SAN LUIS OBISPO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
ZONE 9 ADVISORY COMMITTEE

NOTICE IS HEREBY GIVEN that the Zone 9 Advisory Committee will hold a Regular Meeting at **1:30 PM** on **Wednesday, August 8, 2018** at the City of San Luis Obispo, Community Development Department in Conference Room #1 located at 919 Palm Street, San Luis Obispo, CA 93401.

AGENDA

1. Introductions and roll call
2. Approval of meeting minutes
3. Reports
    a. Sustainable Groundwater Management Act (SGMA) updates
    b. Mid-Higuera Bypass Project updates
    c. Creek maintenance updates
4. Update of the implementation status of the Waterway Management Plan (WMP) *Preferred Project* for flood management
5. Public comment
   At this time, the public may address the Committee on any item not appearing on the agenda that is within the subject matter jurisdiction of the Committee.
6. Future agenda items

Next Regular Meeting
Wednesday, October 10, 2018 at 1:30 PM
City of San Luis Obispo, Community Development Department
919 Palm Street, San Luis Obispo, CA 93401

"The purpose of the Zone 9 Advisory Committee: SECTION 1: To advise the County Board of Supervisors concerning all policy decisions relating to Zone 9. The Committee shall determine the needs, desires, and financial capabilities of the property owners in Zone 9 and, upon deliberation, shall convey to the Board of Supervisors their recommendations with respect to the objectives of said zone. SECTION 2: To recommend to the Board of Supervisors specific programs to alleviate and control flood damage within Zone 9 with recognition of the ecological and aesthetic values of the programs. Further, to recommend to the Board of Supervisors other programs within Zone 9 concerning the objects and purposes of the Flood Control District Act. SECTION 3: To recommend methods of financing programs for Zone 9." – Excerpts from the By-Laws adopted March 1, 2011

FILE: CF 340.180.05

SAN LUIS OBISPO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
ZONE 9 ADVISORY COMMITTEE

Meeting Minutes (Draft) - Wednesday, April 11, 2018

Members Present
Andy Pease, Member, City Council
Matt Horn, Vice Chairperson, Member, City Staff
Christine Mulholland, Member, City At-Large
Dave Romero, Alternate, City At-Large
Wayne Peterson, Chairperson, Member, County At-Large
Kaila Dettman, Member, County At-Large

1. Introductions and roll call

   Wayne Peterson calls the meeting to order at 1:30 pm. Quorum established.

2. Public comment

   Wayne Peterson comments that he and Mladen Bandov, County Public Works, attended a meeting on April 10, 2018 with the developers of the Avila Ranch project and residents near the Buckley Road area. The developers described the project improvements including the extension of Buckley Road to Higuera Street and raising the intersection of Buckley Road and Vachell Lane about two feet. He comments that the improvements don't address the flooding or geometric (bike path) problems of the road, and that flooding occurs almost every year. He adds that the developer does not intend to fix the Buckley Road bridge, which will cause a backwater flooding condition. Dave Romero asks if this issue was addressed during the approval process. Wayne Peterson replies that it had, but the bridge was not a project requirement. Andy Pease asks if there was consensus about the problem. Wayne Peterson replies that it is a County-maintained bridge, but it is not on the replacement list. Christine Mulholland recommends adding this topic to the next agenda for discussion.

3. Approval of Meeting Minutes – December 13, 2017

   Motion by: **Andy Pease**
   Second by: **Christine Mulholland**

   The Committee approves the December 13, 2017 meeting minutes, as amended (5-0-0).

4. Administrative

   Mladen Bandov introduces the procedural items to confirm the current officers of the Committee and to consider adding this as a standing agenda item at the first meeting of each year. Committee members discuss the procedure and timing of the confirmations given that officer terms limits are not addressed in the by-laws and agree that Committee members should confirm the current officers at the end of each year for the following year. If Committee members do not approve the

current officers for the next year or changes occur regarding appointments, an election for those positions should occur at the first regular meeting of the year in February and following confirmation of their appointment by the Board of Supervisors.

Christine Mulholland moves that the Committee confirms the existing officers for the remainder of this year and until the next confirmation at the regular meeting scheduled in December and direct the Secretary to continue thereafter with confirmations of officers at the end of each year.

Motion by: **Christine Mulholland**
Second by: **Kaila Dettman**

The Committee approves (5-0-0).

5. Sustainable Groundwater Management Act (SGMA) Updates

Andy Pease reports about the Groundwater Sustainability Agency (GSA) kick-off meeting on April 18, 2018 to begin developing the Groundwater Sustainability Plan (GSP). Christine Mulholland reports on the most recent Water Resource Advisory Committee (WRAC) meeting regarding a public forum that presented information on water law.

6. Mid-Higuera Bypass Project Updates

Mladen Bandov announces that the County Board of Supervisors will have a public hearing on certifying the Final Supplemental Environmental Impact Report for the Mid-Higuera Bypass Project (MHBP) on August 21, 2018.

Matt Horn announces that Manny Guzman, who was the project manager, has moved to the City's construction management division. Brian Nelson, Supervising Civil Engineer, is the new project manager for the Mid-Higuera Bypass Project.

Brian Nelson reports that the City will be issuing a purchase order to Wallace Group for $226,000 for development of final design plans for the bypass, Bianchi bridge, and re-vegetation. The design plans should be done by early next year. Dave Romero asks about sources of funding for construction and suggests phasing of the project if necessary due to lack of funding. Brian Nelson mentions that Wallace Group will be providing preliminary cost estimates soon.

Kaila Dettman discusses two upcoming state bonds that would help the project: Proposition 68 on the June primary ballot and another on the November general ballot. Wayne Peterson asks how the City could to apply. Kaila Dettman estimates that the state grant guidelines would come out next year.

7. Creek Maintenance Update

Matt Horn reports on the silt removal projects, which are in the design and environmental permitting process. The primary site that is expected to be completed this year is the Perfumo Creek arm at Los Osos Valley Road and Laguna Lake. The other sites, which will likely be completed

next year, are at Tank Farm Road, 250 feet west of Orcutt and at Sacramento Street north of via Esteban. Committee members discuss further about other projects including dredging Laguna Lake.

Kaila Dettman reports that the Arundo removal efforts have been successful and did not bounce back following last year's wet winter. The Land Conservancy will be re-filing their NDPES permit for the year and reporting treatments in the waterways. Following notification with landowners in June, they will begin treatment in August through October.

8. Future Meeting Agenda Items

   Mladen Bandov mentions that the development of the Stormwater Resource Plan is underway, and the plan is required as a condition of grant funding for stormwater runoff capture projects.

   Christine Mulholland comments on imported soil during property developments that is impacting wetlands and asks about the role of Zone 9 regarding soil deposition. Mladen Bandov indicated that he would report back on the objectives and purposes of Zone 9.

Meeting was adjourned at approximately 2:50 pm

TO: **Zone 9 Advisory Committee**

FROM: **Dick Tzou, Water Resources Engineer**

DATE: **August 8, 2018**

SUBJECT: **Agenda Item #3: Sustainable Groundwater Management Act (SGMA) Update**

Recommendation

1. Receive update on SGMA efforts.

Discussion

The San Luis Obispo Basin characterization study report has been completed and finalized. It can be accessed online via the County's www.slocountywater.org website. The Groundwater Sustainability Commission (Commission) of the San Luis Obispo Basin was formed based on the Memorandum of Agreement between all the partners and the two Groundwater Sustainability Agencies (i.e., City and County of San Luis Obispo) and will be meeting next on September 12, 2018 based on a regular quarterly schedule.

On May 7, 2018, the County of San Luis Obispo (County) was conditionally awarded the Proposition 1 Sustainable Groundwater Planning (SGWP) grant in an amount of $854,650 from the California Department of Water Resources (DWR). The purpose of this grant funding is to help fund the development of a Groundwater Sustainability Plan (GSP) for the San Luis Obispo Basin. The Commission met on July 26, 2018 to receive an overview of the scope of work for the development of a GSP and provided feedback. It is anticipated that a Request for Proposals (RFP) for GSP development will be published in August and a consultant will be selected and contract awarded at the end of 2018 or early 2019.

TO: **Zone 9 Advisory Committee**

FROM: **Mladen Bandov, Water Resources Engineer**

DATE: **August 8, 2018**

SUBJECT: **Agenda Item #4: Implementation status of the Waterway Management Plan (WMP) *Preferred Project* for flood management**

Recommendation

1. Receive an update of the implementation status of the Waterway Management Plan (WMP) *Preferred Project* for flood management

Discussion

At the April 11, 2018 meeting, Chairperson Wayne Peterson commented on the issues related to the reoccurring flooding at the intersection of Buckley Road and Vachell Lane and the adjacent Buckley Road bridge. The location of the flooding occurs north of the confluence of the Tank Farm Creek and East Fork San Luis Obispo (SLO) Creek. As a result, County staff reviewed the Waterway Management Plan (WMP) for the implementation of projects to address flood management across the watershed to provide context in addressing this specific location.

The Board of Supervisors adopted the WMP on February 10, 2004 via Resolution 2004-51. The WMP includes several components to provide comprehensive flood management within the San Luis Obispo Creek watershed:

- **Stream Maintenance and Management Program (SMMP)** for routing stream maintenance practices and procedures
- **Drainage Design Manual (DDM)** for stormwater, flood control, and bank repair design
- **Flood Management Plan** for flood control projects
- **Bank Stabilization Program** for addressing bank instability problem areas
- **Habitat Enhancement and Restoration Program** for addressing stream resource enhancement, restoration and protection

The *Preferred Project* was developed and includes components from the above programs as well as individual projects within SLO Creek and major tributaries. The following list of individual structural flood control projects is derived from WMP Volume I, Chapter 6 *Flood Management Plan Preferred Project, Table 6-1*:

- **SLO-I-1**: Channel Modification below Los Osos Valley Road (LOVR), LOVR Culvert and Bridge Replacement
- **SLO-II-2**: Elks Lane Bypass Channel
- **SLO-I-3**: Mid-Higuera Bypass Channel & Terrace
- **SLO-I-4**: Cuesta Park Detention Enhancement
- **ST-I-1:** Murray Bridge replacement
- **ST-I-2:** Foothill Bridge replacement
- **ST-II-3**: Santa Rosa Bridge replacement

- **EB-I-1**: Buckley Road Detention Basin
- **EB-I-2 through EB-I- 6**: Constructed natural channel modifications

Each individual project is identified using the project location (e.g., "SLO" for SLO Creek projects), priority (e.g., "I" for first priority, "II" for second priority), and a number used to order the text (e.g., "1", "2", etc.). The three locations are "SLO" for SLO Creek projects, "ST" for Stenner Creek projects, and "E"" for East Fork Creek projects.

An excerpt from the WMP Chapter 6.1 Preferred Project Structural Flood Control describing the individual projects, including a map showing the locations of the individual projects as part of the *Preferred Project*, are provided as **Attachment 1**.

East Fork SLO Creek projects

The East Fork SLO Creek projects (EB-I-1 through EB-I-6) were recommended in a prior draft of the Airport Area Specific Plan (AASP). According to the AASP that was revised in September 2014, the drainage system concepts no longer included the above-mentioned projects, and included on-site stormwater detention consistent with the DDM.

An excerpt from the AASP revised September 2014, Chapter 7.1 Storm Drainage is provided as **Attachment 2**.

The flooding issues previously commented on regarding the Buckley Road bridge and the Buckley Road and Vachell Lane intersection was assumed to be addressed by the above-mentioned projects as referenced in the WMP. It is not determined to what degree that current flood mitigation alternatives address this specific location.

Implementation Status of the Preferred Project

The Mid-Higuera Bypass Project (SLO-I-3) is underway. The final design is anticipated to be completed mid-2019. The public hearing to certify the Final Supplemental Environmental Impact Report (FSEIR) for the project is scheduled for August 21, 2018 in the County Board of Supervisors Chambers located at 1055 Monterey Street, San Luis Obispo CA.

The status for other individual structural projects of the Preferred Project has not been determined.

In addition to the structural projects including bridge replacements and channel modifications, the Preferred Project includes regular bank repair, silt removal, and vegetation management within the waterways. The City of San Luis Obispo has been coordinating these maintenance efforts within the city limits.

Non-structural flood control measures include planning and community outreach, building relocation/demolition, and flood prone property land acquisition. The status of the non-structural components has not been determined.

Attachments

1. WMP Chapter 6.1 Preferred Project Structural Flood Control
2. AASP revised September 2014, Chapter 7.1 Storm Drainage

6.1 Preferred Project Structural Flood Control

It is recognized at the outset that managing all of the flooding problems along SLO Creek to obtain a high level of flood protection, such as for a 100-year event, is not feasible for two reasons. First, environmental quality along most of the existing natural stream corridor would likely be adversely impacted by certain components of the project. Second, certain parts of these projects would be very costly, requiring right-of-way acquisition, extensive bridge, utility, and other infrastructure relocation, and complicated structural engineering. The structural solutions contained in the Preferred Project and the Viable Design Alternative do not provide 100 -year flood protection, but significantly reduce the frequency and depth of flooding and flood damage. Therefore a flood-proofing program for most reaches should be considered a complementary element. Flood control projects that are part of the Preferred Project are divided into structural solutions and non-structural solutions.

Table 6-1 summarizes the major project features of the City/Zone 9 Preferred Project. This important component of the WMP is based on:

1) Field inventory of creeks and GIS development
2) Hydrologic and hydraulic analysis
3) Problem Identification
4) Public Meetings (2) on inventory, problem identification and preliminary alternatives
5) Review and short-listing of "Long List" of alternatives by Zone 9 Advisory Committee
6) Engineering feasibility and benefit: cost analysis of "Short List" of alternatives
7) Designation of "Preferred Project" for CEQA/NEPA review purposes by SLO City Council
8) Development of "Other Alternatives Being Considered" for CEQA/NEPA review
9) Designation of non-feasible projects "Not Considered Further"

Table 6-1
Select Channel Modification Projects Land Requirements

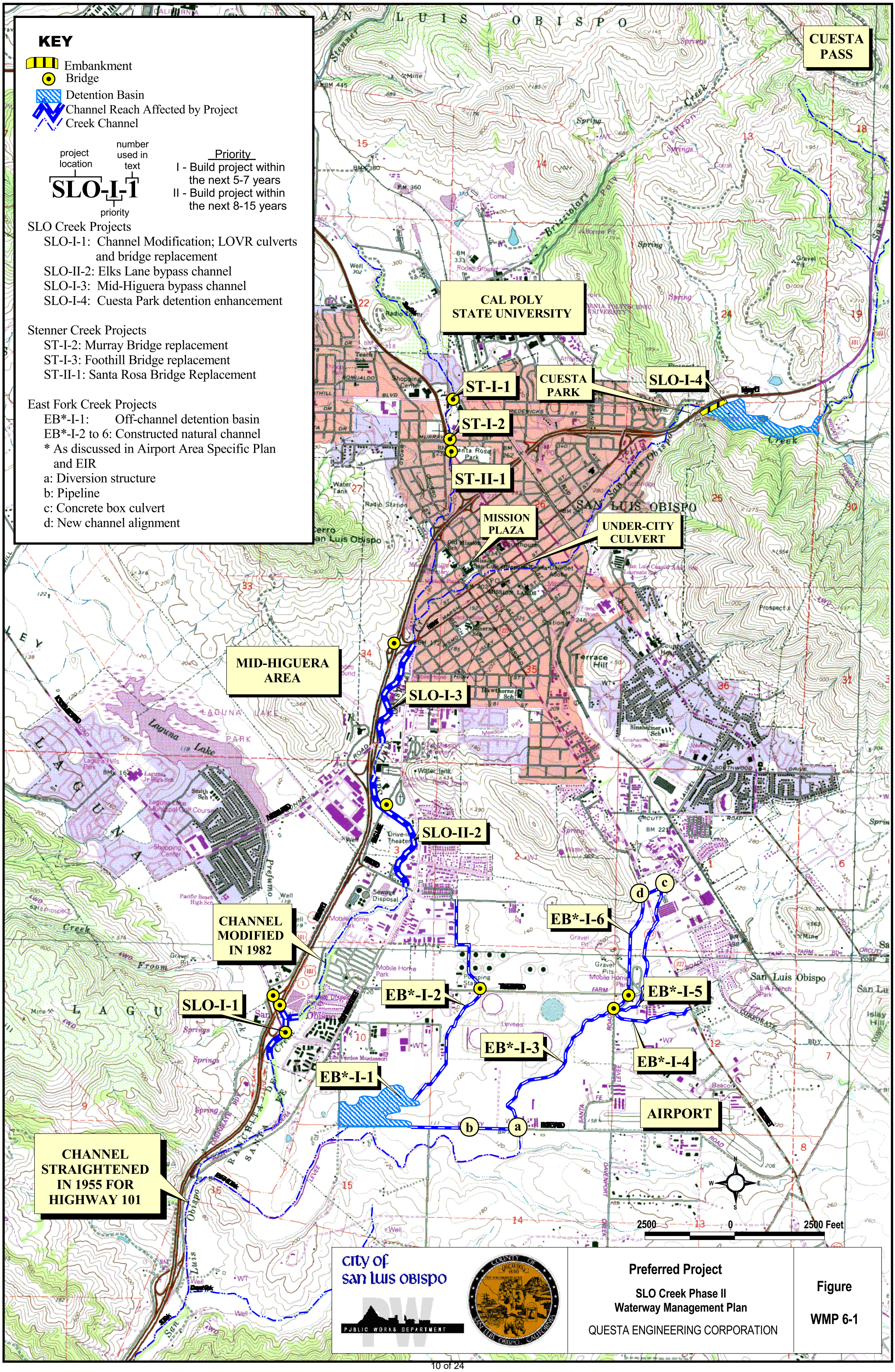
Project	Location	Design Flow	Major Project Features
SLO I-1	Channel Modification Below LOVR, LOVR Culvert and Bridge Replacement	100-year	• 400m (1300 ft) long by 45m (150 ft) wide bypass channel • Replacement of culverts where Prefumo Creek crosses Hwy 101 and the southbound off-ramp from Hwy 101 • Possible new bridge for bypass under LOVR
SLO II-2	Elks Lane Bypass Channel	50-year	• 1100m (3600 ft) long by 40m (130 ft) wide bypass channel • New bridge for bypass, adjacent to existing creek bridge on Elks Lane • 40m by 120 m-long terrace on west bank below Prado Road

Project	Location	Design Flow	Major Project Features
SLO II-3	Mid-Higuera Bypass Channel & Terrace	20-year	• 400m (1300 ft) long by 20 to 60m (65 to 200 ft) wide bypass channel
SLO I-4	Cuesta Park Detention Enhancement	Provides 100-year protection on SLO to Stenner Creek confluence	• Increases 100-year depth above culvert by about 3m (10 ft), and 10-year depth by about 2m (7 ft) • Increases drainage time for existing storage area from about 4 hours to approx. 8 hours at 100-year event • 5000-10,000m^2 embankment footprint
ST I-1 and ST I-2, ST II-3	Stenner Creek Bridge Replacements	100-year	• Replaces Foothill and Murray Street Bridges • Replaces Santa Rosa Street Bridge if further hydraulic studies indicate need.
EBI-1*	Buckley Road Detention Basin	Maintains current flow conditions on East Fork at SLO confluence	• 13.4 hectare (33 acre) detention basin
EBI-2 through 6*	East Fork Channel Modifications	100-year	• Constructed natural channel modifications along 8000m (25,000ft) of existing, mostly degraded channel.

* *For informational purposes only, project is part of Airport Area Specific Plan.*

The Zone 9 Advisory Committee, City, and County Engineering and Planning staff met monthly to review and provide input over an 18-month period. The structural elements of the Preferred Project are conceptual, and detailed environmental, engineering, cost estimating and financing studies must be completed before the concept plans proceed to final design, permit review, and construction. The Preferred Project provides a road map for how the SLO community intends to manage its flooding problems, and as such it can be used for forward planning and budgeting by the City and County. The Preferred Project is in draft form and changes to the concepts, including changed construction priorities, may occur as it proceeds through public review and agency comment.

Figure 6-1 references each of the Preferred Project flood management descriptions**,** with the map reference shown on the figure used in the text heading. The figure number also represents the proposed project prioritization. (Example, Project SLO I-1 is first project on SLO Creek, Priority 1). Individual projects are discussed below.



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Preferred Project

SLO Creek Phase II
Waterway Management Plan

QUESTA ENGINEERING CORPORATION

Figure

WMP 6-1

6.1.1 Channel and Bridge/Culvert Replacement Work at Los Osos Valley Road (LOVR) (Project SLO I-1)

High water in San Luis Obispo Creek during storms as small as the 10-year event currently causes flooding of Highway 101 near Los Osos Valley Road (LOVR). This flooding extends up Prefumo Creek to Calle Joaquin. This proposed project would install a bypass channel to San Luis Obispo Creek near (below) LOVR to increase local capacity and reduce backwater flooding on Prefumo Creek and Highway 101 (**Figure 6-2**). The channel would be located on the east bank, and would extend downstream about 400 meters (1300 feet).

Prefumo Creek crosses under Highway 101 and the onramp to Highway 101 through two separate concrete box culvert structures. Replacing these culverts will be necessary to provide 100-year capacity in this area.

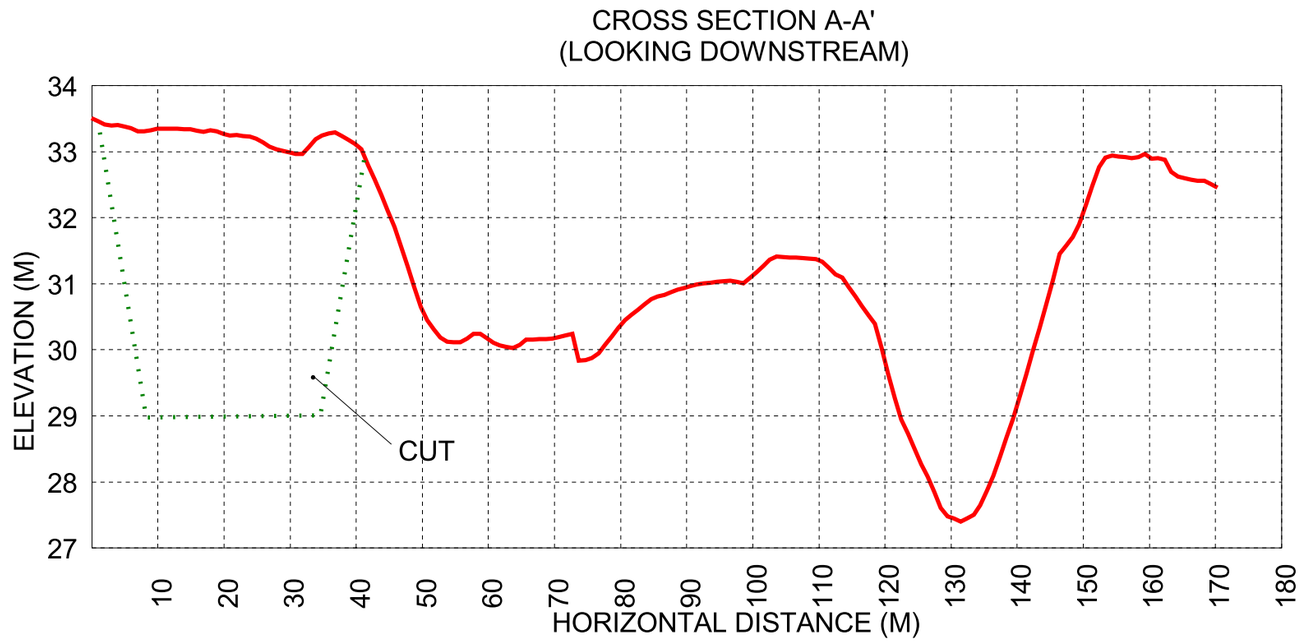
Currently, flow from San Luis Obispo Creek spills across Highway 101 during high flow events near Madonna and Prado Roads and eventually enters lower Prefumo Creek. The magnitude of the split flow is similar to the natural flow in Prefumo Creek. Installing culverts or a bridge with sufficient capacity to pass both the natural flow of Prefumo Creek and the added SLO Creek split flow would be difficult. This project assumes (for achieving 100-year protection) that the flow splits will be partially mitigated upstream by channel modifications or construction of a bypass channel parallel to SLO Creek in the Elks Lane area above Prado Road (see **SLO II 2**).

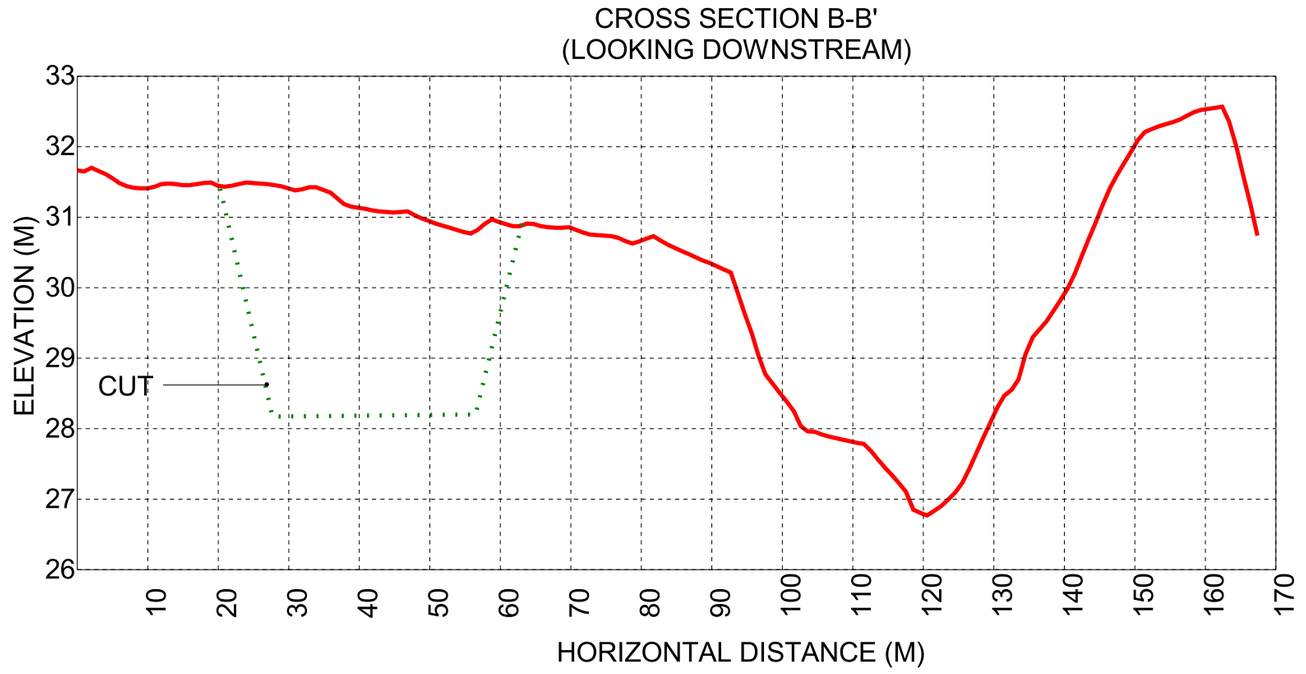
Additional lowering of the water surface elevations in lower Prefumo Creek would be achieved in this reach by managing the existing dense vegetation per the SMMP. This would involve selectively thinning and limbing up the willows, and inter-planting with single trunk species such as sycamores and cottonwoods. This work is also included as part of this project. Replacing the Prefumo Creek culverts under Highway 101 and the Highway 101 onramp are also included with this project, as is the construction of a bridge on Los Osos Valley Road across the proposed bypass channel (immediately east of the existing LOVR culverts crossing of SLO Creek).

6.1.2 Elks Lane Bypass Channel (Project SLO II 2)

Under existing conditions, at about the 20-year recurrence interval, flow spills out of the channel of San Luis Obispo Creek near Elks Lane (below the Lady Family Sutcliffe Cemetery) and flows overland across the floodplain, through the existing drive-in theater site, and eventually across Prado Road. The larger flood flows spill onto the City Corporation Yard and Waste Water Treatment Plant (WWTP) (Note: currently the sludge ponds and critical treatment facilities are not inundated by the 100-year flood). From there, larger flows spill across Highway 101 to enter lower Prefumo Creek while the rest returns to the main creek channel below the Wastewater Treatment Plant.

Flood protection to meet the proposed 50-year Design Flow for this area would be provided by creating a parallel bypass channel as shown in **Figure 6-3**. For most of its 1100-meter (3600 feet) length the 40-50 meter (130-165 feet) wide bypass channel would be separated





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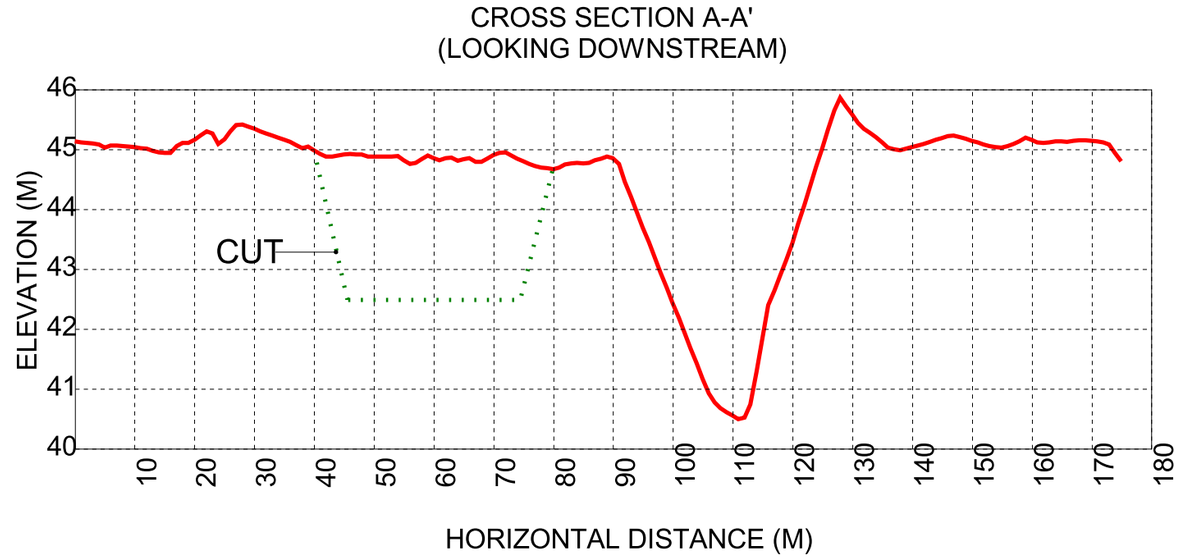
Channel / Bridge Replacement - LOVR

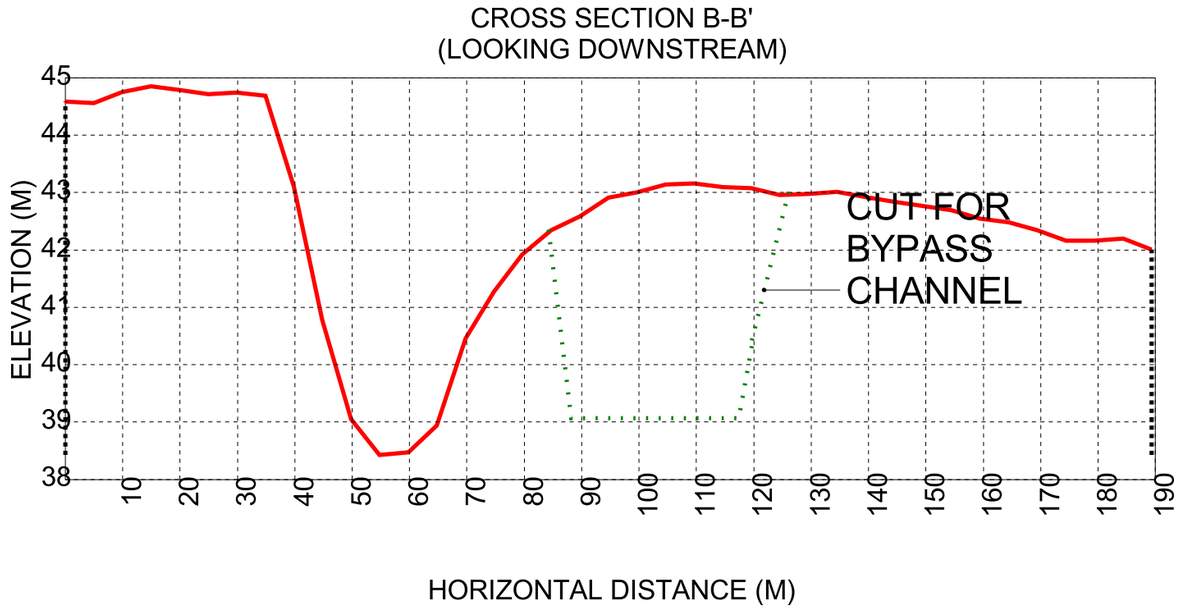
SLO Creek Phase II
Waterway Management Plan

QUESTA ENGINEERING CORPORATION

Figure

WMP 6-2





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Elks Lane By-Pass
SLO Creek Phase II
Waterway Management Plan
QUESTA ENGINEERING CORPORATION

Figure
WMP 6-3

from the existing channel by a variable width vegetated buffer at least 30 meters (100 feet) wide. Where the bypass crosses Elks Lane, a new bridge structure would be built.

Some channel modification work is also included with this project in the most constricted channel portion, adjacent to the Mausoleum below Madonna Road. There is not enough room here for a bypass channel or construction of an in-channel floodplain terrace, so a biotechnical retaining structure such as a live crib wall or vegetated geogrid is proposed for this approximately 70 meter (210 foot) section along the channel banks (west side). Even so, some continued flooding would occur in the cemetery area.

(Note: Further widening the bypass channel could contain the 100-year event flow with little additional impacts to SLO creek, but there may be little public benefit in this, considering the costs of the project. This widened bypass project, if constructed, may be the obligation of adjacent property owners and would be subject to additional environmental review, permitting and City Council approval. At another constricted location, just above Prado Road, it would also not be possible to provide 100-year protection without both widening the existing channel and replacing the existing bridge (assuming that portions of the WWTP cannot be relocated). The bridge currently passes the proposed 50-year Design Flow. The existing bridge at Elks lane would also require replacement for 100-year level of protection.)

At certain locations, it will be necessary to construct a levee or berm along low points on the west bank of the creek or bypass channel, especially near Elks Lane where the bypass will need to terminate and where flow currently leaves the stream channel. Any levees here would have minimal impact on upstream water surface elevations since the channel capacity would have been increased due to the channel modifications.

The downstream impacts of the project are more complicated, since flow that currently spreads out across the floodplain and spills across Highway 101 would be kept within the existing channel. It would be necessary to construct low levees or floodwalls on the east bank of the creek at certain locations near Prado Road, since the 100-year water surface elevation would be raised to near the top-of-bank at this location. Furthermore, the 100-year water surface elevation downstream of Prado Road could be elevated above the bank top at the existing mobile home park. This would be mitigated by constructing a low (1 meter or 3 foot) floodwall at this location.

By reducing the amount of floodplain available for storage, the hydraulic modeling shows that this project would result in less attenuation of the hydrograph (flood flow rate reduction) through the reach than currently occurs. The flood peak would travel through the reach more quickly than it currently does, reaching the confluence with the East Fork of SLO Creek about 10 minutes earlier than under existing conditions. Since under existing conditions, flow in the East Fork has already peaked by the time the flood wave on SLO Creek passes through, having the wave come through earlier could increase the total flow in the creek below Buckley Road. The increase in flow ranges from less than 1 percent above the confluence with the East Fork to between 2 and 3 percent below the confluence. There are no structures in this area that would be affected by the changed hydrograph and the effect is significantly dampened by the time peak flows reach the Avila Beach area.

Any flow that overtopped the stream banks in this reach would contribute directly to flooding of most of the "25-year protected" floodplain. The hydraulics of this flooding is

very complicated and is impossible to analyze without knowledge of the way development would occur in the protected area. It is likely that the flooding would occur in different areas than currently experience flooding. Since this scenario could occur relatively frequently (4 times in 100 years, on average), providing 25-year protection for this reach is not recommended without strict land use controls that ensure floodplain development will not greatly reduce the existing conveyance provided by the floodplain. These are provided for in the DDM *No Adverse Impact* and *No Net Fill* policies.

Any development plan for areas protected by this project needs to consider the impacts to flood conveyance through the floodplain. The DDM would also require that a Drainage Master Plan be developed for the area that ensures no increase in flooding because of the channel modification project and adjacent floodplain development.

6.1.3 Mid-Higuera Bypass Channel, Terrace and Vegetation Management (Project SLO I-3)

Over the past 40 years, there have been six significant flooding events between Marsh Street and Madonna Road. The last major flood event occurred on March 10-11, 1995. Historically, this reach has had some of the most frequent and significant flooding problems in the community. There are several reasons for the recurrent flooding problems*:*

- The channel has a smaller cross-sectional area and lower flood conveyance capacity than the channel immediately upstream and downstream. In addition, the channel grade flattens below Marsh Street.
- The floodplain has been significantly encroached upon by buildings and floodplain fill on Higuera Street.
- The Marsh Street Bridge, located at the upper end of the reach, historically becomes partially blocked by sediment and debris during high creek flow events, causing flow to spill out of the channel just upstream of the bridge. Flows travel down Higuera Street through the business area.
- During very large storm events, flow in SLO Creek can exceed the capacity of the large buried culvert under Higuera Street between Osos and Chorro Streets, with overflow from the break-out point traveling down Higuera, Marsh, and Pacific Streets, flooding the businesses before re-entering the channel at various return-flow points within the Mid-Higuera business district.

Previous studies (Nolte, 1977) identified several flood mitigation alternatives that are not considered economically justifiable or permissible by environmental regulatory agencies. Consequently, a project was developed within relatively strict design constraints that the project could not significantly modify the stream channel bed or remove major areas of native riparian vegetation.

In the Mid-Higuera area the channel work would consist of construction of a terrace along the creek located above the 2-year flow-line, and a bypass system constructed parallel to but mostly away from the existing creek alignment. The channel would be designed to carry an

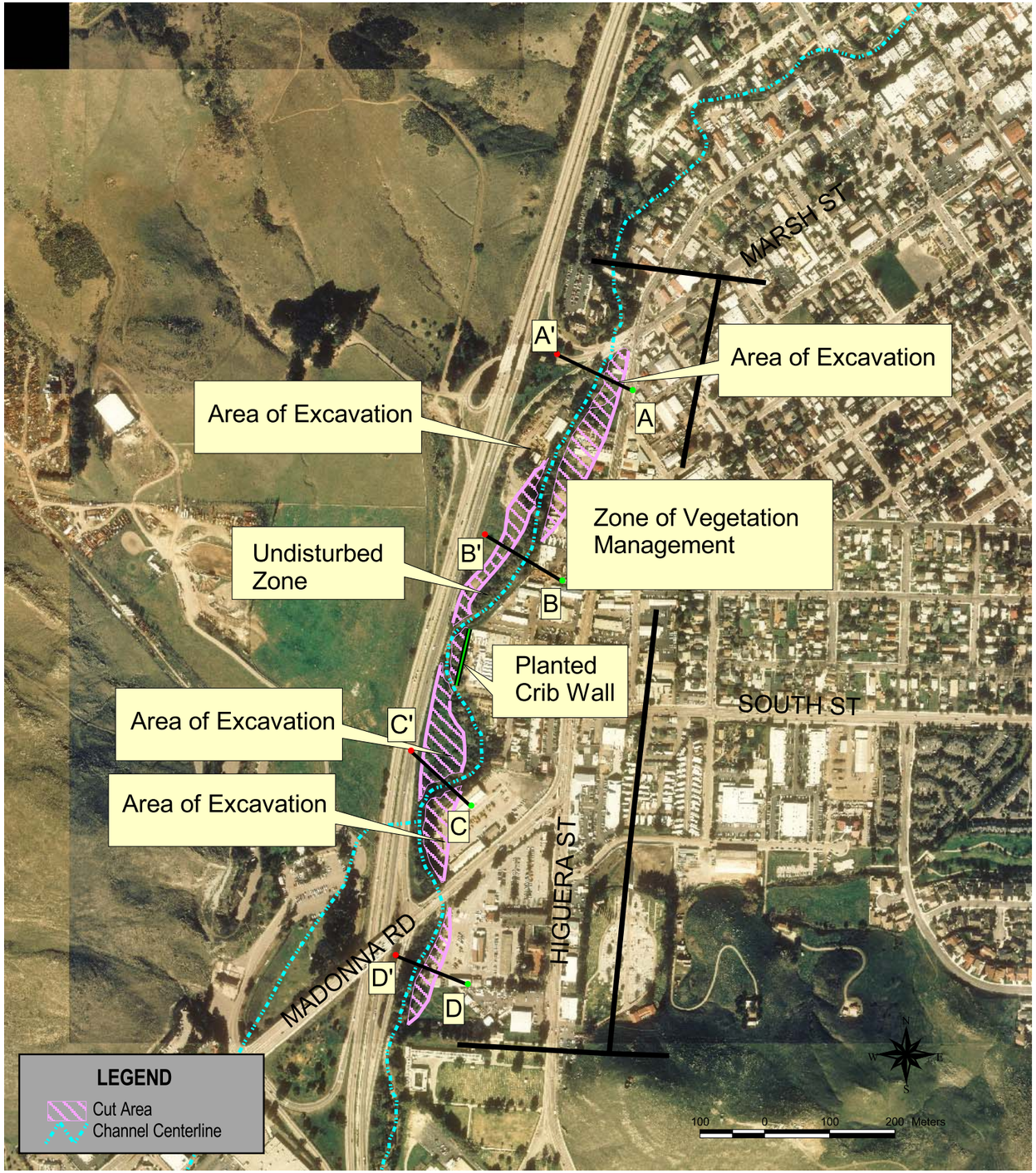
approximately 20- year storm (**Figure 6-4**). The excavation of the secondary overflow flood pathway on the floodplain would be on the west side of the creek. Where possible (and in most areas), the excavation of the flood secondary pathway would be isolated from the active channel by an island of higher ground ("untouched area") adjacent to the channel that supports native trees and shrubs. However, in several locations, including on the east bank at the Caltrans Maintenance yard, and on the west bank through much of Madonna Construction Company's yard, floodplain excavation would be contiguous to the creek. Excavation would begin above the 2-year flow line (above ordinary high water or ACOE jurisdiction), about 2 m (6.6 ft) above the channel bed. The floodplain would be lowered by 1.8 to 2.4 m (6 to 8 ft). All material would be hauled off-site and out of the 100-year floodplain.

The reconfigured flood pathway would extend from the Marsh Street Bridge downstream to the Madonna Bridge, primarily on the west side of the channel. Approximately 400 meters (1300 feet) of creek length would be involved. The bypass channel would be built above the channel bottom of the existing channel, about 1/3 of the way up the bank, at the upstream and downstream transition points. These transitions would be protected with willow planted rock rip-rap.

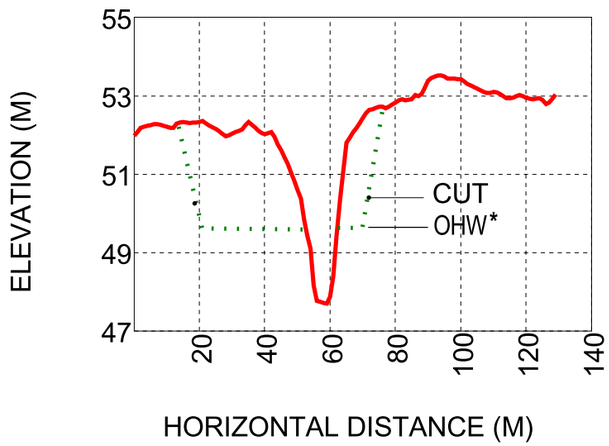
Only floodwaters in excess of a 2-year storm would move through the bypass channel. This would maintain summer low flow and prevent sedimentation in the pools in this area. The natural channel would remain to maintain in-stream fisheries habitat. The bypass channel would be planted with a scattered to semi-dense stand of native, wood-plant species. Periodic maintenance would be needed to remove low branches and other hydraulic roughness elements. The Bianchi Lane Bridge would be replaced with a clear span, arched structure as part of this project, if the property on the west side of the creek is to have all weather access.

Marsh Street Property Floodway Terrace. This component of the Mid-Higuera project would entail excavation of a floodway terrace on the creek's east bank immediately downstream of Marsh Street Bridge (at the McNamara Real Estate property). In addition, minor improvements to the channel upstream of Marsh Street Bridge would be included to reduce the effects of sediment and debris blockage of the bridge barrels. Implementation of this element of the project would result in a predicted drop in water surface elevations of 0.28 m (0.9 ft) at the Marsh Street Bridge but has little direct impact elsewhere in the reach.

Channel Vegetation Management Program. An intensive, long term vegetation management program is included with the Mid-Higuera area project work. This constitutes measured, environmentally sensitive channel maintenance, reducing the channel roughness of the creek banks by carefully and selectively thinning and limbing up the willows, and inter-planting taller growing, single trunk native trees (Sycamores and cottonwood) on the upper creek banks. These would eventually shade out many shorter willows. In the short term, the lower branches on existing willows would be thinned during an annual maintenance visit, and any large gaps in the canopy would be inter-planted with tall, straight, tree forming species. Work would focus on willows along the lower channel banks, and phased replacement of



CROSS SECTION A-A'
(LOOKING DOWNSTREAM)



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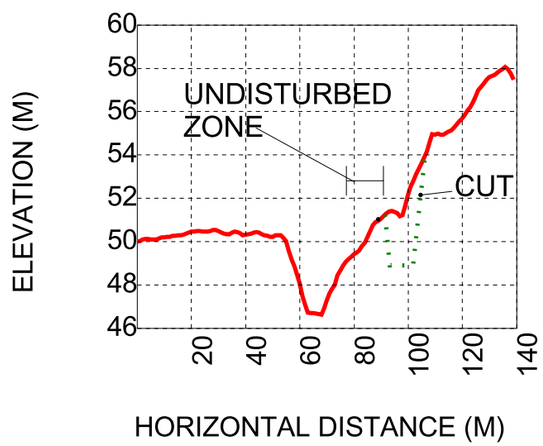

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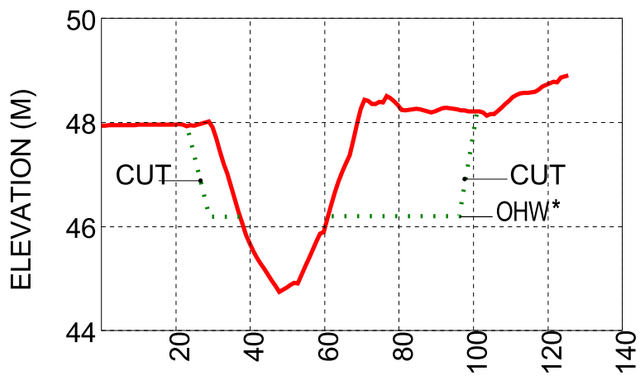

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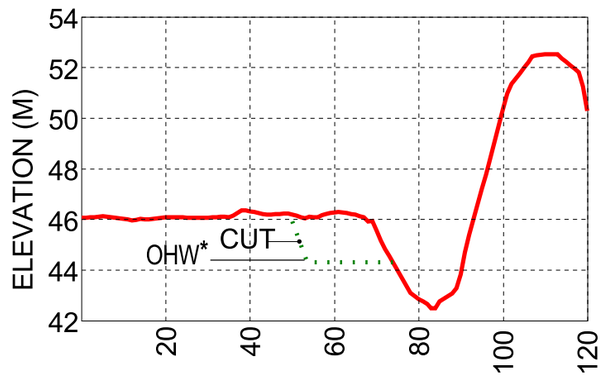

*Area below OHW to be protected and remain undisturbed.

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Mid-Higuera Design Alternative

SLO Phase II Waterway Management Plan

QUESTA ENGINEERING CORPORATION

Figure 6-4

non-native trees, avoiding sensitive areas such as dense willow clusters adjacent to summer pools.

Each year the proposed channel maintenance work (City-wide) would be described in an Annual Work Plan (AWP) that will be provided to the ACOE and other regulatory agencies for review. A team consisting of a hydrologist and biologist would pre-mark in the field all sensitive areas, including trees to be preserved, hazard trees to be stabilized, trees to be thinned and limbed, and areas to be inter-planted with native trees and shrubs. A CDFG Biologist will be invited to review the proposed work, prior to implementation. The actual maintenance work will be supervised in the field by a qualified biologist.

The Mid-Higuera project would also include an intensive creek restoration effort involving both enhancement of channel conditions through the installation of in-stream structures (root wads, boulder clusters and lunkers as determined by a Fisheries Biologist), and revegetation of bank top areas.

Vegetation management would be completed in phases, and only become fully effective in 7-10 years or more. However, each year some important net reduction in channel flow resistance would be accomplished. Annual channel maintenance would be accomplished within the conditions of the overall SMMP.

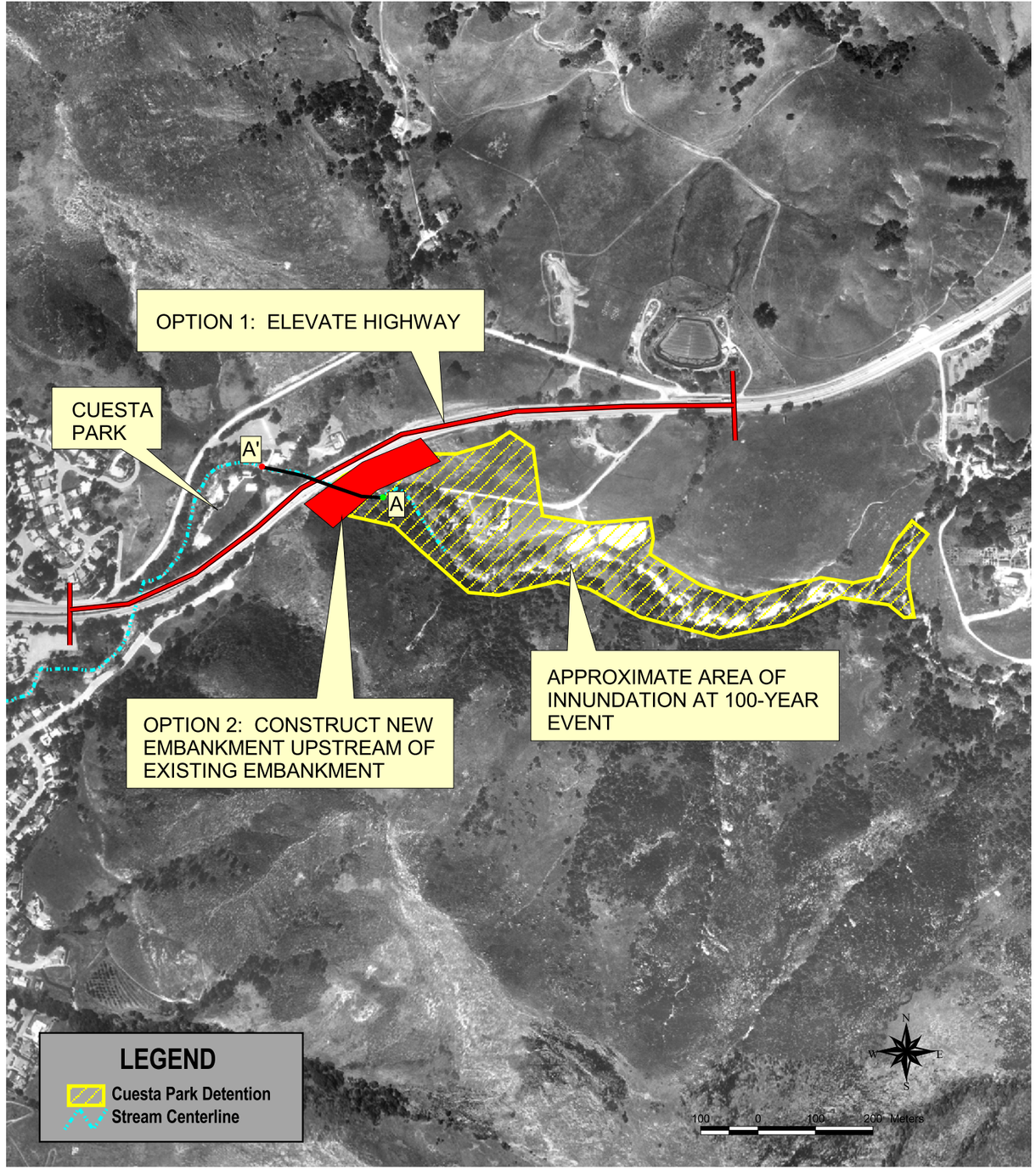
Vegetation management to achieve reductions in flood flow resistance must be completed carefully, balancing needed flood conveyance improvements with the risks of increased channel bed erosion from the resultant increases in channel velocity.

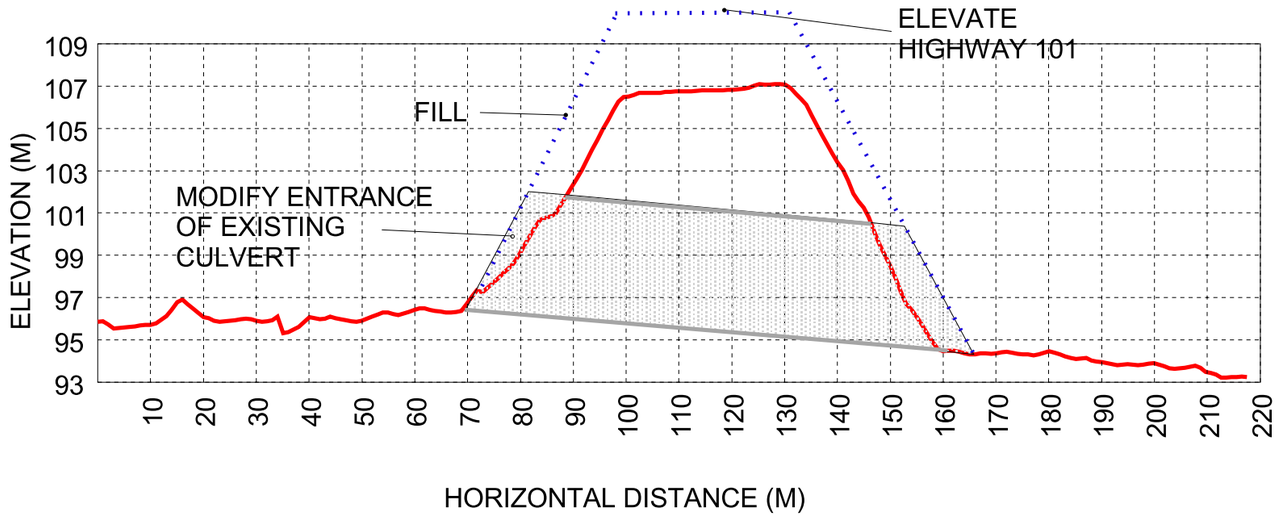
In some cases, channel bed and lower channel bank stabilization, (for instance using low 5 m or 18" rock channel grade stabilization structures, or planted rock rip rap) will be needed. The SMMP require that channel vegetation management field decisions be conducted by a team consisting of a hydrologist and biologist, and that the California Department of Fish & Game and National Marine Fisheries be invited to consult informally in the field on all such projects.

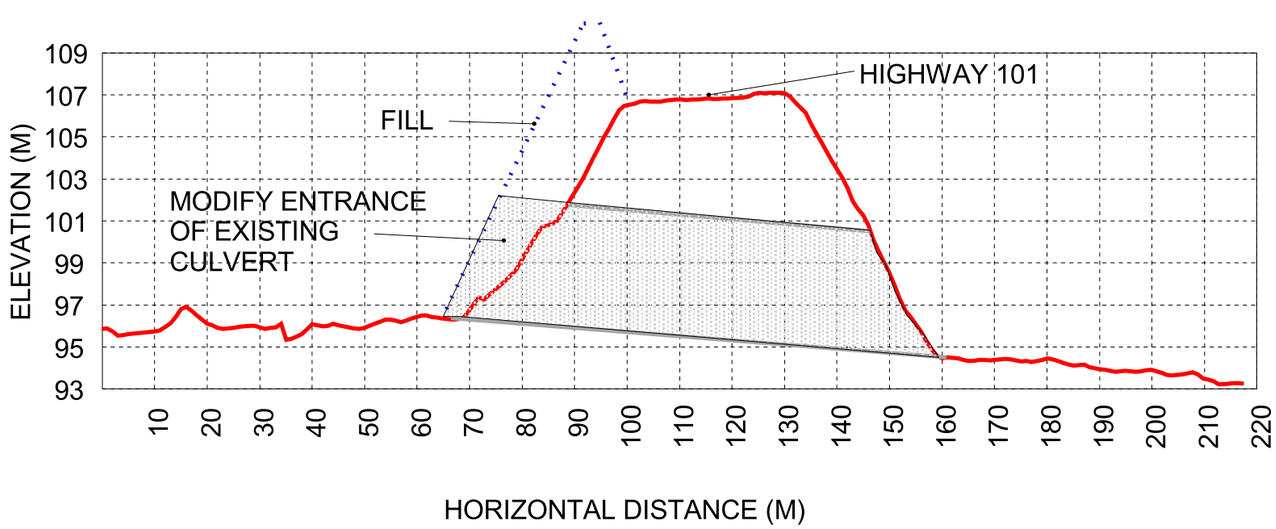
A program of active channel vegetation maintenance will have some benefit in this stream reach, reducing flood water surface elevations for the 10-year flood event by about 0.1 to 0.3 meters, (0.4 to 1.0 foot), depending on location within the reach.

6.1.4 Cuesta Park Detention Enhancement (Project SLO I-4)

Currently, the Highway 101 culvert crossing of San Luis Obispo Creek above Cuesta Park acts as a dam during very large storms, providing an important measure of flood protection storage for the City. This function would be enhanced by elevating the highway shoulder by about 5 meters (16 feet) and modifying the existing culvert (choking down the culvert to reduce flow and increase detention storage-see **Figure 6-5**). The upstream storage area would only fill (greater than it currently does) during rare events, and the flow detention would be temporary, lasting only several hours to at most a day. During most storms and most years, the upstream channel system would be essentially unaffected by the project.







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Cuesta Park Detention Storage
SLO Creek Phase II
Waterway Management Plan
QUESTA ENGINEERING CORPORATION

Figure
6-5

The structures proposed would be sufficient to reduce the 100-year flow rate within San Luis Obispo Creek through downtown San Luis Obispo to about 127 cms (4500 cfs), which is the reported capacity of the under city culvert (Nolte 1977). A slightly smaller structure (approximately 1-m lower) would be sufficient to provide 50-year protection. Also, if the capacity of the under-city culvert is determined to be higher than the reported 127 cms (4500 cfs), the embankment structure's size may be reduced. While the benefits of the project would potentially be quite large on San Luis Obispo Creek above the Stenner Creek confluence, they are not as significant below the confluence, (i.e. Mid-Higuera area) where the other projects are still required to address existing flooding problems. Since the culvert is owned by the California Department of Transportation, and embankment modifications would be within the Caltrans right-of-way, their authorization and cooperation is essential. The size of the detention structure will mean that the California Division of Dam Safety will need to be involved with project design review and approval. An emergency spillway will almost certainly be needed (there is not one for the existing structure). The design of the emergency spillway structure will make the project challenging, with potentially significant construction impacts on Highway 101.

The Cuesta Park project is a high priority. It will be one of the most beneficial in terms of flood reduction benefits with few environmental impacts. The conceptual plan needs to be further coordinated with Caltrans and the State Division of Dam Safety to address institutional feasibility issues.

6.1.5 Stenner Creek Bridge(s) Replacement (Projects S I-1, S I-2, SI I-3)

The Foothill, Murray, and Santa Rosa Street Bridges across Stenner Creek do not have sufficient capacity to pass the proposed Design Flows. Starting at between a 10-year and 25-year event, flow spills out of the channel, across Santa Rosa Street and through a residential neighborhood toward Chorro Street and Old Garden Creek. Replacing the three bridges would prevent this from occurring, removing the threat of flooding to a significant number of residences.

The proposed replacement of the Foothill Bridge is currently in environmental review and preliminary design. Since the Foothill and Murray Street bridges each cause flow to be lost from Stenner Creek, the replacement bridges must be designed and staged so that the no-longer detained flows do not move downstream and cause worse flooding at a downstream bridge (either Murray or Santa Rosa Streets). Installing temporary channel constrictors, or temporarily blocking portions of the structures until the downstream bridges are replaced can accomplish this.

The channel below Santa Rosa Street has an estimated 100-year flood conveyance capacity, so replacing all three bridges concurrently will not create increased downstream flooding risk. The Santa Rosa Street Bridge on Stenner Creek has undergone several stages of construction, which has resulted in an irregular bridge opening, making modeling the hydraulics of the Santa Rosa Street area quite difficult. Before a final decision is made to replace that bridge, a more detailed bridge hydraulic study and/or observation of

performance during high flow events are needed. However, it is unlikely that the Santa Rosa Street Bridge has 100-year capacity.

6.1.7 Detention Basin and Channel Work along East Fork - Airport Specific Plan (Projects EB I 1 to 6)

The WMP includes several drainage and flood control projects recommended in the Draft Airport Area Specific Plan, including a proposed regional storm water detention facility off Buckley Road, several bridge and culvert replacement projects, and modifications to the East Fork of SLO Creek and several of its tributaries. The Specific Plan-proposed East Fork modifications may not be entirely consistent with the DDM guidelines and the final design may have to be modified to reflect the DDM. A Constructed Natural Channel is required by the DDM. The drainage facilities shown in the Specific Plan have been included to provide the reader with a cumulative picture of the watershed-wide flood management facilities that may be built over the next ten years.

The recommended channel design would have a narrow in-channel vegetated terrace constructed at the 2-year flow line, with the upper banks sloped back 2.5:1 and revegetated with native trees and shrubs. A wide (100-foot minimum) buffer would be established along the bank tops on either side of the channel in most areas. The buffer area would be within the 100-year floodplain of the East Fork of SLO Creek and its tributaries. This corridor would also be planted with native trees and shrubs, although less densely than on the main branch of SLO Creek, reflective of the natural plant community throughout this area. A public access trail may be included within the buffer zone.

6.2 Preferred Project Non-Structural Flood Control

Non-structural measures in the Preferred Project include:

- Planning and Community Outreach
- Building Relocation/Demolition
- Flood Prone Property Land Acquisition

6.2.1 Planning and Community Outreach

There are three components to the proposed Planning and Community Outreach part of the Non-structural Flood Control Element: (1) Floodplain Management Policies; (2) Community Rating System, and (3) Flood proofing.

Floodplain Management Policies. The new and revised Policies contained in the DDM and discussed earlier are progressive and would comprise one of the strongest floodplain management programs in California. This is a major emphasis of the overall WMP flood management program.

Community Rating System. Educating residents that live in flood prone areas about the hazards of flooding and what they can do to be better prepared for the eventual flooding that will occur should be a major part of a flood management plan, and is a part of the WMP.

7.1 STORM DRAINAGE

DRAINAGE SYSTEM OBJECTIVES

As discussed in Chapter 3, Conservation & Resource Management, a number of creeks flow through the planning area, where flooding is a regular occurrence. The on-site flooding and the potential for increased downstream flooding have restricted development in the area. When considering how to address storm drainage in the area, a number of objectives were identified for the drainage improvement plan. These include:

- Use the City's Drainage Design Manual and Waterways Management Plan as the basis for all detention requirements in the Specific Plan area.
- Provide a method for flood protection consistent with the City's Flood Damage Prevention Regulations.
- Maximize the opportunity for environmental enhancement of stream corridors and stormwater detention and conveyance facilities.
- Minimize capital expenditures.
- Provide opportunities for multiple-use of storm drainage facilities.

DRAINAGE SYSTEM CONCEPTS

Initially, an area-wide drainage solution was envisioned for the Airport Area. This solution was referred to as the Storm Drain Master Plan and relied on significant creek channel modifications to keep storm flows within existing creek channels, modified natural channels, and in man-made by-pass channels. A regional detention basin south of Buckley Road was proposed to detain water and prevent downstream flooding. After this solution was developed, the City's Waterways Management Plan was approved, which includes a Drainage Design Manual with standards for on-site storm water detention. Once it became evident that the costs of the original Storm Drain Master Plan were prohibitive, the Storm Drain Master Plan was revised to allow for on-site detention of storm flows, consistent with the Drainage Design Manual.

DRAINAGE SYSTEM IMPROVEMENTS

New development projects and the incorporate of the Chevron Remediation and Development project will enhance the drainage capacity of the region while enhancing natural habitat. All projects in the region will:

1. Apply the requirements of the City's Floodplain Management Regulations to proposed development within the Airport Area.

2. Apply the requirements of the City's Waterways Management Plan, Drainage Design Manual, City's Stormwater Ordinance, and the Post Construction Stormwater Regulations (RWQCB) to proposed development within the Airport Area.

These proposed improvements, along with implementation of existing City-wide ordinances and requirements are expected to provide 100-year flood protection and provide for environmental enhancement of stream corridors. The analytical methods outlined in the Waterway Management Plan, Drainage Design Manual shall be used to assist in the future design of flood control improvements. The Waterway Management Plan is available through the Public Works Department and incorporated into this Specific Plan by reference.

DRAINAGE SYSTEM POLICIES

Policy 7.1.1: Encourage BMP's

The City will encourage Best Management Practices for drainage when reviewing all development proposals. The use of bio-swales for conveying storm water on-site through open channels is

particularly encouraged for their efficacy and natural, aesthetic quality.

Policy 7.1.2: Creek Corridor Enhancement

As part of the development review process for sites that are crossed by one or more creek corridors, the City will require creek corridor enhancement consisting of:

- Removal of non-native vegetation.
- Removal of obstructions that impede storm flows and that are detrimental to aquatic species.
- Establish additional riparian vegetation.

Policy 7.1.3: Off-Site Improvements Permissible

When detention requirements cannot be fully met on-site, off-site improvements of creek corridors is permissible, consistent with the requirements of the City's Waterways Management Plan and Drainage Design Manual.

Policy 7.1.4: Porous Paving Encouraged

The use of porous paving to facilitate rainwater percolation is encouraged. As a condition of project approval, the City will require parking lots and paved outdoor storage areas, where practical, to use one or more of the following measures to reduce surface water runoff and aid in groundwater recharge: porous paving; ample landscaped areas that receive surface drainage and that are maintained to facilitate percolation; drainage detention basins with soils that facilitate percolation.

Policy 7.1.5: On-Site Detention Basins and Creek Corridors

Detention basins will be owned by the subdivider, a property owners' association, or a major nonresidential parcel owner, and will be maintained by an owners' association or a special district. Ownership and maintenance of minor waterways will be the same, with a City easement for open space and, where trails occur, public access.

Policy 7.1.6: Developer's Responsibility

Developers are responsible for drainage facilities serving their parcels, including needed facilities through adjoining properties. Where facilities serve more than one parcel, developers may form benefit districts or establish reimbursement agreements.

Policy 7.1.7: Design Review

The design of detention and conveyance facilities will be subject to City approval as subdivisions are reviewed, and will be based on runoff studies and recommendations by qualified professional engineers.

Policy 7.1.8: Design of Detention Facilities

Detention facilities will be compatible with natural features and the desired neighborhood character. Shallow basins with curvilinear sides, adjacent to waterways, are acceptable, while steep-sided, rectangular basins are not. Use of detention areas for habitat protection and enhancement, or for appropriate recreation, is encouraged. Additional design guidelines for drainage are found in Section 5.21 of this Specific Plan.

Policy 7.1.9: NPDES

All drainage facilities must comply with National Pollutant Discharge Elimination System (NPDES) Phase II permit requirements. The City of San Luis Obispo has a set of standards for Post Construction runoff control that must be implemented by property owners as they develop.

Policy 7.1.10: Developer's Costs

Developers will contribute to the cost of implementing the Storm Drain Master Plan and in some cases may be required to perform

the work and then be reimbursed. Additional information on costs can be found in Section 8.4.7 of this Specific Plan.

Policy 7.1.11: Incentives

Exceptional implementation of drainage design policies makes a project eligible for development incentives as described in Section 4.4.7 of this Plan.

7.2 WATER

Development in the Airport Area can occur only if adequate water supply is available. Both the existing water supply and the City's capacity to treat it are limited. While existing water is available, new sources will be needed before build-out of the Airport Area occurs. Increasing demand will stress the capacity of the existing sources to reliably deliver desired water quantities. Therefore, it is important that the City continue to pursue additional water sources to meet General Plan buildout demands. In addition, treatment for potential new surface water supplies will require conventional treatment, which could require that the raw water conduit capacity and conventional treatment capacity be increased to accommodate projected citywide growth.
If City water supplies are not supplemented in time to serve maximum buildout of a property in the Airport Area, on-site water supplies may be used. If on-site supplies are not sufficient to serve the maximum development of a property otherwise possible, the property should be developed to allow for subsequent buildout of the property when additional city supplies become available.

Based on the proposed land uses, the average daily water demand for the Airport Area at build-out is projected to be 1,234 gallons per minute or 1.8 million gallons per day, excluding water demands from the airport (Water System Master Plan, dated October 2000, by Boyle Engineering). The maximum daily water demand is estimated to be 2,468 gpm (3.6 MGD). This increase in demand represents approximately 60% of the projected total citywide increase in water demand at build-out of the entire General Plan area. Approximately 13% of the increase in citywide demand would be due to the Margarita area, and the remaining 27% would be due to growth in other parts of the city.

The Airport Area will be served by the existing Edna Saddle Pressure Zone. The primary water service to this pressure zone is from a 20-inch diameter transmission main that carries water from reservoirs located to the north of the city. The 4-million gallon Edna Saddle storage tank, which is located to the north of the Margarita and Airport areas, provides operational, emergency, and fire flow storage for the area. It also provides water to the airport via a metered service to its private water system.

Water will be delivered to the Airport Area through a grid of 12-inch diameter mains: three traversing east-west, which are generally connected at the Los Osos Valley Road, Tank Farm Road, and Prado Road alignments, three north-south mains connecting to the existing 16- and 20-inch transmission mains to the north. The exact locations of these mains will likely change somewhat to follow future planned roadways, but their general configuration should remain similar to that shown in Figure 7-1. These grid mains are necessary to allow the transport of water within and across the area to supply fire flows. The interior distribution mains will be based on the final land use designation and related fire flow demands as determined by the Uniform Fire Code. These pipes will range between 8 and 10 inches, depending on fire flow demands and the looping configuration.

A 0.2-MG reservoir is also recommended for the Edna Saddle Zone to be located in the southwest part of the city near the Prefumo Canyon area. This tank will increase fire flows in this immediate area.

Additional demand for water supply is likely because at the time of adoption, the City's facility master plans did not cover the area south of the 1994 URL (Avila Ranch properties) or east of the airport (Morabito/Burek and Senn/Glick properties).

As a result, site specific studies are required before the review and approval of development projects in these areas (Figture 7-1).