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STAFF REPORT AND RECOMMENDATION

ON CONSISTENCY DETERMINATION

Consistency Determination No.	**CD-117-99**
Staff:	JRR-SF
File Date:	12/16/1999
45th Day:	01/30/2000
60th Day Extended to:	8/17/2001
Commission Meeting:	8/9/2001

FEDERAL AGENCY: CORPS OF ENGINEERS

DEVELOPMENT LOCATION: Lower Mission Creek, Santa Barbara (Exhibit 1)

DEVELOPMENT DESCRIPTION: Lower Mission Creek flood-control improvements (Exhibits 2-9)

EXECUTIVE SUMMARY

The Corps has submitted a consistency determination to improve flood protection on Mission Creek, in the City of Santa Barbara. The proposed project will increase the channel capacity to 3400 cubic feet per second (cfs) and will thereby provide approximately a 20-year storm level of protection. Four bridges along the study reach will be replaced during the project and the City, prior to the project, will replace one. Additionally, the project includes a new culvert bypassing the oxbow below Highway 101 ("oxbow bypass"). The oxbow will be left in place as a low-flow channel. The project includes planting of native riparian species along sloped banks stabilized by riprap and creation of additional riparian habitat by enlarging planted slopes in areas where the Corps must purchase property adjacent to the stream. The creek banks will consist of either a vertical wall or a combination vertical wall and riprap sideslope. The combination vertical wall and riprap sideslope will consist of vertical wall for the bottom half, while ungrouted riprap slope will form the upper half. Native riparian

vegetation will be planted within the riprap. Existing natural stream bottom will be maintained and stream bottom that is now concrete lined will be restored to natural conditions, except for immediately underneath bridges and through the oxbow. The project includes instream features to improve fish habitat. The flood control facility within the coastal zone consists primarily of vertical walls, with two small sections that include short walls with a vegetated riprap slope above the walls. The area inland of the coastal zone will be mostly vegetated riprap with small retaining walls.

Sections 30236 and 30233 of the Coastal Act allow stream alteration that is necessary for flood-control purposes and prevent the Commission from approving this stream alteration unless it is the least damaging feasible alternative. The proposed project will improve flood-control capacity of the stream, which floods on a regular basis. In addition, most of the alternatives considered by the Corps would not provide sufficient flood-control protection or would not otherwise be feasible.

The proposed project includes impacts to estuarine and riparian wetland resources. Sections 30236, 30233 and 30240 of the Coastal Act prevent the Commission from approving this stream alteration unless it includes feasible mitigation and it avoids significant disruption to the sensitive habitat. The proposed project affects habitat to federally listed threatened species, steelhead trout and tidewater goby. The project includes the following mitigation measures: 1) creation of riparian habitat on the banks of the stream; 2) widening the estuary; 3) construction of a pilot channel functioning as a low flow channel for the entire creek above the estuary; 4) instream features improving fish habitat; and 5) seasonal limitations on construction and maintenance activities.

The proposed flood-control facility includes annual dredging, vegetation removal, and herbicide use inland of the coastal zone boundary and could degrade the water quality of the stream. Section 30231 of the Coastal Act requires the Commission to protect the water quality of coastal waters. The removal of vegetation and sediment will not occur in the coastal zone. In addition, the Corps' maintenance activities include measures, such as silt curtains and mosaic vegetation removal, to minimize water quality impacts on coastal zone resources from maintenance activities inland of the coastal zone. The Corps has agreed to coordinate the construction of the flood-control facility with the water quality efforts within the City of Santa Barbara, so that, if necessary and advantageous, the City could construct measures to control appropriate non-point source pollution concurrent with the project. Finally, the Corps will prepare a storm water pollution prevention plan (SWPPP) to minimize water quality impacts from the construction of the flood-control facility. The Commission, in a subsequent consistency review of the design phase of this project, will review both the SWPPP and the maintenance plan.

The proposed project includes the removal of sediment from the stream. Section 30233 of the Coastal Act requires sediment removed from coastal streams to be

used to restore sand supply on local beaches. Although the Corps' consistency determination does not evaluate the suitability of this sediment for beach replenishment purposes, the Corps proposes to place any suitable material on the beach. The Corps will provide the Commission with sediment characterization data when it conducts a subsequent consistency review of the project before the Corps approves the final design of the project.

The proposed construction of the vertical walls south of Highway 101 could adversely affect visual resources of the coastal zone. Section 30251 of the Coastal Act provides for the protection of visual resources within the coastal zone. In its environmental documents, the Corps proposes to design the project in a manner that minimizes visual impacts. This commitment will be confirmed through federal consistency review of the final design plans.

The environmental documents for the Mission Creek project state that there are historic and archaeological resources potentially affected by the proposed project. Section 30244 of the Coastal Act requires the Commission to consider mitigation measures for these resources. The Corps has coordinated with the State Historic Preservation Officer (SHPO) and has incorporated relevant protection measures into the proposed project.

SUBSTANTIVE FILE DOCUMENTS:

1. Draft Environmental Impact Statement/Environmental Impact Report for Lower Mission Creek Flood Control Project, Santa Barbara, California, December 1999.

2. Final Environmental Impact Statement/Environmental Impact Report for Lower Mission Creek Flood Control Project, Santa Barbara, California, September 2000.

3. Biological Assessments, Lower Mission Creek Flood Control Project, Santa Barbara, California, December 1999.

4. Draft Fish and Wildlife Coordination Act Report, Lower Mission Creek Flood Control Project, Santa Barbara, California, U.S. Fish and Wildlife Service, September 1999.

5. Biological Opinion for the Lower Mission Creek Flood Control Project, Santa Barbara, County California, National Marine Fisheries Service, August 2, 2000.

6. Biological Opinion for the Lower Mission Creek Flood Control Project, Santa Barbara, County California, U.S. Fish and Wildlife Service, June 1, 2001.

STAFF SUMMARY AND RECOMMENDATION:

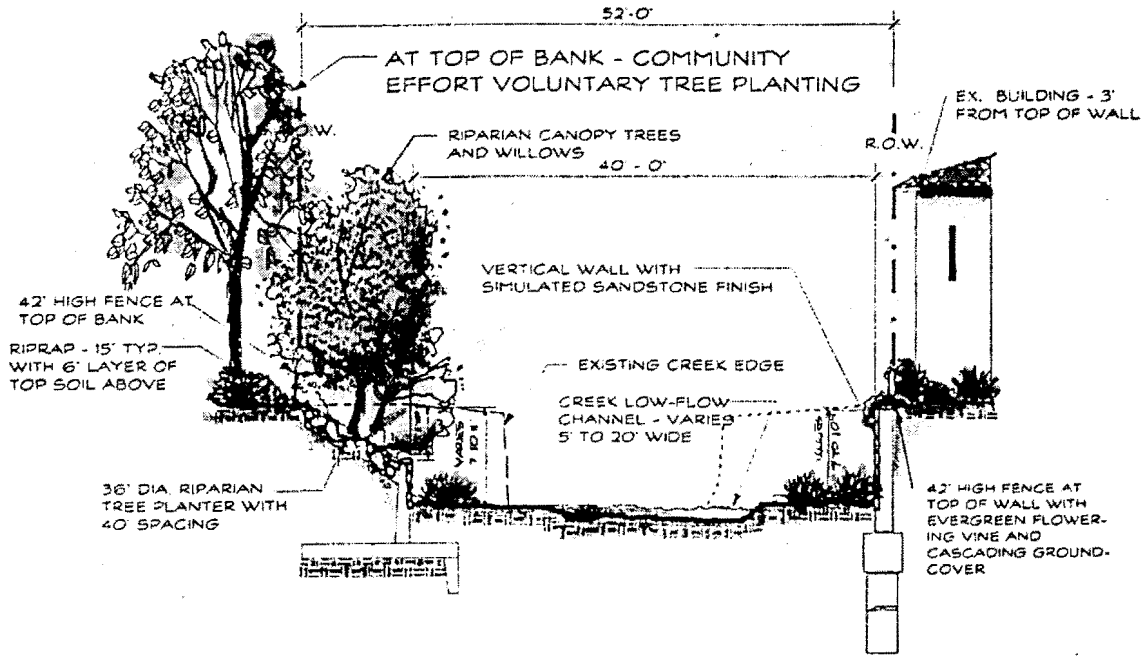
I. Project Description.

The Corps proposes to develop a flood-control facility on Mission Creek in Santa Barbara with a capacity of 3,400 cfs (existing capacity is 1,500 cfs) and will thereby provide approximately a 20-year storm level of protection. Four bridges along the study reach will be replaced. Additionally, the project includes a new culvert bypassing the oxbow upstream of Highway 101 ("oxbow bypass"). The culvert will cross the highway, Montecito Street, and the railroad tracks before rejoining the creek upstream of the Chapala Street Bridge. The culvert will be covered only across Montecito Street down to its confluence at Chapala Street Bridge, which will consist of two concrete boxes (12 ft x 10.5 ft). The open portion of the culvert beginning upstream of Highway 101 will be a 25-foot-rectangular concrete channel. The open channel will be approximately 200 linear feet, while the concrete box culvert will be approximately 350 feet in length. The oxbow will be left in place as a low flow channel.

The project includes planting of native riparian species along sloped banks stabilized by riprap, creation of 0.6 acres of riparian habitat adjacent to the oxbow, and enlargement of sloped planting areas. Land acquisitions will provide for the widening of the creek and creation of habitat expansion zones at several locations (as many as six) along Lower Mission Creek. The habitat expansion zones will be planted with trees native to coastal California. Species planted may include western sycamore (*Platanus racemosa*), cottonwood (*Populus fremontii*), coast live oak (*Quercus agrifolia*), California laurel (*Umbellularia californica*), wax myrtle (*Myrica californica*), hollyleaf cherry (*Prunus ilicifolia*), and white alder (*Alnus rhombifolia*).

The creek banks will consist of either a vertical wall or a combination vertical wall and riprap sideslope. The combination bank treatment will consist of vertical wall for the bottom half, while ungrouted riprap (15 inches thick) at a 1.5:1 (Vertical to Height ratio) slope will form the upper half. The height of the vertical wall in this combination design will vary along the entire length of the project area. Riprap will be overlain on a layer of native rock and soil, with topsoil distributed through the interstices of the riprap, and covered with 9 inches of prepared topsoil. Concrete pipes of varying sizes (up to a maximum three feet in diameter) will be placed in between the riprap to allow planting of native trees and vegetation. Several species of riparian trees, including western sycamore, cottonwood, and coast live oak will be planted from one gallon nursery stock into cylindrical planters embedded within the riprap and spaced 40 feet apart.

Rendering of short floodwalls with vegetated riprap[1]



VEGETATED SIDE SLOPE AND VERTICAL WALL SECTION VIEW

NOT TO SCALE

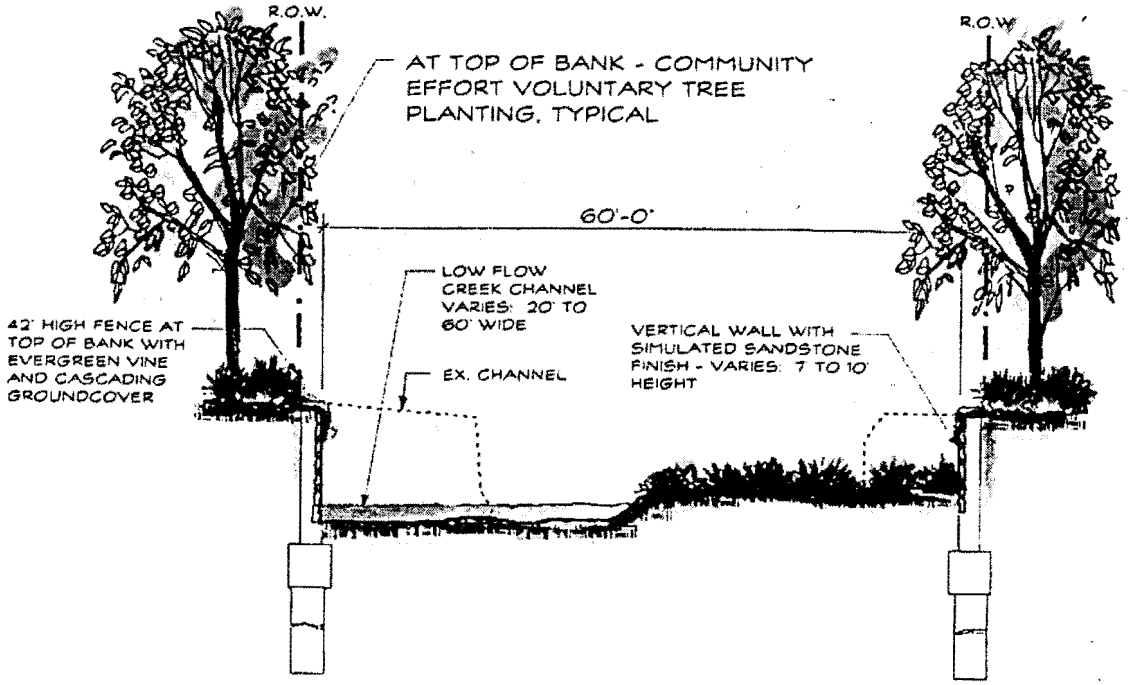
Willow branches will be placed into prepared soil below the riprap in dense rows with the expectation that approximately 20% will sprout vegetatively and find their way through gaps in the riprap. Other native understory species, including arroyo willow (*Salix lasiolepis*), Mexican elderberry (*Sambucus mexicana*), and coyote brush (*Baccharis pilularis*), will be seeded into the topsoil, or set out from liner stock.

Combination riprap and vertical wall will be the dominant bank treatment upstream of Highway 101, except in two short reaches just upstream of Haley-De la Vina Bridge and De la Guerra Bridge. Below Highway 101, the combination riprap and vertical wall will be applied along the southeast bank, starting from midpoint between Chapala Bridge and Mason Bridge down to midpoint between Mason Bridge and State Bridge and between the State Street bridge and the Cabrillo Street Bridge. In total, about 4,275 feet of Mission Creek will be finished

[1] City of Santa Barbara, Letter Dated 2/22/00

with this combination design. However, most of the stream banks in the coastal zone will consist of vertical walls.

Rendering of Vertical Flood walls[2]



VERTICAL WALL ON PIER FOOTING
TYPICAL SECTION

NOT TO SCALE

Existing natural stream bottom will be maintained and stream bottom that is now concrete lined will be restored to natural conditions, except for immediately underneath bridges and through the oxbow. Restoration to natural bottom will necessitate excavation and removal of one to four feet of streambed in the reach between De la Guerra Street bridge and Ortega Street Bridge, one to three feet of streambed between Ortega Street Bridge and Bath Street Bridge, two to three feet of streambed between Cota Street Bridge and Haley-De la Vina Bridge, and two to four feet of streambed between Haley-De la Vina Bridge and Gutierrez Street Bridge. In the reach between Chapala Street Bridge and State Street Bridge, there will be excavation and/or fill of one foot of streambed. In the final reach of Lower Mission Creek from State Street Bridge to Cabrillo Boulevard Bridge, the streambed will be cleared of leftover footings from earlier structures.

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[2] City of Santa Barbara, Letter Dated 2/22/00

There will be no flood-control improvements in the Mission Creek lagoon, south of Cabrillo Boulevard. Additionally, the project will include measures to improve fish habitat within the stream. These measures include placement of boulder clusters as energy dissipaters and provide some heterogeneity to the stream. Additionally, the project includes construction of a low-flow channel inland of the coastal zone, fish ledges and baffles and Goby refugia (hideouts) constructed along the flood-control walls.

Finally, the proposed project provides for annual maintenance of the flood-control facility. The maintenance activities include removal of sediment and vegetation from the streambed inland of the coastal zone, inspection and repairing, as needed, the channel wall, overflow culvert and weir structure, monitoring and repairing the vegetated rip rap areas and habitat expansion zones, and repairing interior drainage structures (storm drains). The vegetation removal will occur in a mosaic pattern that requires removal of vegetation from half the stream with the other half being cleared in the following year. Thus, the removal of vegetation from any one part of the stream will occur every other year. This consistency determination does not include vegetation or sediment removal in the coastal zone as part of the maintenance program.

II. Status of Local Coastal Program.

The standard of review for federal consistency determinations is the policies of Chapter 3 of the Coastal Act, and not the Local Coastal Program (LCP) of the affected area. If the Commission certified the LCP and incorporated it into the CCMP, the LCP can provide guidance in applying Chapter 3 policies in light of local circumstances. If the Commission has not incorporated the LCP into the CCMP, it cannot guide the Commission's decision, but it can provide background information. The Commission has partially incorporated the City of Santa Barbara LCP into the CCMP.

III. Federal Agency's Consistency Determination.

The Corps of Engineers has determined the project to be consistent to the maximum extent practicable with the California Coastal Management Program.

IV. Motion:

I move that the Commission agree with consistency determination CD-117-99 that the project described therein is fully consistent, and thus is consistent to the maximum extent practicable, with the enforceable policies of the California Coastal Management Program (CCMP).

V. Staff Recommendation:

Staff recommends a YES vote on the motion. Approval of this motion will result in concurrence by the Commission in the determination and adoption of the following resolution and findings. An affirmative vote of a majority of the Commissioners present is required to pass the motion.

VI. Resolution To Concur With Consistency Determination:

The Commission hereby concurs with the consistency determination by Corps of Engineers on the grounds that the project described therein is fully consistent, and thus is consistent to the maximum extent practicable, with the enforceable policies of the CCMP.

VII. Findings and Declarations:

The Commission finds and declares as follows:

A. Habitat Resources. The Coastal Act provides for the protection of stream resources. Section 30233(a) provides that:

> *(a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:*
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> *(l) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities.*
>
> *(2) Maintaining existing, or restoring previously dredged, depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps.*
>
> *(3) In wetland areas only, entrance channels for new or expanded boating facilities; and in a degraded wetland, identified by the Department of Fish and Game pursuant to subdivision (b) of Section 30411, for boating facilities if, in conjunction with such boating facilities, a substantial portion of the degraded wetland is restored and maintained as a biologically productive wetland. The size of the wetland area used for boating facilities, including berthing space, turning basins, necessary navigation channels, and any necessary support service facilities, shall not exceed 25 percent of the degraded wetland.*
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> *(4) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities*

and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities.

(5) Incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.

(6) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.

(7) Restoration purposes.

(8) Nature study, aquaculture, or similar resource dependent activities.

Section 30236 of the Coastal Act provides that:

Channelizations, dams, or other substantial alterations of rivers and streams shall incorporate the best mitigation measures feasible, and be limited to (l) necessary water supply projects, (2) flood control projects where no other method for protecting existing structures in the floodplain is feasible and where such protection is necessary for public safety or to protect existing development, or (3) developments where the primary function is the improvement of fish and wildlife habitat

Section 30240(a) of the Coastal Act provides that:

(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.

1. **Existing Resources.** The Corps of Engineers proposes to develop a flood-control facility on Lower Mission Creek, a 1.1-mile section of Mission Creek from the intersection of Canon Perdido and Castillo Streets to Cabrillo Boulevard, located in the City of Santa Barbara. This section of Mission Creek flows southeast through the City of Santa Barbara and eventually discharges into the ocean approximately 450 feet east of Stearn's Wharf.

The Mission Creek drainage, the largest of several coastal stream systems in the Santa Barbara region, originates in the Santa Ynez Mountains north of Santa Barbara. The drainage, including its tributaries, is approximately 11.5 square miles in size. The headwaters of Mission Creek and its major tributary, Rattlesnake Creek, occur at 3,500 feet. During the rainy season, Mission Creek ranges from a comparatively small stream carrying an average maximum of 370

cfs during non-flood years to a creek with peak flows of 5120 cfs[3]. The incidental trickle moving down the channel after mid-summer appears to be primarily urban runoff that enters Mission Creek via storm drains along its course. Mission Creek also periodically receives water from the Santa Barbara water tunnels.

The condition of the natural resources varies along the length of the Mission Creek watershed. The creek flows through steep terrain in the mountains with vegetation that is relatively undisturbed in its upper reaches. On this portion of the drainage, riparian woodland vegetation occurs along Mission Creek and its tributaries, and the surrounding vegetation includes chaparral and coast live oak woodland. South of the Botanical Garden, the terrain becomes flatter and the creek shows more signs of disturbance associated with the greater density of adjacent commercial and residential development. Within the project study area, between Canon Perdido Street and Cabrillo Boulevard, the natural habitat of the creek is highly modified. Only remnants of native vegetation remain in the creek and estuary, and the area adjacent to the creek consists of buildings, ornamental landscapes, parking lots, and roads. Natural habitat is significantly limited by urban development including periodic clearance of vegetation and accumulated sediments from the channel, the indiscriminate use of the channel as a dumping ground for refuse, intermittent and private hard siding of its channels, housing along both sides of the channel, bridges, discharge of storm water lines into the channel (especially underneath bridges), and the concentration of business developments within or adjacent to residential neighborhoods.

In lower Mission Creek, three areas of concrete interrupt the natural channel bottom and banks. Approximately 0.3 miles of a concrete trapezoidal channel occurs from Los Olivos Street to Mission Street. An approximately 0.8-mile concrete trapezoidal channel occurs from Valerio Street to Canon Perdido, the point where the project study area begins. Both of these areas are outside of the project area and the coastal zone, and will not be affected by the proposed project. However, there is a 0.1-mile rectangular concrete-bottomed and stone-walled channel occurs in the project study area from the Southern Pacific Railroad tracks to Chapala Street. In addition, the banks and stream bottom in the project area have been altered with grout stone, sacked concrete, pipe and wire revetment, gabions, bulkhead structures, and other stabilization structures to prevent bank erosion and flooding of adjacent development. Thus, the physical characteristics of the creek have been modified to a great extent, especially along the lower portions.

Although the Mission Creek watershed is not pristine, the drainage as a whole provides important aquatic resources. Mission Creek and its main tributary, Rattlesnake Creek, are designated by Santa Barbara County as prime examples of freshwater streams in the County. This designation maintains that these

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[3] Hydrology data from the U.S. Army Corps of Engineers 1995a.

creeks deserve special protection because the upper Mission Creek drainage supports extensive areas of quality riparian communities with high wildlife value. Even though the lower Mission Creek is significantly degraded, it provides habitat for two federally listed threatened species, the steelhead trout and the tidewater goby. The steelhead trout uses Lower Mission Creek as a migratory corridor to the upper reaches of the watershed, which are suitable for fish spawning. In addition, a population of tidewater gobies lives within the Mission Creek estuary.

2. Allowable Use and Alternatives. Section 30233 of the Coastal Act identifies eight allowable uses for the dredging diking and filling of coastal waters. Flood-control facilities are not defined as an allowable use under Section 30233(a). In addition, Section 30240(a) of the Coastal Act prevents the Commission from approving activities within an environmentally sensitive habitat area unless the activity is dependent on the sensitive resources. Obviously, a flood-control facility is not dependent on those resources.

However, Section 30236 of the Coastal Act allows for alteration of streams for flood-control purposes, provided that it meets all the requirements of that section. Section 30236 clearly anticipates dredging, diking, and filling of coastal waters for flood-control purposes and is a more specific policy than Section 30233(a) or 30240(a) and clearly shows legislative intent to allow alteration of streams for flood-control purposes.[4] In other words, Section 30236 of the Coastal Act requires the Commission to approve flood-control facilities in certain circumstances, even though such activities do not comply with the allowable-use and resource-dependent tests of Sections 30233(a) and 30240(a) of the Coastal Act, respectively. Thus, the permissive language in Section 30236 provides evidence of legislative intent that, where necessary and properly designed, flood-control facilities can be authorized under the Coastal Act in coastal streams and rivers.

Before the Commission can authorize a flood-control project, it must meet all of the requirements of Section 30236. That section allows alterations of streams if they are for flood-control purposes, if there are no other feasible method for protecting existing structures in the floodplain, and if such protection is necessary for public safety or to protect existing development. According to the Corps, the proposed flood-control facility is necessary to protect existing development. In its Draft Feasibility Study, the Corps states that:

> *The primary problem affecting the lower Mission Creek study area is the threat of flooding to property which affects the health, safety and well-being of the residents of Santa Barbara. This is*

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[4] Giving precedence to the more particular provisions of section 30236 over the more general provisions of sections 30233(a) and 30240(a) is in accord with generally applicable principles of California law. See, e.g., Civil Code § 3534 ("Particular expressions qualify those which are general.").

substantiated by flood records dating back to 1862. Records show that the area has suffered at least 20 considerable floods since 1900. Increased urbanization of the Santa Barbara area over the last century has contributed to increased runoff, and therefore, increased flooding frequencies.

...

Records since 1900 show that floods occurred in the Santa Barbara County area in 1906, 1907, 1909, 1911, 1914, 1918, 1938, 1941, 1943, 1952, 1958, 1962, 1964, 1967, 1969, 1973, 1978, 1980, 1983, 1995, and 1998.[5]

Additionally, the Feasibility Study identifies the cost of damages from flooding of Mission Creek. These costs are reported in Table 1 below and include damage to both structures and contents in 1998 dollars.

Table 1. Historical Flood Damages[6]

Date of Flooding	Damages	Flood Level
March 1995	$5,482,000	9-year
January 1995	$11,808,000	55-year
January 1983	$1,847,000	10-year
February 1983	$2,086,000	11-year
January 1967	$3,925,000	NA

According to this data, flooding on Mission Creek has damaged existing structures in the City of Santa Barbara.

The proposed project will improve the capacity of the stream from its existing capacity of 1,500 cfs, a five-year level of flood protection, to 3,400 cfs, a 20-year level of flood protection. The capacity improvement will be achieved through deepening and widening of the stream and through construction of floodwalls and riprap side slopes. Therefore, the Commission finds that the proposed project is for flood-control purposes and is necessary to protect existing development.

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[5] Draft Feasibility Report, Santa Barbara County Streams, Lower Mission Creek Corps of Engineers, December, 1999, pp. 13-17.
[6] Draft Feasibility Report, Santa Barbara County Streams, Lower Mission Creek, Corps of Engineers, December 1999, p. 35.

The third test of Section 30236 limits the proposed flood-control facilities to those where there are no other feasible method for protecting existing structures. This test is similar to the alternatives requirement of Section 30233 of the Coastal Act, which prevents the Commission from authorizing dredging or filling within a stream unless the activity is the least damaging feasible alternative. The Corps analyzed several different alternatives to the proposed project. These alternatives included non-structural alternatives, several different flood-control designs, and the no-project alternative. The Corps' analysis of non-structural alternatives includes flood plain management, flood proofing, and relocation. The Corps describes these alternatives as follows:

> *The City of Santa Barbara has been a participant in the National Flood Insurance Program which requires the City to maintain a Flood Plain Management Plan to reduce future flood plain hazards. The Reconnaissance Study also investigated the flood warning system and evacuation element of flood plain management. The study revealed that a flood warning system would be impractical to implement. Storm waters falling in the upper Mission Creek watershed reach the lower Mission Creek area in less than one hour, which would be too short a time for local residents to respond to any flood warning.*
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> *Flood proofing measures examined in the Reconnaissance Study include blocking flood water from entering a structure, jacking the first floor of a structure above a flood surface elevation, and constructing a flood wall or ring dike. Blocking the flood waters at individual structures was not considered feasible due to likely failure of the structures' walls as a result of hydrostatic and hydrodynamic forces. Raising (jacking) structures above flood water elevations was determined to be too expensive and uneconomical given the frequency of flooding in the area. Flood walls or ring dikes were not considered a feasible alternative due to inadequate space, aesthetic considerations, and the difficulty in ensuring proper closure of openings in the wall or dike during a flood.*
>
> *Finally, relocation of structures in the flood plain was considered. However, Santa Barbara is a highly developed area which has very little space to relocate structures out of the floodplain.*

The Commission agrees that the lower Mission Creek is an urban stream and relocation or retrofitting existing development would likely be cost prohibitive and infeasible. The Corps also considered structural alternatives. Within the coastal zone, the Corps will primarily construct vertical walls, except for the easterly bank above and below Mason Street Bridge and between State Street and Cabrillo Boulevard, where the Corps will construct the toe wall and vegetated riprap combination. The portion of the project outside of the coastal zone consists

primarily of toe wall with vegetated riprap slopes. In a response to concerns raised by Commission staff, the City of Santa Barbara sent a letter explaining why a flood-control alternative that uses vegetated slopes within the coastal zone is not feasible (Exhibit 10). The City argues that such an alternative would require substantial acquisition of land and significantly increase the cost of the project. Additionally, the City would be required pursuant to state and federal law to mitigate for impacts to low-income housing and historic resources. That mitigation would also substantially increase the cost of the facility. According to the City, the cost increases required for such an alternative would result in a benefit-cost ratio of less than one,[7] which means that the Corps could not fund the proposal. Therefore, the City concludes that that alternative is not feasible. The Commission does not consider its determination of feasibility to be constrained or governed by the Corps' cost benefit analysis. Nevertheless, in this case, the Commission agrees with the City that the alternative described above is infeasible, and that alternatives that are feasible are not less environmentally damaging, as discussed below.

For example in its revised consistency determination, the Corps considered a smaller version of the proposed project. In its Feasibility Study, the Corps considered two alternatives that provide protection from a 15-year flood, as opposed to the 20-year flood protection provided by the proposed project. Initially, this alternative seemed preferable, because it may allow the use of more vegetated riprap slopes within the coastal zone without the significant land acquisition costs. Additionally, its impacts to the estuary may be less than the proposed project because the stream corridor would be narrower. Finally, its costs may be significantly less, and thus it may have a benefit-cost ratio of greater than one. However, upon further analysis, the Corps' evaluation concluded that this alternative would not increase the amount of vegetated slopes in the coastal zone, reduce the impact to the estuary, nor lower the project costs. Therefore, the Corps concluded that that alternative was not environmentally preferable to the proposed project (Exhibit 11). In conclusion, the Commission finds that proposed project is the least damaging feasible alternative.

3. **Mitigation.** The proposed project includes excavating streambed, removing aquatic vegetation, widening of the stream banks and removing native and exotic vegetation from the banks. Additionally, the project includes annual maintenance of the facility. The project will increase the amount of estuarine habitat in the coastal zone, as it includes widening of the creek and removal of most of the existing cement from the streambed. In addition, the project includes construction of floodwalls and riprap slopes along the entire project area. This bank-hardening component will not significantly affect coastal zone resources.

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[7] If the economic benefits from a project are greater than its costs, then the benefit-cost ratio is greater than one and the project is acceptable to the Corps for federal participation. The Corps usually proposes the alternative with the highest ratio, also known as the "NED Alternative."

Most of the banks in the coastal zone are already hardened with a mixture of bank treatments including sandbags, cement walls, wood walls, gabions, and other measures to reduce erosion. In addition, the walls of buildings form the stream banks in several locations. Based on a rough estimate of the existing structures along the stream bank, approximately 85% of the coastal zone banks are currently hardened. The following chart shows the existing extent of stream bank structures:

Table 1, EXISTING BANK TREATMENTS IN THE COASTAL ZONE[8]

STRETCH	HARDENED BANK (feet)	NATURAL BANK (feet)	TOTAL (feet)
Yanonali Street to Mason Street, Right Bank	430	0	430
Yanonali Street to Mason Street, Left Bank	390	110	500
Mason Street to State Street, Right Bank	480	10	490
Mason Street to State Street, Left Bank	210	210	420
State Street to Cabrillo, Right Bank	60	0	60
State Street to Cabrillo, Left Bank	160	0	160
Total	**1,730**	**330**	**2,060**
Percentage of Coastal Zone	**84.0%**	**16.0%**	

Despite the existing conditions of the creek, the project could result in impacts to stream resources, by decreasing the stream's ability to absorb pollution and reducing the amount of nutrients in the creek. In addition, the widening of the stream and the loss of bank vegetation may also result in water temperature increases because of the expanded surface area exposed to the sun and loss of shading. Finally, the increased maintenance from the project will cause annual disturbances to the stream including removal of recently established vegetation, application of pesticides, removal of pools, riffles, and other stream resources that may have formed since the previous year, removal of benthic organisms and burrowing male gobies, and other annual disturbances to stream resources.

The primary impacts from construction and maintenance of the flood-control facility are the loss of aquatic vegetation and potential increases in water temperature. However, the Corps incorporated mitigation for these impacts into

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[8] Personal Communications, John Moeur, LA District Corps of Engineers, 3/16/01.

its project. To mitigate for the loss of bank and instream vegetation, the Corps' project includes planting of riparian vegetation where it uses riprap and in habitat expansion zones. In addition, the Corps proposes to plant trees in the coastal zone on the inland side of the floodwalls where there is no vegetated riprap (Exhibit 11). The Corps maintenance activities do not include vegetation or sediment removal in the coastal zone. Therefore, estuarine or riparian vegetation that grows in the Mission Creek estuary will remain and will provide a source of nutrients and shading for the estuary. Finally, the Corps and the County Flood-Control District maintenance activities inland of the coastal zone (the maintenance plan does not include sediment and vegetation removal in the coastal zone) are designed to minimize vegetation removal. Specifically, the Corps will remove vegetation from half the channel along one side for an arbitrary distance, then switching to the opposite bank for another arbitrary distance. With the implementation of these measures, the loss of instream vegetation will not significantly stream resources.

Another potential adverse impact on stream resources from the proposed project is the possibility of an increase in water temperature. Specifically, the project includes widening of the stream and estuary thereby increase amount of water surface exposed to solar radiation. In addition, the project will remove a significant amount of non-native vegetation that provides shading of the stream. The Corps' analysis of this impact (Exhibit 12) concludes that the project will not significantly affect stream temperature. This conclusion is based on project features designed to minimize any temperature impacts. These mitigation measures include planting of trees inland of the floodwalls, planting of riparian vegetation on riprap slopes and habitat expansion zones, maintenance activities that do not include removal of vegetation in the estuary, and the mosaic vegetation removal (described above) inland of the coastal zone. These mitigation measures will prevent any long-term temperature impacts from the proposed project.

In conclusion, the Commission finds that the project will benefit the stream resources by widening of the stream and estuary and removal of artificial hard bottom in the estuary and stream. In addition, the Commission finds that the project includes mitigation for potential impacts to aquatic resources from vegetation removal and temperature increases. Therefore, the Commission finds that the project includes mitigation measures that will minimize environmental impacts from the proposed project in a manner consistent with the requirements of Section 30233(a) of the Coastal Act.

4. Avoiding Significant Disruption.

As described above, the Mission Creek provides habitat for steelhead trout and tidewater gobies, both of which are listed as threatened species. These sensitive resources are also ESHAs under the Coastal Act. Section 30240 of the Coastal Act requires that the project avoid significant disruption to the sensitive resources. The stream features (removal of hard bottom areas and stream widening) will increase the amount of habitat available to these species. In

addition, mitigation measures described above will mitigate for impacts to stream resources, and thus reduce impacts to listed species. Finally, the Corps has incorporated measures into its project specifically to minimize impacts to these sensitive species.

The U.S. Fish and Wildlife Service (Service) and the National Marine Fisheries Service (NMFS), as required by the federal Endangered Species Act, have evaluated all of these measures. Both of these resource agencies have responded to the Corps with favorable biological opinions (Exhibit 13 and 14). These biological opinions allow the project to go forward with modifications to protect listed species. The required modifications have been incorporated into the Corps' consistency determination (Exhibit 11).

Both the Service and NMFS recognize potential effects on listed species and add conditions to their biological opinions to address potential adverse effects. The specific measures incorporated into the project to avoid impacts to sensitive species include timing the project to avoid breeding and migration seasons, capturing and relocating these species prior to construction, and adding instream features to the project that will enhance the ESHA.

To avoid construction impacts on sensitive species, the Corps proposes the following measures.

Measures in the estuary to protect steelhead trout and tidewater gobies[9]

1. No construction work in water anywhere in the estuary from December 1st to June 1st;

2. Divide a suitable length of the estuary down the middle with an impermeable barrier;

3. Dam half the estuary at the upper end of the center-line barrier with sheet piling;

4. Qualified biologists walk downstream in zigzag pattern to herd as many fish as possible from the incipient exclosure;

5. Dam the lower end of the exclosure with sheet piling immediately;

6. Fish biologists seine the entire confined half thoroughly to remove any gobies and other large organisms to the wet side of the construction exclosure;

7. Commence pumping water from the exclosure with intakes to pump fitted with 1/2 mesh screens;

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[9] Final EIS, pp. 10-61—10-62.

8. Fish biologists monitor drying exclosure and seine it thoroughly at least twice a week;

9. When construction on one side has been complete, the downstream wall of the exclosure shall be removed first, followed by the upstream end;

Measures in the remaining portion of the creek to protect steelhead trout

10. No mechanized equipment permitted in water between December 1st and the end of March;

11. If continuous flows greater than half an inch deep occur through the Caltrans portion of Mission Creek (just above the project area) between April 1st and June 1st operation of mechanized equipment in the stream channel shall cease and may not resume until steady flows have dropped below that threshold;

12. Prior to starting work in the next region upstream, a qualified biologist will examine all scour pools at bridge abutments, undercut concrete ledges, etc.;

13. Any steelhead, or young salmonid fish in particular, found unexpectedly in these small refuges will be relocated upstream;

14. Silt curtains shall be deployed below the immediate area of construction. Curtains will be deployed in pairs, with a gap at least 30 feet wide between the upstream and the downstream curtain to reduce suspended sediments in the water;

15. A temporary net shall be strung across the existing low flow channel to prevent salmonids from entering the section of creek next to be constructed;

16. Once certified free of protected fish, the current will be diverted to a temporary pilot channel;

17. As many culvert pipes as determined necessary to carry anticipated low flows (at least 40 ft/sec capacity) shall be placed into the pilot channel. Culverts shall be at least 24 inches in diameter. All joints between culverts shall be smooth and the lining of each culvert shall also be smooth to the touch;

18. Once culverts have been placed, the biologist shall monitor each section at least twice a week to verify that screens are in place over intakes and water has not leaked into the local section under construction;

19. Prior to completion of work in a given section, the temporary net shall be re-suspended upstream of the culvert intake and fully across the existing low flow channel;

In summary, these measures will avoid significant impacts to steelhead by avoiding the migration season, removing any remaining steelhead from the construction area, and isolating the construction area from the rest of the creek. According to NMFS, steelhead use lower Mission Creek primarily as a migratory corridor and the creek does not contain habitat for oversummering juveniles or habitat for spawning. The migratory use of the stream will not be altered by the proposed project. In addition, the Corps has included features in the project design to improve the steelhead migratory function of this portion of the creek. These improvements include installation of fish ledges to provide some shading for steelhead trout, and fish baffles (a double row of large angular rocks) that provide areas for small fish to hide. The project also includes several boulder fields in the stream that are necessary as energy dissipaters but also provide some changes in water conditions making the stream more suitable for steelhead migration. Finally, the project will include a low flow channel (which will be reconstructed after maintenance) to provide better migratory habitat for steelhead trout. The NMFS conclusion about the project's effects is as follows:

> *Steelhead occurring within the project area during construction will be limited mainly to rearing juveniles and outmigrating smolts. Minor amounts of harassment and incidental mortality could occur (10-20 fish captured and 1-2 individuals experience mortality during relocations) during stream diversion and relocations. This small number of individuals affected is not expected to affect the survival of the steelhead population in Mission Creek or the survival and recovery of the Southern California ESU.*
>
> *NMFS expects 5380 linear ft of temporary and permanent impacts to designated critical habitat, along the channel invert and both embankments, resulting from the project action. Within this area, project construction will result in the permanent loss of natural banks, and temporary degradation to the stream bed and riparian vegetation. In addition, maintenance activities will result in ongoing impacts to the stream bed. These impacts, however, will not alter the current use of lower Mission Creek as a steelhead migration corridor. Furthermore, with the maintenance of a natural bottom channel bed, incorporation of fish baffles and ledges, and enhancement of the riparian corridor, including replacement of nonnative with native vegetation, these impacts are not expected to diminish the value of habitat for the survival and recovery of the Mission Creek population or of the Southern California ESU.*[10]

The project is also designed to avoid significant impacts to tidewater gobies. The project does not include any activities in Mission Creek lagoon (south of Cabrillo Boulevard), which is goby breeding habitat. The creek above Cabrillo Boulevard

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[10] Biological Opinion, Mission Creek Flood-Control Channel, NMFS, August 2, 2000, pp.25-26.

has considerable amount of cement placed on the streambed making it unsuitable for goby breeding. Other mitigation measures include timing of project construction to occur between April and October when water flow is minimal, not allowing work in flowing water unless absolutely necessary, placing silt-fencing during routine maintenance activities, using existing access points, ensuring that construction equipment is in good working order and inspected for leaks and drips on a daily basis prior to commencement of work, and developing a storm water pollution prevention plan to prevent discharges of oil or grease into the creek. Finally, the Corps proposes to install tidewater goby refugia on the floodwalls in the estuary to provide hiding places for the gobies during high water flows (the Service describes this as a novel but untested concept with uncertain beneficial effects). In addition, the Service concludes that the project impacts to tidewater gobies are as follows:

> *After reviewing the current status of the tidewater goby, the environmental baseline for the action area, the effects of the proposed Project, and the cumulative effects, it is our biological opinion that the Lower Mission Creek Flood Control Project, as proposed, is not likely to jeopardize the continued existence of the tidewater goby. We have reached this conclusion because the project is unlikely to result in the permanent extirpation of the species from Mission Creek. Also, the Corps and County will implement measures to minimize adverse effects, and the quality of the spawning habitat will not be substantially affected by the project. Lastly, the tidewater goby currently occurs in approximately 85 streams and the loss of the population in Mission Creek, however unlikely, would not appreciably reduce the ability of the species to survive and recover.*[11]

In conclusion, the project area of Mission Creek provides a migration corridor for steelhead trout and foraging habitat for tidewater gobies. The project construction will affect these sensitive species, but the Corps' project includes measures to minimize construction-related impacts. The completed flood-control channel will provide similar habitat values to that which is currently there. Additionally, the project includes features that will provide additional benefits to these sensitive species. These features include removal of cement from streambed, construction and maintenance of a low-flow channel, and placement of boulder fields, fish ledges and baffles, and goby refugia. Therefore, the Commission finds that the proposed project will not significantly disrupt the sensitive species and is consistent with Section 30240 of the Coastal Act.

5. Other Habitat Issues. In the previous staff recommendations on this project, the staff has raised concerns about adequacy of monitoring and use of non-native vegetation to cover floodwalls and fences. The previous concern

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[11] Biological Opinion, Mission Creek Flood-Control Channel, USFWS, June 1, 2001, p.14.

on the monitoring was that it was limited to five years and was not based on performance standards. The Corps has modified the monitoring to identify restoration goals and monitor the area until those goals are accomplished. Specifically, the Corps will monitor for five years. If the plants do not meet pre-determined growth and survival rates, actions shall be taken to improve growing conditions such as fertilization, increased irrigation, and replanting. The Corps' restoration goal is 90% success of the planted vegetation at end of five years. After five years from the project construction, the Santa Barbara County will assume all operational and maintenance activities. Monitoring of plants will be incorporated into the annual maintenance manual, and Santa Barbara County will monitor vegetation for the life of the project. In addition, the Corps will monitor project impacts on steelhead and gobies and will submit all of these monitoring plans to the Commission. These modifications resolve previous concerns over monitoring and the Commission finds that the monitoring is consistent with the Coastal Act's habitat policies.

The original project proposal provided for planting non-native ivy on the floodwalls and the fences above the facility. The Commission staff previously raised concerns that this type of vegetation is likely to spread into the riparian plants and reduce their habitat value. Based on Commission concerns, the Corps revised its project to eliminate any provision to plant non-native vegetation. Specifically, the Corps proposes to use locally native vegetation, such as blackberry vines, to cover fences and floodwalls. With this modification, the project's re-vegetation provisions are consistent with the habitat policies of the Coastal Act.

6. **Conclusion.** In conclusion, the Commission finds that the proposed project is necessary to protect existing structures from flooding. In addition, based on analysis provided by the Corps, the proposed project is the least damaging feasible alternative. The project also includes feasible habitat improvements and mitigation, including monitoring, that meets the mitigation requirements of the CCMP. Finally, the project incorporates measures that will avoid significant construction and operational disruptions to the threatened species habitat within the stream. Therefore, the Commission finds that the proposed project is consistent with the stream alteration, wetland, and habitat policies of the CCMP.

B. Water Quality. The Coastal Act protects the quality of coastal waters, including streams. Section 30231 of the Coastal Act provides that:

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with*

surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

Mission Creek is located in a relatively urban part of the City of Santa Barbara. The water quality of Mission Creek has been degraded by the discharge of non-point source pollution associated with urban land uses. As stated above, Mission Creek provides habitat for two federally listed threatened fish species, which can be adversely affected by water pollution. The proposed project has the potential to adversely affect these sensitive species by increasing point and non-point sources of pollution.

The proposed project may increase sedimentation into the creek during construction and maintenance operations. In similar situations, the Commission has required a pollution prevention plan to address these construction-related impacts. The environmental documents for this project indicate that the Corps will prepare a runoff and erosion control plan. Since the Corps has not completed this plan, the Commission cannot evaluate it for consistency with the water quality policies of the CCMP. However, the Corps has committed to phased consistency review of this project. The Corps will approve the final project design through a process known as "Pre-construction Engineering Design" (PED). The Corps will evaluate the PED for coastal zone effects and, if necessary, consistency with the CCMP. Since the storm water pollution prevention plan (SWPPP) will be prepared as part of the final plan, the Commission will review it for consistency when it reviews the PED for the project. At this point in the process, the Corps has committed to preparing a SWPPP that will minimize non-point source pollution from construction and maintenance activities. This commitment along with an agreement to conduct a phased consistency review that will include a SWPPP is sufficient to find the proposed project consistent with the water quality policies of the CCMP.

Another water quality concern is from discharges associated with flood-control maintenance activity. The Corps' consistency determination allows for annual maintenance activities that include sediment and vegetation removal and the use of herbicides to control aquatic vegetation. However, the consistency determination for this project does not include any sediment or vegetation removal in the coastal zone. In addition, the Corps committed to additional mitigation measures to prevent adverse water quality effects on coastal zone resources from maintenance activities inland of the coastal zone. These water quality measures are as follows:[12]

1. All routine maintenance shall be accomplished between August and mid-October.

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[12] Final EIS, pp. 7-18—7-19.

2. A pair of silt curtain fences shall be set across the low flow not more than 100 yards downstream of the work area; the fences shall be approximately 10 yards apart.

3. If storm events do not reduce conveyance more than 15% then the next maintenance cycle shall involve only mowing of vegetation.

4. No discharge of oil or spill of contaminated material should be allowed within the creekbed (conditions identified above will be followed during the future maintenance).

5. BMPs will be employed to avoid excessive impacts to water quality.

Additionally, the project provides for the use of herbicides to control vegetation. However, since the project does not include vegetation removal for maintenance purposes in the coastal zone, herbicides will only be used inland of the coastal zone boundary. Additionally, the vegetation removal activities will occur during the dry season when creek flows are minimal or non-existent. Finally, the type and manner with which the Corps will use herbicides will be consistent with state and federal regulations. The Corps and subsequently the Flood-Control district will only use herbicides authorized for aquatic and near-aquatic use, Rodeo™ and Round-up™. Therefore, the Commission finds the use of herbicides for vegetation control inland of the coastal zone will not affect water quality resources of the coastal zone.

The proposed flood-control facility provides the Corps with an opportunity to restore water quality resources in Mission Creek by incorporating appropriate measures or technologies into the project design to reduce non-point source pollution. The reconstruction of the flood-control facility, including the replacement of bridges, installation of a culvert under Highway 101, and construction of floodwalls, provide the Corps with an opportunity to design the facility to incorporate measures into the project in order to reduce non-point source pollution. Section 30231 of the Coastal Act requires the restoration of water quality resources where feasible. However, based on discussions with water quality experts within the Commission staff and Santa Barbara County, it is undesirable to install non-point source pollution treatment devices at the storm drain outfall into the flood-control channel because that location makes maintenance of the treatment device more problematic.[13] It seems preferable to place the treatment devices away from the creek where it is more accessible for maintenance purposes. In addition, the City of Santa Barbara is applying for a Phase II Stormwater NPDES to address non-point source pollution and the City has other programs to address water quality. Finally, the Corps has agreed that prior to construction it will coordinate with the City's water quality staff to determine if any of the activities proposed by the City could be coordinated with

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[13] Personal Communication, Santa Barbara County, 3/29/01.

the flood-control project. With these measures, the project is consistent with the water quality policies of the Coastal Act.

In conclusion, the Commission finds that the proposed project will not significantly affect water quality resources of the coastal zone. Specifically, the project provides for water quality protection measures for construction and maintenance of the flood-control channel. Additionally, the Corps will coordinate its construction activities with the City's non-point source pollution program to avoid redundant construction efforts and increasing construction efficiency. Therefore, the Commission finds that the proposed project is consistent with the water quality policies of the CCMP.

C. Sand Supply. Section 30233(d) of the Coastal Act provides for the use of suitable material removed from coastal streams to be used for beach replenishment purposes. This section provides that:

> *Erosion control and flood control facilities constructed on water courses can impede the movement of sediment and nutrients which would otherwise be carried by storm runoff into coastal waters. To facilitate the continued delivery of these sediments to the littoral zone, whenever feasible, the material removed from these facilities may be placed at appropriate points on the shoreline in accordance with other applicable provisions of this division, where feasible mitigation measures have been provided to minimize adverse environmental effects. Aspects that shall be considered before issuing a coastal development permit for such purposes are the method of placement, time of year of placement, and sensitivity of the placement area.*

The proposed project includes the removal of sediment from the stream. With such activities, the Coastal Act requires the use of suitable sediment for beach replenishment purposes, if it is feasible. In this case, the Corps proposes to test the material prior to excavation to determine if it is suitable for beach disposal. If it is suitable, the Corps will use the sediment for beach replenishment purposes. Otherwise, the Corps will dispose this sediment at nearby landfills. The Corps and the County will conduct the same analysis for sediment removal associated with maintenance activities. The final EIS for the proposed project does not include an evaluation of the suitability of this material for beach replenishment. In order to make such an evaluation, the Corps must analyze the physical and chemical characteristics of the sediment. Without this information, the Commission cannot determine if sediment disposal activities would adversely affect coastal resources. However, these evaluations will be conducted and submitted to the Commission staff during the PED consistency review. With the commitments for phased consistency review and use of suitable material for beach replenishment purposes, the Commission finds that the proposed project is consistent with the sand supply policies of the Coastal Act.

D. Visual Resources. The Coastal Act protects visual resources of the coastal zone. Section 30251 of the Coastal Act provides, in part, that:

> *The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas....*

The proposed construction of the vertical walls south of Highway 101 could adversely affect visual resources of the coastal zone. In its environmental documents, the Corps proposes to design the project in a manner that minimizes visual impacts. The Corps describes addresses visual quality as follows:

> *Aesthetic values would be increased by planting native riparian types of vegetation on the upper slope of the creek. Establishment of vegetation on the creek banks would enhance aesthetic values of the project area compared to other alternatives and existing conditions. Vertical walls would not be visible to people walking along the creek banks, as the upper banks would be covered with vegetation. Aesthetic treatment would be applied to visible lower banks to minimize impacts of the vertical walls. During the public scoping meeting, people voiced their concerns regarding aesthetic resources located within the project area. The new constructed channel would be pleasing and natural looking. Their concerns are addressed by implementation of this alternative. The visual quality of the project reach would have positive impacts on tourists visiting the City of the Santa Barbara. Within a few years, planted vegetation would be mature, and trees would increase the visual value of the project area. Lower vertical walls may not be visible to people walking on a side of the creek banks due to the vegetation growth on upper banks. It should be noted, however that full-height vertical walls would be used for most of the distance between State and Mason Streets. These walls would also receive aesthetic treatment, including the use of colored concrete and forms that would mimic the appearance of sandstone or natural vertical creek banks.*[14]

As stated above, most of the Creek within the coastal zone will be developed with vertical walls and will not appear as a natural stream. However, most of the stream within the coastal zone (approximately 85%) is already developed with some manmade structures. The remaining portion of the stream within the coastal zone still has some natural appearance. The proposed project will change that appearance of the entire stream within the coastal zone to a channelized hardened stream. Despite this change in character, the Corps

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[14] FEIS, p. 13-6.

believes that the project will improve the visual character of the creek. This conclusion is based on several factors: 1) the project will remove trash and debris from the creek and project fences will make it more difficult to dispose of trash in the stream; 2) the project will remove buildings that are immediately adjacent to the creek (in some cases the walls of the buildings are the banks of the stream); 3) removal of several different types of existing bank treatments that have already adversely affected the stream's visual quality; and 4) the floodwalls will be constructed out of sandstone which will be more aesthetically pleasing than the current bank treatments and the project will include planting of vegetation that will also improve the visual quality of the stream. Finally, through the PED consistency review, the Commission will be able to ensure that the final design will protect and improve visual resources. Therefore, the Commission finds that the proposed project is consistent with the view protection policies of the Coastal Act.

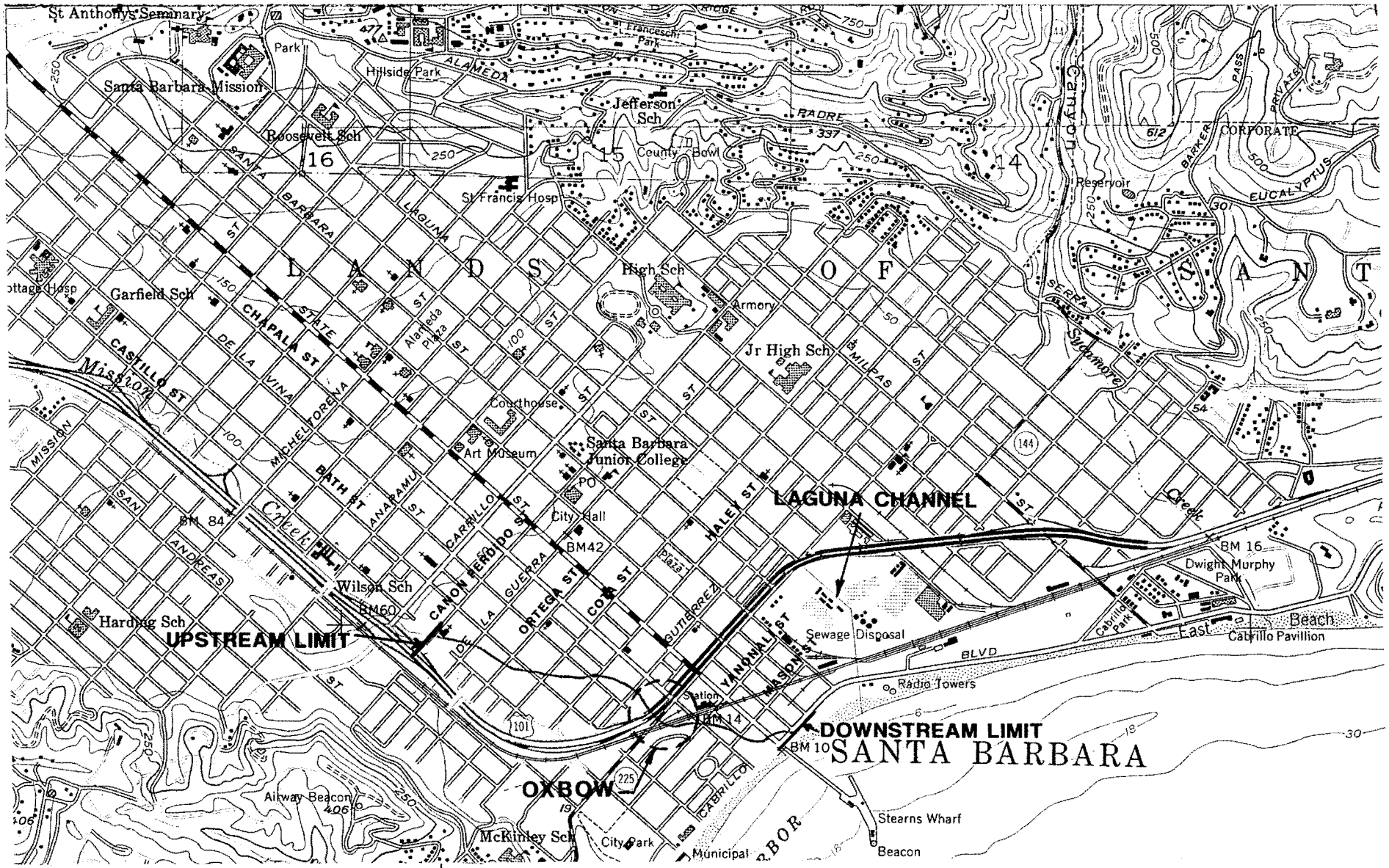
E. Archaeological Resources. The Coastal Act provides for protection of historic and archaeological resources. Section 30244 of the Coastal Act provides that:

> *Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.*

In addition, Section 30251 provides, in part, that:

> *... Permitted development shall be sited and designed ... to be visually compatible with the character of surrounding areas....*

The proposed project is located in an area that contains both historic structures and archaeological sites. The environmental documents for the Mission Creek project state that there are historic and archaeological resources potentially affected by the proposed project. The project includes measures to protect these resources by avoiding the removal of historic buildings and constructing a sandstone channel that is visually consistent with the historic character of downtown Santa Barbara. In addition, the Corps has coordinated with the State Historic Preservation Officer (SHPO), who did not raise any objections with the Corps' project. Therefore, the Commission finds that the proposed project is consistent with the archaeological policies of the Coastal Act.



Source: USGS 1:24,000, Santa Barbara, California

0′ 2000′ 4000′

GRAPHIC SCALE: 1″=2000′

EXHIBIT NO. 1

APPLICATION NO. CD-117-99

California Coastal Commission

SANTA BARBARA COUNTY STREAMS
LOWER MISSION CREEK

LOCATION MAP

Exhibit 2

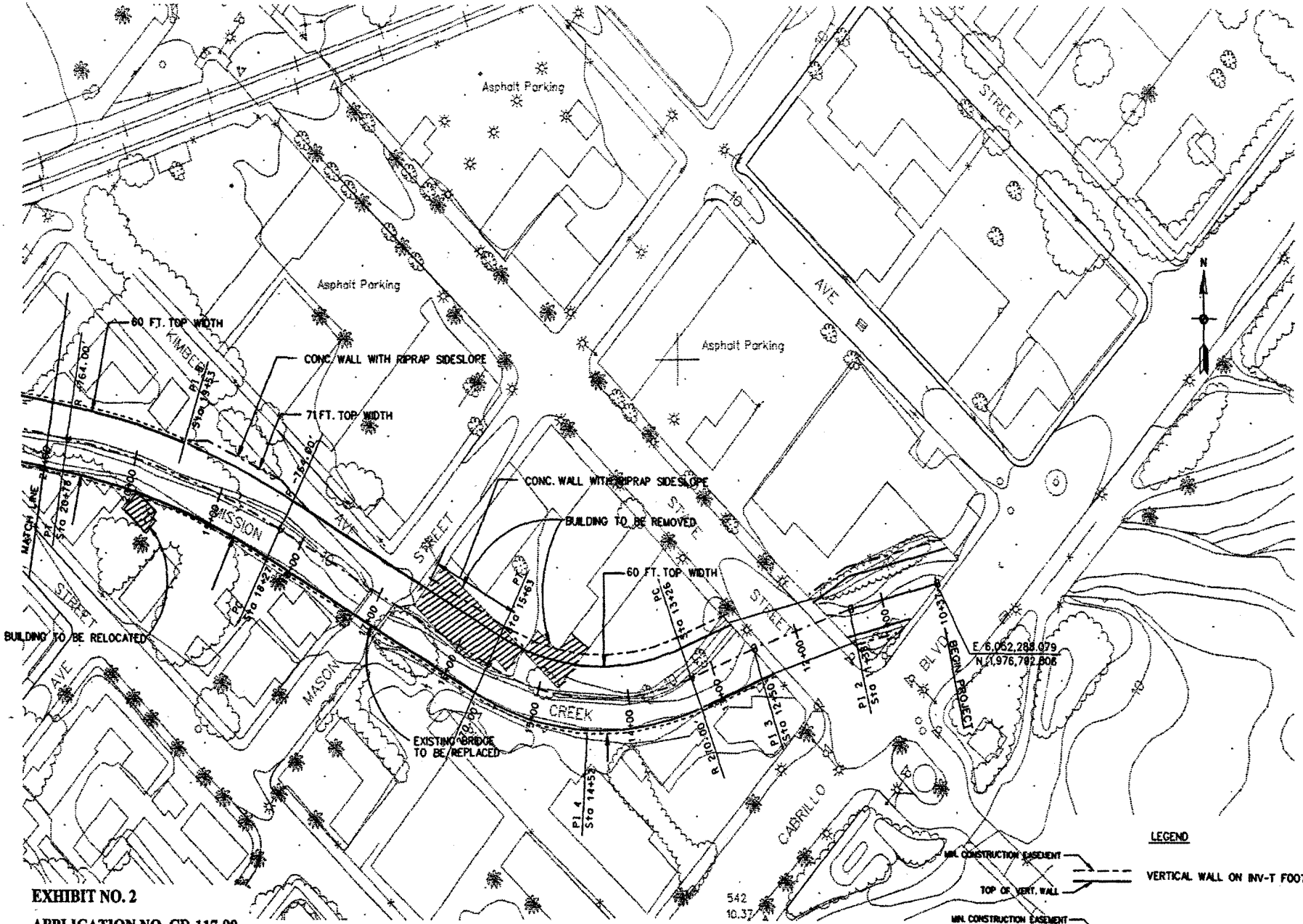


EXHIBIT NO. 2

APPLICATION NO. CD-117-99

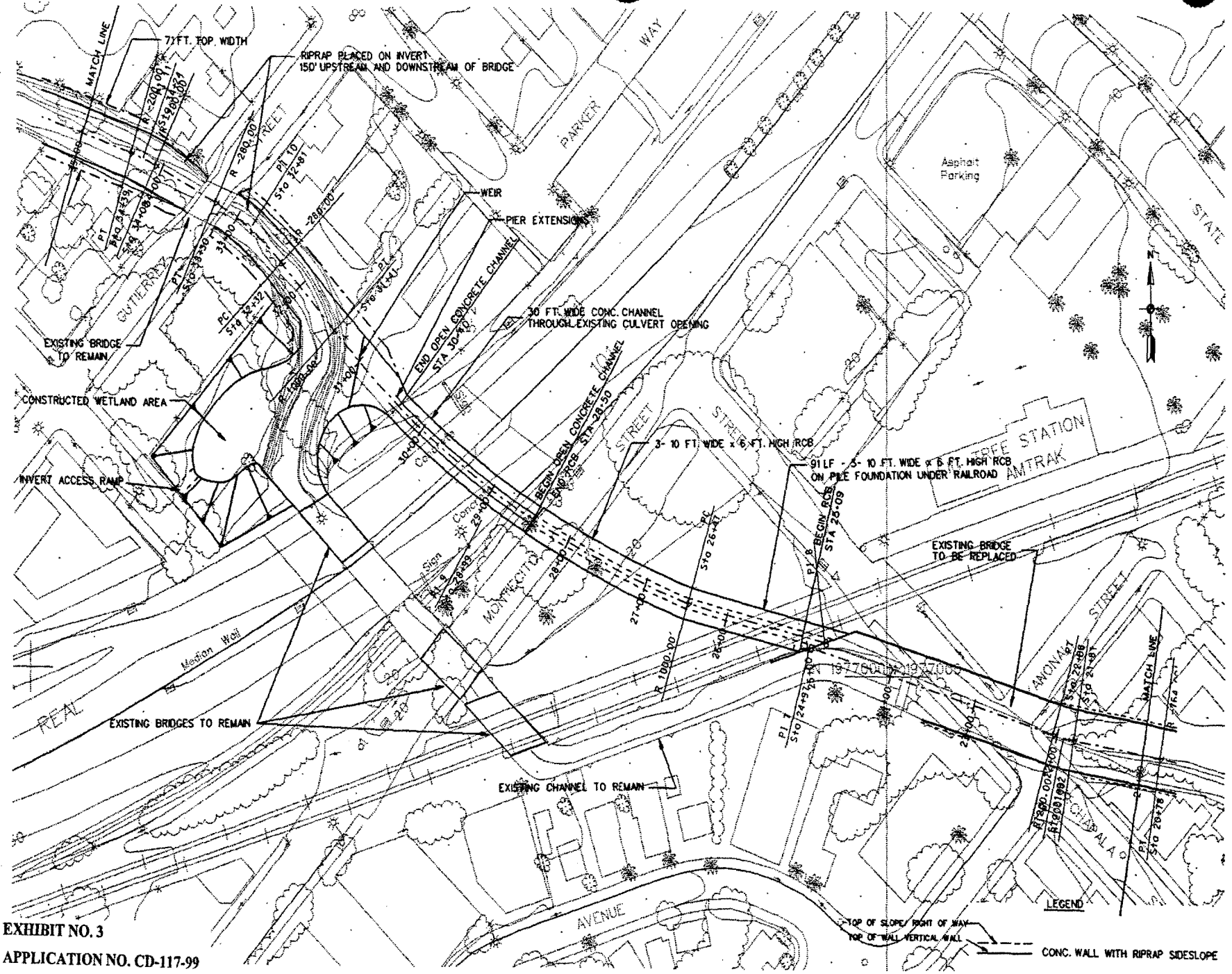
California Coastal Commission

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
RIPRAP SIDESLOPE WALL ALTERNATIVE
ALTERNATIVE 12

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

SHEET 15



NOTE:
SEE SHEET 7 FOR STAGING AREA LOCATIONS

EXHIBIT NO. 3

APPLICATION NO. CD-117-99

California Coastal Commission

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
RIPRAP SIDESLOPE WALL ALTERNATIVE
ALTERNATIVE: 12

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

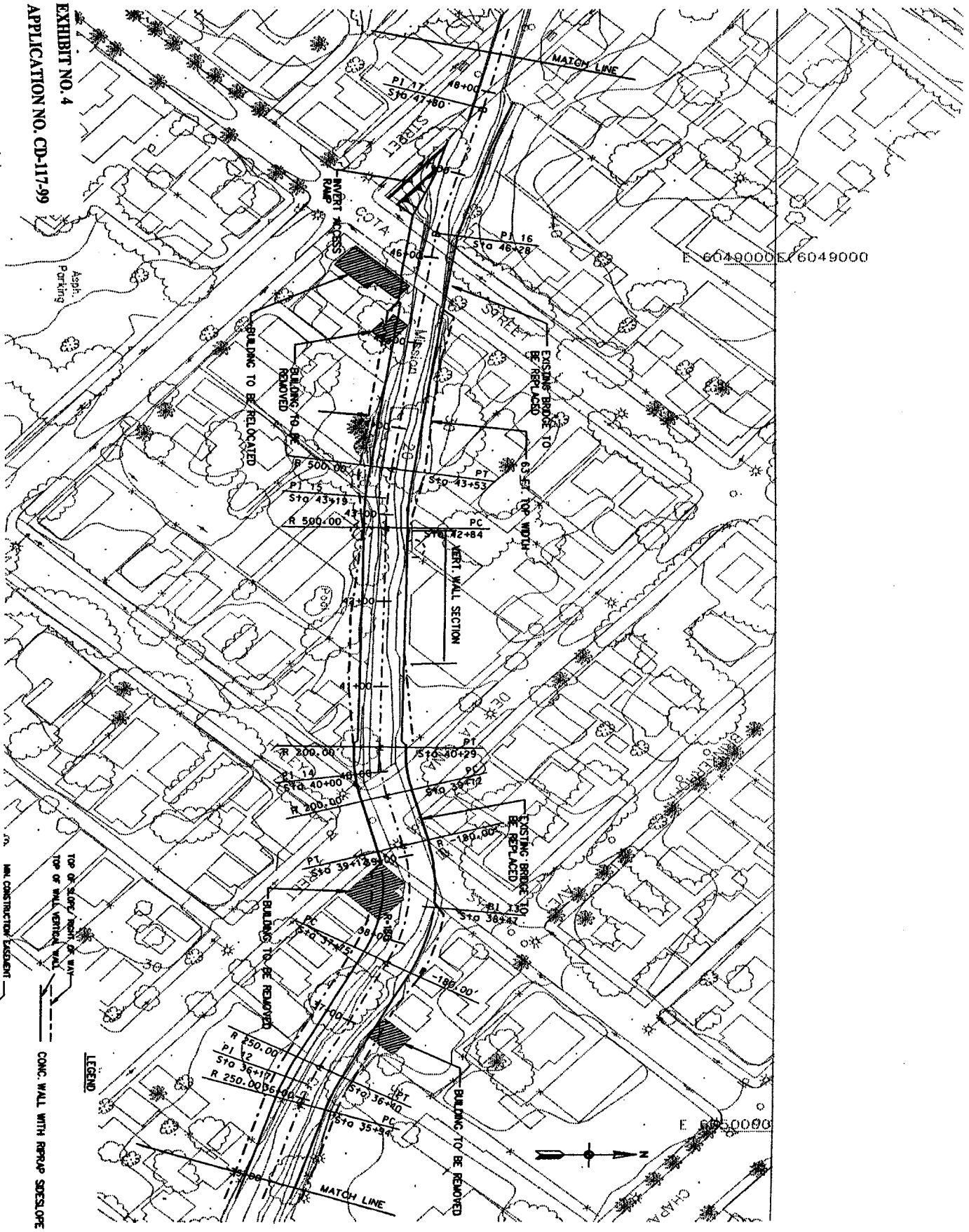
THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

SHEET 15

California Coastal Commission

EXHIBIT NO. 4

APPLICATION NO. CD-117-99



U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	DESIGNED BY: RT DRAWN BY: RT CHECKED BY: RT	LOWER MISSION CREEK FEASIBILITY STUDY SANTA BARBARA COUNTY, CALIFORNIA 3400 CFS ALTERNATIVE RIPRAP SIDESLOPE WALL ALTERNATIVE ALTERNATIVE: 12	SYMBOL / DESCRIPTIONS / DATE / APPROVAL REVISIONS
SUBMITTED BY: THOMAS H. SAGE, P.E. CHIEF, DESIGN BRANCH			
DISTRICT FILE NO. 2000	CADD FILE NAME/SHEET 34P3		

SHEET 14

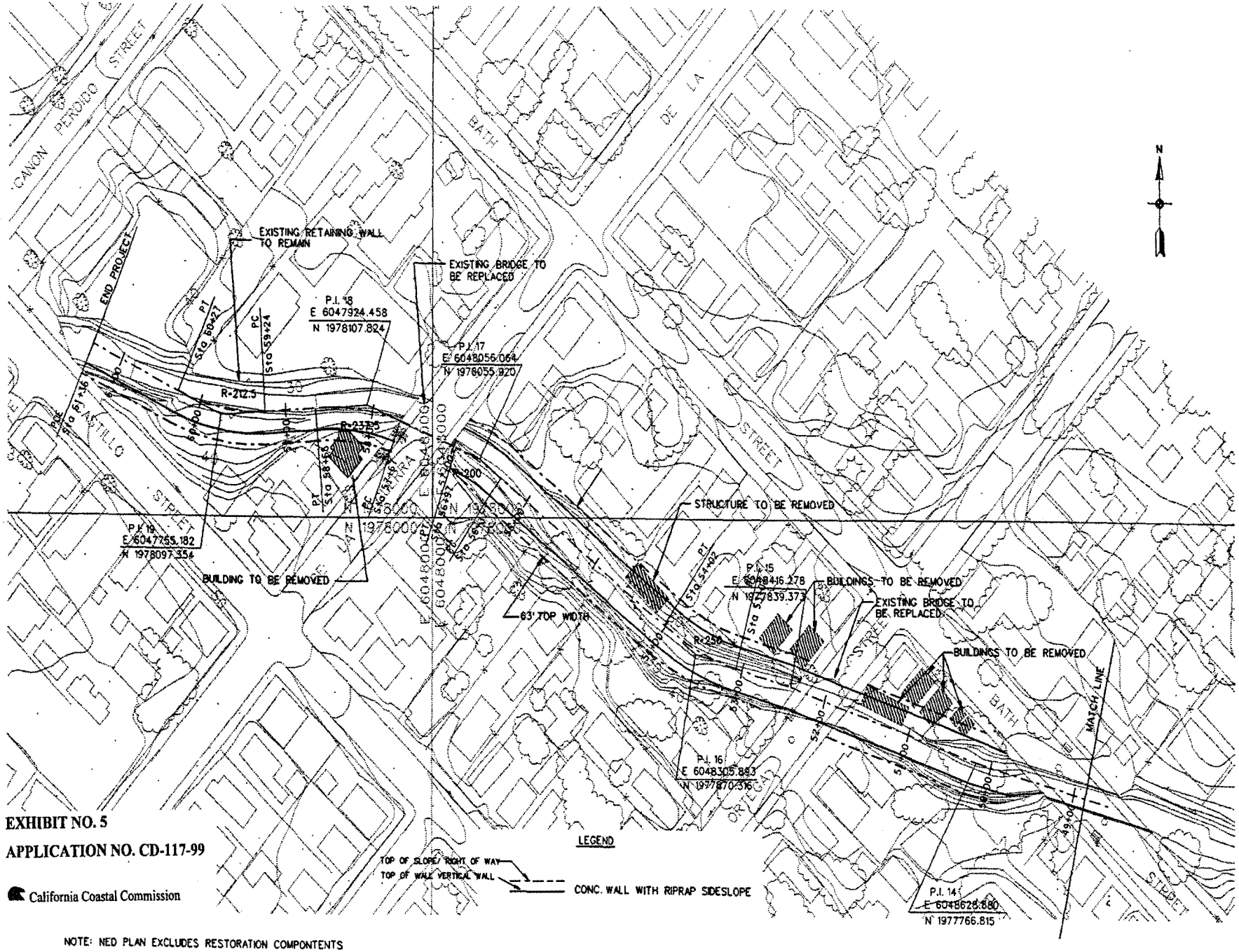


EXHIBIT NO. 5

APPLICATION NO. CD-117-99

California Coastal Commission

NOTE: NED PLAN EXCLUDES RESTORATION COMPONTENTS

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
RIPRAP SIDESLOPE WALL ALTERNATIVE
ALTERNATIVE-12

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

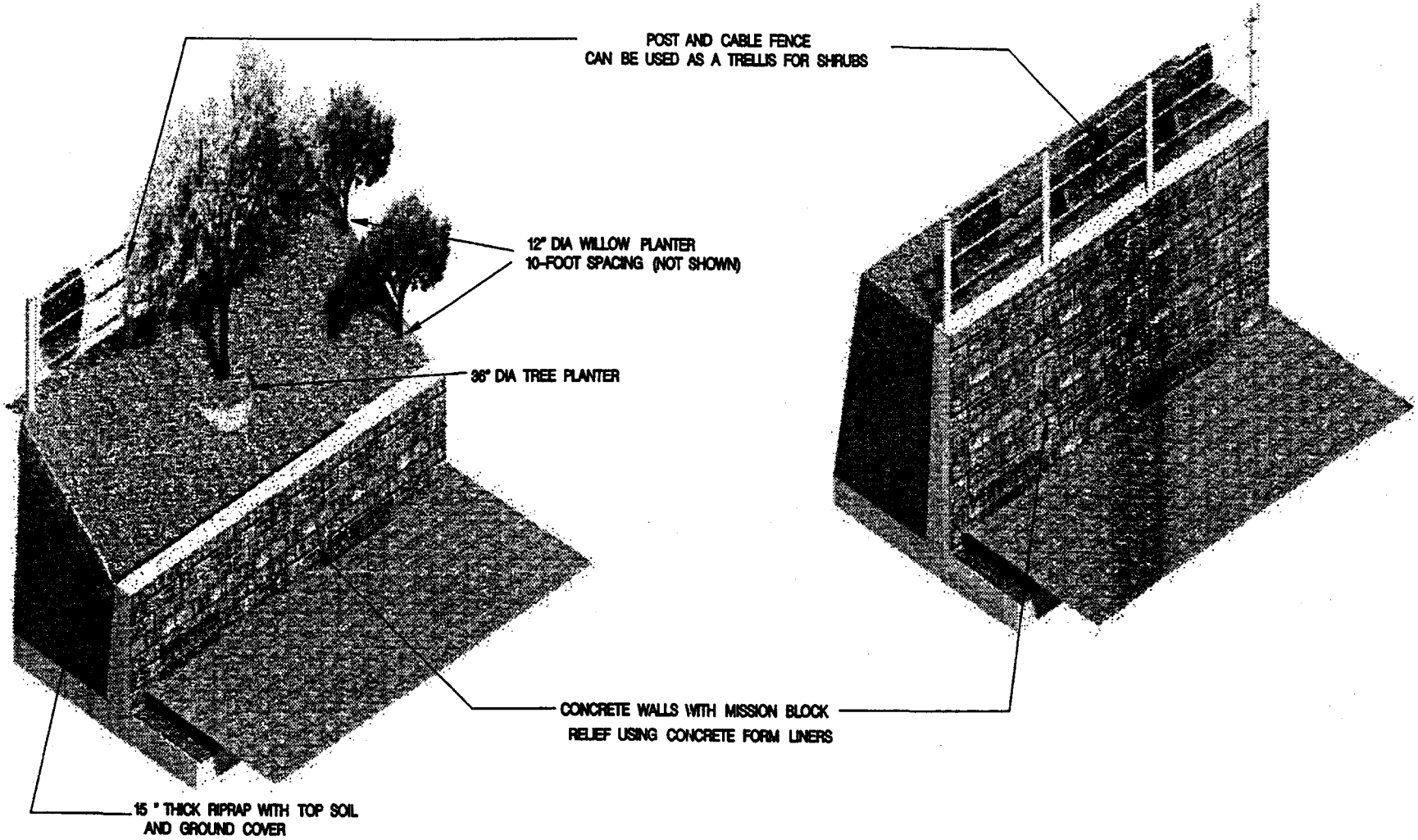
SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

CADD FILE NAME: SHEET 34P4

DISTRICT FILE NO. 34W

SHEET 13



WALL WITH RIPRAP SIDESLOPE

NOT TO SCALE

VERTICAL WALL

NOT TO SCALE

EXHIBIT NO. 6

APPLICATION NO. CD-117-99

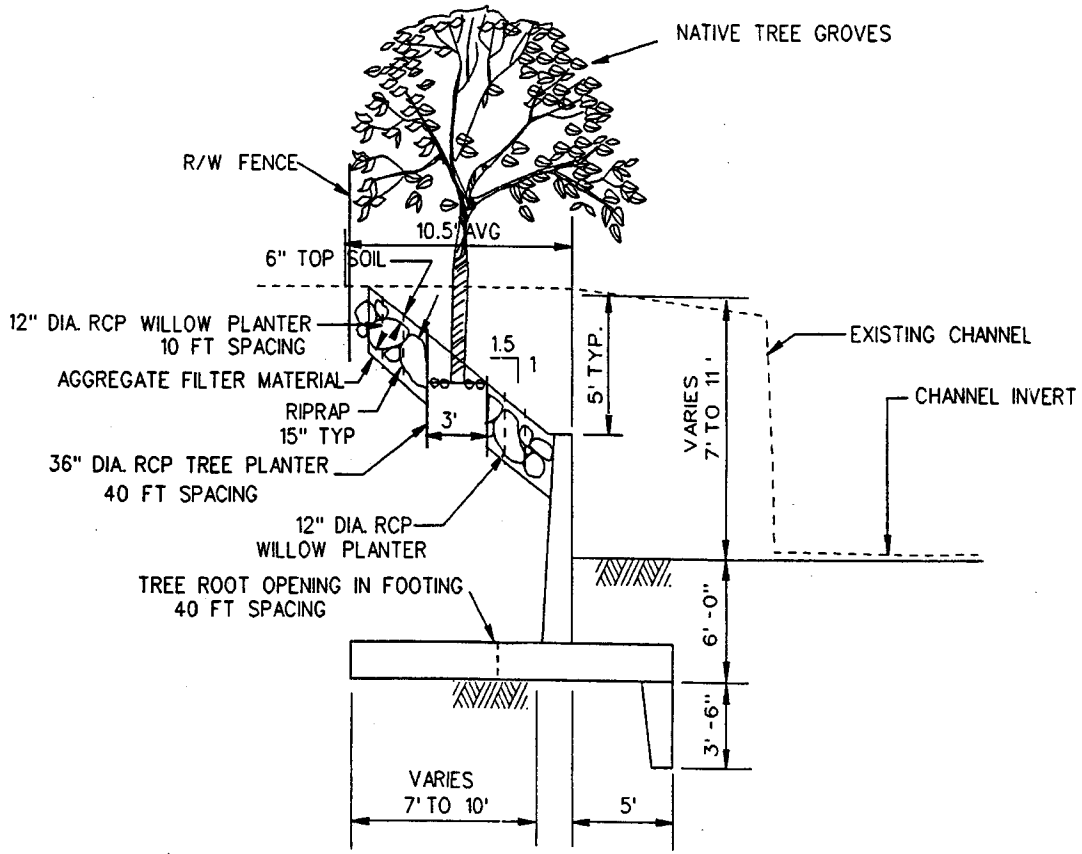
California Coastal Commission

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
9400 CFS ALTERNATIVE
CHANNEL WALL TYPICAL ESTHETIC FEATURES

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

THOMAS H. SAGEL, P.E.
CHIEF, DESIGN BRANCH

SHEET
20



RIPRAP WALL ALTERNATIVE

SCALE: NOT TO SCALE

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
RIPRAP WALL ALTERNATIVE CROSS SECTION

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

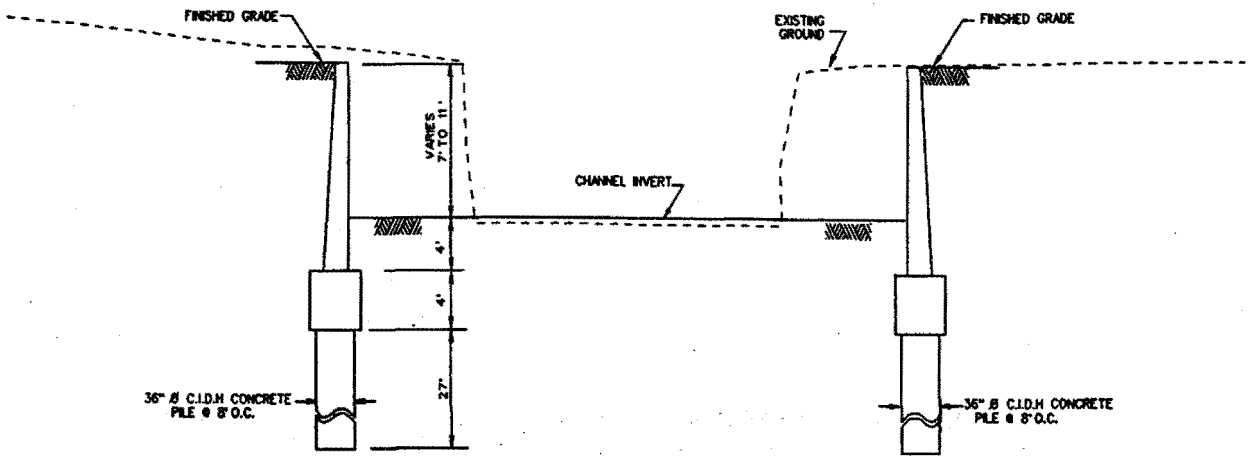
THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

SHEET
13

EXHIBIT NO. 7

APPLICATION NO. CD-117-99

California Coastal Commission



TYPICAL CROSS SECTION
VERTICAL WALL ON PIER FOOTING

*NOT TO SCALE

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
TYPICAL CROSS SECTIONS

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

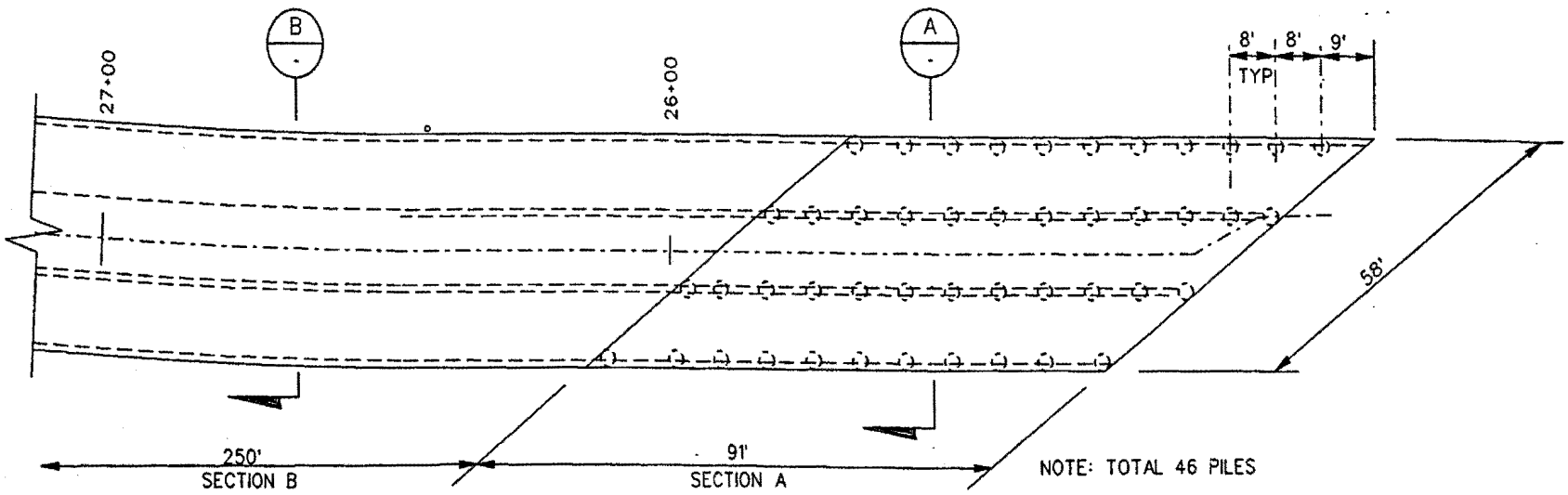
JAMES N. CRUM, P.E.
CHIEF, DESIGN BRANCH

SHEET 18

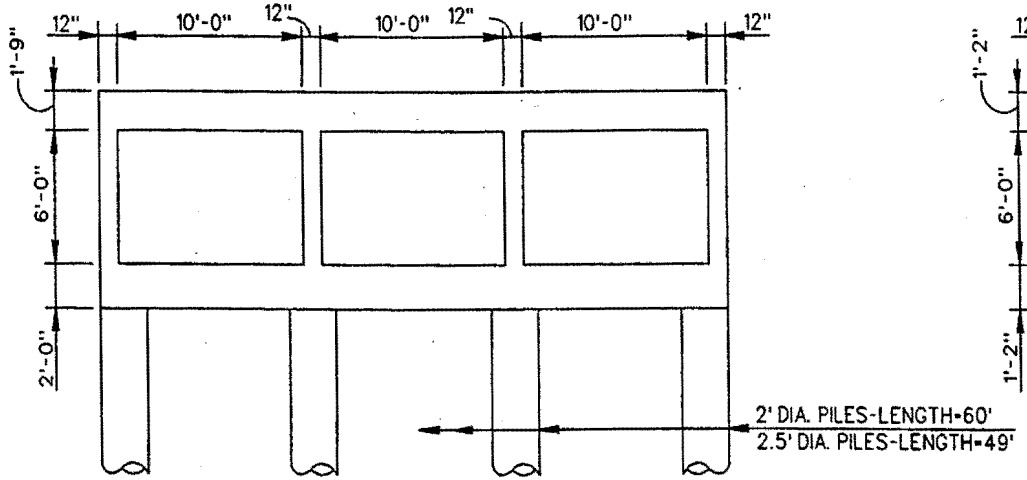
EXHIBIT NO. 8

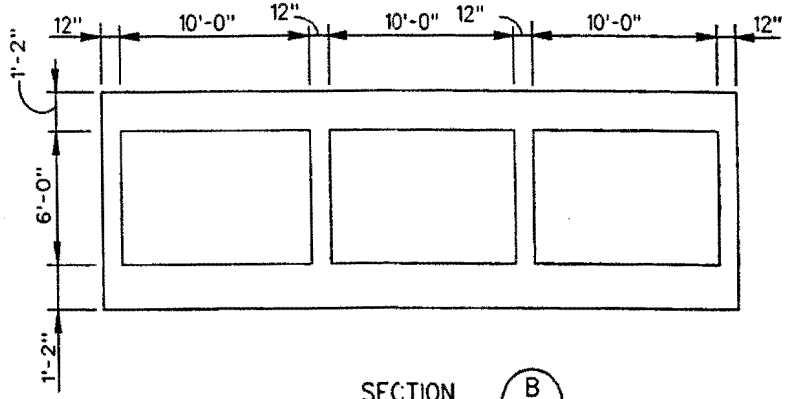
APPLICATION NO. CD-117-99

California Coastal Commission



BOX CULVERT PLAN
SCALE: N.T.S.





SECTION B
SCALE: N.T.S.

SECTION A
SCALE: N.T.S.

EXHIBIT NO. 9
APPLICATION NO. CD-117-99

California Coastal Commission

U. S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT

LOWER MISSION CREEK FEASIBILITY STUDY
6' HIGH x 10' WIDE THREE-CELL BOX CULVERT

FIGURE 7 OF 7

DESIGNED BY	CHECKED BY	DATE	FILE NAME
M. LY	X	SEPT 2, 1999	LMC-PLAN

CITY OF SANTA BARBARA

COMMUNITY DEVELOPMENT DEPT.
Planning Division 564-5470
Housing & Redevelopment Division .. 564-5461
Building & Safety Division 564-5485
Director's Office 564-5502
Fax Number 564-5477

630 GARDEN STREET
POST OFFICE BOX 1990
SANTA BARBARA, CA 93102-1990

February 22, 2000

Mr. James Raives
California Coastal Commission
45 Fremont St., Suite 2000
San Francisco, CA 94105-2219

SUBJECT: Lower Mission Creek Flood Control Project, Coastal Consistency Determination (CD-117-99)

Dear Mr. Raives:

We have reviewed the memorandum you wrote to John Moeur at the U.S. Army Corps of Engineers (Corps) and the Draft Staff Report and Recommendation on the above-stated project. We understand that the Corps will be responding to most of the issues you have raised. However, the City of Santa Barbara has additional comments as well. These comments primarily focus on the vertical walls between Yanonali and State Streets and on water quality issues.

Replacement of Vertical Walls Between Yanonali and State Streets

Coastal Commission staff has raised the question of why the U.S. Army Corps of Engineers is not proposing to do either a short vertical wall with vegetated riprap slope above or a full vegetated riprap bank below the Freeway. There are several reasons why this is not being pursued. Alternative 12 (the Preferred Alternative) is projected to cost approximately $18 million (this includes revisions to reflect the gross appraisal of acquisition costs prepared for the City and changes to the project design to reduce land acquisition costs). Alternative 9, which includes the low vertical toe wall and vegetated riprap above and is the alternative that most closely complies with the California Coastal Commission's request, is even more expensive. For additional information regarding how the Corps calculated real estate costs, as well as additional information on the hydrologic models, we have included a copy of the Technical Appendices for the Main Report (Exhibit 1). There are also additional costs that were not considered in the Corps estimation of costs. These are outlined in more detail below.

EXHIBIT NO. 10
APPLICATION NO. CD-117-99
8 pages
California Coastal Commission

Additional Property Acquisition Costs

In order to include short vertical walls and a vegetated riprap slope and keep the proposed 3400 cfs capacity, it would be necessary to widen the channel at the top of the bank by 20 feet. If the channel is designed with a full vegetated riprap slope, it would be necessary to widen the channel at the top of the bank by 32 feet. This would result in the need to demolish or relocate several buildings not considered for demolition as part of Alternative 12. These buildings are outlined in Exhibit 2 (attached). Land acquisition and relocation costs would increase from approximately $4.1 million to $8.1 million, increasing the project cost to at least $22 million. It should be noted that the Corps estimates for acquisition for this area are substantially less than the $4 million estimated by the independent appraisal performed as part of the required gross appraisal.

Required Replacement of Low and Moderate Income Housing in the Coastal Zone

There are nine (9) units contained in the buildings that would be affected by constructing Alternative 9. At least some of the units affected may be housing inhabited by low/moderate income residents. If this is the case, in addition to the standard relocation costs included above, it may be necessary to meet the provisions of California Government Code Article 10.7, Low- and Moderate-Income Housing Within the Coastal Zone, Section 65590, which states, in subsection (b):

> *"(b) The conversion or demolition of existing residential dwelling units occupied by persons and families of low or moderate income, as defined in Section 50093 of the Health and Safety Code, shall not be authorized unless provision has been made for the replacement of those dwelling units with units for persons and families of low or moderate income. Replacement dwelling units shall be located within the same city or county as the dwelling units to be demolished. The replacement units shall be located on the site of the converted or demolished structure or elsewhere within the coastal zone if feasible, or, if location on the site or elsewhere within the coastal zone is not feasible, they shall be located within three miles of the coastal zone. The replacement dwelling units shall be provided and available for use within three years from the date upon which work commenced on the conversion or demolition of the residential dwelling unit. In the event that an existing residential dwelling unit is occupied by more than one person or family, the provisions of this subdivision shall apply if at least one such person or family, excluding any dependents thereof, is of low or moderate income. ...*
>
> *"The requirements of this subdivision for replacement dwelling units shall not apply to the following types of conversion or demolition unless the local government determines that replacement of all or any portion of the converted or demolished dwelling units is feasible, in which event replacement dwellings shall be required:*

> *"(1) The conversion or demolition of a residential structure which contains less than three dwelling units, or, in the event that a proposed conversion or demolition involves more than one residential structure, the conversion or demolition of 10 or fewer dwelling units.*
>
> *"(2) The conversion or demolition of a residential structure for purposes of a nonresidential use which is either "coastal dependent," as defined in Section 30101 of the Public Resources Code, or "coastal related," as defined in Section 30101.3 of the Public Resources Code. ...*
>
> *"(3) The conversion or demolition of a residential structure located within the jurisdiction of a local government which has within the area encompassing the coastal zone, and three miles inland therefrom, less than 50 acres, in aggregate, of land which is vacant, privately owned and available for residential use.*
>
> *"(4) The conversion or demolition of a residential structure located within the jurisdiction of a local government which has established a procedure under which an applicant for conversion or demolition will pay an in-lieu fee into a program, the various provisions of which, in aggregate, will result in the replacement of the number of dwelling units which would otherwise have been required under this subdivision."*

Replacement of lost low/moderate income housing in the Coastal Zone or anywhere in the City of Santa Barbara is extremely expensive, given the value of land in the Santa Barbara area (much less the Coastal Zone itself). The median cost of a single family home on the South Coast of Santa Barbara County was recently reported at $475,000, well above affordability for most people. Condominiums in the area are priced in the mid $250,000 range and above. Two-bedroom units currently rent at $1200 per month and above. It would require a subsidy of approximately $100,000 per unit to construct additional housing as required by Government Code Section 65590.

Use of Redevelopment Agency Funds

Commentors have suggested that City Redevelopment Agency funds could be used to provide for an alternative that includes the low vertical walls with vegetated side slope or a full vegetated riprap bank. The Community Redevelopment Law (Health and Safety Code §33000 et seq.) limits project purposes for which redevelopment funds may be used. Case law has indicated that unless such purposes are stated specifically in the Community Redevelopment Law, funds should generally not be used for such purposes. Capital recreation projects intended to foster private redevelopment of physically and economically blighted areas might be considered. However, payment for flood control facilities is not included in the list of projects. Redevelopment funding can be used to improve project aesthetics or to provide for needed recreation. However, as

indicated above, the additional funds required to purchase property to allow vegetated banks would be approximately $4 million. The City Redevelopment Agency has agreed to set aside $2.5 million to be used for project enhancements or betterments, provided that such enhancements are consistent with and foster the statutory objectives of Redevelopment law. This is not enough to buy the necessary property. In the Waterfront Area, south of U.S. 101, there are already significant recreation and park facilities, so the primary recreation focus has been on providing small passive park areas and/or "tot lots" north of the freeway, in the West Downtown area, where there are no park spaces and the residential density is much higher. Redevelopment funds would also be used to improve the appearance of the bridges to be replaced to make sure that they continue to fit the small-scale, semi-residential character of their neighborhoods. Redevelopment funds would be used to expand the number of trees and other plants used in the project reach and in the habitat expansion areas, in order to assure as much of a canopy and understory as possible. Finally, redevelopment funds would be used to provide interpretive signs that would enhance the creek experience and promote public education on creek systems.

Cost of Mitigation for Lost Historic Resources

The City is very concerned about the potential loss of significant historic resources as a result of the project. All of the buildings west of Mission Creek on Chapala and Mason Streets in the Waterfront Area are eligible for listing on the National Register of Historic Places, the California Register of Historic Resources and for designation as either a City Landmark or City Structure of Merit. The 100 Block of Chapala Street also appears to be eligible for designation as a National Register Landmark District. There is no acceptable mitigation for the loss of these structures, which would be significant and unavoidable. Even partial mitigation, which would include full Historic American Buildings Survey documentation, at a minimum, would be costly. It is estimated that documentation of the four historic buildings on the west side of the creek would cost approximately $6,000. The best partial mitigation would be to try to relocate the structures to other parcels, which would be even more expensive than standard residential or business relocation costs, because of the need to both purchase a parcel on which to place the building and to actually move the building itself. At least one of the buildings may not be physically able to be relocated due to the type of construction involved. Costs could be expected to exceed $1 million.

Aesthetics

The appearance of the vertical walls is another issue in this section of the creek. A Mission Creek Design Subcommittee was formed in 1999 and has met regularly for the last several months. The Subcommittee includes representatives from the City's Historic Landmarks Commission (which has design jurisdiction over most of the creek south of U.S. 101), he Architectural Board of Review (which has design review jurisdiction where the Historic Landmarks Commission does not), the Planning Commission and the Parks and Recreation Commission. The concept of vegetated side slopes with short vertical toe walls was developed

with the assistance of the Design Subcommittee, based on the Alternative supported by the original Mission Creek Consensus Group. This alternative includes vertical walls where necessary to minimize impacts on historic structures and avoid prohibitively expensive acquisition of property, housing and businesses. The Design Subcommittee also made recommendations regarding various aesthetic improvements to the Corps project. The City forwarded these recommendations to the Corps and the Corps has agreed to incorporate these design changes into the project (see Exhibit 3 – 5 sheets showing the project reach by reach and Exhibit 4 – several pages showing design details). These drawings show that the concrete walls would be formed, textured and colored to resemble the sandstone walls so prevalent in Santa Barbara.

The preferred project (Alternative 12 plus the City and County preferred design changes) replaces significant sections of existing full height hard bank protection with vegetated side slopes with short toe walls. This approach is most feasible above the freeway where property costs are substantially less than in the areas below the freeway and development adjacent to the creek is somewhat less dense. However, as discussed below, there are two small habitat expansion zones in this area.

Habitat Expansion Zone Areas

While it may not be feasible to provide non-vertical walls for the entire project area south of Yanonali Street, it should be noted that there are two habitat expansion zones included in this area. Both are on the easterly side of the creek. One is between the creek and Kimberly Avenue, north of Mason Street. The second is immediately south of Mason Street. There are several ways to design these Habitat Expansion Zones. They can be designed so that there is vegetated riprap for the entire area. This would create locations for Tidewater gobies to hide in vegetation during high flows. It may also be feasible to redesign the area between State Street and Cabrillo Boulevard, which is proposed to have a low toe wall and vegetated riprap, to allow for more vegetation closer to the creek bottom.

Summary

For all of these reasons, including increased project costs, effects on housing and loss of cultural resources, we do not believe that it is feasible to redesign the project below U.S. 101 to include either low vertical walls with vegetated riprap side slopes or full vegetated riprap banks in the final design. We would further point out that the wider creek cross-section might also be more difficult to shade than the present vertical wall design. However, as indicated above, we believe that it may be possible to design both the habitat expansion zones in this area and the section between State Street and Cabrillo Boulevard to provide better habitat for the Tidewater goby.

Water Quality

Background

Mission Creek water quality was studied as part of the South Coast Watershed Characterization Study and reported on in the Study's final report dated August 1999 (Exhibit 5). This study was undertaken to investigate four Santa Barbara County South Coast streams in reaction to the coming mandate to develop a National Pollution Discharge Elimination System (NPDES) work plan under Phase II of the NPDES regulations. The study concluded that the major contamination problem for South Coast streams is bacteriological contamination. Specifically regarding Mission Creek, the study concluded:

- Bacteria are the principal pollutants of concern
- Much of the uppermost watershed has acceptable levels of bacteria
- Storm drains and creek encampments are probable sources of high levels of bacteria in the middle portions of the watershed
- Storm drains and lagoon fauna, such as birds, are probable sources of high levels of bacteria in the lower watershed
- No direct link between septic system and beach closures has yet been established
- Stormwater carries several times the low flow levels of bacteria

Concurrent and subsequent investigations by the City have identified the existence of encampments in the lower watershed as one primary cause of high bacteria levels. In addition, Old Mission Creek, the abandoned former channel of Mission Creek prior to channel relocation of the middle reach of Mission Creek, is also a significant contributor to elevated bacteria levels downstream of its connection to the current main channel of Mission Creek.

Current Activities

The City and County of Santa Barbara are cooperatively continuing efforts to clean up local creeks. The reaches of Mission Creek with high bacteria levels are within the boundaries of the City of Santa Barbara, so efforts in this creek are largely those of the City. The cooperative public education and information program, however, is a joint effort that is key to gaining public acceptance of the many activities and improvements that will be needed to improve creek water quality in Mission Creek and other South Coast creeks.

The City's efforts in Mission Creek include a variety of activities directed toward improving creek water quality. This group of activities is called the Creek Water Quality Improvement Project. The Creeks Strategic Plan Program is also investigating Creek restoration. Both of these approaches should result in improvements to the water quality in the City's creeks.

The Creek Water Quality Improvement Project includes the elements of a work plan required by Phase II of the NPDES stormwater management program. Activities include:

- Monitoring of creek water quality, including increased investigation of "hot spots"
- Increased enforcement of City ordinances related to prohibition of discharges of contaminated water
- Public information and education
- Municipal government good housekeeping
- Increased cleanups of catch basins and creeks
- Removal of illegal encampments within creek corridors
- Enhanced street sweeping

The City is also investigating the possibility of a pilot project for installation of one or more stormwater interceptors for storm drains that flow into lower Mission Creek.

The Creek Strategic Plan Program is doing a creeks inventory to determine restoration possibilities in City creeks, investigating revising City policies that are related to creek water quality and overall enhancement, and implementing a small number of opportunity restoration projects within City creeks. The creeks inventory is expected to present a larger list of restoration opportunities within City creeks. The opportunity projects of most interest for Mission Creek are enhancements to the Lower Mission Creek Flood Control Project and restoration of habitat and environmental education in a park along Old Mission Creek.

Future Activity in Mission Creek

The investigations underway indicate that lower Mission Creek has poor bacteriological water quality because it receives surface runoff from the City's commercial areas, has homeless encampments, and is the recipient of trash from a number of sources including neighboring residential areas and bridges. Old Mission Creek, which has elevated bacteria counts from a number of sources, provides the base flow for lower Mission Creek during periods of low flow. It is considered a "hot spot" and is a target for increased investigation to determine the exact sources of contamination. Because Mission Creek is the most visible City creek and is the subject of the flood control project, City staff is focusing efforts on this creek. The focused effort includes:

- Increased monitoring within the creek to determine sources of contamination dynamics (this includes weekly creek walks to document location and extent of contamination sources)
- Stormwater interceptor pilot project
- Installation of catch basin filters in the State Street commercial area (this area drains to lower Mission Creek)
- Cleanup of Old Mission Creek hot spot(s)

The Lower Mission Creek Flood Control Project, with the approved consensus-based enhancements, is considered to be an important creek restoration element for the improvement of water quality in the creek. We expect the creek restoration and the improved flood control maintenance elements of the project to be important additions to the water quality improvement activities described above. The improved creek bottom vegetation that is part of the project enhancements will act as a biofilter for the residual contamination. Improved flood control maintenance can act as a backup or enhancement to planned cleanup efforts. All these efforts will be needed to bring the water quality of the creek to the level expected by the residents of the City of Santa Barbara.

In conclusion, we believe that concerns regarding the use of vertical walls below Yanonali Street and the improvement of water quality can be resolved. If you have any questions, please contact Pat Kelly at (805) 564-5366 or Jan Hubbell at (805) 564-5470..

Sincerely,

Pat Kelly
City Engineer/Assistant Public Works Director

Jan Hubbell
Janice M. Hubbell, AICP
Project Planner

Exhibits

1. Lower Mission Creek Flood Control Feasibility Study, Technical Appendices, December 1999
2. Estimate of Additional Right-of-Way Costs for Sloped Vegetated Side Slopes with Short Vertical Walls, State Street to Yanonali Street
3. City and County recommended Design Changes
4. City and County recommended Design Details
5. South Coast Watershed Characterization Study, August 1999, prepared by URS Greiner Woodward-Clyde for the Counties of Santa Barbara and Ventura and the Cities Santa Barbara and Carpinteria

cc: Dan Young, U.S. Army Corps of Engineers
Tom Fayram, Santa Barbara County Flood Control District

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DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

July 19, 2001

REPLY TO
ATTENTION OF

Office of the Chief
Environmental Resources Branch

Mr. Peter Douglas
Executive Director
California Coastal Commission
Attention: Mr. Jim Raives
45 Fremont, Suite 2000
San Francisco, California 94105

Dear Mr. Douglas:

The U.S. Army Corps of Engineers (Corps), submitted a Coastal Consistency Determination (CCD) for the Lower Mission Creek Flood Control Project, Santa Barbara, California for your review and consideration in December 1999 with the Draft Environmental Impact Statement and Environmental Impact Report (EIS/EIR). By letter dated March 5, 2001, the Corps submitted a revised CCD with additional information on the stream's hydraulics and hydrology, a Biological Opinion from the National Marine Fisheries Service (NMFS), Mitigation Monitoring Plan, Shade Studies, and improvement on water quality. Continuous coordination occurred between Corps staff and Mr. James Raives of your staff.

Since the CCD was submitted to your office, the Corps requested postponement of the public hearing for CD-117-99 until August 2001. All correspondence related to postponements is on file at the Los Angeles District. Project related information is provided in the Final EIS/EIR, a copy of the Final Feasibility Report and EIS/EIR was provided to your office during public review of the Final EIS/EIR.

On June 29, 2001, an on site meeting was conducted with Mr. James Raives to clarify specific issues for the proposed project. Santa Barbara County and City of Santa Barbara staff participated in this meeting. Mr. Raives requested that the Corps provide explanations and information regarding implementation of the project. The following paragraphs provide clarification and information on some of the concerns raised by Mr. Raives at this meeting.

1) **2500 CFS Conveyance Capacity Alternatives**:

Mr. Raives requested the Corps to examine smaller versions of Alternatives providing 2500 cfs capacity with vegetated bank stabilization. The Corps developed two conceptual

designs and informal economic analysis for two proposed alternatives. The analysis was based on available information in the feasibility report for 2500 cfs conveyance capacity, including construction costs, right-of-way costs and damage reduction benefits. Description of these alternatives can be found in the Final EIS/EIR, Section 3.4, page 3-7 and the in Economics Appendix bound separately from the Main Report, Section 15, Pages 67 through 70.

These two alternatives are: First, an alternative that would provide 2500 cfs conveyance capacity (15-year level of protection) using the combination of toe wall and riparap slope to stabilize the creek banks; and Second Alternative is to provide 2500 cfs conveyance capacity (15 year level of protection) using riprap slopes for bank stabilization. An informal economic analysis revealed that neither alternative would meet the yield of Benefits to Cost (B/C) required for the Federal governments' involvement. Conservative approach and assumptions were applied to this analysis. The B/C ratio for the first alternative was 0.83, and for the second alternative the B/C ratio was 0.89. These do not meet the Federal requirement for an economically viable (B/C ratio=>1.0) flood control project and thus, would not warrant Federal involvement. The section below provides the details of both plans as presented in the Technical Appendix, Economic Section.

Cursory Economic Analysis of the Smaller Versions of the Recommended Plan for the Lower Mission Creek Flood Control Study

A. Plans analyzed.

1. 2500 cfs (15-yr flood protection) Alternative using the combination toe wall and riprap slope to protect and stabilize the creek banks, as described in the Commission's Staff Report.

2. 2500 cfs (15-yr flood protection) Alternative using riprap to protect and stabilize the creek banks, as presented during the public hearing by Brian Trautwein representing the Environmental Defense Center.

B. Purpose of cursory economic analysis.

This information is provided in response to comments from the California Coastal Commission (Commission) Staff regarding the lack of additional alternative analysis for the smaller version of the Recommended Plan similar to the 2500 cubic feet per second (cfs) alternatives analyzed earlier in the feasibility study. The comments point to the absence of having the 2500 cfs alternative design that would use a "softer" bank protection in the form of the combination vertical (toe) wall and riprap slope for the entire project reach upstream and downstream of HWY101.

C. Background.

During the plan formulation process early in the feasibility study, the smaller design having vegetated riprap for the entire bank was considered. However, it was abandoned due to the foreseeable impacts to the adjoining properties resulting from the need for a flatter sideslope. Flatter sideslopes require more right-of-way to enable the same floodflow conveyance or cross section. This design would be contrary to one of the study's objectives, which is to minimize real estate impacts.

In order to aid the Commission in determining Federal consistency for this project with regards to the issue of softer bank protection, especially in the coastal zone, the Corps performed a cursory analysis of the aforementioned alternatives.

This analysis used available information from the earlier 2500 cfs Alternatives found in the feasibility report. These two alternatives provide the same level of protection and damage reduction benefits; Alternative 2, which would use a stepped wall bank protection upstream of HWY 101 and vertical walls downstream, and Alternative 3, which would use vertical walls throughout the entire project reach. The construction costs and the right-of-way costs for these two alternatives were used in the analysis of the new alternatives.

D. Summary of Analysis and Results.

*1.) **Alternative 2a - 2500 cfs (15-yr flood protection) capacity using the combination toe wall and riprap slope to protect and stabilize the creek banks**, as described in the Commission's Staff Report. This design would be similar to Alternative 2 found in the Feasibility Report, however, the bank protection would instead use the combination toe wall and riprap sideslope instead of stepped-wall and vertical wall sides. The typical cross section of this design is illustrated on Sheet No. 1 of the attached drawings (enclosure 1).*

a.) Assumptions. This cursory analysis applies several reasonable and logical assumptions:

1.) Although it should be expected that the rights-of-way (ROW) needed will be greater than Alternative 2 in the report, due to the wider riprap slope (as compared to the stepped wall), this analysis will conservatively assume the same ROW costs as Alternative 2 in the report.

2.) The design of the toe wall and riprap sideslope and the costs of materials will be the same as Alternative 12. However, it should be expected that this design would require more materials than Alternative 12 since it would have more riprap banks than Alternative 12.

3.) No costs were assumed for mitigation requirements although some costs should be expected.

4.) Other construction related costs would be assumed to be as the same as Alternative 2 in the report.

b.) Results and Conclusion. (See enclosure 1: Table No. E65 and Table No. E66). Given the conservative approach and assumptions applied to this analysis, the project would be expected to cost at least $17,020,000. This equates to an annual cost of $1,205,000 including $30,000 for future annual maintenance. Having the same conveyance capacity and level of protection as Alternative 2 in the report, the annual damage reduction benefits that could be expected would be $995,000. This would yield a Benefit to Cost (B/C) ratio of 0.83. This does not meet the Federal requirement for an economically viable (B/C ratio =>1.0) flood control project and thus, would not warrant Federal involvement. This would have been dropped from further consideration in our feasibility study.

2.) ***Alternative 2b - 2500 cfs (15-yr flood protection) capacity using riprap slope*** *to protect and stabilize the creek banks, as presented during the public hearing by Brian Trautwein representing the Environmental Defense Center. The typical cross section of this design is illustrated on Sheet No. 2 of the attached drawings.*

a.) Assumptions. This cursory analysis applies several reasonable and logical assumptions:

1.) As compared to Alternative 2 in the report, this alternative would replace the proposed stepped wall and vertical wall with full-vegetated riprap sideslope. The use of riprap and the expected vegetation growth will result in increased roughness of the sides, which consequently reduces conveyance capacity. This would result in the need to have a slightly larger cross sectional area compared to Alternative 2, to compensate for the lost conveyance.

2.) Historically, the Corps uses a 1:3 slope for ungrouted full riprap banks. However, this cursory design would assume the steeper and conservative slope of 1:2. The steeper slope would make the estimation of ROW and construction costs tend to be on the low side.

3.) No costs assumed for mitigation requirements, although some costs should be expected.

4.) Other construction related costs would be assumed to be the same as Alternative 2 in the report.

b.) Results and Conclusion. (See enclosure 1: Table No. E65 and Table No. E66). As shown on Sheet 2 of the drawings, the need for a larger conveyance or cross sectional area and the flatter slope (compared to the stepped wall) would require at least an additional 5 feet of ROW on each side (compared to Alternative 2) of the creek. Given the conservative approach and assumptions applied to this analysis, the project could be expected to cost at least $15,761,000. This project cost would equate to an annual cost of $1,118,000 including $30K for future annual maintenance. Having the same conveyance capacity and level of protection as Alternative 2 in the report, the annual damage reduction benefits that could be expected from this Alternative would be $995,000. This would yield a Benefit to Cost (B/C) ratio of 0.89. Clearly, this would not meet the Federal requirement for an economically viable (B/C ratio =>1.0) flood control project and thus, would not warrant Federal involvement. This alternative would have been dropped from further consideration in our feasibility study.

E. Conclusion.

These cursory analyses show that Alternative 2a and Alternative 2b as described above would not be economically feasible and would not warrant Federal participation. Like the other previously analyzed alternatives that are not economically viable, Alternative 2a and Alternative 2b would not have been carried forward for detailed analysis and would have been abandoned early during the formulation process.

2) **Need for Flood Control Measures and Alternation of the Stream;**

Mission Creek flows through a densely populated area; the project area consists of residential, commercial and public establishments. Some of the buildings' walls are the creek bank. Records of floods date back to 1862 and show an irregular history when floods occurred in the south coast of Santa Barbara County: 1906, 1907, 1911, 1914, 1918, 1938, 1941, 1943, 1952, 1955, 1958, 1962, 1964, 1967, 1969, 1973, 1969, 1973, 1980, 1983, 1995, and 1998. Increased urbanization of the watershed during the historical period has undoubtedly contributed to increased run-off. During many of these flooding event significant damage occurred to properties (see details in Section 2.2 of the Final EIS/EIR and Section 4D of the Main Report).

Under existing conditions, the stream function and course have been altered due to urbanization that occurred within the flood plain and along the creek banks historically. The proposed project will provide 20-year flood protection and would reduce the threat of flooding to the establishments located within the flood plain.

The proposed project would alter the creek compared to existing conditions where the creek course has changed due to human intrusion and natural banks have been replaced by various types of manmade stabilization methods. The proposed project would make the creek

wider and includes creation of a meandering low-flow channel and planting of vegetation along part of the creek banks. Therefore, in the future some of the river functions would be re-established. Alteration of the creek would not adversely impact existing biological resources.

3) **Mitigation for Aquatic Resources:**

The Final EIS/EIR has evaluated loss of the aquatic habitat without project conditions and for the implementation of the proposed construction. The ecological value of the aquatic habitat for without project condition has been evaluated reach by reach, and the decrease of aquatic resources would be from 0.13 to 0.66 habitat unit. The project would result in net decrease of 0.07 habitat unit over 50 years (see Section 10.4.2.1 of the Final EIS/EIR). A conservative approach has been taken in evaluating impacts to the aquatic resources.

The project biologist has developed the mitigation measures through coordination with the resource agencies, U.S. Fish and Wildlife Service and National Marine Fisheries Service to minimize impacts to aquatic resources. All impacts to either fish species (steelhead and tidewater goby) would be of temporary nature. The project would not permanently reduce net reproductive rate ($R_0 \approx \int l_x m_x dx$), age-specific survivorship (l_x), age-specific fertility (m_x) or dispersal ability of either species. Table 6 of the biological assessment for steelhead summarizes implementation of each structural feature to mitigate adverse effects to steelhead and tidewater goby and indirect benefits generated by each feature. The following paragraph summarizes benefits and analysis of the structural features generated due to the project implementation.

- **Increase of Natural Bottom**. The creekbed would be widened; therefore, project design would yield approximately 4.4 acres of streambed, compared to 2.3 acres of an existing streambed. In total, approximately 4450 linear feet of streambed would be surfaced with native sediments.

- **Larger Estuary**. Expansion of the creek bed to a width of 60 feet will create greater surface area in the estuary. Compared to existing conditions, gobies would have approximately 2¼ times as much water in which to forage between Mason Street and Cabrillo Boulevard.

- **Fish Refugia in the Estuary**. The project would provide permanent and durable hiding places for fish. Both toe walls and full-height vertical walls would be formed with a coarse surface ornamentation, artificial overhangs, and double rows of coarse boulders between the overhangs where fish may take refuge. Walls throughout the estuary would have both these molded features.

- **Mid-stream Boulder Clusters**: Placement of clusters within the baffle field is intended to promote the variety of water conditions trout seek out in natural streams, so clusters would be placed to outline a sinuous and meandering predominant channel, one that shifts back and forth across the streambed.

- **Fish Baffles Upstream of Mason Street.** Fish baffles would occupy locations in lower velocity sections of the creek, on one side or the other as appropriate to its curvature. In certain lengths of the creek, side baffles would be placed along one side only, then for another length be built against the opposite side. Many baffles would extend along 150 feet of the creek's side, a few up to 200 feet in length, while others would be shorter by necessity. Design restrictions prevent their placement beneath bridges, for a certain distance on the upstream side of bridge abutments, and directly opposite other baffles or ledges.

The creek's channel allows fish baffles to be interspersed with ledges as indicated by the prevailing direction of currents and streambed to encourage formation of varied stream features shown the in preliminary design attachment. Side baffles would be installed over approximately 1400 linear feet of the stream's edge; 675 linear feet of fish baffles on the left and 725 linear feet on the right side.

All mitigation measures identified in the Final Biological Opinion from the NMFS (pages 29 to 32) will be followed to minimize impacts to steelhead, The Final Biological Opinion can be found in Appendix B of the Final EIS/EIR. The Corps has also received a Final Biological Opinion from the USFWS for tidewater gobies. A copy of the Final BO is attached. Conditions identified on pages 16 through 18 will be followed to minimize impacts to tidewater gobies.

In addition to these mitigation measures, specific conditions and mitigation measures are provided for the project construction within specific reaches. Between Cabrillo Boulevard and Yanonali Street, no construction work will occur in water anywhere in the estuary from December 1st to June 1st to minimize impacts to tidewater gobies; and between Highway 101 and Canon Perdido Street:, no mechanized equipment will be permitted in flowing water between December 1st and the end of March to avoid impacts to steelhead. Surveys for steelhead and tidewater gobies would be performed prior to construction. Methods and devices to divert water from the construction area are clearly specified. Many other measures to avoid impacts to aquatic habitat have been identified in the Final EIS/EIR, Section 10.4.3.5, pages 10-62 through 10-64 and Appendix H of the Final EIS/EIR, pages H13- through H-16.

The degradation of aquatic habitat due to construction would be exactly equivalent to the existing habitat value of the future without project namely 0.73 HU. Construction impacts can not be avoided, but design features inherent in Alternative 12 and mitigation measures to be implemented (developed in Section 10.4.3.4 and 10.3.4.5 of the EIS/EIR and identified above paragraph), would negate these impacts entirely and render them effectively temporary in nature (EIS/EIR, page 10-38).

Through implementation of the mitigation measures identified in the Final EIS/EIR, Mitigation Monitoring Plan, Biological Assessments and Biological Opinions impacts to the aquatic habitat would be minimized to the maximum extent. Net environmental benefits for aquatic habitat of 0.34 HUs will be gained for the project implementation in comparison to the future without project (EIS/EIR, Appendix H, Summary Table, page H-6).

4) **Planting of Native Trees within the Project Area and Monitoring:**

The EIS/EIR (Section 10.4.3.3, pages 10-48 through10-50 Appendix H, Section III) identifies planting of native vegetation within the project area. Preferably, plants, seeds, and cuttings would be collected from the local area, if available, within the project area. If it is necessary to go outside the project area, collection area should be near the coastal portions of local creeks. Principal species which would be planted include native trees, such as western sycamore, Fremont's cottonwood, black cottonwood, coast live oak, white alder, California bay, Arroyo willow, holly-leafed cherry, coyote brush, Mexican elderberry, blackberry etc. No non-native species would be planted within the project area.

Appropriate native perennial and annual grasses, small perennials, annuals, and forbes would be applied over the finished surface.

A temporary, above ground drip irrigation system would sustain all plantings through the initial year's dry months of the year. It is anticipated that these plantings would need supplemental irrigation for 3 to 5 years.

Monitoring of Planted Vegetation:

The EIS/EIR (Appendix H, and Summary Mitigation Monitoring Table) identifies that monitoring of the planted vegetation would be performed by the Corps for five years. If the plants do not meet pre-determined growth and survival rates, actions shall be taken to improve growing conditions such as fertilization, increased irrigation and replanting. The Corps is committed to achieve 90% success of the planted vegetation at end of five years. After five years of the project construction, the Santa Barbara County would assume all operational and maintenance activities. Monitoring of plants would be incorporated into the annual maintenance manual, Santa Barbara County would monitor vegetation for the life of the project.

5) **City of Santa Barbara's Proposed Planting Vegetation along the Creek Banks on Private Property**:

The Corps has coordinated with the City of Santa Barbara regarding planting of native vegetation into private property. The City of Santa Barbara has proposed establishing or contributing to an existing non-profit nursery that would be used to provide residents who live along the creeks with native trees and shrubs that would allow the expansion of the riparian buffer into private back yards. Funding will be available from the Creeks Restoration and Water

Quality Improvement Program or the Redevelopment Agency (RDA). The basis for RDA's participation would be to improve aesthetics and reduce water quality problems, leading to improved property values in the area. By carrying out this program, the policy concerns regarding an appropriate buffer would be further reduced because property owners would establish wider buffers along the creek by planting appropriate native vegetation. Although a separate program, the Creeks Restoration and Water Quality Improvement Program will include a technical assistance component for property owners that would like to restore native habitat adjacent to creeks throughout the City. Additional opportunities for enhancements to lower Mission Creek will be evaluated during the development of the work program of the Creeks Restoration and Water Quality Improvement Program.

6) **Restoration Goals and Criteria for Planted Vegetation and No use of Non-Native Species**:

Appendix H (pages H-5 through H-11) of the Final EIS/EIR identifies goals, success criteria and species to be planted within the project area. A summary of goals and criteria is provided below.

Mitigation Goals for Streambed Vegetation:

- Obtain higher quality and quantity habitat by planting much higher quality species and many more of them in areas larger than exist currently.
- Restore the current effective thickness and height of existing plants within 3 to 5 years.
- Attain the structural complexity/diversity of vegetation equal to a coastal stream habitat within 30 years.
- Non-native vegetation shall be controlled with herbicide and/or removed.
- Replace coarse, invasive, non-native stream bank vegetation with tree species capable of forming an overhead gallery where canopies touch, and appropriate understory species adapted to the riparian ecological niche of coastal California streams.
- Preserve large western sycamores (*Platanus racemosa*) growing along the creek banks where possible.
- Plant dense clusters of stream side and upland species in five habitat expansion zones along the creek's banks.
- Plant native trees directly to the water's edge in two locations. Shade from trees would buffer water temperature in most of the creek during summer months.

- Indirectly re-establish an ecologically important component of assimilable nutrients and energy to organisms living in the creek itself through leaf litter from these plantings.

Summary of Planted Vegetation Success:

- As planned, at least 120 trees would be planted into the 4740 linear feet of riprap banks. Structural design necessities of the walls dictate spacing between trees on riprap slopes.

- At a minimum, 115 trees can be planted into five habitat zones. Canopy forming trees can be planted closer together in the habitat expansion zones.

- Achieve 90% success of the planted vegetation at end of five years of planting, and ensure that vegetation survival rate is equivalent to the success criteria identified below in Table 1- Success Rate for Planted Vegetation.

- The upland shrub species in habitat expansion zones should have attained at least 50% of the height and breadth typical of each in this climate, and overall at least 40% of these plants from nursery stock would still be alive and well.

- Minimum of 50% of these corridors would be occupied by willows. Willows would be about 7 to 10 feet in height 5 years after planting them. Growth of this vegetation should form the bulk of understory biomass along the riprap slopes.

Performance Criteria:

Reintroduction of the species native and adapted to this stream bank habitat will probably progress fairly slowly. The Corps will replant the vegetation as needed within the project area within five years. Success rate for the planted vegetation are provided in the table below.

TABLE -1
SUCCESS RATE FOR PLANTED VEGETATION

Evaluation time	% ground covered by native perennial	% of plants in generally good health	% of plants at least 5 feet high
after 1 year	5%	40%	< 5%
after 2 years	12%	55%	15%
after 3 years	30%	75%	40%
after 4 years	50%	85%	65%
after 5 years	75%	90%	80%

The Corps will monitor and prepare a monitoring report for the planted vegetation as identified in the Final EIS/EIR, Appendix H. The report will be provided to the concerned resource agencies, and a copy will be provided to your office also.

7) **Explanation of Pilot Channel and Bankful Channel:**

A meandering low-flow, (pilot) channel would be constructed after completion of the project. During future maintenance, the county will reconstruct the pilot channel, and the rebuilt channel would follow whatever natural alignment the pilot channel had acquired since being built originally. The pilot channel would reflect an alignment that would come about through natural processes, and which would be optimally efficient in the transport of sediments during low flow times of the year.

To assist in determining future maintenance needs, detailed sediment routing will be completed during the Preconstruction Engineering and Design (PED) phase of the study. Bankfull, i.e. effective or dominant, discharge curves could be developed from frequency-discharge and sediment discharge rating curves. In addition, stage-discharge and velocity-discharge rating curves would be available from the hydraulic models developed.

The sediment routing process normally takes into account antecedent flows, which are often smaller than the design discharge, as well as the entire design hydrograph, not just the peak discharge.

Note, however, that lower Mission Creek is a channelized "designed" channel and regime equations may not be applicable. However, we will evaluate the concerns during the PED phase of the study.

8) **Use of Herbicide and its Impacts on Biological Resources**

The preferred method for controlling growth of obstructive vegetation in the channel is manual cutting and trimming with hand-held tools, or mowing. Flexible plants, mostly herbaceous in nature, which bend down as water flows over them would not be removed unless sediments themselves have to be dug from the channel. Systemic herbicides would be applied on a very limited scale, typically to eradicate persistent clumps of giant reed. Such limited use of herbicides as would prove necessary would be applied in the driest season. Sunlight would rapidly decompose that not absorbed by plants. No impacts to biological resources would occur because of this sparing use of herbicides for periodic channel maintenance.

9) **Future Maintenance Plan**

Future maintenance would be associated with the earthen creek bottom, channel walls, creek banks, planted vegetation, overflow culvert, interior drainage, habitat expansion zones, rocky energy dissipaters, and other appurtenances. It is estimated that the average frequency of sediment removal could be as often as one year. Analysis in the EIS/EIR was based on this worst-case assumption. However, when several low-flow years occur sequentially, sediment removal might occur every two to three or more years. As an example maintenance has not been necessary in Mission Creek since 1998.

Vegetation clearing could be accomplished by either brushing, spraying, or clearing. The removal would occur in a mosaic pattern (see details in Final EIS/EIR, 3.5.3.2). The following environmental commitments would be followed during future maintenance.

- All routine maintenance shall be accomplished between August and mid-October.
- A pair of silt curtain fences shall be set across the low flow channel not more than 100 yards downstream of the work area; the fences shall be approximately 10 yards apart.
- If storm events do not reduce conveyance more than 15%, then the next maintenance cycle shall involve only mowing of vegetation.
- During those maintenance cycles when the County determines silt removal has become necessary, all plants and deposits would be removed. As the final step during maintenance, the pilot channel would be rebuilt following the path where a natural channel had gradually come into being, or where the pilot channel would be if hydraulic processes have not already shifted and reshaped it.
- A swath half the channel wide shall then be mowed or brushed to suppress the growth of potentially large perennials, first along one side as seems convenient for an arbitrary distance (say, 250 feet), then switching to the opposite bank for another arbitrary distance. The pilot channel would not be disturbed.
- If sediment removal is not needed the year after, then the other half of the channel would be mowed and brushed. The pilot channel would not be disturbed.
- If storm events of the next winter leave enough sediments to warrant their removal, then during the following summer the full width of that section of the creek would be groomed to remove obstructing sediments and plants. The pilot channel would be rebuilt where a natural channel had gradually come into being, or where the pilot channel had been if hydraulic processes have not already shifted and reshaped it.

- No discharge of oil or spill of contaminated material shall be allowed within the creekbed (conditions identified above would be followed during future maintenance).

- Best Management Practices (BMPs) will be employed to avoid excessive impacts to water quality.

10) **No Future Sediment Removal Between Yanonali Street and Cabrillo Boulevard (Coastal Zone):**

The Final EIS/EIR, Sections 3.5.3.2, 10.4.2.1 and Biological Assessments and Mitigation Monitoring Plan, identify that no sediments were removed in the past between Yanonali Street and Cabrillo Boulevard. No sediment removal or vegetation removal has occurred in the estuary in past. Initial numeric models of sediment transport for the proposed project indicate even less accumulation of fine deposits in the estuary than now occurs. The Corps expects no regular sediment or vegetation needed for this area, which is inhabited by tidewater gobies. Maintenance of the constructed structural features (bank protection, fish refugia in the estuary, mid-stream boulder clusters, fish baffles upstream of Mason Street and other structural features) may be required to maintain their form and function. Maintenance would occur between August and mid-October. These activities are expected to be minor in nature, and would not have any significant impacts on the biological resources.

11) **Hydrological Model-HEC-RAS for Cabrillo Boulevard**:

Physical measurements were made by the Corps staff on March 11, 1998, and the downstream cross-sectional dimension was measured to have an effective width of 62-feet and effective height of 8-feet. This cross section takes into account the 16-inch-diameter pipe overhanging the downstream side of the pedestrian bridge. This cross sectional measurement has been used throughout the hydraulic analysis. Enclosure 2, "Memorandum for Hydraulic Impact of Removing 16-inch Pipe at Cabrillo Boulevard", explains the hydraulic effect of removing the pipe. As per this analysis removing the pipe would have no hydraulic impact. The pressure flow caused by Cabrillo Boulevard Bridge is inlet controlled. This means that the upstream soffit elevation, not the downstream soffit elevation, determines the backwater upstream of the bridge. Since the design water surface does not contact the downstream side of the bridge, removing the pipe would not decrease the energy losses caused by the bridge.

12) **Hydrological Analysis, HEC-6 and Sediment Analysis:**

Balanced hydrographs for Mission Creek were developed using the HEC-1 Flood Hydrograph Package computer program. The result indicated that very little sediment movement would occur for the 2.3- and 5-year flood event. Within the estuary, the maximum scour and deposition would be approximately 0.1 and 0.2 ft, respectively, for the 2-3 year flood event. Similarly, the maximum scour and deposition would be approximately 0.3 and 0.4 ft, respectively, for the 5-year flood event.

Due to the presence of the inline weir, it would be expected that most of the sediment would drop out upstream of the oxbow and culvert bypass. As a result, clearer water would flow downstream of the culverts.

However, it is expected that additional hydraulic analyses will be needed during the Pre-construction Engineering Design (PED) Phase of the study to analyze minor changes in channel and bridge configurations. A more detailed sediment analysis, e.g. HEC-6, will be required during the PED phase of the study to refine the project design and verify the project performance in terms of the anticipated sediment loads.

The Corps will provide results of the HEC-6, and any additional studies performed during the PED phase to your office.

13) **Water Quality Improvement:**

The Final EIS/EIR, Section 7.7.6, 24. 2, and Appendix H, identify mitigation measures for the project construction and future maintenance to minimize impacts to water quality. A Storm Water Pollution Prevention Plan (SWPPP) will be prepared for the project construction, which would include measures to minimize construction impacts to water quality. The SWPPP will control where and how construction equipment is used and maintained, how materials are stored and measures to be taken should spills occur. Other considerations include timing of construction to avoid higher flows, placement of silt fences below construction areas and a variety of erosion control measures. The SWPPP will be prepared by the construction contractor prior to construction. A copy would be provided to the CCC for information and review.

The Corps supports the City's Water Quality Improvement and Creek Restoration Program in order to improve water quality and native habitat along the City's eight creeks, including Mission Creek. The program is funded by an increase in the Transient Occupancy Tax (also known as the "bed tax"). Annual revenues are expected to average about $2 million. This program identifies several measures to improve water quality within Mission Creek. A letter from the City of Santa Barbara is enclosed for your information (enclosure 3). The Corps agrees to coordinate the design and implementation of the proposed flood control project at Lower Mission creek with the City of Santa Barbara's proposed measures for water quality improvements, in order to avoid potential conflicts in design and eliminate duplication of construction efforts.

14) **Phased Review of the CCD:**

The Corps has completed a feasibility study, which includes a conceptual plan for the project design. The process also requires approval of Pre-construction Engineering Designs. Pursuant to the federal regulations implementing the federal Coastal Zone Management Act, it is appropriate for the Corps to conduct federal consistency review of the project prior to PED

approvals. If, after a thorough review, the Corps determines that the information generated from the PED phase results in effects on coastal zone uses or resources that are new or different from those analyzed in the consistency determination submitted during the feasibility phase, then the Corps will submit a consistency determination before final PED approval. Otherwise, the Corps will submit a negative determination for the Commission staff's concurrence with the Corps conclusion that the project does not raise new or different effects on coastal zone resources.

The Corps assumes that there should not be any major changes in the final design for the project. However due to further hydrological studies, real estate acquisition or any unforeseen conditions, the design may change. Through the consistency coordination during the PED phase, the Corps will notify the CCC of any changes in the design of the project, and will describe the changes and their impacts to coastal uses and resources.

15) **Providing Detailed Project Design Plan to CCC for review:**

The Corps will coordinate with the CCC continuously until the project construction is completed. This coordination will include starting date, completion date and description of any significant changes to project design during construction. For five years after completion of the project, the Corps will provide monitoring reports, biological survey reports and water quality improvement reports (prepared by the City) to your office.

The plans developed during PED phase will be provided to the CCC staff for review. If any changes occur during PED phase, the Corps will keep the CCC staff informed.

16) **Office of Historic Preservation Officer (SHPO) Approval**:

The Corps has coordinated with SHPO regarding compliance with Section 106 of the National Preservation Act and implementing regulations codified at 36 CFR Part 800. By letter dated August 3, 2000, the SHPO has concurred with the Corps' determination that the Lower Mission Creek Flood Control Project will have no adverse effect on federally significant historic properties. A letter from SHPO is enclosed for your information (enclosure 4).

However, under the City's threshold's one historical structure located at 15 West Mason Street will be removed (determined not eligible for national Register of Historic Places

(NRHP, SHPO letter, August 3, 2000). The City has determine this to be acceptable because it allows the project design to preserve several structures on the opposite side of the creek that area eligible for inclusion on the NRHP.

Your timely concurrence of this CCD would be greatly appreciated. We are especially thankful for Mr. James Raives's coordination and responses to us in addressing project related issues and for a site visit with us. If you have any questions regarding this project please, contact Ms. Joy Jaiswal Environmental Coordinator at (213) 452-3871.

Thank you for your time and attention to this request.

Sincerely,

Ruth Bajza Villalobos
Chief, Planning Division

Enclosures

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W.O. 13216.01

February 25, 2000

Mr. Pat Kelly
City of Santa Barbara
Public Works Department
630 Garden Street
Santa Barbara, CA 93101

Subject: **Lower Mission Creek Shade Analysis**

Dear Pat:

This shade analysis was performed in response to questions regarding how much of the water in Lower Mission Creek would be shaded after completion of the project proposed by the Army Corps of Engineers. This analysis was conducted using a landscape design program entitled "Sierra Land Designer – 3D." The program provides an indication of the extent of shading and allows the modification of a number of variables that affect shade along a creek. The shade along the creek above and below the freeway was investigated.

The segment of creek below Chapala Street was analyzed in greater detail due to the concern that the widening of the creek to 60' would preclude shading of the creek with trees. The concern over shade in this area is increased due to the negative affect direct summer sun has on algae blooms in the ponded creek water and thus the production of undesirable odors. The shade analysis for the creek below Chapala Street also included a review of the extent of existing shade from trees and buildings.

The first section of this letter provides background information relative to the computer program and the approach used in this analysis. The second section reviews the results of the analysis and the third section summarizes the findings of this analysis.

The reader is cautioned to remember that this shade analysis software probably only provides a general qualitative perspective; however, field observations were made to confirm the reliability of the shade analysis program.

P&S

BACKGROUND

Sierra Land Designer – 3D allows the user to input various buildings, hardscapes, land forms and plants to create a three dimensional model of a landscaped area. This model can then be used to graphically depict shadows cast by plants. This model allows variation of the following parameters:

Compass orientation
Plant growth over time
Seasonal changes of plants
Longitude
Time of day

The program shows shadows cast by buildings, but not shadows cast by fences, walls or creek banks.

To simplify the analysis, two typical sections were modeled. The first section represents the creek upstream from the freeway and is based on a creek that has vegetated side slopes with short vertical walls. The distance between the walls was set at 42 feet. The second section represents the creek below the freeway and is based on a creek with vertical walls spaced 60 feet apart. This section assumes that some sycamore and willow trees will be planted by the community adjacent to the creek bank on private property. The typical section for the 42' foot wide creek shows a higher density of sycamore and willow trees than the section below Chapala Street. The typical sections are both shown with the creek flowing west to east (north south axis perpendicular to the creek). A typical residential neighborhood is shown in both sections to provide scale and perspective.

The model shows the sycamore trees to be approximately 20 to 30 feet tall after 5 to 10 years and growing to 50 to 60 feet tall after 20 to 30 years. The willow trees are shown to be 15 to 20 feet tall after 5 to 10 years and growing to 25 to 35 feet tall after 20 to 30 years. These tree sizes have been confirmed by biologists familiar with the growth of trees along creeks.

Information on existing shade was collected on February 24, 2000 at approximately 1 pm. A model run was produced for February and compared to actual shade levels to help confirm the reliability of the model.

RESULTS OF THE ANALYSIS

For the section above the freeway, a plan view is attached as Exhibit 1. The plan view is for trees that have grown 5 to 10 years. The view shows the extent of shade produced by these trees in July. Also provided are two 3-D pictures showing the size of the trees in 5 to 10 years (Exhibit 2) and the trees in 20 to 30 years (Exhibit 3). This analysis clearly indicates that the proposed planting of sycamore and willow trees will completely shade

the 42 foot wide creek within 5 to 10 years. For this reason, no further analysis was performed relative to the shadows cast along the creek upstream from the freeway.

The remainder of the analysis is concerned with shades cast on Mission Creek downstream from Chapala Street where the creek is proposed to be 60 feet wide.

As mentioned above, the segment of creek below Chapala Street was analyzed in greater detail due to the concern that widening of the creek to 60' would preclude shading of the creek with trees. The concern over shade in this area is increased due to the negative affect direct summer sun has on algae blooms in the ponded creek water and thus the potential production of undesirable odors. The water sitting in this section of creek results from the tidal influence and the ponding resulting from the sandbar that regularly blocks the flow of water from the creek to the ocean. The shade analysis for the creek below Chapala Street also included a review of the extent of existing shade from trees and buildings adjacent to the creek.

Exhibit 4 shows the 60-foot wide creek with vertical walls. The trees are shown 5 to 10 years old with the shadows as cast in July at approximately noon. This exhibit indicates that approximately 15 to 20 percent of the creek would be shaded when the sun is highest in the sky. Exhibit 5 shows these same trees in a perspective view. Over time, these trees will grow and produce increased levels of shade. Exhibit 6 shows the shade that can be expected from sycamore trees after 20 to 30 years. This exhibit indicates that approximately 70 to 80 percent of the creek would be shaded when the sun is highest in the sky. The perspective view of these trees is depicted in Exhibit 7.

Two more models were run for the 60-foot channel. These two models were for February at noon so that existing shade conditions could be compared to the model predictions. The model indicates in Exhibit 8 (60' LMC Feb. Noon @ 5 to 10 years) that an object 20 to 30 feet tall will cast a shadow approximately 50 feet across the creek. This was confirmed by field observations of the shadows cast by existing trees and buildings. Exhibit 9 shows the shadows produced in February at noon by sycamore trees that are 50 to 60 feet tall (20 to 30 years old). These shadows were confirmed by the shadows cast by the existing multi-trunk sycamore tree downstream from the Mason Street Bridge. This large sycamore cast shadows that extended more than 70 feet from its base. This tree is estimated to be 50 to 60 feet tall even after being topped in the recent past (probably topped due to concerns over the stability of the tree with the creek erosion occurring at its base).

Existing shade conditions can be seen in the 14 photos included in Exhibit 10. These photos show that the only shade on the creek from Cabrillo to almost Mason Street, is from the walls, buildings and bushes along the creek. The planting of fast-growing riparian sycamore trees would quickly add shade to this section of creek. This shade would increase over time as shown in Exhibits 4 through 9. The section of creek at Mason Street is currently well shaded by the giant sycamore tree just downstream of the Mason Street Bridge. The project as currently proposed includes preservation of this tree

which would continue to shade the widened creek. The first 200 feet of creek upstream from the Mason Street Bridge has shade from buildings only. The planting of sycamore trees in this area will greatly enhance the shading of the widened creek.

The next section of creek up to the Chapala Street Bridge is almost completely shaded at this time by non-native trees and the invasive giant reed (Arrundo). The trees on the south side of the creek will be preserved with the project and will continue to shade the creek. The invasive giant reed will be removed as a part of the project and replaced with native willow and sycamore trees. At first this change will result in a decrease in shade on the creek; however, over time the fast-growing sycamore and willow trees will provide significant shade to this section of creek as depicted in Exhibits 4 through 9.

SUMMARY OF FINDINGS

The application of a fairly simple shading model clearly indicates that the 42-foot wide creek with vegetated side slopes and short wall will be quickly and completely shaded by the fast growing native willow and sycamore trees. The comparison of the results of this model with the existing conditions indicates that the shading of the creek from Cabrillo to Chapala will be improved overall with native willow and sycamore trees planted along the widened creek.

As stated earlier in this letter, this analysis only provides an indication of the level of shading that can be expected in the years following the implementation of the proposed project. The results of the computer analysis were confirmed by field observations along the creek.

Please contact me if you have any questions about this analysis.

Sincerely,

PENFIELD & SMITH

Bruce Burnworth
Principal Engineer

Attachments: Exhibits 1 through 10

c: Jan Hubbell
Tom Fayram

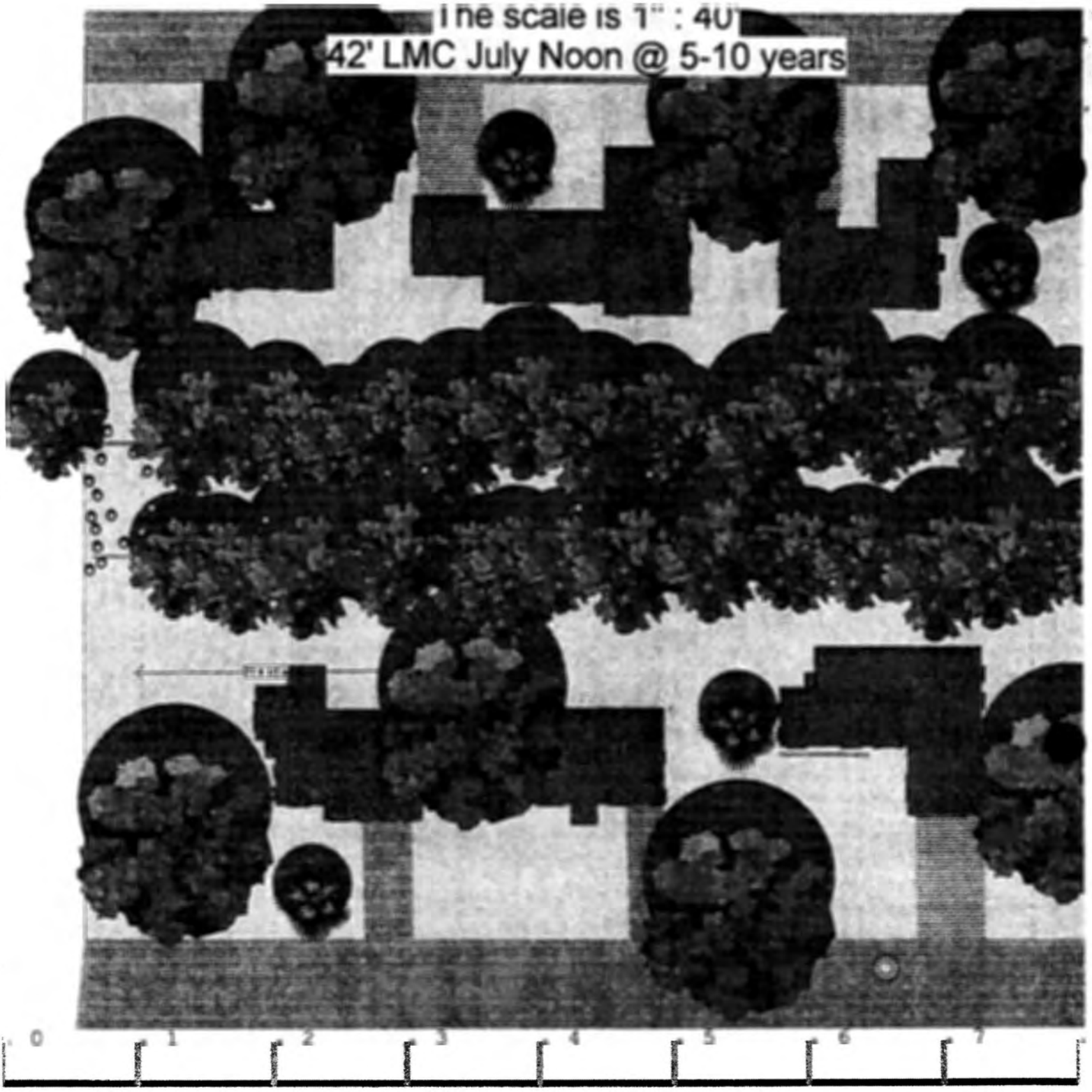


EXHIBIT 1
42' LMC July Noon
@ 5 to 10 Years

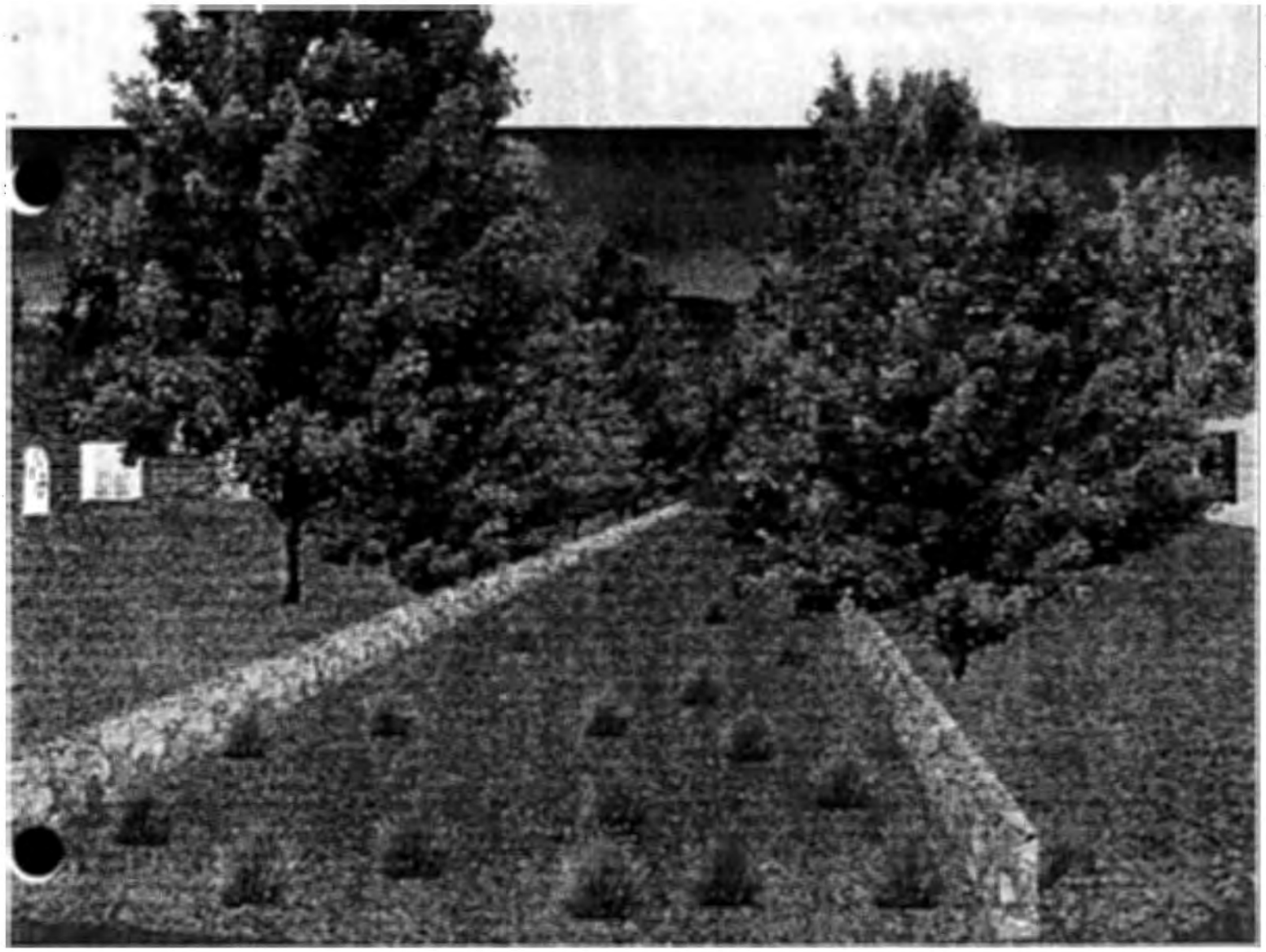


EXHIBIT 2
42' LMC Perspective View of Creek
@ 5 to 10 Years

EXHIBIT 3
42' LMC Perspective View of Creek
@ 20 to 30 Years

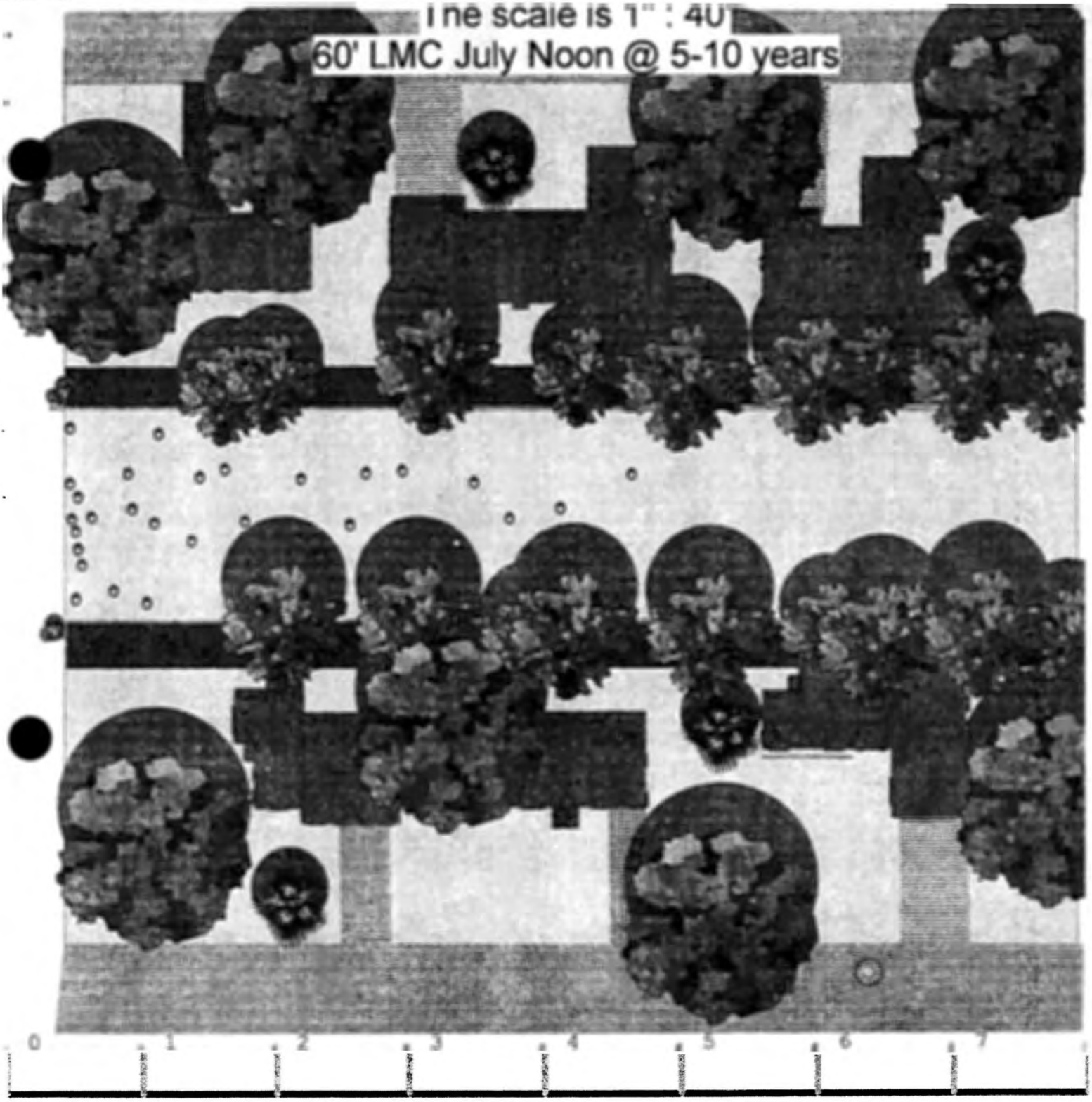


EXHIBIT 4
60' LMC July Noon
@ 5 to 10 Years

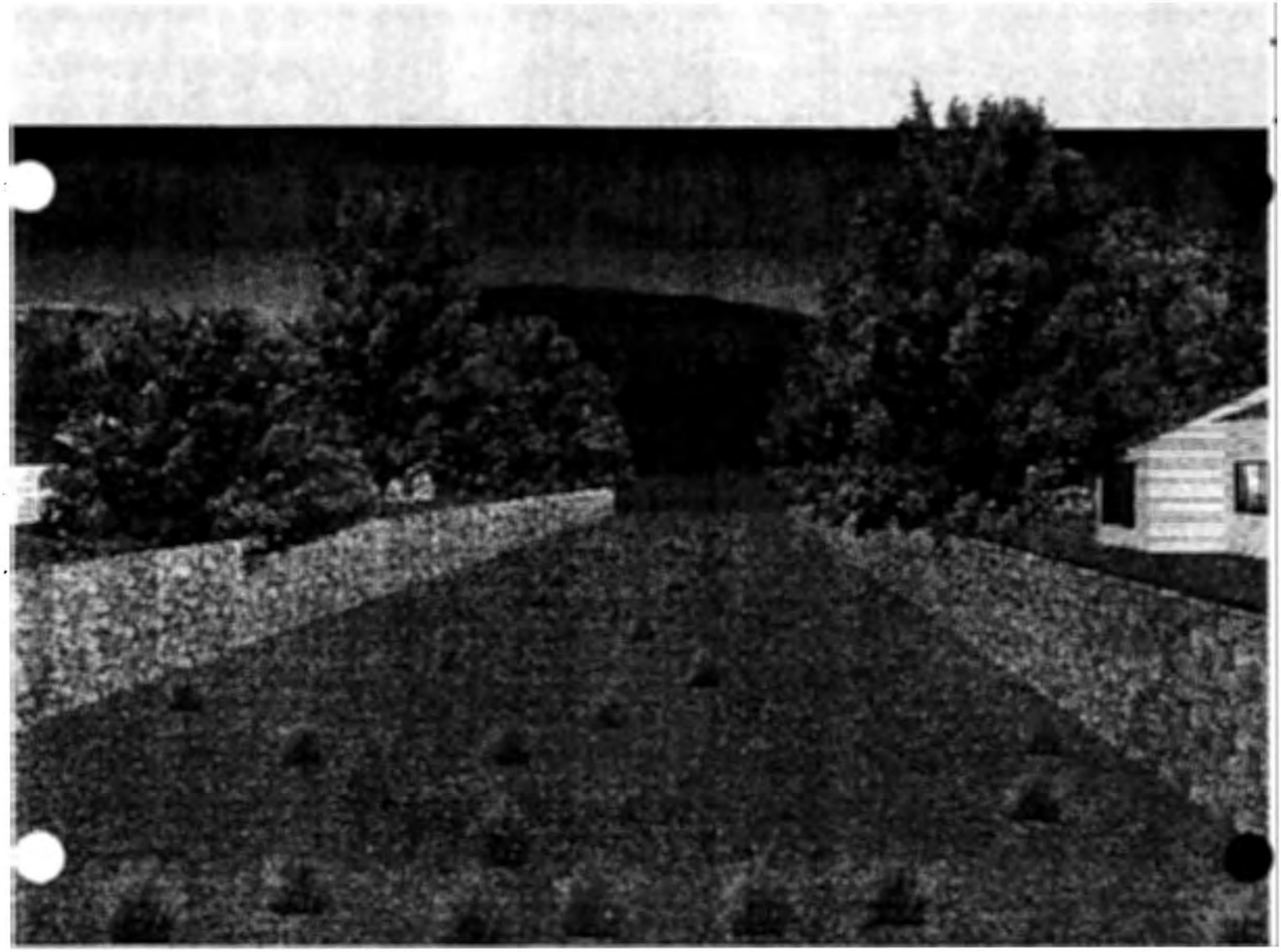


EXHIBIT 5
60' LMC July Noon
@ 20 to 30 Years

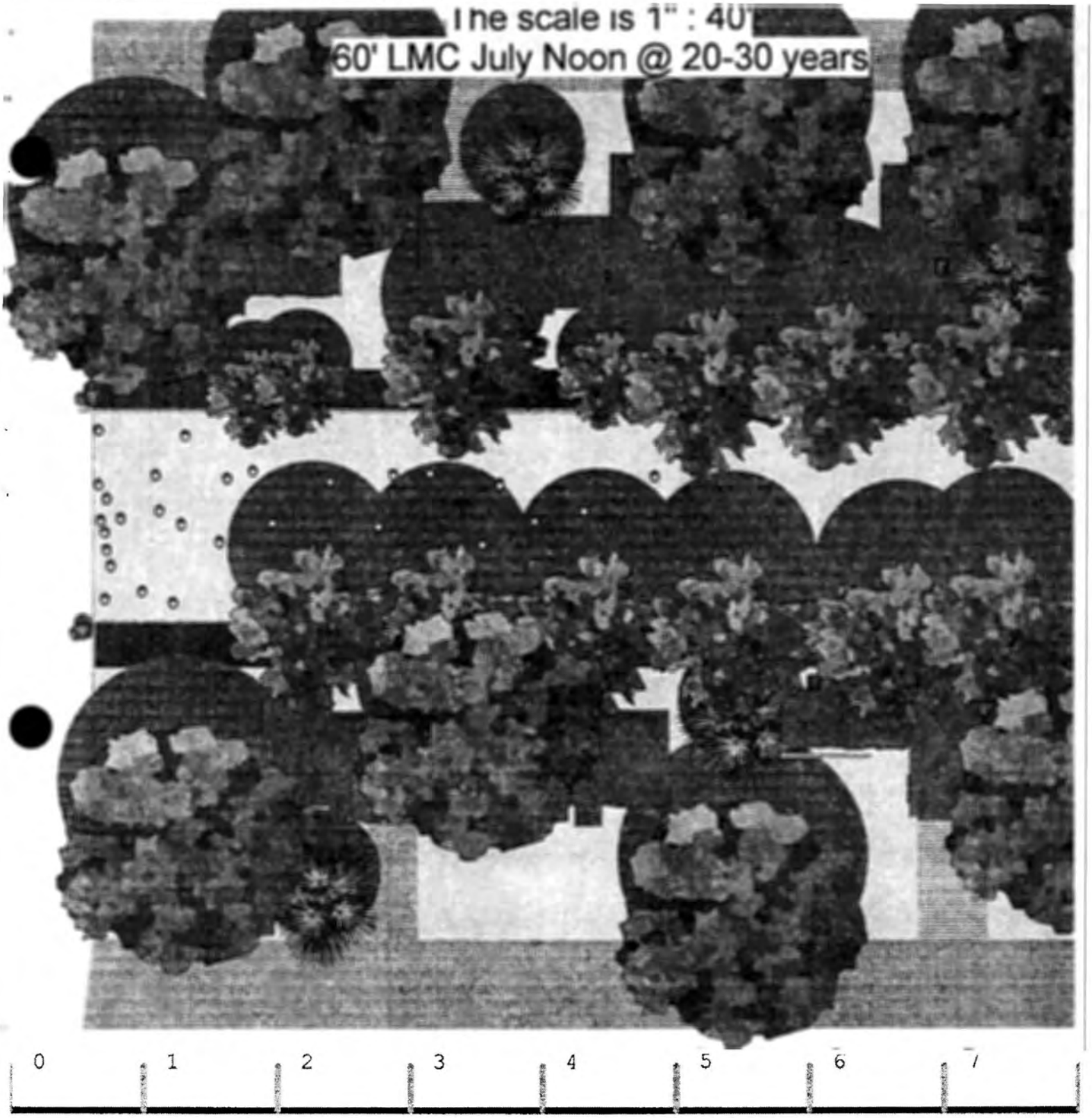


EXHIBIT 6
60' LMC July Noon
@ 20 to 30 Years

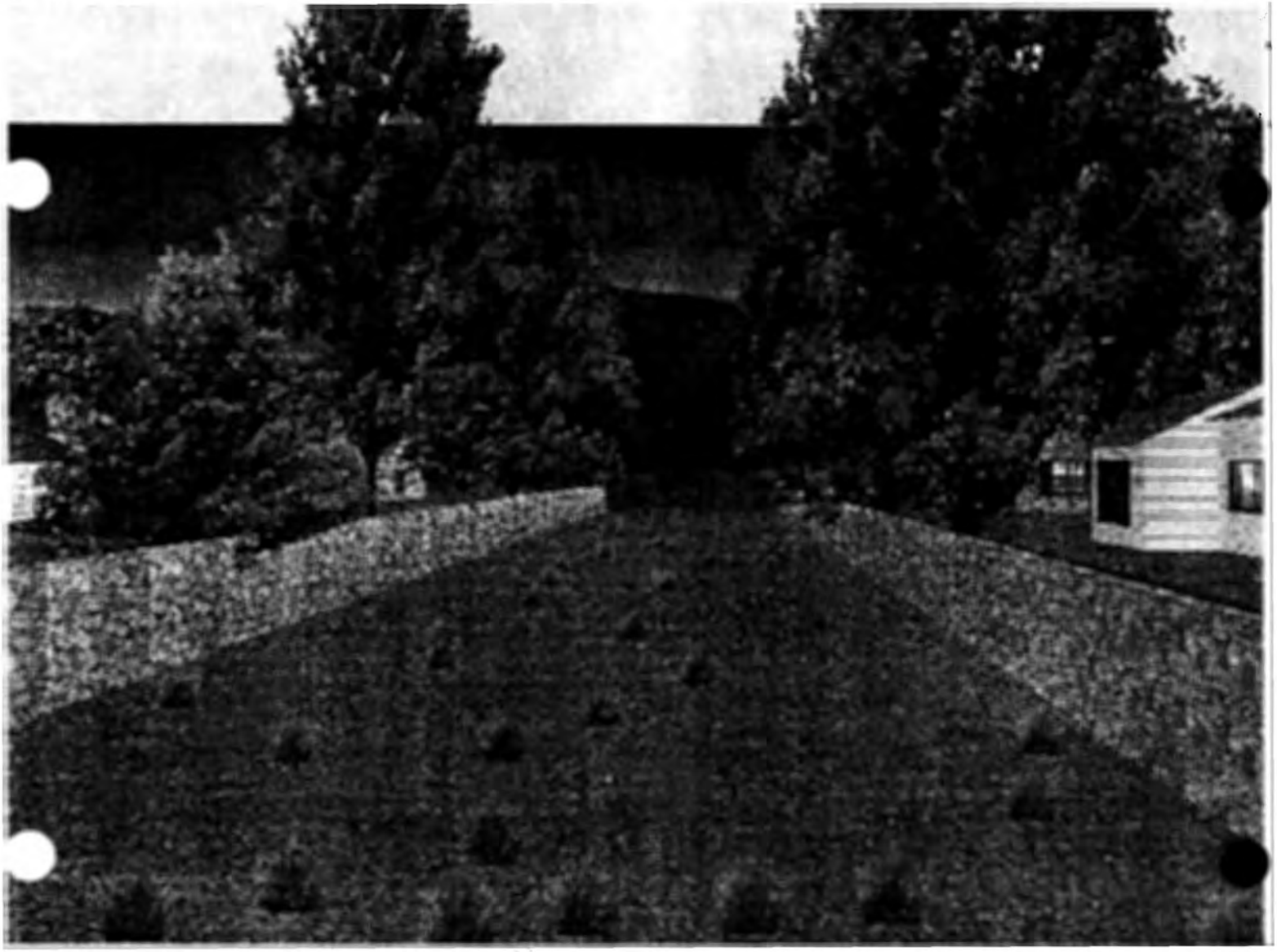


EXHIBIT 7
60' LMC Perspective View of Creek
@ 20 to 30 Years

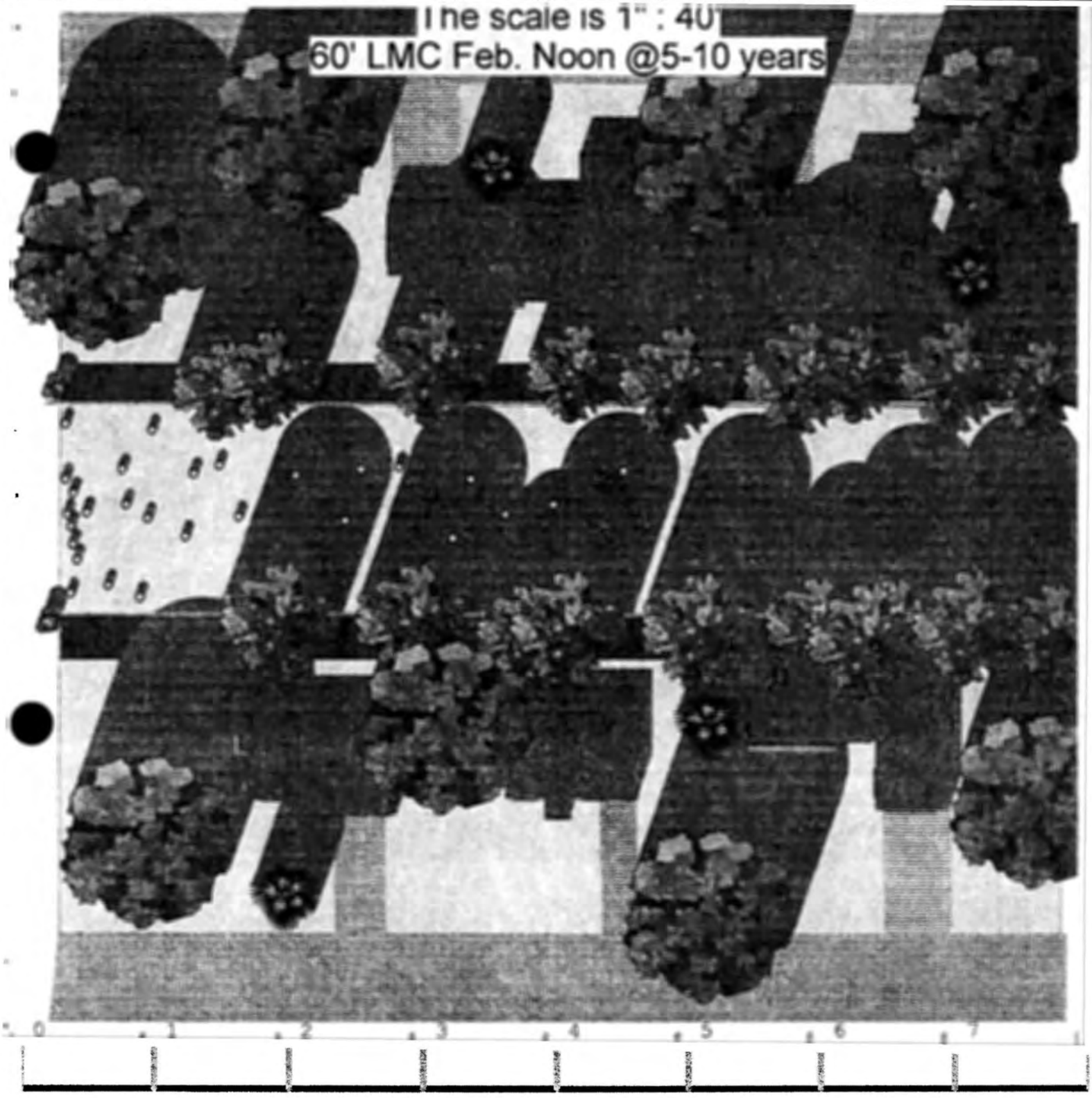


EXHIBIT 8
60' LMC Feb. Noon
@ 5 to 10 Years

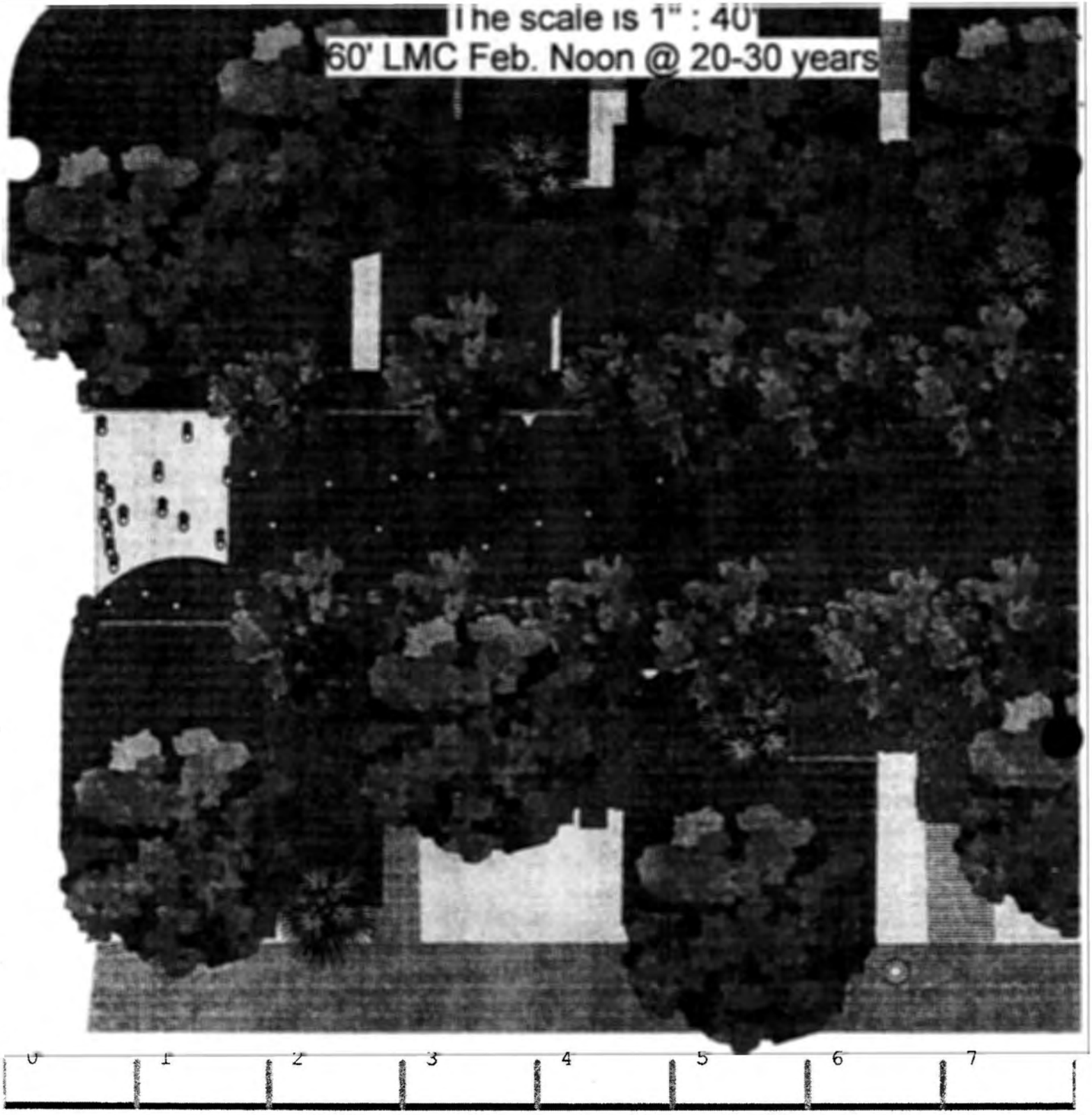
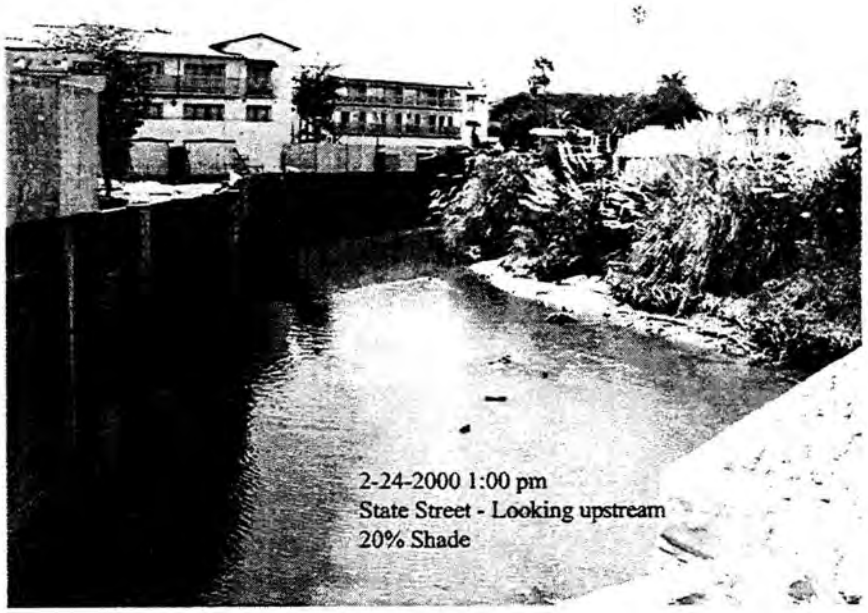
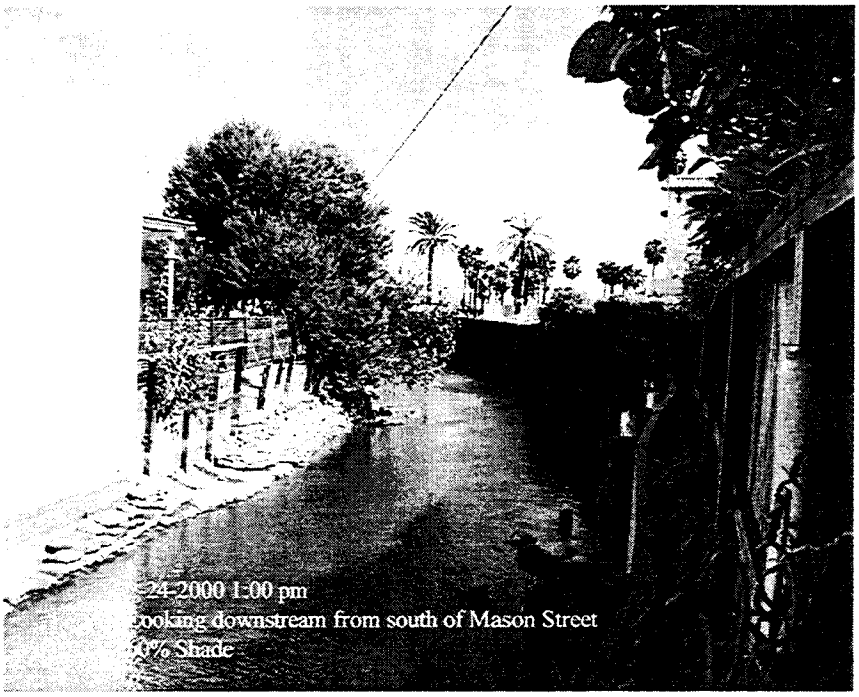


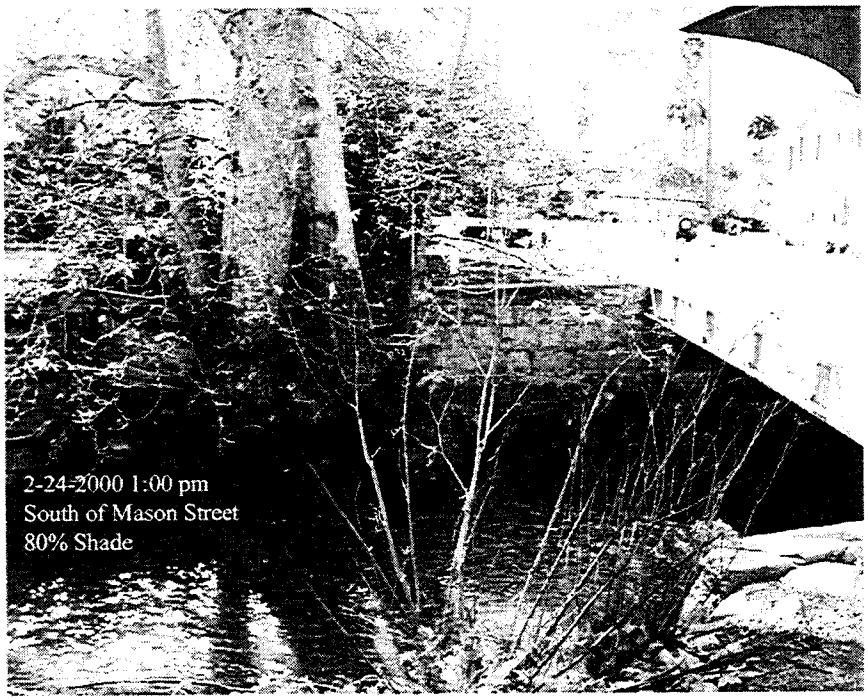
EXHIBIT 9
60' LMC Feb Noon
@ 20 to 30 Years

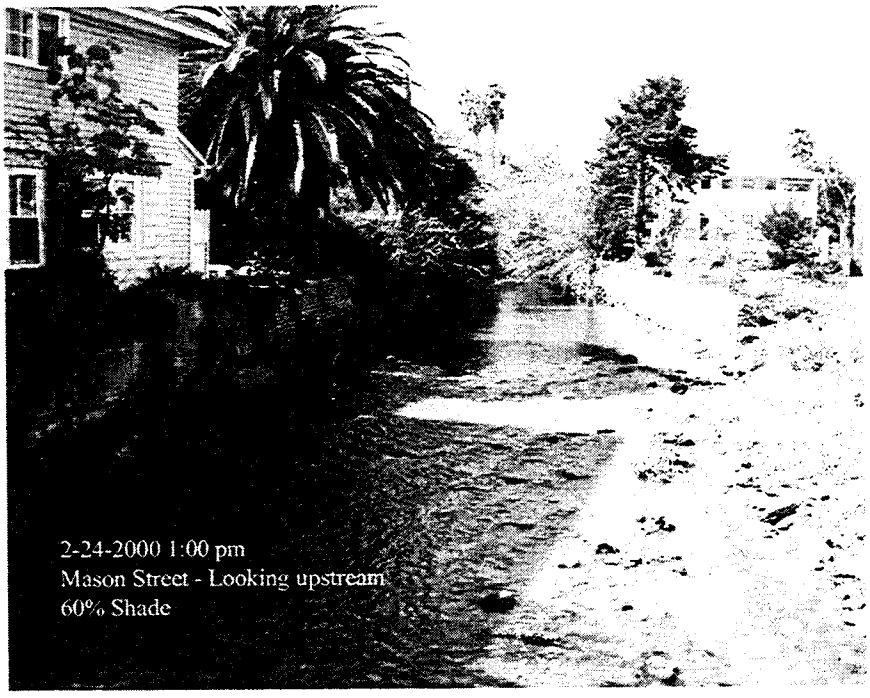
EXHIBIT 10
Existing LMC Feb. Noon
(Cabrillo to Chapala)


2-24-2000 1:00 pm
State Street - Looking upstream
20% Shade

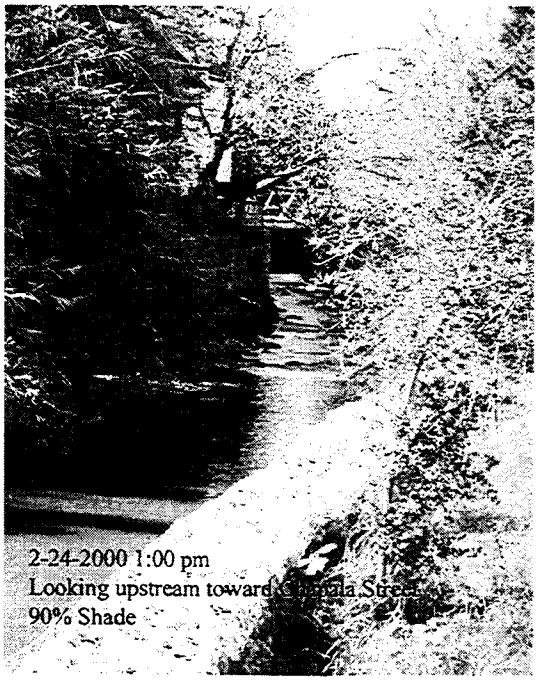

24-2000 1:00 pm
ooking downstream from south of Mason Street
0% Shade

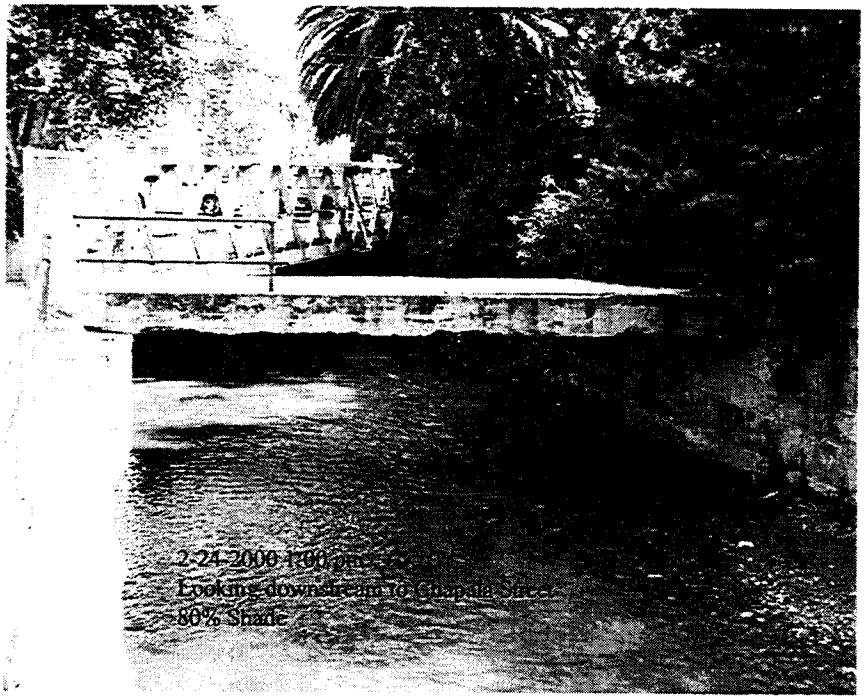

Looking downstream
80% Shade

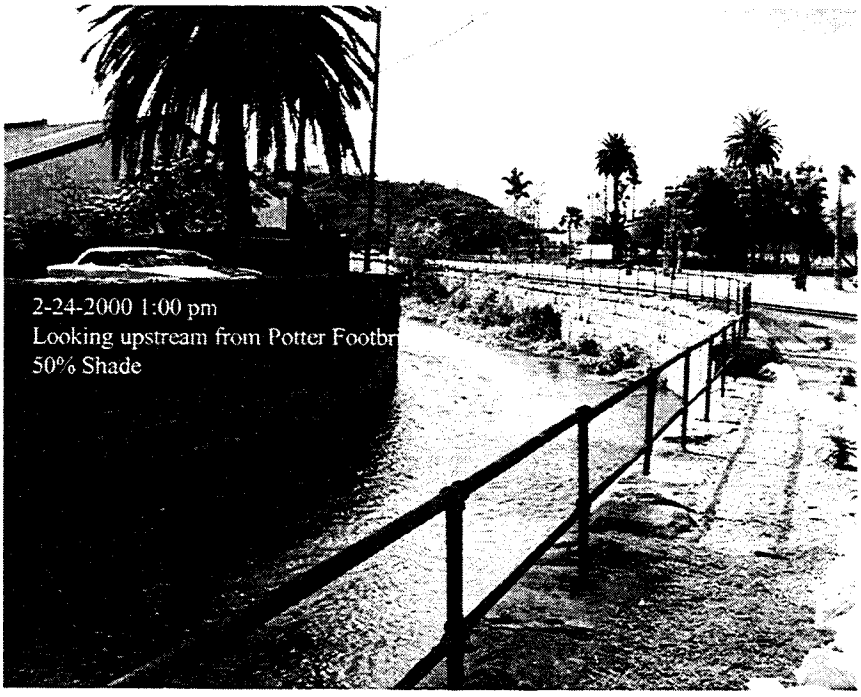

2-24-2000 1:00 pm
South of Mason Street
80% Shade

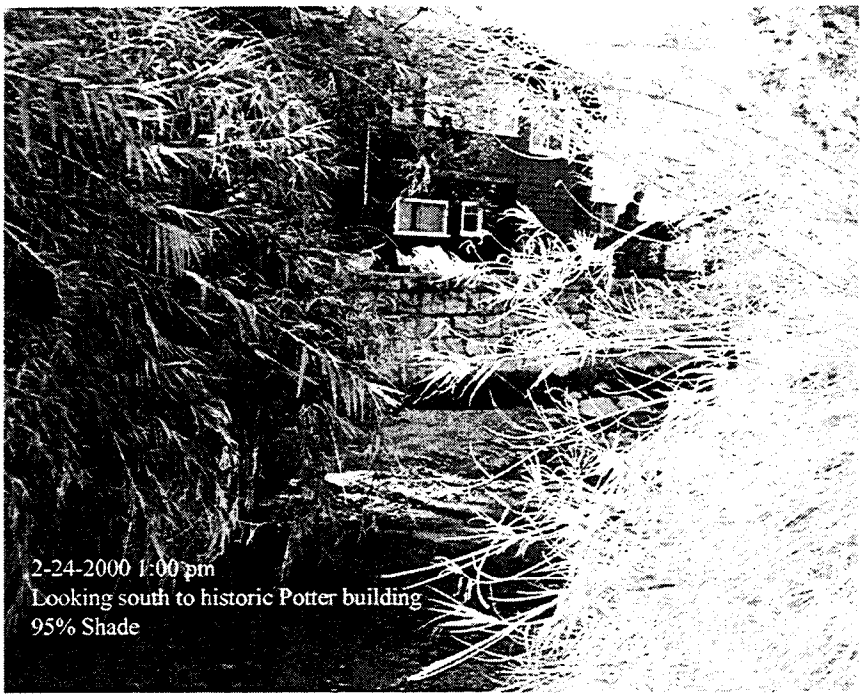

2-24-2000 1:00 pm
Mason Street - Looking upstream
60% Shade


2-24-2000 1:00 pm
Looking downstream to Magnolia Street
90% Shade

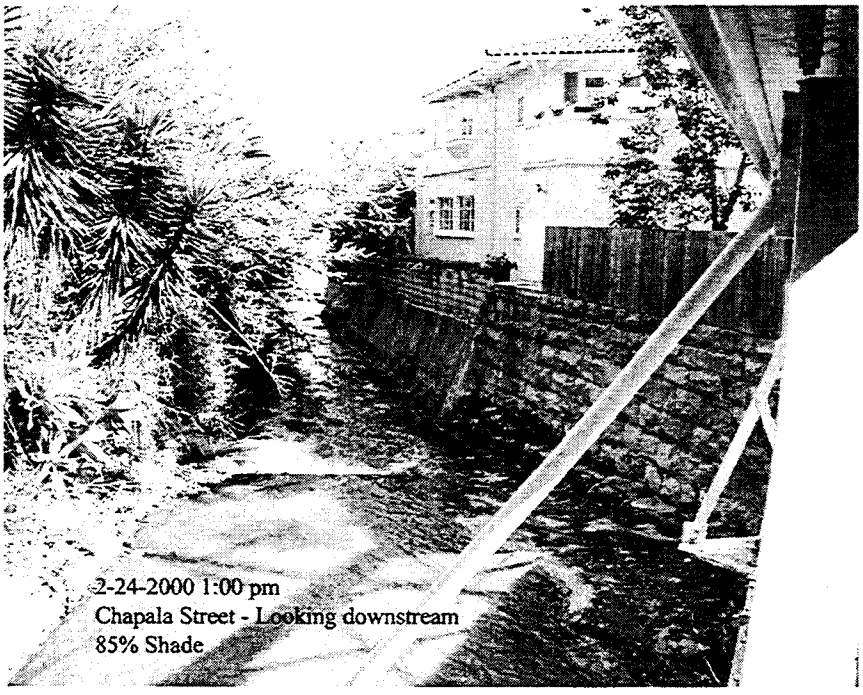

2-24-2000 1:00 pm
Looking upstream toward Magnolia Street
90% Shade


2-24-2000 1:00 pm
Looking downstream to Chapala Street
80% Shade


2-24-2000 1:00 pm
Looking upstream from Potter Footbr
50% Shade



2-24-2000 1:00 pm
Looking south to historic Potter building
95% Shade



2-24-2000 1:00 pm
Chapala Street - Looking downstream
85% Shade

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

AUG 2 2000

In Your Response
Please Refer to:

F-LB-00-23:KAJ

Robert E. Koplin
Department of the Army
Los Angeles District, Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

Dear Mr. Koplin:

This document transmits the National Marine Fisheries Service's (NMFS) biological opinion based on NMFS' review of the Army Corps of Engineers' (ACOE) project to construct and the County of Santa Barbara (County) project to maintain a flood control channel on lower Mission Creek in the City of Santa Barbara, Santa Barbara County, California, and their effects on the Federally endangered Southern California Evolutionarily Significant Unit (ESU) of steelhead (*Oncorhynchus mykiss*) and its critical habitat in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Formal consultation for the Mission Creek flood control project was initiated on June 20, 2000.

The NMFS contact for this project is Korie Johnson. Please contact her at (562) 980-4199, if you have any questions regarding this consultation.

Sincerely,

Rodney R. McInnis
Acting Regional Administrator

EXHIBIT NO. 13

APPLICATION NO. CD-117-99
31 Pages
California Coastal Commission

BIOLOGICAL OPINION

AGENCY: United States Army Corps of Engineers

ACTION: Construction and maintenance of flood control channel on lower Mission Creek, Santa Barbara County, California

CONSULTATION CONDUCTED BY: National Marine Fisheries Service, Southwest Region

DATE ISSUED: AUG 2 2000

I. INTRODUCTION

Lower Mission Creek and its associated floodplain is highly constrained by residential and commercial development. Thus, streamflow often overtops the creek embankments during heavy storms, resulting in extensive flooding. The City has experienced approximately 20 damaging floods since 1900. In 1995, flooding resulted in extensive damage to City and private property, numerous evacuations of residents living within the immediate floodplain of Mission Creek, and transportation delays. Due to the recurrent flooding, the City of Santa Barbara (City) and the Santa Barbara County Flood Control District (County) requested that the Army Corps of Engineers (ACOE) assist the City in finding a solution to the flooding problems. In response to this request, ACOE has proposed the construction and maintenance of a flood control channel along the lower 1.2 miles of Mission Creek in the City of Santa Barbara, Santa Barbara County, California.

During early planning stages of this project, NMFS staff attended multiple site visits and agency coordination meetings. During these early meetings, NMFS informed the ACOE of steelhead concerns regarding the proposed project. On December 21, 1999, NMFS received a feasibility report for the ACOE's project along with a request for formal consultation. At that time, however, completed descriptions of construction and maintenance activities were not available. Thus, NMFS requested further project information, including detailed project plans, proposed maintenance activities, hydraulic analyses, cross sections and profiles of the project reach, and an analysis of possible effects to steelhead. At a June 7, 2000 meeting, ACOE presented the requested information and asked for further input from NMFS. On June 20, 2000, the final Biological Assessment, project description and hydraulic analyses were received by NMFS and formal consultation on endangered steelhead and steelhead critical habitat was initiated in accordance with section 7 of the Endangered Species Act (ESA).

This biological opinion, therefore, represents formal consultation for the Southern California ESU for the Federally endangered steelhead and for designated steelhead critical habitat. A complete administrative record is on file at NMFS

Southwest Region Office (501 W. Ocean Blvd., Suite 4200, Long Beach, CA 90802-4213).

II. Description of the Proposed Action

Introduction

The Federal action involves the Army Corps of Engineers (ACOE) constructing a flood control channel along 5380 linear feet (ft) of lower Mission Creek beginning at the Canon Perdido Street Bridge and continuing downstream to the Cabrillo Boulevard Bridge within the estuary (Figure 1). The purpose of the project is to increase the capacity of lower Mission Creek from 1050 cubic feet per second (cfs) to 3,400 cfs in order to provide flood protection up to a 20-year storm event. Once the project is constructed, the County would be responsible for maintaining the channel at the design capacity.

Action Area

The action area for the ACOE lower Mission Creek flood control project includes approximately 5500 linear feet of Mission Creek, including the channel invert and both embankments from Canon Perdido Street down to Cabrillo Boulevard near the mouth. Mission Creek is part of the Southern California Evolutionarily Significant Unit (ESU) for the Federally endangered steelhead (*Onchorynchus mykiss*) and was designated by NMFS as steelhead critical habitat on February 16, 2000.

Proposed Action

Overview

Generally, the ACOE project involves widening the channel, lining the embankments with vertical concrete walls, streamlining the bedslope, installing a bypass culvert near the Highway 101 crossing (referred to as the oxbow), and replacing four bridges (Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridges) in order to accommodate increased channel capacity (Figure 1). Five properties along the creek channel will be purchased by the ACOE, and existing buildings on those properties will be removed for the widening of the creek. The remainder of the parcels would be used in the creation of isolated park areas, referred to as habitat expansion zones. The parcels range in size from 0.03 to 0.52 acres. Native trees, including western sycamores, cottonwoods, and coast live oak will be planted in these parks and along creek embankments to provide an expanded riparian corridor.

In order to widen and stabilize the channel, ACOE will remove existing bank stabilization structures, excavate embankments, and install hard bank slope protection. A total of 82,000 cubic yards of material will be excavated from the

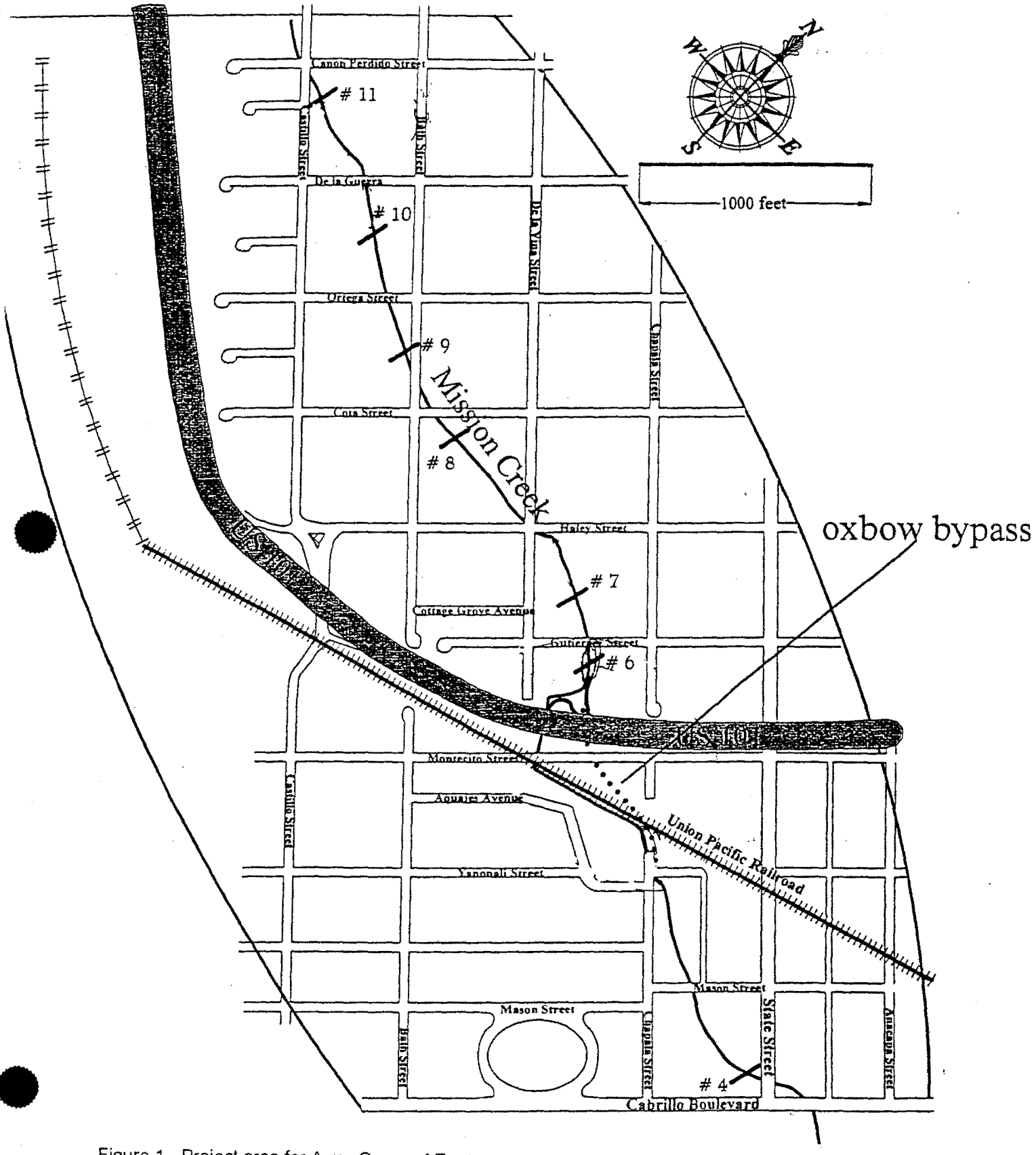


Figure 1. Project area for Army Corps of Engineers Flood Control Project along lower Mission Creek in the City of Santa Barbara, Santa Barbara County, California. Numbered lines indicate locations of representative cross sections used in hydraulic analyses.

creek channel and embankments. Only the retaining wall located on the eastern bank upstream of the De la Guerra Bridge and the hard bottom channel and mortared sandstone walls (approximately 940 linear ft) located between the upstream side of Highway 101 and the downstream side of Chapala Street, referred to as the "oxbow," will be left in place. Approximately 420 linear ft of existing cement channel located between Haley and De la Vina Street bridges will be removed.

Hard bank slope protection will consist of either complete vertical cement walls or combination vertical toe wall and vegetated riprap sideslope (Table 1). Walls will be constructed in one of two methods, depending on their proximity to existing structures. An inverted "T" footing would be applied in areas where sufficient rights-of-way are available. In areas with limited rights-of-way, a pier footing construction would be used. In general, the toe wall height will be half the depth of the channel. The remaining top half of the bank will be the riprap side slope. Between successive bridges the toe walls will be of constant height and therefore the height of the riprap slope could vary somewhat. The side slope will be constructed by backfilling the vertical wall with riprap at a maximum slope of 1.5:1. The riprap will be covered with topsoil and planted to establish a healthy riparian corridor. Short cylinders will be placed in between the riprap to allow planting of native trees and vegetation. Following project implementation a total of 2395 linear feet will be vertical wall and 4490 linear feet will be vertical wall-riprap sideslope.

Table 1. Overview of modifications to lower Mission Creek channel and embankments.

Reach	Upstream Extent	Proposed Treatment Left Bank	Proposed Treatment Right Bank	Proposed average depth	Proposed width (channel invert)	In-Channel Modifications
1	Canon Perdido	Wall/riprap Vertical wall	Wall/riprap Vertical wall	7.5	42	Boulder cluster, fish baffles & ledges
2	De la Guerra	Wall/riprap Vertical wall	Wall/riprap	9	42	Boulder cluster, fish baffles & ledges
3	Ortega	Wall/riprap	Wall/riprap	9	42	fish baffles
4	Bath	Vertical wall	Access ramp	9	42	fish baffles & ledges
5	Cota	Wall/riprap Vertical wall	Wall/riprap Vertical wall	9	42	
6	Haley-De la Vina	Wall/riprap Vertical wall	Wall/riprap	9	50	Boulder cluster, fish baffles & ledges
7	Gutierrez	Wall/riprap Culvert inlet	Wall/riprap Riprap	9	50	Boulder cluster
8	Highway 101	Bypass culvert Oxbow	Bypass culvert Oxbow		33-40 (no change)	Boulder cluster
9	Chapala/ Yanonali	Wall/riprap Vertical wall	Vertical wall	7.5	60	fish baffles & ledges

10	Mason	Wall/riprap Vertical wall	Vertical wall	8	60	fish baffles, vertical ridges, ledges
11	State to Cabrillo	Wall/riprap	Wall/riprap	9	60	fish baffles, vertical ridges

An overflow box culvert will be installed at the oxbow. During this stretch, the creek makes several sharp turns as it crosses Highway 101, the Montecito Street Bridge, and Union Pacific Railroad. The culvert will have two 15 ft wide by 6 ft high boxes and will follow a direct path between the Gutierrez and Chapala Street Bridges. A weir structure will be built at the inlet of the culvert to direct all flows up to 640 cfs through the oxbow channel. If flows increase above 640 cfs, the weir will split flows between the overflow culvert and the oxbow channel. At a design flow of 3400 cfs, 2350 cfs will be directed through the culvert and 1050 cfs will flow through the oxbow. The weir will be approximately 3 ft higher than the channel invert and will be 240 ft in length, extending about 22 ft laterally into the channel.

Fish habitat

ACOE has incorporated a number of measures into the design of the flood control channel to provide cover and resting areas for steelhead. In order to dissipate high velocities and allow for improved migration of steelhead, the creek channel will be lined with riprap (up to 15 inches in diameter) at three locations. At two locations, clusters of 6 to 9 large boulders will be keyed into the riprap within the channel to break up the principal currents. Boulders will be 3 to 4 ft in diameter and placed 5 to 8 ft apart. Individual boulder fields will be 300 ft in length. One will be centered at the De la Guerra Street Bridge (starting150 feet upstream and running 150 feet below the bridge). The second would be located from 150 feet upstream of the Gutierrez Street Bridge downstream to the start of the oxbow. The outlet of the overflow culvert will be armored with riprap to prevent scouring of the streambed, but will not have boulder clusters.

ACOE will also incorporate structures into the vertical concrete walls to provide cover, shade and resting areas for steelhead. Between Mason Street and Cabrillo Boulevard, molded ridges extending vertically along the wall will lower water velocity and create localized eddy currents, providing refuge for small fish. These ridges will mostly benefit gobies, but could provide cover for young-of-the-year steelhead as well. Ridges will begin at the bottom of the formed wall and continue vertically to the ordinary high water mark, a height of approximately 8 ft at the estuary. They will vary in length from 1 to 4 feet, and will be 6 inches wide and extend 3 inches out from the wall. The space between successive ridges will be 12 inches.

In addition, artificial overhangs will be cantilevered from the wall extending 2 ft into the channel. The ledges will be 6 inches thick and approximately 50 ft long.

Within the estuary, ledges will be built approximately 10-20 inches above the invert of the stream so that water will cover the ledges at all times except at the lowest low tides. Double rows of coarse boulders (baffles) will be keyed into the channel between the overhangs along the creek walls. Spaces in between the rocks will provide additional cover and heterogeneity to the channel invert. These boulder side baffles will extend 5 ft into the channel and project 18 to 24 inches above the creek invert. A space of approximately 5 ft to 8 ft will be left between pairs of rocks to facilitate periodic removal of sediment.

The combination of all three of the above features will be incorporated into the channel and channel walls within the estuary between Mason and Cabrillo bridges. In this estuarine section of the creek, boulders would be packed together as tightly as possible. Features will be offset, so that ledges on one bank of the creek face ridges and boulders on the opposite bank of the creek. This will result in a total of 380 linear ft of fish ridges and boulders, and 240 linear feet of over hanging ledges on the eastern bank of the creek, and 360 linear feet of ridges and boulders, and 300 linear ft of ledges on the western bank of the creek.

Upstream of the Mason Street Bridge, overhangs will be placed at locations where currents are expected to impinge against the wall and scour persistent pools under the ledges. Four ledges will be built along the eastern bank for a total of 200 linear ft. Five ledges will be built along the western bank for a total of 250 linear ft. Ten rock baffles will be constructed in lower velocity sections of the creek, with individual baffles extending from 150 to 200 ft in length. A total of approximately 1400 linear ft of rock baffles will be installed; 675 linear ft on the east bank and 725 linear ft along the right side.

Construction

Prior to any construction activities within a given project reach, a qualified biologist shall survey for the presence of steelhead. If steelhead are present, a qualified biologist shall net and relocate them to suitable habitat within Mission Creek. Methods for steelhead capture and relocation are discussed below.

Construction activities shall begin at the downstream extent of the project area and progress upstream. Project construction is expected to last 3 years, although delays due to weather or mechanical failure could prolong the project for an additional 1 to 2 years. For construction within the estuary from Cabrillo Boulevard up to Yanonali Street, all construction within the creek will occur between June 1 and December 1 of any given year. Upstream of the estuary work could begin as early as April 15, but only if Mission Creek does **not** have continuous surface flow between Oak Park and the upper extent of the project area. If surface flow persists, construction will only occur after June 1. Only one side of the channel will be isolated and dewatered at any given time to allow normal tidal flushing and unimpeded stream flows within the other half.

In order to dewater the work area within the estuary, a temporary barrier will be installed down the centerline of the proposed channel (not the existing centerline) by driving sheet piles. Pile driving equipment working from the top of the eastern bank will drive the sheet piles near the existing east bank. Barriers will then be installed at the upper and then the lower end of the proposed centerline to create an enclosure on one side (on the east side first) of the creek. The enclosure will be seined by qualified biologists to remove any fish trapped within the area. Once all fish are removed, pumps fitted with ½ inch mesh screens will be used to pump water out of the enclosure. Biologists will continue to monitor the enclosure while water is pumped out in order to rescue any fish that were missed during the initial seining. Construction activities, including excavation and wall construction will then be completed within the dewatered area. The ACOE will complete construction along one side of the estuary, between Cabrillo Boulevard and Yanonali Street, in a single segment, thus avoiding the complications of repetitive de-watering processes in multiple short segments of the estuary. Once construction is completed within the dewatered work area, the downstream and upstream barriers will be removed and installed on the opposite side of the channel. The new enclosure will be surveyed and dewatered as described above, and construction within the newly dewatered area will be completed.

Prior to construction upstream of the estuary stream flow will be diverted through 2 culverts set into a temporary pilot channel that will be dug into the channel invert. The combined capacity of the two culverts will be at least 40 cfs. Culverts will be smooth along their inner walls and at transitions between segments. Following construction, the streambed will be shaped according to design elevation and slope. A lowflow channel will be constructed through the project area and the channel invert will be restored using substrate representative of natural conditions (type and size) in lower Mission Creek. Following restoration of the channel invert, the diversion will be removed. This sequence of activities will continue upstream until the project is finished.

Revegetation

Of the 7310 linear feet of stream bank within the project area (excluding bridges and the 940 ft length of the oxbow) , 2100 linear feet (29%) have natural soft surfaces, while the remaining 5210 linear feet (71%) have some form of revetment. Vegetation grows along all of the embankments with soft surfaces and through cracks within the hard surfaces. The vegetation present is dominated by invasive non-native species, such as giant reed (*Arundo donax*). As much as is practicable, large native trees that are present will be avoided and saved. When finished, the combination toe-wall and riprap slope would occupy 4740 linear feet (65%) while full-height vertical walls would remain along 2510 linear feet (35%) of the stabilized banks. Following construction the riprap sideslopes and habitat expansion areas will be replanted with native vegetation. A minimum of 120 trees will be planted on the sideslopes and a minimum of 330

trees will be planted in the habitat expansion areas. Exact tree species have not been determined but will include western sycamore, Fremont's cottonwood, black cottonwood, coast live oak, white alder, California bay, Arroyo willow, wax myrtle, Mexican elderberry, squaw bush, and blackberry. In addition, sideslopes and habitat expansion areas will be revegetated with native shrubs and grasses by hydroseeding. A temporary, above ground irrigation system will be installed to irrigate planted vegetation for at least 3 years. Any dead or dying trees and shrubs shall be replaced immediately (except during midsummer). Non-native vegetation will be controlled, by brushing or herbicide, and/or removed.

In order to insure success of revegetation efforts, the ACOE has developed a detailed vegetation monitoring plan. Riparian corridors will be monitored every 3 months during the first year following construction, every 4 months during the second year, and every 6 months during the third, fourth and fifth year. Following the fifth year, the County will incorporate all monitoring and maintenance activities into their annual streambed maintenance activities. Growth rates of trees and shrubs will be documented for 5 years. If plants do not meet pre-determined growth rates, growing conditions will be improved using fertilization or increased irrigation. Success of revegetation will be defined by the following:

1. A minimum of 90% survival of planted vegetation after five years.
2. A minimum of 40% survival of shrubs after five years. All shrubs should attain at least 50% the height and breadth typical of each in this climate.
3. A minimum of 50% of the riparian corridor should be occupied by willows, 7 to 10 ft in height, after five years.

Maintenance

The County will be responsible for maintaining the project reach at its design function and form. All maintenance activities will be accomplished between August 1 and October 31 of any given year. Maintenance activities could include sediment and vegetation removal, repair of concrete walls, culvert, riprap, side baffles, and boulder fields, and upkeep of the riparian corridor. All maintenance activities will be documented in the County's Annual Maintenance Plan.

Sediment and vegetation will be cleared in any areas where the design capacity of the creek is lowered by 15% or more. Prior to any maintenance activities a qualified biologist will survey project areas and relocate any steelhead found there to suitable habitat within Mission Creek. Methods for steelhead capture and relocation are discussed below. Sediment will be removed using a loader or road grader working from within the channel. Vegetation will be removed by brushing, clearing, or spraying. Removal will be completed in a mosaic pattern so that only one side of the creek shall be cleared during any given year. To achieve the mosaic pattern, a swath, half the width of the channel, will be cleared along one side of the creek for a distance of approximately 100-200 ft. Activities within the 100-200 ft downstream of this swath will then be confined to the

opposite half of the creek. This pattern will continue downstream until maintenance activities are completed. The areas of the creek that are not excavated or cleared would be mowed to suppress woody vegetation, while allowing herbaceous vegetation to grow.

Following any clearing activities, a low flow channel will be constructed or re-established so that streamflow passes close to areas where cover and shading are available throughout the dry season. Removal of sediment and/or mowing of vegetation would likely occur once every 3 years, depending on climatic conditions. However, a sequence of large storm could necessitate maintenance activities to be performed as often as once a year. Areas of clearing will be reversed between years so that no one area is excavated or completely cleared two years in a row unless necessary to remove sediments deposited by unexpectedly large storm events in order to restore design capacity.

Sediment will also be removed from among boulder clusters and side baffles as needed to prevent them from being buried. Any woody vegetation, such as giant reed or salt cedar, will be removed from within the boulder clusters using hand tools or herbicides. Low growing herbaceous plants will be left in place.

Concrete structures, such as vertical walls, bridge abutments, ledges or culverts, will be inspected annually for cracking, chipping, breaking, sedimentation, uplift or scour. Repair of these structures will occur as needed. If dewatering is necessary to complete repairs, methods described above will be utilized. Any boulders that are displaced by currents will be pushed back into a suitable spot and reset. The County will also inspect and repair vegetated side slopes to maintain the riparian corridor. Riprap and topsoil will be replaced as necessary.

Fish Relocations

Fish relocations will be done in conjunction with, or at the direction of NMFS and/or California Department of Fish & Game (CDFG) using approved techniques. Steelhead will be caught with nets and moved to suitable habitat within Mission Creek and its major tributaries only; no fish will be relocated outside of the creek system. Specific relocation sites will be determined in conjunction with NMFS and CDFG prior to any relocation activities. Relocation will be conducted in a manner that mimics their natural migration patterns. Juvenile fish that appear to be smolting will be moved downstream to suitable habitat while juveniles that appear to be over-summering will be moved upstream to suitable habitat.

Once caught, fish shall be immediately placed in a 5-gallon bucket or 45-gallon ice chest filled with water from the immediate area. Oxygen will be diffused into the container while fish are present. Fish will be immediately transported to the relocation sites and released. Once fish are released, the biologist shall observe the relocated fish, document their behavior for at least one hour, and then return

the following day to make additional observations of the fish presence and behavior.

Upon completion, a report shall be submitted to NMFS documenting all relocation efforts. The report shall include the following information: 1) location of the fish prior to relocation, 2) number of fish relocated, 3) estimated size of fish relocated, 4) general observations of fish condition, 5) time fish was netted, 6) time for transport, 7) relocation site, 8) time of release, and 9) observations made after relocation.

Monitoring

The ACOE shall develop a monitoring plan, to be approved by NMFS, to ensure that flow conditions within the flood control channel match those predicted during pre-project analyses. The plan will include measures to monitor continuous flow conditions and benchmark water depths and velocities. Monitoring will also include observations of how the rock baffles are interacting with the lowflow channel and any opportunistic observations of steelhead migration. If data collected during monitoring indicate that conditions are not suitable for upstream steelhead migration, the ACOE will modify the channel to provide passage.

III. Status of the Species

Introduction

Based on the location, timing, and operations of the proposed project, endangered steelhead and designated steelhead critical habitat could be adversely affected by project activities. Adverse impacts could occur due to stream diversion, channel and embankment excavation, vertical wall construction within the creek channel and riparian corridor, and future maintenance of the flood control channel within Mission Creek.

Status

Steelhead, the ocean-going form of rainbow trout, are native to Pacific Coast streams from Alaska south to northwestern Mexico (Moyle 1976; National Marine Fisheries Service 1997). Wild steelhead populations in California have decreased from their historic levels (Swift et al. 1993; National Marine Fisheries Service 1997). This decline prompted listing of the Southern California ESU of steelhead as endangered on August 18, 1997 (National Marine Fisheries Service 1997).

The relationship between resident rainbow trout and steelhead trout in most areas is complicated and poorly understood. Although often separated by a natural or man-made barrier to migration, the two forms can interbreed. In addition, resident trout can produce anadromous offspring and vice versa

(National Marine Fisheries Service 1996; Shapovalov and Taft 1954). Anadromous individuals also are capable of residualizing when access to the ocean is blocked, and then returning to anadromy when access is restored. The listing for the Southern California ESU includes all naturally spawned populations of steelhead and their progeny residing below long-term barriers (National Marine Fisheries Service 1997). Adults that have migrated to the ocean usually are larger and more silvery than adult resident trout due to changes in diet and physiological characteristics necessary for ocean survival (Shapovalov and Taft 1954). It is difficult, however, to distinguish juvenile rainbow trout from juvenile steelhead trout without genetic analyses.

The Southern California ESU extends from the Santa Maria River in Santa Barbara County to Malibu Creek in Los Angeles County (inclusive). In the Southern California ESU, there are four major rivers: Malibu Creek and the Santa Clara, Santa Ynez, and Ventura Rivers, and numerous creek drainages that provide important habitat for steelhead. Historically, steelhead probably utilized many coastal streams and rivers in Southern California. For example, historical records document steelhead utilization of the Santa Maria and Santa Ynez Rivers and their major tributaries, and Gaviota, Arroyo Hondo, Venadito, Las Flores Canyon, El Capitan, Corral, Refugio, Atascadero, Mission, Montecito, Carpinteria, and Rincon Creeks (Henke 1998; Swift et al. 1993, Titus et al. in press) the Ventura River, Santa Clara River, Big Sycamore Canyon Creek, Malibu Creek and Topanga Canyon Creek (Busby et al. 1996; Swift et al. 1993).

General causes for the decline of steelhead abundance throughout Southern California include destruction and modification of habitat, point and non-point source water pollution, water withdrawals and diversions, dam operation and maintenance, over-utilization of habitat for recreational purposes, recreational harvest, and natural factors (National Marine Fisheries Service 1997). Even in less urbanized areas, agricultural land-use has led to decreased water quality, reduced vegetation and increased erosion and sedimentation.

In addition, access to many waterways, including critical spawning and rearing habitat, is constrained by manmade barriers (e.g., dams, culverts, road crossing structures, flood control structures, and channelization) and seasonal fluctuations in hydrological conditions. Complete barriers block the use of the upper watershed, often the most productive spawning and rearing habitat in the system. Temporal barriers block passage during certain flow conditions and delay migration. Salmonids generally expend 80% of their stored energy during normal upstream migration to spawning areas (Lauman 1976). Any additional delays can force these fish to use up limited energy reserves, which can significantly impair spawning success. Partial barriers block smaller or weaker fish of a population, limiting the number of fish able to reach spawning grounds. Thus, man-made structures that act as barriers to steelhead passage can have significant impacts on production.

Estimates of run sizes for the major rivers in the Southern California ESU are as follows: Santa Ynez River, <100; Ventura River, <200; Santa Clara River, <100; Malibu Creek, <100 (Busby et al. 1996). These run estimates are not based on survey data and cannot be used to quantitatively assess population abundance throughout the entire Southern California ESU. Although abundance estimates are limited, surveys document the continued existence of steelhead within the Santa Ynez River and some of its tributaries (Busby et al. 1996), Arroyo Hondo Creek (Busby et al. 1996), Gaviota Creek (Reavis 1991; Virginia Gardner, CA State Parks Dept., pers. comm., 1998), Maria Ygnacio Creek (M. Cardenas, CDFG, pers. comm., 1999), Mission Creek (CDFG 1996), Montecito Creek (K. Johnson, NMFS, pers. obs., 1999), San Ysidro Creek (K. Johnson, NMFS, pers. obs., 1999), Carpenteria Creek (CDFG 1996), Ventura River (Reavis 1991), Santa Clara River (Reavis 1991; Nehlsen et al. 1991; CDFG 1996), and Malibu Creek (Reavis 1991; Nehlsen et al. 1991). Information from these surveys indicate, however, that Southern California steelhead numbers are very low and that the population is in danger of extinction.

Life History and Habitat Requirements

The major life history stages of steelhead involve freshwater rearing and emigration of juveniles, upstream migration of adults, spawning, and incubation of embryos (Shapovalov and Taft 1954; Moyle 1976; Cederholm and Martin 1983; Barnhart 1991; Meehan and Bjornn 1991; Busby et al. 1996; National Marine Fisheries Service 1997). Steelhead young rear in freshwater for one to three years before migrating to the ocean, usually in the spring, where they may remain for up to four years. Steelhead grow and reach maturity at age two to four while in the ocean. The majority of adults immigrate to natal streams for spawning, however some individuals stray to streams other than their natal one (Quinn 1993). This straying serves as one mechanism for dispersal and colonization of new or historical habitats or streams (Wood 1995). Most adults immigrate to freshwater during October to March. Adults may migrate several miles, hundreds of miles in some watersheds, to reach their spawning grounds. Although spawning may occur during December to June, the specific timing of spawning may vary a month or more among streams within a region. Steelhead do not necessarily die after spawning and may return to the ocean, sometimes repeating their spawning migration one or more years.

When spawning, female steelhead dig a nest in the stream and then deposit their eggs. After fertilization by the male, the female covers the nest with a layer of gravel; the eggs incubate within the gravel pocket. Hatching time varies from about three weeks to two months depending on water temperature. The young fish emerge from the nest about two to six weeks after hatching.

Habitat requirements of steelhead in streams generally depend on the life history stage (Cederholm and Martin 1983; Bjornn and Reiser 1991). Streamflow volume, water temperature, and water chemistry must be appropriate for adult

immigration and juvenile emigration (specific habitat requirement data can be found in Bjornn and Reiser 1991). Low streamflow, high water temperature, physical barriers, low dissolved oxygen, and high turbidity can delay or halt upstream migration of adults and timing of spawning, and downstream migration of juveniles and subsequent entry into estuary, lagoon, or ocean habitats. Suitable water depth and velocity, and substrate composition are the primary requirements for spawning, but water temperature and turbidity are also important. Dissolved oxygen concentration, pH, and water temperature are factors affecting survival of incubating embryos. Fine sediment, sand and smaller particles can fill interstitial spaces between substrate particles, thereby reducing water-flow through and dissolved oxygen levels within a nest. Juvenile steelhead require living space (different combinations of water depth and velocity), shelter from predators and harsh environmental conditions, food resources, and suitable water quality and quantity, for ontogeny and survival during summer and winter. Young-of-the-year and yearling steelhead generally use riffles and runs (e.g., Roper et al. 1994) during much of a given year where these habitats exist. Young-of-the-year and older juveniles may seek cover and cool water in pools during the summer (Nielsen et al. 1994).

The information used to describe steelhead life history is largely based on northern populations. Specific data on the life history of southern steelhead are lacking and northern populations provide a general description of steelhead life history and habitat requirements. There are some differences between the two populations. For example, annual rainfall and stream flow is considerably lower and more variable in Southern California than in regions to the north (Moore 1980; Titus et al. in press). Southern California steelhead are often subject to higher water temperatures, increased duration of sand berms across the mouths of streams and rivers, and complete dewatering of some reaches of these streams. These factors influence the migration and life history of Southern California steelhead, and could result in differences between the life history of southern and northern populations. At this time, however, data to support or describe these differences is unavailable. Therefore, NMFS will consider the life history aspects of northern and southern populations comparable for the purpose of this biological opinion.

Critical Habitat

Critical habitat for the Southern California Evolutionarily Significant Unit for the Federally endangered steelhead, published on February 16, 2000 (50 CFR 226; NMFS 2000), includes all freshwater and estuarine areas, including adjacent riparian zones, accessible to listed steelhead in coastal river basins from the Santa Maria River to Malibu Creek (inclusive). Freshwater critical habitat includes all waterways and substrates below longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). Essential features of steelhead critical habitat include adequate substrate, water quality, water temperature, water velocity, cover/shelter, flood, riparian

vegetation, space, and safe passage conditions. Excluded from designated critical habitat are former anadromous areas above the following dams: Vaquero Dam on the Cuyama River; Bradbury Dam on the Santa Ynez River; Casitas Dam and Robles Diversion on the Ventura River; Santa Felicia Dam on Santa Clara River; and Rindge Dam on Santa Monica Bay.

IV. Environmental Baseline

Watershed Overview

Mission Creek flows from the south side of the Santa Ynez Mountains through the City of Santa Barbara where it meets the Pacific Ocean. The creek and its main tributary, Rattlesnake Creek, drain approximately 11.4 square miles. Average gradients in the foothill area are about 1000 ft per mile in contrast to the gradients of 150 ft per mile in the lower reaches of the creek. Other than informal surveys, comprehensive data on steelhead abundance in Mission Creek are unavailable.

Mission Creek can be divided into two sections: the upper watershed within the Santa Ynez Mountains and foothills, and the lower section beginning at the foothills and extending down through downtown Santa Barbara to the ocean. A reasonable location marking the transition between these two areas is the Santa Barbara Mission located 4 miles upstream from the Pacific Ocean. Upper Mission Creek consists of mostly natural habitat with extensive riffle-pool complexes and healthy, developed riparian vegetation dominated by western sycamore, cottonwood, coast live oak, and willow trees. This area of the Mission Creek watershed contains the majority of suitable steelhead spawning and rearing habitat within the system. Although no systematic surveys have been completed, trout have been observed repeatedly upstream from the Mission on both Mission and Rattlesnake Creeks. In June 1999, NMFS biologists walked portions of these areas and observed 4 to 5 trout near the Natural History Museum, 9 large and numerous small trout on Rattlesnake Creek, and tens to hundreds of 1 to 4 inch young-of-the-year (YOY) throughout lower Rattlesnake Creek. Two adults and several YOY were observed at a large scour pool at base of Foothill Bridge and Los Olivos Bridge. These two bridges have concrete aprons that could act as partial impediments to steelhead migration. Trout were observed again in the above areas in July 2000.

Barriers on both Mission and Rattlesnake Creeks block steelhead passage to the highest extent of the watershed. The Botanical Gardens on Mission Creek, located approximately 1 mile upstream of the confluence with Rattlesnake Creek, has an historical dam with aquaduct that stands over 15-20 ft tall. This structure is a complete barrier to steelhead upstream migration. Approximately 2000 ft upstream of this dam is a County owned debris basin that was built in 1964 following the Coyote Fire. This debris basin has a dam associated with it that is a total barrier to steelhead migration. On Rattlesnake Creek, approximately 1.6

miles upstream with the confluence with Mission Creek, there is another debris basin that was also built in 1964 after the Coyote Fire. Again, this basin has an associated dam that impedes migration of steelhead. CDFG biologists have observed trout upstream of these barriers. It is possible that these trout are descendants of residualized steelhead that would demonstrate anadromy if access to the ocean were restored. It is also possible that these trout, whether descendants of resident or steelhead trout, are producing anadromous offspring that are either residualizing above the barriers, or successfully migrating downstream through the various barriers during optimal flow regimes.

Natural habitat persists into lower Mission Creek, but this reach is highly confined due to residential and commercial development. Two reaches within this area have been lined with concrete: a 0.3 mile section and 0.8 mile section both built by the California Department of Transportation in conjunction with the Highway 101 Freeway. Under high flow conditions, velocities increase within these channels and can result in passage impediments. At low flow conditions, streamflow spreads out into a thin layer across the smooth, flat channel. These shallow depths can also act as impediments to steelhead migration. Although good habitat is more limited in lower Mission Creek, steelhead have been observed in some areas. In spring 2000, a CDFG biologist estimated approximately 100-200 trout (6-8 inches in length) in large pools in Oak Park, located approximately 2.6 miles upstream from the ocean.

Flow characteristics are highly variable in Mission Creek and are reflective of the variability in rainfall. Average total annual rainfall between October 1983 and May 2000 in Santa Barbara County is 19.94 inches. The majority of rainfall occurs in December, January, February and March, but is still unpredictable and sporadic between years. Within the above time period total monthly rainfall between December and March ranged from 0 to 20.86 inches per month. Because of the unpredictable timing and magnitude of rainfall, and thus streamflow, flow conditions that allow for steelhead migration can be limited. Suitable rearing habitat is also limited by streamflow in Mission Creek as large sections of lower Mission Creek go dry during summer and fall of most years. It is unknown whether the juveniles observed within and downstream of the project site are migratory steelhead or resident trout, but because they were found in a coastal stream with downstream access to the ocean, they are assumed to be steelhead by NMFS.

Factors Affecting Species in Action Area

The action area begins just downstream of the longer Caltrans channel at Canon Perdido Street. Within the action area, Mission Creek parallels Highway 101 and then turns to the west in an area known as the oxbow. This section of Mission Creek has been altered extensively by manmade structures. Starting at the oxbow, Mission Creek flows through a 140 ft long box culvert (Highway 101), a 60 ft section lined by riprap and wing walls, a 60 ft wide box culvert (Montecito

Street), a 20 ft section lined with wing walls, a 70 ft section beneath the Union Pacific Railroad tracks and then through a 530 ft section lined with historic sandstone. A 15 inch high sill exists at the downstream end of the sandstone lining (Yanonali Street). This location marks the change from freshwater to brackish water at the upstream extent of the estuary.

In addition, many short reaches of lower Mission Creek are lined with various bank stabilization treatments installed by the City and/or private landowners. Typical treatments include piled stone, sacked concrete, gabions, vertical cement walls, and pipe and wire revetment. These treatments cover approximately 5240 linear ft of embankments (including both banks) and have reduced habitat for fish and wildlife and caused the loss of riparian vegetation. Vegetation that has persisted is highly disturbed with extensive growth of non-natives. The majority of vegetation along embankments is influenced by residential and commercial landscaping.

The County routinely clears sediments and vegetation that accumulate within lower Mission Creek to maintain flood capacity. Vegetation that grows within the channel is mowed and sprayed with herbicides by the County to maintain flood capacity of the channel. Accumulated silts are cleared using loaders. Following flood control maintenance, the channel is often a flat, trapezoidal channel devoid of heterogeneity.

The downstream extent of Mission Creek, extending approximately 1060 linear ft upstream from the mouth of the creek, is tidally influenced. The estuary flows under State Street in the City of Santa Barbara and empties in the Pacific Ocean near Stearn's Wharf and the Santa Barbara Marina. The wharf and beach in this area are used heavily for recreational activities. In the past, the City of Santa Barbara has relocated the mouth entrance to avoid the debris washing into the Marina. The City also artificially breaches the mouth of Mission Creek during summer months to avoid stagnant water, which can be unsightly or have an unpleasant odor, in an area of high tourist use.

Status of Species in Action Area

There are anecdotal observations of juvenile trout in scour pools in lower Mission Creek. Most of the pools that persist during summer months are located in the lower portion of the project area, and are formed due to scouring below and behind hard bank lining. It is likely that juveniles found in these pools have been washed or actively move downstream and are then unable to move back upstream to more suitable rearing habitat when flows decline rapidly in early summer.

In March 2000, a 27 inch female steelhead spawned within the project area, just downstream of De la Guerra Street. The female created four redds, two of which were fertilized by a smaller male steelhead. It is probable that the steelhead

moved into Mission Creek following a significant rainfall event in late February. And then, as is common for Mission Creek, flows dropped too quickly to provide sufficient water depth at the 0.8 mile Caltrans channel for the female to continue moving upstream to good spawning habitat. If this was the case, then the female was forced to spawn within the upstream reach of the project area, which did not provide optimal conditions for spawning. After spawning, the male migrated downstream, presumably to the ocean. The female did not survive, nor did any of the fertilized eggs.

On May 4, 2000, ACOE and US Fish and Wildlife Service staff observed 2 juvenile steelhead (6-8 inches in length) near the Mason Street Bridge in the Mission Creek estuary. These fish were probably smolts making their way to the ocean, and could have been some of the same fish seen by CDFG at Oak Park a month or so earlier. Thus, there exists the potential for juvenile steelhead to be present within and downstream of the project area during project activities. Furthermore, fish passage must be maintained through the project area for downstream migration of smolts and upstream movement of juveniles and adults.

V. Effects of Project Action

Introduction

Generally, possible effects of the project action on steelhead and their proposed critical habitat are those associated with construction and maintenance of the flood control channel, including excavation of the creek bed and embankments, installation and maintenance of vertical concrete walls and structures, continued excavation and removal of woody debris and vegetation as needed, and relocation and monitoring of steelhead. Anticipated effects involve possible take in the form of capture, trap, harm, harassment, injury, and/or mortality of juvenile steelhead present in the project area, loss and alteration of instream and riparian habitat, loss of aquatic macroinvertebrates, turbidity, and sedimentation. Direct and indirect effects are discussed below. No interrelated or interdependent effects are anticipated.

Methodology for Effects Analysis

Useful quantitative data for the affected area and project action are limited; the assessment of project action effects therefore focuses mostly on qualitative identification. This approach was based on a review of ecological literature concerning the effects of loss and alteration of instream and riparian habitat, turbidity, and sedimentation on steelhead in particular and stream fish populations in general. This information was then compared to the estimated amount of instream, riparian, and aquatic macroinvertebrate losses, estimated background turbidity levels in the creek and associated with the project action, and estimated rates of sedimentation.

EFFECTS TO POPULATION

Migration

Project activities will include extensive dewatering and excavation during three consecutive years. Construction time windows have been incorporated to avoid winter and spring months when upstream migration of adults is most prevalent. No construction within the estuary will occur prior to June 1 of any year. Upstream of the estuary, work could begin as early as April 15, but only if Mission Creek does **not** have continuous surface flow (or less than ½ inch water depth at Caltrans cement channel) between Oak Park and the upper extent of the project area. If surface flow persists, construction will only occur after June 1. Under these conditions, no upstream or downstream migration of adults through the action area is expected, and outmigration of smolts through the action area should be minimal.

Stream diversions and dewatering are designed to allow for steelhead movement through the project area. At any given time only one half of the estuary will be dewatered to allow natural flow and tidal movement within the other half of the estuary. Upstream of the estuary, all flows will be directed through smooth pipe culverts, which allow downstream migration of smolts. Thus, except for the period of time (3-4 days) when the diversion is being constructed or relocated, any juveniles or smolts will be able to move freely through the project area.

Temporary delay in movement could occur for smolts when diversion culverts are being constructed. This artificial delay would only occur if continuous surface water were present. Because ACOE is required to begin construction only after June 1 if surface water is continuous, it is expected that the majority of outmigrating smolts should have moved down through the project area prior to start of project activities. Those individuals still migrating through, however, would be delayed for a period of up to 4 days while the culvert is being constructed. A biologist will be present during all diversion activities to relocate any fish, as necessary, that are delayed while the diversion culverts are put in place.

As described above, a number of possible impediments exist within Mission Creek, which steelhead must traverse to reach upstream spawning and rearing habitat. Under baseline conditions, steelhead must successfully pass through the channelized oxbow portion of the project area, through two Caltrans cement channels, and over numerous small vertical drops formed at bridge crossings. Because of these passage impediments, steelhead in Mission Creek are forced to use energy reserves above and beyond natural demands to reach good spawning habitat. Thus, any additional challenges placed on steelhead could severely delay or decrease successful migration, which in turn could lead to decreases in spawning output. To avoid additional impacts to steelhead

migration, the ACOE will provide suitable conditions, including water depths and velocities, for fish passage through the project area both during and following project construction.

ACOE has completed hydraulic modeling for the project area to analyze existing and post-project streamflow conditions. Table 2 contains pre- and post-project water velocities at representative cross sections throughout the project area. Models incorporate a water conveyance of 640 cfs, which is the estimated mean annual flow or 2.3-year flow event. Based on channel size, this is the upper flow limit for upstream fish migration. By completing analyses at this level, the ACOE is characterizing the highest velocities that steelhead would encounter.

Table 2. Existing and post-project water velocities (ft/sec) modeled at specific cross sections within the project area.

	Water velocity (ft/sec) when conveying 640 cfs		
Cross section	Existing channel	Proposed channel	Difference
11	5	7	2
10	8	6	-2
9	5	3	-2
8	10	5	-5
7	6	4	-2
6	9	4	-5
4	2	4	2
		Average Change	-2

Based on this modeling, streamflow velocities will decrease by approximately 1 to 6 fps at five locations and increase by approximately 2 fps at two locations, with an overall net decrease in water velocity over the entire project reach. Resulting velocities range from 3.89 to 6.88 feet per second (fps).

Bell (1990) reports sustained swimming speeds (normal functions without fatigue) for average sized adult steelhead at 0-4.6 feet per second (fps), prolonged swimming speeds (lasting 15 seconds to 200 minutes which result in fatigue) at 4.6-13.7 fps, and burst speeds (activities which cause fatigue in 15 seconds or less) ranging from 13.7-26.5 fps. Data used in the Bell (1973) study are based on steelhead in the Pacific Northwest, which typically are larger, and thus stronger, than Southern California steelhead. Therefore, Southern California steelhead swimming abilities probably lie in the lower or middle range of the above estimates. All of the above water velocities fall within the lower range of estimated prolonged swimming speeds for steelhead. In addition, side baffles will be placed throughout the project area to provide resting areas for migrating steelhead (every 100-200 linear feet between Canon Perdido and Bath Street, every 400-500 ft between Bath and Gutierrez Streets, and every 100-200 feet downstream of Gutierrez). Provided these features occur within the lowflow or wetted channel, steelhead should be able to break the project area into several shorter stretches, rather than traversing the entire channel in one continuous effort. Considering the minor (1.5%) slope, projected velocities and location of rock baffles throughout the project area, NMFS anticipates that the

ACOE flood control channel will provide suitable conditions for upstream migration of adult steelhead.

Ledges, baffles and boulder clusters installed by ACOE will not be of any use to steelhead if they are not contained in the thalwag of the channel. It is possible that natural flow events will establish a lowflow channel that flows away from these structures. It is impossible to determine whether or not this will occur, but in conversations the ACOE has been made aware of this possibility, and has agreed to modify placement of side baffles and boulders, to the maximum extent possible, in order to maximize the benefits realized by steelhead.

As a result of construction activities, the channel invert will be artificially flattened and widened and will lack any natural heterogeneity that is currently present. Under such conditions, fewer resting areas are available, flows are spread out across the channel rather than being concentrated in a lowflow channel, and fewer hard structures are present to break up velocities. Thus, upstream migration of adults is made more difficult. If left alone, the channel will take at least 1 to 2 years to recover to somewhat natural conditions. Furthermore, it is likely that the benefits proposed by the ledges and side baffles will take time to develop since large flows are required to scour out pools under the ledges. ACOE will minimize these impacts by insuring that substrates, representative of natural conditions, are present in the channel following construction and by constructing a lowflow channel that, as close as possible, matches what would be established naturally. Although ACOE will attempt to minimize these temporary effects, some are unavoidable and will increase the amount of effort required of steelhead during upstream migration. NMFS does not, however, anticipate that these impacts will cause a decline in the steelhead population in Mission Creek.

Relocation

Incidental mortality could occur as a result of handling if fish relocations become necessary. All work areas will be surveyed for steelhead prior to any construction or maintenance activities. Any fish found in work areas will be relocated to suitable habitat within Mission Creek. Fish will be caught with nets only; electrofishing will not be utilized. Based on previous experience of NMFS personnel, incidental mortality is expected to occur for only a small percentage (<10%) of the fish that are relocated. Areas in upper Mission Creek, where juveniles would be relocated to, have better habitat (including cover, water quality and temperature) for juveniles to survive and grow through the dry season. Therefore, juveniles that survive relocations will likely have an increased chance of survival than if forced, even under natural conditions, to remain in poor habitat in lower Mission Creek. Given the conditions anticipated during project construction, these fish would certainly die if not relocated out of the construction area.

The number of fish that will need to be relocated, if any, is unknown at this time, but, as mentioned above, should be limited to rearing juveniles and outmigrating smolts. During most years, Mission Creek goes dry between Oak Park and the project area. Any rearing juveniles downstream of the cement channel are limited to the estuary and a limited number of scour pools for oversummering habitat. No records are available on the number of juveniles rearing in lower Mission Creek, but numbers are expected to be low, based on limited pool availability and poor habitat conditions. If we assume that 10 to 20 juveniles (which is likely an overestimate) will have to be relocated, and that 10% will die because of handling, then approximately 1 to 2 juveniles per year would be harmed or killed during relocations.

Observations of juveniles in the project area are isolated and sparse. Casual surveys by NMFS staff in upper Mission and Rattlesnake Creeks document high juvenile abundances (100s) during early summer months over at least 2-3 consecutive years. This information indicates that the upper Mission Creek watershed provides the vast majority, if not all, suitable spawning and rearing habitat for the system. The few juveniles seen rearing in the lower watershed (anecdotal observations) are most likely a small fraction of the juveniles present throughout the entire system.

Estimates of numbers of smolts migrating downstream through the project area also are not available. However, as described above, CDFG personnel observed approximately 100-200 fish (6-8 inches in length) in large pools at Oak Park during March 2000. A few weeks after the time of observation, 2 individuals of the same approximate size were observed in the estuary near the Mason Street Bridge. It is probable that the fish seen in the estuary were some of the same seen at Oak Park, on their way out to the Ocean. If a similar pattern of outmigration occurs during ACOE project activities, smolts may need relocating. Relocation will only be necessary, however, if they are present while diversions are constructed. Once diversions are in place, smolts will be able to move freely through the project area and will not need relocating. As discussed above, the majority of outmigration by smolts is expected to occur prior to the start of project construction. Continuous surface water persists into June only during years with relatively high rainfall. Even if these conditions occur, diversions will require only 1 to 4 days for construction. Because of the timing of diversion activities and limited time period for possible impacts, only a small number of smolts are expected to be present in the project area. NMFS anticipates that no more than 10 smolts, per year, will need relocation. Assuming 10% mortality due to handling, 1 individual smolt will be harmed or killed due to project construction activities.

ALTERATION OF INSTREAM HABITAT

Instream habitat is designated critical habitat within the Southern California ESU for the Federally endangered steelhead. Direct loss or alteration of instream habitat results when creek habitat is removed or modified during construction activities. The extent that steelhead are indirectly harmed by instream habitat alterations depends, in part, on the extent of permanent changes to substrate type, cover complexity, instream habitat complexity, water column depth and velocity patterns. Modifications that degrade the quality of instream habitat may cause reductions in fish abundance (Elser 1968; Hunt 1969; Dolloff 1986; Riley and Fausch 1995).

Project construction will impact, through excavation, grading and shaping approximately 5380 linear ft of instream habitat in Mission Creek (Table 3). Current instream habitat within the proposed project area consists of cement channel, and natural run habitat with a few isolated pools. Portions of this habitat will be unavailable to steelhead during construction. The ACOE flood control project will remove 420 linear ft of the existing cement channel and will leave any existing natural bottom in place. As discussed above, temporary impacts resulting from construction activities are unavoidable. Because of the extensive excavation and grading, the natural bottom will require time to recover and develop heterogeneous features. Under existing conditions, lower Mission Creek provides only limited habitat for oversummering juveniles. Suitable spawning habitat is not present. Because steelhead use the area primarily as a migration corridor, current use of this area will not be altered.

Table 3. Summary of linear feet altered by ACOE construction activities.

Feature	Existing Amount (ft)	Proposed Amount (ft)	Difference (ft)
Hard Channel Lining	1350	930	- 420
Hard Bank Protection	5210	6885	+ 1675

Maintenance of the flood control channel by the County will result in continued impacts to the channel invert of lower Mission Creek. Channel clearing and excavation will be completed any time capacity within a reach is lowered by at least 15%. The County will conduct maintenance activities in a mosaic pattern, as described above [See Project Description section], so that the same area is not impacted during consecutive years. Maintenance activities proposed by the County are the same as those that the County has been implementing for several years. ACOE completed a sediment deposition analysis for the project area, which can be used to determine if construction of the flood control channel will result in more frequent or more extensive maintenance than existing conditions require. Results of the analyses indicate that project construction will result in a net increase of 25 cubic yards of sediment after a 1-year storm event, and net decreases of 35 cubic yards and 385 cubic yards for 5-year and 20-year events, respectively. Thus, recurrent maintenance within the upstream channel and

estuary should be less extensive than current practices until the occurrence of a large storm event (over 20 years).

Although the channel invert will be left to somewhat natural conditions, both embankments along the entire project reach will be lined with vertical cement walls of varying height (Table 3). Considering existing hard bank structures resulting from previous bank stabilization projects, the ACOE flood control channel will result in a loss of approximately 1675 linear feet of natural embankment. Vertical walls that would replace natural embankments do not allow for undercut banks or scour pools that provide important habitat and cover for steelhead. To compensate for the loss of natural embankment, ACOE has incorporated 1190 linear ft of overhanging ledges and 1940 linear ft of rock side baffles to promote formation of scour pools and provide shade and cover. Provided ledges and baffles provide the benefits to steelhead as currently proposed, these features should compensate somewhat for the loss of natural banks.

The additional benefits of natural bank, however, such as woody debris, leaf litter and insect drop, can not be simulated with manmade structures. These features provide important cover and food resources for rearing juveniles. The loss of this input in the project area will further preclude restoration of lower Mission Creek to include suitable rearing habitat. However, the current use of lower Mission Creek as a migration corridor will not be impacted.

Loss of Riparian Habitat

The riparian habitat affected by the project is part of designated critical habitat for the Southern California ESU for the Federally endangered steelhead. The functional values of riparian corridors and the benefits they provide to aquatic systems in general, and stream fish populations in particular, are well documented (Hall and Lantz 1969; Karr and Schlosser 1978; Lowrance et al. 1985; Wesche et al. 1987; Gregory et al. 1991; Platts 1991; Welsch 1991; Castelle et al. 1994; Lowrance et al. 1995; Wang et al. 1997).

Excavation activities will result in a loss of riparian vegetation along 7310 linear feet of embankment. Loss of riparian trees might increase the extent of solar radiation and fine sediment input to the creek, increase stream temperatures, reduce insect drop, and decrease the amount of woody debris input to streams. As much as is practicable, large sycamores will be avoided. As part of project activities, the ACOE has incorporated an extensive re-vegetation plan to mitigate for loss of existing trees and vegetation and to establish a healthy riparian corridor. The majority of vegetation that will be impacted consists of non-native vegetation, such as giant reed. These non-natives will be replaced with native vegetation and, ultimately, will improve the qualities of the riparian corridor. Riparian vegetation that provides shade, cover and insect drop for steelhead, however, will take a number of years to develop.

A shading analysis (Sierra Land Designer – 3D) was conducted to estimate the amount of Mission Creek that will be shaded following revegetation. The analysis concludes that upstream of Highway 101, Mission Creek will be completely shaded in 5 to 10 years. Fast growing willows and shrubs should provide some shading within the first 1 to 2 years. Under existing conditions downstream of Highway 101, the majority of shading is provided by buildings and houses, non-native giant reed, and some large sycamores. The sycamores will be left in place, as much as is practicable. Loss of giant reed will lessen shading in the short term, but replacement with sycamores and willows will eventually provide increased cover and shading within a few years. Phased construction over the course of 3 years insures that the entire reach will not be completely devoid of shading or vegetation at any given time. Although loss of natural cover and shading will occur temporarily following construction, shading and cover should begin to recover after 1 to 2 years.

Vegetation within the channel invert will be limited in size and nature during the County's routine maintenance activities. Vegetation greater than 4 inches in diameter will not be allowed to grow within the channel invert. These maintenance activities are currently conducted routinely throughout Santa Barbara County, including lower Mission Creek. Vegetation clearing is not expected to alter steelhead use of the project area, especially with shading and cover expected from the vegetated sideslopes and wall ledges.

SEDIMENTATION AND TURBIDITY

Turbidity refers to the amount of light that is scattered or absorbed by a fluid. Elevated levels of turbidity may result when fine sediment is contributed to the creek during project activities. High turbidity concentrations can cause fish mortality, reduce fish feeding efficiency, and decrease food availability (Berg and Northcote 1985; McLeay et al. 1987; Gregory and Northcote 1993; Velagic 1995). Turbidity may cause indirect harm, injury, or mortality to juvenile steelhead in the vicinity and downstream of the worksites due to decreases in respiratory function, feeding and/or growth (Waters 1995). Sedimentation occurs when fine sediments, such as those suspended during project activities, settle out of the water column and onto the creek substrate. Substantial sedimentation rates could bury less mobile organisms that serve as a food source for many fish species (Ellis 1936; Cordone and Kelley 1961), degrade instream habitat conditions (Cordone and Kelley 1961; Eaglin and Hubert 1993), cause reductions in fish abundance (Alexander and Hansen 1986; Berkman and Rabeni 1987), and reduce growth in salmonids (Crouse et al. 1991).

Channel excavation and grading could result in an increase of fine sediments within the creek channel. This would cause increased turbidity and sedimentation if these sediments are suspended and washed downstream during the following winter storm events. Because embankments will be armored with

vertical cement walls, sediment input will be limited to the channel invert and erosion of topsoil placed on top of riprap sideslopes. In order to minimize inputs of sediments into Mission Creek, ACOE will use pipe culverts to divert streamflow around project areas during excavation, grading and revegetation. In addition, any bare soil along the sideslopes will be covered with landscaping mat until vegetation has established enough to stabilize the soil.

As water levels drop during summer months, exposure to sun and wind causes sediment to loosen and dry. Thus, high turbidity and sedimentation occurs naturally during early winter storm events when unconsolidated sediments are suspended and washed downstream. Unconsolidated sediments resulting from project activities are expected to be washed downstream during the first rain event of each year when background levels are high. Although these background levels will be increased due to project activities, the increase will be limited to sections within the lower 1.2 miles of the creek and are expected to be temporary. Steelhead could be temporarily delayed if turbidity levels are too high to allow migration. NMFS expects, however, that the degree of increase will not increase significantly over background levels to delay migration.

VI. Cumulative Effects

Cumulative effects include the effects of future state, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. The NMFS is generally familiar with actions affecting steelhead in Mission Creek and is unaware of such actions that would be reasonably certain to occur within the action area. Future Federal actions that are unrelated to the project action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. Consequently, NMFS believes no cumulative effects are likely.

VI. Summary

Steelhead occurring within the project area during construction will be limited mainly to rearing juveniles and outmigrating smolts. Minor amounts of harassment and incidental mortality could occur (10-20 fish captured and 1-2 individuals experience mortality during relocations) during stream diversion and relocations. This small number of individuals affected is not expected to affect the survival of the steelhead population in Mission Creek or the survival and recovery of the Southern California ESU.

NMFS expects 5380 linear ft of temporary and permanent impacts to designated critical habitat, along the channel invert and both embankments, resulting from the project action. Within this area, project construction will result in the permanent loss of natural banks, and temporary degradation to the stream bed and riparian vegetation. In addition, maintenance activities will result in ongoing impacts to the stream bed. These impacts, however, will not alter the current use

of lower Mission Creek as a steelhead migration corridor. Furthermore, with the maintenance of a natural bottom channel bed, incorporation of fish baffles and ledges, and enhancement of the riparian corridor, including replacement of non-native with native vegetation, these impacts are not expected to diminish the value of habitat for the survival and recovery of the Mission Creek population or of the Southern California ESU.

VII. Conclusion

After reviewing the best scientific and commercial data available and the current status of steelhead, the environmental baseline for the action area, the effects of the ACOE flood control channel, and the cumulative effects, it is the opinion of NMFS that the ACOE project action is not likely to jeopardize the continued existence of the Federally endangered Southern California steelhead ESU and is not likely to destroy or adversely modify designated critical habitat.

INCIDENTAL TAKE STATEMENT

Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavior patterns, including breeding, spawning, rearing, migrating, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the proposed action is not considered to be prohibited taking under the Act provided that such taking is in compliance with an Incidental Take Statement.

The measures described below are nondiscretionary, and must be undertaken by the ACOE so that they become binding conditions of any grant or permit issued to the County, as appropriate, for the exemption in section 7(o)(2) to apply. The ACOE has a continuing duty to regulate the activity covered by this incidental take statement. If the ACOE (1) fails to assume and implement the terms and conditions or (2) fails to require the County to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the County must report the progress of the action and its impact on the species to NMFS as specified in the incidental take statement (50 CFR 402.14(i)(3)).

I. Extent of Take

The NMFS believes the proposed ACOE flood control project on Mission Creek, Santa Barbara County, California, may result in the incidental take of steelhead. Any incidental take resulting from the ACOE flood control project will mostly likely be limited to outmigrating smolts or rearing juveniles located within the project area. Incidental take in the form of harassment, harm, or mortality could occur if fish are unable to migrate through the project area. In addition, incidental take could occur in the form of "harassment, collection capturing and/or mortality" if it becomes necessary to relocate individuals out of the project area. It is anticipated that relocation will occur on an annual basis during project construction (3 yrs). NMFS expects that mortality of fish due to handling during relocation will probably be less than 10 percent of captured fish.

Juveniles have been observed in scour pools within the project area. If juveniles are found prior to construction or maintenance activities, ACOE or the County shall relocate them. Conservatively, NMFS expects that less than 10 juveniles will be located in the project area each year at the time of project construction activities. Thus, NMFS does not anticipate mortality of rearing juveniles beyond one individual per year.

As discussed above, the majority of outmigration by smolts is expected to occur prior to the start of project construction. Continuous surface water persists into June only during years with relatively high rainfall. Even if these conditions occur, diversions will require only 1 to 4 days for construction. Because of the timing of diversion activities and limited time period for possible impacts, only a small number of smolts are expected to be present in the project area. NMFS anticipates that no more than 10 smolts per year, will need relocation. Assuming 10% mortality due to handling, 1 individual smolt will be harmed or killed per year of construction activities due to relocations. No harm or mortality should occur to smolts as a result of maintenance activities.

The accompanying biological opinion does not anticipate any form of take that is not incidental to the proposed project action. This Take Statement anticipates no mortality beyond one juvenile and one smolt during any year. If recurrent mortality occurs, or if mortality beyond 10 percent of steelhead being relocated (not to exceed 1 juvenile and 1 smolt per year), the ACOE shall reinitiate consultation.

II. Effect of Take

In the accompanying biological opinion, NMFS concluded that the anticipated level of take associated with the project action is not likely to jeopardize the continued existence of the Federally endangered Southern California steelhead ESU.

III. Reasonable and Prudent Measures

NMFS believes the following reasonable and prudent measures are necessary and appropriate to minimize and monitor incidental take of steelhead:

1. The ACOE shall avoid and minimize impacts to steelhead from construction and maintenance activities.

2. The ACOE and County shall minimize the extent of permanent changes to instream and riparian habitat.

3. The ACOE and County shall minimize cumulative impacts and/or delays to fish migration in Mission Creek.

4. The ACOE and County shall monitor the project area to ensure correct project implementation and to minimize the take of steelhead incidental to project operations.

IV. TERMS AND CONDITIONS

In order to be exempt from the take prohibitions of the ESA, the ACOE must comply and/or ensure that the County complies with the following terms and conditions, which implement the reasonable and prudent measures described above and outline reporting/monitoring requirements. These terms and conditions are non-discretionary:

1. The following terms and conditions implement reasonable and prudent measure No. 1.

A. ACOE shall complete any construction activities occurring downstream of Yanonali Street between June 1 and November 30 of any year.

B. ACOE shall complete any construction activities occurring upstream of Yanonali Street between June 1 and November 30 of any year if continuous surface flow (or more than ½ inch water depth in Caltrans channel immediately upstream of project area) is present between Oak Park and the project area. If continuous surface flow is **not** present between Oak Park and the project area, activities may occur between April 15 and December 1 of any given year.

C. The County shall complete all maintenance activities between August 1 and October 31 of any given year.

D. Downstream of Yanonali Street, ACOE shall isolate and dewater only one side of the channel at a time to allow normal tidal flushing and unimpeded stream flows within the other half. Any water remaining within the work site shall be pumped through a filter to capture any silt and then into the wetted area surrounding the enclosure.

E. Upstream of Yanonali Street, ACOE shall divert all stream flow through pipe culverts. Culverts shall be smooth along the inside lining and at any culvert joints. Combined capacity of the culverts shall be at least 40 cfs. Any water remaining within the work site shall be pumped through a filter to capture any silt and then into the diversion channel.

F. A fishery biologist with expertise in the areas of fish biology and ecology, fish/habitat relationships, biological monitoring, and handling, collecting, and relocating salmonid species shall be responsible for all required monitoring of the project area. The biologist will survey the project area by snorkeling or visual observations from the embankments prior to any project activities, including all diversion, construction and maintenance activities. No diversion, construction or maintenance activities shall occur while steelhead are present.

G. The biologist shall capture any steelhead located in project areas and relocate the individuals to suitable instream habitat in Mission Creek. All relocations shall be coordinated with NMFS and CDFG and shall be conducted as described in the attached Biological Opinion.

H. The biologist shall monitor construction activities, instream habitat, and performance of sediment control/detention devices for the purpose of identifying and reconciling any condition that could adversely affect steelhead or their habitat. The biologist shall be empowered to halt work activity and to recommend measures for avoiding adverse effects to steelhead and their habitat.

I. The ACOE biologist shall contact NMFS (Anthony Spina, 562-980-4045) immediately if one or more steelhead are found dead or injured. The purpose of the contact shall be to review the activities resulting in take and to determine if additional protective measures are required. Subsequent notification must also be made in writing to NMFS (501 W. Ocean Blvd., Suite 4200, Long Beach, California 90802) within five days of noting dead or injured steelhead. The written notification shall include the date, time, and location of the carcass or injured specimen, a color photograph, cause of injury or death, and name and affiliation of the person who found the specimen.

J. When practical, ACOE and the County shall use existing points of ingress or egress, or perform work from the top of the creek banks, for the purposes of avoiding work and heavy equipment in flowing water, and disturbing creek bank vegetation, and instream habitat.

K. Erosion control and sediment detention devices shall be incorporated into the ACOE project and implemented at the time of the project action. These devices shall be in place during construction, maintenance, and after if necessary, for the purpose of minimizing sediment and sediment/water slurry input to flowing water. The devices shall be placed at all worksites where likelihood of sediment input exists. The devices shall be maintained at least once daily. Sediment collected in the devices shall be disposed of off site.

L. Refueling of heavy equipment and vehicles will occur only within a designated area where potential spills can be readily contained. Equipment shall be checked and maintained to prevent leaks of fuels, lubricants or other fluids into the stream.

2. The following terms and conditions implement reasonable and prudent measure No. 2.

A. The ACOE shall photograph the project site before, during and immediately after the project is completed and develop a reference of instream and riparian habitat characteristics.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

June 1, 2001

Robert E. Koplin
Los Angeles District, Corps of Engineers
Department of the Army
P.O. Box 532711
Los Angeles, California 90053-2325

Subject: Biological Opinion for the Lower Mission Creek Flood Control Project, Santa Barbara County, California (1-8-00-F-74)

Dear Mr. Koplin:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion on the U.S. Army Corps of Engineers' (Corps) Lower Mission Creek Flood Control Project (Project) located in the city of Santa Barbara, Santa Barbara County, California, and its effects on the endangered tidewater goby (*Eucyclogobius newberryi*). This biological opinion has been prepared in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). We received your June 21, 2000 request for formal consultation on June 22, 2000.

This biological opinion is based on the information provided in your June 21, 2000, request for consultation, your biological assessment pertaining to the tidewater goby, previous documents submitted by the Corps in support of the consultation, communications with experts on the species, communications between staff of the Corps and the Service, and our files. A complete administrative record for this biological opinion is on file at the Ventura Fish and Wildlife Office.

CONSULTATION HISTORY

We have been involved with the Corps on the proposed Project since June, 1999, as part of a Fish and Wildlife Coordination Act agreement (Service 1999). We commented on the proposed Project in a draft Fish and Wildlife Coordination Act Report, which was sent to the Corps in December of 1999. The Corps submitted a biological assessment in December, 1999, along with a draft environmental impact statement/environmental impact report. Subsequent to this submission, the proposed Project was modified and a revised biological assessment was submitted, along with the June 21, 2000, request for consultation. On May 3, 2000, we sent the final Fish and Wildlife Coordination Act Report to the Corps. Additionally, in March, 2000, the

U.S. Department of the Interior Office of Environmental Policy and Compliance sent comments on the proposed Project to the Corps.

The Corps initiated formal consultation in a letter dated June 21, 2000, and we issued a biological opinion to the Corps on February 16, 2001. During its review of the document, the Corps realized that the ongoing maintenance was not addressed because of direction received by the Service stating that the Santa Barbara County Flood Control District (County) would be responsible for this activity. In a discussion on February 22, 2001, the Corps informed the Service that maintenance was in fact part of the proposed project. In response to the new information and other concerns, the Corps requested that the Service prepare a draft biological opinion that would include an analysis of the construction phase of the project as contained in the original February 16, 2001, version, and an analysis of the effects of the continued maintenance of the project.

Following its review of the draft biological opinion, which we provided on March 20, 2001, the Corps presented additional concerns. In particular, the Corps had stated during preparation of the draft biological opinion, that the Service need not consider long-term, future maintenance as a covered activity in this consultation. Consequently, we did not include a discussion of maintenance in the draft biological opinion. In a meeting on April 18, 2001, the Corps requested that the long-term mantenance be added to the final biological opinion. Additionally, the Corps informed the Service that the Corps does not issue itself a permit for civil works projects; however, the County, in its responsibility for long-term maintenance, has applied for a section 404 general permit for continued activities. The duration of the section 404 permit would be determined by the Corps' regulatory branch. This new information is included in this biological opinion.

The Corps and the National Marine Fisheries Service have completed formal consultation for the federally endangered steelhead trout (*Onchorynchus mykiss*) which also occurs in Mission Creek.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The purpose of the proposed Project is to increase the flood carrying capacity in Mission Creek to 3,400 cubic feet per second (cfs). The proposed Project would cover approximately a mile of Mission Creek between Cañon Perdido Street Bridge at the upstream end and Cabrillo Boulevard Bridge at the downstream end (figure 4 from Corps 2000, enclosed). Presently, this section conveys approximately 1,050 cfs and is prone to frequent flooding. The changes to lower Mission Creek would include the widening of the creek, replacement of bridges, streamlining bedslope, stabilizing and protecting creek banks using vertical walls and vegetated riprap sideslopes, and installing an overflow culvert that bypasses the oxbow between Highway 101 and the Chapala Street Bridge. The widened creek would generally follow the existing alignment. Sections with natural creek bottom would be maintained and, in some sections, existing concrete

bottom would be restored to a natural bottom. According to the biological assessment (Corps 2000), the project would alter the net sediment budget by capturing more fine materials upstream.

The Project components that could affect the tidewater goby include excavation, construction, and maintenance.

Excavation and Construction

The Corps anticipates that the excavation and construction could be completed in approximately two years. Inclement weather, funding constraints, mechanical failure, or other unexpected events may extend this time frame. Specific excavation and construction activities that could affect tidewater gobies are as follows:

1. Bank Removal and Excavation - All existing banks would be removed in the project area with the exception of a retaining wall located just upstream of the De la Guerra Street Bridge and along the oxbow between Highway 101 and the Chapala Street Bridge. The creek bottom would also be excavated in the proposed Project area to widen the channel. The total amount of material to be excavated from both the creek bottom and the banks is estimated at 246,000 cubic feet. Excavated material would be partially stockpiled in a staging area located along the creek bank and the remaining material, approximately 192,000 cubic feet, would be recycled or transported to disposal sites located within a radius of 10 to 20 miles from the proposed Project site. The Corps estimates that 51,000 to 54,000 cubic feet of material would be used in Project construction as fill material. Usable earthen material may be reused as backfill or cover for the riprap slope. The Corps estimates that channel excavation will likely require 130 to 180 days to complete.

2. Bank Protection - Existing bank protection would be replaced with either a vertical wall (toe wall) or a combination of vertical wall and vegetated riprap sideslope. The upper half of the vegetated riprap sideslope would be sloped back with concrete pipes in varying sizes placed to allow the planting of native trees and vegetation. Wherever this combination of toe wall and vegetated riprap sideslope is used, the vertical height of the toe wall would be half the depth of the creek. For example, if the depth of the creek is 8 feet, the toe wall would be 4 feet tall, with the remainder being vegetated riprap. Below Highway 101, this combination toe and vegetated riprap would be used along the southeast bank, starting from the midpoint between Chapala and Mason Street Bridges down to the midpoint between the Mason and State Street Bridges. Vertical walls would be applied or maintained for the remainder of the downstream Project area. Above Highway 101, the combination toe wall and vegetated riprap would be the primary bank protection modification, with the exception of two short reaches just upstream of the Haley-De la Vina Bridge and the De la Guerra Bridge.

3. Replacement of Existing Bridges - Four bridges in the proposed Project area would be removed and replaced. Those are Ortega Street, Cota Street, De la Vina Street, and

Mason Street. Minor modifications of other bridges may be required to increase conveyance capacity.

4. Weir Inlet and Overflow Culvert - A reach of lower Mission Creek known as the "oxbow" runs between the Guiterrez and Chapala Street Bridges. The Corps proposes to build a weir inlet and overflow culvert beginning immediately downstream of the Guiterrez Street Bridge. The weir inlet would be constructed to allow flows only during storm events (greater than 640 cfs). From the weir inlet, storm flows would flow into an overflow culvert. The culvert would essentially connect both ends of the oxbow. The California Department of Transportation has built a culvert span across Highway 101 so traffic is not affected during storm events. The culvert would also cross beneath Montecito Street and the railroad tracks before rejoining the creek downstream of the Chapala Street Bridge. Downstream of the Montecito Street Bridge, the culvert would be buried (figure 4 from Corps 2000).

5. Rock Energy Dissipaters and Boulder Clusters - Three reaches of lower Mission Creek would be modified using a dissipater design consisting of the placement of large boulders and riprap. The first location would be from Cañon Perdido Street to below the De la Guerra Street Bridge. The second location would be from upstream of the Gutierrez Street Bridge downstream to the upper bend of the natural oxbow, near Highway 101. The third reach would be at the outlet of the overflow culvert. This design would basically include the placement of riprap into the widened creek channel, along with the embedding of large boulders three to four feet in diameter arranged in clusters in the riprap. This design is intended to dissipate the force of currents at vulnerable places along the creek and improve habitat for the steelhead trout.

6. Expanded Habitat Zones - The proposed Project may have as many as five small parcels of land that would be used for planting native riparian vegetation and as small recreational park space. The parcels of land in consideration range from 0.03 to 0.52 acre. Final calculations for the proposed Project channel configuration would determine how much of this space is available for planting. Native riparian trees obtained from local nursery stock would be planted in the habitat expansion zones. In some of these zones, pathways and benches may also be added.

   Another habitat expansion zone may be created near the oxbow formation area. However, because the area has been contaminated from past use by a dry cleaning business, it would have to be remediated prior to the construction of a habitat expansion zone. The area is approximately 0.6 acre in size. Finally, the vertical toe and vegetated riprap design is also considered as habitat expansion by the Corps, as vegetated riprap is currently lacking in most stretches of lower Mission Creek.

7. Structural Features to Minimize and Avoid Impacts to Biological Resources - To minimize the effects of the action on the tidewater goby and the steelhead, the Corps has

incorporated several structural features as part of the channel widening. The Corps has designed "hiding" places where fish can take refuge. These hiding places include coarse surface relief built into the lower sections of vertical walls as tidewater goby refugia, concrete overhangs projecting out from the vertical wall (fish ledges), and placement of double rows of coarse boulders between the overhangs along the vertical walls (fish baffles). A combination of these three features would be placed within the Mission Creek estuary between Mason Street and Cabrillo Boulevard on both sides. The ledges and baffles design would be used throughout the remainder of the proposed Project reach. More baffles than ledges would be placed.

Maintenance of the Project Area

The biological assessment describes maintenance in two areas:

1. Upstream Sediment and Vegetation Management - Sediment and vegetation will be removed periodically from the Mission Creek channel above the Yanonali Street sill. None of this perpetual maintenance would take place within the estuary. The County would conduct maintenance in the same manner that it has for many years. The upstream maintenance activities would not change under the project, with the exception of those measures included in the Corps' maintenance manual; *i.e.*, sediment and vegetation would only be removed between August and October, when the creek is generally dry and, if any flow is present, silt fences would be installed during removal of sediment and vegetation. The Corps' maintenance manual for the Mission Creek project will incorporate all measures specified in the environmental impact statement prepared for the project, the 404 permit to be issued to the County for long-term maintenance, and the terms and conditions of this biological opinion.

   The upstream maintenance would not be performed every year unless conditions warrant. The sediment removal would only occur when the capacity of the flood control channel has been reduced by 15 percent.

2. Downstream Vegetation Management - The Corps would be responsible for maintenance of vegetation, including that in the Expanded Habitat Zones described above and the plantings to be performed as beneficial measures, described below. All of this maintenance would occur downstream of the Yanonali Street sill. The proposed monitoring of vegetation includes documentation of vegetation growth. If the plants do not meet pre-determined growth and survival rates [as specified in the biological assessment (Corps 2000) and incorporated herein by reference], the Corps would implement actions to improve growing conditions, such as fertilizer, increased irrigation, and replanting. Periodic augmentation of soil in the vegetated riprap may be accomplished by using sediment removed from clearing activities or importing soil from other areas.

For the first year after completion of construction and planting, monitoring would occur every three months, the second year every four months, and the third, fourth, and fifth year every six months. The Corps would do the maintenance for the first five years following construction. Thereafter, the Corps has assumed that the vegetation will not require maintenance but will be self-sustaining. Although some mortality is expected over the long-term, only in the event of bank failure and necessary reconstruction would vegetation be replaced by the County.

In addition to the activities described above, the project would include measures that would be implemented to avoid and minimize some adverse effects to tidewater gobies. The proposed minimization measures include the following:

1. Native Vegetation Planting - The Corps would plant native vegetation below the Yanonali Street bridge in the areas that have been excavated or recontoured, and where such plantings would be appropriate. Planted vegetation would consist of native trees, shrubs, and grasses. A Project biologist would coordinate the planting of vegetation. A temporary above-ground irrigation system would be installed to irrigate planted vegetation. The irrigation system would be used for a maximum of three years. Irrigation water would come from municipal sources and the Corps would ensure that planted vegetation is watered sufficiently. The Corps estimates that riparian vegetation would reestablish to its current height and thickness within 3 to 5 years and that the structural complexity and diversity equal to typical coastal stream habitat would be attained within 30 years.

   Giant reed (*Arundo donax*) and other non-native vegetation would be first removed by hand, then treated with an application of glyphosate herbicide via cutting of stems to the ground and painting of exposed surfaces, as needed. Large western sycamores (*Platanus racemosa*) would be retained where feasible.

2. Creek Dewatering Practices - Impacts to the tidewater goby would result from the necessity to dry the streambed and toe of banks prior to construction between Cabrillo Boulevard and Yanonali Street. To minimize the impact caused by drying the streambed, the Corps proposes to time the construction activity outside of the tidewater goby spawning period, conduct dewatering and construction in only half of the streambed at a time, and relocate tidewater gobies that remain in the construction area.

   The dewatering of half the streambed would be accomplished by dividing the creek and estuary length-wise using an impermeable barrier, such as sheet piling. At the upstream end of this barrier, half the estuary would be dammed to allow water to continue to flow through the other half of the creek/estuary. Once this is done, qualified biologists would walk downstream in a zig-zag pattern to herd as many tidewater gobies as possible downstream. When the tidewater gobies have been herded downstream, an exclusion dam would immediately be lowered to seal off their re-entry into the work area. The

biologists would once again enter the confined area and seine the streambed to capture any remaining tidewater gobies. If tidewater gobies are captured, they would be relocated to the wet side of the estuary. When this process has been completed, the confined area would be pumped of any remaining water with an intake hose covered with a half-inch mesh screen. Biologists would monitor the drying of the confined area and seine it thoroughly at least twice a week if necessary. This process would be repeated for the other side of the creek once the project on one side is completed.

Mechanized equipment would enter the creek via existing parking lots at Cañon Perdido and Cota Streets or the area immediately adjacent to the oxbow. To minimize contamination of the creek by heavy equipment, the Corps proposes to inspect equipment for leaks and drips on a daily basis prior to the commencement of work. A storm water pollution prevention plan would also be prepared to minimize the potential discharge of oil or grease into the creek. Best management practices (BMPs) would be followed during construction and excavation. No work, outside of the placement of impermeable barriers, dams, and culverts, would be allowed in flowing water except as absolutely necessary.

Upstream of Yanonali Street, where tidewater gobies are not found, the streambed would be dewatered using a system of in-channel culverts and the Corps would place a series of silt curtains immediately below the construction area in an effort to reduce suspended sediments in the creek. The culverts would be at least 24 inches wide and no longer than 300 feet.

Prior to construction, the construction crews would be briefed on the environmental commitments. The Corps, or a Corps contractor, would monitor the construction contract bi-weekly during the initial stages of construction to ensure compliance with various conditions. Finally, during construction of the proposed Project, the Corps, or a Corps contractor, would monitor turbidity levels within the creek water.

3. Beneficial Effects - The Corps believes this Project would benefit the tidewater goby by doubling the size of the estuary as a result of removing bank stabilization structures and widening the channel, and by reducing siltation into the estuary. Additionally, the Corps believes the toe wall design features in the estuary would provide refugia for tidewater gobies.

STATUS OF THE SPECIES

The tidewater goby was listed as endangered on March 7, 1994 (59 Federal Register 5494). A recovery plan has not been published. On June 24, 1999, the Service proposed to delist the remaining northern populations of the tidewater goby because we concluded the listing exaggerated the risk of extinction by overestimating the rate of local population extinction and the northern populations of the tidewater goby are not presently in danger of extinction or likely

to become in danger of extinction within the foreseeable future (64 Federal Register 33816). In the proposal to delist the northern populations, the Service defined a southern distinct population segment (DPS) as those populations occurring in San Diego and Orange counties. Critical habitat was designated for this DPS on November 20, 2000 (65 Federal Register 224). A final determination on delisting the northern populations has not been made at this time. Detailed information on the biology of the tidewater goby can be found in Wang (1982), Irwin and Soltz (1984), Swift *et al.* (1989), Worcester (1992), and Swenson (1995); much of the information from this account was taken from these sources.

The tidewater goby is a small, elongate, grey-brown fish not exceeding two inches standard length. The species, which is endemic to California, is typically found in coastal lagoons, estuaries, and marshes with relatively low salinities (approximately ten parts per thousand (ppt)). Its habitat is characterized by brackish shallow lagoons and lower stream reaches where the water is fairly still but not stagnant. However, tidewater gobies can withstand a range of habitat conditions; they have been documented in waters with salinity levels from 0 to 42 ppt, temperatures from 46 to 77 degrees Fahrenheit, depths from 10 inches to 6 feet or more, and dissolved oxygen levels of less than one milligram per liter.

Tidewater gobies may, at times, range upstream into fresh water, up to one and a half miles from an estuary. In San Antonio Creek and the Santa Ynez River, Santa Barbara County, tidewater gobies are often collected four to five miles upstream of the tidal or lagoonal areas, sometimes in beaver-impounded sections of streams. Conversely, tidewater gobies enter marine environments if sandbars are breached during storm events. The species' tolerance of high salinities (up to 60 ppt for short periods) likely enables it to withstand the marine environment and to colonize or re-establish in lagoons and estuaries following flood events, as has been recently hypothesized (Lafferty *et al.* 1999a, b).

The tidewater goby is primarily an annual species in central and southern California, although some variation has been observed. If reproductive output during a single season fails, few if any tidewater gobies survive into the next year. For this reason, populations can be sensitive to short-term adverse environmental conditions. In one notable case, a population estimated at between 10,000 and 30,000 individuals was extirpated after a single construction project (Swift and Holland 1998). However, recent research suggests that tidewater gobies have adapted to climatically dynamic conditions and are adept at recolonizing sites from which they have been extirpated (Lafferty *et al.* 1999a).

Reproduction peaks from late April or May to July and can continue into November or December depending on the seasonal temperature and rainfall. Males begin the breeding ritual by digging burrows (four to five inches deep) in clean coarse sand and silt. Females then deposit eggs into the burrows, laying an average of 400 eggs per spawning effort (Swenson 1999). Males remain in the burrows to guard the eggs. Males frequently forgo feeding during this period, possibly contributing to the mid-summer mortality noted in some populations. Within nine to ten days, larvae emerge. The larvae live in vegetated areas within the lagoon until they are 0.75 inch SL,

when they become substrate oriented, spending the majority of time on the bottom rather than in the water column. Both males and females can breed more than once in a season, with a lifetime reproductive potential of 3 to 12 spawning events.

Tidewater gobies feed on small invertebrates, usually mysids, amphipods, ostracods, snails, and aquatic insect larvae, particularly dipterans, most of which live in the sediments. Small tidewater gobies probably feed on unicellular phytoplankton or zooplankton similar to many other early stage larval fishes (Swenson and McCray 1996).

Historically, the tidewater goby occurred in at least 110 California coastal lagoons from Tillas Slough near the Oregon border to Agua Hedionda Lagoon in northern San Diego County. The southern extent of its distribution has been reduced by approximately eight miles. The species is currently known to occur in about 85 locations, although this number will decrease during severe drought conditions. Today, the most stable populations are in lagoons and estuaries of intermediate sizes (5 to 124 acres) that have remained relatively unaffected by human activities. These populations have probably provided colonists for nearby smaller ephemeral sites (Swift *et al.* 1997, Lafferty *et al.* 1999b).

Losses of tidewater goby populations can be attributed primarily to urban, agricultural and industrial development in and surrounding coastal wetlands and alteration of habitats from seasonally closed lagoons to tidal bays and harbors. Some extirpations are believed to be related to pollution, upstream water diversions, and the introduction of exotic fish species (most notably sunfishes and black basses [Centrarchidae]). These threats continue to affect some of the remaining populations of tidewater gobies. Tidewater gobies have been extirpated from several water bodies that are impaired by degraded water quality (*e.g.*, Mugu Lagoon, Ventura County), but still occur in others (*e.g.*, Santa Clara River, Ventura County).

ENVIRONMENTAL BASELINE

The estuary of Mission Creek is a relatively small California coastal estuary. It extends from the small lagoon formed at its mouth to the sill at Yanonali Street. The size of the lagoon expands and contracts with given amounts of rainfall and whether it has breached to the ocean, but typically rarely exceeds five acres. The lower portions of Mission Creek lie within urbanized Santa Barbara. The Mission Creek drainage originates from the Santa Ynez Mountains in the Los Padres National Forest. The drainage, including its tributaries, is approximately 11.5 square miles in size (Service 2000a). The lower reaches of Mission Creek are typically dry in the summer months, although urban runoff keeps small amounts of water moving through the creek. During the summer months, the City of Santa Barbara traditionally manually breached the Mission Creek lagoon due to health and safety concerns; however, upon being notified in 2000 that this activity was not permitted, the City ceased the breaching. During high rainfall years, lower Mission Creek is prone to overtopping its banks and high flow velocities.

Over several decades, crude bank protection has been attempted through the placement of grouted stone, sacked concrete, pipe and wire revetment, gabions, bulkhead structures, and other stabilization structures. These stabilization structures are randomly placed throughout lower Mission Creek. The combination of adjacent buildings and bank stabilization has modified the natural characteristics of lower Mission Creek and its habitat. The sheltering from the wind prevents adequate mixing of the surface with deeper water, resulting in stratification of salinity and dissolved oxygen uncharacteristic of similar estuaries where man-made structures are not present (Swift 2000).

The substrate of the Mission Creek estuary varies from the sill at Yanonali Street down to the lagoon below Cabrillo Boulevard. Within the area of concern in the biological opinion, Swift (2000) characterizes the conditions as follows:

> "From this point (the railroad bridge) downstream to Chapala Street the bottom was flat, hard, carved sandstone of historical significance. The sandstone had a veneer of sand and algae in water mostly 10-15 cm (4-6 inches) deep with about 10% deeper pools to 30 cm (12 inches) deep. At Chapala, the flat sandstone bottom ends in a 30-40 cm falls into the upper end of the lagoon. On the June 8 visit the lagoon was at a higher level, standing about 15 centimeters (6 inches) above the top of the "falls" and extended 5-10 meters (16-33 feet) farther upstream. The upper lagoon has mostly rocks and gravel downstream to and beyond the Mason Street Bridge and becomes progressively less rock and more sand to the sand berm separating the lagoon from the ocean."

Tidal influence extends to a 1.5-foot high sill (Swift's "falls") which spans the entire channel at the Yanonali Street Bridge; therefore, the estuary extends from the lagoon upstream to the sill. As mentioned in the description of the proposed project, the sill at Yanonali Street probably blocks further upstream movement by the tidewater goby so that the species' distribution in Mission Creek coincides with the estuary or extends up to the Yanonali Street sill.

Swift (2000) goes on to say that the presence of rock and boulders in the area above Cabrillo Boulevard indicates that Mission Creek is "sediment-starved." He concludes that the sand and sediment in the lower estuary and lagoon must be coming from the ocean, deposited by wave action, and that the periodic breaching performed in the past by the City of Santa Barbara reduced the suitable substrate available to tidewater gobies.

Vegetation in the proposed Project area is dominated by opportunistic invasive plants such as giant reed, castor bean (*Ricinus communis*), and tree tobacco (*Nicotiana glauca*) with only remnant stands of native riparian vegetation. Salt cedar (*Tamarix* sp.), a highly invasive species, has been found in the creek channel (Service 2000a). The proposed Project area supports small patches of native vegetation including western sycamores, coast live oak (*Quercus agrifolia*), cottonwood (*Populus* spp.), and native willows (*Salix* spp.).

During the summer months, salinity levels in the estuary typically range between 20 and 30 ppt. During winter months, salinity levels are lower and at times approach completely fresh regimes. Turbidity in the estuary has been measured between 1 and 10 nephelometric turbidity units with winter months yielding the highest turbidity, as expected (Service 2000a). Bacterial contamination of Mission Creek may be the result of adjacent urbanization, homeless encampments near the creek, and birds using the lagoon. Measurements taken in 1998 show elevated levels of total coliform, fecal coliform, and enterococcus (Project Clean Water 1999). The estuary sediment closest to the ocean is composed mostly of fine and coarse sands. The estuary does not contain tidal mud flats and is devoid of estuarine vegetation.

The Santa Barbara County Parks and Recreation Department ((PRD) has manually breached the Mission Creek estuary for nearly 40 years when odors from the estuary became noxious and bacterial contamination became a concern. The PRD has not obtained federal permits for this activity. Recently, the PRD contacted the Corps to begin the permitting process for this breaching activity. The PRD has also contacted the Service to discuss ways in which the breaching could be done to minimize adverse effects to the tidewater goby.

According to Swift (2000), tidewater gobies have been known to occur in Mission Creek since 1993. In 1994, Lafferty and Alstatt (1995) observed tidewater gobies within the estuary above Cabrillo Boulevard. A tidewater goby survey was conducted in the estuary in May and June of 1999, but no tidewater gobies were captured (Service 2000b). Swift (2000) reports that he found the species in Mission Creek on May 10, 2000. These observations show that tidewater goby numbers at any given location may fluctuate from year to year, so absence in one survey year does not necessarily indicate extirpation of the population. The tidewater goby population in Mission Creek may be transient. The changing conditions of the estuary (*i.e.*, periodic drying, poor water quality, breaching of the lagoon mouth) may extirpate the population in a given year, with recolonization from nearby populations occurring in favorable years. We do not have enough data to make conclusions about the persistence of the Mission Creek population.

According to Swift (2000), the success of the tidewater goby population depends upon the amount of coarse sand substrate available for breeding. Much of the substrate suitable for breeding is in the lower portion of the lagoon, downstream of the Cabrillo Boulevard bridge. Therefore, breeding by tidewater gobies in Mission Creek is not extensive and could be greater with some changes that would enlarge the lagoon. When the lagoon is breached, suitable habitat for breeding is further reduced; at these times, tidewater gobies may be limited to the deepest pools above Cabrillo Boulevard, although breeding may not be possible in these pools because of the unsuitable substrate.

EFFECTS OF THE ACTION

The most direct adverse effect of the action would be the sequential drying of one half of the creek bed and relocation of stranded tidewater gobies. During this activity, tidewater gobies may be killed or injured from trampling by workers, crushed during the placement of impermeable

barriers and dams, dessicate and suffocate in a dewatered section of the creek bed, be subject to increased predation during the drying and relocation process, or may die during the actual handling and relocation process. Additionally, as water is being pumped out of one section of the creek, tidewater gobies may be injured or killed by impingement onto the pump screen. These direct effects would only occur during construction in the estuary.

Another possible effect on the tidewater gobies would include impairment of respiration as a result of suspended sediments being released during construction and maintenance in the creek bed and on creek banks. The Corps has proposed to minimize the release of fine sediments into Mission Creek during construction by installing silt-fencing. The suspension of fine sediments during maintenance would be minimized by limiting such work to the dry season and the use of silt fencing, as needed.

Contamination of tidewater goby habitat may occur during the application of herbicides, spills and leaks from construction equipment, spills of fertilizers which may be used to augment the growth of planted vegetation, or release of buried substances during creek and creek bank excavation or removal of adjacent structures. Contamination to tidewater goby habitat may result in acute or chronic mortality, degradation of habitat through reduction in prey items, or, in the case of fertilizer releases, eutrophication. The Corps has proposed minimization measures to reduce the possibility of accidental spills of all kinds into tidewater goby habitat. These measures include timing of Project construction and sediment removal between April and October when water flow is minimal, not allowing work in flowing water unless absolutely necessary, placing silt-fencing during routine maintenance activities, using existing access points, ensuring that construction equipment is in good working order and inspected for leaks and drips on a daily basis prior to commencement of work, and developing a storm water pollution prevention plan to prevent discharges of oil or grease into the creek. Given the minimization measures, contamination of tidewater goby habitat is not likely.

The proposed Project may also disrupt the foraging base of tidewater gobies in Mission Creek which may result in a reduction of prey items. Impacts to prey items may occur as water levels are manipulated, thereby altering the hydrology of the creek and estuary. Temporary pulses of suspended sediment during construction and maintenance (*i.e.*, sediment removal) above the sill may cover and suffocate bottom-dwelling organisms. A reduction in prey items may lead to increased competition for food and a reduction in the ability of Mission Creek to support tidewater gobies. Bottom-dwelling organisms would likely begin to recover once construction is complete or during the period between maintenance actions.

We do not anticipate that the maintenance practices would adversely affect tidewater gobies. The proposed avoidance and minimization measures (*i.e.*, restricting work to low flows periods, use of silt fences) are likely to be effective at preventing sudden turbidity and contamination that could harm tidewater gobies. We do not know if past management practices in areas upstream of the estuary, which will continue unchanged under the project, had an effect on the tidewater goby or its habitat; we do not have enough data on the population to know how persistent it has been or if the estuary substrate was affected.

The Corps has included a variety of minimization measures to reduce adverse effects to tidewater gobies during construction and has incorporated structures intended to act as refugia for individuals of the species into the project design. However, the project introduces uncertainties pertaining to the long-term adverse effects on the physical structure of tidewater goby habitat:

1. The tidewater goby refugia, although novel in concept, have not yet been tested and proven to provide benefits to the species during periods of above average flow. We remain uncertain as to the beneficial effects the refugia will provide.

2. In its biological assessment, the Corps (2000) concluded that the project would result in the loss of suitable spawning habitat in the Mission Creek estuary. The Corps predicted that the proposed project would likely result in the reduction of fine sediments in the bedload and the expansion of the gravelly and rocky substrate as a result of the improved efficiency of the flood control functions upstream of the estuary. Overflow from the proposed bypass culvert would be cleaner (*i.e.*, not carrying fine sediments) and would actually remove fine sediments from tidewater goby habitat in the estuary. During discussions on February 22, 2001, the Corps stated that the shift from fine to coarser substrate in the estuary would occur only during high flows, when the bypass and the weir were functioning as intended. The Corps also stated that the influx of fine sediments may return to the estuary under normal flow conditions upstream.

   Upon revisiting Swift's (2000) report and after discussions with the Corps on April 18, 2001, we have concluded that the conversion to a gravelly and rocky substrate would only affect the tidewater goby's foraging habitat. The area of suitable spawning habitat would be unlikely to change because, according to Swift (2000), most of the fine sand and sediment which is an important component for the structural stability of tidewater goby reproductive burrows, comes from the ocean side of the lagoon and not from the flows in Mission Creek. Consequently, we conclude that the project would not substantially alter the available spawning habitat for tidewater gobies.

   The need for fine sediments should not be confused with sudden, harmful plumes of sediment that can result from construction or maintenance. These sudden siltation events may be deleterious because the water level is likely to be low and the sediments concentrated, thus suffocating both the tidewater gobies and their prey. These plumes of sediment will not contribute to the spawning habitat in the lagoon.

Based upon the information available to us regarding the likely consequences of the proposed action, the ecology of the tidewater goby, and the uncertainty of the status of the species in Mission Creek due to a lack of data, we cannot predict with certainty whether the species will persist in the Mission Creek estuary. In any case, the tidewater goby population in Mission Creek is likely to experience some change in the existing habitat conditions as a result of the project. However, Swift (2000) states that tidewater gobies would derive the greatest benefit from measures that affect water depth, salinity, and substrate in the lagoon, which is outside of the project area and would be unaffected by the Corps' proposed actions.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. We are unaware of any non-federal activities within the action area that are reasonably expected to occur.

CONCLUSION

After reviewing the current status of the tidewater goby, the environmental baseline for the action area, the effects of the proposed Project, and the cumulative effects, it is our biological opinion that the Lower Mission Creek Flood Control Project, as proposed, is not likely to jeopardize the continued existence of the tidewater goby. We have reached this conclusion because the project is unlikely to result in the permanent extirpation of the species from Mission Creek. Also, the Corps and County will implement measures to minimize adverse effects, and the quality of the spawning habitat will not be substantially affected by the project. Lastly, the tidewater goby currently occurs in approximately 85 streams and the loss of the population in Mission Creek, however unlikely, would not appreciably reduce the ability of the species to survive and recover.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act, provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary and the Corps must ensure they are implemented during any activity that it or its contractor undertakes for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps fails to adhere to the terms and conditions of the incidental take statement or fails to ensure that its contractor adheres to them, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Corps must

report the progress of the action and its impact on the species to us as specified in the incidental take statement [50 CFR §402.14(I)(3)].

The Service anticipates that individuals of all life stages of the tidewater goby within the Mission Creek estuary, from the lagoon upstream to the Yanonali Street sill, may be taken through the combined effects of direct mortality or injury as a result of project activities, long-term modification to tidewater goby habitat upstream of Cabrillo Boulevard, and handling during removal from work areas. The exact number of tidewater gobies that could be affected cannot be predicted because of the natural fluctuations in numbers that this species experiences and the difficulty in determining how many individuals are present at any given time. Incidental take of tidewater gobies would be minimized to the extent possible during excavation, construction, and maintenance with full implementation of the avoidance and minimization measures proposed by the Corps.

REASONABLE AND PRUDENT MEASURES

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of tidewater gobies:

1. The Corps shall retain the services of a qualified biologist to implement protective measures for the tidewater goby and to provide an education program to all personnel working in the estuary.

2. A qualified biologist shall be retained to conduct pre-construction surveys and to monitor the estuary to determine the status of the tidewater goby in Mission Creek after completion of the project.

3. The diversions required during construction and maintenance shall incorporate protective measures to minimize tidewater goby mortality.

The Service's evaluation of the effects of the proposed action includes consideration of the measures developed by the Corps, and repeated in the Description of the Proposed Action portion of this biological opinion, to minimize the adverse effects of the project to the tidewater goby. Any subsequent changes in the minimization measures proposed by the Corps may constitute a modification of the proposed action and may warrant re-initiation of formal consultation, as specified at 50 CFR 402.16. These reasonable and prudent measures are intended to clarify or supplement the protective measures that were proposed by the Corps as part of the proposed action.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Corps shall comply with or ensure that its contractor complies with the following terms and conditions, which implement the

reasonable and prudent measures described above and outline reporting and monitoring requirements. These terms and conditions are non-discretionary:

The following terms and conditions implement reasonable and prudent measure 1:

1. The Corps shall submit to the Service in writing, at least four weeks prior to the onset of work, the qualifications of a biologist familiar with tidewater goby biology. This biologist will be responsible for implementing measures that involve handling and relocating tidewater gobies. The Service will provide written authorization of the individual, if qualified, or denial, if unqualified.

2. The qualified biologist shall conduct a training session for all personnel associated with construction in the estuary prior to the onset of work. At a minimum, the training shall include a description of the tidewater goby and its habitat; the general provisions of the Act; the necessity for adhering to the provisions of the Act; the penalties associated with violating the provisions of the Act; the specific measures that are being implemented to conserve the tidewater goby as they relate to the project; and the boundaries of the project within which it may be accomplished.

The following term and condition implements reasonable and prudent measure 2:

3. The authorized biologist shall complete initial surveys for tidewater gobies in Mission Creek one week prior to the onset of work. After the construction phase of the project has been completed and then annually for a period of five years, a qualified biologist shall conduct surveys for tidewater gobies to determine their status. Surveys shall be conducted as follows:

    a. Monitoring surveys shall be conducted at the same time each year, the time of which will have been determined by surveys conducted prior to the onset of work, as described above.

    b. Five survey locations shall be identified for the initial survey and shall be used for the duration of the monitoring, regardless of condition of the estuary each year. The locations shall be spread within the estuary from the lagoon up to the sill at Yanonali Street.

    c. The qualified biologist shall note the conditions of the substrate in the estuary, such as its depth, relative suitability for spawning and foraging, and any other factors deemed relevant to tidewater goby habitat.

    d. The qualified biologist shall note water conditions in the estuary, including temperature, a subjective estimate of turbidity, level at the sampling locations, and subjective water quality (odor, color, litter).

e. Individuals shall be captured using standard techniques such as beach seining or dip-netting. The specimens shall be released immediately at the point of capture once they have been identified, measured, and their sex determined.

The following terms and conditions implement reasonable and prudent measure 3:

4. Because tidewater gobies are most often on the bottom of the estuary, the intake on the pumps used for water diversion shall be floated as long as possible to prevent tidewater gobies from being entrained and killed.

5. The mesh size on the pump intake shall be 1/8-inch or less. The mesh shall be checked by the qualified biologist prior to use each day and twice daily during operation to determine that it is intact. If the mesh develops holes or other conditions that impair its functioning, it shall be replaced, or repaired immediately.

REPORTING REQUIREMENTS

In addition to the information gathered pursuant to the terms and conditions above, the Corps shall provide an annual report to us on activities conducted during the year related to the project for each calender year the Corps is involved in construction and monitoring operations. The report shall contain a brief discussion of the activities completed in the previous year or planned for the next year; approximate acreage habitat within the estuary affected; occurrences of incidental take, if any; problems encountered in implementing avoidance and minimization measures and terms and conditions; recommendations for modifying the terms and conditions to enhance the protection of the tidewater goby and to simplify compliance with them; and any other pertinent information. The report shall be submitted by January 31 each year. Our office shall be notified in case of a delay. This document would assist our office and the Corps in evaluating future measures for the conservation of the tidewater goby during similar projects.

DISPOSITION OF INJURED OR DEAD SPECIMENS

Within three days of locating any dead or injured tidewater gobies, you must notify the Service's Division of Law Enforcement by facsimile at (310) 328-6399 and our office at (805) 644-1766 (2493 Portola Road, Suite B, Ventura, California 93003) by telephone and in writing. Your report shall include the date, time, location of the carcass, a photograph, cause of death, if known, and any other pertinent information.

Care shall be taken in handling injured animals to prevent additional injury. Injured animals may be released to the wild after receipt of concurrence from our office. Care shall be taken in handling dead specimens to preserve biological material in the best possible state for later analyses. Dead tidewater gobies shall be preserved in 90 or 95 percent ethanol.

The remains of tidewater gobies shall be placed with the Los Angeles County Museum of Natural History, Section of Fishes, 900 Exposition Boulevard, Los Angeles, California, 90007, (213) 763-3374; Marine Vertebrate Collection, Scripps Institute of Oceanography, La Jolla, California, 92093-0208, (619) 534-2199; or any other permitted facility authorized to receive specimens.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. The Corps should examine ways of ensuring that the proper amount of sediment, of the correct grain size, moves into the estuary to maintain natural conditions for tidewater gobies. The results of annual monitoring of the estuary should assist in determining whether additional sediment is needed. Maintenance schedules or practices could be adjusted to accommodate the need for more sediment, if necessary.

2. Because recolonization of watersheds by tidewater gobies is not well-documented, the Corps should coordinate with tidewater goby experts such as Camm Swift or Kevin Lafferty to determine if a capture-mark-recapture study is viable. If such a study is viable, the Corps should provide funding for a research program to determine if recolonization events are occurring at Mission Creek. Tidewater gobies in Mission Creek and in the nearest estuaries to the south and north of Mission Creek should be marked prior to winter rains and subsequently sought in adjacent drainages.

3. The Corps should work with the City of Santa Barbara to improve the quality of water in Mission Creek, especially in the lagoon. Measures which could be implemented include processing of nuisance runoff through filters to remove trash and oil and grease, locating and eliminating sources of bacterial contamination, and controlling activities adjacent to the estuary.

4. Because the genetic relationship of individual tidewater goby populations is unclear, the Corps could fund research into the genetics of the tidewater goby. This would involve removal of tissue samples from tidewater gobies in numerous estuaries and analysis of their DNA. Such research would either solidify the evolutionary significance of populations in separate estuaries or demonstrate that genetic exchange and colonization is extensive. If genetic research shows that colonization and genetic exchange between populations is limited or non-existent, the conservation of individual populations could be important.

REINITIATION NOTICE

This concludes formal consultation on the Corps' Lower Mission Creek Flood Control Project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions, please contact Rick Farris of my staff at (805) 644-1766.

Sincerely,

Ann A Bell

For Diane K. Noda
Field Supervisor

Enclosure

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