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4.1.1 INTRODUCTION

This section provides a description of the surface water hydrology within the Project area and evaluates the potential direct, indirect, and secondary surface water hydrology and flood control impacts resulting from the proposed Project and alternatives. The associated development along the Santa Clara River within the Project area, including build-out of the Newhall Ranch Specific Plan, Valencia Commerce Center, and a portion of the Entrada planning area, could result in increased flood hazards. Accordingly, several flood protection improvements and facilities have been formulated as part of the facilitated development adjacent to the Santa Clara River and its tributary drainages, as described in **Section 2.0**, Project Description, of this EIS/EIR.

Direct impacts are evaluated for the proposed Project and its alternatives. Implementation of the proposed RMDP and SCP components also would facilitate County-approved development on the Specific Plana, VCC, and a portion of the Entrada planning area. Therefore, impacts to hydrology from the build-out of these areas are evaluated as indirect impacts of the proposed Project and alternatives. Hydraulic modeling conducted for this analysis includes build-out in these planning areas. Implementation of the proposed RMDP and SCP components also would result in potential changes to the watershed hydrology and hydraulics outside the boundaries of the Project area. These potential effects are evaluated as secondary impacts in this EIS/EIR.

The 18.7 square mile planning area includes the tributary drainages to the Santa Clara River. The RMDP site encompasses 11,999 acres of the total tributary drainage area of 20,724 acres. The tributary drainages located within the Project area are generally bounded by SR-126 and lower portions of San Martinez Grande and Chiquito Canyons on the north, the Six Flags Magic Mountain Amusement Park on the east, the crest of the Santa Susana Mountains on the south, and the lower portion of Salt Creek Canyon on the west.

4.1.1.1 Relationship of Proposed Project to Newhall Ranch Specific Plan Program EIR

This section (**Section 4.1**) provides a stand-alone assessment of the potentially significant hydrology impacts associated with the proposed Project and alternatives; however, the previously certified Newhall Ranch environmental documentation provides important information and analysis pertinent to this EIS/EIR. The Project components would require federal and state permitting, consultation, and agreements that are needed to facilitate development of the approved land uses within the Specific Plan site and that would establish spineflower preserves within the Project area, also facilitating development in the Specific Plan, VCC, and a portion of the Entrada planning area. Due to this relationship, the Newhall Ranch environmental documentation, findings, and mitigation, as they relate to surface water, hydrology, and flood control resources, are summarized below to provide context for the proposed Project and alternatives.

Section 4.2 of the Newhall Ranch Revised Draft EIR (March 1999) identified and analyzed the existing flood conditions, potential impacts, and mitigation measures for the entire Specific Plan area. In addition, Section 5.0 of the Revised Draft EIR (March 1999) identified and analyzed the potential flood impacts and mitigation measures associated with construction and operation of the approved WRP, which would treat the wastewater generated by the Specific Plan.

With respect to flood impacts, the Newhall Ranch Specific Plan Program EIR concluded that implementation of the Specific Plan's Conceptual Backbone Drainage Plan[1] would result in an approximate 30 percent decrease in total debris volume and a 12 percent decrease in total burned and bulked runoff in the 20,724-acre tributary watershed where the Newhall Ranch Specific Plan is located. Specifically, the existing amount of burned and bulked flows totals 52,729 cubic feet per second (cfs) for the 50-year capital storm, and the current total debris volume is estimated at 1,203,790 cubic yards (cy). Implementation of the Specific Plan would reduce the amount of burned and bulked discharge by 6,179 cfs to 46,550 cfs, and the amount of debris volume generated by 361,420 cy to a total of 842,370 cy.

In order to avoid flooding impacts along the Santa Clara River, those areas along the river that are proposed for development would be elevated above the existing 100-year and 50-year capital floodplains, thereby, removing the development from flood hazards. The floodplain modifications proposed in the Specific Plan included three bridge crossings over the Santa Clara River, bank stabilization along portions of the banks in the River Corridor of the Specific Plan site, and removal of mostly agricultural acreage from the floodplain by raising the land areas and installing elevated bank protection. It was concluded that the proposed Specific Plan would alter flows in the Santa Clara River; however, the effects would only be expected during infrequent flood events that reached the buried banks (*e.g.*, 50-year and 100-year flood events).

Within the Specific Plan area (from Commerce Center Drive to the Los Angeles County/Ventura County line), the analysis also found that implementation of the Specific Plan would not hinder flows or reduce the overall floodplain area that is inundated during high frequency flood events (2-year, 5-year, and 10-year), but would limit the overall floodplain area that is inundated during the less frequent, higher flow events (20-year, 50-year and 100-year events). However, these impacts were found to be less than significant given the magnitude of change and the infrequency of the flow events. Based on the prior analysis, implementation of the Specific Plan was found to not increase site discharge during a capital storm, not result in upstream or downstream flooding, and not subject any on-site or off-site improvements to flood hazards. Therefore, the development proposed in the Specific Plan was found to result in less-than-significant on-site and off-site flooding impacts.

Although no significant impacts were identified in this section of the EIS/EIR, the Newhall Ranch Specific Plan Program EIR, nonetheless, recommended implementation of Mitigation Measures SP-4.2-1 through SP-4.2-8 to ensure compliance with all plan and regulatory requirements.[2] In addition, to ensure avoidance of flood impacts resulting from construction and operation of the approved WRP, the Newhall Ranch Specific Plan Program EIR recommended implementation of Mitigation Measure SP-5.0-14 through SP-5.0-20. The Los Angeles County Board of Supervisors found that adoption of the recommended compliance mitigation measures would ensure compliance with all plan and regulatory

[1] The Conceptual Backbone Drainage Plan (Sikand, 2002), which specifies the proposed drainage and flood protection plan for the Specific Plan project area, was approved as a part of the NRSP.

[2] Reference to these compliance mitigation measures included in the Newhall Ranch Specific Plan Program EIR are preceded by "SP" in this EIS/EIR to distinguish them from other mitigation measures discussed herein.

requirements. The Newhall Ranch mitigation program was adopted by Los Angeles County in findings and in the revised Mitigation Monitoring Plans for the Specific Plan and WRP.

Table 4.1-1 summarizes the Specific Plan's and the WRP's flood impacts, the applicable mitigation measures, and the significance findings after the mitigation is implemented.

Table 4.1-1
Potential Flood Impacts Caused By Implementation of the Specific Plan and WRP

Impact Description	Mitigation Measures	Finding After Mitigation
Specific Plan Flood Impacts - The Specific Plan would not increase site runoff during a capital storm event and would not result in upstream or downstream flooding. In addition, the Specific Plan would not subject any on- or off-site improvements to flood hazards beyond applicable regulatory thresholds. During construction, the Specific Plan would have the potential to discharge sediment downstream during storm events, and this is a significant impact. Upon build-out, however, downstream sedimentation would be reduced. This sediment reduction in flood waters would reduce the amount of sediment available to replenish beaches down-current of the Santa Clara River mouth, but this is not considered significant.	• SP-4.2-1 (flood control improvements must be to the satisfaction of the Los Angeles County Department of Public Works Flood Control Division); • SP-4.2-2 (all necessary permits or letters of exemption must be obtained prior to construction of drainage improvements); • SP-4.2-3 (all necessary streamed agreements must be obtained); • SP-4.2-4 (Conditional Letters of Map Revision must be obtained after construction of the proposed drainage facilities); • SP-4.2-5 (prepare and obtain approval of a Final Hydrology Plan, Final Drainage Plan, and Final Grading Plan); • SP-4.2-6 (install permanent erosion control measures in order to prevent sediment and debris from entering storm drainage improvements); • SP-4.2-7 (satisfaction of all applicable requirements of the NPDES Program in effect in Los Angeles County); and • SP-4.2-8 (compliance with all appropriate requirements of the Los Angeles County Standard Urban Stormwater Mitigation Plan and the State Water Resources Control Board's Order 99-08-DWQ).	Not significant.

Table 4.1-1
Potential Flood Impacts Caused By Implementation of the Specific Plan and WRP

Impact Description	Mitigation Measures	Finding After Mitigation
Specific Plan Cumulative Flood Impacts - Assuming that all development within the tributary watershed of the Santa Clara River complies with local regulatory requirements to ensure that upstream or downstream flooding does not occur and to ensure that downstream erosion and sedimentation do not occur, no unavoidably significant cumulative flooding, erosion, sedimentation, or beach sand replenishment impacts would be created.	• No further mitigation recommended.	Not significant.
WRP Flood Impacts - A portion of the WRP site is within the Los Angeles County 50-year capital floodplain and the Federal Insurance Administration 100-year floodplain. Site preparation would include the placement of sufficient fill material across the site, so as to provide a minimum of one foot of freeboard above the 50-year level. During construction, however, uncovered soils could be blown or washed by rainwater into the Santa Clara River, thereby resulting in significant erosion and sedimentation impacts.	• SP-5.0-14 (collection and channeling of runoff to the street and/or natural drainage courses *via* non-erosive devices); • SP-5.0-15 (prohibition against standing water on graded pads); • SP-5.0-16 (prepare and implement County-approved erosion control plan); • SP-5.0-17 (flood control improvements must be constructed to the satisfaction of the County's Department of Public Works); • SP-5.0-18 (obtain all necessary permits and letters of exemption); • SP-5.0-19 (obtain Conditional Letters of Map Revision); • SP-5.0-20 (prepare and obtain approval of a Final Hydrology Plan, Final Drainage Plan, and Final Grading Plan).	Not significant.

Source: Newhall Ranch Revised Draft EIR (March 1999); Newhall Ranch Revised Additional Analysis (May 2003).

4.1.1.2 Relationship of Proposed Project to VCC and Entrada Planning Areas

4.1.1.2.1 VCC Planning Area

The SCP component of the proposed Project, if approved, would facilitate development in the VCC planning area. The VCC is reliant on the SCP and associated take authorizations, and would not be developed without the take authorizations due to grading constraints. The VCC planning area is the remaining undeveloped portion of the VCC commercial/ industrial complex currently under development by the applicant. The VCC was the subject of an EIR certified by Los Angeles County in April 1990 (SCH No. 1987-123005). The applicant recently has submitted to Los Angeles County the last tentative

parcel map (TPM No. 18108) needed to complete build-out of the remaining undeveloped portion of the VCC planning area. The County will require preparation of an EIR in conjunction with the parcel map and related project approvals; however, the County has not yet issued a Notice of Preparation (NOP) of the EIR or released the EIR for the remaining portion of the VCC planning area. **Table 4.1-2** summarizes the VCC's impacts on flood hazards, the applicable mitigation measures, and the significance findings after mitigation from the previously certified VCC EIR (April 1990).

Table 4.1-2
Impacts to Flood Hazards Caused By VCC Implementation

VCC Impact Description	VCC Mitigation Measures	Finding After Mitigation
Project Impacts to Flood Hazards - Development of the VCC project will increase the amount of clear runoff from the project site, while decreasing the amount of bulked runoff flowing to the Santa Clara River. Further, the net amount of runoff will decrease.	• Mitigation measures call for flood control measures to be constructed to the satisfaction of the U.S. Army Corps of Engineers and the Department of Public Works. Further, pre-project runoff conditions will be restored at the downstream project boundary. In addition, the project applicant obtained a section 404 permit from the Corps that imposes various flood control conditions. Finally, the project applicant is required to widen and install lining on Hasley Creek, and energy dissipaters approximately every 300 to 500 feet.	Not significant.
Cumulative Impacts Flood Hazards- The flood control will be designed so that water will exit the VCC project site in relatively the same volume and velocity as it entered. Therefore, the VCC project is not expected to have an adverse hydrological impact downstream from the project site. Channel designs of related projects would be dictated by the hydrological analyses of the proposed sites. Therefore, as cumulative design standards and mitigation measures are the responsibility of the Department of Public Works, the Los Angeles County Flood Control District and the U.S. Army Corps of Engineers, cumulative impacts are less-than-significant.	• No further mitigation recommended.	Not significant.

Source: VCC EIR (April 1990).

4.1.1.2.2 Entrada Planning Area

The applicant is seeking approval from Los Angeles County for planned residential and nonresidential development within the Entrada planning area. The SCP component of the proposed Project would designate an area within Entrada as a spineflower preserve. If approved, the SCP component would include take authorization of spineflower populations in Entrada that are located outside of the designated

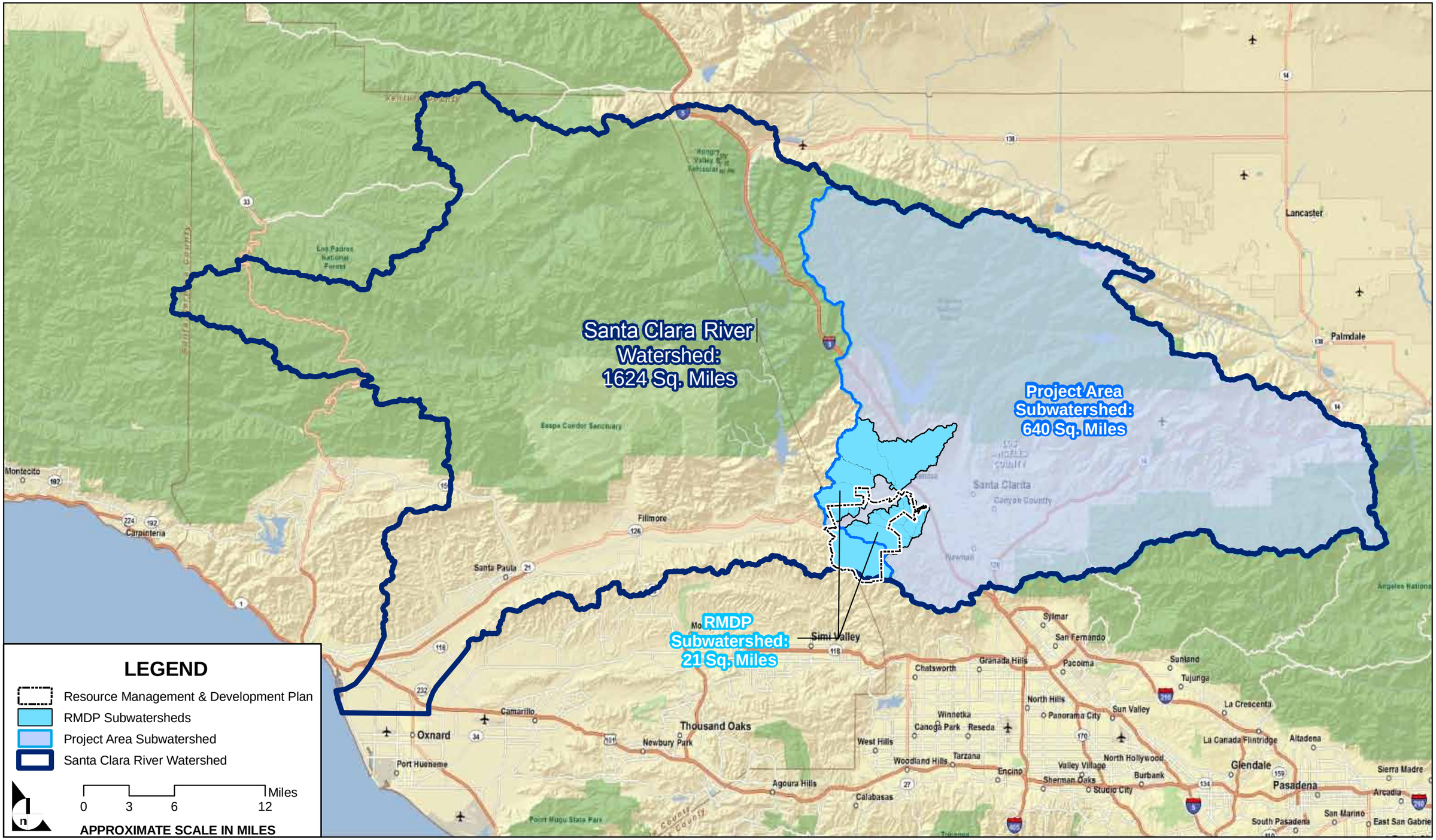
spineflower preserve area. Thus, the planned residential and nonresidential development within portions of the Entrada planning area is reliant on the SCP and associated take authorizations, and those portions would not be developed without the take authorizations. The applicant has submitted to Los Angeles County Entrada development applications, which cover the portion of the Entrada planning area facilitated by the SCP component of the proposed Project. However, as of this writing, the County has not yet issued a NOP of an EIR or released an EIR for Entrada. As a result, there is no underlying local environmental documentation for the Entrada planning area at this time.

4.1.2 METHODOLOGY

The scope of this section involves describing the existing drainages, surface water hydrology, and flood hazards within the Project area, presenting the regulatory setting with respect to surface water hydrology and flooding, and evaluating the flooding hazards associated with implementation of the proposed Project and alternatives, as well as the facilitated development in the Specific Plan, VCC, and a portion of the Entrada planning area. The objectives of the RMDP include providing flood protection to preclude flood hazards within the Project area due to the facilitated development in the Newhall Ranch Specific Plan area. These flood protection measures included in the Project and alternatives are not designated as mitigation measures since they are integral to the Project description.

The description of existing surface water hydrology and the impact analysis utilize the results of a technical analysis prepared by PACE for the Santa Clara River and its tributaries in the Project area. The PACE analysis is contained in the reports entitled, "Newhall Ranch Resource Management & Development Plan: River & Tributaries Drainage Analysis, Santa Clara River" (December 2008A) and "Santa Clara River and Tributaries Drainage Analysis: Newhall Ranch Resource Management & Development Plan, Major Tributary Watersheds" (December 2008B). This analysis includes updated hydraulic modeling results that evaluate flood hazards based on the proposed Project, the alternatives, and the facilitated development in the Specific Plan, VCC, and a portion of the Entrada planning area and is found in **Appendix 4.1** of this EIS/EIR. The PACE analysis also was conducted to comply with the Los Angeles County Department of Public Works' (DPW) requirements for flood protection as Project approval is contingent upon meeting these requirements. Regarding stormwater management, the proposed Project and alternatives must comply with applicable State of California and DPW requirements, and incorporate the project design features specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008; see **Appendix 4.4**).

The proposed Project area is located within the Santa Clara River basin watershed, 1,634 square miles in total area. The Santa Clara River originates in the San Gabriel Mountains in the east and terminates in the Pacific Ocean to the west. As illustrated in **Figure 4.1-1**, Watershed Location Map, Santa Clara River, the portion of the Santa Clara River watershed that is located upstream, or generally east of the Ventura/Los Angeles County line, is approximately 640 square miles in size, and drains portions of the Los Padres National Forest from the north, the Angeles National Forest from the northeast and east, and the Santa Susana Mountains from the south and southeast. The Project area consists of approximately 22.3 square miles (3.5 percent) of the 640-square mile watershed.



SOURCE: PACE 2008

FIGURE 4.1-1

WATERSHED LOCATION MAP
SANTA CLARA RIVER

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4.1.3 REGULATORY SETTING

Development that discharges stormwater runoff into and/or encroaches upon natural drainages, wetlands, and/or floodplains is subject to the requirements of the Corps, the State Water Resources Control Board (SWRCB), and the Los Angeles Region, Regional Water Quality Control Board (RWQCB) pursuant to the Clean Water Act (CWA); the CDFG pursuant to Fish and Game Code sections 1600 *et seq*.; and the Flood Control Division of DPW. The proposed flood protection and stormwater control activities do not require permits from the County of Ventura; however, the lower portion of Salt Creek Canyon is situated within Ventura County. Accordingly, the Ventura County flood protection and stormwater control regulations were reviewed to determine whether any additional requirements or considerations would be required for the proposed Project or the alternatives. The proposed Project and alternatives do not result in any modifications to the 100-year floodplain within Ventura County. In regard to stormwater conveyance, the proposed Project and alternatives do not include any stormwater conveyance improvements within Ventura County. Based on these findings, no applicable nexus to the County of Ventura was found. In general, however, Ventura County flood protection and stormwater control regulations are comparable and/or less stringent than DPW requirements.

4.1.3.1 Federal

4.1.3.1.1 Clean Water Act (33 U.S.C. §§ 1251, *et seq.*)

Section 401 of the Clean Water Act. Under section 401 of the CWA, every applicant for a federal permit for any activity that may result in a discharge of dredge or fill material to a water body must obtain a State Water Quality Certification (Certification) that the proposed activity will comply with state water quality standards (*i.e.*, beneficial uses, water quality objectives, and anti-degradation policy).

Section 404 of the Clean Water Act. Under section 404 of the Clean Water Act, the Corps is authorized to permit the discharge of dredged or fill materials to "waters of the U.S.," which includes both wetland and non-wetland aquatic habitats within the jurisdictional extent of rivers and streams defined by the ordinary high water mark (OHWM). Section 404 permits can be issued as individual, general, or nation-wide permits. Consultation with the Corps and section 401 Certification is required for all individual permits.

In the winter of 2003 and spring of 2004, URS conducted a delineation of all "waters" of the United States situated within the Project area. The "waters" delineation also represented an approximation of the limits of wetlands. For a further discussion of on-site wetland resources and impacts, please refer to **Section 4.5**, Biological Resources.

4.1.3.1.2 National Flood Insurance Program

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP). FEMA has completed Flood Insurance Rate Maps for the Santa Clara River and major tributaries in 2002, which identify Special Flood Hazard Areas. To comply with the NFIP, communities must adopt a floodplain management ordinance addressing construction and habitation in flood zones. In

California, the Department of Water Resources provides and encourages communities to adopt the California Model Floodplain Management Ordinance.

For areas where the location of the FEMA-defined floodplain would be altered by the Project, a Conditional Letter of Map Revision (CLOMR) would be submitted to the DPW for review and subsequent submittal to FEMA. FEMA would review the CLOMR, and, if it concurs, would validate the map revision.

4.1.3.2 State

4.1.3.2.1 Porter-Cologne Water Quality Control Act (Wat. Code, § 13000 *et seq.*)

The Porter-Cologne Act establishes the SWRCB and the Regional Boards as the principal state agencies with responsibility for the control of water quality. The Los Angeles RWQCB has jurisdiction over water quality within the region of the proposed Project. The Los Angeles RWQCB developed the Water Quality Control Plan (Basin Plan) for the Los Angeles Region,[3] which guides conservation and enhancement of water resources and establishes beneficial uses for surface waters within the region. Beneficial uses, and the water quality objectives necessary to sustain those beneficial uses, are designated for receiving waters (groundwater and surface waters).

4.1.3.2.2 Section 401 Water Quality Certification

The Los Angeles RWQCB issues section 401 Water Quality Certifications for Los Angeles County.

4.1.3.2.3 Stormwater Permit

In 2001, the Los Angeles RWQCB issued a National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements (Order No. 01-182) under the CWA and the Porter-Cologne Act for discharges of urban runoff in public storm drains in Los Angeles County. The Permittees are the Los Angeles County cities and the County (collectively, "the Co-permittees"). This permit regulates stormwater discharges from Municipal Separate Storm Sewer Systems (MS4s) in the Project area. The NPDES permit details requirements for new development and significant redevelopment, including specific sizing criteria for treatment Best Management Practices (BMPs) and hydromodification control requirements. Stormwater permitting is discussed in more detail in **Section 4.4**, Water Quality.

The MS4 Permit, Part 4, section D.1, notes that increased volume, velocity, and discharge duration of stormwater runoff from developed areas may potentially accelerate downstream erosion and impair habitat-related beneficial uses in "Natural Drainage Systems." Natural Drainage Systems are defined by the MS4 Permit to include the Santa Clara River. Section D.1 of the MS4 Permit stipulates that Permittees must control post-development peak stormwater runoff discharge rates, velocities, and durations in Natural Drainage Systems to prevent accelerated stream erosion and protect stream habitat.

[3] Water Quality Control Plan for the Los Angeles Region, California Regional Water Quality Control Board, Los Angeles Region 4, February 23, 1995.

4.1.3.2.4 Fish and Game Code, Sections 1601-1603

Under Fish and Game Code, sections 1601-1603, the CDFG must be notified of any project that would divert, obstruct, or change the natural flow, bed, channel, or bank of any river, stream, or lake. Compliance with sections 1601 through 1603 of the Fish and Game Code is described further in **Section 4.6**, Jurisdictional Waters and Streams, of this EIS/EIR.

4.1.3.3 Local

4.1.3.3.1 Overview of Los Angeles County Requirements for Flood Protection

In 1931, the Los Angeles County Flood Control District (now the Flood Control Division of DPW) began development of a comprehensive plan of flood control facilities to collect and convey flows from the mountainous canyons, the alluvial fans, and the urbanized coastal plain. The major needs in designing the system were the reduction of damage due to high canyon flows, the conveyance of large volumes of water in a major storm, and the ability to meet future flood control needs. The design of the flood protection system for the County is based upon DPW's capital flood hydrology.

The Department's capital flood (or Qcap) hydrology is based on a "design," or theoretical storm event, which is derived from 50-year frequency rainfall values and is patterned after actual major extratropical storms observed in the Los Angeles region. The design storm is assumed to occur over a period of four days, with the maximum rainfall falling on the fourth day.

Analysis of recorded major storms reveals that, during the 24-hour period of maximum rainfall, rainfall intensity typically increases during the first 70 to 90 percent of the period and decreases in the remaining time. Furthermore, approximately 80 percent of the amount of the 24-hour rainfall occurs within the same 70 to 90 percent of the period. In developing the capital flood, the 50-year frequency design storm is assumed to fall on saturated soils. In converting rainfall to runoff, rainfall that is not lost due to the hydrologic processes of interception, evaporation, transpiration, depression storage, infiltration, or percolation is assumed to be surface runoff. The effect of snowfall or snowmelt on rainfall-runoff relationships is a consideration in only a very limited portion of the County (*i.e.*, the higher elevations) where snowfall accumulates in winter.

Another assumption made in developing a capital flood design flow rate is that natural portions of the watershed have been burned by fire. When a watershed burns, the soil infiltration rate decreases due to the loss of vegetation and physical changes in the soil. The County has run field infiltrometer tests in order to quantify the effect that burning has on the coefficient of runoff. The effect of burning the watershed can increase the design runoff rate from 10 to 20 percent.

The final factor in adjusting the capital flood design flow rate is referred to as a bulking factor. In the area where a watershed is burned, the runoff would carry with it a large layer of eroded topsoil. This sediment, along with the associated burned trees and brush, is referred to as debris. In order to account for these quantities of debris, the design flow rate is artificially increased using a prescribed bulking factor, which is a function of not only soil type, but also the steepness of the terrain and the size of the

drainage basin. The bulking factors for larger drainage basins range from about 1.20 to 1.50, or from 20 to 50 percent, over and above the burned flow rate.

In September 2003, DPW revised the hydrologic method that accounts for fire effects on runoff computations.[4] In the previous practice, a completely burned watershed was assumed. That policy was updated to employ a statistical approach that relates historical fire data and vegetation recovery rates to changes in the runoff coefficient of soil. In so doing, a fire factor was developed to represent the effectively burned percentage of a given watershed. This factor is used to adjust runoff coefficients for the capital flood by indexing between an unburned and completely burned soil coefficient for a given soil. This method has yet to be officially adopted by the County.

The updated 2003 capital discharge will be employed in this EIS/EIR as this updated version is anticipated to be adopted between now and approval of the proposed Project. Because the 2003 capital discharge is lower than previous calculations, using updated values in the design phase will result in reduced calculated flood flows and a reduced calculated potential for flood-related impacts. Changes in design of bank protection resulting from utilizing the updated capital discharge would reduce the top of bank protection elevation and toe of the bank protection depth. Final design of bank protection would adhere to DPW capital flood design standards.

In summary, the County's Qcap is based on a theoretical four-day storm event occurring right after the watershed has been burned with the resulting flow rate being increased again by a bulking factor, thereby yielding a peak flow rate that is greater than a 50-year storm over an unburned-unbulked drainage basin. The probability of all of the theoretical assumptions identified in the County's capital flood occurring at the same time is extremely small, and yields greater design flows than the Federal Insurance Administration's methodology for calculating the 100-year and 500-year floods. As a result, the County's methodology is more conservative than that of the Federal Insurance Administration.

4.1.3.3.2 County of Los Angeles Department of Public Works

The DPW was formed on January 1, 1985, consolidating the former County Road Department, a portion of the County Engineer-Facilities, and the County Flood Control District. The Department of Public Works is responsible for the design, construction, operation, maintenance, and repair of roads, bridges, airports, sewers, water supply, flood control, water quality, and water conservation facilities, and for the design and construction of capital projects. Additional responsibilities include regulatory and ministerial programs for the County of Los Angeles, Los Angeles County Flood Control District, other special districts, and contract cities that request services.

The DPW has developed specific design, operation, and maintenance criteria for drainage facilities. The Project Preparation Instruction Manual for Drainage Facilities (DPW, 1988) states that the criteria for drainage facility design shall be contained in the following Los Angeles County Flood Control District and Department Manuals:

[4] The revised method is included in the most recent DPW *Hydrology Manual*, dated January 2006.

- Project Preparation Instruction Manual (February 1988);
- Hydraulic Design Manual (March 1982);
- Structural Design Manual (April 1982); and
- Debris Dams and Basins Design Manual (January 1983).

The Project Preparation Instruction Manual states that deviations from DPW design criteria as provided in the above manuals shall be submitted to DPW for approval prior to use.

The DPW subsequently developed requirements for hydrologic design of flood control and stormwater management facilities. The following manuals were last updated in January 2006:

- Sedimentation Manual (June 1993);
- Addendum to the 1991 Hydrology/Sedimentation Manual (June 2002); and
- Hydrology Manual (December 1991).

Capital Flood. A DPW memorandum, dated March 31, 1986, has established the Los Angeles County policy on levels of flood protection. This policy describes which degree of flooding, and, therefore, which design storms to use for different conditions and structures. In September 2003, DPW revised the hydrologic method that accounts for fire effects on runoff computations. The revised capital flood is based on a theoretical 50-year frequency storm event (an event with the probability of 1/50 of being equaled or exceeded in any year) occurring right after the watershed has been burned with the resulting flow rate being increased again by a bulking factor, thereby yielding a peak flow rate that is greater than a 50-year storm over an unburned-unbulked drainage basin.

The standard set by the Federal Flood Insurance Agency (FIA) for flood insurance protection is the 100-year flood, an elevation level based on historic runoff records; however, the standard makes no allowance for future urbanization or debris. In flood hazard areas, the federal standard requires the finished floor elevations of proposed buildings to be at least one foot above the surface water level of the 100-year flood. The capital flood takes into account the effect of urbanization, burned and "bulked" flows, and typically meets or exceeds FIA standards.

The capital flood applies to all areas mapped as floodways and all culverts under major and secondary highways and to all facilities, including open channels, closed conduits, bridges, and dams and debris basins not under California's jurisdiction, that are constructed in or intercept floodwaters from natural watercourses. A natural watercourse is a path in which water flows due to natural topographic features and is defined based on the following characteristics:

- Flow velocity of greater than five feet per second (fps);
- Flow depth greater than one and a half feet; and

- Water surface elevations within one foot below the base of adjacent dwellings, if that elevation is the result of the construction of drainage facilities with less than a capital flood capacity. This applies only to those facilities that are intended to replace the natural watercourse.

This EIS/EIR utilizes the updated 2003 capital discharge methodology as this updated version is anticipated to be adopted between now and approval of the proposed Project. Because the 2003 capital discharge is lower than previous calculations, using updated values in the design phase will result in reduced calculated flood flows and a reduced calculated potential for flood-related impacts. The changes in design of bank protection resulting from utilizing the updated capital discharge would reduce the top of bank protection elevation and toe of the bank protection depth. Final design of bank protection would adhere to DPW capital flood design standards.

Santa Clara River and Major Tributaries Drainage Policy. The DPW has determined that the Santa Clara River Basin is a major source of sediment for coastal beaches. In addition, groundwater recharge provides a significant amount of water for the Santa Clarita Valley and should be maintained. Based on these needs, DPW developed a drainage policy for the Santa Clara River as follows (DPW Sedimentation Manual, 1993):

- The design of flood protection facilities for the Santa Clara River shall be based on:
    - The Department capital flood flow rates (50-year rainfall discharge, bulked only);
    - Soft bottom waterways with levees; and
    - Protective levees and additional facilities, such as drop structures or stabilizers, as required shall be designed using DPW criteria.
- The design of flood protection facilities for tributary drainages to the Santa Clara River that have existing flood control improvements shall be compatible with these existing facilities.
- The soft bottom drainages shall be designed to maintain equilibrium between sediment supply to the drainage and sediment transport through the drainage. In cases where a soft bottom drainage is subject to significant deposition due to high sediment supply or significant erosion due to lack of sediment supply, then the drainage concept will be developed in consultation with DPW to comply with applicable requirements for tentative tract map approval.

Storm Drains and Urban Flood Protection. All facilities in developed areas that are not covered under the capital flood protection conditions above must be designed for the urban flood. The urban flood is runoff from a 25-year frequency design storm falling on a saturated watershed. A 25-year frequency design storm has a probability of 1/25 of being equaled or exceeded in any year.

In developed areas, street flow in an urban flood must be contained within the street, but the runoff may be carried in a drain under the street as well as on the street surface. Under urban flood conditions, street flow is allowed in the upstream area of an urban watershed, to the point where the flow reaches the street capacity at the property line. At this point, the flow must be split and conveyed both in the street and in a

drain below street level. The drain should have enough capacity to carry at least the flow from the 10-year frequency design storm (DPW Hydrology Manual, 1991).

Urban Drains. Urban drains typically are designed to carry the runoff from a 10-year frequency storm. The runoff resulting from the 25-year frequency design storm must be carried within the drain and on the street, below the private property line. The 10-year frequency design storm is based on a rainfall with a probability of 1/10 of being equaled or exceeded in any year. Like the 50-year frequency design storm, these design storms are four-day storms with the maximum rainfall quantities occurring on the fourth day (DPW Addendum to 1991 Hydrology Manual, 2002).

Sumps. Sumps are structures used to capture runoff, and in urban areas must be designed for the capital flood. Drains leaving the sump must have capacity to carry the runoff resulting from a 50-year frequency rainfall event.

Multiple Levels of Flood Protection. The DPW has established policies for multiple levels of flood protection. This applies in cases where a drainage system might have to provide more than a single level of flood protection. An example is where a natural canyon is tributary to a proposed urban drain or sump. In this case, the system must protect the developed area from an urban flood, as well as debris and stormwater from the natural canyon. Additional capacity also must be incorporated into the urban drainage system to accommodate the burned and bulked flow from the canyon area and protect the drainage from a capital flood (DPW Hydrology Manual, 1991).

Debris Production Zones. The Project area is located within debris production zones designated by the Hydraulic/Conservation Division of DPW. Specific debris production maps are provided in Appendix A of the DPW 1991 Hydrology Manual. The DPW has constructed and maintains several debris control structures within the Santa Clara River watershed to minimize the chance of channels clogging with debris. Debris control structures, volumes, and transportation rates are provided in the DPW Sedimentation Manual.

Burn Policy Methodology for the Santa Clara River Watershed. In September 2003, DPW updated the Addendum to the 1991 Hydrology Manual by including Appendix H: Burn Policy Methodology for the Santa Clara River Watershed. The DPW hydrologic method accounts for fire effects of runoff computations. This burned watershed hydrology policy replaces the previous practice, which assumed a completely burned watershed. The burn policy is compatible with the recently revised hydrologic method. Brush fires drastically change the hydrologic characteristics of a watershed by removing vegetation and creating a water-repellent soil layer beneath the ground surface. Volumes and flow rates of runoff increase when watersheds burn. Historical fire data was analyzed to determine the percentage of the watershed affected by fires for each year of record in the Santa Clara River watershed. The analysis considered recovery from fires within the previous five years. The concept of a fire factor was developed to represent the effectively burned percentage of the watershed area. The fire factor is used to adjust runoff coefficients for burned watershed hydrology.

The County of Los Angeles has developed a soil file for the Santa Clara River watershed, which contains unburned soil runoff coefficients and burned soil runoff coefficients calculated for all Los Angeles

County soil types. All sub-areas with impervious values of 15 percent or less must include burned runoff calculations.

Los Angeles Department of Public Works, Flood Control Division. The Flood Control Division within DPW is responsible for collecting and analyzing hydrologic data to support the design, operation, and maintenance of flood control facilities within Los Angeles County. Among other duties, the Flood Control Division performs hydrology and sedimentation studies; collects stream flow, precipitation, and evaporation data; forecasts rainfall runoff; and analyzes flood flows. The data collected by the Flood Control Division is used in conjunction with design standards developed by DPW to ensure that flood control facilities are adequately sized, maintained, and operated. The Flood Control Division operates and maintains County flood control facilities, including open flood control channels, underground storm drains, catch basins, debris retaining structures, and concrete streambed stabilization structures.

The Flood Control Division uses site-specific data to prepare maps of watersheds burned by brush fires, potential mudflow areas, and debris flow zones. Hydrologic and topographic information is used by the Flood Control Division to prepare detailed flood hazard zone maps. These maps are more detailed than the Flood Insurance Rate Maps (FIRM) used by FEMA, because impervious and burned surfaces are taken into account.

In the Santa Clarita Valley along the Santa Clara River, DPW requires that: (1) the top elevation of the bank protection must contain the capital flood discharge; (2) the bank protection must be readily accessible for inspection and emergency repair; (3) the bank protection must be constructed of a material resistant to erosive flows; and (4) the bank protection must extend to or below the anticipated scour elevation for the capital flood event. Lining of the natural channel bottom is typically not required.

Hydromodification Control. Under Part 4, section D.1 of the MS4 Permit, the County and its Co-permittees were required to develop and implement by February 1, 2005, numeric criteria for peak flow control in accordance with the findings of the Peak Discharge Impact Study analyzing the potential impacts on natural streams due to impervious development. The DPW and the Southern California Storm Water Monitoring Coalition had been conducting the study, but the study was not completed in time to meet the February 1, 2005 deadline. Therefore, on January 31, 2005, the County adopted and submitted to the RWQCB an Interim Peak Flow Standard to be in effect until such time as a final standard can be adopted based on a completed study. As of the date of this EIR/EIS, the interim policy is still in place.

The adopted Los Angeles County Interim Peak Flow Standard was derived from a similar Interim Peak Flow Standard for Ventura County approved by the RWQCB under the Standard Urban Stormwater Mitigation Plan (SUSMP) requirements provisions of the MS4 Permit. The intent of the Interim Standard, as described by the County in a letter, dated January 31, 2005, is to provide protection for natural streams to the extent supported by findings from the ongoing study, and consistent with practical construction practices. The Interim Peak Flow Standard adopted by the County is:

> The Peak Flow Standard shall require that all post development runoff from a 2-year, 24-hour storm shall not exceed the predevelopment peak flow rate, burned, from a 2-year, 24-hour storm when the predevelopment peak flow rate equals or exceeds five cubic feet per second. Discharge flow rates shall be calculated using the County of Los Angeles Modified Rational Method. The

> Peak Flow Standard shall also require that post development runoff from the 50-year capital storm shall not exceed the predevelopment peak flow rate, burned and bulked, from the 50-year capital storm.

Proposed projects are required to meet the peak flow control criteria as a part of the development plan approval process for building and grading permits.

In addition to the Interim Peak Flow Standard, the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (SWMP; Geosyntec, 2008) that was approved by the County of Los Angeles provides an alternative performance standard for the Specific Plan projects. The Specific Plan projects will be conditioned to require, as a project design feature, sizing and design of hydraulic features as necessary to control hydromodification impacts in accordance with this Newhall Ranch Specific Plan Sub-Regional SWMP. The Specific Plan projects will comply with the following performance standard:

> *The erosion potential (Ep) of stormwater discharges from the Project shall be maintained within 20% of the target value in the tributary drainages that will receive post-development flows. The target erosion potential (Ep) will consider changes in sediment supply.*

The erosion potential (Ep) is a metric that measures the potential impact of modified flows on stream stability and excessive erosion, and has been developed as a means to define an in-stream performance standard and a "significance test" of the effectiveness of proposed hydromodification control strategies. An equivalently effective, similarly geomorphically-referenced approach may be developed and applied in the future in place of the erosion potential approach.

The hydromodification performance standard will be met for all of the Specific Plan projects from the point of discharge to the tributary drainage channel downstream to the confluence of the tributary drainage with the Santa Clara River, and shall be achieved through on-site or in-stream controls, or a combination thereof.

4.1.3.4 Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan

The Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (SWMP; Geosyntec, 2008) (see **Appendix 4.4**) was developed to comply with the County Municipal Separate Storm Sewer System (MS4) NPDES Permit and the Standard Urban Stormwater Mitigation Plan requirements and sets forth the urban runoff management program that will be implemented for the Specific Plan sub-region. The Sub-Regional SWMP is the first of three levels of stormwater plan preparation. These levels include: (1) the Sub-Regional SWMP, which applies to the entire Specific Plan area; (2) the Project Water Quality Technical Report, which will provide the project-level impact analysis for each of the villages within the Specific Plan area; and (3) the final Project SUSMP, which will be prepared prior to the recordation of any final subdivision map or the issuance of any grading or building permit. The Sub-Regional SWMP sets the framework for the future levels of stormwater plan preparation.

The Sub-Regional SWMP includes an analysis of potential flood impacts associated with the proposed Project and provides control measures that will be implemented to minimize potential flood hazards. The

control measures, or project design features, include site design criteria to help minimize changes in runoff following project construction, treatment controls including bioretention areas designed to capture and treat stormwater runoff, high flow by-pass in the tributaries which would convey excess stormwater runoff directly to the Santa Clara River instead of discharging to a tributary drainage, and storage of excess runoff volume for irrigation reuse.

The Sub-Regional SWMP and subsequent Project-level stormwater management plans will be reviewed by the RWQCB and DPW and their approval of these plans is required prior to implementation of the proposed Project.

4.1.4 EXISTING CONDITIONS

This section describes the existing conditions with respect to surface water hydrology and flood control. **Subsection 4.1.4.1** describes the project area climate and precipitation, which is a major factor in the hydrologic setting. **Subsection 4.1.4.2** then describes the hydraulic network (*i.e.*, the physical characteristics), of the landforms within the Project area. The information provided is based on existing literature/data as well as field surveys that were conducted in support of the proposed Project. Flows in the Santa Clara River are based on U.S. Geological Survey (USGS) stream gage data collected between 1953 and 1996 and descriptions of the Santa Clara River and tributary watersheds in the Project area are based on existing literature and field surveys conducted in 2003 and 2006 that were used to characterize the overall watershed, habitat, and geomorphology. The data used is representative from the project area that reflects the existing conditions data necessary for environmental analysis.

4.1.4.1 Climate and Precipitation

The mean annual precipitation for the Santa Clara River watershed ranges from 16 inches in the valley areas to about 36 inches in the mountains. Most precipitation occurs from December through March. Three types of storms produce precipitation in the watershed: winter storms, summer storms, and local storms. Winter storms occur generally from December through March. They originate over the Pacific Ocean due to interaction between polar Pacific and tropical Pacific air masses that move eastward across California. These storms may last several days and respond greatly to orographic influences, that is, changes in topography. Some of these storms produce snow in the mountains, but it is short-lived. Summer storms are infrequent and are usually associated with late-summer cyclones, producing very little precipitation. Local storms can occur at any time of the year. These storms are frequently accompanied by lightning and thunder. They affect only small areas, but can result in significant precipitation.

Streamflow from natural precipitation in the Project area is negligible most of the year, except during and immediately following rainfall events. Streamflow increases rapidly in response to effective rainfall,[5] then drops abruptly due to percolation losses in the alluvial channels. Extreme runoff events are generally

[5] Effective rainfall is the component of the storm hyetograph, which is neither retained on the land surface nor which infiltrates into the soil. The effective rainfall produces overland flow that results in the direct runoff.

produced by intense rainfall over a relatively short period of time. Melting snow in the upper watershed has very little influence on streamflow.

4.1.4.2 Hydraulic Network

This section describes the physical characteristics of the Santa Clara River and tributaries within the Project area. After describing the hydraulic network, the specific attributes of the watershed as it relates to flood potential are described.

4.1.4.2.1 Santa Clara River

The Santa Clara River, which flows through the northern portion of the Project area from east to west, is the largest river system in southern California that remains in a relatively natural condition. It is also the largest watercourse in the Project area. The Santa Clara River is perennial within the boundaries of the Project area. Tributaries in the Project area are ephemeral with the exception of lower Potrero Canyon, which is perennial. Stream flow in the Project area is often debris laden because of: (1) intense rainfall patterns; (2) relatively impervious soil types in the upper watershed; (3) sparse vegetation in the upper watershed; (4) possible denudation by fires; and (5) steep gradients.

The Santa Clara River originates near Acton in Soledad Canyon in the San Gabriel Mountains and it empties into the Pacific Ocean near Ventura, about 84 miles from its origin. Ninety percent of the watershed consists of mountainous terrain with steep, rocky ridges, and deep canyons. Only 10 percent of the watershed consists of narrow alluvial valleys. The Project area is within a gently sloping alluvial valley that extends downstream from Castaic Creek to the Los Angeles County/Ventura County line.

Downstream of the existing Valencia Water Reclamation Plant (WRP), the Santa Clara River is perennial to approximately 5 miles downstream of the Los Angeles County/Ventura County line near Rancho Camulos. Flows in the Santa Clara River also can be affected by groundwater dewatering operations or by diversions for agriculture or groundwater recharge. Throughout the Santa Clara River channel, complex surface water/groundwater interactions lead to areas of alternating gaining and losing river segments. In particular, downstream of the Los Angeles County/Ventura County line, the Santa Clara River flows through the Piru groundwater basin, which forms a "Dry Gap" where dry-season streamflow is lost to groundwater.

As with most southern California streams, flows in the Santa Clara River are highly episodic. For the gauged period between 1953 and 1996, annual flow at the Los Angeles County/Ventura County line gage ranged between 253,000 acre-feet (1969) and 561 acre-feet (1961). Annual peak flows at the County line between 1953 and 1996 ranged from 68,800 cfs (1969) to 109 cfs (1960). The second highest annual peak, 32,000 cfs in 1966, was less than half of the highest peak (68,800 cfs in 1969).

The average discharges or flows (*i.e.*, volume of water/time) for floods of different recurrence intervals (2-year, 5-year, 10-year, 20-year, 50-year,[6] 100-year recurrence intervals[7]) at the upstream and

[6] Note this is not the 50-year capital flood, which is based on a theoretical four-day storm event

downstream ends of the RMDP area under existing conditions are shown in **Table 4.1-3**. A 2-year event has a probability of occurring once every two years on average while a 50-year flood event has a probability of occurring once every 50 years on average and is much larger than the 2-year event because it is less frequent.

Table 4.1-3
Existing Santa Clara River Flows Through the RMDP/SCP Area

Location	Discharge for Different Return Events (cfs)					
	2-yr	5-yr	10-yr	20-yr	50-yr	100-yr
Upper end of the RMDP/SCP area, but downstream of Castaic Creek	2,527	8,232	14,942	24,157	41,141	58,207
Downstream end of the RMDP/SCP area at the County line	2,600	8,480	15,400	24,900	42,400	60,000

Source: Newhall Ranch Revised Additional Analysis (May 2003)

The data in **Table 4.1-3** indicate that the 50- to 100-year events are quite large (over 40,000 cfs). These data also show that flows do not increase substantially as the River traverses the RMDP areas because peak flow contributions from tributaries on the site (*e.g.*, San Martinez Grande, Chiquito Canyon, Potrero Canyon) are minor compared to contributions from the Santa Clara River. Flows from Castaic Creek, a tributary that enters from the northeast end of the RMDP area, provide a substantial contribution to the flows that traverse it.

Artificial Streamflow. Artificial streamflow in the Project area is derived from three sources: (1) runoff from agricultural fields and urban areas; (2) discharges of treated effluent from two existing water reclamation plants; and, 3) releases from Castaic Lake. Discharges from agricultural operations are decreasing as croplands are converted to urban uses. Irrigated lands still occur on the north side of the

occurring right after the watershed has been burned with the resulting flow rate being increased again by a bulking factor. For purposes of comparison, the predicted flow during the 100-year FEMA flood event at the Los Angeles County/Ventura County jurisdictional boundary line is 60,000 cfs, while the County capital flood discharge at this same location is 168,000 cfs.

[7] For recurrence interval flows, a 2-year event has a probability of occurring once every two years on average and has a 50% probability of occurring in any given year; a 5-year event has a probability of occurring once every five years on average and has a 20% probability of occurring in any given year; a 10-year event has a probability of occurring once every ten years on average and has a 10% probability of occurring in any given year; a 20-year event has a probability of occurring once every twenty years on average and has a 5% probability of occurring in any given year; a 50-year event has a probability of occurring once every fifty years on average and has a 2% probability of occurring in any given year; and a 100-year event has a probability of occurring once every one hundred years on average and has a 1% probability of occurring in any given year.

Santa Clara River near Six Flags Magic Mountain Amusement Park. The amount and seasonality of this runoff are variable.

Two existing regional water reclamation plants occur upstream of the Project area and are operated by the County Sanitation Districts of Los Angeles County (Districts). These plants discharge tertiary-treated wastewater to the Santa Clara River, and are interconnected to provide operational flexibility. The Saugus WRP outfall for treated effluent is located near Bouquet Canyon Road Bridge on the Santa Clara River. The Saugus WRP produces about 5 million gallons per day (mgd) of effluent that is discharged to the River. It creates perennial flows from the outfall to I-5. The current plant capacity is 6.5 mgd. The Valencia WRP outfall is located immediately downstream of the I-5 bridge. The Valencia WRP produces about 9 mgd of treated effluent and has a capacity of 12.6 mgd. The plant discharge also creates perennial flow that extends from the outfall to the confluence of the River with Castaic Creek and downstream.

Effluent discharges to the River began in 1970 at about 3.3 mgd, increasing to the current level of discharge of about 14 mgd (equivalent to about 18,000 acre-feet per year). The combined capacity of these plants is planned to increase from 19.1 mgd to 34 mgd (18,000 to 38,000 acre-feet per year) by the year 2015. Increased capacity would be provided at the Valencia WRP; no future expansion is anticipated at the Saugus WRP.

Increased discharges of treated effluent would increase the depth and area extent of the perennial flow in the River. This would not have an appreciable effect on the channel capacity in the River due to the relatively small volumes of wastewater (*i.e.*, less than 25 cfs) involved compared to the river channel capacity (*i.e.*, more than 30,000 cfs).

The Castaic Lake Water Agency (CLWA) plans to distribute reclaimed water from the plants in the near future for landscaping and industrial use. Use of 1,700 acre-feet per year of reclaimed water has been approved by the Districts and CLWA. Additional distribution of reclaimed water may occur in the future, thereby reducing discharges from the treatment plants to the River.

Castaic Lake is a terminal reservoir of the State Water Project (SWP) and is operated by the California Department of Water Resources (DWR). Local storms that generate surface flows captured by Castaic Dam are released to Castaic Creek in accordance with agreements between DWR and four downstream entities (the "Downstream Water Users"). The Downstream Water Users consist of the County of Los Angeles, The Newhall Land and Farming Company, Newhall County Water District, and United Water Conservation District. Under the terms of the agreement with the Downstream Water Users, DWR releases water from the reservoir to Castaic Creek at a discharge rate that is consistent with the inflow to the reservoir, up to a maximum of 100 cfs. Any flows in excess of 100 cfs are retained and stored in the reservoir. Up until May 1 of every year, release of stored water to Castaic Creek occurs after notice is provided to DWR by the United Water Conservation District, the designated representative for the Downstream Water Users. After May 1, all stored local water remaining in the reservoir becomes part of the SWP.

4.1.4.2.2 Tributary Drainages

The existing drainages within the RMDP site boundaries consist of Castaic Creek and several major and minor tributary drainages to the Santa Clara River. Major tributaries are those drainages that are regulated by the DPW Santa Clara River and Major Tributaries Drainage Policy and have capital flood discharges greater than 2,000 cfs. The major tributaries consist of the drainage courses of Chiquito Canyon and San Martinez Grande Canyon to the north of the Santa Clara River, and Long Canyon, Lion Canyon, Potrero Canyon, and Salt Canyon to the south of the Santa Clara River. The minor tributaries consist of the drainage courses of Homestead Canyon, Off-Haul Canyon, Mid-Martinez Canyon, Unnamed Canyon A to the north of the Santa Clara River, and Middle Canyon, Magic Mountain Canyon, Dead End Canyon, Exxon Canyon, Humble Canyon, Ayers Canyon, Unnamed Canyon B, Unnamed Canyon C, and Unnamed Canyon D, Unnamed Canyon 1, and Unnamed Canyon 2 to the south of the Santa Clara River (**Figure 4.1-2**, Tributary Watershed Data). Some of the tributaries have been mapped as blue-line streams by the USGS. While it is the intent of the USGS to indicate that blue-line streams are flowing perennial streams, in arid states such as California, and particularly in southern California, this is not always the case. For example, the blue-line stream in upper Potrero Canyon is an ephemeral drainage. Aside from the lower portions of Salt and Potrero Canyons, each of the tributaries within the Newhall Ranch Specific Plan boundary is classified as an intermittent or ephemeral drainage (Geosyntec, 2008). The following provides a description of each of the tributaries and presents them from west to east (downstream to upstream along the Santa Clara River).

Salt Creek Canyon. The 9.2 square mile (5,859 acre) Salt Creek Canyon watershed is a tributary to the southern bank of the Santa Clara River. The total length of the mainstem channel is approximately 25,830 feet with an average overall slope of 3.4 percent. Approximately 3,808 acres (65 percent) of the watershed is located within the RMDP site. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Gaviota rocky sandy loam and are predominately classified as being in hydrologic soil group C/D (higher runoff potential). The associated vegetative cover within the watershed varies, but includes California sagebrush scrub, chaparral, and annual grassland.

While the Salt Creek drainage is one of the largest found within the boundary of the RMDP site, it was not subject to detailed hydrologic/hydraulic modeling because it is contained within the High Country SMA, where no development will occur. The Specific Plan includes a Visitor Serving land use designation, which allows for an access point to the High Country SMA/SEA 20. Approximately 1,992 feet of bank protection in non-jurisdictional uplands would be installed in conjunction with development of approved Visitor Serving uses as described in the Specific Plan. Otherwise, this area will be maintained in its present state in perpetuity.

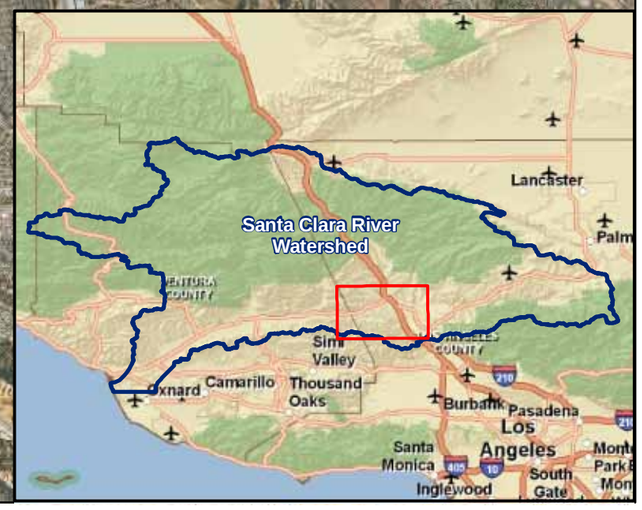
Hasley Creek
Castaic Creek
Chiquito Canyon
San Martinez Grande
Mid-Martinez Canyon
Unnamed Canyon A
Off-Haul Canyon
Homestead Canyon
Unnamed Canyon C
Unnamed Canyon B
Humble Canyon
Exxon Canyon
Dead-End Canyon
Unnamed Canyon D
Middle Canyon
Lion Canyon
Unnamed 1
Unnamed 3
Unnamed 2
Magic Mountain Canyon
Ayers Canyon
Long Canyon
Potrero Canyon
Salt Creek Canyon
5
126

LEGEND

- Resource Management & Development Plan
- Tributaries
- Tributary Watershed Boundaries
- Santa Clara River CDFG Jurisdiction

0 0.5 1 2 Miles

APPROXIMATE SCALE IN MILES



SOURCE: PACE 2008

FIGURE 4.1-2

TRIBUTARY WATERSHED DATA

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Unnamed Canyon A. The 0.70 square mile (445 acre) Unnamed Canyon A watershed is a tributary to the northern bank of the Santa Clara River. The total length of the mainstem channel is approximately 1,293 feet, with an average overall slope of 3.4 percent. Approximately 133 acres (29 percent) of the watershed is located within the RMDP site. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Castaic-Balcom complex and silty clay loams, and are predominately classified as being in hydrologic soil group "C" (higher runoff potential). The associated vegetative cover within the watershed varies, but includes annual grassland and agriculture.

Homestead Canyon. The 0.12 square mile (75 acre) Homestead Canyon watershed is a tributary to the northern bank of the Santa Clara River. The total length of the mainstem channel is approximately 3,606 feet, with an average overall slope of 5.4 percent. The entire watershed area is located within the RMDP site. Approximately 90 percent or more of the watershed consists of rugged foothill topography, with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Castaic-Balcom silty clay loams and are predominately classified as being in hydrologic soil group "C" (higher runoff potential). The associated vegetative cover within the watershed varies, but includes annual grassland and agriculture. One thin strip of big sagebrush scrub is present lining the stream channel near the lower end.

Off-Haul Canyon. The 0.92 square mile (587 acre) Off-Haul Canyon watershed is a tributary to the northern bank of the Santa Clara River. The total length of the mainstem channel is approximately 4,223 feet, with an average overall slope of 7.1 percent. Approximately 470 acres (80 percent) of the watershed is located within the RMDP site. The creek flows in a general north to south direction, similar in alignment to Grande Canyon and joining the Santa Clara River floodplain valley. Approximately 90% percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Castaic-Balcom silty clay loams and are predominately classified as being in hydrologic soil group "C" (higher runoff potential). The upper reaches of Off-Haul Canyon drainage contain a mixture of California sagebrush scrub and alluvial scrub. Lower areas, in the vicinity of SR-126, are dominated by agricultural land.

Potrero Canyon. The 4.73 square mile (3,025-acre) Potrero Canyon watershed is a tributary to the south bank of the Santa Clara River. The total length of the mainstem channel is approximately 25,381 feet, with an average overall slope of 3.1 percent. Approximately 2,626 acres (87 percent) of Potrero Canyon is located within the RMDP site, with the remainder being upstream of the Project site. Approximately 90 percent or more of the watershed consists of rugged foothill topography, with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Castaic-Balcom silty clays and are predominantly classified as being in hydrologic soil group "C" (higher runoff potential). The associated vegetative cover within the watershed varies, but includes annual grassland and agriculture.

There are no flood control improvements or dams within the watershed, other than several road culvert crossings that would influence the watershed response to rainfall events. The lower 50 percent of the Potrero Canyon watershed has been influenced by human activities that have relocated the existing active creek into an engineered earthen channel along the northern side of the canyon. The remaining upper

portion of the drainage does not reflect as much of this influence since there appear to have been fewer historic farming operations impacting this portion of the natural creek channel.

Ayers Canyon. The 0.23 square mile (147 acre) Ayers Canyon watershed is a tributary to the southern bank of the Santa Clara River within the RMDP site. The total length of the mainstem channel is approximately 2,464 feet, with an average overall slope of 4.4 percent. The entire watershed area is located within the RMDP site. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being narrow valley floor. Generally, the soils in the watershed are characterized as Castaic and Saugus soils and are predominately classified as being in hydrologic soil group "B/C" (moderate runoff potential). The associated vegetative cover within the watershed varies, but includes California sagebrush scrub (black sage) and agriculture.

San Martinez Grande Canyon. The 3.63 square mile (2,322-acre) San Martinez Grande Canyon watershed is a tributary to the northern bank of the Santa Clara River. The total length of the mainstem channel is approximately 5,170 feet, with an average overall slope of 1.9 percent. Approximately 382 acres (16.5 percent) of the San Martinez Grande Canyon watershed area is located within the RMDP site, with the majority being upstream and off site. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Castaic-Balcom silty clay loams and are predominantly classified as being in hydrologic soil group "C" (higher runoff potential). The associated vegetative cover within the watershed varies, but includes California grassland and California sagebrush scrub.

The only manmade structure that currently influences the hydraulic operation is the roadway culvert crossing for SR-126, but this appears to have sufficient hydraulic capacity to minimize effects to the floodplain (PACE, 2008A).

Mid-Martinez Canyon. The 0.16 square mile (105 acre) Mid-Martinez Canyon watershed is a tributary to the northern bank of the Santa Clara River. The total length of the mainstem channel is approximately 3,729 feet, with an average overall slope of 6.5 percent. Approximately 67 acres (64 percent) of the watershed is located within the RMDP site. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Zamora Loam and are predominately classified as being in hydrologic soil group "B" (lower runoff potential). The associated vegetative cover within the watershed varies, but includes California sagebrush scrub and agriculture.

Long Canyon. The 1.99 square mile (1,271-acre) Long Canyon watershed is a tributary to the southern bank of the Santa Clara River. The total length of the mainstem channel is approximately 9,829 feet, with an average overall slope of 3.0 percent. Approximately 821 acres (64.5 percent) of Long Canyon is located within the RMDP site, with the remainder being upstream off the Project site. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Castaic and Saugus soils and are predominantly classified as being in hydrologic soil group "C" (higher runoff potential). The associated vegetative cover within the watershed varies, but includes disturbed land and chaparral.

Chiquito Canyon. The 4.85 square mile (3,106-acre) Chiquito Canyon watershed is a tributary to the northern bank of the Santa Clara River. The total length of the mainstem channel is approximately 7,605 feet, with an average overall slope of 2.39 percent. Approximately 433 acres of the Chiquito Canyon watershed (13.9 percent) is within the RMDP site, with the majority being upstream in the developed Val Verde Community or off site. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Castaic and Saugus soils and are predominantly classified as being in hydrologic soil Group C (higher runoff potential). The associated vegetative cover within the watershed varies, but includes California sagebrush scrub and agriculture.

Unnamed Canyon B. The 0.05 square mile (29 acre) Unnamed Canyon B watershed is a tributary to the southern bank of the Santa Clara River. The total length of the mainstem channel is approximately 1,574 feet, with an average overall slope of 15.2 percent. The entire watershed is located within the RMDP site. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Castaic and Saugus soils and are predominately classified as being in hydrologic soil group "C" (higher runoff potential). The associated vegetative cover within the watershed varies, but includes California annual grassland and chaparral.

Unnamed Canyon C. The 0.07 square mile (43 acre) Unnamed Canyon C watershed is a tributary to the southern bank of the Santa Clara River. The total length of the mainstem channel is approximately 1,272 feet, with an average overall slope of 7.3 percent. The entire watershed is located within the RMDP site. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Castaic and Saugus soils and are predominately classified as being in hydrologic soil group "C" (higher runoff potential). The associated vegetative cover within the watershed varies, but includes California sagebrush scrub and agriculture.

Humble Canyon. The 0.41 square mile (261 acre) Humble Canyon watershed is a tributary to the southern bank of the Santa Clara River. The total length of the mainstem channel is approximately 4,863 feet, with an average overall slope of 7.0 percent. Approximately 253 acres (97 percent) of the watershed is located within the RMDP site. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Castaic and Saugus soils and are predominately classified as being in hydrologic soil group "C" (higher runoff potential). The habitat types found in the upper reaches of the Humble Canyon watershed includes agriculture and chaparral.

Lion Canyon. The 0.84 square mile (539 acre) Lion Canyon watershed is a tributary to the southern bank of the Santa Clara River. The total length of the mainstem channel is approximately 4,761 feet, with an average overall slope of 4.6 percent. Approximately 280 acres of the watershed (52 percent) is located within the RMDP site. The creek flows in a general east to west direction, similar in alignment to Long Canyon and joining the Santa Clara River floodplain valley. Approximately 90% or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Castaic and Saugus soils (with Saugus loam)

and are predominately classified as being in hydrologic soil group "B/C" (moderate runoff potential). The associated vegetative cover within the watershed varies, but includes California sagebrush scrub and chaparral.

Castaic Creek. Castaic Creek is located within the boundaries of the VCC planning area. The 8.7 square mile (5,555.3 acre) Castaic Creek watershed is a tributary located north of the Santa Clara River. The total length of the mainstem channel is approximately 36,819 feet, with an average overall slope of 3.7 percent. The entire watershed is located outside the RMDP site, and 0.09 percent of the total watershed area is within the VCC Project area. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. The maximum elevation difference from the headwaters to the mouth of the creek at the Santa Clara River is 1,378 feet. Generally, the soils in the watershed are characterized as Saugus loam and are predominately classified as being in hydrologic soil group "B" (lower runoff potential). The associated vegetative cover within the watershed varies, but includes California sagebrush scrub.

Exxon Canyon. The 0.03 square mile (16 acre) Exxon Canyon watershed is a tributary to the southern bank of the Santa Clara River. The total length of the mainstem channel is approximately 2,193 feet, with an average overall slope of 9.2 percent. The entire watershed area is located within the RMDP site. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Saugus loam and are predominately classified as being in hydrologic soil group "B" (lower runoff potential). The associated vegetative cover within the watershed varies, but includes California sagebrush scrub and disturbed land.

Dead-End Canyon. The 0.19 square mile (124 acre) Dead-End Canyon watershed is a tributary to the southern bank of the Santa Clara River. The total length of the mainstem channel is approximately 1,076 feet, with an average overall slope of 6.1 percent. The entire watershed area is located within the RMDP site. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Castaic-Balcom silty clay loams and are predominately classified as being in hydrologic soil group "C" (high runoff potential). The associated vegetative cover within the watershed varies, but includes California sagebrush scrub and disturbed land.

Middle Canyon. The 0.53 square mile (340 acre) Middle Canyon watershed is a tributary to the southern bank of the Santa Clara River. The total length of the mainstem channel is approximately 7,967 feet, with an average overall slope of 3.7 percent. Approximately 272 acres (80 percent) of the watershed is located within the RMDP site. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Castaic-Balcom silty clay loams and are predominately classified as being in hydrologic soil group "C" (higher runoff potential). This watershed is dominated by California sagebrush scrub, with small pockets of mixed chaparral and California grassland. The stream channel flows through California grassland, agricultural areas, alluvial scrub, and live oak woodland.

Hasley Creek. Hasley Creek is located within the boundaries of the VCC planning area. The 89.7 square mile (57,416 acre) Hasley Creek watershed is a tributary located north of the Santa Clara River. The total length of the mainstem channel is approximately 112,708 feet, with an average overall slope of 2.2 percent. The entire watershed is located outside the RMDP site but within the SCP, and 1.75 percent of the total watershed area is within the VCC Project area. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. The maximum elevation difference from the headwaters to the mouth of the creek at the Santa Clara River is 2,430 feet. Generally, the soils in the watershed are characterized as Stonyford-Millsholm Family soils and are predominately classified as being in hydrologic soil group "D" (high runoff potential). The associated vegetative cover within the watershed varies, but includes Chamise chaparral.

Unnamed Canyon D. The 0.04 square mile (28 acre) Unnamed Canyon D watershed is a tributary to the southern bank of the Santa Clara River. The total length of the mainstem channel is approximately 1,740 feet, with an average overall slope of 11.6 percent. The entire watershed is located within the RMDP site. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Zamora loam from both the Castaic and Saugus formations and are predominately classified as being in hydrologic soil group "B" (lower runoff potential). The associated vegetative cover within the watershed varies, but includes California sagebrush scrub and agriculture.

Magic Mountain Canyon. The 1.32 square mile (847 acre) Magic Mountain Canyon watershed is a tributary to the southern bank of the Santa Clara River. The total length of the mainstem channel is approximately 4,813 feet, with an average overall slope of 3.4 percent. Approximately 178 acres (27 percent) of the watershed is located within the RMDP site. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. Generally, the soils in the watershed are characterized as Castaic and Saugus soils and Castaic-Balcom silty clay loams and are predominately classified as being in hydrologic soil group "C" (higher runoff potential). The associated vegetative cover within the watershed varies, but includes California sagebrush scrub and disturbed land.

Unnamed Canyon 1 (Entrada). The 0.16 square mile (103 acre) Unnamed Canyon 1 watershed is a tributary to the southern bank of the Santa Clara River. The total length of the mainstem channel is approximately 2,020 feet, with an average overall slope of 2.7 percent. The entire watershed is located within the SCP site. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. The topography for the watershed varies from a maximum elevation of 1,427 feet in the headwaters to a low elevation of 1,160 feet near the mouth of the canyon at the Santa Clara River valley. Generally, the soils in the watershed are characterized as Castaic-Balcom silty clay loams and are predominately classified as being in hydrologic soil group "B" (lower runoff potential). The associated vegetative cover within the watershed varies, but includes California sagebrush scrub.

Unnamed Canyon 2 (Entrada). The 0.6 square mile (401 acre) Unnamed Canyon 2 watershed is a tributary located south of the Santa Clara River. The total length of the mainstem channel is approximately 3,126 feet, with an average overall slope of 3.1 percent. The entire watershed is located

within the SCP site. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. The topography for the watershed varies from a maximum elevation of 1,858 feet in the headwaters to a low elevation of 1,161 feet near the mouth of the canyon at the Santa Clara River valley. Generally, the soils in the watershed are characterized as Saugus loam and are predominately classified as being in hydrologic soil group "B" (lower runoff potential). The associated vegetative cover within the watershed varies, but includes developed and disturbed land.

Unnamed Canyon 3 (Entrada). The 0.13 square mile (85 acre) Unnamed 3 Canyon watershed is a tributary located south of the Santa Clara River. The total length of the watershed is approximately 2,907 feet, with an average overall slope of 5.3 percent. Approximately 95% of the drainage is contained within the boundary of the SCP. Approximately 90 percent or more of the watershed consists of rugged foothill topography with the remainder being the narrow valley floor. The topography for the watershed varies from a maximum elevation of 1,275 feet in the headwaters to a low elevation of 1,100 feet near the mouth of the canyon at the edge of The Old Road where it enters a local storm drain that is tributary to the Santa Clara River. Generally, the soils in the watershed are characterized as Saugus loam and are predominately classified as being in hydrologic soil group "C" (higher runoff potential). The associated vegetative cover within the watershed varies, but includes California sagebrush scrub and disturbed land.

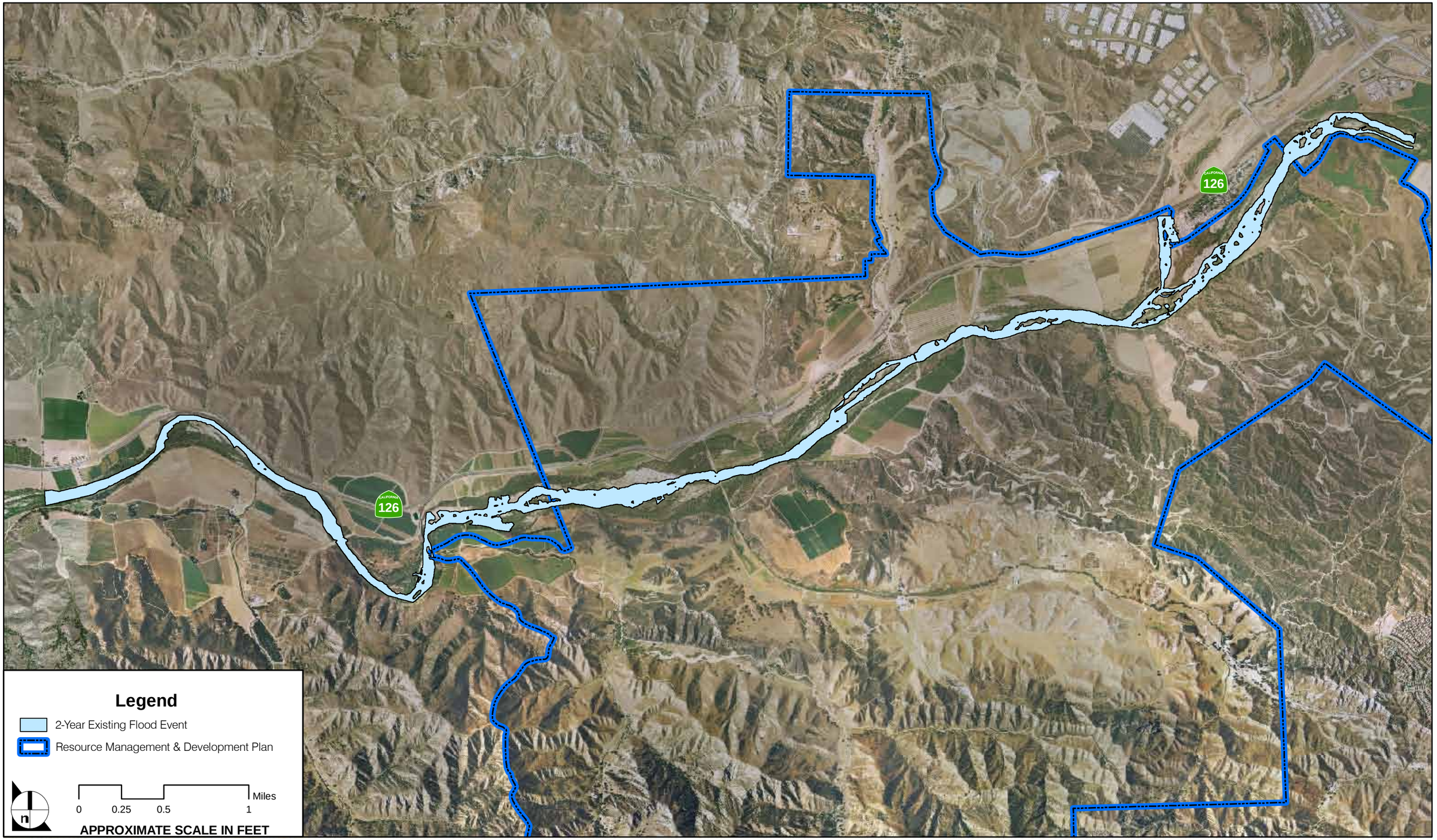
4.1.4.3 Flood Control

This section describes the existing conditions with respect to floodplain extent and flood control for the Santa Clara River and its tributaries within the Project area.

4.1.4.3.1 Santa Clara River Floodplain

The width of the active Santa Clara River channel (*i.e.*, area of river bottom inundated during 2-year event) in the RMDP area varies from 200 to 800 feet. The maximum width of the river channel and floodplain inundated during the 100-year event is 2,200 feet.

The boundaries of the floodplain (the ground surface covered by water) for different return events, from the Commerce Center Drive bridge location to a point four miles downstream of the Los Angeles County/Ventura County line, are shown in **Figures 4.1-3a** through **4.1-3f**. The floodplain area increases as the discharge and associated water level increase moving east to west. A summary of the floodplain area for different return events is provided in **Table 4.1-4**.

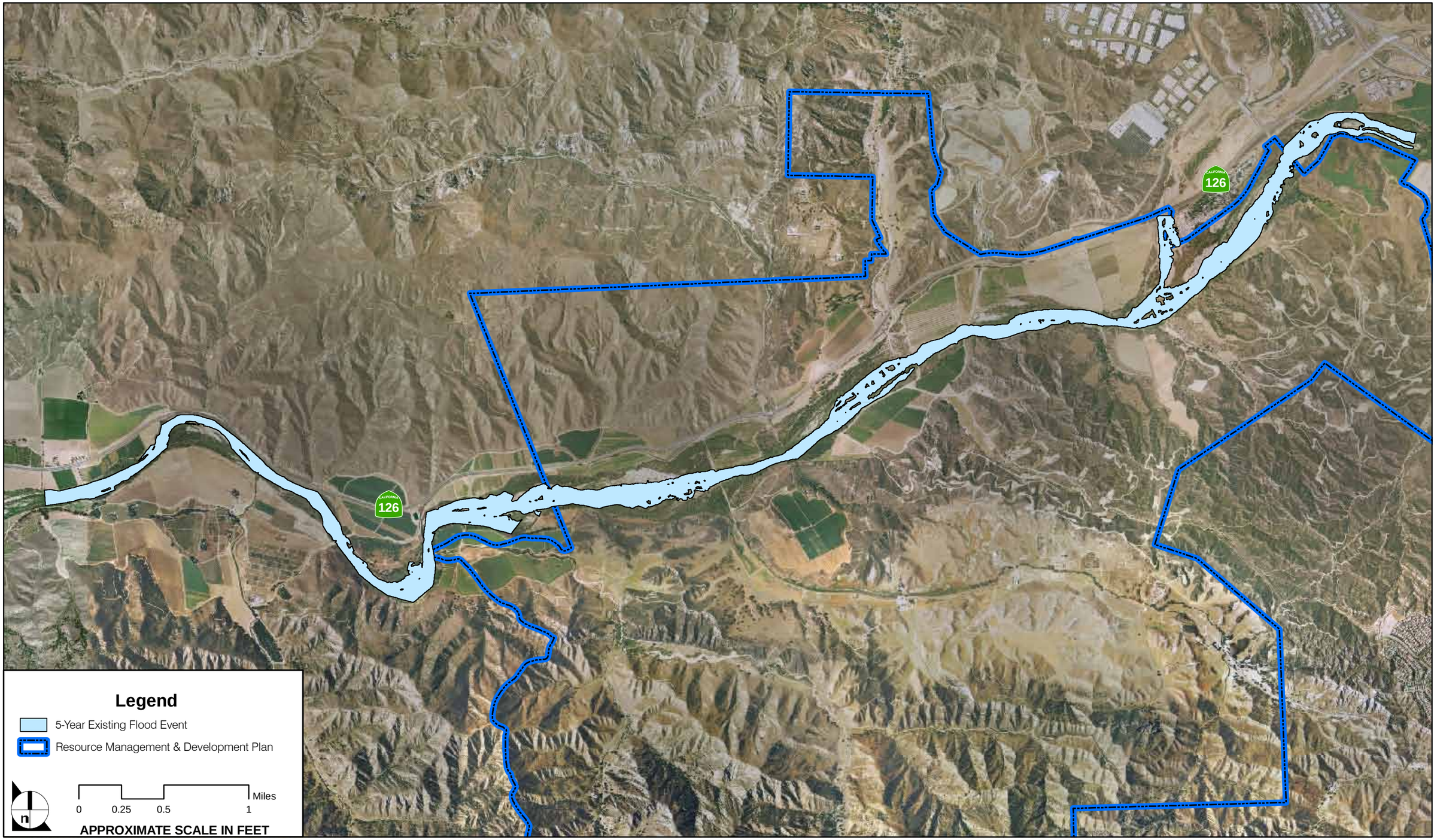


SOURCE: PACE 2008

FIGURE 4.1-3a

EXISTING FLOODPLAIN BOUNDARY
2-YEAR FLOOD EVENT SANTA CLARA RIVER

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-3a_ExistingFloodplain2yrPC1_072308.mxd

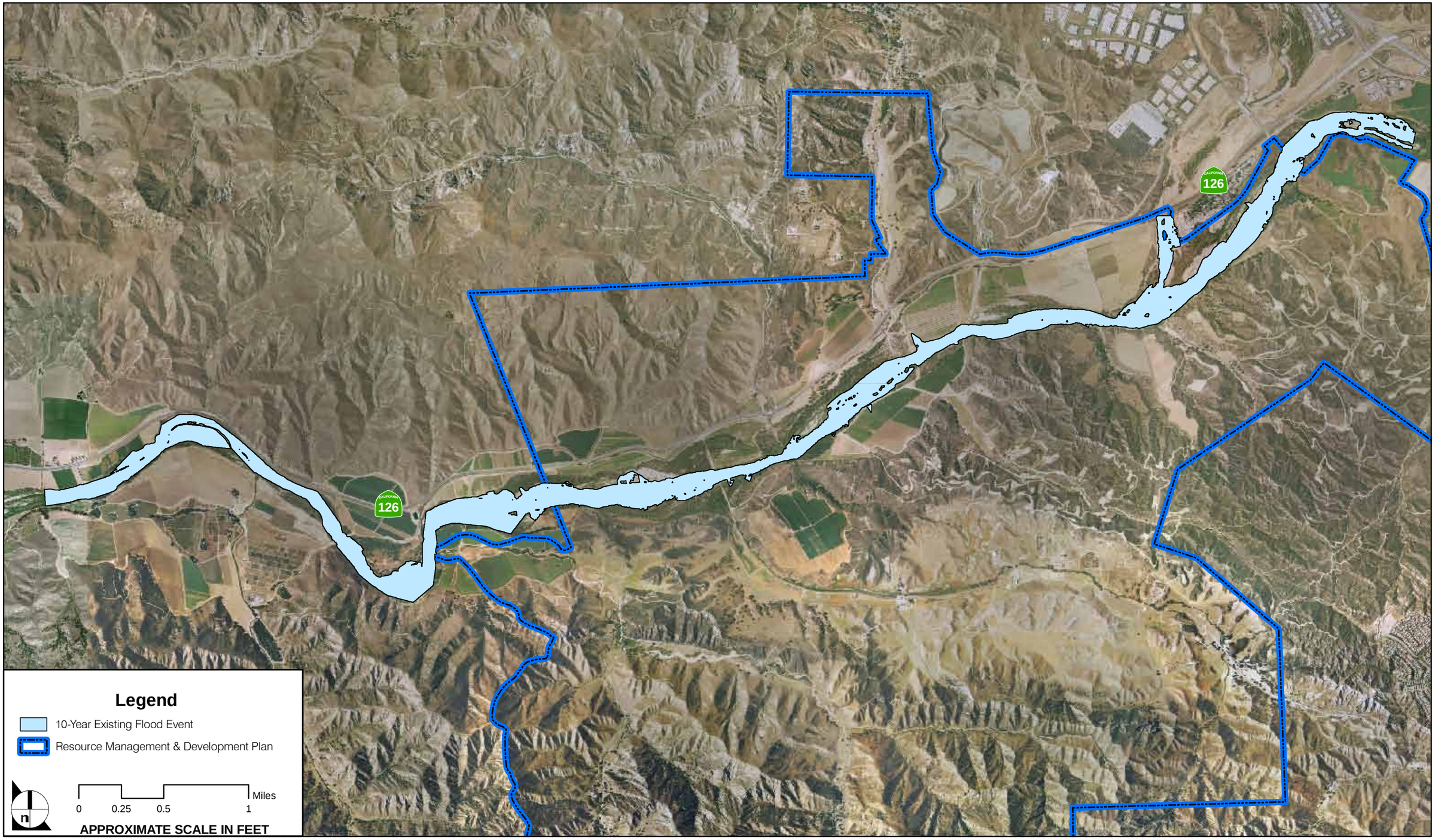


SOURCE: PACE 2008

FIGURE 4.1-3b

EXISTING FLOODPLAIN BOUNDARY
5-YEAR FLOOD EVENT SANTA CLARA RIVER

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-3b_ExistingFloodplain5yrPC1_072308.mxd



SOURCE: PACE 2008

FIGURE 4.1-3c

EXISTING FLOODPLAIN BOUNDARY
10-YEAR FLOOD EVENT SANTA CLARA RIVER

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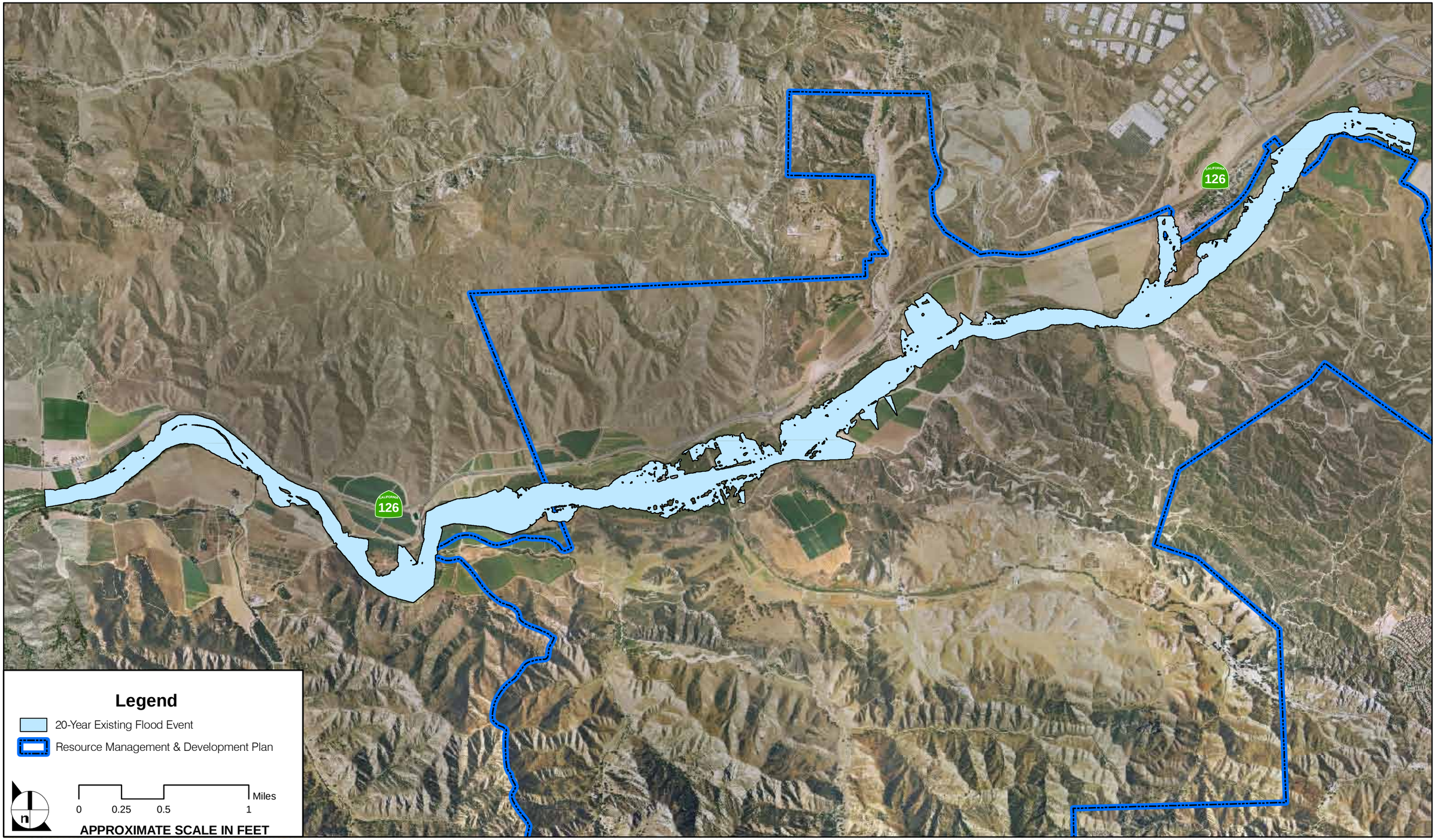

SOURCE: PACE 2008

FIGURE 4.1-3d

EXISTING FLOODPLAIN BOUNDARY
20-YEAR FLOOD EVENT SANTA CLARA RIVER

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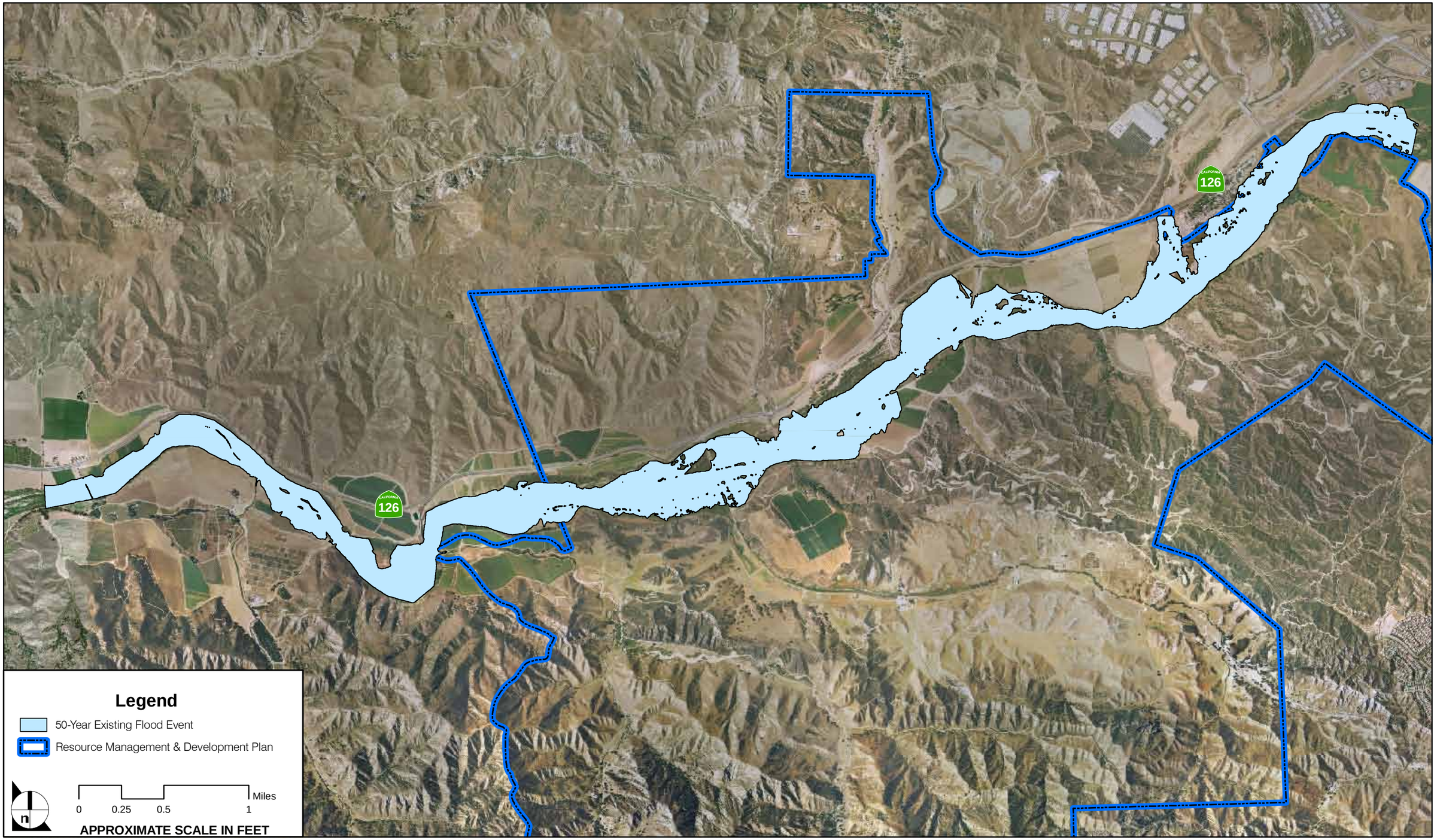
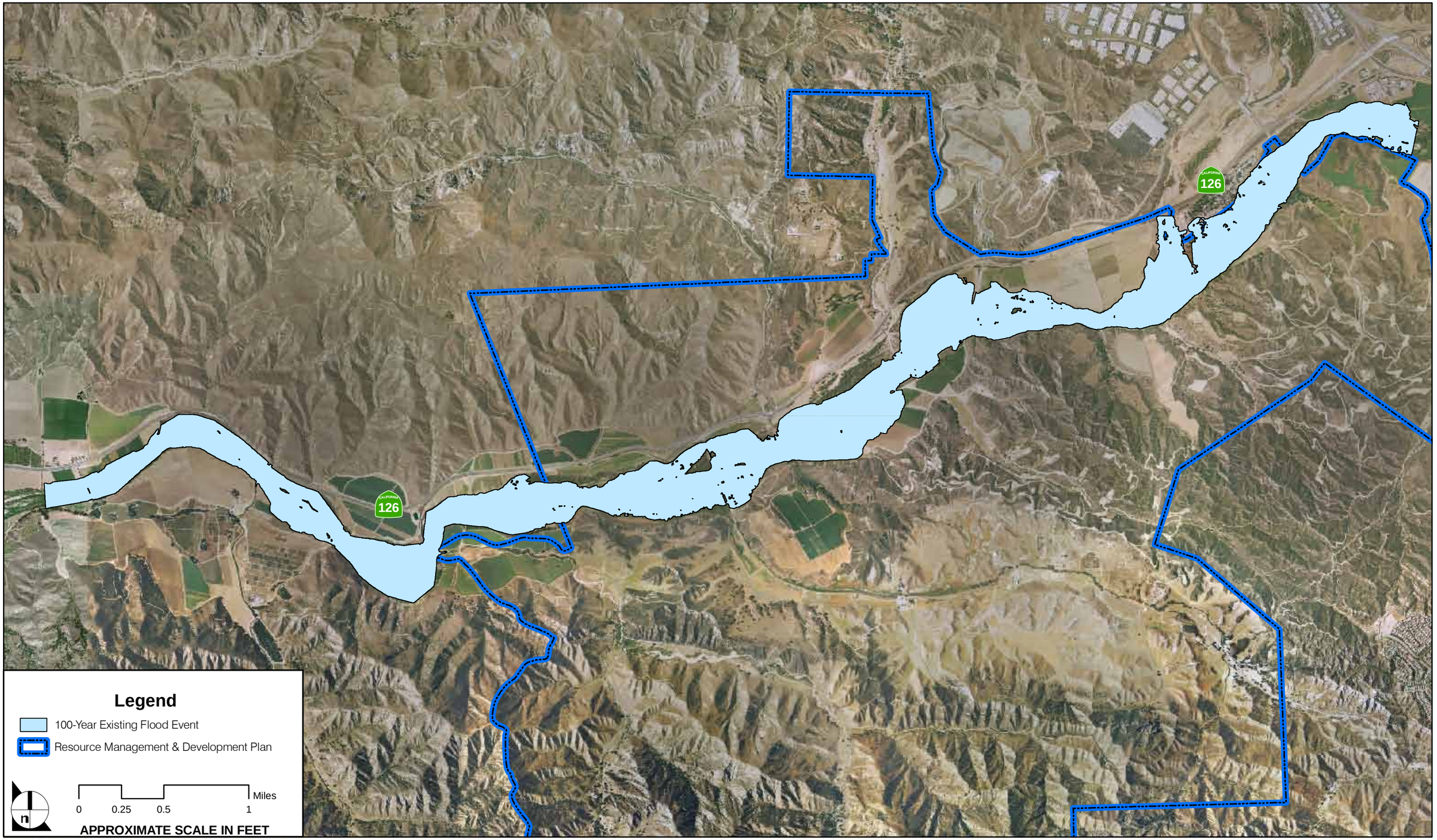


SOURCE: PACE 2008

FIGURE 4.1-3e

EXISTING FLOODPLAIN BOUNDARY
50-YEAR FLOOD EVENT SANTA CLARA RIVER

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-3e_ExistingFloodplain50yrPC1_072308.mxd



SOURCE: PACE 2008

FIGURE 4.1-3f

EXISTING FLOODPLAIN BOUNDARY
100-YEAR FLOOD EVENT SANTA CLARA RIVER

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-3f_ExistingFloodplain100yrPC1_072308.mxd

Table 4.1-4
Floodplain Area for Different Discharges Existing Conditions

Flood Event (years)	Acreage of Floodplain that is Flooded within the RMDP/SCP Project Area
2	447
5	598
10	720
20	999
50	1,294
100	1,408

Source: PACE, 2008A.

Land adjacent to the Santa Clara River is located in the FEMA 100-year floodplain, and in the capital floodplain designated by DPW. The original FEMA FIRMs for the Santa Clara River along Newhall Ranch were updated in a Letter of Map Revision (LOMR) prepared by Sikand Engineering Associates in 1998 based on more detailed floodplain hydraulic mapping and more accurate topographic information. The floodplain maps associated with the approved LOMR are used as the existing condition 100-year floodplain in the supporting PACE River and Tributaries Analysis. (PACE, 2008A, 2008B.)

Regarding flood protection, DPW has developed standards for the design of flood protection facilities along the Santa Clara River. In the Santa Clarita Valley, DPW requires that: (1) the top elevation of the bank protection must contain the capital flood discharge; (2) the bank protection must be readily accessible for inspection and emergency repair; (3) the bank protection must be constructed of a material resistant to erosive flows; and (4) the bank protection must extend to or below the anticipated scour elevation for the capital flood event. Lining of the natural channel bottom is typically not required.

4.1.4.1 Tributary Floodplains

The following describes the floodplain conditions for those tributary drainages with published FEMA 100-year floodplains. These tributaries consist of Potrero Canyon, San Martinez Grande Canyon, Chiquito Canyon, and Middle Canyon, as shown in **Figure 4.1-4.**

4.1.4.4.1 Potrero Canyon

Potrero Canyon has a published FEMA 100-year floodplain, which extends from the Santa Clara River to approximately 13,000 feet upstream. The original published mapping illustrated in the 1996 Q3[8] data was updated in a LOMR prepared by Sikand Engineering Associates in 1998 based on more detailed floodplain hydraulic mapping and more accurate topographic information.

[8] Q3 data are derived from the Flood Insurance Rate Maps (FIRMs) published by FEMA. The data consist of a digital representation of features such as the 100-year floodplain.

4.1.4.4.3 San Martinez Grande

San Martinez Grande Canyon has a published FEMA 100-year floodplain, which extends from the downstream confluence with the Santa Clara River to approximately 5,000 feet upstream. The upstream extent of the FEMA floodplain is approximately 500 feet upstream of the Specific Plan boundary. The original published mapping illustrated in the 1996 Q3 data was updated in a LOMR prepared by Sikand Engineering Associates in 1998 based on more detailed floodplain hydraulic mapping and more accurate topographic information.

The County of Los Angeles has published floodplain studies for different stream and river systems within the County, which include San Martinez Grande. The County has generated the capital floodplain and floodway boundaries on published maps for San Martinez Grande. The capital floodplain and floodway are illustrated on map ML-748, which was generated in October 1986 and adopted by the Los Angeles County Board of Supervisors in January 1990. The capital flood flow used by the County of Los Angeles is different from the adopted FEMA 100-year flowrate in terms of the methodology and rainfall, which results in the capital flood generally being much larger than the FEMA flowrate. The capital flood flow identified in the 1990 County maps is 6,700 cfs.

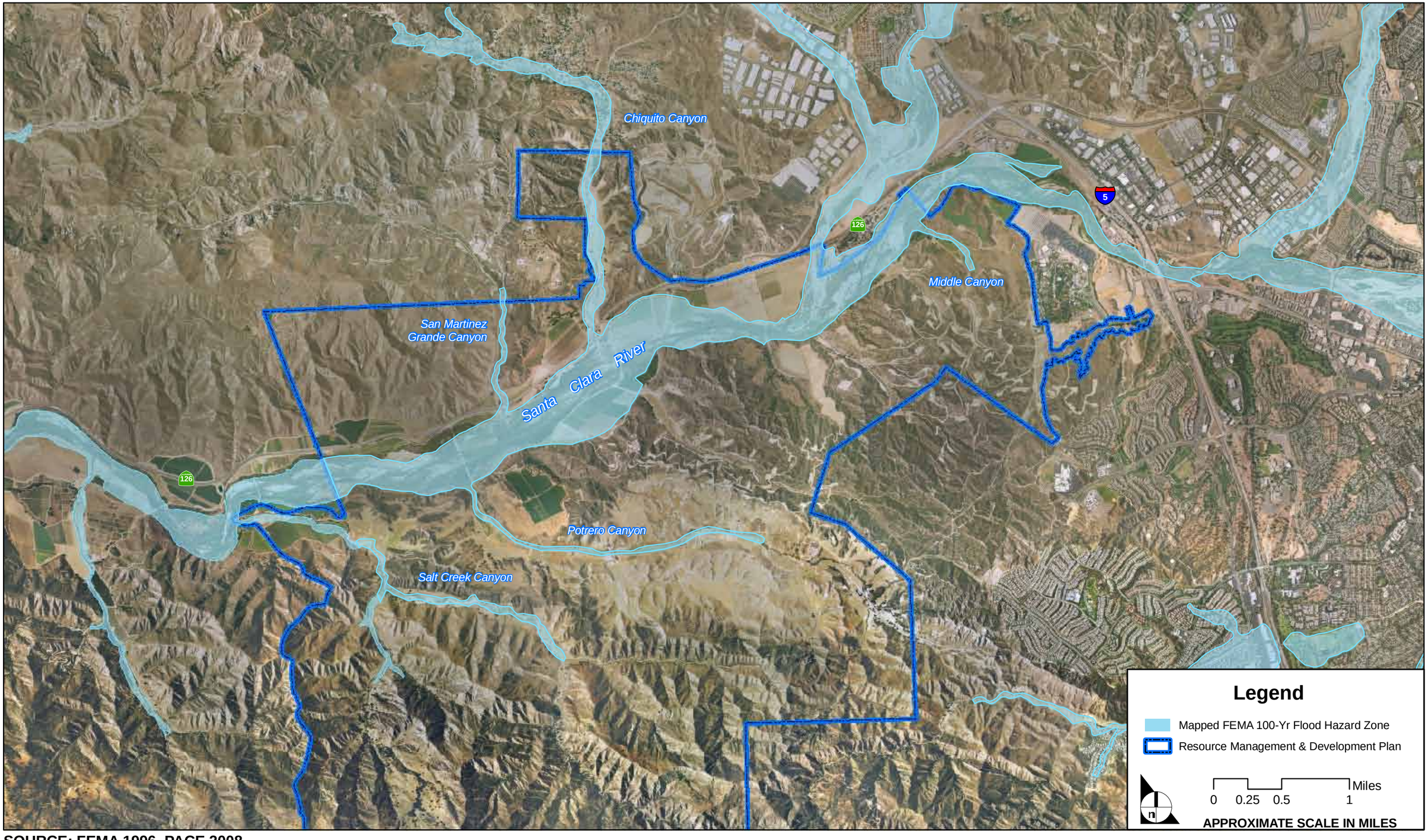
4.1.4.4.4 Chiquito Canyon

Chiquito Canyon has a published FEMA 100-year floodplain that extends from the downstream confluence with the Santa Clara River to approximately 18,000 feet upstream. The upstream extent of the FEMA floodplain is approximately 7,000 feet upstream of the Specific Plan boundary. The original published mapping illustrated in the 1996 Q3 data was updated in a LOMR prepared Sikand Engineering Associates in 1998, based on more detailed floodplain hydraulic mapping and more accurate topographic information.

The County of Los Angeles also has published floodplain studies for different stream and river systems within the County which include Chiquito Canyon. The County has generated the capital floodplain and floodway boundaries on published maps for Chiquito Canyon. The capital floodplain and floodway are illustrated on map ML-387, which was generated in October 1986 and adopted by the Los Angeles County Board of Supervisors in January 1990. The capital flood flow used by the County of Los Angeles is different from the adopted FEMA 100-year flowrate in terms of the methodology and rainfall, which results in the capital flood generally being much larger than the FEMA flowrate. The capital flood flow identified in the 1990 County maps is 7,940 cfs.

4.1.4.4.5 Middle Canyon

Middle Canyon has a published FEMA 100-year floodplain that extends from the downstream confluence with the Santa Clara River to approximately 3,000 feet upstream. The original published mapping illustrated in the 1996 Q3 data was updated in a LOMR prepared Sikand Engineering Associates in 1998, based on more detailed floodplain hydraulic mapping and more accurate topographic information.



SOURCE: FEMA 1996, PACE 2008

FIGURE 4.1-4

MAPPED FEMA 100-YEAR FLOOD HAZARD ZONE
SANTA CLARA RIVER

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-4_MappedFEMA100yrFloodHazardZoneSantaClaraRiver_PC1_072308.mxd

4.1.5 IMPACT SIGNIFICANCE CRITERIA

The significance criteria listed below are derived from both Appendix G of the State CEQA Guidelines and Los Angeles County's Environmental Document Reporting Procedures and Guidelines, and were used to determine the significance of impacts related to hydrology. The Corps has agreed to use the CEQ criteria presented below for purposes of this EIS/EIR, although significance conclusions are not expressly required under NEPA. The Corps also has applied federal requirements as appropriate in this EIS/EIR.

Impacts would be significant if implementation of the proposed Project or its alternatives would:

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site (as described below, the portions of this criterion relevant to flooding and flood hazards are addressed in this section while the portions relevant to alteration of the course of a stream or river are addressed in **Section 4.2**, Geomorphology and Riparian Resources);
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff (as described below, the portions of this criterion relevant to stormwater conveyance are addressed in this section while the portions relevant to water quality are addressed in **Section 4.4**, Water Quality);
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map (as described below, the Newhall Ranch Specific Plan Program EIR has analyzed the proposed land uses associated with the RMDP, and all buildings and structures will be constructed outside of the 100-year flood hazard area. Accordingly, this criterion is not discussed further in this document);
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows (as described below, the Newhall Ranch Specific Plan Program EIR has analyzed the proposed land uses associated with the RMDP, and all buildings and structures will be constructed outside of the 100-year flood hazard area. Accordingly, this criterion is not discussed further in this document);
- Create the potential for inundation by seiche,[9] tsunami,[10] or mudflow (as described below, this criterion is not relevant given the location of the proposed Project); and/or

[9] A seiche (pronounced say'sh) is a wave on the surface of a lake or landlocked bay caused by atmospheric or seismic disturbances. The effect of a seiche may also be referred to as "sloshing," which occurred to many swimming pools in the San Fernando Valley during the 1994 Northridge earthquake,

[10] A tsunami (pronounced soo-NAH-mee) is a series of waves of extremely long wave length and long period, generated in a body of water by an impulsive disturbance that displaces the water such as an earthquake, landslide, or sub-marine volcanic eruption.

- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam. (as described below, this criterion is discussed in **Section 4.17**, Hazards, Hazardous Materials, and Public Safety).

Several of the CEQA Appendix G significance criteria are not applicable to the proposed Project or are addressed in other sections of the EIS/EIR. The Newhall Ranch Specific Plan Program EIR has analyzed the proposed land uses associated with the RMDP, and all buildings and structures will be constructed outside of the 100-year flood hazard area. Given the inland location of the Specific Plan site, inundation by tsunami is not analyzed further in this EIS/EIR. Because the Specific Plan site is not adjacent to the shore of an enclosed body of water (*e.g.*, lake), inundation by seiche also is not analyzed further in this EIS/EIR. An analysis of direct and indirect impacts as a result of a potential failure of the Castaic Lake dam is addressed in **Section 4.17**, Hazards, Hazardous Materials, and Public Safety, of this EIS/EIR. The potential impact of mudflows also is incorporated into the analysis of landslides in **Section 4.17** of this EIS/EIR. The likelihood of producing polluted runoff is addressed in **Section 4.4**, Water Quality. Potential impacts to geomorphology and riparian resources are addressed in **Section 4.2** of this EIS/EIR.

Since most of the criteria do not apply or are addressed in other sections, the significance criteria used in this section consist of the following:

Significance Criterion 1: Flooding/Flood Hazards -- impacts would be significant if implementation of the proposed Project and alternatives would substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site; and,

Significance Criterion 2: Storm Water Conveyance -- impacts would be significant if implementation of the proposed Project and alternatives would create or contribute runoff water, which would exceed the capacity of existing or planned stormwater drainage systems.

4.1.6 IMPACTS OF THE PROPOSED PROJECT AND ALTERNATIVES

This section assesses the direct, indirect, and secondary impacts related to surface water hydrology and flood control, based upon the regulatory setting, existing conditions, and significance criteria described above. Direct impacts are impacts that are a direct result of the construction, operation and maintenance of the RMDP and SCP components of the proposed Project. Indirect impacts are impacts from the development facilitated by the Specific Plan, VCC, and a portion of the Entrada planning area. Secondary impacts are potential changes to flooding and flood control downstream of the Project area.

Although no significant impacts were identified in this section of the EIS/EIR, the Newhall Ranch Specific Plan Program EIR, nonetheless, recommended implementation of Mitigation Measures SP-4.2-1 through SP-4.2-8 to ensure compliance with all plan and regulatory requirements.[11] In addition, to ensure

[11] Reference to these compliance mitigation measures included in the Newhall Ranch Specific Plan Program EIR are preceded by "SP" in this EIS/EIR to distinguish them from other mitigation measures discussed herein.

avoidance of flood impacts resulting from construction and operation of the approved WRP, the Newhall Ranch Specific Plan Program EIR recommended implementation of Mitigation Measure SP-5.0-14 through SP-5.0-20. The Los Angeles County Board of Supervisors found that adoption of the recommended compliance mitigation measures would ensure compliance with all plan and regulatory requirements. The Newhall Ranch mitigation program was adopted by Los Angeles County in findings and in the revised Mitigation Monitoring Plans for the Specific Plan and WRP.

4.1.6.1 Impact Assessment Methods

The focus of the impact analysis is on the consequences of implementation of the RMDP and associated development of the Specific Plan, Valencia Commerce Center, and a portion of the Entrada planning area to flooding and storm water conveyance, including reduction of floodplain area, increase in flows along the Santa Clara River, and inadequate capacity of storm water drainage infrastructure, which can result in increased flooding hazards within and outside of the Project area. The analysis of impacts for the Santa Clara River and major tributaries (San Martinez Grande, Chiquito, Lion, Long, and Potrero Canyons) is based on an evaluation of hydraulic modeling results. As discussed in **Subsection 4.1.3.3**, the DPW has specific design, operation, and maintenance criteria for flood control, debris basin, and storm water drainage facilities. The RMDP and SCP components are designed in accordance with these criteria and the design for the proposed structures would require review and approval by the DPW prior to construction.

Impacts related to flooding/flood hazards (Significance Criterion 1) are based on hydraulic modeling results indicating the change in floodplain area. Reduction of the existing floodplain may hinder flows and/or result in an increase in surface water, which could cause flooding within the Project area and any increase in flows within the Santa Clara River could result in flooding impacts outside of the Project area. Accordingly, the hydraulic model results for the Project and alternatives are compared to existing conditions for the Santa Clara River and proposed conditions for the major drainages to evaluate potential flooding/flood hazards resulting from the Project and alternatives. Regarding the minor tributaries, the Project and various alternatives propose to either maintain existing conditions or convert all or portions of these drainages to buried storm drains. Accordingly, flood hazards associated with the minor tributaries are addressed by Significance Criterion 2, Storm Water Conveyance.

Regarding storm water conveyance (Significance Criterion 2), potential impacts are evaluated by comparing estimated runoff following implementation of the Project and alternatives to the existing conveyance capacity for the Santa Clara River or proposed stormwater conveyance capacity for infrastructure improvements in the tributary drainages.

The following provides an overview of the hydraulic models used in this analysis. The models are described in more detail in the PACE River and Tributaries Analysis (PACE, 2008A, 2008B), which is found in **Appendix 4.1** of this EIS/EIR.

4.1.6.1.1 Hydraulic Modeling for the Santa Clara River

The hydraulic model used in this assessment is consistent with that provided in the Newhall Ranch Revised Additional Analysis and consists of the Corps' HEC-RAS (River Analysis System, Version 3.1.2)

water surface profile model. The model was used to determine the floodplain area and water surface elevations for existing conditions and conditions following Project implementation. The HEC-RAS model is a rigid boundary model that assumes a fixed channel geometry and calculates water surface profile hydraulics for steady/unsteady and gradually varied flow in open channels. The primary inputs to the model consist of flow, channel geometry, and Manning's roughness. The inputs used in this analysis are described below.

Regarding flows, the model was used to evaluate existing and post-Project conditions in the Santa Clara River for the 2-, 5-, 10-, 20-, 50-, and 100-year flow events. The flows used in the model were obtained from 1994 Corps' study entitled, "Santa Clara River Adopted Discharge Frequency Values." This study is based upon a frequency analysis of stream flow data along the Santa Clara River and, therefore, approximates river flows from observed data. These values are presented in **Table 4.1-5**. It is important to note that these values also include discharges from upstream tributaries and direct runoff from the watershed. Six of the seven recurrence intervals included in the analysis were obtained from the 1994 study; the seventh, the Los Angeles County capital flood, is referenced from the previously published DPW ML Maps 43-ML-24 and 43-ML-25 of floodplain and floodway. This published capital flood flow rate from DPW was recently revised downward. For comparison purposes, the existing and existing plus Project conditions were evaluated with previously published (higher) capital flood flow rates, but the final design of bank protection would utilize the newest (lower) rates.

Table 4.1-5
Santa Clara River Existing Conditions Discharge by Return Period (cfs)

Location	2-year flood	5-year flood	10-year flood	20-year flood	50-year flood	100-year flood
Downstream of Commerce Center Drive	1,720	5,240	9,490	15,600	27,500	40,300
At Castaic Creek Confluence	2,527	8,232	14,942	24,157	41,141	58,207
Downstream of Chiquito Canyon Confluence	2,558	8,333	15,126	24,453	41,646	58,922
At San Martinez Grande Confluence	2,581	8,408	15,263	24,675	42,025	59,457
Downstream of Potrero Canyon Confluence	2,600	8,480	15,400	24,900	42,400	60,000

Source: PACE, 2008A.

The analysis of post-Project hydrology and hydraulics utilized calculated runoff rates associated with the 2-, 5-, 10-, 20-, 50-, and 100-year storm events that were generated using the Corps' HEC-1 rainfall-runoff model. The input data to the HEC-1 model included USGS topographic data and simulated soil infiltration rate to transform rainfall excess into surface runoff. The physical topographic features and ridgelines for each tributary watershed were used to establish the major regional watershed boundary. The regional watershed boundary was then subdivided into sub-basins to facilitate the modeling process and establish appropriate delineation of the interior watershed areas.

The soil infiltration rates used in the HEC-1 model were obtained from Natural Resources Conservation Service (NRCS) soil maps and associated soil property data The soil types in the Project area are classified into four types, ranging from Type "A," which is very permeable (sandy soils), to Type "D," which is relatively impermeable (clay soils). The model used existing soil conditions to characterize pre-

Project runoff conditions and evaluated post-Project runoff by increasing the amount of impervious cover according to the Project land use plans. The amount of impervious area was determined based on the land use density for that area and the amount of impervious cover typically associated with that land use designation described in local hydrology manuals.

The channel geometry used in the model was obtained from digital terrain models (DTMs) of topographic data along the Santa Clara River channel. Cross sections were digitally oriented on the electronic mapping by BOSS-RMS and the data was exported to HEC-RAS. The evaluation of post-Project conditions was conducted by modifying existing cross section geometrics of the River to simulate the hydraulic effects of the proposed RMDP soil cement; erosion protection; and the Commerce Center Drive Bridge, Potrero Canyon Bridge, and Long Canyon Road Bridge abutments and piers. The encroachment due to the soil cement was conservatively approximated with levees in the hydraulic model -- model levees set at equivalent elevation on slope of channel invert. The modeling of the proposed bridge span, soil cement, pier spacing, and abutment locations are based on the DPW Design Division's location, span, and clearance plans, which is consistent with the approach used in the Newhall Ranch Revised Additional Analysis, Volume VIII (May 2003). For modeling and impact analysis consideration, these conservative bridge configurations would have the greatest impact on river hydraulics. It should be pointed out that the present analysis is based on the Project-specific design information, not assumptions from the previous Specific Plan evaluation.

Manning's roughness values, a characteristic of the stream bed, were taken from analysis of aerial photography of the RMDP site, and vary horizontally along each model cross section. The proposed conditions analysis was conducted by modifying the existing conditions model such that bank protection, as described below, was placed within the model as encroaching levees.

This analysis primarily uses the model results for change in floodplain area and flows to evaluate impacts for each of the various Project alternatives. A comprehensive summary of the model results is provided in PACE Floodplain Hydraulics Impacts Assessment for the Santa Clara River, 2008A; and the PACE Major Tributary Watersheds, 2008B.

4.1.6.1.2 Hydraulic Modeling for the Major Tributaries

For each of the major tributaries (San Martinez Grande, Chiquito, Lion, Long, and Potrero Canyons), the Corps' HEC-1 and HEC-RAS models were used to evaluate Project impacts. The HEC-1 model was used to calculate existing and post-Project runoff rates associated with the 2-, 5-, 10-, 20-, 50-, and 100-year storm events. The runoff calculations associated with existing conditions were based on existing soil properties and post-Project runoff was calculated by increasing the amount of impervious cover according to the Project land use plans.

The calculated runoff rates were used as input into a HEC-RAS model that was developed for each of the major tributaries. The channel geometry used in the model was obtained from DTMs of topographic data, and Manning's roughness values were taken from analysis of aerial photography of the RMDP site and vary horizontally along each model cross section. The proposed conditions analysis was conducted by modifying the existing conditions model to reflect the proposed Project structures and channel modifications.

The analysis of flood hazards for the major tributaries utilized the hydraulic model results to determine whether the post-Project conditions were adequate to contain the flows from a 100-year storm event and a capital flood event.

4.1.6.1.3 Minor Tributaries

The minor tributaries do not have floodplains as defined by FEMA or DPW, so the impact analysis does not include an evaluation of impacts relative to Significance Criterion 1, Flooding/Flood Hazards. Instead, the analysis utilizes DPW design criteria and information provided in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008) to evaluate potential impacts relative to Significance Criterion 2, Stormwater Conveyance, since the Project proposes to either maintain existing conditions or convert all or portions of these drainages to buried storm drains.

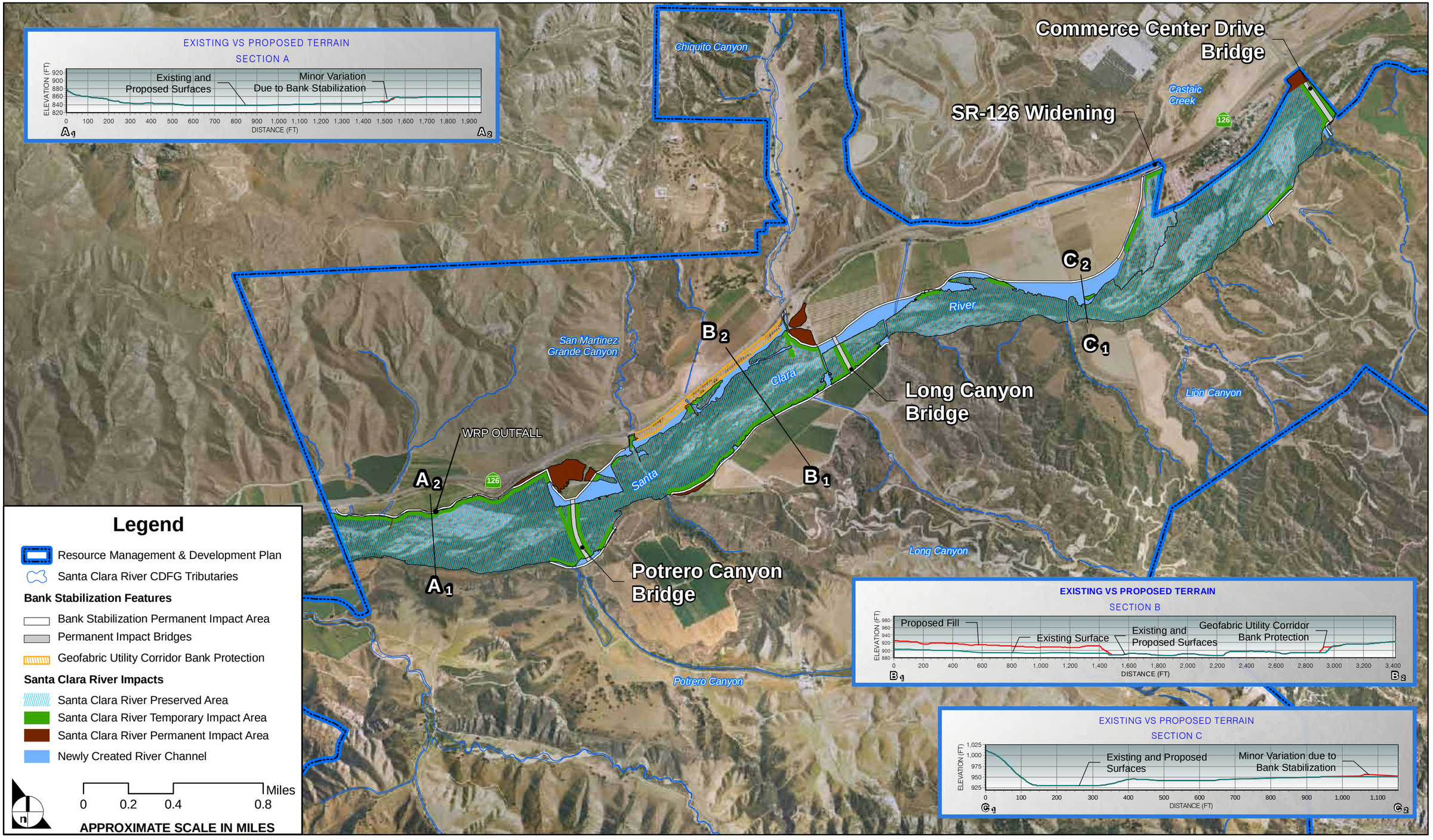
4.1.6.2 Impacts of Alternative 1 (No Action/No Project)

Under Alternative 1, no action would be taken and the proposed Project would not be developed. Therefore, under this alternative, there would be no construction of bridges, bank stabilization, grade stabilizer structures, detention basins, storm drains, or the WRP. Consequently, Alternative 1 would not result in any direct impacts to the environment. Similarly, with respect to indirect and secondary impacts, under Alternative 1, no RMDP infrastructure would be built and no federal or state permits issued to facilitate development within the Specific Plan area, the VCC planning area, or in a portion of the Entrada planning area. Therefore, Alternative 1 would not have the potential to affect hydrology, indirectly or otherwise. Consequently, this alternative would not result in any surface water hydrology and flood control-related impacts associated with development and implementation of the proposed Project or the "build" alternatives.

4.1.6.3 Impacts of Alternative 2 (Proposed Project)

The proposed Project, as described in **Section 2.0**, Project Description, of this EIS/EIR, would involve the construction of buried bank stabilization in upland and riparian areas along approximately half of the north bank and one-third of the south bank of the portion of the Santa Clara River within the Newhall Ranch Specific Plan as shown in **Figure 2.0-25**. The proposed Project also would involve the construction of three bridges across the River, one at Commerce Center Drive (previously authorized under Corps Permit No. 94-00504-BAH and LSAA No. 5-502-97, and identified in this document for information and cumulative impact purposes only), one at the mouth of Potrero Canyon, and one at the mouth of Long Canyon. In total, the RMDP project component proposes that 29,779 linear feet of buried bank stabilization and three new bridges be constructed in the Santa Clara River corridor. In addition, a WRP outfall to the Santa Clara River would be constructed. No grade stabilizer structures are proposed on the river mainstem. The RMDP infrastructure is designed to contain the 100-year and capital flood events, and protect structures adjacent to and outside of these flood areas.

A summary of the RMDP infrastructure is provided in **Table 4.1-6**, and **Figures 4.1-5** and **4.1-6** show the proposed RMDP components under Alternative 2.

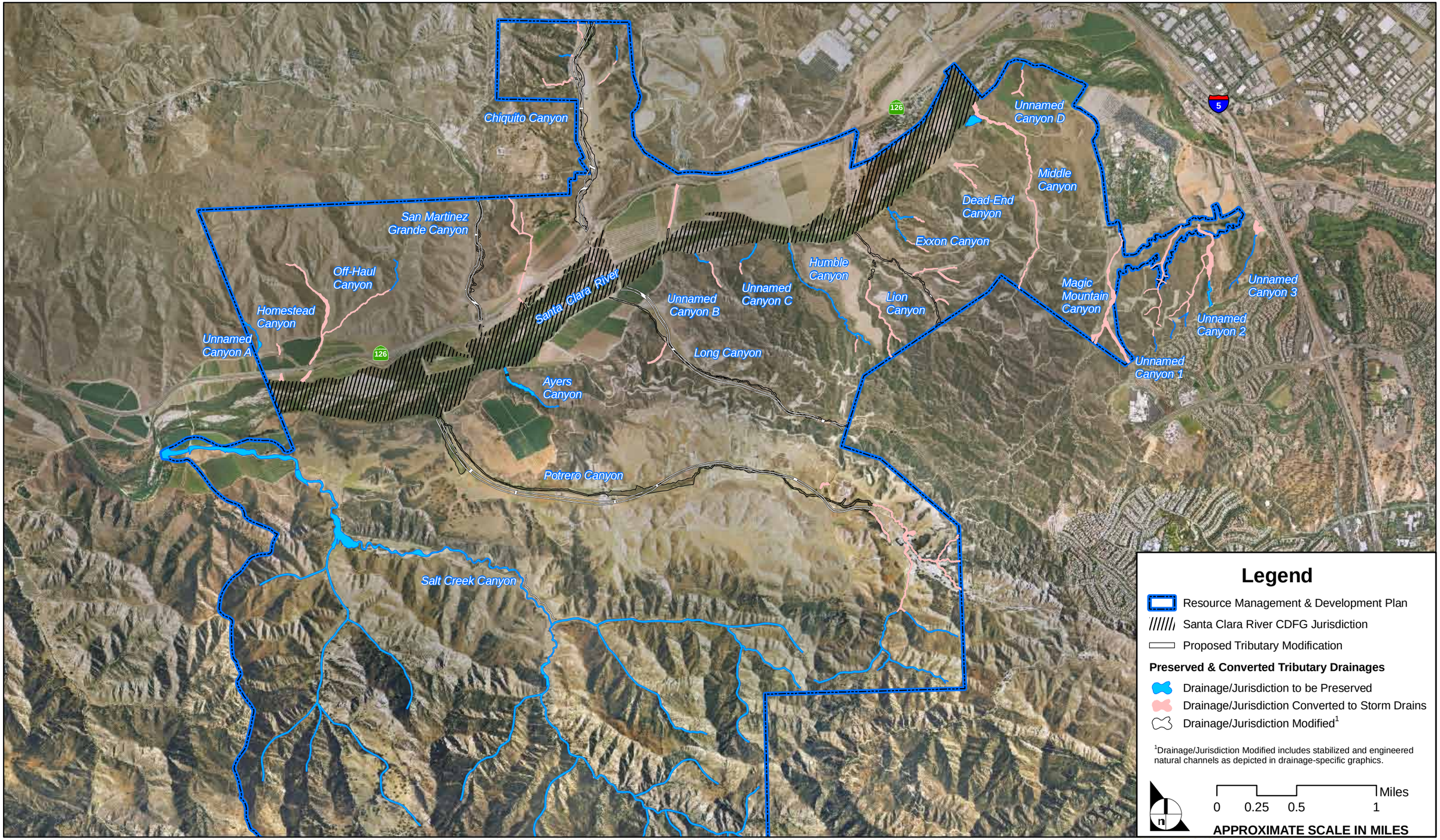


SOURCE: PACE 2008

FIGURE 4.1-5

ALTERNATIVE 2 PROPOSED RMDP
SANTA CLARA RIVER FEATURES

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-5_SCRMajorFeaturesAlt2RMDP_PC1_043008.mxd



SOURCE: PACE - April 2008

FIGURE 4.1-6

ALTERNATIVE 2 (PROPOSED PROJECT)
MODIFIED, CONVERTED, AND PRESERVED TRIBUTARY DRAINAGES

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-6_ModifiedConvertedPreservedTributaryDrainageTreatmentsAlt2_PC1_050108.mxd

Table 4.1-6
RMDP Infrastructure Components: Alternative 2

Location	Bank Stabilization (Linear Feet)	Drainage Converted to Buried Storm Drain (Linear Feet)	Grade Stabilizer Structures	New/Widened Bridges and Road Crossings
Santa Clara River	**29,779**	**-**	**-**	**3**[1]
Major Tributaries				
Chiquito Canyon	14,692	2,549	11	3
San Martinez Grande Canyon	8,566	0	8	2
Long Canyon	17,648	961	44	3
Potrero Canyon	32,530	10,918	98	5
Lion Canyon	0	6,316	28	1
Minor Tributaries				
Salt Creek Canyon	1,992[2]	0	0	0
Agricultural Ditch	0	1,479	0	0
Ayers Canyon	0	0	0	1
Dead-End Canyon	0	1,931	0	0
Exxon Canyon	0	1,276	0	0
Homestead Canyon	0	609	0	0
Humble Canyon	0	421	0	0
Middle Canyon	0	7,439	0	0
Mid-Martinez Canyon	0	4,541	0	0
Off-Haul Canyon	0	7,593	0	0
Magic Mountain Canyon	0	6,111	0	1
Unnamed Canyon 1 (Entrada)	0	4,647	0	1
Unnamed Canyon 2 (Entrada)	0	416	0	1
Unnamed Canyon A	0	0	0	0
Unnamed Canyon B	0	1,004	0	0
Unnamed Canyon C	0	402	0	0
Unnamed Canyon D	0	1,232	0	0
Alternative Total in Tributaries	**75,429**	**59,845**	**189**	**15**

Notes:
[1] Commerce Center Drive Bridge is already permitted but is included in analysis for informational purposes.
[2] No fill within the U.S. Army Corps of Engineers jurisdictional area will occur within Salt Canyon, except for habitat restoration and enhancement throughout the watershed.
Source: RMDP, 2008.

Alternative 2 would involve the designation of a total of 167.6 acres of spineflower preserves. If this alternative is implemented, a total of 105,207 linear feet of bank stabilization, 189 grade stabilizer structures, and 18 new bridge/culvert road crossings would be constructed on the Specific Plan site. This alternative would require 59,845 linear feet of ephemeral and intermittent drainages to be replaced with buried storm drains to accommodate the creation of building pads.

There are five major tributary drainages that would be partially regraded or modified, but remain in soft bottom channel conditions: Chiquito Canyon; San Martinez Grande Canyon; Potrero Canyon; Long Canyon; and Lion Canyon. Significant portions of several small, tributary drainages would be graded and replaced with storm drains or other appropriate conveyance facilities, including: Magic Mountain Canyon; Middle Canyon; Dead-End Canyon; Exxon Canyon; Mid-Martinez Canyon; Off-Haul Canyon; Homestead Canyon; the Chiquito Canyon agricultural ditch; Unnamed Canyon B; Unnamed Canyon C; Unnamed Canyon D; Unnamed Canyon 1; and Unnamed Canyon 2 drainages.

Chiquito Canyon. The RMDP proposes that bank stabilization be installed along the entire length of both banks of Chiquito Canyon. Two new bridge/culvert road crossings would be installed just upstream of SR-126, and another would cross the drainage approximately halfway between SR-126 and the northern Project area boundary. The existing, two-lane bridge allowing SR-126 to cross the drainage would be widened from two to four lanes. In total, implementation of the proposed Project would involve the placement of 14,692 linear feet of buried bank stabilization, 11 grade stabilizer structures, and three new bridge/culvert road crossings in Chiquito Canyon. Regarding flooding and stormwater conveyance, the Project would be designed to convey the 100-year and capital flood runoff events in compliance with DPW requirements and would include project design features to minimize flood hazards as specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008). (See **Figure 4.1-7**.)

San Martinez Grande Canyon. Alternative 2 proposes that a soft bottom channel be constructed adjacent to the existing alignment of San Martinez Grande Canyon Road between SR-126 and the northern Project area boundary. The existing stream channel would be graded, and the drainage would be relocated westward into the soft bottom channel. Bridge/culvert road crossings are proposed just upstream of SR-126 and approximately two-thirds of the way between SR-126 and the northern Project area boundary. The existing bridge allowing SR-126 to cross the drainage would be widened from two to four lanes. In total, this alternative would involve the placement 8,566 linear feet of buried bank stabilization, eight grade stabilizer structures, and two new bridge/culvert road crossings in San Martinez Grande Canyon. Regarding flooding and stormwater conveyance, the Project would be designed to convey the 100-year and capital flood runoff events in compliance with DPW requirements and would include project design features to minimize flood hazards as specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008). (See **Figure 4.1-8**.)

Legend

- Resource Management & Development Plan

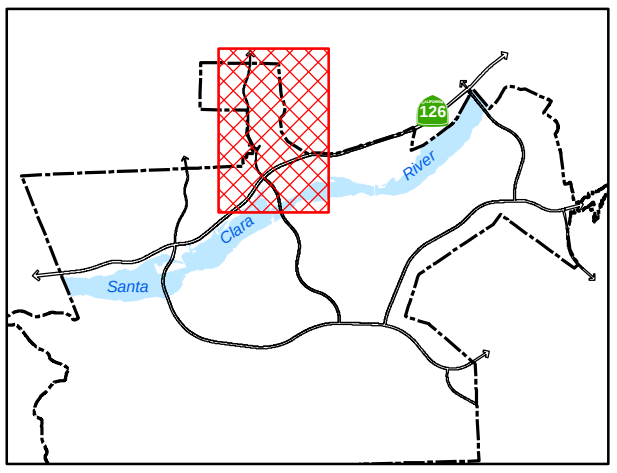
Drainage/Jurisdiction Features

- Drainage/Jurisdiction Temporarily Impacted
- Drainage/Jurisdiction Permanently Impacted
- Drainage/Jurisdiction Converted to Storm Drain

Bank Stabilization Features

- Drainage/Jurisdiction Newly Created
- Proposed Bank Stabilization
- Bridge/Road Crossing
- Drop Structure/Grade Stabilzers
- Proposed Grading
- Roads

Feet
0 300 600 1,200
APPROXIMATE SCALE IN FEET



8000'
7000'
6000'
5000'
4000'
3000'
2000'
1000'

Road Crossing
Culvert Location

Road Crossing
Culvert Locations

SR-126 Bridge
Widening

CALIFORNIA
126

SANTA
CLARA
RIVER

SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-7

CHIQUITO CANYON ALTERNATIVE DETAIL - ALTERNATIVE 2 & 4
PROPOSED RMDP TRIBUTARY TREATMENTS

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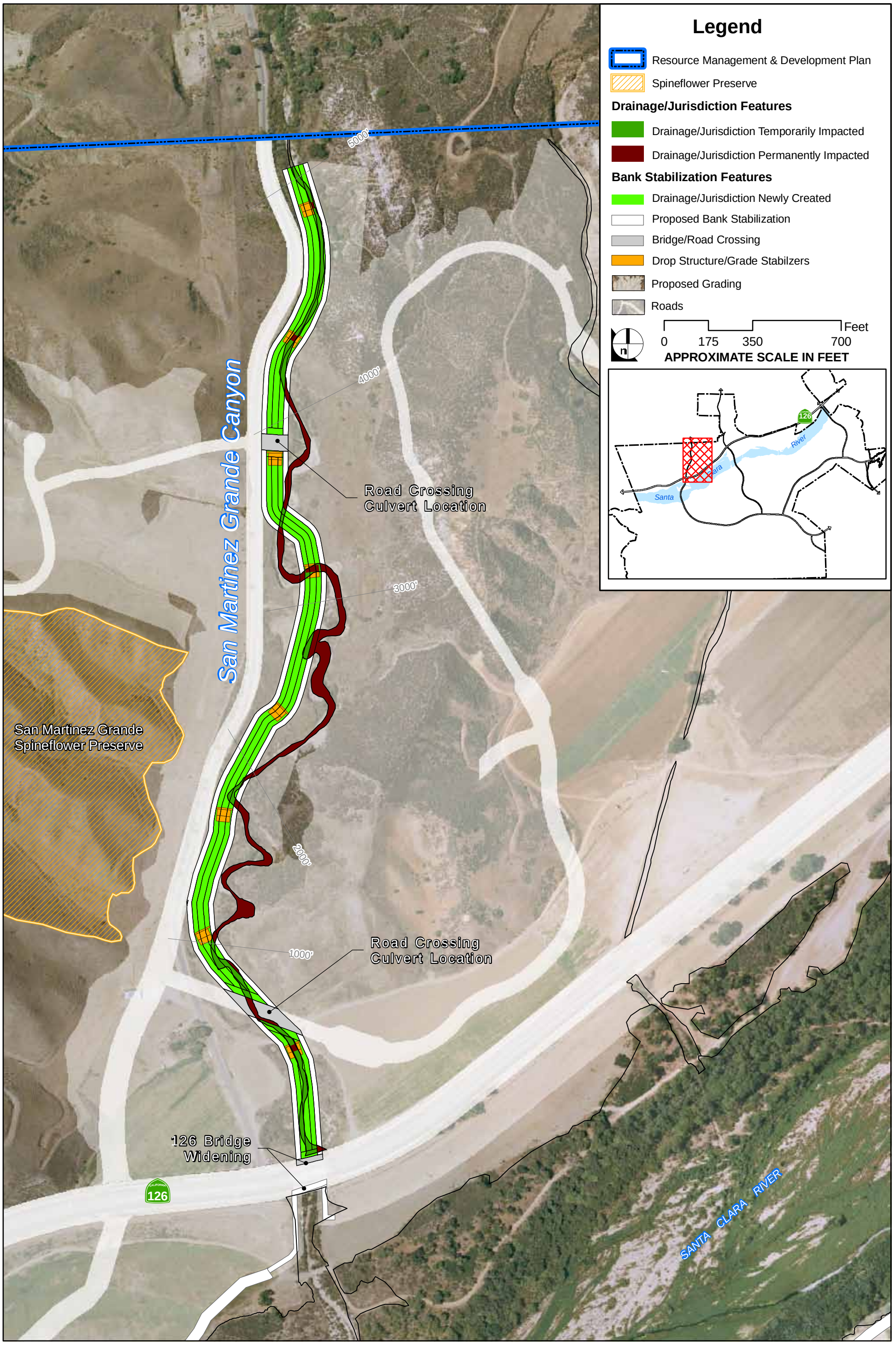


SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-8

SAN MARTINEZ GRANDE CANYON ALTERNATIVE DETAIL - ALTERNATIVE 2 & 4
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-8_SanMartinezAlternative2-4_PC1_042908.mxd

Long Canyon. The preliminary design for Long Canyon RMDP improvements proposes that a soft bottom channel be constructed between the eastern Project area boundary and the confluence with the Santa Clara River. Less than ten percent of this constructed channel would fall within the existing drainage; the remaining portion would require the stream to be relocated. Two new bridge/culvert road crossings would cross the drainage just upstream of the Santa Clara River confluence, and another is proposed approximately 1,000 feet upstream of the eastern Project area boundary. In total, the preliminary design includes the placement of 17,648 linear feet of buried bank protection, 44 grade stabilizer structures, and three new bridge/culvert road crossings in Long Canyon. Regarding flooding and stormwater conveyance, the Project will be designed to convey the 100-year and capital flood runoff events in compliance with DPW requirements, and will include project design features to minimize flood hazards as specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008). (See **Figure 4.1-9**.)

Potrero Canyon. The preliminary design for Potrero Canyon RMDP improvements includes the construction of a soft bottom channel lined with buried bank stabilization between the Santa Clara River confluence and a point approximately four-fifths of the way up the drainage. This channel would not correspond to the natural location of the drainage, and would require the stream to be relocated. Grade stabilizer structures would be constructed at intervals along this channel, and five new bridge/culvert road crossings would be constructed to allow roadways to cross the drainage. Upstream of this channel, the natural drainage would be graded and buried storm drains would convey flows. The preliminary design also involves the conversion of 10,918 linear feet of the existing Potrero Canyon drainage to buried storm drains, and the installation of 32,530 linear feet of buried bank stabilization, 98 grade stabilizer structures, and five new bridge/culvert road crossings in Potrero Canyon. Regarding flooding and stormwater conveyance, the final Project will be designed to convey the 100-year and capital flood runoff events in compliance with DPW requirements and will include project design features to minimize flood hazards as specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008). (See **Figure 4.1-10**.)

Lion Canyon. The preliminary design for Lion Canyon RMDP improvements includes the placement of one new bridge/culvert road crossing in Lion Canyon and the conversion of 6,316 linear feet of the existing Lion Canyon drainage to buried storm drains. The design also involves the installation of 28 grade stabilizer structures. Regarding flooding and stormwater conveyance, the final Project would be designed to convey the 100-year and capital flood runoff events in compliance with DPW requirements and would include project design features to minimize flood hazards as specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008). (See **Figure 4.1-11**.)

Minor Tributaries and Drainage. Implementation of the proposed RMDP would involve the placement of one new bridge/culvert road crossing in Ayers Canyon, a minor drainage on the south side of the River. The existing six-lane bridge allowing SR-126 to cross the Castaic Creek drainage would be expanded to eight lanes. In addition, the RMDP proposes several other drainages on the Specific Plan site be graded to accommodate pads for residential and commercial buildings and that the drainage flows be conveyed by buried storm drains varying in diameter from 30 to 144 inches. Within these drainages, the RMDP proposes to convert 39,101 linear feet of these drainages to buried storm drains.

4.1.6.3.1 Direct Impacts

RMDP Direct Impacts. The following presents an analysis of direct impacts associated with the RMDP for Alternative 2. The discussion first presents the impacts to the Santa Clara River relative to Significance Criteria 1 and 2, then proceeds with the analysis for the major tributaries relative to these significance criteria, and then, finally, the analysis for the minor tributaries.

Santa Clara River. In the Santa Clara River, the proposed RMDP consists of the construction of two bridges, the previously permitted Commerce Center Bridge, approximately 29,779 feet of bank stabilization along approximately one half of the north bank and one third of the south bank of the River within the Project area, and the construction of 5 viewing platforms and associated walkways along the northern portion of the Santa Clara River between Lion Canyon to the east and Potreo Canyon to the west. In addition, the Newhall Ranch WRP outfall to the Santa Clara River would be constructed. The River would be encroached upon by the placement of buried soil cement, turf reinforcement mats, bridge abutments and piers, storm drain outlets, and energy dissipaters proposed by the RMDP.

The proposed RMDP infrastructure would alter the existing boundary of the river floodplain in the RMDP area. A summary of the changes in the floodplain area due to the RMDP infrastructure is shown in **Table 4.1-7**.

Table 4.1-7
Changes in Floodplain Area, Alternative 2

Year Event	Existing Floodplain Area (acres)	Alternatives 2 Floodplain Area (acres)	Change in Floodplain Area (acres)
2-Year	447.6	447.8	0.04%
5-Year	598.4	599.5	0.2%
10-Year	720.1	717.2	-0.4%
20-Year	999.0	928.5	-7.0%
50-Year	1294.2	1161.7	-10.2%
100-Year	1407.6	1283.8	-8.8%

Source: PACE, 2008A.

As shown above, for the 2- and 5-year floods events, the proposed RMDP floodplain modifications would not hinder flows or reduce the floodplain area. Instead, these flows would spread across the River channel and flow similar to pre-Project conditions. However, during the 10-, 20-, 50-, and 100-year flood events, river flow would be impacted by the proposed bank stabilization features by reducing the area of the estimated floodplain during these infrequent, larger flood events. As to the viewing platforms and associated walkways, the pier footings for these structures could cause localized scour impacts, but these structures would not hinder flows or reduce the floodplain area. To prevent flooding, the proposed Project includes bank stabilization that is designed to contain and convey the FEMA 100-year flood event and the DPW capital flood event. Implementation of the proposed Project would include the submittal and approval of a Conditional Letter of Map Revision (CLOMR) to FEMA to account for the modified floodplain area and approval of a revised capital floodplain area from DPW.

Santa Clara River

Road Crossing
Culvert Location

1000'

2000'

Road Crossing
Culvert Location

3000'

4000'

5000'

Long Canyon

6000'

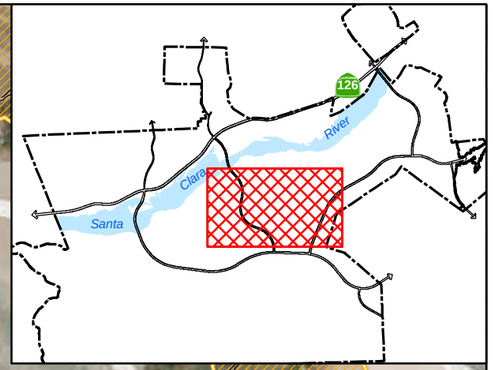
7000'

8000'

Magic Mountain Parkway
Culvert

9000'

Roads



Legend

- Resource Management & Development Plan
- Spineflower Preserve

Drainage/Jurisdiction Features

- Drainage/Jurisdiction Permanently Impacted
- Drainage/Jurisdiction Converted to Storm Drain

Bank Stabilization Features

- Drainage/Jurisdiction Newly Created
- Proposed Bank Stabilization
- Bridge/Road Crossing
- Drop Structure/Grade Stabilizers
- Proposed Grading
- Proposed Grading

0 300 600 1,200 Feet

APPROXIMATE SCALE IN FEET

SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-9

LONG CANYON ALTERNATIVE DETAIL - ALTERNATIVE 2 & 3
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-9_LongAlternative2-3_PC1_042908.mxd

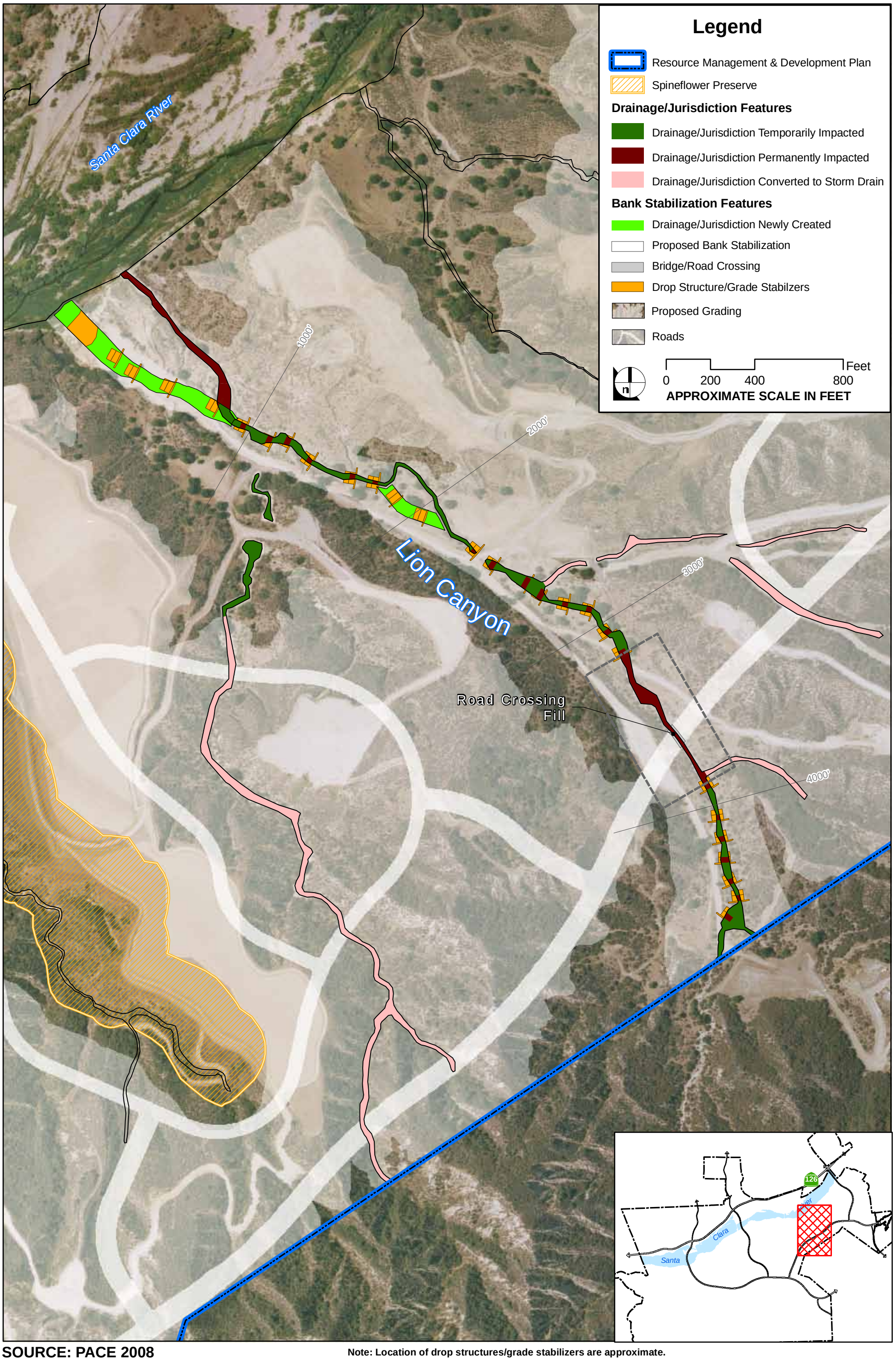
SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-10

POTRERO CANYON ALTERNATIVE DETAIL - ALTERNATIVE 2
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-10_PotreroAlternative2_PC1_042908.mxd



SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-11

LION CANYON ALTERNATIVE DETAIL - ALTERNATIVE 2-6
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-11_LionAlternative2_6_PC1_043008.mxd

Based on the hydraulic model results (PACE, 2008A), the RMDP infrastructure would not be subjected to significant flooding impacts and would not result in significant risk of loss, injury or death to people in the Project area. Therefore, the impacts associated with Alternative 2 are considered adverse, but less than significant relative to Significance Criterion 1. The proposed improvements do not impact storm flows in the Santa Clara River because these improvements are designed to accommodate the flows associated with the 2-, 5-, 10-, 20-, 50-, and 100-year floods events under the proposed conditions for Alternative 2. In addition, no storm flows are diverted from or to the River as a result of the Project, and no drainage tributary to the River would be prevented from flowing to the River in the proposed Project condition. Therefore, the impacts associated with Alternative 2 are considered adverse, but less than significant relative to Significance Criterion 2.

Major Tributaries. There are five major tributary drainages that will be partially regraded or modified, but remain in soft bottom channel conditions: Potrero Canyon; Long Canyon; Lion Canyon; Chiquito Canyon; and San Martinez Grande Canyon. All of these tributary drainages will either be protected or designed to accommodate any modifications to the existing hydrology as a result of Specific Plan area build-out. The proposed improvements under Alternative 2 are shown in **Figure 4.1-6** and a description of the impacts to the major tributaries associated with Alternative 2 is provided below.

Runoff within the major tributaries will be conveyed through both engineered, soft bottom channels and underground stormwater conveyance infrastructure. Regarding flooding and flood hazards, the engineered channels will be designed to contain and convey the flows from a 100-year storm event and the DPW capital flood event in accordance with County regulations. The adequacy of the final engineered channel flow capacity will be assessed by DPW during Village-level review. For approval, the final channel design must meet the requirements of the DPW sedimentation manual. The hydraulic modeling and calculations supporting the final channel design will incorporate the required freeboard and an acceptable factor of safety to prevent impacts from overtopping and flooding. In addition, where appropriate, implementation of the Project would include approval of a CLOMR from FEMA and approval of a revised capital floodplain area from DPW.

Since the engineered channels will be designed to convey the 100-year and capital flood events, the Project would not create a flooding hazard and would not result in significant risk of loss, injury or death to people in the Project area. Therefore, the impacts associated with Alternative 2 are considered adverse, but less than significant relative to Significance Criterion 1.

As indicated above, runoff within the major tributaries will be conveyed through both engineered, soft bottom channels and underground stormwater conveyance infrastructure. The engineered channels will be designed to convey both the 100-year and capital flood events in accordance with DPW requirements. Regarding the underground stormwater conveyance infrastructure, the design of these storm drains will comply with DPW requirements for "Storm Drains and Urban Flood Protection" and will incorporate project design features specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008) to minimize flood hazards. The final engineered design of the storm drains will be evaluated and approved by DPW during project-level EIRs. Final design will be compliant with DPW requirements for storm drains and urban flood protection (DPW Hydrology Manual, 1991).

Since the engineered channels will be designed to convey the 100-year and capital flood events, and the underground storm water conveyance infrastructure will be designed in compliance with DPW requirements, the impacts associated Alternative 2 are considered adverse, but less than significant relative to Significance Criterion 2.

Minor Tributaries. The Project proposes grading within several of the minor tributaries to accommodate pads for residential and commercial buildings and that the drainage flows be conveyed by buried storm drains varying in diameter from 30 to 144 inches as shown in **Figure 4.1-6**. The stormwater drainage infrastructure associated with these drainages will be designed to comply with DPW requirements for "Storm Drains and Urban Flood Protection" and will incorporate the project design features described in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008). Accordingly, the impacts associated Alternative 2 are considered adverse, but less than significant relative to Significance Criterion 2.

Salt Creek Canyon. The Specific Plan includes a Visitor Serving land use designation, which allows for an access point to the High Country SMA/SEA 20. Approximately 1,992 feet of bank protection in non-jurisdictional uplands would be installed in conjunction with development of approved Visitor Serving uses as described in the Specific Plan. Any potential impacts would be limited in nature and related to access and recreational use of the High Country, and might include footbridges and maintenance of existing farm roads. Accordingly, the flood hazard and stormwater runoff impacts are considered adverse, but less than significant for this Specific Plan component relative to Significance Criteria 1 and 2.

SCP Direct Impacts. The SCP component of the proposed Project would reduce the developable area of the proposed Project since no development would occur in the SCP areas. The decrease in developed area would result in a slight decrease in impermeable area overall and a slight reduction in surface runoff. However, the decrease in runoff volume would be minor compared to the overall contributions from the tributary watersheds, so the runoff from the SCP has the same or appropriate characteristics as runoff from the natural drainage. In addition, all of the SCP areas are located outside of the Santa Clara River 100-year floodplain, so the SCP would not affect flood control. Based on this information, the impacts associated with the SCP for Alternative 2, are considered adverse, but less than significant relative to Significance Criteria 1 and 2 since it would not impact flooding or storm flows in the river or tributaries.

4.1.6.3.2 Indirect Impacts

RMDP Indirect Impacts. Implementation of the proposed Project would facilitate County-approved development of the Specific Plan. The Newhall Ranch Specific Plan Program EIR describes in detail the impacts associated with the build-out of the Specific Plan with regard to flood hazards and stormwater conveyance, and mitigation measures related to these criteria are incorporated into this EIS/EIR. Since flood hazards and stormwater conveyance associated with the Specific Plan are addressed by the previously incorporated Specific Plan Mitigation Measures SP-4.2-1 (compliance with LADPW flood control requirements), SP-4.2-4 (obtaining CLOMRs following construction of drainage facilities), SP-4.2-5 (DPW plan and map approvals), and SP-4.2-8 (DPW SUSMP and SWPPP requirements), the RMDP indirect impacts are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

SCP Indirect Impacts. Implementation of the proposed Project would facilitate County-approved developments on the Specific Plan site, and the VCC and Entrada planning areas; therefore, these would be indirect impacts. The Newhall Ranch Specific Plan Program EIR describes in detail the impacts associated with build-out of the Specific Plan with regard to flood hazards and stormwater conveyance, and protection related to these issues are incorporated into this EIS/EIR. Impacts related to hydrology and flooding associated with build-out of the VCC were evaluated in the VCC EIR (April, 1990). The VCC and Entrada planning areas were incorporated into the hydraulic model that was used to evaluate direct and indirect impacts. The existing conveyance facility from the Entrada planning area boundary to the Santa Clara River may not currently be sized to accommodate the flows that would likely result from the proposed (but not yet approved) development in the Entrada planning area. Accordingly, the existing drainage infrastructure would need to be re-designed to accommodate the increase in flows prior to implementation of the Entrada development. The proposed drainage infrastructure would be designed to comply with DPW criteria and require DPW review and approval prior to construction. Since flood hazards and stormwater conveyance associated with these projects are captured in the hydrologic and hydraulic modeling used in the impact analysis for direct and indirect impacts and are addressed through the incorporation of mitigation measures, the indirect SCP impacts for Alternative 2 are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

4.1.6.3.3 Secondary Impacts

RMDP Secondary Impacts. Increases in the transport and deposition of debris from the Project area could result in secondary flood hazards downstream. Debris within the Project area would be captured in debris basins that are designed in accordance with DPW requirements and require DPW review and approval prior to construction. In addition, the basins would incorporate the project design features described in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008), which were developed to balance runoff and sediment loading to Project tributaries and the Santa Clara River. Since the debris basins would be designed in accordance with the DPW requirements and incorporate additional features to enhance the management of debris, the secondary impacts of the RMDP are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

SCP Secondary Impacts. The SCP areas would remain preserved and are not expected to affect existing levels of sediment and debris runoff. Any debris that may be generated from the SCP areas would be adequately handled by the RMDP improvements, and thus, would not contribute to downstream flooding hazards. Therefore, the secondary impacts of the SCP with respect to Significance Criteria 1 and 2 are considered adverse, but less than significant.

4.1.6.4 Impacts of Alternative 3 (Elimination of Planned Potrero Bridge and Additional Spineflower Preserves)

Alternative 3 would involve the construction of buried bank stabilization in upland and riparian areas along approximately half of the north bank and one-third of the south bank of the Santa Clara River as shown in **Figure 3.0-12**. This alternative would involve the construction of two bridges across the River, one at Commerce Center Drive (already permitted) and one at the mouth of Long Canyon. No bridge is proposed at the mouth of Potrero Canyon under this alternative. In total, this alternative would propose 26,540 linear feet of buried bank stabilization and two new bridges to be constructed within the Santa

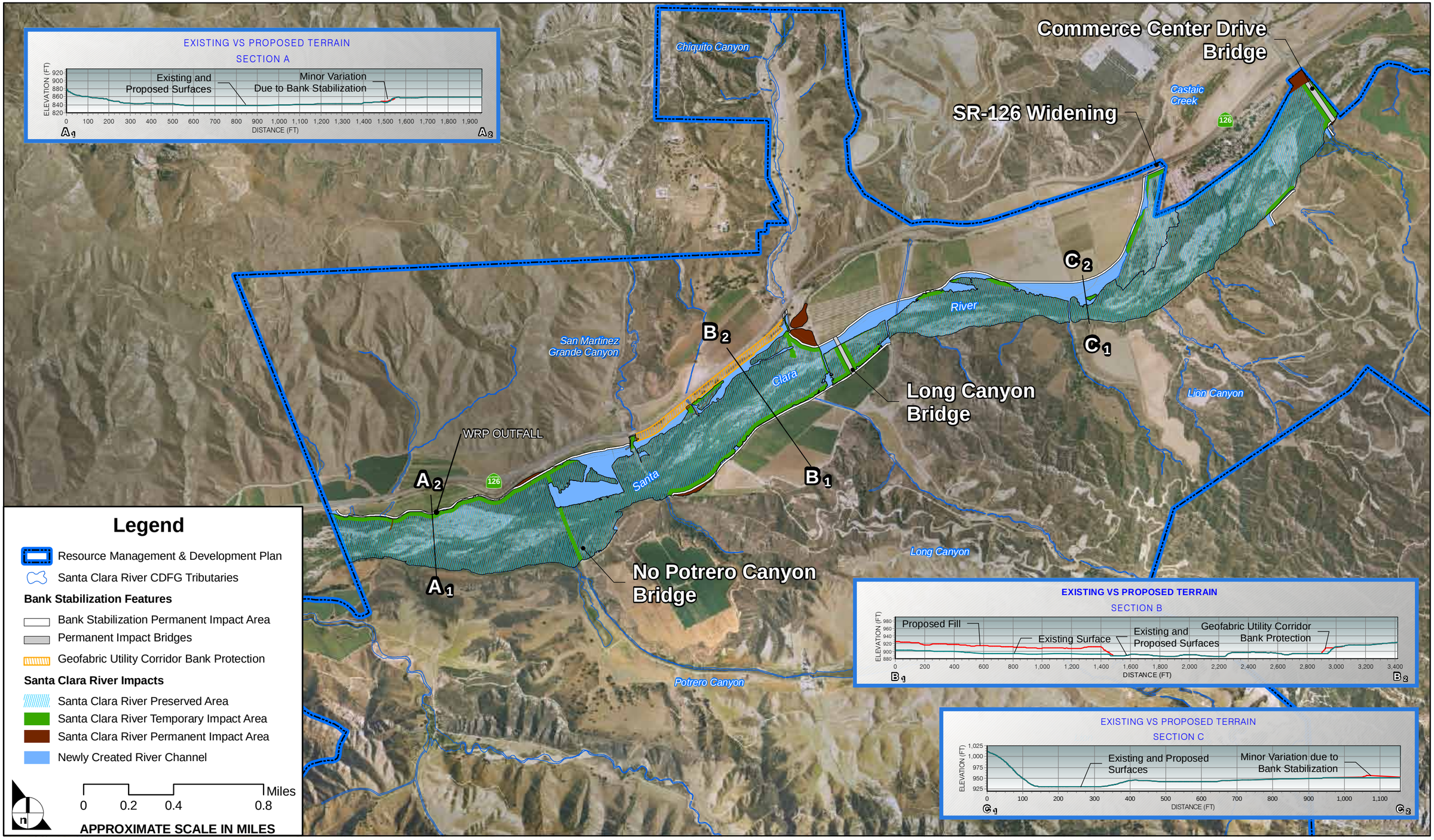
Clara River corridor, as compared to 29,779 linear feet of buried bank stabilization and three new bridges to be constructed under Alternative 2. In addition, the WRP outfall to the Santa Clara River would be constructed. It would not be necessary to construct any grade stabilizer structures within the River.

A summary of the RMDP infrastructure components under Alternative 3 is presented in **Table 4.1-8**, and **Figures 4.1-12** and **4.1-13** show the RMDP components under Alternative 3.

Alternative 3 also would involve the designation of a total of 221.8 acres of spineflower preserves, as compared to 167.6 acres under Alternative 2. If this alternative is implemented, a total of 94,407 linear feet of bank stabilization (as compared to 105,207 linear feet under Alternative 2), 188 grade stabilizer structures (one less than as proposed under Alternative 2), and 17 new bridge/culvert road crossings (as compared to 18 under Alternative 2) would be constructed on the Specific Plan site. This alternative would require 60,010 linear feet of ephemeral and intermittent drainages to be replaced with buried storm drains, as compared to 59,845 linear feet under Alternative 2, to accommodate the creation of building pads**.**

Implementation of Alternative 3 would result in the reduction of approximately 263 acres of developable area when compared to the build-out potential of the proposed Project. The reduction of developable area would occur due to preservation of streams and riparian areas; designation of spineflower preserves; proximity to unstabilized drainages; and reduction of access to isolated parcels.

Under Alternative 3, there are five major tributary drainages that would be partially regraded or modified, but remain in soft bottom channel conditions: Chiquito Canyon; San Martinez Grande Canyon; Potrero Canyon; Long Canyon; and Lion Canyon. Significant portions of several small, tributary drainages would be graded and replaced with storm drains or other appropriate conveyance facilities, including: Magic Mountain Canyon; Middle Canyon; Dead-End Canyon; Exxon Canyon; Mid-Martinez Canyon; Off-Haul Canyon; Homestead Canyon; the Chiquito Canyon agricultural ditch; Unnamed Canyon B; Unnamed Canyon C; Unnamed Canyon D; Unnamed Canyon 1; and Unnamed Canyon 2 drainages.

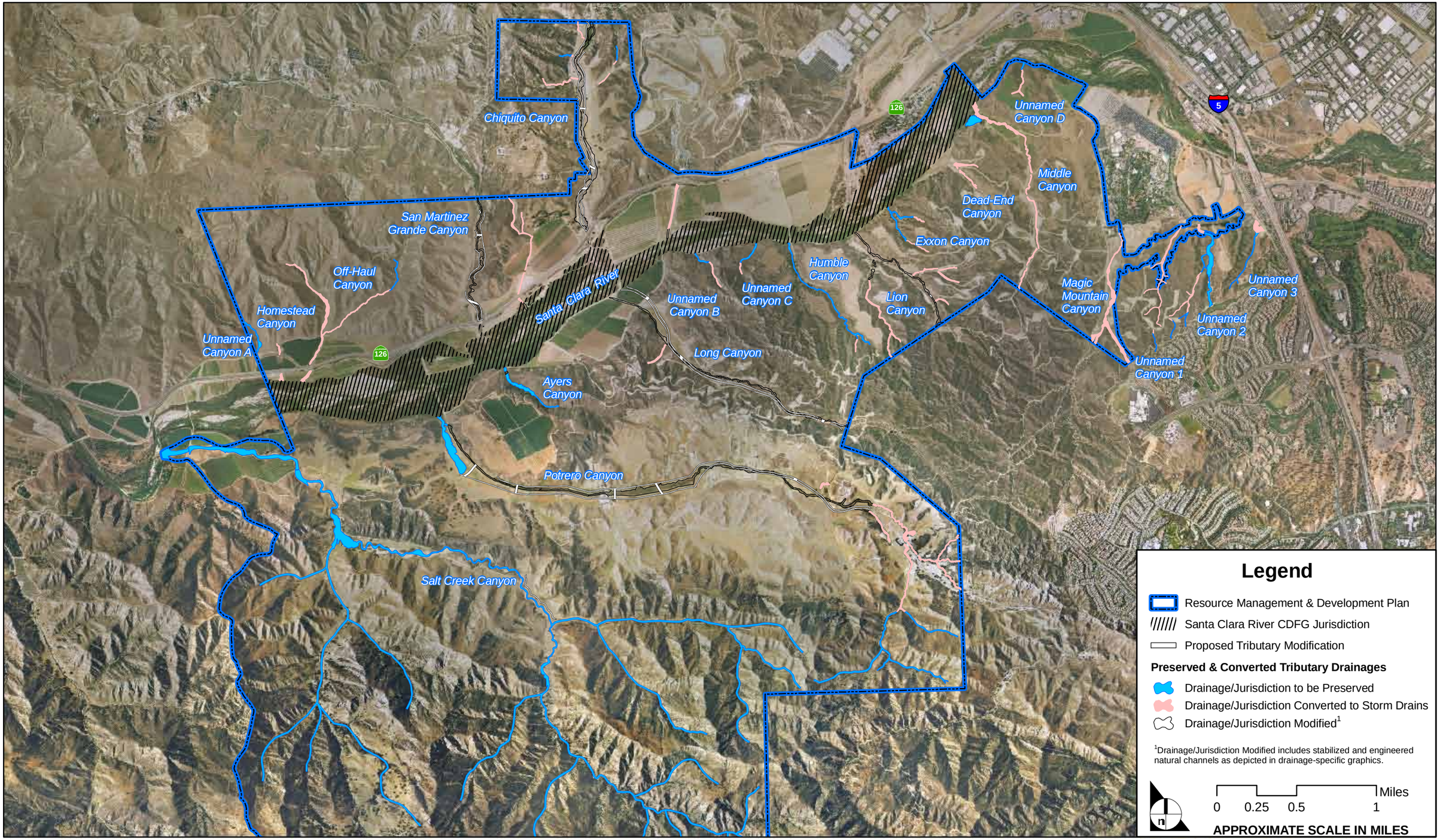


SOURCE: PACE 2008

FIGURE 4.1-12

ALTERNATIVE 3 & 4 PROPOSED RMDP
SANTA CLARA RIVER FEATURES

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-12_SCRMajorFeaturesAlt3_4_PC1_043008.mxd



SOURCE: PACE - April 2008

FIGURE 4.1-13

ALTERNATIVE 3
MODIFIED, CONVERTED, AND PRESERVED TRIBUTARY DRAINAGES

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-13_ModifiedConvertedPreservedTributaryDrainageTreatmentsAlt3_PC1_050108.mxd

Table 4.1-8
RMDP Infrastructure Components: Alternative 3

Location	Bank Stabilization (Linear Feet)	Drainage Converted to Buried Storm Drain (Linear Feet)	Grade Stabilizer Structures	New/Widened Bridges and Road Crossings
Santa Clara River	**26,540**	**0**	**0**	**2**[1]
Major Tributaries				
Chiquito Canyon	14,645	2,791	13	3
San Martinez Grande Canyon	5,798	0	5	2
Long Canyon	17,644	910	44	3
Potrero Canyon	27,789	10,918	98	5
Lion Canyon	0	6,316	28	1
Minor Tributaries				
Salt Creek Canyon	1,992[2]	0	0	0
Agricultural Ditch	0	1,479	0	0
Ayers Canyon	0	0	0	1
Dead-End Canyon	0	1,931	0	0
Exxon Canyon	0	1,276	0	0
Homestead Canyon	0	609	0	0
Humble Canyon	0	421	0	0
Middle Canyon	0	7,439	0	0
Mid-Martinez Canyon	0	4,541	0	0
Off-Haul Canyon	0	7,593	0	0
Magic Mountain Canyon	0	6,111	0	0
Unnamed Canyon 1 (Entrada)	0	4,647	0	0
Unnamed Canyon 2 (Entrada)	0	391	0	0
Unnamed Canyon A	0	0	0	0
Unnamed Canyon B	0	1,004	0	0
Unnamed Canyon C	0	402	0	0
Unnamed Canyon D	0	1,232	0	0
Alternative Total in Tributaries	**67,869**	**39,075**	**188**	**15**

Notes:

[1] Commerce Center Drive Bridge is already permitted but is included in analysis for informational purposes.

[2] No fill within the U.S. Army Corps of Engineers jurisdictional area will occur within Salt Canyon, except for habitat restoration and enhancement throughout the watershed.

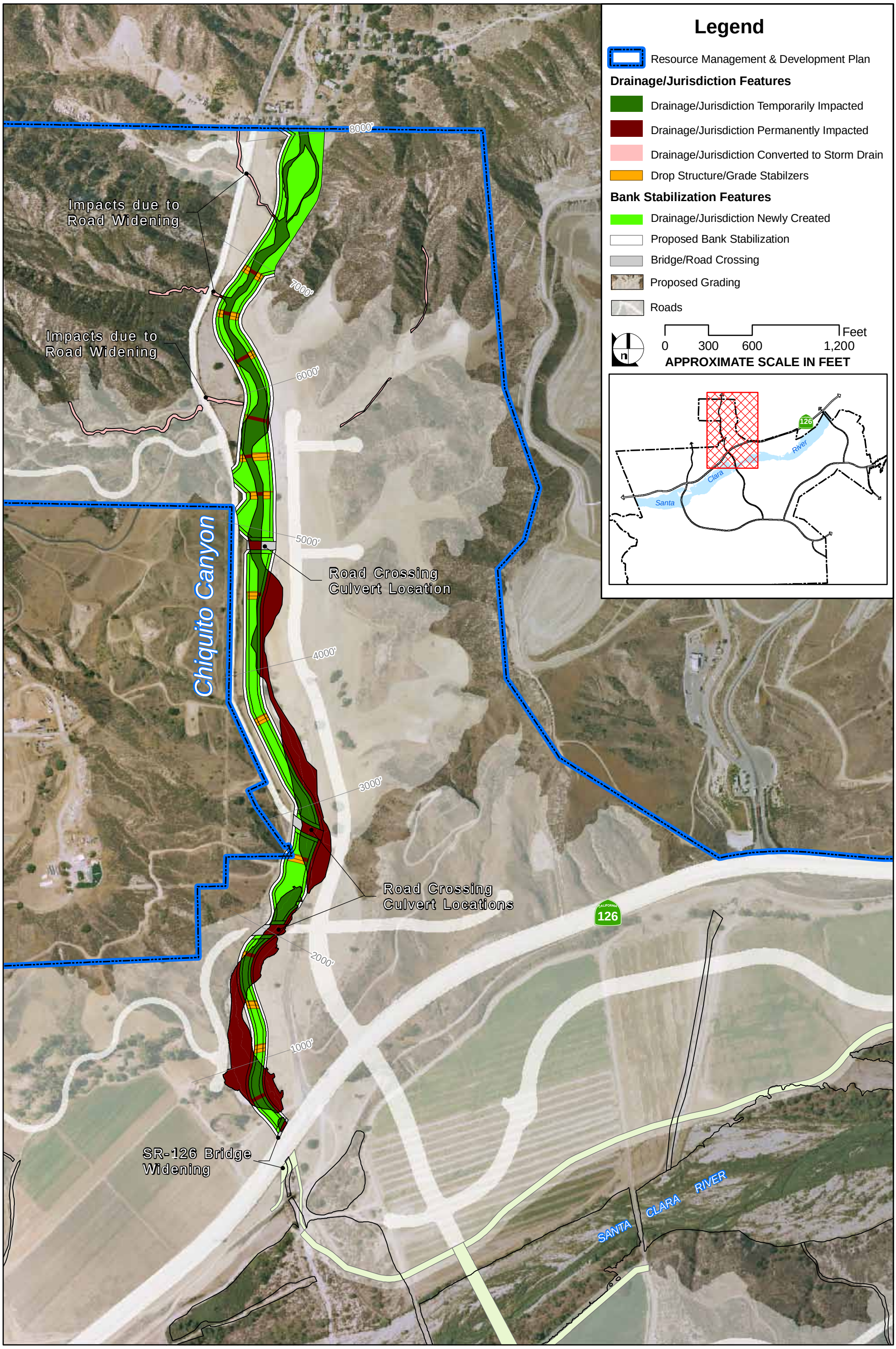
Source: RMDP, 2008.

Chiquito Canyon. In Chiquito Canyon, Alternative 3 would involve buried bank stabilization along the entire west bank of the drainage between SR-126 and the northern boundary of the Project area. Stabilization would be constructed along the east bank as well, but would be discontinued approximately 1,000 feet from the northern Project area boundary. Two new bridge/culvert road crossings would be installed just upstream of SR-126, and another would cross the drainage approximately halfway between SR-126 and the northern Project area boundary. The existing bridge allowing SR-126 to cross the drainage would be widened from two to four lanes. In Chiquito Canyon, Alternative 3 would require the construction of 14,645 linear feet of bank stabilization, 13 grade stabilizer structures, and three new bridge/culvert road crossings. In addition, 2,791 linear feet of the drainage would be replaced with buried storm drain. (See **Figure 4.1-14**.)

San Martinez Grande Canyon. In San Martinez Grande Canyon, all proposed buried bank stabilization would be constructed in upland areas along approximately 80 percent of both banks. A new bridge/culvert road crossing would cross the drainage approximately halfway between SR-126 and the northern Project area boundary, and another is proposed just upstream of SR-126. In total, Alternative 3 would involve the placement of 5,798 linear feet of buried bank stabilization, five grade stabilizer structures, and two new bridge/culvert road crossings in San Martinez Grande Canyon. In addition, the existing two-lane bridge allowing SR-126 to cross the drainage would be widened to four lanes. (See **Figure 4.1-15**.)

Long Canyon. The preliminary design for Alternative 3 proposes that a soft bottom channel be constructed within Long Canyon between the eastern Project area boundary and the confluence with the Santa Clara River. Less than ten percent of this channel would fall within the existing drainage; the remaining portion would require the stream to be relocated. Two proposed bridge/culvert road crossings would cross the drainage just upstream of the Santa Clara River confluence. A third would be constructed near the eastern end of the drainage, approximately 400 feet downstream of the Project area boundary. This alternative would involve the placement of 17,644 linear feet of buried bank protection, 44 grade stabilizer structures, and three bridge/culvert road crossings within Long Canyon. (See **Figure 4.1-9**.)

Potrero Canyon. The preliminary design for Alternative 3 would require bank stabilization to be constructed along both sides of the Potrero Canyon drainage. In the eastern, upstream reaches of the creek, the existing drainage would be graded and flows would be diverted into underground storm drains. At a point approximately four-fifths of the way up the drainage, the storm drains would convey flows into a soft bottom channel constructed approximately parallel to the existing drainage. Between the top of the mesic meadow and the top of the cottonwood/willow woodland just upstream of the saltgrass meadow, bank stabilization would be constructed in upland areas, effectively widening the soft bottom channel in this reach. Bank stabilization would be discontinued immediately upstream of the mesic meadow, which would remain unstabilized. Four new bridge/culvert road crossings would be constructed at approximately even intervals between the upstream end of the mesic meadow and the upstream end of the saltgrass meadow. A fifth bridge/culvert road crossing would cross the channel farther upstream, just downstream of the point where the drainage begins to branch. Grade stabilizer structures are proposed



SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-14

CHIQUITO CANYON ALTERNATIVE DETAIL - ALTERNATIVE 3 & 6
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-14_ChiquitoAlternative3-6_PC1_042908.mxd

Legend

- Resource Management & Development Plan
- Spineflower Preserve

Drainage/Jurisdiction Features

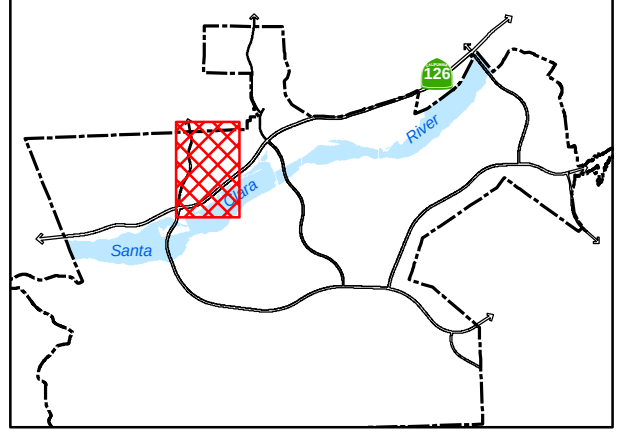
- Drainage/Jurisdiction Preserved
- Drainage/Jurisdiction Temporarily Impacted
- Drainage/Jurisdiction Permanently Impacted

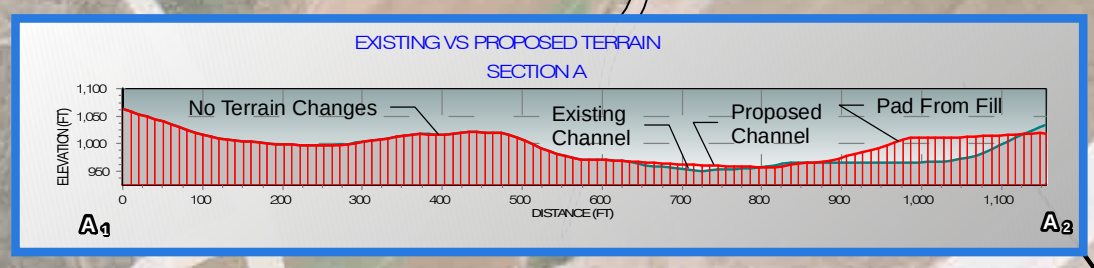
Bank Stabilization Features

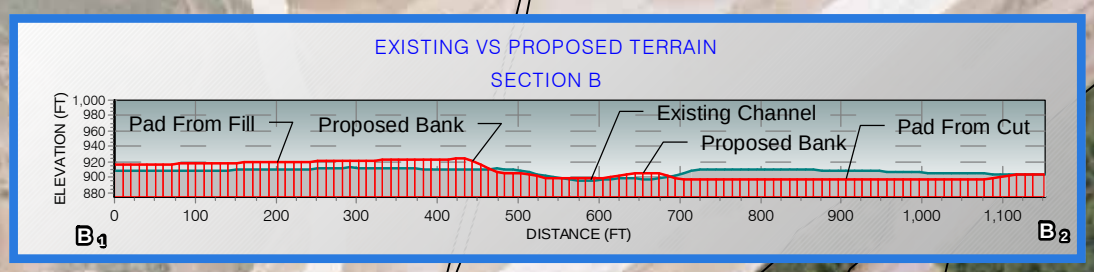
- Drainage/Jurisdiction Newly Created
- Proposed Bank Stabilization
- Bridge/Road Crossing
- Drop Structure/Grade Stabilzers
- Proposed Grading
- Roads

0 175 350 700 Feet

APPROXIMATE SCALE IN FEET







SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-15

SAN MARTINEZ GRANDE CANYON DETAIL - ALTERNATIVE 3
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-15_SanMartinezAlternative3_PC1_062608.mxd

along the entire length of the soft bottom channel. In Potrero Canyon, Alternative 3 would involve the conversion of 10,918 linear feet of existing drainage to buried storm drains, and the construction of 27,789 linear feet of buried bank stabilization, 98 grade stabilizer structures, and five new bridge/culvert road crossings. (See **Figure 4.1-16**.)

Lion Canyon. The preliminary design for Alternative 3 includes the placement of one new bridge/culvert road crossing in Lion Canyon and the conversion of 6,316 linear feet of the existing Lion Canyon drainage to buried storm drains. The design also involves the installation of 28 grade stabilizer structures. Regarding flooding and stormwater conveyance, the final Project will be designed to convey the 100-year and capital flood runoff events in compliance with DPW requirements, and will include project design features to minimize flood hazards as specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008). (See **Figure 4.1-11**.)

Minor Tributaries and Drainages. One bridge/culvert road crossing would be constructed across the mouth of the Ayers Canyon drainage. No other drainage facilities would be constructed in Ayers Canyon. In addition, the existing six-lane bridge allowing SR-126 to cross the Castaic Creek drainage would be expanded to eight lanes. In addition, 39,075 linear feet of drainage would be converted to buried storm drain within the several minor tributaries.

4.1.6.4.1 Direct Impacts

RMDP Direct Impacts.

Santa Clara River. Under Alternative 3, the Potrero Canyon Bridge would not be constructed. In total, this alternative would result in 26,540 linear feet of buried bank stabilization to be constructed primarily in upland and riparian areas along the River. Other facilities and improvements within and along the River include the WRP outfall, bank stabilization, bridge abutments and piers, drainage outlets, and energy dissipaters. No nature viewing platforms or associated walkways along the northern portion of the Santa Clara River would be provided by this alternative.

As shown in **Table 4.1-9**, the proposed RMDP infrastructure associated with Alternative 3 would alter the existing boundary of the Santa Clara River floodplain through the Project area.

Table 4.1-9
Changes in Floodplain Area, Alternative 3

Year Event	Existing Floodplain Area (acres)	Alternative 2 Floodplain Area (acres)	Alternative 3 Floodplain Area (acres)	Change relative to Alt. 2 (acres)	% Change relative to Alt. 2
2-Year	447.6	447.8	447.1	-0.7	-0.2%
5-Year	598.4	599.5	598.9	-0.6	-0.1%
10-Year	720.1	717.2	715.2	-2.0	-0.3%
20-Year	999.0	928.5	933.8	5.3	0.6%
50-Year	1294.2	1161.7	1179.7	18.0	1.6%
100-Year	1407.6	1283.8	1298.0	14.2	1.1%

Source: PACE, 2008A.

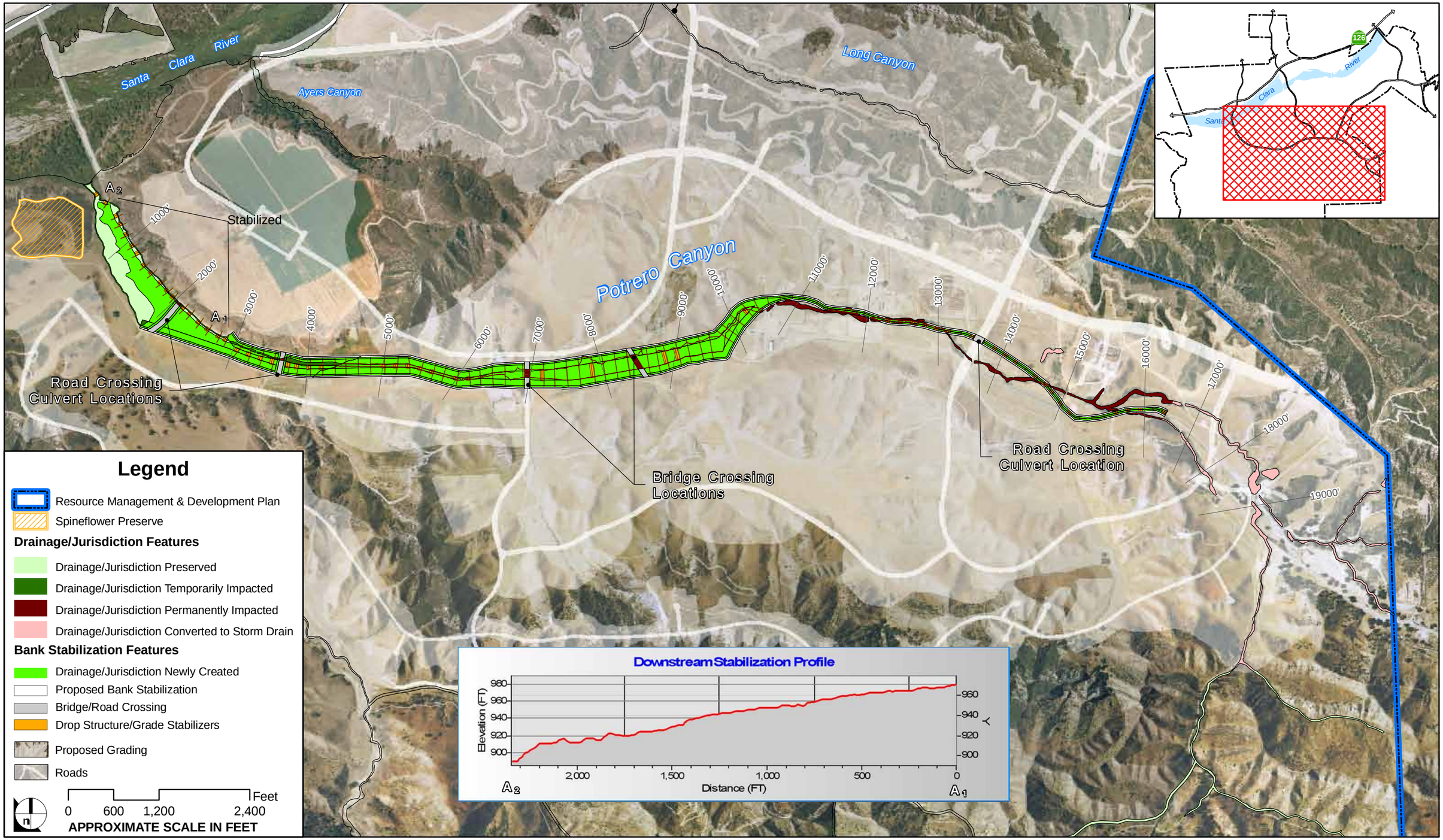
Alternative 3 would result in a decrease in floodplain area relative to Alternative 2 for the 2-, 5-, and 10-year recurrence interval flow events and an increase in the floodplain area relative to Alternative 2 for the 20-, 50-, and 100-year recurrence interval flow events. In comparison to existing conditions, there would be reductions in floodplain acreages for the 2-, 10-, 20-, 50-, and 100-year storm events as river flows would be impacted by proposed RMDP infrastructure that would reduce the area of the estimated floodplain during these less frequent, larger flood events. To prevent flooding, the Alternative 3 would include bank stabilization that is designed to contain and convey the FEMA 100-year flood event and the DPW capital flood event. Implementation of Alternative 3 would include the submittal and approval of a CLOMR to FEMA to account for the modified floodplain area and approval of a revised capital floodplain area from DPW.

Based on the hydraulic model results (PACE, 2008AA), the Alternative 3 RMDP infrastructure would not be subjected to significant flooding impacts and would not result in significant risk of loss, injury or death to people in the Project area in comparison with existing conditions. Therefore, the impacts associated with Alternative 3 are considered adverse, but less than significant relative to Significance Criterion 1.

Similar to Alternative 2, the proposed improvements associated with Alternative 3 do not impact storm flows in the Santa Clara River because these improvements are designed to accommodate the flows associated with the 2-, 5-, 10-, 20-, 50-, and 100-year floods events under the proposed conditions for Alternative 3. In addition, no storm flows are diverted from or to the River under Alternative 3, and no drainage tributary to the River will be prevented from flowing to the River under Alternative 3. Therefore, the impacts associated with Alternative 3 are considered adverse, but less than significant relative to Significance Criteria 2.

Major Tributaries. There are five major tributary drainages that will be partially regraded or modified, but remain in soft bottom channel conditions: Potrero Canyon; Long Canyon; Lion Canyon; Chiquito Canyon; and San Martinez Grande Canyon. All of these tributary drainages will either be protected or designed to accommodate any modifications to the existing hydrology as a result of Specific Plan build-out. The proposed improvements under Alternative 3 are shown in **Figure 4.1-13** and a description of the impacts to the major tributaries associated with Alternative 3 is provided below.

Runoff within the major tributaries will be conveyed through both engineered, soft bottom channels and underground stormwater conveyance infrastructure. Regarding flooding and flood hazards, the engineered channels will be designed to contain and convey the flows from a 100-year storm event and the DPW capital flood event in accordance with County regulations. The adequacy of the final channel flow capacity will be assessed by DPW during Village-level review. For approval, the final channel design must meet the requirements of the DPW sedimentation manual. The hydraulic modeling and calculations supporting the final channel design will incorporate the required freeboard and an acceptable factor of safety to prevent impacts from overtopping and flooding. In addition, where appropriate, implementation of the Project would include approval of a CLOMR from FEMA and approval of a revised capital floodplain area from DPW.



SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-16

POTRERO CANYON DETAIL - ALTERNATIVE 3
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-16_PotreroAlternative3_PC1_043008.mxd

Since the engineered channels would be designed to convey the 100-year and capital flood events, the Project would not create a flooding hazard and would not result in significant risk of loss, injury or death to people in the Project area. Therefore, the impacts associated with Alternative 3 are considered adverse, but less than significant relative to Significance Criterion 1.

As indicated above, runoff within the major tributaries would be conveyed through both engineered, soft bottom channels and underground stormwater conveyance infrastructure. The engineered channels would be designed to convey both the 100-year and capital flood events in accordance with DPW requirements. Regarding the underground stormwater conveyance infrastructure, the design of these storm drains would comply with DPW requirements for "Storm Drains and Urban Flood Protection" and would incorporate project design features specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008) to minimize flood hazards. The final design of storm drains would be evaluated and approved by DPW during Village-level review. Final design would be compliant with DPW requirements for storm drains and urban flood protection (DPW Hydrology Manual, 1991).

Since the engineered channels would be designed to convey the 100-year and capital flood events and the underground storm water conveyance infrastructure would be designed in compliance with DPW requirements, the impacts associated with Alternative 3 relative to Significance Criterion 2 are considered adverse, but less-than-significant.

Minor Tributaries. The Project proposes grading within several of the minor tributaries to accommodate pads for residential and commercial buildings and that the drainage flows be conveyed by buried storm drains varying in diameter from 30 to 144 inches, as shown in **Figure 4.1-13.** The stormwater drainage infrastructure associated with these drainages will be designed to comply with DPW requirements for "Storm Drains and Urban Flood Protection" and will incorporate the project design features described in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008). Accordingly, the impacts associated with Alternative 3 are considered adverse, but less than significant relative to Significance Criterion 2.

Salt Creek Canyon. The Specific Plan includes a Visitor Serving land use designation, which allows for an access point to the High Country SMA/SEA 20. Approximately 1,992 feet of bank protection in non-jurisdictional uplands would be installed in conjunction with development of approved Visitor Serving uses as described in the Specific Plan. Any potential impacts would be limited in nature and related to access and recreational use of the High Country, and might include footbridges and maintenance of existing farm roads. Accordingly, the flood hazard and stormwater runoff impacts are considered adverse, but less than significant for this Specific Plan component relative to Significance Criteria 1 and 2.

SCP Direct Impacts. The SCP component of Alternative 3 would reduce the developable area of the proposed Project since no development would occur in the SCP areas. The decrease in developed area would result in a slight decrease in impermeable area overall and a slight reduction in surface runoff. However, the decrease in runoff volume would be minor compared to the overall contributions from the tributary watersheds, so the runoff from the SCP has the same or approximate characteristics as runoff from the natural drainage. In addition, all of the SCP areas are located outside of the Santa Clara River 100-year floodplain, so the SCP would not affect flood control. Based on this information, the impacts

associated with the SCP for Alternative 3 relative to Significance Criteria 1 and 2 are considered adverse, but less than significant since it would not impact flooding or storm flows in the river or tributaries.

4.1.6.4.2 Indirect Impacts

RMDP Indirect Impacts. Implementation of the proposed Project would facilitate County-approved development of the Specific Plan. The Newhall Ranch Specific Plan Program EIR describes in detail the impacts associated with the build-out of the Specific Plan with regard to flood hazards and stormwater conveyance, and mitigation measures related to these criteria are incorporated into this EIS/EIR. Since flood hazards and stormwater conveyance associated with the Specific Plan are addressed by the previously incorporated Specific Plan Mitigation Measures SP-4.2-1 (compliance with LADPW flood control requirements), SP-4.2-4 (obtaining CLOMRs following construction of drainage facilities), SP-4.2-5 (DPW plan and map approvals), and SP-4.2-8 (DPW SUSMP and SWPPP requirements), the RMDP indirect impacts are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

SCP Indirect Impacts. Implementation of Alternative 3 would facilitate County-approved developments on the Specific Plan site, and the VCC and Entrada planning areas; build-out of these areas would result in indirect impacts. The Newhall Ranch Specific Plan Program EIR described in detail the impacts associated with the build-out of the Specific Plan with regard to flood hazards and stormwater conveyance, and mitigation related to these criteria are incorporated into this EIS/EIR. Impacts related to hydrology and flooding associated with build-out of the VCC were evaluated in the VCC EIR (April, 1990). The VCC and Entrada planning areas were incorporated into the hydraulic model that was used to evaluate direct and indirect impacts. The existing conveyance facility from the Entrada planning area boundary to the Santa Clara River may not currently be sized to accommodate the flows that would likely result from the proposed (but not yet approved) development in the Entrada planning area. Accordingly, the existing drainage infrastructure would need to be re-designed to accommodate the increase in flows prior to implementation of the Entrada development. The proposed drainage infrastructure would be designed to comply with DPW criteria and would require their review and approval prior to construction. Since flood hazards and stormwater conveyance associated with these projects are captured in the hydrologic and hydraulic modeling used in the impact analysis for direct and indirect impacts and are addressed through the incorporation of mitigation measures, the indirect SCP impacts for Alternative 3 are considered adverse, but less than significant. relative to Significance Criteria 1 and 2.

4.1.6.4.3 Secondary Impacts

RMDP Secondary Impacts. Increases in the transport and deposition of debris from the Project area could result in secondary flood hazards downstream. Debris within the Project area would be captured in debris basins that are designed in accordance with DPW requirements and would require DPW review and approval prior to construction. In addition, the basins would incorporate the project design features described in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008), which were developed to balance runoff and sediment loading to Project tributaries and the Santa Clara River. Since the debris basins would be designed in accordance with the DPW requirements and would incorporate additional features to enhance the management of debris, the secondary impacts of the RMDP are considered adverse, but less than significant relative to Significance Criterion 1.

SCP Secondary Impacts. The SCP areas would remain preserved and are not expected to affect existing levels of sediment and debris runoff. Any debris that may be generated from the SCP areas would be adequately handled by the RMDP improvements, and thus, would not contribute to downstream flooding hazards. Therefore, the secondary impacts of the SCP are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

4.1.6.5 Impacts of Alternative 4 (Elimination of Planned Potrero Bridge and Addition of VCC Spineflower Preserve)

Alternative 4 would involve the construction of buried bank stabilization along approximately half of the north bank and one-third of the south bank of the Santa Clara River, mostly in upland areas, as shown in **Figure 3.0-12**. Bank stabilization would be installed upstream of Chiquito Canyon and downstream of San Martinez Grande Canyon on the north bank, and between Long and Potrero Canyons on the south. Alternative 4 also would involve the construction of two bridges across the River, one at Commerce Center Drive (already permitted) and one at the mouth of Long Canyon. No bridge would be constructed at the mouth of Potrero Canyon under this alternative. In total, this alternative proposes to construct 26,751 linear feet of buried bank stabilization and two new bridges in the Santa Clara River Corridor, as compared to three new bridges and 29,779 linear feet of buried bank stabilization to be constructed under Alternative 2. In addition, a WRP outfall to the Santa Clara River would be constructed. It would not be necessary to construct any grade stabilizer structures within the River.

A summary of the RMDP infrastructure components of Alternative 4 is presented in **Table 4.1-10**, and **Figures 4.1-12** and **4.1-17** show the proposed RMDP components under Alternative 4.

Alternative 4 also would involve the designation of a total of 259.9 acres of spineflower preserves, as compared to 167.6 acres under Alternative 2. If this alternative is implemented, a total of 93,277 linear feet of bank stabilization (as compared to 105,207 linear feet under Alternative 2), 174 grade stabilizer structures (as compared to 189 under Alternative 2), and 17 new bridge/culvert road crossings (as compared to 18 under Alternative 2) would be constructed on Newhall Ranch. No nature viewing platforms or associated walkways along the northern portion of the Santa Clara River would be provided by this alternative. This alternative would require 59,868 linear feet of ephemeral and intermittent drainages to be replaced with buried storm drains, as compared to 59,845 linear feet under Alternative 2, to accommodate the creation of building pads.

Implementation of Alternative 4 would result in the reduction of approximately 251 acres of developable area when compared to the build-out potential of the proposed Project. The reduction of developable space would occur due to preservation of streams and riparian areas, designation of spineflower preserves, proximity to unstabilized drainages, and reduction of access to isolated parcels. No development would be facilitated on the VCC planning area under this alternative.

Table 4.1-10
RMDP Infrastructure Components: Alternative 4

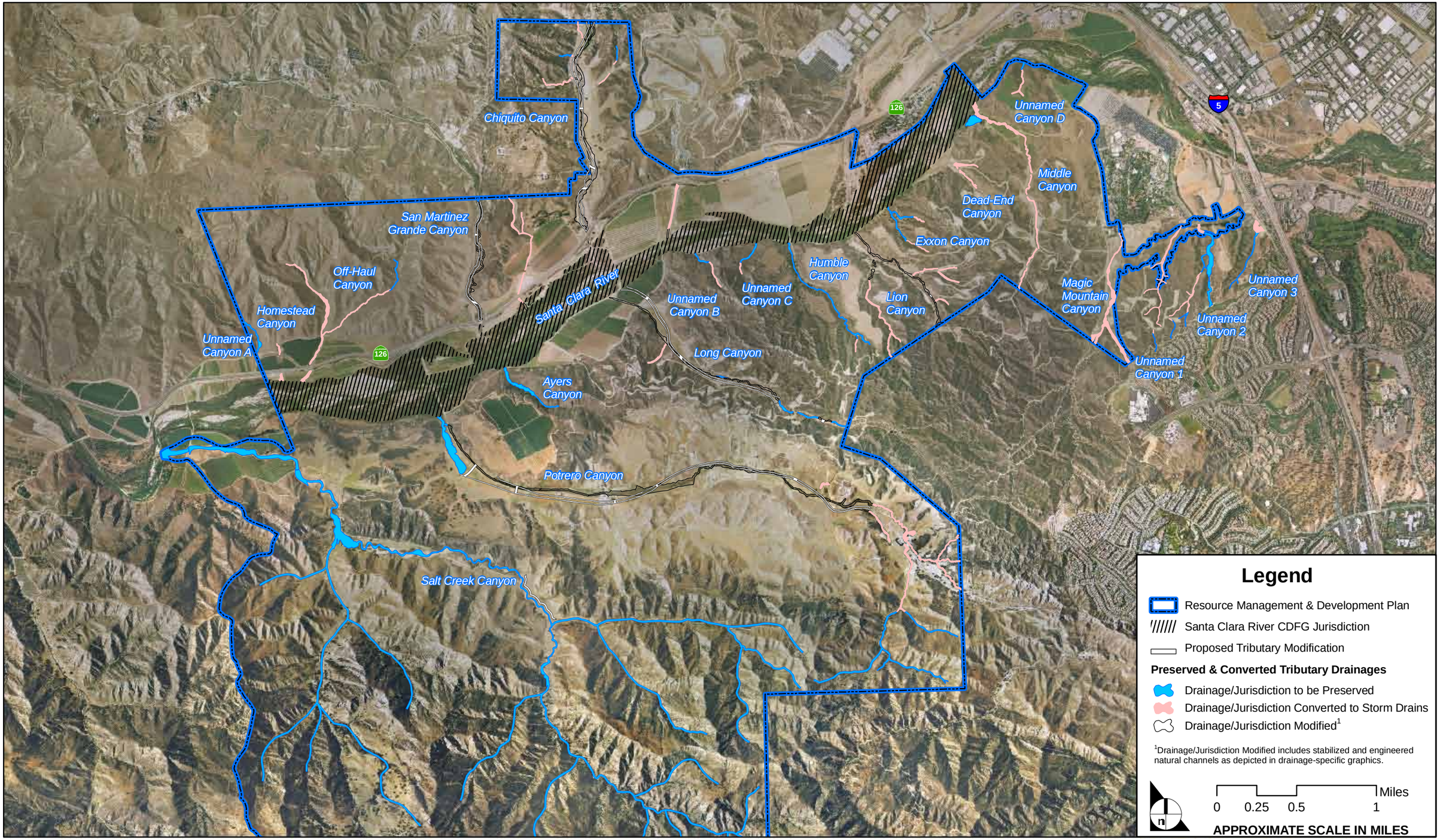
Location	Bank Stabilization (Linear Feet)	Drainage Converted to Buried Storm Drain (Linear Feet)	Grade Stabilizer Structures	New/Widened Bridges and Road Crossings
Santa Clara River	**26,751**	**0**	**0**	**2**[1]
Major Tributaries				
Chiquito Canyon	14,716	2,598	11	3
San Martinez Grande Canyon	8,566	0	6	2
Long Canyon	13,502	961	33	3
Potrero Canyon	27,751	10,918	97	5
Lion Canyon	0	6,316	27	1
Minor Tributaries				
Salt Creek Canyon	1,992[2]	0	0	0
Agricultural Ditch	0	1,479	0	0
Ayers Canyon	0	0	0	1
Dead-End Canyon	0	1,931	0	0
Exxon Canyon	0	1,276	0	0
Homestead Canyon	0	609	0	0
Humble Canyon	0	421	0	0
Middle Canyon	0	7,439	0	0
Mid-Martinez Canyon	0	4,541	0	0
Off-Haul Canyon	0	7,593	0	0
Magic Mountain Canyon	0	6,111	0	0
Unnamed Canyon 1 (Entrada)	0	4,647	0	0
Unnamed Canyon 2 (Entrada)	0	390	0	0
Unnamed Canyon A	0	0	0	0
Unnamed Canyon B	0	1,004	0	0
Unnamed Canyon C	0	402	0	0
Unnamed Canyon D	0	1,232	0	0
Alternative Total in Tributaries	**66,526**	**59,868**	**174**	**15**

Notes:

[1] Commerce Center Drive Bridge is already permitted but is included in analysis for informational purposes.

[2] No fill within the U.S. Army Corps of Engineers jurisdictional area will occur within Salt Canyon, except for habitat restoration and enhancement throughout the watershed.

Source: RMDP, 2008.



SOURCE: PACE - April 2008

FIGURE 4.1-17

ALTERNATIVE 4
MODIFIED, CONVERTED, AND PRESERVED TRIBUTARY DRAINAGES

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-17_ModifiedConvertedPreservedTributaryDrainageTreatmentsAlt4_PC1_050108.mxd

There are five major tributary drainages that would be partially regraded or modified, but remain in soft bottom channel conditions: Chiquito Canyon; San Martinez Grande Canyon; Potrero Canyon; Long Canyon; and Lion Canyon. Significant portions of several small, tributary drainages would be graded and replaced with storm drains or other appropriate conveyance facilities, including: Magic Mountain Canyon; Middle Canyon; Dead-End Canyon; Exxon Canyon; Mid-Martinez Canyon; Off-Haul Canyon; Homestead Canyon; the Chiquito Canyon agricultural ditch; Unnamed Canyon B; Unnamed Canyon C; Unnamed Canyon D; Unnamed Canyon 1; and Unnamed Canyon 2 drainages.

Chiquito Canyon. Alternative 4 proposes that bank stabilization be installed along the entire length of both banks of Chiquito Canyon. Two new bridge/culvert road crossings would be proposed just upstream of SR-126, and another would cross the drainage approximately halfway between SR-126 and the northern Project area boundary. The existing two-lane bridge allowing SR-126 to cross the drainage would be widened to four lanes. In Chiquito Canyon, implementation of Alternative 4 would involve the placement of 14,716 linear feet of buried bank stabilization, 11 grade stabilizer structures, and three new bridge/culvert road crossings. In addition, 2,598 linear feet of drainage would be converted to buried storm drain. (See **Figure 4.1-7**.)

San Martinez Grande Canyon. Alternative 4 proposes that a soft bottom channel be constructed adjacent to the existing alignment of San Martinez Grande Canyon Road between SR-126 and the northern Project area boundary. The existing stream channel would be graded, and the drainage would be relocated westward into the soft bottom channel. A bridge/culvert road crossing is proposed approximately two-thirds of the way between SR-126 and the northern Project area boundary, and another would be constructed just upstream of SR-126. In total, this alternative would involve the placement 8,566 linear feet of buried bank stabilization, eight grade stabilizer structures, and two new bridge/culvert road crossings in San Martinez Grande Canyon. In addition, the existing bridge allowing SR-126 to cross the drainage would be widened. (See **Figure 4.1-8**.)

Long Canyon. In Long Canyon, Alternative 4 leaves the upper 25 percent of the natural drainage unstabilized. The lower 75 percent of the existing channel would be graded, and the stream would be relocated and lined with buried bank stabilization. Two proposed bridge/culvert road crossings would cross the drainage just upstream of the Santa Clara River confluence. A third crossing would be constructed near the eastern end of the drainage, approximately 400 feet downstream of the Project area boundary. In Long Canyon, this alternative would involve the placement of 13,502 linear feet of buried bank stabilization, 33 grade stabilizer structures, and three new bridge/culvert road crossings. (See **Figure 4.1-18**.)

Potrero Canyon. In Potrero Canyon, Alternative 4 would require the construction of a soft bottom channel lined with buried bank stabilization between the upstream end of the lower mesic meadow and a point approximately four-fifths of the way up the drainage. This channel would not correspond to the existing location of the drainage, and would require the stream to be relocated. Downstream of this channel, the mesic meadow area would remain unstabilized and the drainage would be left in its current state. Upstream of this channel, 10,918 linear feet of the natural drainage would be graded and buried storm drains would convey flow. Four new bridge/culvert road crossings would be constructed at approximately even intervals between the upstream end of the mesic meadow and the upstream end of the

saltgrass meadow, allowing roadways to cross the lined, soft bottom channel. A fifth bridge/culvert road crossing would cross the channel farther upstream, just downstream of the point where the drainage begins to branch. Alternative 4 would involve the installation of 27,751 linear feet of buried bank stabilization, 97 grade stabilizer structures, and five new bridge/culvert road crossings in Potrero Canyon. (See **Figure 4.1-19**.)

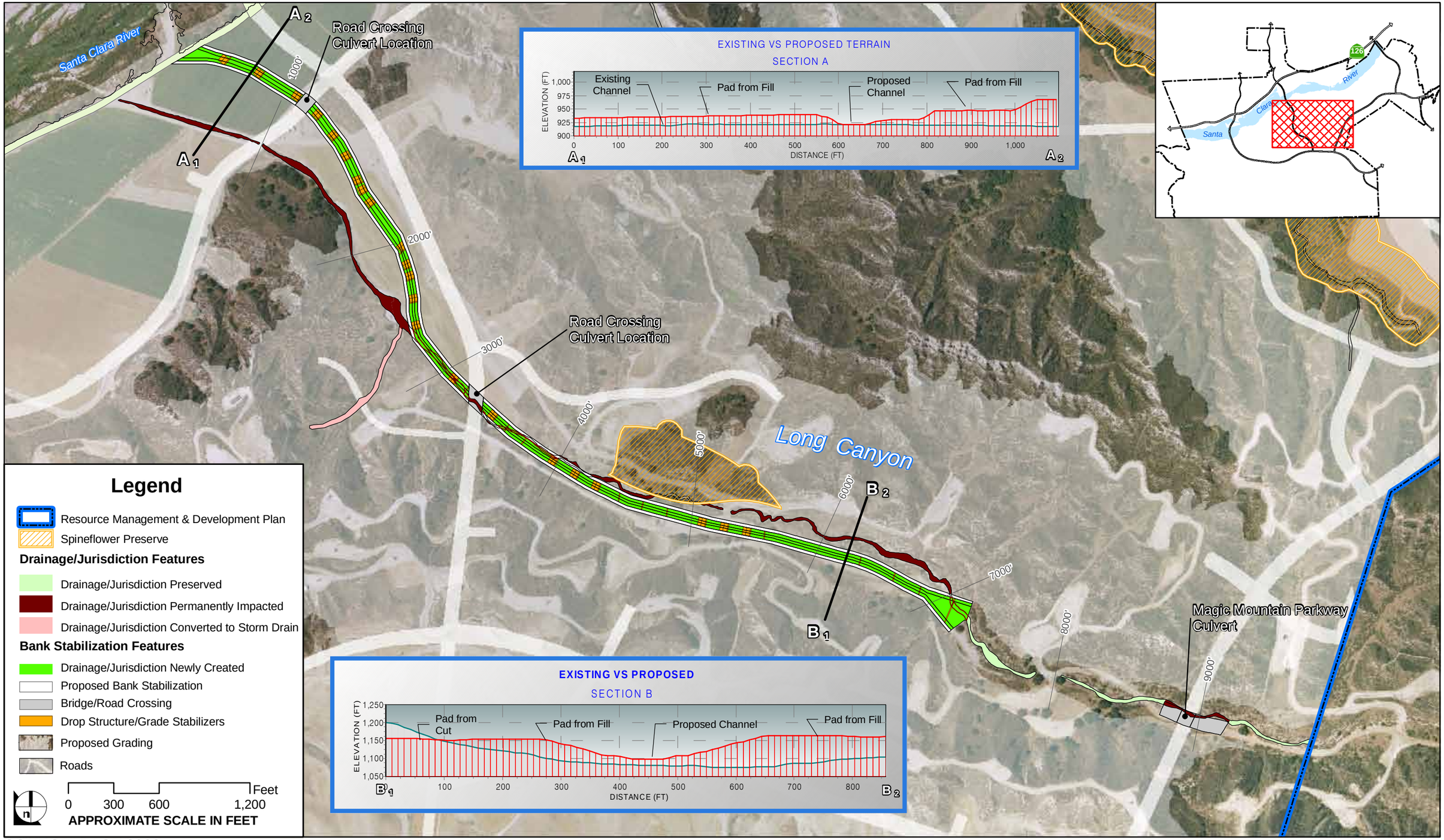
Lion Canyon. The preliminary design for Alternative 4 includes the placement of three new bridge/culvert road crossings in Lion Canyon and the conversion of 6,316 linear feet of the existing Lion Canyon drainage to buried storm drains. The design also involves the installation of 27 grade stabilizer structures. Regarding flooding and stormwater conveyance, Alternative 4 will be designed to convey the 100-year and capital flood runoff events in compliance with DPW requirements, and will include project design features to minimize flood hazards as specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008). (See **Figure 4.1-11**.)

Minor Tributaries and Drainages. In total, approximately 39,075 linear feet of drainage would be converted to buried storm drain within the several minor tributaries. One bridge/culvert road crossing would be constructed across the mouth of the Ayers Canyon drainage. No other drainage facilities would be constructed in Ayers Canyon. In addition, the existing six-lane bridge allowing SR-126 to cross the Castaic Creek drainage would be expanded to eight lanes.

4.1.6.5.1 Direct Impacts

RMDP Direct Impacts.

Santa Clara River. Alternative 4 differs from Alternative 2 (proposed Project) in that there would be 26,751 linear feet of bank stabilization, as compared to 29,779 linear feet under Alternative 2, and two bridges, which is one less than the proposed Project. Alternative 4 does not propose to construct a bridge across the River at Potrero Canyon. In addition, activities such as facility maintenance and habitat enhancement would be conducted within and along the River under Alternative 4. These activities are described in **Section 4.5**, Biological Resources, of this EIS/EIR.



SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-18

LONG CANYON ALTERNATIVE DETAIL - ALTERNATIVE 4 & 5
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-18_LongAlternative4-5_PC1_042908.mxd

Legend

- Resource Management & Development Plan
- Spineflower Preserve

Drainage/Jurisdiction Features

- Drainage/Jurisdiction Preserved
- Drainage/Jurisdiction Temporarily Impacted
- Drainage/Jurisdiction Permanently Impacted
- Drainage/Jurisdiction Converted to Storm Drain

Bank Stabilization Features

- Drainage/Jurisdiction Newly Created
- Proposed Bank Stabilization
- Bridge/Road Crossing; Road Crossing Fill
- Drop Structure/Grade Stabilizers
- Proposed Grading
- Roads

0 600 1,200 2,400 Feet

APPROXIMATE SCALE IN FEET

SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-19

POTRERO CANYON ALTERNATIVE DETAIL - ALTERNATIVE 4
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-19_PotreroAlternative4_PC1_04309.mxd

As shown in **Table 4.1-11**, the proposed RMDP infrastructure associated with Alternative 4 would alter the existing boundary of the Santa Clara River floodplain throughout the Project area.

Table 4.1-11
Changes in Floodplain Area, Alternative 4

Year Event	Existing Floodplain Area (acres)	Alternative 2 Floodplain Area (acres)	Alternative 4 Floodplain Area (acres)	Change relative to Alt. 2 (acres)	% Change relative to Alt. 2
2-Year	447.6	447.8	447.1	-0.7	-0.2%
5-Year	598.4	599.5	598.9	-0.6	-0.1%
10-Year	720.1	717.2	715.2	-2.0	-0.3%
20-Year	999.0	928.5	933.8	5.3	0.6%
50-Year	1294.2	1161.7	1179.7	18.0	1.6%
100-Year	1407.6	1283.8	1298.0	14.2	1.1%

Source: PACE, 2008A.

Alternative 4 would result in a decrease in floodplain area relative to Alternative 2 for the 2-, 5-, and 10-year recurrence interval flow events and an increase in the floodplain area relative to Alternative 2 for the 20-, 50-, and 100-year recurrence interval flow events. In comparison to existing conditions, there would be reductions in floodplain acreages for the 2-, 10-, 20-, 50-, and 100-year storm events as river flows would be impacted by proposed RMDP infrastructure that would reduce the area of the estimated floodplain during these less frequent, larger flood events. To prevent flooding, Alternative 4 would include bank stabilization that is designed to contain and convey the FEMA 100-year flood event and the DPW capital flood event. Implementation of the Project would include the submittal and approval of a CLOMR to FEMA to account for the modified floodplain area and approval of a revised capital floodplain area from DPW.

Based on the hydraulic model results (PACE, 2008A), Alternative 4 RMDP infrastructure would not be subjected to significant flooding impacts and would not result in significant risk of loss, injury or death to people in the Project area. Therefore, the impacts associated with Alternative 4 are considered adverse, but less than significant relative to Significance Criterion 1.

The proposed improvements do not impact storm flows in the Santa Clara River because these improvements are designed to accommodate the flows associated with the 2-, 5-, 10-, 20-, 50-, and 100-year floods events under the proposed conditions for Alternative 4. In addition, no storm flows are diverted from or to the River as a result of the Project, and no drainage tributary to the River would be prevented from flowing to the River in the proposed Project condition. Therefore, the impacts associated with Alternative 4 are considered adverse, but less than significant relative to Significance Criterion 2.

Major Tributaries. There are five major tributary drainages that would be partially regraded or modified, but remain in soft bottom channel conditions: Potrero Canyon; Long Canyon; Lion Canyon; Chiquito Canyon; and San Martinez Grande Canyon. All of these tributary drainages would either be protected or designed to accommodate any modifications to the existing hydrology as a result of Specific

Plan build-out. The proposed improvements under Alternative 4 are shown in **Figure 4.1-17** and a description of the impacts to the major tributaries associated with Alternative 4 is provided below.

Runoff within the major tributaries would be conveyed through both engineered, soft bottom channels and underground stormwater conveyance infrastructure. Regarding flooding and flood hazards, the engineered channels would be designed to contain and convey the flows from a 100-year storm event and the DPW capital flood event in accordance with County regulations. The adequacy of the final channel flow capacity would be assessed by DPW during Village-level review. For approval, the final channel design must meet the requirements of the DPW sedimentation manual. The hydraulic modeling and calculations supporting the final channel design would incorporate the required freeboard and an acceptable factor of safety to prevent impacts from overtopping and flooding. In addition, where appropriate, implementation of the Project would include approval of a CLOMR from FEMA and approval of a revised capital floodplain area from DPW.

Since the engineered channels would be designed to convey the 100-year and capital flood events, the Project would not create a flooding hazard and would not result in significant risk of loss, injury or death to people in the Project area. Therefore, the impacts associated with Alternative 4 are considered adverse, but less than significant relative to Significance Criterion 1.

As indicated above, runoff within the major tributaries would be conveyed through both engineered, soft bottom channels and underground stormwater conveyance infrastructure. The engineered channels would be designed to convey both the 100-year and capital flood events in accordance with DPW requirements. Regarding the underground stormwater conveyance infrastructure, the design of these storm drains would comply with DPW requirements for "Storm Drains and Urban Flood Protection" and would incorporate project design features specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008) to minimize flood hazards. The final design of storm drains would be evaluated and approved by DPW during Village-level review. Final design would be compliant with DPW requirements for storm drains and urban flood protection (DPW Hydrology Manual, 1991).

Since the engineered channels would be designed to convey the 100-year and capital flood events and the underground storm water conveyance infrastructure would be designed in compliance with DPW requirements, the impacts associated Alternative 4 are considered adverse, but less than significant relative to Significance Criterion 2.

Minor Tributaries. The Project proposes grading within several of the minor tributaries to accommodate pads for residential and commercial buildings and that the drainage flows be conveyed by buried storm drains varying in diameter from 30 to 144 inches, as shown in **Figure 4.1-17**. The stormwater drainage infrastructure associated with these drainages would be designed to comply with DPW requirements for "Storm Drains and Urban Flood Protection" and would incorporate the project design features described in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008). Accordingly, the impacts associated with Alternative 4 are considered adverse, but less than significant relative to Significance Criterion 2.

Salt Creek Canyon. The Specific Plan includes a Visitor Serving land use designation, which allows for an access point to the High Country SMA/SEA 20. Approximately 1,992 feet of bank protection in non-

jurisdictional uplands would be installed in conjunction with development of approved Visitor Serving uses as described in the Specific Plan. Any potential impacts would be limited in nature and related to access and recreational use of the High Country, and might include footbridges and maintenance of existing farm roads. Accordingly, the flood hazard and stormwater runoff impacts are considered adverse, but less than significant for this Specific Plan component relative to Significance Criteria 1 and 2.

SCP Direct Impacts. The SCP component of the proposed Project would reduce the developable area of the proposed Project since no development would occur in the SCP areas. The decrease in developed area would result in a slight decrease in impermeable area overall and a slight reduction in surface runoff. However, the decrease in runoff volume would be minor compared to the overall contributions from the tributary watersheds, so the runoff from the SCP has the same or approximate characteristics as runoff from the natural drainage. In addition, all of the SCP areas are located outside of the Santa Clara River 100-year floodplain, so the SCP would not affect flood control. Based on this information, the impacts associated with the SCP for Alternative 4 relative to Significance Criteria 1 and 2 are considered adverse, but less than significant since it would not impact flooding or storm flows in the river or tributaries.

4.1.6.5.2 Indirect Impacts

RMDP Indirect Impacts. Implementation of the proposed Project would facilitate County-approved development of the Specific Plan. The Newhall Ranch Specific Plan Program EIR describes in detail the impacts associated with the build-out of the Specific Plan with regard to flood hazards and stormwater conveyance, and mitigation measures related to these criteria are incorporated into this EIS/EIR. Since flood hazards and stormwater conveyance associated with the Specific Plan are by the previously incorporated Specific Plan Mitigation Measures SP-4.2-1 (compliance with LADPW flood control requirements), SP-4.2-4 (obtaining CLOMRs following construction of drainage facilities), SP-4.2-5 (DPW plan and map approvals), and SP-4.2-8 (DPW SUSMP and SWPPP requirements), the RMDP indirect impacts are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

SCP Indirect Impacts. Implementation of Alternative 4 would facilitate County-approved developments on the Specific Plan site and Entrada planning area, and build-out of these areas would result in indirect impacts. The Newhall Ranch Specific Plan Program EIR described in detail the impacts associated with build-out of the Specific Plan with regard to flood hazards and stormwater conveyance and mitigation related to these criteria are incorporated into this EIS/EIR. Impacts related to hydrology and flooding associated with build-out of the Entrada planning area were incorporated into the hydraulic model that was used to evaluate direct and indirect impacts. The existing conveyance facility from the Entrada planning area boundary to the Santa Clara River may not currently be sized to accommodate the flows that would likely result from the proposed (but not yet approved) development in the Entrada planning area. Accordingly, the existing drainage infrastructure would need to be re-designed to accommodate the increase in flows prior to implementation of the Entrada development. The proposed drainage infrastructure would be designed to comply with DPW criteria and would require DPW review and approval prior to construction. Since flood hazards and stormwater conveyance associated with these projects are captured in the hydrologic and hydraulic modeling used in the impact analysis for direct and indirect impacts and are addressed through the incorporation of mitigation measures, the indirect SCP

impacts for Alternative 4 are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

4.1.6.5.3 Secondary Impacts

RMDP Secondary Impacts. Increases in the transport and deposition of debris from the Project area could result in secondary flood hazards downstream. Debris within the Project area would be captured in debris basins that are designed in accordance with DPW requirements and would require DPW review and approval prior to construction. In addition, the basins would incorporate the project design features described in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008) which were developed to balance runoff and sediment loading to Project tributaries and the Santa Clara River. Since the debris basins would be designed in accordance with the DPW requirements and would incorporate additional features to enhance the management of debris, the secondary impacts of the RMDP are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

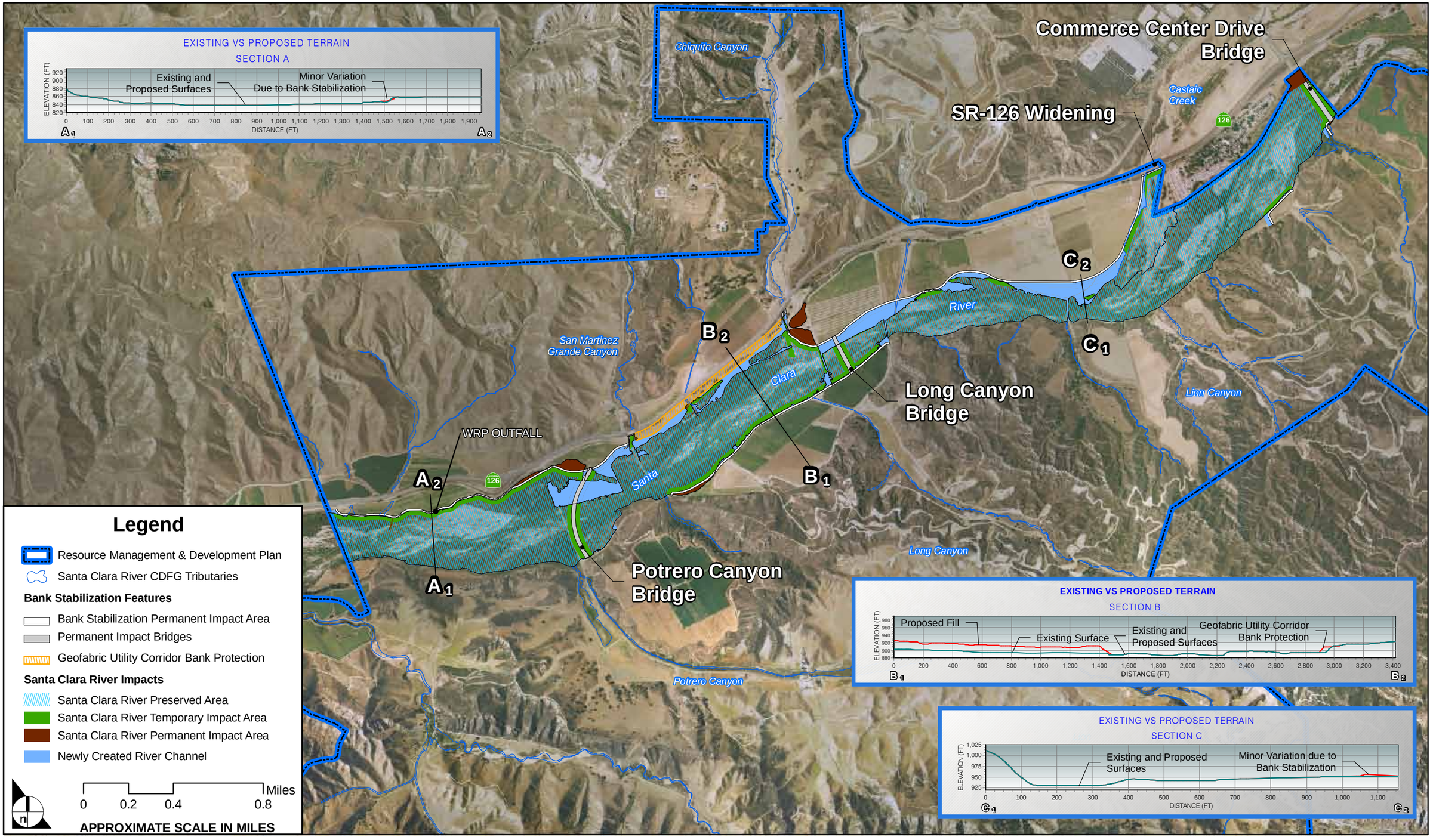
SCP Secondary Impacts. The SCP areas would remain preserved and are not expected to affect existing levels of sediment and debris runoff. Any debris that may be generated from the SCP areas would be adequately handled by the RMDP improvements, and thus, would not contribute to downstream flooding hazards. Therefore, the secondary impacts of the SCP are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

4.1.6.6 Impacts of Alternative 5 (Widen Tributary Drainages and Addition of VCC Spineflower Preserve)

Alternative 5 would involve the construction of buried bank stabilization along approximately half of the north and one-third of the south bank of the Santa Clara River within the Specific Plan area, mostly constructed in upland areas, as shown in **Figure 3.0-20**. Bank stabilization would be installed upstream of Chiquito Canyon and downstream of San Martinez Grande Canyon on the north bank, and between Long and Potrero Canyons on the south. Alternative 5 would also involve the construction of three bridges across the River: one at Commerce Center Drive (already permitted), one at the mouth of Potrero Canyon, and one at the mouth of Long Canyon. In total, this alternative proposes to construct 26,952 linear feet of buried bank stabilization and two new bridges in the Santa Clara River Corridor, as compared to 29,779 linear feet of buried bank stabilization and three new bridges to be constructed under Alternative 2. In addition, the WRP outfall to the Santa Clara River would be constructed. It would not be necessary to construct any grade stabilizer structure within the River.

A summary of the RMDP infrastructure components under Alternative 5 is presented in **Table 4.1-12**, and **Figures 4.1-20** and **4.1-21** show the RMDP components under Alternative 5.

Alternative 5 also would involve the designation of a total of 338.6 acres, as compared to 167.6 acres under Alternative 2. If this alternative is implemented, a total of 89,658 linear feet of bank stabilization (as compared to 105,207 linear feet under Alternative 2), 173 grade stabilizer structures (as compared to 189 under Alternative 2), and 18 new bridge/culvert road crossings (as is proposed under Alternative 2)



SOURCE: PACE 2008

FIGURE 4.1-20

ALTERNATIVE 5 PROPOSED RMDP
SANTA CLARA RIVER FEATURES

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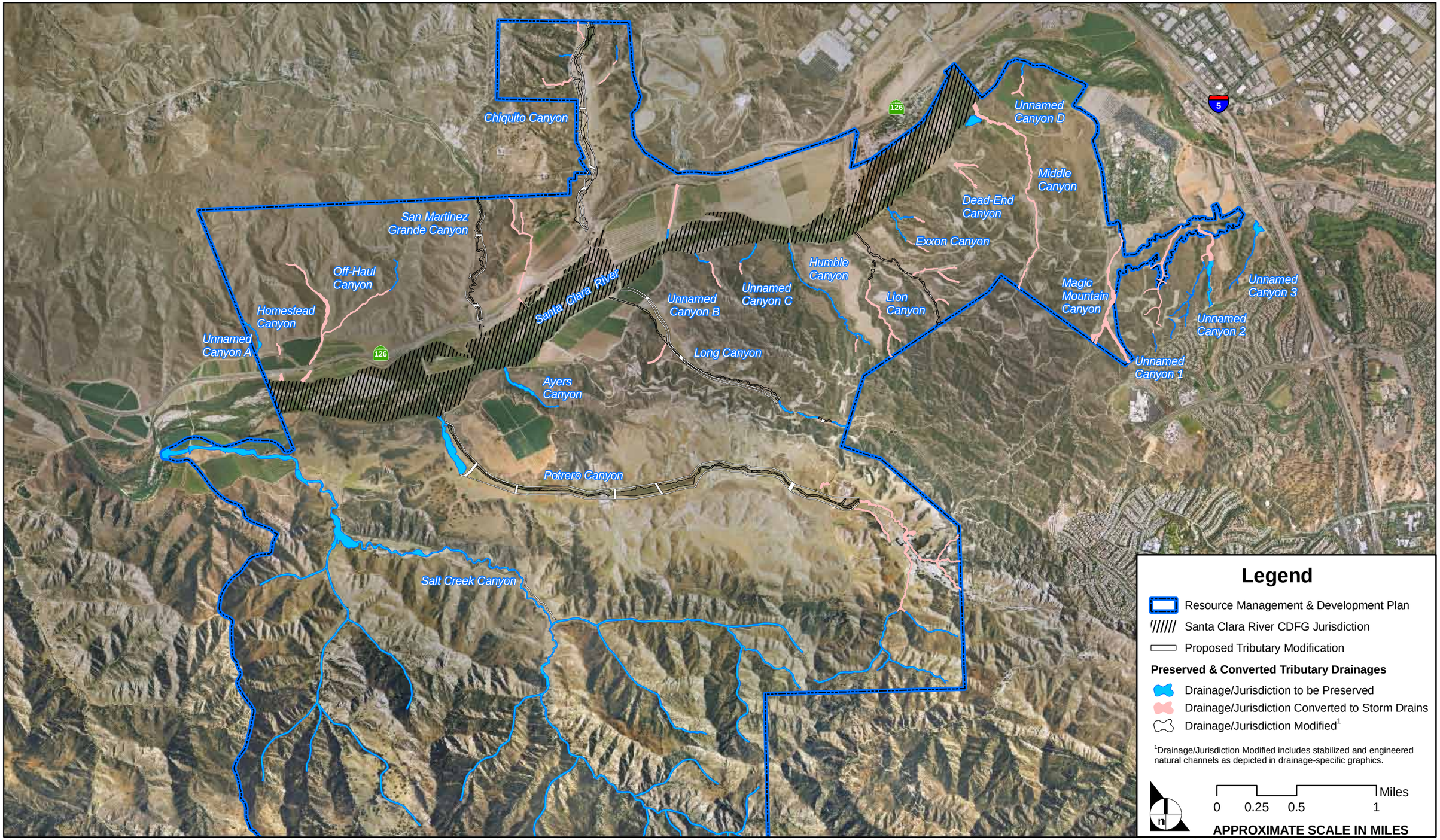


SOURCE: PACE - April 2008

FIGURE 4.1-21

ALTERNATIVE 5
MODIFIED, CONVERTED, AND PRESERVED TRIBUTARY DRAINAGES

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-21_ModifiedConvertedPreservedTributaryDrainageTreatmentsAlt5_PC1_050108.mxd

Table 4.1-12
RMDP Infrastructure Components: Alternative 5

Location	Bank Stabilization (Linear Feet)	Drainage Converted to Buried Storm Drain (Linear Feet)	Grade Stabilizer Structures	New/Widened Bridges and Road Crossings
Santa Clara River	**26,952**	**0**	**0**	**3**[1]
Major Tributaries				
Chiquito Canyon	12,902	2,624	13	3
San Martinez Grande Canyon	4,754	0	5	2
Long Canyon	13,502	961	33	3
Potrero Canyon	29,557	11,909	95	5
Lion Canyon	0	6,316	27	1
Minor Tributaries				
Salt Creek Canyon	1,992[2]	0	0	0
Agricultural Ditch	0	1,479	0	0
Ayers Canyon	0	0	0	1
Dead-End Canyon	0	1,931	0	0
Exxon Canyon	0	1,276	0	0
Homestead Canyon	0	609	0	0
Humble Canyon	0	421	0	0
Middle Canyon	0	7,439	0	0
Mid-Martinez Canyon	0	4,541	0	0
Off-Haul Canyon	0	7,593	0	0
Magic Mountain Canyon	0	6,111	0	0
Unnamed Canyon 1 (Entrada)	0	4,647	0	0
Unnamed Canyon 2 (Entrada)	0	416	0	0
Unnamed Canyon A	0	0	0	0
Unnamed Canyon B	0	1,004	0	0
Unnamed Canyon C	0	402	0	0
Unnamed Canyon D	0	1,004	0	0
Alternative Total in Tributaries	**62,706**	**60,683**	**173**	**15**

Notes:

[1] Commerce Center Drive Bridge is already permitted but is included in analysis for informational purposes.

[2] No fill within the U.S. Army Corps of Engineers jurisdictional area will occur within Salt Canyon, except for habitat restoration and enhancement throughout the watershed.

Source: RMDP, 2008.

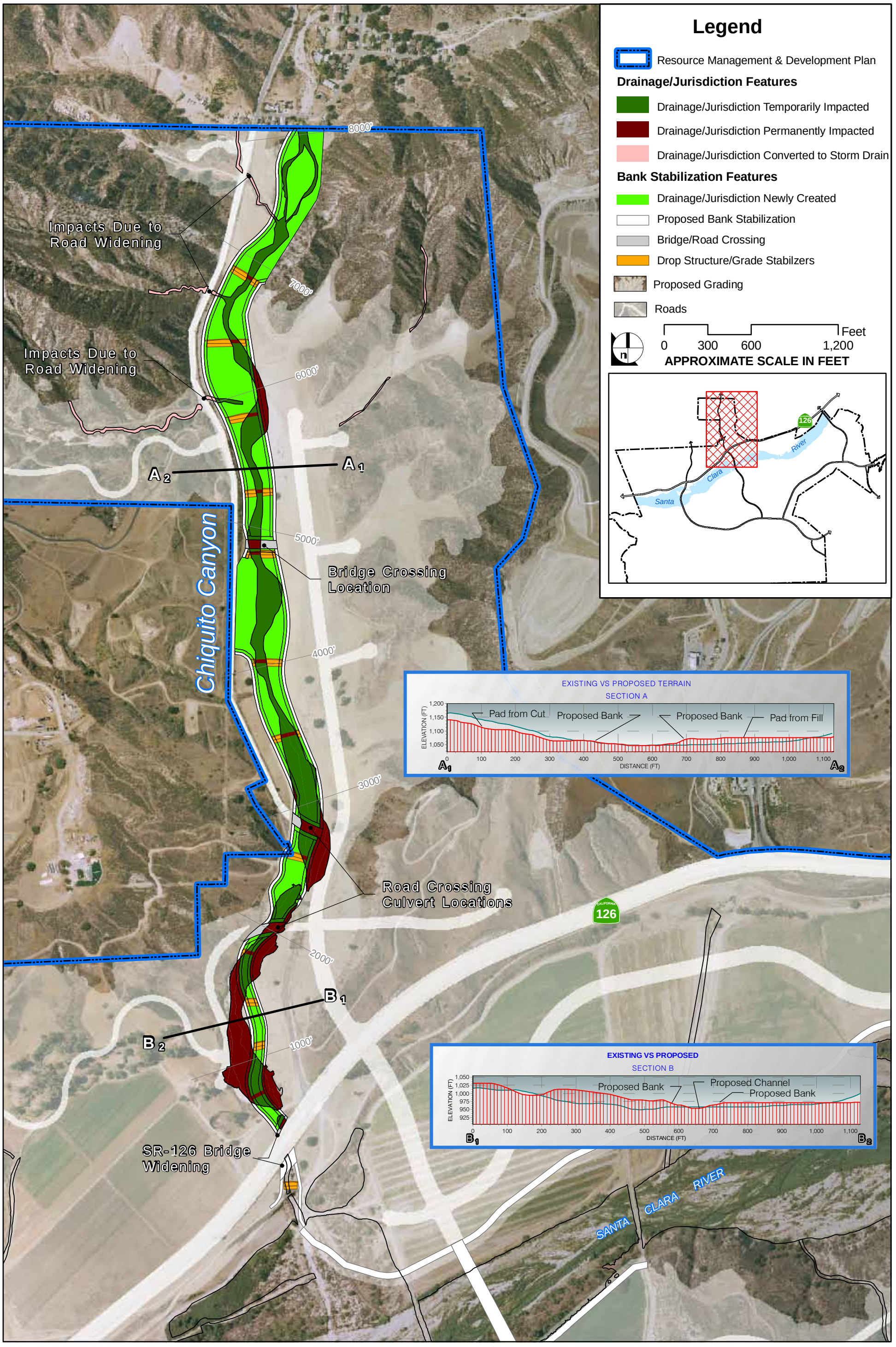
would be constructed on Newhall Ranch. No nature viewing platforms or associated walkways along the northern portion of the Santa Clara River would be provided by this alternative. Alternative 5 would require 60,683 linear feet of ephemeral and intermittent drainages to be replaced with buried storm drains, as compared to 59,845 linear feet under Alternative 2, to accommodate the creation of building pads. The proposed RMDP components are illustrated in **Figure 4.1-20** and **Figure 4.1-21**.

Implementation of Alternative 5 would result in approximately 339 less acres of developable area, compared to the build-out potential of the proposed Project. The reduction of developable area would occur due to preservation of streams and riparian areas, designation of spineflower preserves, and reduction of access to isolated parcels. No development would be facilitated on the VCC planning area under this alternative.

There are five major tributary drainages that would be partially regraded or modified, but remain in soft bottom channel conditions: Chiquito Canyon; San Martinez Grande Canyon; Potrero Canyon; Long Canyon; and Lion Canyon. Significant portions of several small, tributary drainages would be graded and replaced with storm drains or other appropriate conveyance facilities, including: Magic Mountain Canyon; Middle Canyon; Dead-End Canyon; Exxon Canyon; Mid-Martinez Canyon; Off-Haul Canyon; Homestead Canyon; the Chiquito Canyon agricultural ditch; Unnamed Canyon B; Unnamed Canyon C; Unnamed Canyon D; Unnamed Canyon 1; and Unnamed Canyon 2 drainages.

Chiquito Canyon. In Chiquito Canyon, bank stabilization would be placed along the entire length of the eastern side of the drainage, except for the cottonwood/willow woodland at the northern Project area boundary. Approximately one-third of this stabilization would be placed in upland areas. Buried bank stabilization would be placed along the western edge of the drainage with the exception of an 800-foot segment approximately halfway up the drainage, which would remain unstabilized. Upstream of this unstabilized area, bank protection would be installed in uplands. Three new bridge/culvert road crossings are proposed under this alternative, two just upstream of SR-126 and one approximately halfway between SR-126 and the northern Project area boundary. In addition, the existing two-lane bridge allowing SR-126 to cross the drainage would be widened to four lanes. In Chiquito Canyon, this alternative would involve the placement of 12,902 linear feet of buried bank stabilization, 13 grade stabilizer structures, and three new bridge/culvert road crossings. In addition, approximately 2,624 linear feet of drainage would be converted to buried storm drain. (See **Figure 4.1-22**.)

San Martinez Grande Canyon. In San Martinez Grande Canyon, Alternative 5 would require bank stabilization to be constructed in upland areas along approximately two-thirds of the east bank, and along approximately one-fourth of the west bank. One bridge/culvert road crossing would be constructed approximately two-thirds of the way between SR-126 and the northern Project area boundary, and another is proposed just upstream of SR-126. In total, this alternative would involve the placement of 4,754 linear feet of buried bank stabilization, five grade stabilizer structures, and two new bridge/culvert road crossings in San Martinez Grande Canyon. In addition, the existing bridge allowing SR-126 to cross the drainage would be widened. (See **Figure 4.1-23**.)



SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-22

CHIQUITO CANYON ALTERNATIVE DETAIL - ALTERNATIVE 5
PROPOSED RMDP TRIBUTARY TREATMENTS

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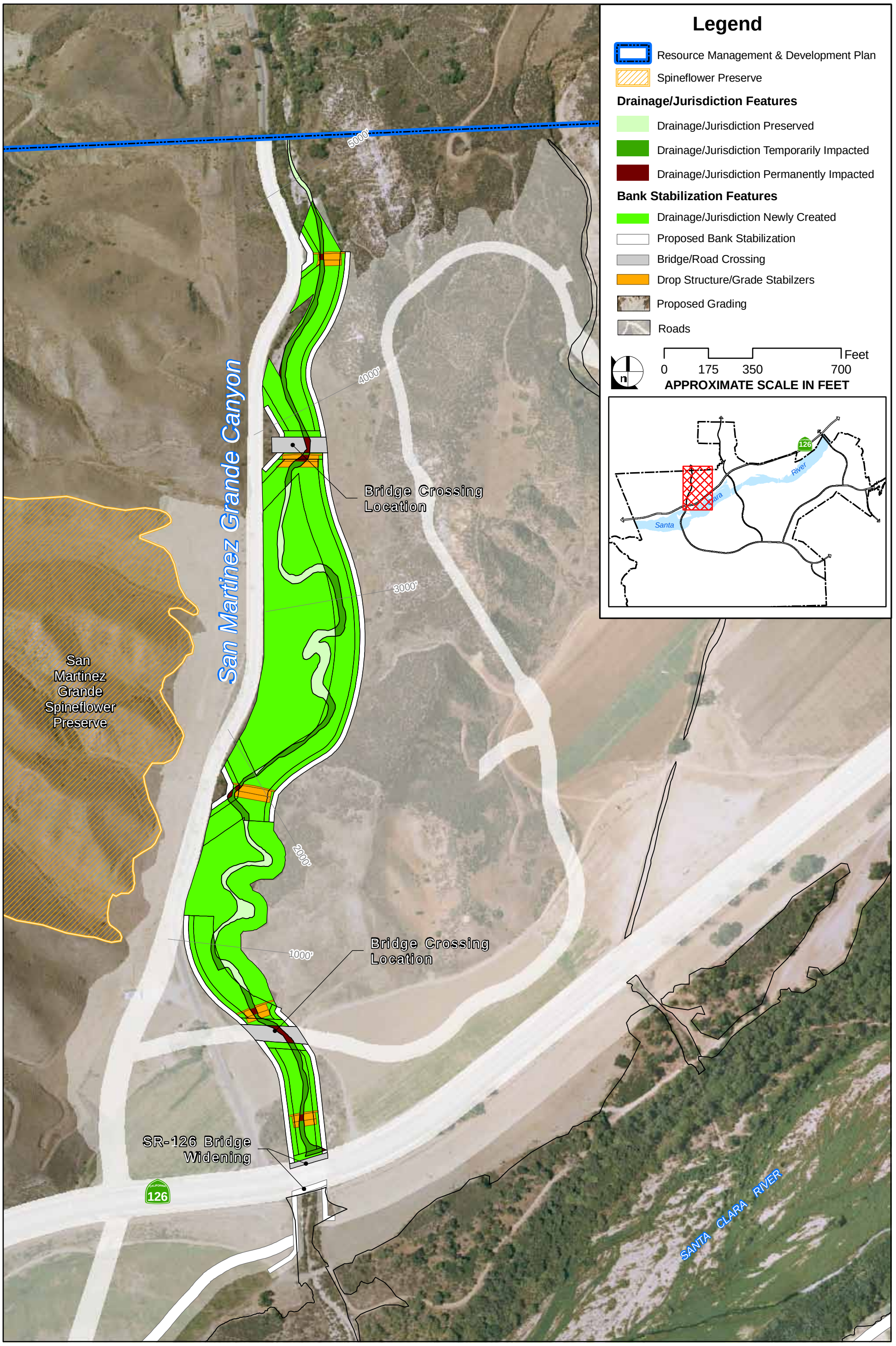


SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-23

SAN MARTINEZ GRANDE CANYON DETAIL - ALTERNATIVE 5
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-23_SanMartinezAlternative5_PC1_042908.mxd

Long Canyon. In Long Canyon, this alternative leaves the upper 25 percent of the natural drainage unstabilized. The lower 75 percent of the channel would be graded, and the stream would be relocated and lined with buried bank stabilization. Two proposed bridge/culvert road crossings would cross the drainage just upstream of the Santa Clara River confluence, and a third would be constructed near the eastern end of the drainage. In Long Canyon, this alternative would involve the placement of 13,502 linear feet of buried bank stabilization, 33 grade stabilizer structures, and three new bridge/culvert road crossings. In addition, approximately 961 linear feet of existing drainage would be converted to buried storm drains. (See **Figure 4.1-18**.)

Potrero Canyon. In Potrero Canyon, Alternative 5 would feature buried bank stabilization constructed in upland areas along both banks downstream of the point where the drainage begins to branch. Four new bridge/culvert road crossings would be constructed at approximately even intervals between the upstream end of the mesic meadow and the upstream end of the saltgrass meadow. A fifth bridge or crossing would cross the drainage farther upstream, just downstream of the point where the stream begins to branch. Upstream of the branching point, the drainage would be graded and diverted into buried storm drains. In total, Alternative 5 would entail the construction of 29,557 linear feet of buried bank stabilization, 95 grade stabilizer structures, and five new bridge/culvert road crossings in Potrero Canyon. In addition, approximately 11,909 linear feet of drainage would be converted to buried storm drain. (See **Figure 4.1-24**.)

Lion Canyon. The preliminary design for Alternative 5 includes the placement of one new bridge/culvert road crossing in Lion Canyon and the conversion of 6,316 linear feet of the existing Lion Canyon drainage to buried storm drains. The design also involves the installation of 27 grade stabilizer structures.. Regarding flooding and stormwater conveyance, Alternative 5 will be designed to convey the 100-year and capital flood runoff events in compliance with DPW requirements and will include project design features to minimize flood hazards as specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008). (See **Figure 4.1-11**.)

Minor Tributaries and Drainages. One bridge would be constructed across the mouth of the Ayers Canyon drainage. No other drainage facilities would be constructed in Ayers Canyon. Approximately 38,873 linear feet of existing drainage would be converted into buried storm drain. In addition, the existing six-lane bridge allowing SR-126 to cross the Castaic Creek drainage would be expanded to eight lanes.

4.1.6.6.1 Direct Impacts

RMDP Direct Impacts.

Santa Clara River. Alternative 5 includes 26,952 linear feet of bank stabilization, no buried storm drains, no grade stabilizer structures, and three bridges. In addition, activities such as facility maintenance and habitat enhancement would be conducted within and along the River under Alternative 5. These activities are described in **Section 4.5**, Biological Resources, of this EIS/EIR.

As shown in **Table 4.1-13**, the RMDP infrastructure associated with Alternative 5 would alter the existing boundary of the Santa Clara River floodplain throughout the Project area.

Table 4.1-13
Changes in Floodplain Area, Alternative 5

Year Event	Existing Floodplain Area (acres)	Alternative 2 Floodplain Area (acres)	Alternatives 5 Floodplain Area (acres)	Change relative to Alt. 2 (acres)	% Change relative to Alt. 2
2-Year	447.6	447.8	447.7	-0.1	-0.02%
5-Year	598.4	599.5	598.4	-1.1	-0.2%
10-Year	720.1	717.2	714.4	-2.8	-0.4%
20-Year	999.0	928.5	911.7	-16.8	-1.8%
50-Year	1294.2	1161.7	1171.3	9.6	0.8%
100-Year	1407.6	1283.8	1250.9	-32.9	-2.6%

Source: PACE, 2008A.

Alternative 5 would result in an increase in floodplain area relative to Alternative 2 for the 50-year recurrence interval flow event but a decrease in floodplain area relative to Alternative 2 for the 2-, 5-, 10-, 20-, and 100-year events. In comparison to existing conditions, there would be reductions in floodplain acreages for the 10- through 100-year storm events as River flows would be impacted by proposed RMDP infrastructure, which would reduce the area of the estimated floodplain during these less frequent, larger flood events. To prevent flooding, Alternative 5 would include bank stabilization that is designed to contain and convey the FEMA 100-year flood event and the DPW capital flood event. Implementation of the Project would include the submittal and approval of a CLOMR to FEMA to account for the modified floodplain area and approval of a revised capital floodplain area from DPW.

Based on the hydraulic model results (PACE, 2008A), Alternative 5 RMDP infrastructure would not be subjected to significant flooding impacts and would not result in significant risk of loss, injury or death to people in the Project area. Therefore, the impacts associated with Alternative 5 are considered adverse, but less than significant relative to Significance Criterion 1.

The proposed improvements do not impact storm flows in the Santa Clara River because these improvements are designed to accommodate the flows associated with the 2-, 5-, 10-, 20-, 50-, and 100-year floods events under the proposed conditions for Alternative 5. In addition, no storm flows are diverted from or to the River as a result of the Project, and no drainage tributary to the River would be prevented from flowing to the River in the proposed Project condition. Therefore, the impacts associated with Alternative 5 are considered adverse, but less than significant relative to Significance Criterion 2.

Major Tributaries. There are five major tributary drainages that would be partially regraded or modified, but remain in soft bottom channel conditions: Potrero Canyon; Long Canyon; Lion Canyon; Chiquito Canyon; and San Martinez Grande Canyon. All of these tributary drainages would either be protected or designed to accommodate any modifications to the existing hydrology as a result of Specific Plan build-out. The proposed improvements under Alternative 5 are shown in **Figure 4.1-20**, and a description of the impacts to the major tributaries associated with Alternative 5 is provided below.

Legend

- Resource Management & Development Plan
- Spineflower Preserve

Drainage/Jurisdiction Features

- Drainage/Jurisdiction Preserved
- Drainage/Jurisdiction Temporarily Impacted
- Drainage/Jurisdiction Permanently Impacted
- Drainage/Jurisdiction Converted to Storm Drain

Bank Stabilization Features

- Drainage/Jurisdiction Newly Created
- Proposed Bank Stabilization
- Bridge/Road Crossing
- Road Crossing Fill
- Drop Structure/Grade Stabilizers
- Proposed Grading
- Roads

0 600 1,200 2,400 Feet

APPROXIMATE SCALE IN FEET

SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-24

POTRERO CANYON ALTERNATIVE DETAIL - ALTERNATIVE 5
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-24_PotreroAlternative5_PC1_043008.mxd

Runoff within the major tributaries would be conveyed through both engineered, soft bottom channels and underground stormwater conveyance infrastructure. Regarding flooding and flood hazards, the engineered channels would be designed to contain and convey the flows from a 100-year storm event and the DPW capital flood event in accordance with County regulations. The adequacy of the final channel flow capacity would be assessed by DPW during Village-level review. For approval, the final channel design must meet the requirements of the DPW sedimentation manual. The hydraulic modeling and calculations supporting the final channel design would incorporate the required freeboard and an acceptable factor of safety to prevent impacts from overtopping and flooding. In addition, where appropriate, implementation of the Project would include approval of a CLOMR from FEMA and approval of a revised capital floodplain area from DPW.

Since the engineered channels would be designed to convey the 100-year and capital flood events, the Project would not create a flooding hazard and would not result in significant risk of loss, injury or death to people in the Project area. Therefore, the impacts associated with Alternative 5 are considered adverse, but less than significant relative to Significance Criterion 1.

As indicated above, runoff within the major tributaries would be conveyed through both engineered, soft bottom channels and underground stormwater conveyance infrastructure. The engineered channels would be designed to convey both the 100-year and capital flood events in accordance with DPW requirements. Regarding the underground stormwater conveyance infrastructure, the design of these storm drains would comply with DPW requirements for "Storm Drains and Urban Flood Protection" and would incorporate project design features specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008) to minimize flood hazards. The final design of storm drains would be evaluated and approved by DPW during Village-level review. Final design would be compliant with DPW requirements for storm drains and urban flood protection (DPW Hydrology Manual, 1991).

Since the engineered channels would be designed to convey the 100-year and capital flood events and the underground storm water conveyance infrastructure would be designed in compliance with DPW requirements, the impacts associated with Alternative 5 are considered adverse, but less than significant relative to Significance Criterion 2.

Minor Tributaries. The Project proposes grading within several of the minor tributaries to accommodate pads for residential and commercial building, and that the drainage flows be conveyed by buried storm drains varying in diameter from 30 to 144 inches, as shown in **Figure 4.1-21**. The stormwater drainage infrastructure associated with these drainages would be designed to comply with DPW requirements for "Storm Drains and Urban Flood Protection" and would incorporate the project design features outlined in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008). Accordingly, the impacts associated with Alternative 5 relative to Significance Criterion 2 are considered adverse, but less than significant.

Salt Creek Canyon. The Specific Plan includes a Visitor Serving land use designation, which allows for an access point to the High Country SMA/SEA 20. Approximately 1,992 feet of bank protection in non-jurisdictional uplands would be installed in conjunction with development of approved Visitor Serving uses as described in the Specific Plan. Any potential impacts would be limited in nature and related to

access and recreational use of the High Country, and might include footbridges and maintenance of existing farm roads. Accordingly, the flood hazard and stormwater runoff impacts are considered adverse, but less than significant for this Specific Plan component relative to Significance Criteria 1 and 2.

SCP Direct Impacts. The SCP component of the proposed Project would reduce the developable area of the proposed Project since no development would occur in the SCP areas. The decrease in developed area would result in a slight decrease in impermeable area overall and a slight reduction in surface runoff. However, the decrease in runoff volume would be minor compared to the overall contributions from the tributary watersheds, so the runoff from the SCP has the same or approximate characteristics as runoff from the natural drainage. In addition, all of the SCP areas are located outside of the Santa Clara River 100-year floodplain, so the SCP would not affect flood control. Based on this information, the impacts associated with the SCP for Alternative 5 relative to Significance Criteria 1 and 2 are considered adverse, but less than significant since it would not impact flooding or storm flows in the river or tributaries.

4.1.6.6.2 Indirect Impacts

RMDP Indirect Impacts. Implementation of the proposed RMDP would facilitate County-approved development of the Specific Plan; and, impacts associated with the Specific Plan would be indirect impacts. The Newhall Ranch Specific Plan Program EIR described in detail the impacts associated with build-out of the Specific Plan with regard to flood hazards and stormwater conveyance, and mitigation measures related to these criteria are incorporated into this EIS/EIR. Since flood hazards and stormwater conveyance associated with the Specific Plan are addressed by the previously incorporated Specific Plan Mitigation Measures SP-4.2-1 (compliance with LADPW flood control requirements), SP-4.2-4 (obtaining CLOMRs following construction of drainage facilities), SP-4.2-5 (DPW plan and map approvals), and SP-4.2-8 (DPW SUSMP and SWPPP requirements), the indirect RMDP impacts are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

SCP Indirect Impacts. Implementation of the Alternative 5 would facilitate County-approved developments on the Specific Plan site and Entrada planning area. The Newhall Ranch Specific Plan Program EIR described in detail the impacts associated with build-out of the Specific Plan with regard to flood hazards and stormwater conveyance, and mitigation related to these criteria are incorporated into this EIS/EIR. Impacts related to hydrology and flooding associated with build-out of the Entrada planning area were incorporated into the hydraulic model that was used to evaluate direct and indirect impacts. The existing conveyance facility from the Entrada planning area boundary to the Santa Clara River may not currently be sized to accommodate the flows that would likely result from the proposed (but not yet approved) development in the Entrada planning area. Accordingly, the existing drainage infrastructure would need to be re-designed to accommodate the increase in flows prior to implementation of the Entrada development. The proposed drainage infrastructure would be designed to comply with DPW criteria and would require DPW review and approval prior to construction. Since flood hazards and stormwater conveyance associated with these projects are captured in the hydrologic and hydraulic modeling used in the impact analysis for direct and indirect impacts and are addressed through the incorporation of mitigation measures, the indirect SCP impacts for Alternative 5 are considered adverse, but less than significant. relative to Significance Criteria 1 and 2

4.1.6.6.3 Secondary Impacts

RMDP Secondary Impacts. Increases in the transport and deposition of debris from the Project area could result in secondary flood hazards downstream. Debris within the Project area would be captured in debris basins that are designed in accordance with DPW requirements and would require DPW review and approval prior to construction. In addition, the basins would incorporate the project design features described in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008), which were developed to balance runoff and sediment loading to Project tributaries and the Santa Clara River. Since the debris basins would be designed in accordance with the DPW requirements and would incorporate additional features to enhance the management of debris, the secondary impacts of the RMDP are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

SCP Secondary Impacts. The SCP areas would remain preserved and are not expected to affect existing levels of sediment and debris runoff. Any debris that may be generated from the SCP areas would be adequately handled by the RMDP improvements, and thus, would not contribute to downstream flooding hazards. Therefore, the secondary impacts of the SCP are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

4.1.6.7 Impacts of Alternative 6 (Elimination of Planned Commerce Center Drive Bridge and Maximum Spineflower Expansion/Connectivity)

Alternative 6 would involve the construction of buried bank stabilization along approximately half of the north bank and one-third of the south bank of the Santa Clara River within the RMDP area, mostly in upland areas, as shown in **Figure 3.0-25**. This alternative also would involve the construction of two bridges across the River: one at the mouth of Potrero Canyon and one at the mouth of Long Canyon. The previously authorized bridge at Commerce Center Drive would not be constructed under this alternative. In total, Alternative 6 would require the placement of 26,076 linear feet of buried bank stabilization and two new bridges within the Santa Clara River Corridor, as compared to the 29,779 linear feet of buried bank stabilization and three new bridges to be constructed under Alternative 2. In addition, a WRP outfall to the Santa Clara River would be constructed. It would not be necessary to construct any grade stabilizer structures within the River.

A summary of the RMDP infrastructure components under Alternative 6 is presented in **Table 4.1-14**, and **Figures 4.1-25** and **4.1-26** show the RMDP components under Alternative 6.

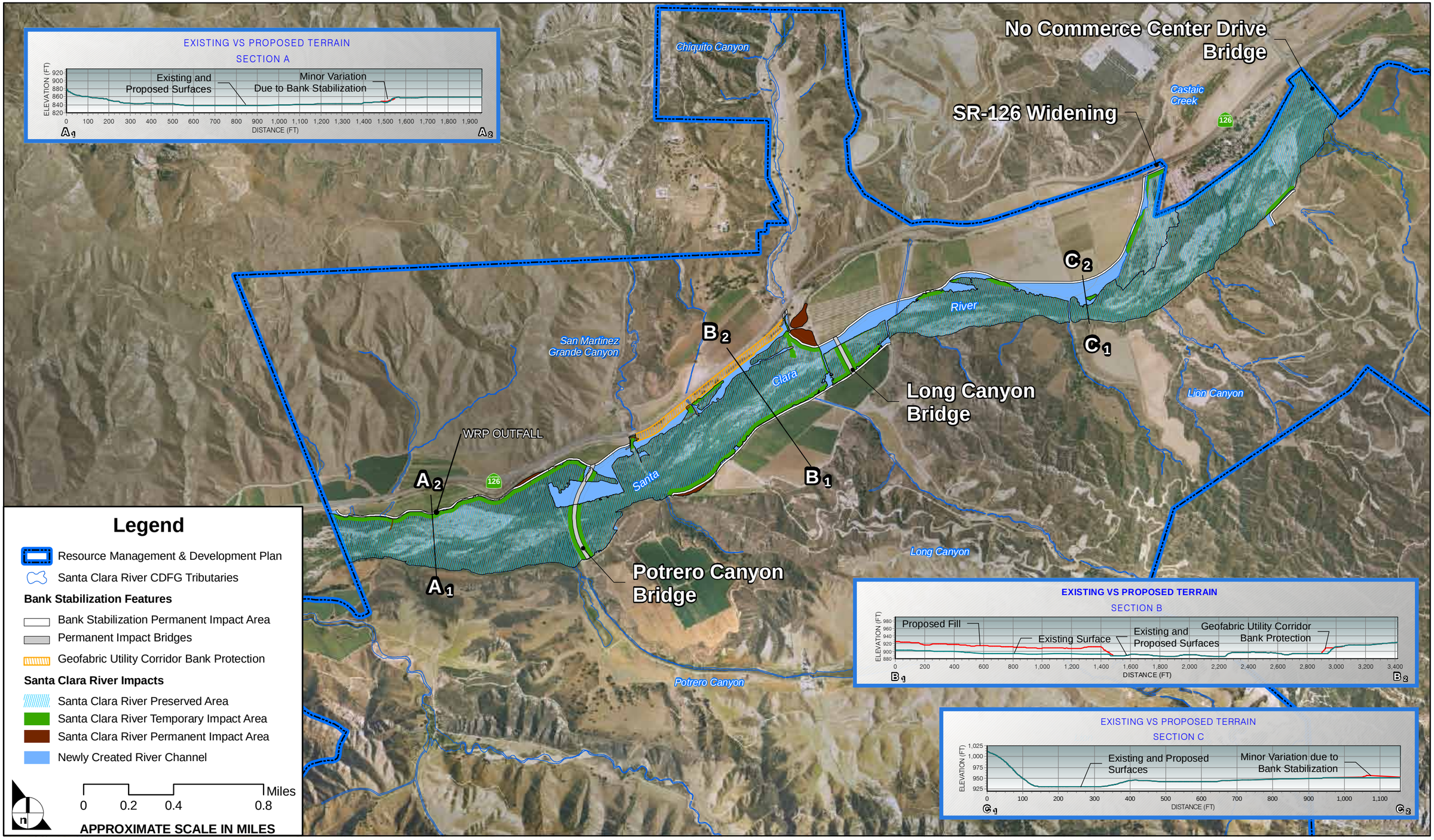
Table 4.1-14
RMDP Infrastructure Components: Alternative 6

Location	Bank Stabilization (Linear Feet)	Drainage Converted to Buried Storm Drain (Linear Feet)	Grade Stabilizer Structures	New/Widened Bridges and Road Crossings
Santa Clara River	**26,076**	**0**	**0**	**2**
Major Tributaries				
Chiquito Canyon	13,519	2,463	14	3
San Martinez Grande Canyon	4,455	0	6	2
Long Canyon	7,921	961	17	3
Potrero Canyon	47,516	1,012	123	7
Lion Canyon	0	6,316	27	1
Minor Tributaries				
Salt Creek Canyon	1,992[1]	0	0	0
Agricultural Ditch	0	1,479	0	0
Ayers Canyon	0	0	0	1
Dead-End Canyon	0	939	0	0
Exxon Canyon	0	1,276	0	0
Homestead Canyon	0	609	0	0
Humble Canyon	0	388	0	0
Middle Canyon	0	3,209	0	0
Mid-Martinez Canyon	0	4,541	0	0
Off-Haul Canyon	0	7,593	0	0
Magic Mountain Canyon	0	6,111	0	0
Unnamed Canyon 1 (Entrada)	0	4,647	0	0
Unnamed Canyon 2 (Entrada)	0	384	0	0
Unnamed Canyon A	0	0	0	0
Unnamed Canyon B	0	1,004	0	0
Unnamed Canyon C	0	402	0	0
Unnamed Canyon D	0	0	0	0
Alternative Total in Tributaries	**75,402**	**43,334**	**187**	**17**

Notes:

[1] No fill within the U.S. Army Corps of Engineers jurisdictional area will occur within Salt Canyon, except for habitat restoration and enhancement throughout the watershed.

Source: RMDP, 2008.

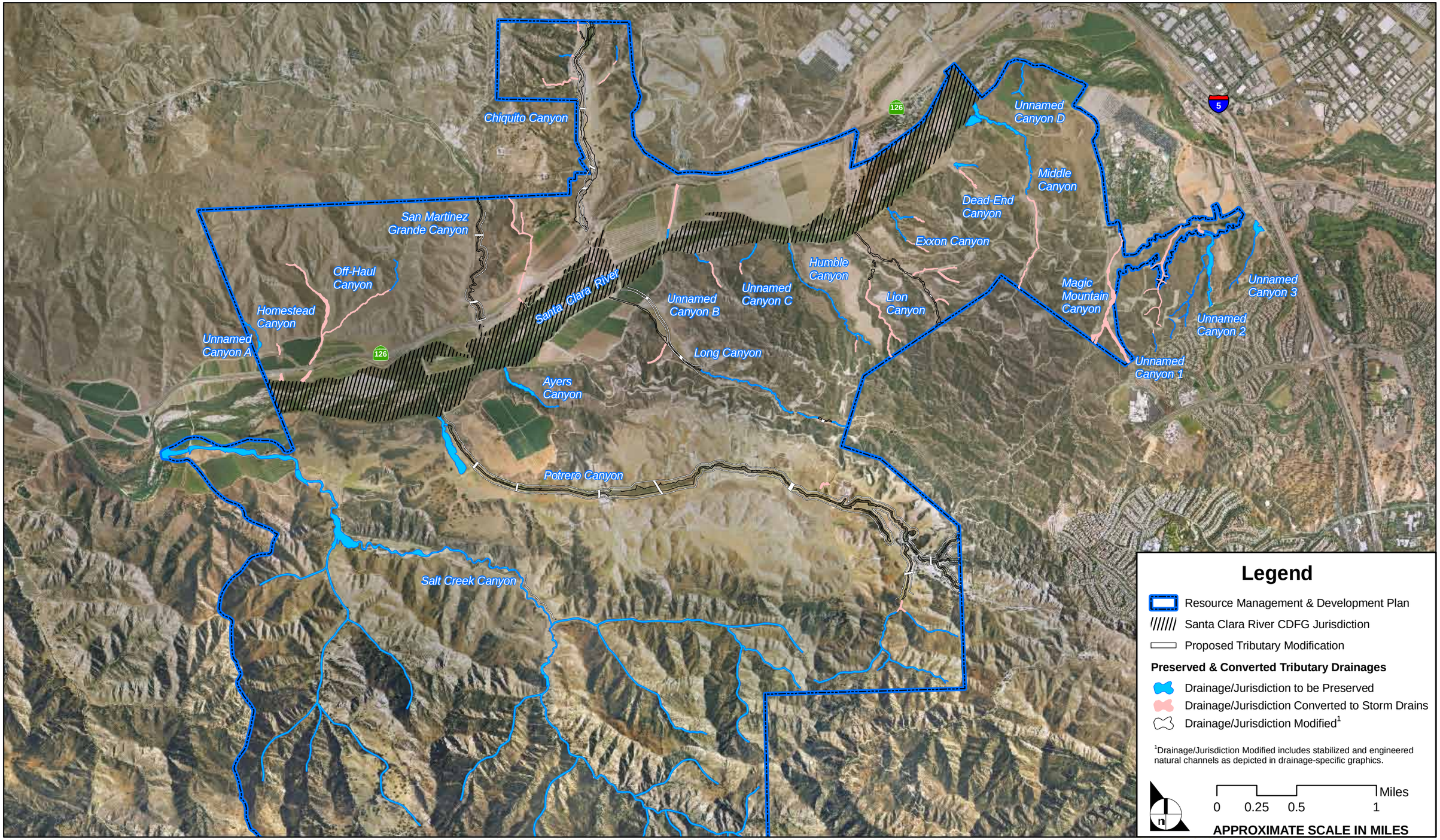


SOURCE: PACE 2008

FIGURE 4.1-25

ALTERNATIVE 6 PROPOSED RMDP
SANTA CLARA RIVER FEATURES

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-25_SCRMajorFeaturesAlt6RMDP_PC1_043008.mxd



SOURCE: PACE - April 2008

FIGURE 4.1-26

ALTERNATIVE 6
MODIFIED, CONVERTED, AND PRESERVED TRIBUTARY DRAINAGES

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-26_ModifiedConvertedPreservedTributaryDrainageTreatmentsAlt6_PC1_050108.mxd

Alternative 6 also would involve the designation of a total of 891.1 acres of spineflower preserves, as compared to 167.6 acres under Alternative 2. If this alternative is implemented, a total of 101,479 linear feet of bank stabilization (as compared to 105,207 linear feet under Alternative 2), 187 grade stabilizer structures (as compared to 189 under Alternative 2), and 19 new bridge/culvert road crossings (one more than proposed under Alternative 2) would be constructed on Newhall Ranch. No nature viewing platforms or associated walkways along the northern portion of the Santa Clara River would be provided by this alternative. Alternative 6 would require 43,334 linear feet of ephemeral and intermittent drainages to be replaced with buried storm drains, as compared to 59,845 linear feet under Alternative 2, to accommodate the creation of building pads.

Implementation of Alternative 6 would result in approximately 556 less acres of developable area as compared to the proposed Project due to preservation of streams and riparian areas and designation of spineflower preserves. No development would be facilitated on the VCC planning area under this alternative.

There are five major tributary drainages that would be partially regraded or modified, but remain in soft bottom channel conditions: Chiquito Canyon; San Martinez Grande Canyon; Potrero Canyon; Long Canyon; and Lion Canyon. Significant portions of several small, tributary drainages would be graded and replaced with storm drains or other appropriate conveyance facilities, including: Magic Mountain Canyon; Middle Canyon; Dead-End Canyon; Exxon Canyon; Mid-Martinez Canyon; Off-Haul Canyon; Homestead Canyon; the Chiquito Canyon agricultural ditch; Unnamed Canyon B; Unnamed Canyon C; Unnamed Canyon 1; and Unnamed Canyon 2 drainages.

Chiquito Canyon. In Chiquito Canyon, Alternative 6 would require the construction of 13,519 linear feet of bank stabilization, 14 grade stabilizer structures, and three new bridge/culvert road crossings. (See **Figure 4.1-14**.)

San Martinez Grande Canyon. Implementation of Alternative 6 would require only minimal construction within the San Martinez Grande Canyon drainage. Bank stabilization would be constructed in upland areas along approximately one-fourth of the west bank and three-fourths of the east bank, and six grade stabilizer structure would be installed. Two new bridge/culvert road crossings would cross the drainage approximately one-third of a mile downstream of the northern Project area boundary and immediately upstream of SR-126. In San Martinez Grande Canyon, this alternative would require the placement of 4,455 linear feet of buried soil cement bank stabilization, one grade stabilizer structure, and two new bridge. (See **Figure 4.1-27**.)

Long Canyon. This alternative would not involve the construction of any drainage facilities within the upper half of the Long Canyon drainage within the Project area. The lower one-fourth of the existing drainage would be filled, and the stream would be relocated to the north and lined with buried bank stabilization. Two new bridge/culvert road crossings would cross the drainage within one-half mile of the canyon mouth, and another would be installed approximately one-quarter mile downstream of the Project area boundary. Alternative 6 would involve the placement of 7,921 linear feet of buried bank stabilization, 17 grade stabilizer structures, and three new bridge/culvert road crossings in Long Canyon.

In addition, approximately 961 linear feet of existing drainage would be converted to buried storm drain. (See **Figure 4.1-28**.)

Potrero Canyon. If Alternative 6 is implemented, the Potrero Canyon drainage would be stabilized with buried soil cement installed in upland areas along the full length of both banks between the mouth and the eastern boundary of Newhall Ranch. However, the mesic meadow area at the mouth of Potrero Canyon would remain unstabilized on the west side. Four new bridge/culvert road crossings would be constructed at approximately even intervals between the upstream end of the mesic meadow and the upstream end of the saltgrass meadow. An additional three bridges or road crossings would be installed in the upstream portion of the drainage, two on the mainstem and one crossing the Via Canyon tributary. Alternative 6 would involve the placement of 47,516 linear feet of buried soil cement and seven new bridge/culvert road crossings within Potrero Canyon. In addition, 1,012 linear feet of existing drainage would be converted to buried storm drain. (See **Figure 4.1-29**.)

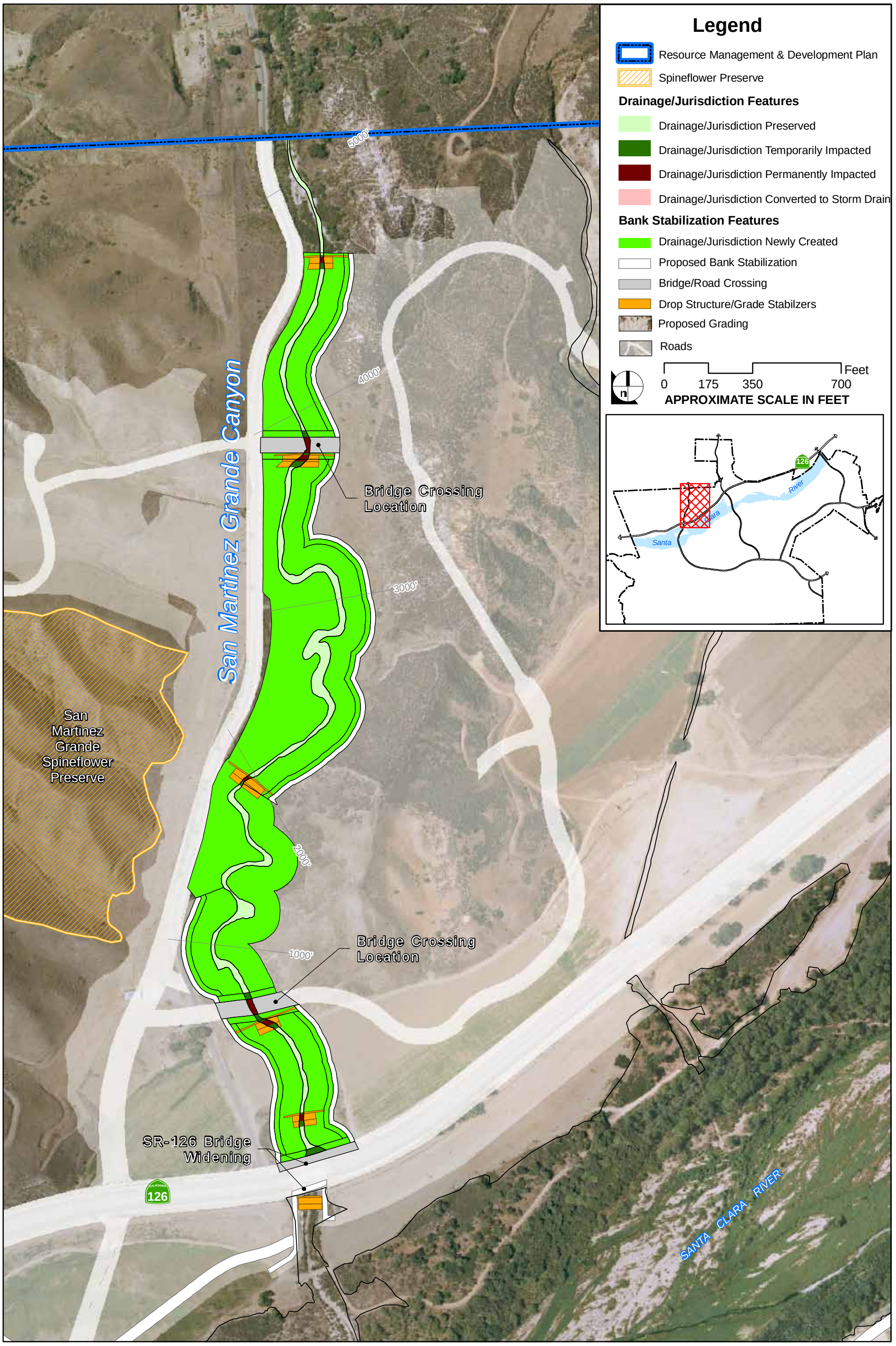
Lion Canyon. Alternative 6 includes the placement of one new bridge/culvert road crossing in Lion Canyon and the conversion of 6,316 linear feet of the existing Lion Canyon drainage to buried storm drains. The design also involves the installation of 27 grade stabilizer structures. Regarding flooding and stormwater conveyance, Alternative 6 will be designed to convey the 100-year and capital flood runoff events in compliance with DPW requirements and will include project design features to minimize flood hazards as specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008). (See **Figure 4.1-11**.)

Minor Tributaries and Drainages. Approximately 32,583 linear feet of existing channel would be converted to buried storm drain. In addition, the existing six-lane bridge allowing SR-126 to cross the Castaic Creek drainage would be expanded to eight lanes.

4.1.6.7.1 Direct Impacts

RMDP Direct Impacts.

Santa Clara River. Alternative 6 would include 26,076 linear feet of bank stabilization, no buried storm drains, no grade stabilizer structures, and one less bridge than Alternative 2. Other facilities and improvements within and along the River include the WRP outfall; buried bank stabilization; bridge abutments and piers; drainage outlets; and energy dissipaters. In addition, activities such as facility maintenance and habitat enhancement would be conducted within and along the River under Alternative 6.



SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-27

SAN MARTINEZ GRANDE CANYON DETAIL - ALTERNATIVE 6
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-27_SanMartinezAlternative6_PC1_042908.mxd

SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-28

LONG CANYON ALTERNATIVE DETAIL - ALTERNATIVE 6
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-28_LongAlternative6_PC1_042908.mxd

SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-29

POTRERO CANYON ALTERNATIVE DETAIL - ALTERNATIVE 6
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-29_PotreroAlternative6_PC1_043009.mxd

As shown in **Table 4.1-15**, the RMDP infrastructure associated with Alternative 6 would alter the existing boundary of the Santa Clara River floodplain throughout the Project area.

Table 4.1-15
Changes in Floodplain Area, Alternative 6

Year Event	Existing Floodplain Area (acres)	Alternative 2 Floodplain Area (acres)	Alternative 6 Floodplain Area (acres)	Change relative to Alt. 2 (acres)	% Change relative to Alt. 2 (acres)
2-year	447.6	447.8	447.7	-0.1	-0.02%
5-Year	598.4	599.5	599.6	0.1	0.02%
10-Year	720.1	717.2	715.3	-1.9	-0.3%
20-Year	999.0	928.5	921.6	-6.9	-0.7%
50-Year	1294.2	1161.7	1172.2	10.5	0.9%
100-Year	1407.6	1283.8	1265.3	-18.5	-1.4%

Source: PACE, 2008A.

Alternative 6 would result in an increase in floodplain area relative to Alternative 2 for the 5- and 50-year recurrence interval flow events and a decrease in floodplain area relative to Alternative 2 for the 2-, 10-, 20-, and 100-year recurrence interval flow events. In comparison to existing conditions, there would be reductions in floodplain acreages for the 10- through 100-year storm events as River flows would be impacted by proposed RMDP infrastructure that would reduce the area of the estimated floodplain during these less frequent, larger flood events. To prevent flooding, Alternative 6 would include bank stabilization that is designed to contain and convey the FEMA 100-year flood event and the DPW capital flood event. Implementation of Alternative 6 would include the submittal and approval of a CLOMR to FEMA to account for the modified floodplain area and approval of a revised capital floodplain area from DPW.

Based on the hydraulic model results (PACE, 2008A), the Alternative 6 RMDP infrastructure would not be subjected to significant flooding impacts and would not result in significant risk of loss, injury or death to people in the Project area. Therefore, the impacts associated with Alternative 6 are considered adverse, but less than significant relative to Significance Criterion 1.

The proposed improvements do not impact storm flows in the Santa Clara River because these improvements are designed to accommodate the flows associated with the 2-, 5-, 10-, 20-, 50-, and 100-year floods events under the proposed conditions for Alternative 6. In addition, no storm flows are diverted from or to the River as a result of the Project, and no drainage tributary to the River would be prevented from flowing to the River in the proposed Project condition. Therefore, the impacts associated with Alternative 6 are considered adverse, but less than significant relative to Significance Criterion 2.

Major Tributaries. There are five major tributary drainages that would be partially regraded or modified, but remain in soft bottom channel conditions: Potrero Canyon; Long Canyon; Lion Canyon; Chiquito Canyon; and San Martinez Grande Canyon. All of these tributary drainages would either be

protected or designed to accommodate any modifications to the existing hydrology as a result of Specific Plan build-out. The proposed improvements under Alternative 6 are shown in **Figure 4.1-25** and a description of the impacts to the major tributaries associated with Alternative 6 is provided below.

Runoff within the major tributaries would be conveyed through both engineered, soft bottom channels and underground stormwater conveyance infrastructure. Regarding flooding and flood hazards, the engineered channels would be designed to contain and convey the flows from a 100-year storm event and the DPW capital flood event in accordance with County regulations. The adequacy of the final channel flow capacity would be assessed by DPW during Village-level review. For approval, the final channel design must meet the requirements of the DPW sedimentation manual. The hydraulic modeling and calculations supporting the final channel design would incorporate the required freeboard and an acceptable factor of safety to prevent impacts from overtopping and flooding. In addition, where appropriate, implementation of Alternative 6 would include approval of a CLOMR from FEMA and approval of a revised capital floodplain area from DPW.

Since the engineered channels would be designed to convey the 100-year and capital flood events, Alternative 6 would not create a flooding hazard and would not result in significant risk of loss, injury or death to people in the Project area. Therefore, the impacts associated with Alternative 6 are considered adverse, but less than significant relative to Significance Criterion 1.

As indicated above, runoff within the major tributaries would be conveyed through both engineered, soft bottom channels and underground stormwater conveyance infrastructure. The engineered channels would be designed to convey both the 100-year and capital flood events in accordance with DPW requirements. Regarding the underground stormwater conveyance infrastructure, the design of these storm drains would comply with DPW requirements for "Storm Drains and Urban Flood Protection" and would incorporate project design features specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008) to minimize flood hazards. The final design of storm drains would be evaluated and approved by DPW during Village-level review. Final design would be compliant with DPW requirements for storm drains and urban flood protection (DPW Hydrology Manual, 1991).

Since the engineered channels would be designed to convey the 100-year and capital flood events and the underground storm water conveyance infrastructure would be designed in compliance with DPW requirements, the impacts associated Alternative 6 are considered adverse, but less than significant relative to Significance Criterion 2.

Minor Tributaries. The Project proposes grading within several of the minor tributaries to accommodate pads for residential and commercial buildings and that the drainage flows be conveyed by buried storm drains varying in diameter from 30 to 144 inches, as shown in **Figure 4.1-26**. The stormwater drainage infrastructure associated with these drainages would be designed to comply with DPW requirements for "Storm Drains and Urban Flood Protection" and would incorporate the project design features outlined in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008). Accordingly, the impacts associated with Alternative 6 are considered adverse, but less than significant relative to Significance Criterion 2.

Salt Creek Canyon. The Specific Plan includes a Visitor Serving land use designation, which allows for an access point to the High Country SMA/SEA 20. Approximately 1,992 feet of bank protection in non-jurisdictional uplands would be installed in conjunction with development of approved Visitor Serving uses as described in the Specific Plan. Any potential impacts would be limited in nature and related to access and recreational use of the High Country, and might include footbridges and maintenance of existing farm roads. Accordingly, the flood hazard and stormwater runoff impacts are considered adverse, but less than significant for this Specific Plan component relative to Significance Criteria 1 and 2.

SCP Direct Impacts. The SCP component of the proposed Project would reduce the developable area of the proposed Project since no development would occur in the SCP areas. The decrease in developed area would result in a slight decrease in impermeable area overall and a slight reduction in surface runoff. However, the decrease in runoff volume would be minor compared to the overall contributions from the tributary watersheds, so the runoff from the SCP has the same or approximate characteristics as runoff from the natural drainage. In addition, all of the SCP areas are located outside of the Santa Clara River 100-year floodplain, so the SCP would not affect flood control. Based on this information, the impacts associated with the SCP for Alternative 6 relative to Significance Criteria 1 and 2 are considered adverse, but less than significant since it would not impact flooding or storm flows in the river or tributaries.

4.1.6.7.2 Indirect Impacts

RMDP Indirect Impacts. Implementation of the proposed RMDP would facilitate County-approved development of the Specific Plan; and, therefore, the impacts associated with the Specific Plan would be indirect impacts. The Newhall Ranch Specific Plan Program EIR described in detail the impacts associated with build-out of the Specific Plan with regard to flood hazards and stormwater conveyance and mitigation measures related to these criteria are incorporated into this EIS/EIR. Since flood hazards and stormwater conveyance associated with the Specific Plan are addressed by the previously incorporated Specific Plan Mitigation Measures SP-4.2-1 (compliance with LADPW flood control requirements), SP-4.2-4 (obtaining CLOMRs following construction of drainage facilities), SP-4.2-5 (DPW plan and map approvals), and SP-4.2-8 (DPW SUSMP and SWPPP requirements), the indirect RMDP impacts under Alternative 6 are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

SCP Indirect Impacts. Implementation of Alternative 6 would facilitate County-approved developments on the Specific Plan site and the Entrada planning area, and build-out of the areas would result in indirect impacts. The Newhall Ranch Specific Plan Program EIR described in detail the impacts associated with the build-out of the Specific Plan with regard to flood hazards and stormwater conveyance, and mitigation related to these criteria are incorporated into this EIS/EIR. The Entrada project was incorporated into the hydraulic model that was used to evaluate direct and indirect impacts. The existing conveyance facility from the Entrada planning area boundary to the Santa Clara River may not currently be sized to accommodate the flows that would likely result from the proposed (but not yet approved) development in the Entrada planning area. Accordingly, the existing drainage infrastructure would need to be re-designed to accommodate the increase in flows prior to implementation of the Entrada development. The proposed drainage infrastructure would be designed to comply with DPW criteria and would require DPW review and approval prior to construction. Since flood hazards and stormwater conveyance associated with these

projects are captured in the hydrologic and hydraulic modeling used in the impact analysis for direct and indirect impacts and are addressed through the incorporation of mitigation measures, the indirect SCP impacts for Alternative 6 are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

4.1.6.7.3 Secondary Impacts

RMDP Secondary Impacts. Increases in the transport and deposition of debris from the Project area could result in secondary flood hazards downstream. Debris within the Project area would be captured in debris basins that are designed in accordance with DPW requirements and would require DPW review and approval prior to construction. In addition, the basins would incorporate the project design features described in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008), which were developed to balance runoff and sediment loading to Project tributaries and the Santa Clara River. Since the debris basins would be designed in accordance with the DPW requirements and would incorporate additional features to enhance the management of debris, the secondary impacts of the RMDP are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

SCP Secondary Impacts. The SCP areas would remain preserved and are not expected to affect existing levels of sediment and debris runoff. Any debris that may be generated from the SCP areas would be adequately handled by the RMDP improvements, and thus, would not contribute to downstream flooding hazards. Therefore, the secondary impacts of the SCP are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

4.1.6.8 Impacts of Alternative 7 (Avoidance of 100-Year Floodplain, Elimination of Two Planned Bridges, and Avoidance of Spineflower)

Alternative 7 would preserve the Corps' jurisdictional areas along the Santa Clara River and within the Potrero Canyon, Long Canyon, Chiquito Canyon, and San Martinez Grande Canyon drainages. Except for bridges to facilitate road crossings, no structures would be constructed in jurisdictional areas within these canyons. Bank protection, which would still be required to protect the Specific Plan development from flooding and erosion, would be constructed in upland areas. This alternative would involve the creation of pads for residential and commercial buildings, and would require 19,330 linear feet of ephemeral drainages within the Project area to be graded and converted to buried storm drains, as compared to 59,845 linear feet of buried storm drains under Alternative 2. One bridge would be constructed across the Santa Clara River at the mouth of Long Canyon. In addition, a WRP outfall to the Santa Clara River would be constructed.

If this alternative is implemented, a total of 144,911 linear feet of bank stabilization (as compared to 105,207 linear feet under Alternative 2), no grade stabilizer structures (as compared to 189 under Alternative 2), and 19 new bridge/culvert road crossings (one more than proposed under Alternative 2) would be constructed on Newhall Ranch. No nature viewing platforms or associated walkways along the northern portion of the Santa Clara River would be provided by this alternative. Alternative 7 would require 19,330 linear feet of ephemeral and intermittent drainages to be replaced with buried storm drains, as compared to 59,845 linear feet under Alternative 2, to accommodate the creation of building pads.

A summary of the RMDP infrastructure components under Alternative 7 is presented in **Table 4.1-16**, and **Figures 4.1-30** and **4.1-31** show the RMDP components under Alternative 7.

Alternative 7 also would involve the designation of a total of 660.6 acres of spineflower preserves, as compared to 167.6 acres under Alternative 2.

Except for bridges to facilitate road crossings, no structures would be constructed in jurisdictional areas within the mainstem drainages of Chiquito Canyon, San Martinez Grande Canyon, Potrero Canyon, Long Canyon, or Lion Canyon. Portions of several small, tributary drainages would be graded and replaced with storm drains or other appropriate conveyance facilities, including: Middle Canyon; Dead-End Canyon; Exxon Canyon; Mid-Martinez Canyon; Off-Haul Canyon; Homestead Canyon; the Chiquito Canyon agricultural ditch; Unnamed Canyon B; Unnamed Canyon C; Unnamed Canyon 1; and Unnamed Canyon 2 drainages.

Chiquito Canyon. The west bank of Chiquito Canyon would remain unstabilized, with the exception of the area within 1,000 feet of the mouth. On the east bank, Alternative 7 would include stabilization in upland areas along the entire length of the drainage except for a 1,000-foot section at the northern Project area boundary. Three bridge/culvert road crossings would cross the Chiquito Canyon drainage under this alternative, and would be located approximately 2,000, 2500, and 5,000 feet upstream of the Santa Clara River confluence. In addition, the existing two-lane bridge allowing SR-126 to cross the drainage would be widened to four lanes. A total of 7,454 linear feet of buried bank stabilization would be constructed within Chiquito Canyon. In addition, approximately 192 linear feet of existing drainage within the Chiquito minor drainages would be converted to buried stormdrain. (See **Figure 4.1-32**.)

San Martinez Grande Canyon. In San Martinez Grande Canyon, buried bank stabilization would be installed in upland areas along the lower one-third of the west bank and approximately two-thirds of the east bank. A total of 4,382 linear feet of buried bank stabilization would be constructed in San Martinez Grande Canyon under Alternative 7. One new bridge/culvert road crossing would cross the drainage approximately two-thirds of the way up from the mouth of the canyon to the northern boundary of Newhall Ranch, and another would be installed just upstream of SR-126. (See **Figure 4.1-33**.)

Long Canyon. In Long Canyon, buried soil cement would be installed in upland areas along the full length of both banks between the mouth and the eastern Newhall Ranch boundary. The total length of stabilization installed would be 19,671 linear feet. Two bridge/culvert road crossings would cross the drainage, approximately 2,000 feet upstream of the Santa Clara River confluence and approximately 1,000 feet downstream of the eastern boundary of Newhall Ranch. In addition, approximately 961 linear feet of existing drainage would be converted to buried storm drain. (See **Figure 4.1-34**.)

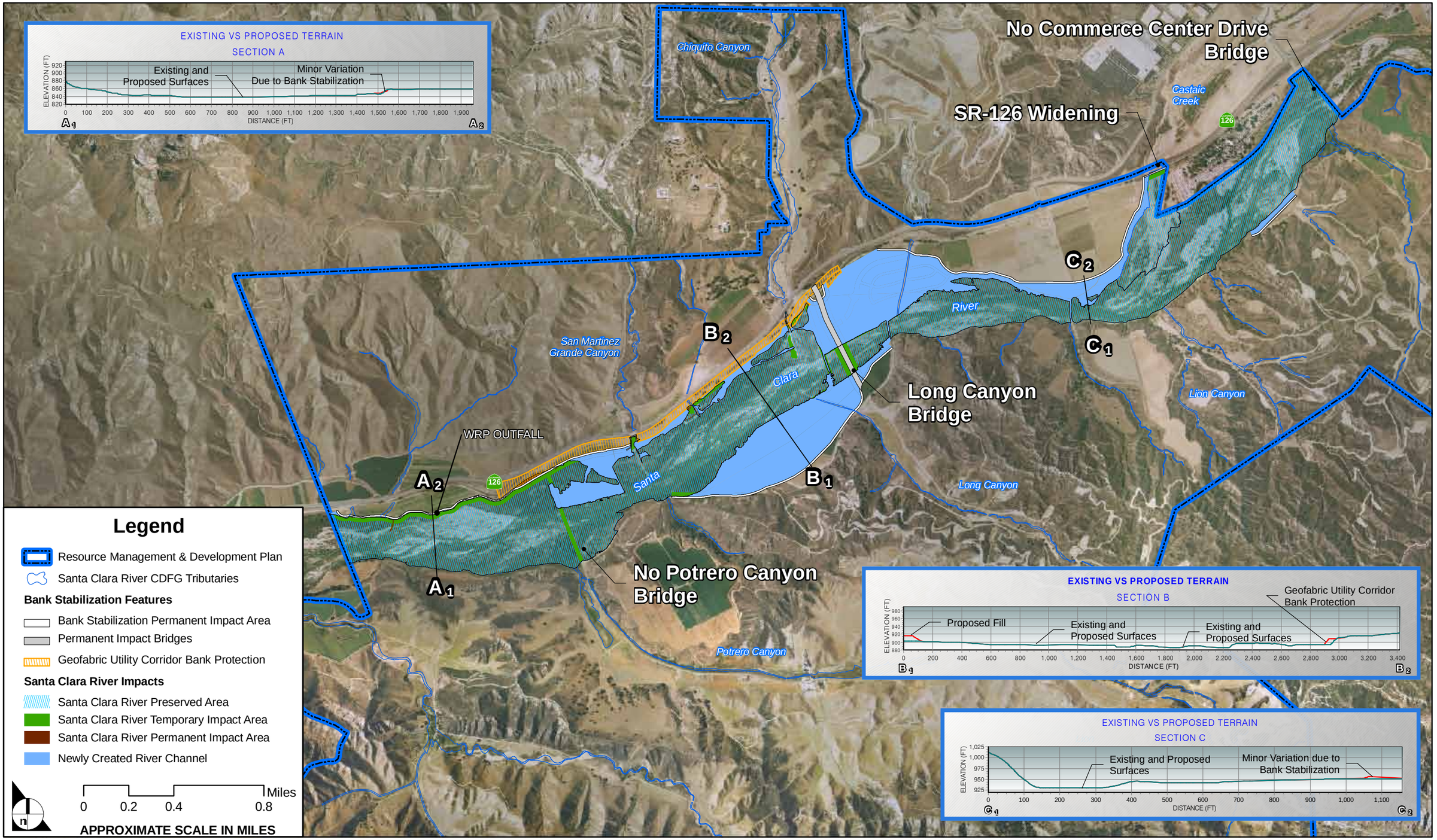
Table 4.1-16
RMDP Infrastructure Components: Alternative 7

Location	Bank Stabilization (Linear Feet)	Drainage Converted to Buried Storm Drain (Linear Feet)	Grade Stabilizer Structures	New/Widened Bridges and Road Crossings
Santa Clara River	**25,514**	**0**	**0**	**1**
Major Tributaries				
Chiquito Canyon	7,454	192	0	3
San Martinez Grande Canyon	4,382	0	0	2
Long Canyon	19,671	961	0	2
Potrero Canyon	48,636	1,121	0	7
Lion Canyon	3,837	0	0	4
Minor Tributaries				
Salt Creek Canyon	1,992[1]	0	0	0
Agricultural Ditch	0	297	0	0
Ayers Canyon	0	0	0	0
Dead-End Canyon	0	928	0	0
Exxon Canyon	0	1,276	0	0
Homestead Canyon	0	609	0	0
Humble Canyon	0	325	0	0
Middle Canyon	0	0	0	0
Mid-Martinez Canyon	0	4,541	0	0
Off-Haul Canyon	0	2,611	0	0
Magic Mountain Canyon	0	0	0	0
Unnamed Canyon 1 (Entrada)	0	4,647	0	0
Unnamed Canyon 2 (Entrada)	0	416	0	0
Unnamed Canyon A	0	0	0	0
Unnamed Canyon B	0	1,004	0	0
Unnamed Canyon C	0	402	0	0
Unnamed Canyon D	0	0	0	0
Alternative Total in Tributaries	**85,971**	**19,330**	**0**	**18**

Notes:

[1] No fill within the U.S. Army Corps of Engineers jurisdictional area will occur within Salt Canyon, except for habitat restoration and enhancement throughout the watershed.

Source: RMDP, 2008.

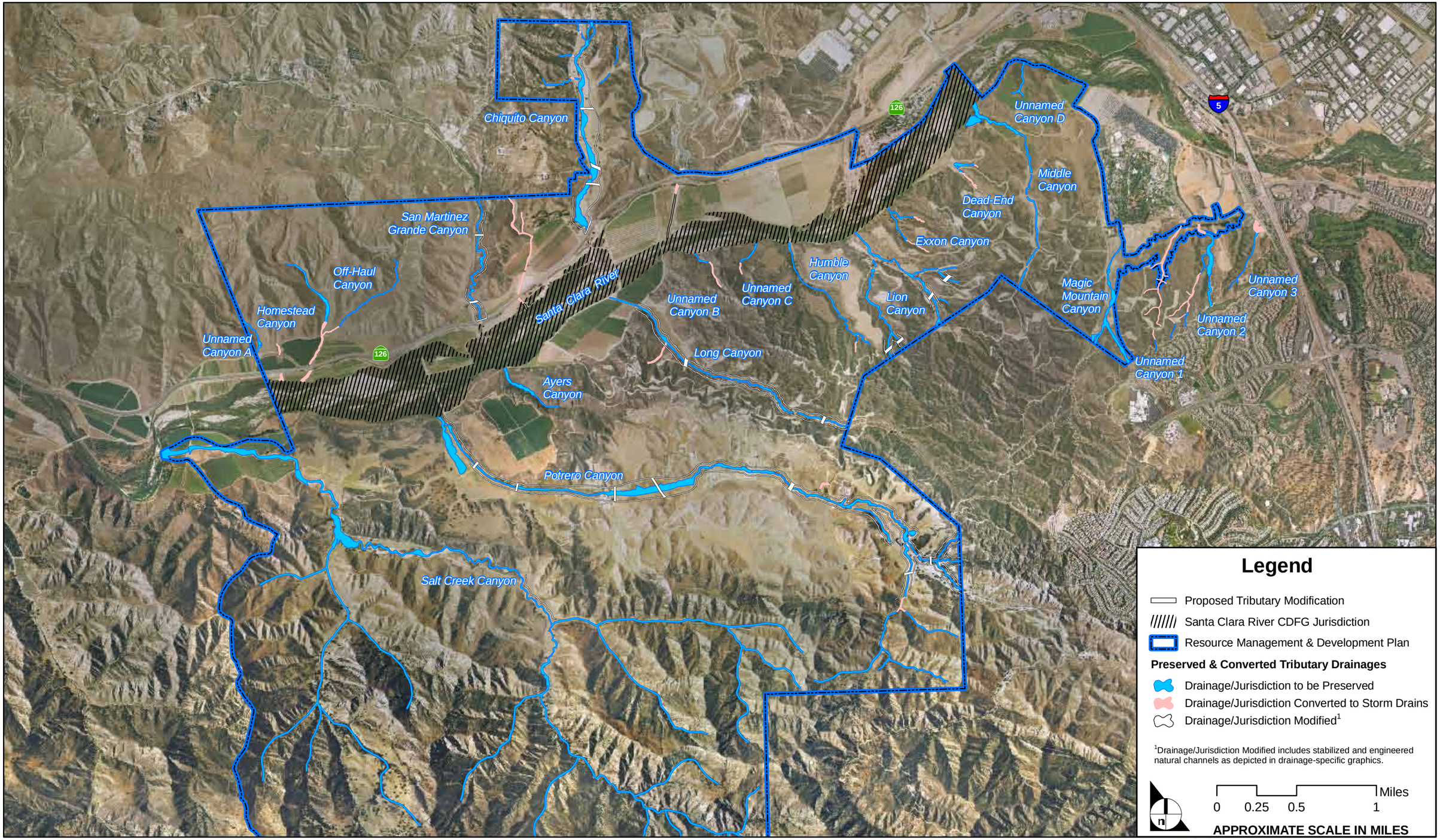


SOURCE: PACE 2008

FIGURE 4.1-30

ALTERNATIVE 7 PROPOSED RMDP
SANTA CLARA RIVER FEATURES

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-30_SCRMajorFeaturesAlt7RMDP_PC1_043008.mxd

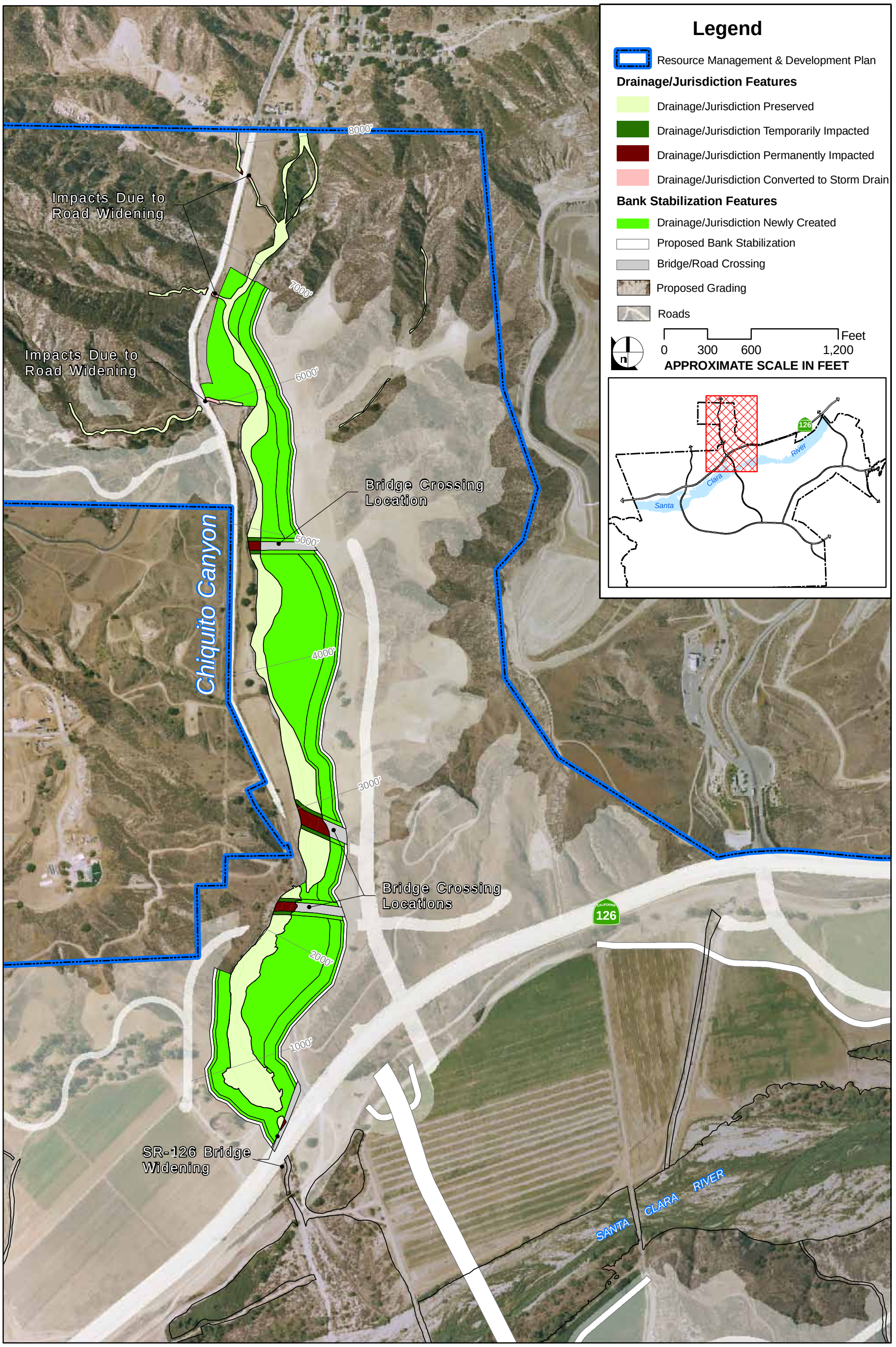


SOURCE: PACE - April 2008

FIGURE 4.1-31

ALTERNATIVE 7
MODIFIED, CONVERTED, AND PRESERVED TRIBUTARY DRAINAGES

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-31_ModifiedConvertedPreservedTributaryDrainageTreatmentsAlt7_PC1_050108.mxd



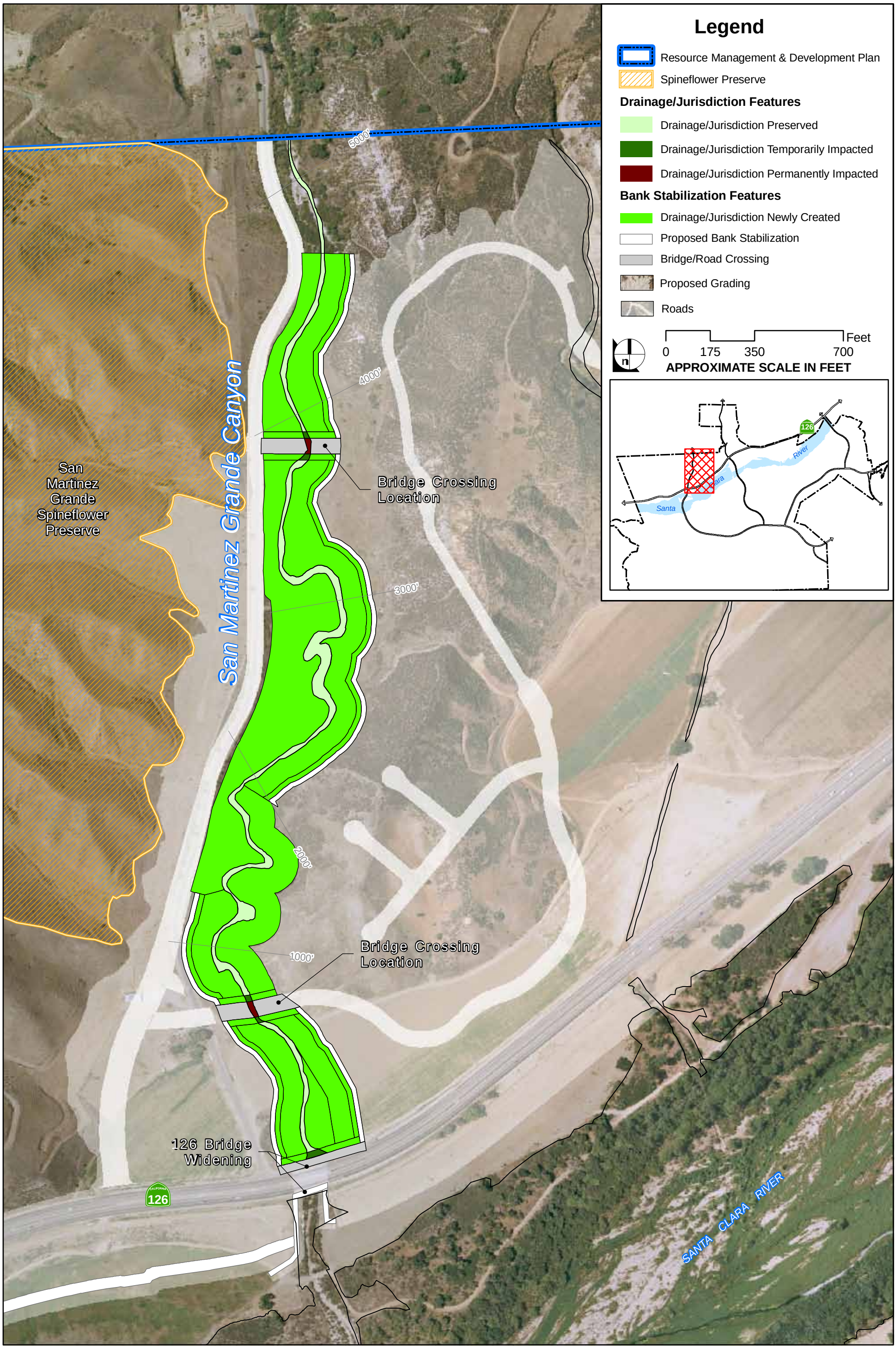
SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-32

CHIQUITO CANYON ALTERNATIVE DETAIL - ALTERNATIVE 7
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-32_ChiquitoAlternative7_PC1_042908.mxd



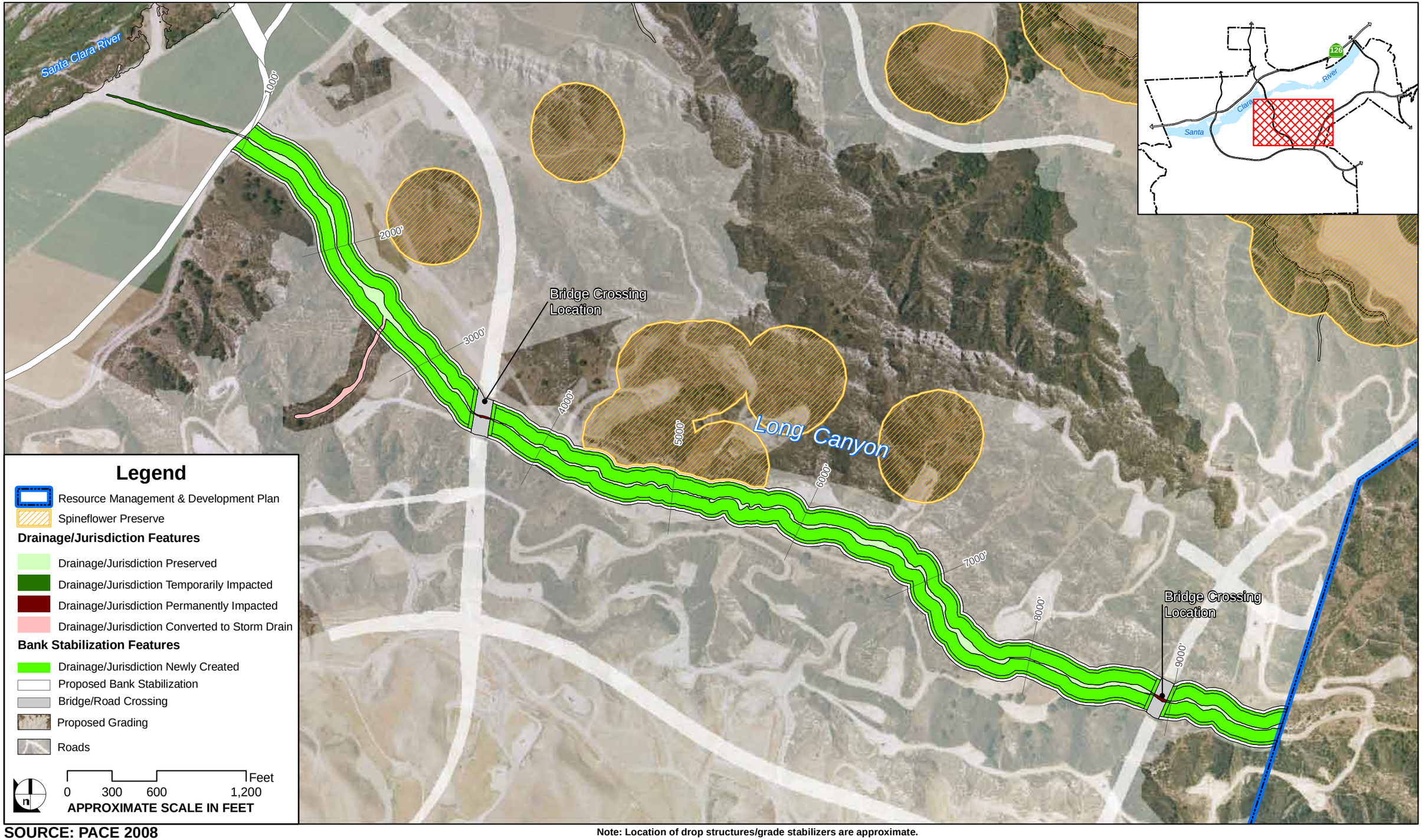
SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-33

SAN MARTINEZ GRANDE CANYON ALTERNATIVE DETAIL - ALTERNATIVE 7
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-33_SanMartinezAlternative7_PC1_042908.mxd



SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-34

LONG CANYON ALTERNATIVE DETAIL - ALTERNATIVE 7
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-34_LongAlternative7_PC1_042908.mxd

Potrero Canyon. If Alternative 7 is implemented, the Potrero Canyon drainage would be stabilized with buried soil cement installed in upland areas along the full length of the north/east bank between the mouth and the eastern boundary of Newhall Ranch. The south/west bank would be similarly stabilized, but the mesic meadow area at the mouth of Potrero Canyon would not have bank protection installed on the west side. In total, Alternative 7 would involve the placement of 48,636 linear feet of buried soil cement in upland areas within Potrero Canyon. Seven bridge/culvert road crossings would be constructed across this drainage and approximately 1,121 linear feet of existing drainage would be converted to buried storm drain. (See **Figure 4.1-35**.)

Lion Canyon. Alternative 7 includes four bridge/culvert crossings that would be constructed across the three forks of the Lion Canyon drainage, one across the east fork, two across the middle fork, and one across the west fork. In addition, a total of 3,837 linear feet of buried bank stabilization would be constructed within Lion Canyon. Regarding flooding and stormwater conveyance, Alternative 7 will be designed to convey the 100-year and capital flood runoff events in compliance with DPW requirements and will include project design features to minimize flood hazards as specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008). (See **Figure 4.1-36**.)

Minor Tributaries and Drainages. The existing six-lane bridge allowing SR-126 to cross the Castaic Creek drainage would be widened to eight lanes. Approximately 17,056 linear feet of existing channel would be converted to buried storm drain under this alternative.

Implementation of Alternative 7 would result in the reduction of approximately 1,247 acres of developable area when compared to the build-out potential of the proposed Project. The reduction of buildable space would occur due to preservation of streams and riparian areas; designation of spineflower preserves; and reduction of access to isolated parcels. No development would be facilitated on the VCC planning area under this alternative.

4.1.6.8.1 Direct Impacts

RMDP Direct Impacts.

Santa Clara River. Under Alternative 7 there would be 25,514 linear feet of bank stabilization, no buried storm drains, no grade stabilizer structures, and two fewer bridges. Other facilities and improvements within and along the River include the WRP outfall, buried bank stabilization, bridge abutments and piers, drainage outlets, and energy dissipaters. In addition, activities such as facility maintenance and habitat enhancement would be conducted within and along the River under Alternative 7. This activity is described in **Section 4.5**, Biological Resources, of this EIS/EIR.

As shown in **Table 4.1-17**, the proposed RMDP infrastructure associated with Alternative 7 would alter the existing boundary of the Santa Clara River floodplain throughout the Project area.

Table 4.1-17
Changes in Floodplain Area, Alternative 7

Year Event	Existing Floodplain Area (acres)	Alternative 2 Floodplain Area (acres)	Alternative 7 Floodplain Area (acres)	Change Relative to Alt. 2 (acres)	% Change Relative to Alt. 2 (acres)
2-Year	447.6	447.8	447.7	-0.1	-0.02%
5-Year	598.4	599.5	599.2	-0.3	-0.05%
10-Year	720.1	717.2	718.3	1.1	0.2%
20-Year	999.0	928.5	988.4	59.9	6.5%
50-Year	1294.2	1161.7	1290.0	128.3	11.0%
100-Year	1407.6	1283.8	1402.2	118.4	9.2%

Source: PACE, 2008A.

Alternative 7 would result in an increase in floodplain area relative to Alternative 2 for the 10- through 100-year recurrence interval flow events. There would be essentially no change in floodplain results as compared to Alternative 2 for the 2- and 5-year storm events. In comparison to existing conditions, there would be a minor increase in floodplain acreage for the 2- and5-year storm events, but decreases in the floodplain area for the 10- through 100-year storm events. To prevent flooding, Alternative 7 would include bank stabilization that is designed to contain and convey the FEMA 100-year flood event and the DPW capital flood event. Implementation of Alternative 7 would include the submittal and approval of a CLOMR to FEMA to account for the modified floodplain area and approval of a revised capital floodplain area from DPW.

Based on the hydraulic model results (PACE, 2008A), the Alternative 7 RMDP infrastructure would not be subject to significant flooding impacts and would not result in significant risk of loss, injury or death to people in the Project area. Therefore, the impacts associated with Alternative 7 are considered adverse, but less than significant relative to Significance Criterion 1. The proposed improvements do not impact storm flows in the Santa Clara River because these improvements are designed to accommodate the flows associated with the 2-, 5-, 10-, 20-, 50-, and 100-year floods events under the proposed conditions for Alternative 7. In addition, no storm flows are diverted from or to the River as a result of the Alternative 7, and no drainage tributary to the River would be prevented from flowing to the River in the proposed Project condition. Therefore, the impacts associated with Alternative 7 are considered adverse, but less than significant relative to Significance Criterion 2.

Major Tributaries. Except for bridges to facilitate road crossings, no structures would be constructed in Corps' jurisdictional areas within Chiquito Canyon, San Martinez Grande Canyon, Potrero Canyon, Long Canyon, or Lion Canyon. The proposed improvements under Alternative 7 are shown in **Figure 4.1-30** and a description of the impacts to the major tributaries associated with Alternative 7 is provided below.

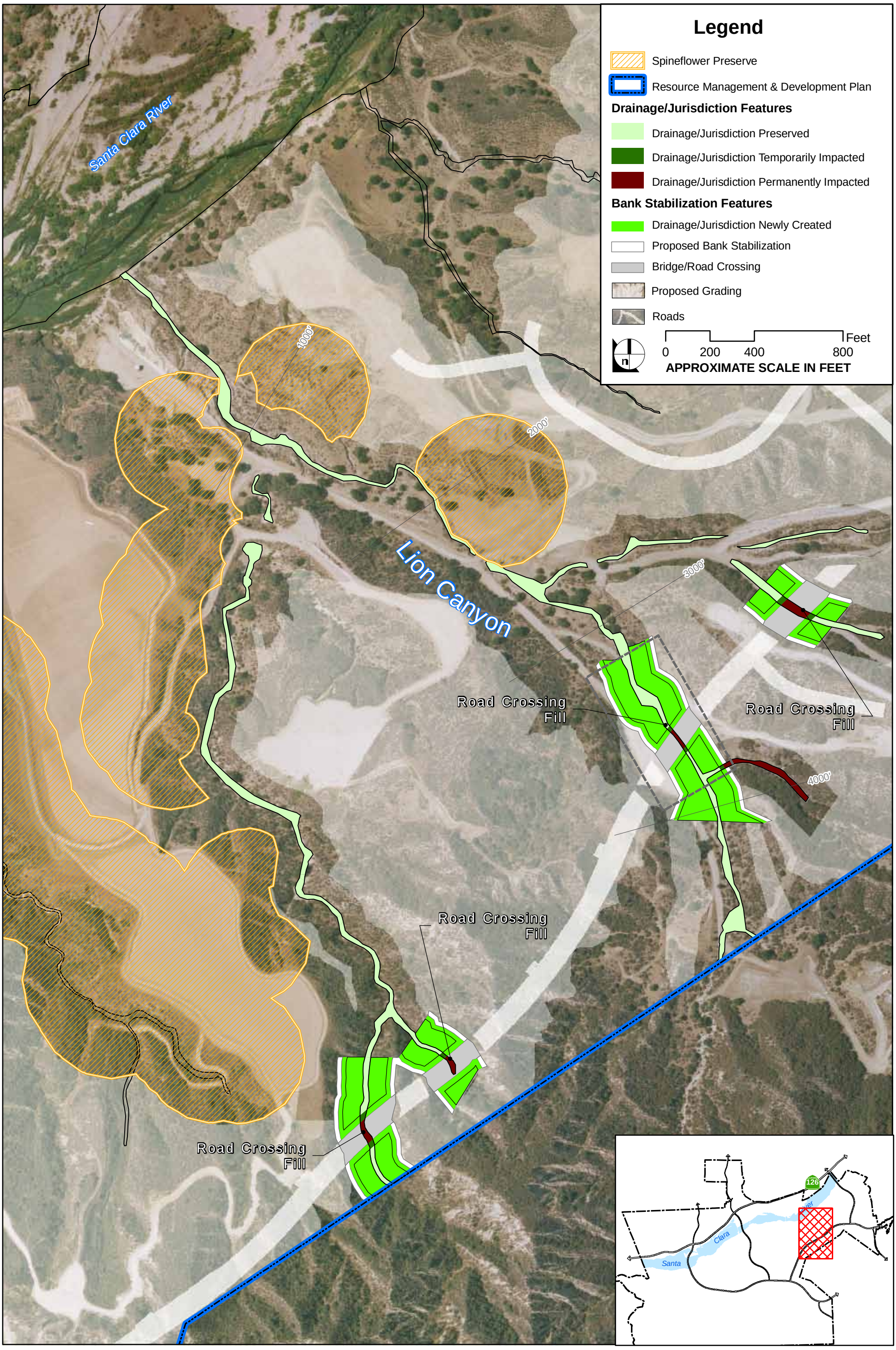
SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-35

POTRERO CANYON ALTERNATIVE DETAIL - ALTERNATIVE 7
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-35_PotreroAlternative7_PC1_043008.mxd



SOURCE: PACE 2008

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 4.1-36

LION CANYON ALTERNATIVE DETAIL - ALTERNATIVE 7
PROPOSED RMDP TRIBUTARY TREATMENTS

P:\8238E\GIS\mxds\EIR_2008\Section4_1\8238E_FIGURE-4-1-36_LionAlternative7_PC1_043008.mxd

Runoff within the major tributaries would be conveyed through both engineered, soft bottom channels and underground stormwater conveyance infrastructure. Regarding flooding and flood hazards, the engineered channels would be designed to contain and convey the flows from a 100-year storm event and the DPW capital flood event in accordance with County regulations. The adequacy of the final channel flow capacity would be assessed by DPW during Village-level review. For approval, the final channel design must meet the requirements of the DPW sedimentation manual. The hydraulic modeling and calculations supporting the final channel design would incorporate the required freeboard and an acceptable factor of safety to prevent impacts from overtopping and flooding. In addition, where appropriate, implementation of Alternative 7 would include approval of a CLOMR from FEMA and approval of a revised capital floodplain area from DPW.

Since the engineered channels would be designed to convey the 100-year and capital flood events, Alternative 7 would not be create a flooding hazard and would not result in significant risk of loss, injury or death to people in the Project area. Therefore, the impacts associated with Alternative 7 are considered adverse, but less than significant relative to Significance Criterion 1.

As indicated above, runoff within the major tributaries would be conveyed through both engineered, soft bottom channels and underground stormwater conveyance infrastructure. The engineered channels would be designed to convey both the 100-year and capital flood events in accordance with DPW requirements. Regarding the underground stormwater conveyance infrastructure, the design of these storm drains would comply with DPW requirements for "Storm Drains and Urban Flood Protection" and would incorporate project design features specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008) to minimize flood hazards. The final design of storm drains would be evaluated and approved by DPW during Village-level review. Final design would be compliant with DPW requirements for storm drains and urban flood protection (DPW Hydrology Manual, 1991).

Since the engineered channels would be designed to convey the 100-year and capital flood events and the underground storm water conveyance infrastructure would be designed in compliance with DPW requirements, the impacts associated Alternative 7 are considered adverse, but less than significant relative to Significance Criterion 2.

Minor Tributaries. Alternative 7 proposes that portions of several small, tributary drainages would be graded and replaced with storm drains or other appropriate conveyance facilities to accommodate pads for residential and commercial buildings, as shown in **Figure 4.1-30.** The stormwater drainage infrastructure associated with these drainages would be designed to comply with DPW requirements for "Storm Drains and Urban Flood Protection" and would incorporate the project design features outlined in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008). Accordingly, the impacts associated Alternative 7 are considered adverse, but less than significant relative to Significance Criterion 2.

Salt Creek Canyon. The Specific Plan includes a Visitor Serving land use designation, which allows for an access point to the High Country SMA/SEA 20. Approximately 1,992 feet of bank protection in non-jurisdictional uplands would be installed in conjunction with development of approved Visitor Serving uses as described in the Specific Plan. Any potential impacts would be limited in nature and related to

access and recreational use of the High Country, and might include footbridges and maintenance of existing farm roads. Accordingly, the flood hazard and stormwater runoff impacts are considered adverse, but less than significant for this Specific Plan component relative to Significance Criteria 1 and 2.

SCP Direct Impacts. The SCP component of the proposed Project would reduce the developable area of the proposed Project since no development would occur in the SCP areas. The decrease in developed area would result in a slight decrease in impermeable area overall and a slight reduction in surface runoff. However, the decrease in runoff volume would be minor compared to the overall contributions from the tributary watersheds, so the runoff from the SCP has the same or approximate characteristics as runoff from the natural drainage. In addition, all of the SCP areas are located outside of the Santa Clara River 100-year floodplain, so the SCP would not affect flood control. Based on this information, the impacts associated with the SCP for Alternative 7 are considered adverse, but less than significant relative to Significance Criteria 1 and 2 since it would not impact flooding or storm flows in the river or tributaries.

4.1.6.8.2 Indirect Impacts

RMDP Indirect Impacts. Implementation of Alternative 7 would facilitate County-approved development of the Newhall Ranch Specific Plan; and the impacts associated with the Specific Plan would be indirect impacts. The Newhall Ranch Specific Plan Program EIR described in detail the impacts associated with build-out of the Specific Plan with regard to flood hazards and stormwater conveyance and mitigation measures related to these criteria are incorporated into this EIS/EIR. Since flood hazards and stormwater conveyance associated with the Specific Plan are addressed by the previously incorporated Specific Plan Mitigation Measures SP-4.2-1 (compliance with LADPW flood control requirements), SP-4.2-4 (obtaining CLOMRs following construction of drainage facilities), SP-4.2-5 (DPW plan and map approvals), and SP-4.2-8 (DPW SUSMP and SWPPP requirements), the indirect RMDP impacts are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

SCP Indirect Impacts. Implementation of Alternative 7 would facilitate County-approved developments on the Specific Plan site and Entrada planning area, which would result in indirect impacts. The Newhall Ranch Specific Plan Program EIR described in detail the impacts associated with build-out of the Specific Plan with regard to flood hazards and stormwater conveyance, and mitigation related to these criteria are incorporated into this EIS/EIR. The Entrada project was incorporated into the hydraulic model that was used to evaluate direct and indirect impacts. The existing conveyance facility from the Entrada planning area boundary to the Santa Clara River may not currently be sized to accommodate the flows that would likely result from the proposed (but not yet approved) development in the Entrada planning area. Accordingly, the existing drainage infrastructure would need to be re-designed to accommodate the increase in flows prior to implementation of the Entrada development. The proposed drainage infrastructure would be designed to comply with DPW criteria and would require DPW review and approval prior to construction. Since flood hazards and stormwater conveyance associated with these projects are captured in the hydrologic and hydraulic modeling used in the impact analysis for direct and indirect impacts and are addressed through the incorporation of mitigation measures, the indirect SCP impacts for Alternative 7 are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

4.1.6.8.3 Secondary Impacts

RMDP Secondary Impacts. Increases in the transport and deposition of debris from the Project area could result in secondary flood hazards downstream. Debris within the Project area would be captured in debris basins that are designed in accordance with DPW requirements and would require DPW review and approval prior to construction. In addition, the basins would incorporate the project design features described in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan (Geosyntec, 2008), which were developed to balance runoff and sediment loading to Project tributaries and the Santa Clara River. Since the debris basins would be designed in accordance with the DPW requirements and would incorporate additional features to enhance the management of debris, the secondary impacts of the RMDP are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

SCP Secondary Impacts. The SCP areas would remain preserved and are not expected to affect existing levels of sediment and debris runoff. Any debris that may be generated from the SCP areas would be adequately handled by the RMDP improvements, and thus, would not contribute to downstream flooding hazards. Therefore, the secondary impacts of the SCP are considered adverse, but less than significant relative to Significance Criteria 1 and 2.

4.1.7 MITIGATION MEASURES

Although no significant impacts were identified in this section of the EIS/EIR, the Newhall Ranch Specific Plan Program EIR, nonetheless, recommended implementation of Mitigation Measures SP-4.2-1 through SP-4.2-8 to ensure compliance with all plan and regulatory requirements. In addition, to ensure avoidance of flood impacts resulting from construction and operation of the approved WRP, the Newhall Ranch Specific Plan Program EIR recommended implementation of Mitigation Measure SP-5.0-14 through SP-5.0-20. The Los Angeles County Board of Supervisors found that adoption of the recommended mitigation measures would ensure compliance with all plan and regulatory requirements. The Newhall Ranch mitigation program was adopted by Los Angeles County in findings and in the revised Mitigation Monitoring Plans for the Specific Plan and WRP.

4.1.7.1 Mitigation Measures Already Required by the Adopted Newhall Ranch Specific Plan EIR

The County of Los Angeles previously imposed mitigation measures to ensure no significant impacts to hydrology within the Specific Plan area as part of the adoption of the Newhall Ranch Specific Plan and WRP. These mitigation measures are found in the previously certified Newhall Ranch Specific Plan Program EIR and the adopted Mitigation Monitoring Plans for the Specific Plan and WRP (May 2003), and are summarized in **Table 4.1-1**, above. In addition, these mitigation measures are set forth in full below, and preceded by "SP," which stands for Specific Plan:

Specific Plan

SP-4.2-1 All on- and off-site flood control improvements necessary to serve the Newhall Ranch Specific Plan are to be constructed to the satisfaction of the County of Los Angeles Department of Public Works Flood Control Division.

SP-4.2-2 All necessary permits or letters of exemption from the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, California Department of Fish and Game, and the Regional Water Quality Control Board for Specific Plan-related development are to be obtained prior to construction of drainage improvements. The performance criteria to be used in conjunction with 1603 agreements and/or 404 permits are described in Section 4.6, Biological Resources, Mitigation Measures 4.6-1 through 4.6-10 (restoration) and 4.6-11 through 4.6-16 (enhancement).

SP-4.2-3 All necessary streambed agreement(s) are to be obtained from the California Department of Fish and Game wherever grading activities alter the flow of streams under CDFG jurisdiction. The performance criteria to be used in conjunction with 1603 agreements and/or 404 permits are described in Section 4.6, Biological Resources, Mitigation Measures 4.6-1 through 4.6-10 (restoration) and 4.6-11 through 4.6-16 (enhancement).

SP-4.2-4 Conditional Letters of Map Revision (CLOMR) relative to adjustments to the 100-year FIA flood plain are to be obtained by the applicant after the proposed drainage facilities are constructed.

SP-4.2-5 Prior to the approval and recordation of each subdivision map, a Hydrology Plan, Drainage Plan, and Grading Plan (including an Erosion Control Plan if required) for each subdivision must be prepared by the applicant of the subdivision map to ensure that no significant erosion, sedimentation, or flooding impacts would occur during or after site development. These plans shall be prepared to the satisfaction of the County of Los Angeles Department of Public Works.

SP-4.2-6 Install permanent erosion control measures, such as desilting and debris basins, drainage swales, slope drains, storm drain inlet/outlet protection, and sediment traps in order to prevent sediment and debris from the upper reaches of the drainage areas which occur on the Newhall Ranch site from entering storm drainage improvements. These erosion control measures shall be installed to the satisfaction of the County of Los Angeles Department of Public Works.

SP-4.2-7 The applicant for any subdivision map permitting construction shall satisfy all applicable requirements of the NPDES Program in effect in Los Angeles County to the satisfaction of the County of Los Angeles Department of Public Works. These requirements currently include preparation of an Urban Storm Water Mitigation Plan (USWMP) containing design features and Best Management Practices (BMPs) appropriate and applicable to the subdivision. In addition, the requirements currently include preparation of a Storm Water Management Pollution Prevention Plan (SWPPP) containing design features and BMPs appropriate and applicable to the subdivision. The County of Los Angeles Department of Public Works shall monitor compliance with those NPDES requirements.

SP-4.2-8 The applicant for any subdivision map permitting construction shall comply with all appropriate requirements of the County of Los Angeles Standard Urban Stormwater Mitigation Plan ("SUSMP") requirements, and comply with the SWRCB-issued General Permit for Construction Activity Storm Water (SWRCB Order 99-08-DWQ), as it may be amended from time to time or replaced by other applicable stormwater permits.

Water Reclamation Plant

SP-5.0-14 Runoff from future pads and structures is to be collected and channeled to the street and/or natural drainage courses via non-erosive drainage devices. (Allan E. Seward Engineering Geology, Inc., 19 September 1994, p. 20)

SP-5-.0-15 Water is not to stand or pond anywhere on the graded pads. (Allan E. Seward Engineering Geology, Inc., 19 September 1994, p. 20)

SP-5.0-16 Prepare and implement a County-approved erosion control plan to be implemented during the construction of the WRP.

SP-5.0-17 All on- and off-site flood control improvements necessary to alleviate flood hazards and provide proper drainage controls are to be constructed to the satisfaction of the County of Los Angeles Department of Public Works, FCD.

SP-5.0-18 All necessary permits or letters of exemption from the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, California Department of Fish and Game, and the Regional Water Quality Control Board for WRP-related development are to be obtained.

SP-5.0-19 Conditional Letters of Map Revision (CLOMR) relative to adjustments to the 100-year FIA flood plain are to be obtained by the applicant after the proposed drainage facilities are constructed.

SP-5.0-20 Prior to grading, a Final Hydrology Plan, a Final Drainage Plan, and a Final Grading Plan (including an Erosion Control Plan, as required) are to be prepared by the applicant and approved by the Department of Public Works, where applicable, to ensure that no significant erosion, sedimentation, or flooding impacts would occur during or after site development.

4.1.7.2 Mitigation Measures Already Required by the Adopted VCC EIR

The County of Los Angeles also adopted mitigation measures to minimize surface water hydrology and flood control impacts within the VCC planning area as part of its approval of the VCC project. These measures are found in the previously certified VCC EIR (April 1990), and are summarized in **Table 4.1-2**, above. In addition, these mitigation measures are set forth in full below, and preceded by "VCC-HY," which stands for Valencia Commerce Center - Hydrology and Flood Control.

At the time of adoption, the VCC mitigation measures represented the best available mitigation imposed by Los Angeles County. Moreover, as noted in **Subsection 4.1.1.2.1**, above, additional environmental review will be conducted by Los Angeles County with respect to the VCC planning area, because the applicant recently submitted the last tentative parcel map for build-out of the VCC planning area. Implementation of the previously adopted, applicable VCC mitigation measures and additional mitigation requirements (*e.g.*, measures similar to those previously adopted for the Specific Plan area and/or recommended for the proposed Project) would ensure that significant impacts to surface water hydrology and flood control within the VCC planning area are reduced to the extent feasible.

VCC-HY-1 Flood control measures will be constructed to the satisfaction of the Army Corps of Engineers and the Department of Public Works. Pre-project runoff conditions will be restored at the downstream project boundary.

VCC-HY-2 The applicant has obtained a 404 permit from the U.S. Army Corps of Engineers that specifies the following flood control conditions:

a. Erosion and sediment control measures shall be established prior to all construction activities on any water course on the project site.

b. The applicant shall install bank protection along the 1.7 mile stretch of Castaic Creek from the bridge of The Old Road, down stream to the Route 126 Bridge just above its confluence with the Santa Clara River. The bank protection shall be in the form of either shotcrete, or closed or opened -called articulating precast concrete tile. Portions of the natural bank of the Creek shall be excavated and other areas filled, and graded to a 2H:1V slope to achieve a smooth bank alignment.

c. The applicant shall construct Backer Road Bridge across Castaic Creek and install an energy dissipater in the creek bed below the bridge.

d. The applicant shall fill the unnamed tributary to Castaic Creek that is approximately 1,500 feet long and empties into the Creek about 800 feet upstream of the Route 123 Bridge.

VCC-HY-3 The applicant shall widen and install shotcrete lining on Hasley Creek. Energy dissipators will be installed approximately every 300 to 500 feet.

4.1.7.3 Mitigation Measures Relating to the Entrada Planning Area

The County of Los Angeles has not yet prepared or released a draft EIR for the proposed development within the portion of the Entrada planning area that would be facilitated by approval of the SCP component of the proposed Project. As a result, there are no previously adopted mitigation measures for the Entrada planning area. However, the adoption and implementation of measures similar to those previously adopted for the Specific Plan area and/or recommended for the proposed Project set forth in **Subsection 4.1.7.4**, below, would ensure that potential impacts to surface water hydrology and flood control within the Entrada planning area are reduced to the extent feasible. to a less-than-significant level.

4.1.7.4 Additional Mitigation Measures Proposed by this EIS/EIR

Although no significant impacts were identified in this section, this EIS/EIR recommends that the Project and alternatives comply with the following mitigation measures to ensure that no significant flood hazards occur. The measures are to be implemented in addition to those previously adopted by the County of Los Angeles in connection with its approval of the Specific Plan, WRP, and the VCC projects. The additional mitigation measures consist of the following:.

HY-1 All on-site and off-site flood control improvements necessary to implement the RMDP must be constructed to the satisfaction of the DPW.

HY-2 The design of flood protection facilities for the Santa Clara River shall be based on the following:

(a) The DPW's capital flood flow rates (50-year rainfall Discharge, burned and bulked);

(b) Soft bottom waterways with levees; and

(c) Protective levees and additional facilities, such as drop structures or stabilizers, as required, using DPW design criteria.

HY-3 Flood control within the Santa Clara River portion of the Newhall Ranch Specific Plan boundaries shall conform to the following requirements, as stated in the Conceptual Backbone Drainage Plan of the Specific Plan:

(a) The flood corridor will allow for the passage of the Los Angeles County capital flood discharge without the permanent removal of natural River vegetation (except at bridge crossings);

(b) The banks of the River generally will be established outside of the "waters of the United States," as defined by federal laws and regulations and determined by the delineation for the Santa Clara River completed by the Corps in August 1993;

(c) Where the Corps delineation width is insufficient to contain the capital flood flow, the flood corridor will be widened by an amount sufficient to carry the capital flood flow without the necessity of permanently removing vegetation or significantly increasing velocity; and

(d) Soil cement will occur only where necessary to protect against erosion adjacent to the proposed development. Where existing bluffs are determined to be stable and there is no adjacent proposed development, no bank protection will be built.

HY-4 Calculation of bulked flow runoff rates for the capital flood in the Santa Clara River watershed shall utilize the fire factors included in the September 2003 DPW Addendum to the 1991 Hydrology Manual Appendix H: Burn Policy Methodology for the Santa Clara River Watershed. All runoff calculations for watershed subareas with impervious values of 15 percent or less must use the burned soil runoff coefficients developed by the DPW for the Santa Clara River watershed.

HY-5 All facilities in developed areas that are not covered under the capital flood protection conditions must be designed for the urban flood. The urban flood is runoff from a 25-year frequency design storm falling on a saturated watershed.

Where street flow reaches the street capacity at the property line, the flow must be split and conveyed both in the street and in a drain below street level. Underground drains must be designed with the capacity to carry at least the flow from the 10-year frequency design storm (DPW Hydrology Manual, 1991).

HY-6 Sumps in urban areas must be designed to carry the runoff resulting from a capital flood, as defined by the DPW.

HY-7 Where a drainage system might have to provide more than a single level of flood protection, the drainage system must be designed with the capacity to carry the bulked capital flood flow from the up-gradient natural canyon in addition to the capacity to protect the developed area from an urban flood (DPW Hydrology Manual, 1991).

4.1.8 SUMMARY OF SIGNIFICANCE FINDINGS

Tables 4.1-18 and **4.1-19** present a summary of the significance criteria relating to each of the Project alternatives, and the reduced level of impact that would be achieved for each alternative by applying the above mitigation measures.

Table 4.1-18
Summary of Significant Hydrology Impacts to the Santa Clara Rivers - Pre- and Post-Mitigation

Significance Criteria	Applicable Mitigation Measures	Drainage	Planning Area	Impact of Alternatives - Pre/Post-Mitigation						
				Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1	HY-1; HY-2; HY-3; HY-4; HY-5; HY-6; HY-7.	Santa Clara	RMDP	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS
2			Entrada	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS
			VCC	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS

NS = Not significant or adverse. No mitigation required.

Table 4.1-19
Summary of Significant Hydrology Impacts to Tributaries in Specific Plan Area - Pre- and Post-Mitigation

Significance Criteria	Applicable Mitigation Measures	Planning Area	Drainage	Impact of Alternatives - Pre/Post-Mitigation						
				Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1	HY-1; HY-2; HY-3; HY-4; HY-5; HY-6; HY-7.	RMDP	Potrero	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS
			Long	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS
			Grande	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS
			Chiquito	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS
			Salt Creek	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS
			Minor Drainage	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS
2	HY-1; HY-2; HY-3; HY-4; HY-5; HY-6; HY-7.	RMDP	Potrero	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS
			Long	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS
			Grande	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS
			Chiquito	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS
			Salt Creek	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS
			Minor Drainage	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS	NS/NS

NS = Not significant or adverse. No mitigation required.

4.1.9 SIGNIFICANT UNAVOIDABLE IMPACTS

Based on the analysis above, and using the significance criteria identified in this section, the proposed Project and alternatives would result in less-than-significant impacts along the Santa Clara River and its tributaries relative to flooding/flood hazards and stormwater conveyance. Moreover, the adoption of the recommended mitigation measures, in addition to those already adopted in conjunction with approval of the Specific Plan and VCC projects, further ensures that impacts remain less than significant. Therefore, the proposed Project and alternatives would not result in significant unavoidable impacts with respect to surface water hydrology and flood control.