Finish Time

STAFF 111/80 → 7. ALERTING NEWS MEDIA OF SCHEDULE, HRS. OF

Same

C. GENERAL COUNTY REQUIREMENTS

1. Administrative

A. Special Plan Check-Inspection Fee

B. Three-Year Warranty in Writing

*C. Performance Bond

*D. Standard Insurance Requirements

E. Maintain County Facilities (Electric, Drainage, etc.) at All Times

2. Construction Considerations

A. Exclude Peak Traffic Periods from Work Operation (Seven Days a Week).

B. Maximum Lane Closure—Generally One Lane Open in Each Direction

C. Trenching: Saw Cut—Minimum 12" Width Trench

D. Backfilling: Achieve 95% Compaction as Specified in the California State Test Method. Jetting Allowed Only for Backfill Within 12" Envelope Around Facilities.

E. Pavement: 12" Deep Strength Asphalt Cover in 6" Lifts

F. Aesthetic: Restore in Kind at General Trench Location

G. Stripe Removal: Sandblasting

H. Paths/Landscaping: Replace in Kind

I. Location of Trench: Away from Intersections When Practical

*Utilities and Governmental Agencies Using Their Own Forces Are Exempted.

September 18, 1980

9A3

TRANSPORTATION MODES COMMITTEE REPORT
TO THE
TRANSPORTATION COMMISSION

Subject: Amendment Number 21 to the County Expressway Policy Resolution (as Amended): Transverse Underground Utility Encroachments

Members Present: Bargabus, Fletcher, Grisham, Million, Pedersen, Siemens, Spivak.

Members Excused: Winckler

Introduction

The Committee met on Wednesday, September 10, 1980 to discuss the proposed Amendment No. 21 to the County Expressway Policy Resolution (as Amended): Transverse Underground Utility Encroachments.

The procedure for processing amendments to the County Expressway Policy Resolution requires the Transportation Modes Committee and the County Transportation Commission to review each proposal prior to consideration by the County Board of Supervisors.

Background

Background information is contained in the attached staff report dated August 29, 1980.

Discussion

The Committee discussed the staff report, including the proposed policy and procedure to allow transverse underground utility encroachments of County expressways and - in unique situations - to allow the "open cutting" of the pavement section. Mr. Lance Morgan of the Pacific Gas and Electric Company (Chairperson of the Underground Utilities Committee) represented the utility companies, and Mr. Del Bechtholdt represented the Transportation Agency staff.

The principal issues discussed by the Committee included:

1. The role of the Committee in reviewing requests to "open cut" an expressway.

2. The anticipated workload (number) of requests to be received from the utility companies.

3. The value of cost savings to public utilities from the proposed policy.

4. The role of the Committee in reviewing requests to "open cut" an expressway.

1 conformed copy to Transportation Commission, 1 conformed to County Executive,
1 conformed copy to Dorothy Gullion Transportation

The Committee then approved the proposed Policy No. 21 and procedure for allowing transverse underground utility encroachments to County expressways with the provision that a status report be prepared by the staff after this policy and procedure have been in effect for one year.

Committee Member Pedersen voted no, based on his feeling that each request to "open cut" an expressway be reviewed by the Modes Committee instead of the staff (similar to a Planning Commission variance request procedure).

Recommendation

It is recommended that the County Transportation Commission approve a policy and procedure to allow transverse underground utility encroachments, including the "open cutting" of paved sections in unique situations as follows, and that this policy and procedure then be forwarded to the County Board of Supervisors for similar action:

1. Policy: Amendment Number 21 to the County Expressway Policy Resolution (as amended): Transverse Underground Utility Encroachments (attached).

2. Procedure: As submitted by the Utilities Committee on May 22, 1980 (dated May 13, 1980) and modified by County staff on August 11, 1980 (attached).

3. Status Report: Staff prepare a status report on the policy and procedure after they have been in effect for one year.

Submitted by:

JIM BARGABUS
Chairmember

attachments

cc: Each Member of the Transportation Modes Committee
Each Member of the Board of Supervisors
William Siegel
Clerk of the Board of Supervisors
Each City Engineer/Director of Public Works
Lance C. Morgan, P.G.&E.
JHG
LM
RMS
NLC
SAB
DHB

RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF SANTA CLARA ADOPTING AMENDMENT NUMBER 21 TO THE COUNTY OF SANTA CLARA COUNTY EXPRESSWAY POLICY RESOLUTION, ADOPTED DECEMBER 20, 1960

The County Expressway Policy Resolution (as amended) be amended by adding Part XVIII, Transverse Underground Utility Encroachments, as follows:

The County of Santa Clara will permit the transverse installation of additional or new (1) city-owned or (2) privately owned public utilities under paved areas within County expressways provided the requesting utility agrees to "bore and jack" the facility under the paved sections of the expressway except as follows:

city-owned and privately-owned public utilities will be allowed to "open cut" the paved area of an expressway when the requesting utility can demonstrate (1) that the boring and jacking requirements of the County will result in excessive additional construction costs and/or delays, (2) that alternative routes are impractical and (3) that appropriate mitigation measures of the requesting utility will maintain public safety, minimize public inconvenience and minimize additional long-term operational and maintenance costs resulting from the utility installation.

The requesting utility will be responsible for submitting a a written report justifying the need to consider the "open cut" alternative, formal engineered drawings and specifications, and proposed mitigation measures. The County will be responsible for the timely review of the utility's request, and if approved, the listing of specific administrative requirements and construction specifications, as conditions of approval.

In the event that the staffs of the requesting utility and the County are unable to reach an agreement on the request to open cut the expressway and/or the County's conditions of approval, the requesting utility will prepare a feasibility study (without cost to the County) for submittal to the Transportation Commission (through the Transportation Modes Committee), who will make a recommendation to the Board of Supervisors.

PASSED AND ADOPTED by the Board of Supervisors of the County of Santa Clara, California on NOV 3 1980 by the following vote:

AYES: Supervisors CORTESE, [redacted], STEINBERG, DIRIDON, WILSON

NOES: Supervisors NONE

ABSENT: Supervisors McCORQUODALE

Chairperson, Board of Supervisors
Geraldine F. Steinberg
Chairperson, pro tempore

ATTEST: DONALD M. RAINS, Clerk
Board of Supervisors

APPROVED AS TO FORM:

DONALD J. BAKER
Assistant County Counsel
9-19-80

Transportation Commission
524 County Administration Building
70 West Hedding Street
San Jose, California 95110
299-2323 Area Code 408

County of Santa Clara
California

October 14, 1980

40

Board of Supervisors
County Government Center
70 West Hedding Street
San Jose, California 95110

Gentlepersons:

At its meeting of October 8, 1980, the Transportation Commission unanimously approved a policy and procedure to allow transverse underground utility encroachments, including the "open cutting" of paved sections in unique situations, as outlined in the Transportation Modes Committee Report dated September 18, 1980. The Commission requests approval by your honorable Board of that policy and procedure.

Sincerely,

TRANSPORTATION COMMISSION

Luretta R. O'Donnell

Luretta R. O'Donnell
Secretary

lk

Attachment

Nov 3 ~~OCT 29~~ 1980

O. Ashok Vyas, Roads and Airports Department, County of Santa Clara. November 13, 1997.

O-1a. This comment addresses project design details and construction methods presented in an early Engineer's Report that apparently was an attachment to the November 19, 1990, Notice of Preparation of a Draft EIR for the Guadalupe River Flood Control Project (Santa Clara Valley Water District 1990). The current version of that project is referred to in this EIR/S as the Bypass Channel Plan. The following information is presented in response to the points raised:

(1) A final determination regarding the construction method for installation of the reinforced concrete box (RBC) culverts at the Almaden Expressway crossings of Canoas Creek and Ross Creek has not been made. Note that consideration of the bore-and-jack method is required in Mitigation Measure No. 2 in section 4.7.4. The County policies regarding transverse underground utility encroachment of the Almaden Expressway will be followed.

(2) Revised drawings for the Bypass Channel Plan (SCVWD 1995) show proposed right-of-way changes that would improve the turn radii at the intersection of Capitol Expressway and Chard Drive (refer to sheet 14 of 39).

(3) The Corps and SCVWD are aware of the County's plans to eventually widen Almaden Expressway to accommodate HOV lanes. The length of the RBC culverts at the Canoas Creek and Ross Creek crossings will be coordinated with the County during the final design stage.

O-1b. This comment refers to Santa Clara County review of improvement plans. The comment does not address adequacy of the EIR/S. No response or revision to the EIR/S is necessary.

O-1c. The requirement for an encroachment permit from Santa Clara County for any construction activity within the Almaden Expressway right-of-way has been added to section 4.7.3.

O-1d. The Santa Clara Valley Transportation Authority has reviewed and commented on the Draft EIR/S. Please refer to the responses to comments K-1 through K-14 above.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

NOV 17 1997

Mr. William DeJager
U.S. Army Corps of Engineers
San Francisco District
333 Market Street
San Francisco, CA 94105-2197

Dear Mr. DeJager:

Thank you for the opportunity to comment on the Draft EIS/EIR, Draft Feasibility Report and Environmental Impact Statement/Report (DEIS) Upper Guadalupe River Feasibility Study. Based upon our review, the draft report does not contain the information needed to make a determination that the preferred alternative would not adversely impact anadromous fish, particularly the steelhead trout that is listed as threatened in the project area. Our comments are provided as General Comments that describe the overall concerns we have regarding the adequacy of fishery considerations in the DEIS and Specific Comments that describe individual concerns or better qualify some of the "general comments."

General Comments

This project description is one of several independent flood control actions on the same water body, affecting perhaps as many as eight independent reaches. Anadromous fish in Guadalupe River include chinook salmon and steelhead trout that migrate through this entire system of reaches. Chinook salmon is a candidate species for listing and steelhead is already listed as a "threatened" species in the project area. The river has multiple habitat-related problems that prevent optimum fish passage and rearing conditions. Mostly these include inadequate water quantity, degraded water quality including high water temperatures, lack of adequate shoreline vegetation, and barriers that restrict migration. Many of these adverse conditions could be ameliorated with improved flood management practices and structures. Maximum benefit would occur if all flood management actions were fully coordinated and orchestrated. P-1

The project selected and described in the Draft is a subset of the preferred and larger project described in the draft EIS/EIR of the Santa Clara Valley Water District (SCVWD), January 1997. In fact there are numerous independent, interdependent, and interrelated flood control activities occurring in this same river. Many have complex and interrelated mitigation obligations. Several projects suggest shared mitigation sites and there seems to be a possibility of double counting mitigation credits in some cases. P-2

We also learned of several major programs that are planned for the watershed, including a watershed management initiative, a fishery management planning effort, a basin sediment management plan, and a vegetation management planning effort. All these appear to be substantially interrelated, but were not mentioned in the Draft. Considering the piecemeal approach to flood protection that continues to occur in the river, we must suggest that the draft report does not comply with the intent or spirit of the National Environmental Policy Act. A more basin-wide, or at least river-wide, consideration is necessary to fully assess the cumulative impact of all flood control projects and to fully coordinate a mitigation plan that will eliminate adverse effects to steelhead trout. P-3

We understand the complexity of improving flood protection in a highly urbanized area like the San Jose community, especially within the highly developed historic flood plain. We also sympathize with the numerous agencies that are involved and the fragmented approach caused by variable funding opportunities. Nonetheless, a holistic watershed approach is essential in anadromous fish streams and is compatible with the Corps of Engineers national approach to flood plain management.

Specific Comments

Considering the complex and interrelated association with the SCVWD in the Guadalupe River, our comments are grouped into the following sections that assess independent elements of your report.

The Corps Flood Control Project

Your draft Feasibility Study investigates several different plans, including No Action, Willow Glen, Valley View, and Bypass Channel. All four plans provide different levels of flood protection (existing, 20-, 50-, and 100-year flood events). We understand that the Corps must evaluate a range of alternatives and determine which plan maximizes the net economic benefits, defined as that which maximizes national economic development (NED). The Valley View Plan provides the highest net benefit and is selected as the NED Plan. Based totally on flood control benefits, it increases the channel capacity to accommodate a 50-year flood event. An exception to this selection could be considered if another plan will provide 100-year flood protection. P-4

The Corps completed a trade-off analysis among the three "action" plans and determined that the Bypass Channel Plan will provide 100-year flood protection, will provide long term aesthetics, and is preferred by the public. Further, the Bypass Channel Plan would be the NED Plan if recreation is incorporated into the analysis. Therefore, although the Corps recommends the Valley View Plan as the NED, it recommends the Bypass Channel Plan as the selected alternative. If this is not an accurate synopsis, then this decision is confusing.

The Santa Clara Valley Water District Project

This Corps flood control project is really a subset of the larger SCVWD project of which the Corps is a partner. The cumulative impact of both projects is probably greater than that reported P-5 in both assessments. Apparently the Corps does not intend to implement its share of the SCVWD project, but cost-share it (we noted this in the SCVWD draft EIS/EIR). Are the impacts of the Corps' share of the SCVWD project fully considered in either project? **P-5**

The National Marine Fisheries Service (NMFS) is presently consulting informally with the Corps and the SCVWD on the SCVWD's preferred project. This will be difficult since it remains unclear which project will be built. Formal consultation probably will be deferred until a final determination is made. In fact, we recommend that a supplemental NEPA EIS be prepared that 1) addresses all flood control initiatives in the Guadalupe River collectively, 2) assesses the cumulative impacts of these actions, and 3) identifies the mitigation that collectively compensates for all impacts. If any flood control action becomes an emergency situation, NMFS will consider it independently and consult appropriately. **P-6**

If you have questions regarding these comments, please contact Mr. Jim Bybee at (707) 575-6052.

Sincerely,

Rodney R McInnis

for William T. Hogarth, Ph.D.
Acting Regional Administrator

P. William T. Hogarth, National Marine Fisheries Service. November 17, 1997.

P-1. We agree with the general assessment of the river's condition and with the desirability of coordinated management actions. We are aware and have taken into account other studies and projects that would potentially affect our study area. The proposed project can stand alone with clearly separate impacts and mitigation. The Corps does not have the authority to do a comprehensive watershed study for the Guadalupe River.

P-2. Reach 10B is intended as mitigation for the upper Guadalupe project and has also been considered as potential mitigation for the downtown project, if the upper project is determined to have excess mitigation. The San Francisco and Sacramento Corps districts and the SCVWD will coordinate to ensure that there is no double counting of mitigation. The text has been clarified to avoid any confusion.

P-3. A basin- or river-wide approach to flood control is beyond the scope of the Corps Feasibility Study and EIR/S, although flood control options, environmental setting, and mitigation measures within the watershed beyond the feasibility study area were considered in the screening process (refer to Chapter 2).

We are sympathetic to the comment's viewpoint, but in this context, the project's impacts have been evaluated and appropriate mitigation measures identified. A wider view of potential flood control measures was part of the screening process that has led to the two alternatives evaluated in this document.

P-4. This comment is an accurate summary of the draft Feasibility Study alternative plan development and NED determination.

P-5. The comment accurately identifies that the Corps' feasibility study would result in cost-sharing in Reaches 7 through 12, and Ross and Canoas Creeks, while not addressing improvements in Reach A and Reach 6 that are included in the SCVWD proposed project. This EIR/S focuses on all potential impacts resulting from the flood control improvement activities for which the Corps would be cost-sharing with the SCVWD. Flood control improvements borne solely by the SCVWD are identified in the Cumulative Impacts section, under 6.1.8 Santa Clara Valley District Upper Guadalupe River Flood Control Project. The subsequent Cumulative Impacts and Mitigation Measures discussion in section 6.2 evaluates those impacts of the Corps cost-sharing project in conjunction with the SCVWD proposed improvements in Reach A and Reach 6, as well as other reasonably foreseeable cumulative projects. Therefore, the environmental impacts of the Corps' share of the SCVWD project are fully considered in this EIS/R.

P-6. The Corps appreciates the NMFS participation and informal consultation in developing a more environmentally protective project. The EIS/R in section 6.0, Cumulative Impacts, satisfactorily addresses requirements of both NEPA and CEQA to evaluate the impacts of the proposed project alternatives in conjunction with foreseeable cumulative projects in the vicinity. The section discusses all present and projected future flood control initiatives in the Guadalupe River in section 6.1, assesses the cumulative impacts by environmental resource in section 6.2, and identifies mitigations required to reduce the project's contribution to these collective cumulative effects.

Therefore, there is no justification for preparing a supplemental EIS or EIR at a later date when the final project design is completed.

Q. **Draft EIR/S Public Hearing Minutes, October 9, 1997.**

(Paragraph numbers coincide with agenda item numbers)

A special meeting of the Santa Clara Valley Water District (District) was noticed in order to attend the public hearing of the U.S. Army Corps of Engineers (Corps) held at the Willow Glen Educational Park Cafeteria, 2001 Cottle Avenue, San Jose, California, at 7 p.m. on October 9, 1997.

1. The District staff members in attendance were R. R. Blank, E. A. Ellis, B. D. Shylo, R.R. Talley, D. Cheong, and P. K. Whitlock. No Board members were in attendance.

   The Corps staff members in attendance were L. Galal, Lt. Col. Thompson, R. Chisholm, B. Smith, B. DeJager, and D. MaKitten.

2. Ms. P. Kay Whitlock, Assistant General Manager, announced that the hearing was going to begin and that Mr. Brian Shylo, Associate Real Estate Agent, Project Development Group, was available as a Spanish-speaking interpreter.

   Mr. Shylo announced in both Spanish and English that his services as a Spanish-speaking interpreter were available for anyone interested.

3. Lt. Col. Thompson, Commander, Corps San Francisco District, opened the Corps public hearing on the Draft Feasibility Report and Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Upper Guadalupe River Feasibility Study from the Southern Pacific Railroad located upstream of Highway 280 to Blossom Hill Road, San Jose. He welcomed those attending the public hearing. He explained that the Corps has responsibility for the federal government's interest in the Upper Guadalupe River Flood Control Project and that the purpose of the hearing was to receive comments on the Draft EIS/EIR for the Upper Guadalupe River. He stated that the hearing was being held by the Corps, who has been partners with the District on this project since 1990. He pointed out that the Corps Sacramento District has been working with the District on another flood control project on the Guadalupe River in downtown San Jose. He stated that project is in the construction stage and is not part of tonight's hearing and that comments should be focused on the project along the upper Guadalupe River, rather than the project in the downtown San Jose area. He then opened the public hearing and introduced Ms. Whitlock, who would be acting as the hearing officer.

   Ms. Whitlock explained that the District is the local sponsor for the Corps' study on this project. The local sponsor may cost share in the construction and would operate and maintain the facilities after the project is completed. Ms. Whitlock explained that the District has been working closely with the Corps and that all comments received at the District's public hearing held last April are being passed on through the District's involvement in the study process.

   She explained that at tonight's hearing, Corps staff will first give a detailed description of the project, including the environmental impacts and mitigation; then the hearing will be opened to receive comments. First, written comments received to date will be entered into the record; the hearing will then be opened to receive comments by public agencies, followed by organized groups, and then comments from anyone wishing to make a statement. She stated that comments taken today will be put into the record along with any written comments received up through October 27, 1997. She conveyed that these comments will be responded to fully in the Final Report. She then introduced Ms. Lynne Galal of the Corps San Francisco District.

Using a slide presentation, Ms. Galal reviewed the project proposals and explained that the Corps is analyzing ways to reduce the impacts of flooding between the Southern Pacific Railroad and Blossom Hill Road at the southern end of the study's 5-mile reach. She stated that approximately 7,500 homes and businesses are located within the 100-year floodplain. She discussed the steps to initiating a proposed flood control project.

Ms. Galal pointed out that the District has their own Draft EIR/S which enables the District to continue pursuing the project in a timely manner, should federal funding not be granted.

Ms. Galal discussed the three flood control alternatives: limited channel widening, expanded channel widening, and the bypass channel plan, which is the preferred plan.

Ms. Galal then introduced Mr. Bill DeJager of the Corps Environmental Planning Section.

Using a slide presentation, Mr. DeJager discussed the "100-year" flood event, the Bypass Channel Plan, and the environmental impacts and mitigation associated with this plan. He then turned the hearing back over to Ms. Galal.

Ms. Galal explained the process after the public's comments are received. She pointed out that the comment period ends October 27, 1997, and that the comments provided would be addressed in writing in the Final EIR/S.

Ms. Whitlock stated that comments would now be taken.

Mr. Randall R. Talley, P.E., Supervising Engineer, Water Resources Management Group, read the following statement into the record:

> I want to thank you for this opportunity to express our support for the Corps' efforts to provide flood protection on the Guadalupe River where we have experienced significant and frequent flooding that has caused damage, disrupted the community, and threatened the lives and property of hundreds of families. This is a problem that needs a solution. Potential damages from a 100-year flood are estimated to be $280 million.
>
> The District is supportive of the plan to protect against the 100-year flood, which is the District Board's policy when it is possible. This will reduce or eliminate the eligibility requirements for purchasing flood insurance; it will conform to the 100-year channel improvements being constructed upstream and downstream; it will reduce the overall risk from flooding and loss of life to a large densely urbanized area; and the continuity of a 100-year plan has the potential to provide substantial recreation benefits to the local community.
>
> Alternatives that provide less protection do not provide near the benefits of a 100-year plan. These would not be acceptable alternatives to the District or the community. The

District appreciates the Corps' willingness to work closely with the us, and we assure you that the District will continue to strongly support the Corps' efforts to formulate a plan that solves a significant problem and is acceptable to the local community.

This is being accomplished through the dual project process described by Ms. Galal. The District has brought the community's concerns learned from our public hearing held last April to the Corps by our participation in the Corps process. The District Board is reviewing the project in response to the comments received from the community during the public hearing, and the final resolution will be transmitted to the Corps.

Ms. Whitlock called on the audience members who submitted speaker cards.

Mr. Vincente Mendez, 311 Willow Street, San Jose, did not wish to speak.

Mr. Lawrence Johmann, representing the Guadalupe-Coyote Resource Conservation District and the Western Water Canoes Club, expressed concern regarding maintenance costs and restoration of the river as an alternative. He stated that the natural river bypass channels should be reinstated, and that the concrete should be removed from the river. He pointed out that a combined study costs less and should have been performed as opposed to two separate studies.

Ms. A. O. Black, 1580 Creek Drive, San Jose, expressed concern regarding creek maintenance as well as trail maintenance and revegetation. She questioned if the opportunity to not pursue the project was available if the 100-year plan was not approved.

Ms. Erma Procaccio, 2278 Mazzaglia Avenue, San Jose, expressed the need to quickly clean up the creeks to avoid or minimize future flooding.

Mr. Robert and Mrs. Harriet Jakovina, 1760, 1784, and 1874 Creek Drive, San Jose, expressed concern regarding habitat, maintaining the integrity of the river, mitigation, and oversight during construction.

Mr. Roger Castillo representing the Silichip Chinook, 1596 Ivy Creek Circle, San Jose, reported that he has observed and documented the return of the salmon. He stated that he believes that money was wasted when the District raised the levees downstream. He recommended that the District implement a pilot plan using the Rosgen method since the previous plan was ineffective.

Ms. Marilyn Holmes, 1635 Creek Drive, San Jose, spoke on behalf of all Creek Drive residents. She stressed that the creeks need to be cleaned up and that she has been trying to get the District to do so near Willow Glen Way for the last five years but hasn't gotten anywhere with the District. She stated that she heard the Malone Road bridge was in trouble. She is against the project and believes that cleaning the creek would resolve the flooding problem, thereby eliminating the need for the project. She also questioned if the effectiveness of this project in preventing flooding was really known.

Ms. Rose Houseweart, 1783 Creek Drive, San Jose, stated that cleaning up the creek does make a difference and would help reduce the flooding.

Mr. William Garbett, P.O. Box 36132, San Jose, spoke on behalf of the environmental organization called T.H.E. P.U.B.L.I.C. Mr. Garbett complained about not being able to receive the Corps Draft EIR/S document. He questioned why the project was only from the Southern Pacific Railroad to Blossom Hill Road. He stated that controlled flooding is needed and that shopping carts and debris needs to be removed from Ross and Canoas Creeks. He also stated that development should be eliminated along floodplains and roads; vacant land, and park lands should be utilized as part of the solution. He expressed that he has lived along the river for 30 years and still has not seen anything done yet.

Mr. Kevin L. David, representing Martyr On The River, 1641 Mackey Avenue, San Jose, reported that he was never notified of this meeting and that he was disappointed about the advertisement of the meeting. He questioned the schedule of the project, pointing out that the District's completion time had changed from 25 to five years. He pointed out that the dams are overflowing and suggested increasing the utilization of the lakes. In addition, he said that the bridge on Willow Glen Way needs to be raised, and that he was against the bypass channel plan. He expressed his concern that the project was under study for the past 37 years. He asked that all the costs associated with all the Guadalupe River Projects be provided.

Ms. Nancy Malick, 644 Willow Glen Way, San Jose, stated that she also was not satisfied about the public meeting notification and that she did not receive a notice of this meeting. She pointed out that debris needs to be removed from the creeks, in particular the shopping carts. Ms. Malick questioned the effects on downstream Guadalupe River once the upstream work is complete.

Mr. James Dumbolton, 1909 Creek Avenue, San Jose, did not wish to speak.

Ms. Whitlock opened the meeting to anyone who did not hand in a speaker card that wished to speak.

Mr. Gary Jansen, 1062 Fairview Avenue, San Jose, stated that he, too, did not receive a written notice of this meeting. He said that the project was taking too long, and that money was being wasted on all these studies. He stated he wanted these meetings stopped. He expressed concern that the human element was lost and was upset about the time frame involved with the project construction, 25 years for the District versus five years for the Corps. He expressed concern that the project will actually be constructed. He said he wants to see the creek cleaned up. He expressed concern about the District rental properties and complained about the flood insurance rates and benefits.

Ms. Galal apologized that the Corps had not notified the individual residents of the study area in writing of this meeting. She stated that it was the Corps' responsibility, not the District's.

Lt. Col. Thompson stated that staff would be available for questions after the meeting.

4. Lt. Col. Thompson closed the public hearing and adjourned the meeting at 9:20 p.m.

Elizabeth A. Ellis
Deputy Clerk/Board of Directors

RESPONSES TO PUBLIC CONCERNS EXPRESSED IN THE PUBLIC HEARING ON OCTOBER 9, 1997

Maintain existing habitat. Maintain the integrity of the river.

Due to severe space constraints, provision of flood control necessarily will mean removal of considerable urban development and/or riparian habitat. The proposed plan tries to balance human needs with ecological considerations. The Minimize Vegetation Impacts Alternative in the SCVWD's EIR/S would provide reduced habitat impacts but would cost an additional $20 million and would displace more people. Some members of the public have indicated that they consider even the preferred alternative to be too expensive.

Concrete rubble should be removed from the river as it is unsightly, a hazard, and impedes fish migrations.

Removal is planned in some areas, and the Corps will investigate this possibility further during the next design phase. However, there are some difficulties with this idea. Mitigation for environmental impacts might be required. Removal could be difficult and expensive in some locations. In the future, installation of proposed vortex rock weirs will prevent downcutting of the channel.

Build a stream restoration alternative instead.

Stream restoration would provide long-term environmental benefits, but would also require a great deal more land. This would cost much more and displace far more people than the proposed plan. This situation is discussed in the SCVWD's EIR/S under their Stream Restoration Alternative, and section 2.2 of the Corps's Final EIR/S.

Maintenance costs for the project may be excessive.

With all costs considered, including maintenance costs over the 100-year project lifetime, the proposal will still make economic sense in the long term. Project maintenance costs paid for with taxpayer's money need to be balanced against flood clean-up costs and damage to public facilities, which are also paid with taxpayer dollars. Sediment modeling indicates that there should not be a serious problem with sediment accumulation.

Emphasis should be placed upon maintenance of the existing channel, including removal of trash and shopping carts, and cutting back brush.

The SCVWD does not have maintenance easements for much of the river. However, if landowners wish to they can work with neighborhood groups and the SCVWD to arrange for cleanup. Removal of significant amounts of vegetation would have negative impacts on wildlife habitat and would have to be mitigated.

<u>There is too much emphasis on fish and wildlife. Take care of human needs by preventing flooding.</u>

The proposed alternative would protect most habitat and mitigate habitat impacts while providing substantial flood control. The Corps must follow federal laws, regulations, and policies. The SCVWD must also follow state laws, regulations, and policies.

Environmental protection rules have been established in response to severe past impacts on the environment by activities intended to benefit humans.

<u>The proposal is too expensive.</u>

The existing river channel is far too small in many areas to handle larger floods. A much larger channel is needed to avoid serious flooding in the future. Habitats along the river are regionally scarce, ecologically valuable, and must be replaced at considerable expense if removed. Real estate along the river is very expensive, and substantial amounts of this real estate must be acquired for the project. Additional expenses include replacement of several bridges that cannot pass large floods, and relocation of utilities including water wells. Given all the practical and legal constraints involved, a project providing protection against a 100-year flood at this location is very costly.

<u>Do something cheaper like cleaning up the river. Cleaning up the river is all you need to do to prevent flooding.</u>

Cleaning up trash and shopping carts in the river would certainly be beneficial in several ways. However, this would only have a minor effect on the ability of the river to handle floods. Removal of vegetation would need to be extensive to have a significant effect, and even then the flood control benefits would not be very great. Moderate and large floods would still overflow the channel. In addition, extensive removal of vegetation without replacement would not be allowed by regulatory agencies due to environmental impacts.

<u>Would there be adequate oversight of construction by contractors?</u>

Yes, the Corps and SCVWD will have adequate oversight to ensure the contractor constructs the facility in a proper manner.

<u>Impacts on salmon and steelhead trout.</u>

The project has been designed to greatly reduce impacts on these fish, although impacts could not be entirely avoided. The project is designed to fully mitigate impacts to these fish over time. Modifying the proposal to further reduce impacts (as in the Minimize Vegetation Impacts Alternative discussed in the SCVWD's EIR/EIS) would make the project much more expensive and would displace many more people. The Corps and the SCVWD are engaged in ongoing discussions with state and federal fish and wildlife agencies regarding impacts and mitigation. See discussion below regarding mitigation of fisheries impacts.

Mitigation would not be effective. Upstream tributaries are not suitable habitat for anadromous fish.

There would be two primary types of mitigation: riparian forest and aquatic. Riparian forest mitigation is normally relatively easy when it is done in an area where riparian forest formerly grew and as long as irrigation is provided initially to enable the trees to become established. Existing riparian forest along the river ranges from very young to fairly mature. Mitigation of the young forest could be accomplished in 10-15 years, but it would take perhaps 40 years to replace the more mature forest. Occasional existing trees are much older, however.

Aquatic mitigation would focus on providing good habitat conditions for chinook salmon and steelhead trout. Success of the aquatic mitigation would be dependent primarily upon the establishment of enough riparian forest along the river's edge to provide adequate shade and other associated habitat features.

Habitat quality in upstream tributaries varies locally. Some areas currently have little shade or streamside vegetation, while other areas have much better habitat and resident trout populations. Providing access to these areas will benefit anadromous fish.

Please also see response to comment L-2.

Effects of the downtown Guadalupe River project on the river and on fish.

The portion of the downtown project that has already been constructed provides an overflow area for floodwaters while enabling the river to maintain its existing course. Construction of the remainder of the project is contingent upon the approval of revised mitigation plans by regulatory agencies.

These studies are too expensive.

We agree that the Corps study has been expensive. However, this expenditure is small compared to either the project cost or long-term flood damages.

These studies are taking too long. The project should have been built by now.

The studies have taken longer than expected, but this is due in part to the complexity of the problem and the need to reconcile conflicting needs and objectives.

Would the project really be effective in preventing floods?

The proposed alternative would greatly increase the capacity of the river to contain floodwaters.

Effect of this project on the downtown Guadalupe project.

When the Corps designed the downtown project, it was anticipated that flood flows along the upper Guadalupe River would remain in the channel rather than spreading out across the floodplain. This normal planning assumption enables a downstream project to remain viable if another project is ever constructed upstream. Therefore, the upper Guadalupe flood control project will not cause the downtown Guadalupe project to be overwhelmed by floods.

Controlled flooding is needed. Construct an off-stream storage facility instead of this project. Acquire the Valley View (Rubino) property and use it as an overflow area.

The property mentioned is not large enough to hold a flood in storage. The floodplain covers about 2,300 acres, while the Valley View property covers about 97 acres. While the acreage of the expanded floodway proposed by the Corps and the SCVWD would be fairly small, it would act to move water downstream rather than holding it in storage. Therefore, each acre of floodway would be able to handle many times the water volume that would cover one acre of land in static storage.

There are no other remaining undeveloped sites large enough to make off-stream storage a workable option.

Store water in upstream reservoirs instead.

There are two ways this might be done. First, operation of the upstream reservoirs could be changed to make flood control their primary purpose. However, this would mean keeping the reservoirs as empty as possible during the winter months, which would largely negate their water supply function. Replacement water would be very expensive and may not be available. Unlike some reservoirs elsewhere, these reservoirs are not large enough to provide both flood control and water supply effectively. Even if they were managed exclusivity for flood control, they would not be able to provide enough flood control to avoid a need for channel modifications downstream.

Alternately, new reservoirs could be constructed. However, this would have larger habitat impacts than the proposed alternative and would still not provide enough flood control to avoid channel modification in some downstream areas. Additionally, this alternative is not economically feasible; costs would be much greater than benefits.

I was unable to obtain the draft EIR/S from the public library where it was supposed to be located.

The availability of this document at local libraries was verified.

More people should have been notified of the meeting.

We apologize for not providing notification to more people. An expanded mailing list will be used to notify the public of the availability of the final EIR/S.

Control development along the river.

This is the responsibility of local government. At this point, almost the entire river length has adjacent development.

Rental properties operated by the SCVWD.

These issues have been referred to SCVWD, which owns and manages these properties.

<u>Flood insurance rates and benefits.</u>

The rules of the flood insurance program are set by Congress and by the Federal Emergency Management Agency (FEMA).

<u>Homeowners have been paying flood insurance premiums all these years, and now the SCVWD wants to use our tax dollars to pay for this project. Where did all the money from our flood insurance premiums go?</u>

The purpose of the flood insurance program is to enable residents and businesses in floodplains to obtain affordable flood insurance. Flood insurance premiums are used to pay for the cost of the program, including benefits paid to flood victims. The program is not intended to raise money for flood prevention.