URS, "Jurisdiction Delineation, Newhall Ranch Project, for a Portion of the Santa Clara River and Its Tributaries, Los Angeles County, California" (December 2003)

JURISDICTION DELINEATION
NEWHALL RANCH PROJECT

FOR A PORTION OF THE SANTA CLARA RIVER AND ITS TRIBUTARIES
LOS ANGELES COUNTY, CALIFORNIA

Prepared for:

U.S. Army Corps of Engineers
California Department of Fish and Game

Prepared by:

URS

130 Robin Hill Road, Suite 100
Santa Barbara, California 93117
(805) 964-6010 ⬍ Fax: (805) 964-0259

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This Jurisdiction Delineation Package (Package) has been prepared by URS Corporation (URS) for the Newhall Land and Farming Company (Newhall Land) in cooperation with agency representatives from the U.S. Army Corps of Engineers (Corps) and the California Department of Fish and Game (CDFG), in support of the Newhall Ranch project Corps 404 and CDFG 1603 permitting processes. The purpose of this package is to facilitate the two agencies' determination of jurisdiction boundaries of the portion of the Santa Clara River and its tributaries located within the Newhall Ranch project area. This Package will be formally submitted to both the Corps and CDFG with a request for a jurisdiction determination from each. This jurisdiction determination will be used for both federal and state environmental review and impact assessment under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), respectively, for the Newhall Ranch project in Valencia, California.

This jurisdiction delineation for the Newhall Ranch project is organized as follows: Section 1.0 – Introduction and Background; Section 2.0 – Jurisdiction Delineation Methods; Section 3.0 – Project Area Characteristics, including the existing physical, hydrologic/hydraulic, and habitat characteristics of the five major jurisdictional watersheds found within the Newhall Ranch project boundary, along with other minor unnamed tributaries; Section 4.0 – Results of the Jurisdiction Delineation; and Section 5.0 – References.

1.1 PROJECT OVERVIEW

The proposed Newhall Ranch project activities that may affect jurisdictional areas are the construction and maintenance of flood control facilities, utility crossings, storm drains, bridges, roads, building pads, nature trails, and a water reclamation facility. These facilities would supply, in an economically practicable manner, a portion of the infrastructure required over the next 20 years to build out the approved Newhall Ranch Specific Plan area's (Figure 1-1) residential, commercial, industrial, mixed uses, and public facilities.

The various proposed projects would be constructed by Newhall Land or other private or public agencies. The proposed 404 permit and 1603 Master Agreement would also include routine maintenance activities to be carried out by the Los Angeles County Department of Public Works (LACDPW) using the 404 permit and 1603 Master Agreement issued to Newhall Land. Any party utilizing a 404 permit and 1603 Master Agreement issued to Newhall Land would be bound by the same conditions in the 404 permit and/or the 1603 Master Agreement.

By seeking a long-term, comprehensive 404 permit and 1603 Master Agreement, Newhall Land can facilitate a well planned and streamlined permit evaluation and decision process by the Corps and CDFG, and can provide an opportunity to design a long-term, regionally-based

planning and mitigation program for impacts to the affected riverine habitats. The 404 permit and 1603 Master Agreement would allow projects to be implemented under specific regional conditions, thereby avoiding the traditional project-by-project permitting process, expediting the permitting process for qualified projects, and ensuring consistent biological mitigation. In addition, the permits would provide a long-term, conditional authorization for ongoing and future maintenance activities by LACDPW.

The proposed federal action under consideration consists of the issuance of an individual permit under Section 404(b)(1) of the federal Clean Water Act (CWA) for those activities that would result in the discharge of fill or dredged material into "waters of the United States." Issuance of a 404(b)(1) permit also requires the Corps to complete an endangered species consultation (pursuant to Section 7 of the federal Endangered Species Act) with the U.S. Fish and Wildlife Service (USFWS). Consultation with the National Marine Fisheries Service (NMFS) may also be required.

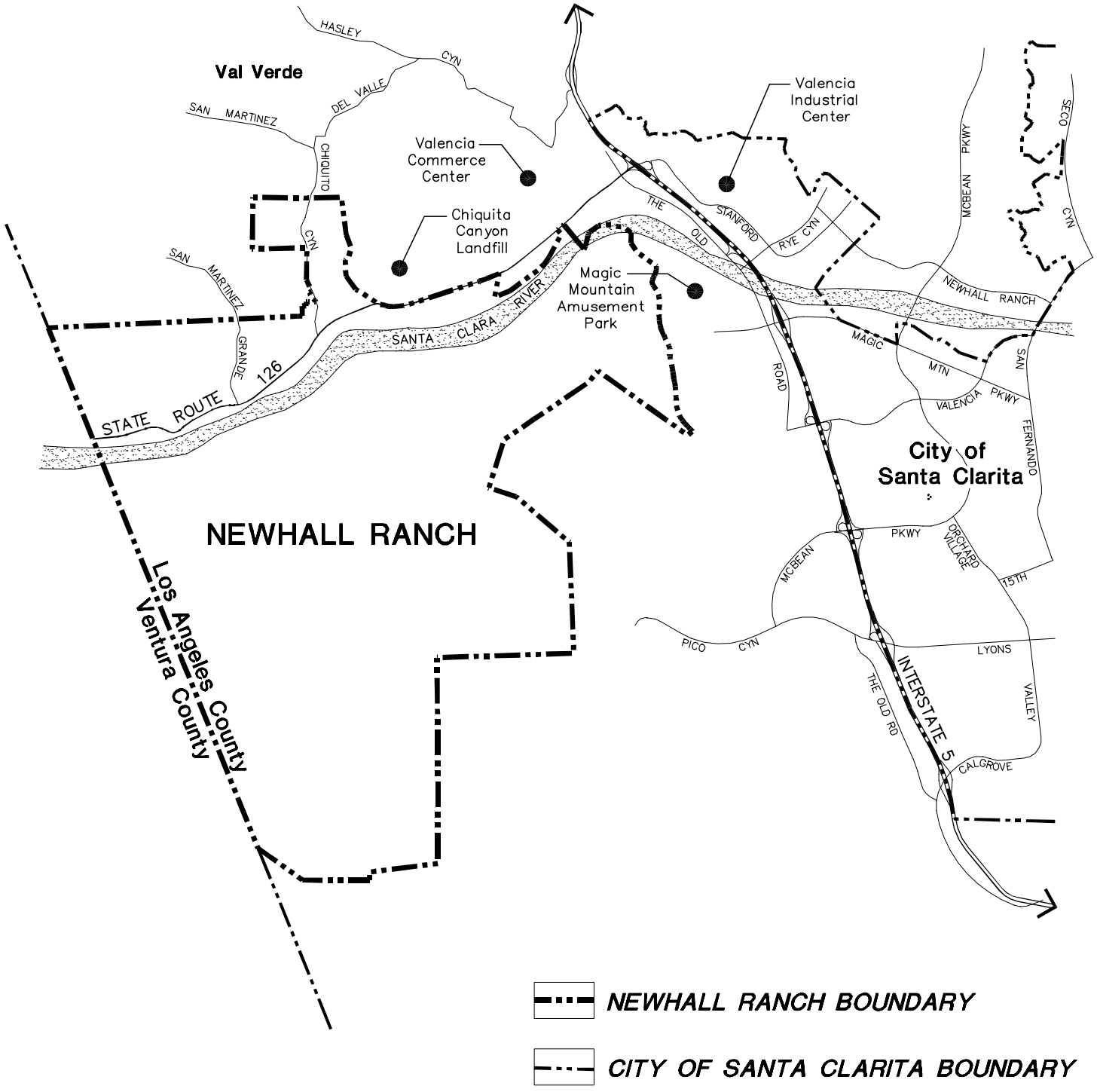
The proposed state action would be the execution of a Master Agreement Regarding Proposed Lake or Streambed Alteration (1603 Agreement) under Section 1603 of the California Fish and Game Code for the activities that would alter the "...natural flow or substantially change the bed, channel, or bank of any river, stream..." and may substantially adversely affect existing fish and wildlife resources. In addition to executing a 1603 Master Agreement, CDFG is required to issue a determination (pursuant to Fish and Game Code 2080.1) of whether the incidental take of species that are listed as threatened or endangered by both the state and federal governments has been authorized by USFWS, and is consistent with the California Endangered Species Act (CESA). Furthermore, CDFG must issue an incidental take permit for all state-only listed species pursuant to Fish and Game Code 2081.

1.2 CORPS AND CDFG JURISDICTION CRITERIA

Section 404 of the CWA requires authorization from the Corps for all discharges of dredged or fill material into waters of the U.S., including jurisdictional wetlands. Waters of the United States are defined in the Code of Federal Regulations (33 CFR 328.3), and include all rivers and streams, including ephemeral and intermittent streams. The extent of Corps jurisdiction over non-tidal waters in the absence of adjacent wetlands is defined by the "ordinary high water mark (OHWM)." In 33 CFR Part 329.1, the OHWM is defined as the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank; shelving; changes in the character of the soil; destruction of terrestrial vegetation; or the presence of litter and debris. In general, the OHWM for a stream is usually determined through an examination of the recent physical evidence of surface flow in the stream channel. This evidence may include, but is not limited to, a clear, natural scour line impressed on the bank; recent bank erosion; destruction of

native terrestrial vegetation; and the presence of litter and debris. For many small arid watersheds, the presence of continuous upland vegetation in the stream channel is a good indicator that it only conveys surface flow during extremely large storm events and, as a result, would not usually constitute a jurisdictional water of the U.S. However, the presence of native riparian species in a dry wash is usually a good indicator that the stream channel usually exhibits surface flow during both small and moderate storm events (Corps, 2001).

The CDFG has direct jurisdiction over any activity diverting or obstructing natural flow or modifying the bed, bank, or channel of any river, stream, or lake designated by CDFG in which there is an existing fish or wildlife resource that may be substantially adversely affected, or from which these resources derive benefit, under California Fish and Game Code 1601-1603. CDFG asserts jurisdiction over state water bodies and watercourses that exhibit a defined bed and bank. The upward limit of CDFG jurisdiction is generally the top of the bank, which often extends farther outward than does the Corps' CWA jurisdiction. CDFG 1601 and 1603 codes are similar to the federal CWA 404 permit, but the area of jurisdiction is often determined on a case-by-case basis for the location, nature, and extent of disturbance.



NEWHALL RANCH™
SPECIFIC PLAN

Prepared For: Newhall Ranch Company

FIGURE 1-1
SPECIFIC PLAN LOCATION AND BOUNDARIES

Computer Mapping by RRM Systems

SEPTEMBER 2003
vicmap2.dwg

The delineation of jurisdictional boundaries within the Newhall Ranch project area began in 1992 with the Corps' jurisdictional survey of Potrero Canyon (Figure 2-1). This survey determined the extent of a portion of the watershed that met the criteria for waters of the U.S. under Section 404 of the CWA. The Corps also conducted a survey of the main stem of the Santa Clara River in 1993 (Figure 2-2).

In April of 1994, CDFG prepared a Stream Alteration Agreement (No. 5-1001-94) for the portion of the Santa Clara River located within the Newhall Ranch project area (Figure 2-3).

Since 1994, Newhall Land staff has continued to work with the Corps and CDFG to define what the jurisdiction within the project area was per each agency's delineation criteria. However, in 2000 these activities ceased while additional environmental analysis was conducted for the Newhall Ranch Specific Plan.

The Los Angeles County Board of Supervisors' approval of the Newhall Ranch Specific Plan on May 27, 2003, triggered the need to resume jurisdiction delineation activities. Since then, Newhall Land and Farming and its consultants have met with agency representatives and conducted several day-long field visits in the project area to look at the tributary drainages to reach concurrence and build upon the previous work regarding their jurisdictional status. Additional meetings have been held with the agencies in an effort to complete this portion of the permitting process. This document contains the results of those activities and serves as a tool to complete the jurisdictional determination process.

2.1 METHODS

A variety of methods have been employed during this process to delineate the watersheds located within the Newhall Ranch project boundary, including analysis of historic data, incorporation of previous jurisdictional determinations by the Corps and CDFG, aerial photo interpretation in conjunction with topographic data, and geographic information systems (GIS) technology. Field assessments have also been carried out to verify the delineations completed using digital technology, and to gather additional locational data via the use of global positioning systems (GPS) equipment to further refine the jurisdictional area.

This delineation, as shown on Figures 3-1 and 3-2, reflects a concerted effort to provide a conservative assessment of the Newhall Ranch project area to include all drainages that meet the agencies' criteria for inclusion within their jurisdictional areas. This delineation has been prepared in consultation with agency representatives both in the field and via review of previously prepared delineations of the area.

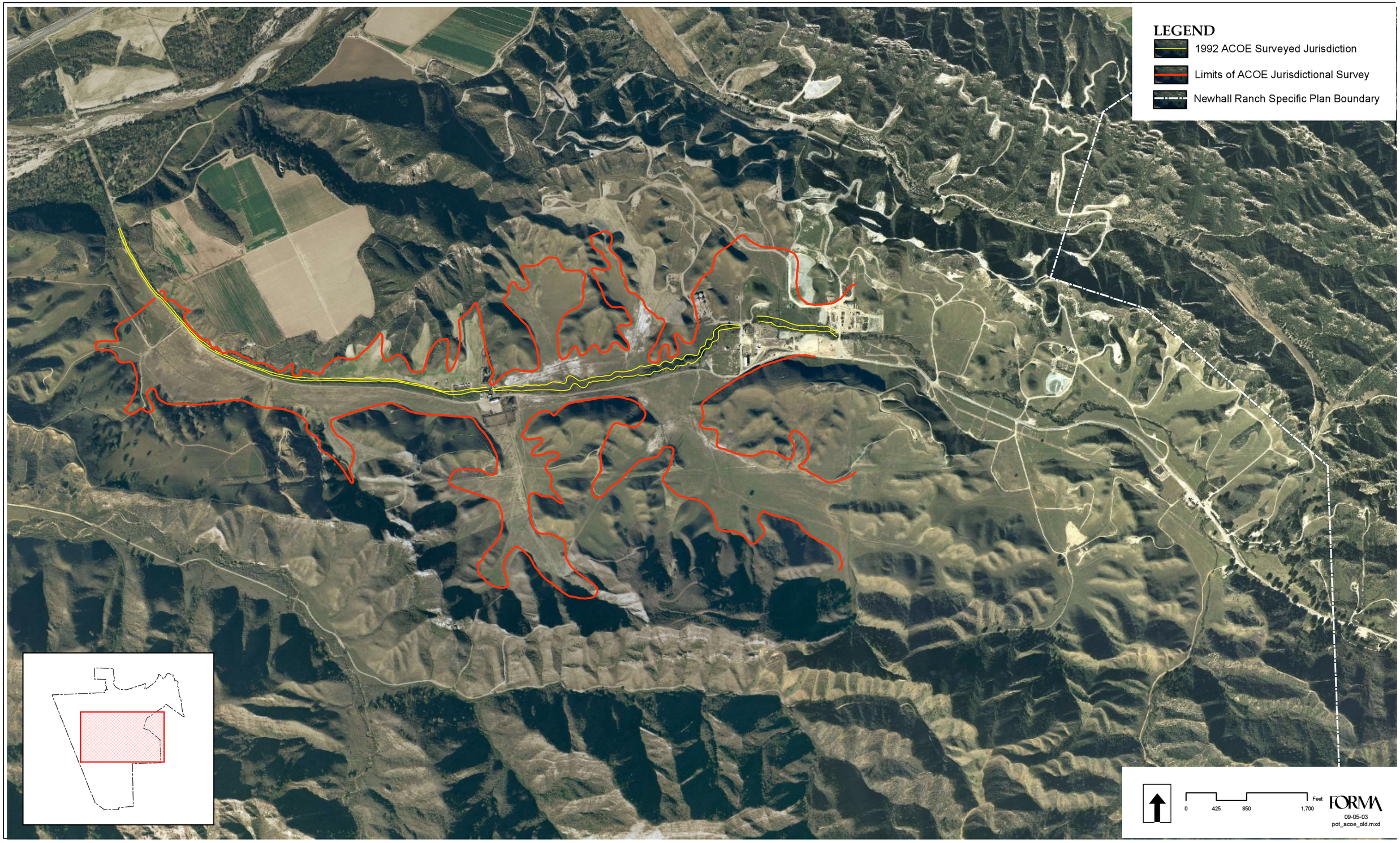


Figure 2-1

POTRERO CANYON
1992 ACOE JURISDICTIONAL SURVEY
NOVEMBER 12, 1992

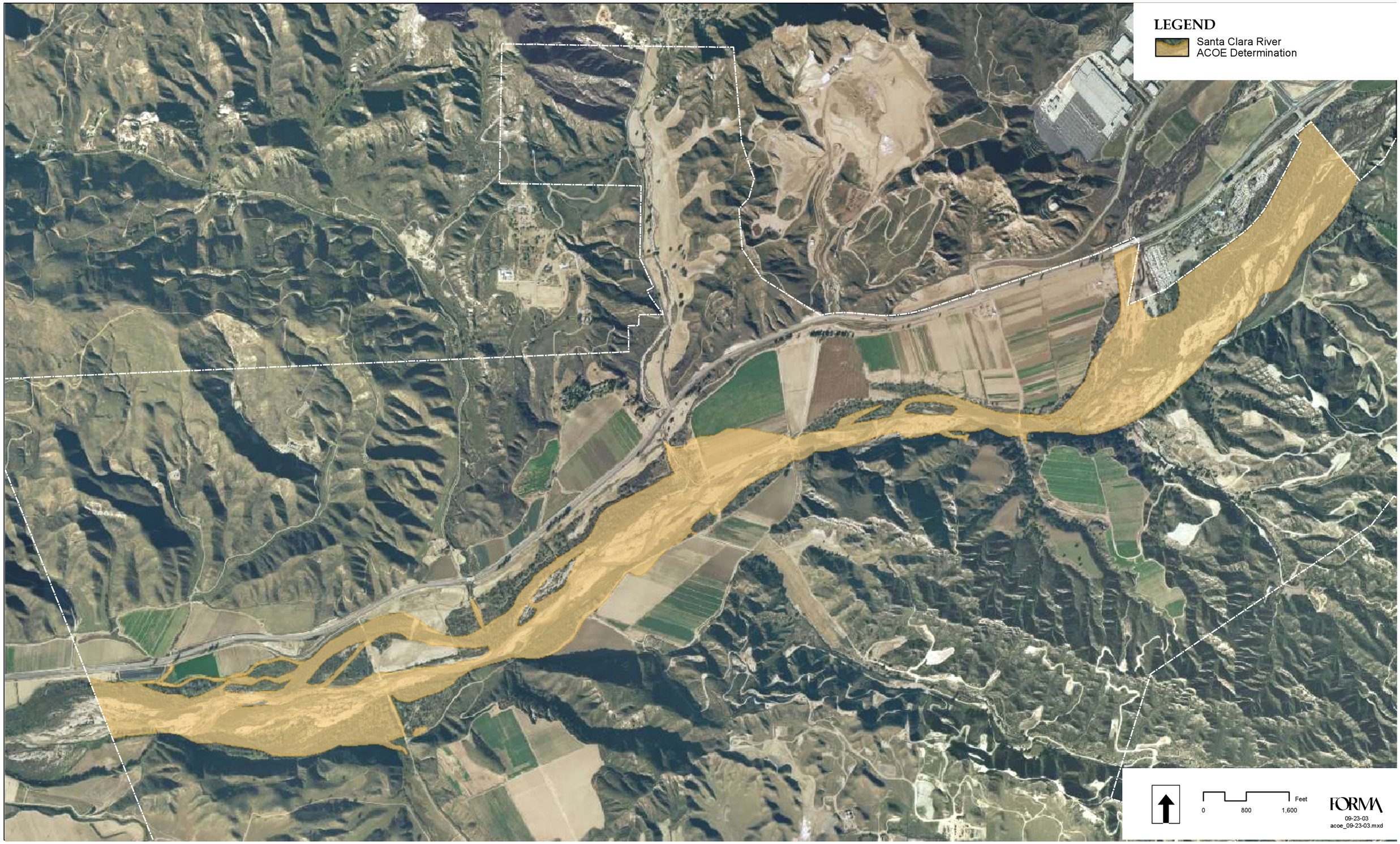


Figure 2-2

SANTA CLARA RIVER

1993 ACOE JURISDICTIONAL DETERMINATION

AUGUST 20, 1993

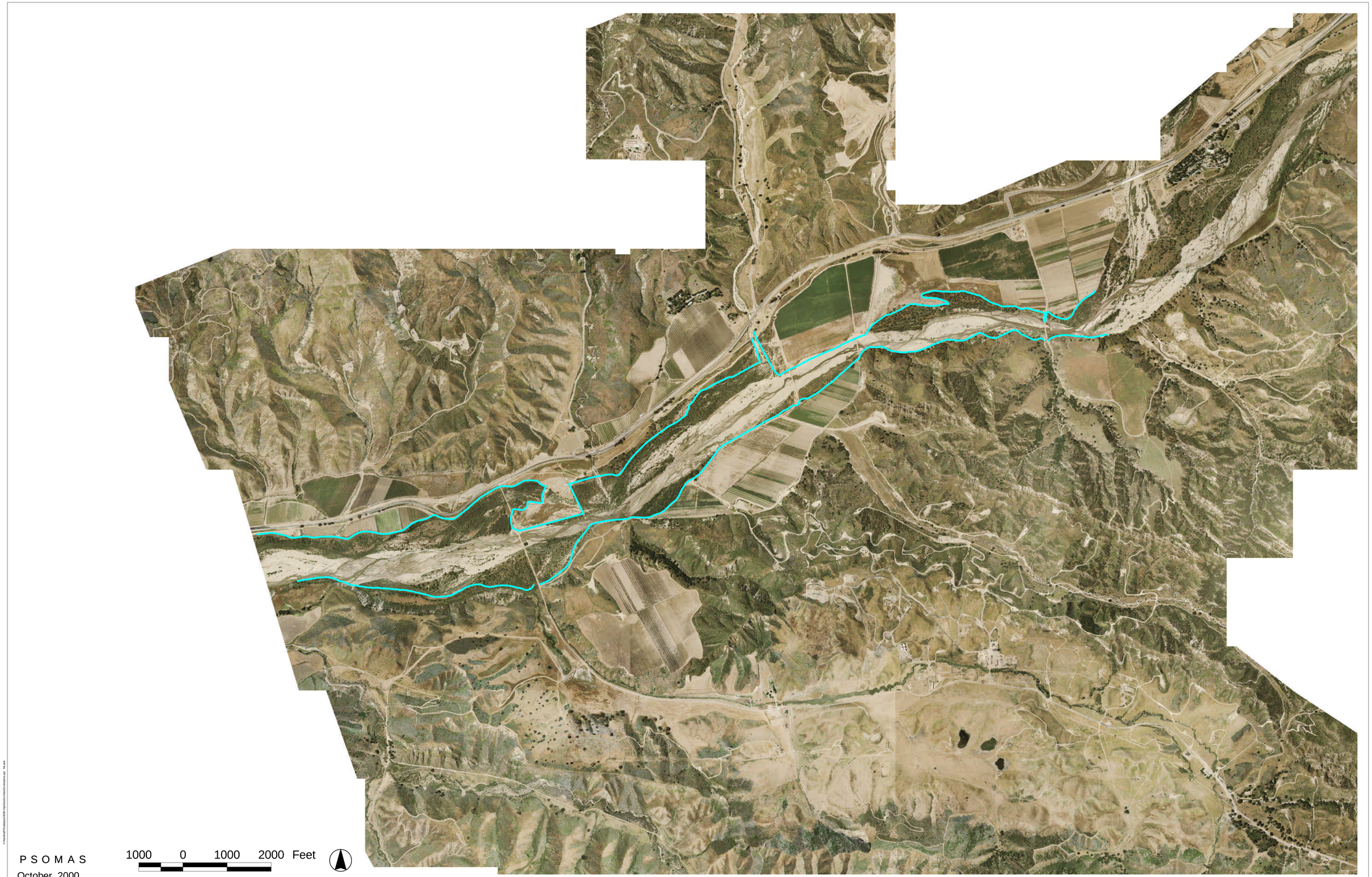


Figure 2-3
CALIFORNIA DEPARTMENT OF FISH AND GAME
JURISDICTION DELINEATION
APRIL 6, 1994

This section presents the existing physical, hydrologic/hydraulic, and habitat characteristics of the five major jurisdictional watersheds found within the Newhall Ranch project boundary, including Chiquito Canyon, Long Canyon, San Martinez Grande Canyon, Potrero Canyon, and the main stem of the Santa Clara River. Descriptions of the habitat types found in the other minor watersheds are also included. Figures 3-1 and 3-2 depict the jurisdiction delineation. The purpose of the discussion presented below is to provide the context in which the jurisdiction delineation has been formulated for the OHWM per the Corps' regulatory criteria, and bed and bank per CDFG's regulatory criteria, as described in Sections 1.2 and 2.0.

3.1 CHIQUITO CANYON EXISTING CHARACTERISTICS

3.1.1 Watershed Description and Characteristics

The 4.8-square mile (3,072-acre) Chiquito Canyon watershed is a tributary to the northern bank of the Santa Clara River within the Newhall Ranch project area (Figure 3-1). Approximately 2,300 acres of Chiquito Canyon, or almost 75 percent of the watershed area, is located upstream or offsite of the Newhall Ranch property boundary. The overall watershed drainage pattern creates a dogleg in which the headwaters flow in a general west to east direction, while the remaining lower portion of the creek flows in a north to south direction, joining the Santa Clara River Valley. The overall watershed boundary has a shape such that the larger portion of the drainage area is tributary in the upper watershed, with the width of the watershed narrowing downstream. The width of the watershed as measured between the watershed ridgelines ranges from approximately 7,000 feet in the upper watershed, to between 4,000 to 2,000 feet in the lower portion of the watershed. The shape of the watershed is important as it influences the time when runoff reaches the outlet or the response of the watershed to rainfall events. The distance from the upper headwaters to the canyon mouth is approximately 24,000 feet with an average overall slope of 0.054. The major natural main stem drainage course within the watershed has an average slope that varies in the upper watershed from 0.043 to approximately 0.029 in the lower reaches of the watershed through the Newhall Ranch property.

The majority of the Chiquito Canyon watershed is characterized by both rugged and steeply developed foothills that have numerous smaller tributary canyons that dissect the watershed, connecting to the narrow alluvial valley associated with the main stem creek. Approximately 90 percent or more of the watershed consists of this rugged foothill topography, with the remainder being the narrow, relatively flat valley floor. The topography for the watershed varies from a maximum elevation of 2,215 feet above mean sea level (amsl) in the headwaters, to a low elevation of 920 feet amsl near the mouth of the canyon in the Santa Clara River Valley.

Generally, the soils in the watershed are characterized as silty clay loams from both the Castaic and Saugus formations. Also, the soils within the Chiquito Canyon watershed can be predominately classified as being in hydrologic soil group C (higher runoff potential) with the exception of areas adjacent to the main stem creek that are Type A (lower runoff potential or higher infiltration rate) and Type B (moderate runoff potential) in the lower reaches. Existing urbanized areas within the watershed that would affect increased impervious areas affecting runoff include the community of Val Verde, which has a population of approximately 1,700 people and approximately 530 housing units covering 211 acres. There are no major flood control improvements or dams within the watershed other than several road culvert/bridge crossings such as that at State Route (SR) 126 that would influence the watershed response to rainfall events. Detailed hydrologic modeling has been performed to evaluate the existing baseline conditions, and the results of the estimated peak discharges for several storm return periods at the downstream canyon mouth are summarized in Table 3-1.

TABLE 3-1
CHIQUITO CANYON EXISTING WATERSHED
HYDROLOGY PEAK DISCHARGES

Return Period	Canyon Mouth Area = 4.8 sq. miles	Upstream Newhall Boundary Area = 3.6 sq. miles
2-year	216 cfs	180 cfs
5 – year	545 cfs	459 cfs
10-year	1,252 cfs	1,074 cfs
20-year	2,785 cfs	2,378 cfs
50-year	3,768 cfs	3,140 cfs
100-year	4,663 cfs	3,917 cfs

3.1.2 Stream Characteristics

The lower portion of Chiquito Canyon is generally located in the canyon floor and follows a mildly sinuous pattern with long linear meanders reflecting the influence of the physiographic features. The active creek is more deeply incised in the lower 2,500 feet of channel upstream from the SR 126 roadway crossing, while the remainder has developed a shallower active channel and wider drainage area. The hydraulics along this portion of the stream are also influenced by three different existing roadway crossing locations that include SR 126, a local access roadway arch crossing, and the Chiquito Canyon Road crossing. The average streambed slope of the channel indicated by the topographic data is relatively constant at approximately 0.029 along the 7,800-foot reach of the lower portion of the stream within the Newhall Ranch boundary (Figure 3-3). Representative cross sections illustrating the geometry of the drainage and the active channel are shown for the lower, middle, and upstream reaches for Chiquito Canyon in (Figures 3-4, 3-5, and 3-6). Detailed hydraulic

modeling of the existing drainage was performed, which indicated that this entire lower reach of Chiquito Canyon was hydraulically "steep," generating higher velocities than a "mild" channel. A brief description of the hydraulic operation for the drainage from the downstream canyon mouth to the upstream Newhall Ranch boundary includes the following:

Lower Reach

1. Flows exit the SR 126 multi-span culvert crossing, expanding to the downstream earthen channel system that joins the Santa Clara River. This results in lowered velocity downstream through the expansion area of the valley floor.

2. The arch roadway crossing upstream of SR 126 causes a hydraulic restriction that results in lower localized velocity immediately upstream of this location for medium to large storm events.

Middle Reach

3. The incised channel expands upstream of this location to the Chiquito Canyon Road crossing where the flows accelerate near the crossing location.

4. Upstream of this location, the drainage expands over a much wider area in the valley floor but never encompasses the entire valley floor. The average velocity through the middle reach is slightly lower, but still relatively high, ranging from 10 to 22 feet per second (fps).

Upper Reach

5. Two areas of natural constrictions influence the remaining upstream portion of the stream located within Newhall Ranch. These constrictions accelerate the flow. This is followed by a large expansion area at the very upstream end of the Newhall Ranch boundary that has very low velocities of approximately 5 fps, as indicated by the high concentration of vegetation within the active channel in this location.

The hydraulic characteristics of the 100-year storm event generated by the hydraulic modeling indicate that:

1. The average depth is approximately 3.8 feet, ranging from 9.5 feet to 1.6 feet

2. The average velocity is approximately 11.9 fps, ranging from 22 fps to 5 fps

3. The width of the stream water surface averages 195 feet, ranging from 285 feet to a minimum of 40 feet at the roadway crossing

Higher velocities generally occur within the contracted and incised portions of the drainage, and lower velocities occur within expansion areas and flatter longitudinal streambed slopes. Lower velocities occur along the fringes of the drainage, while higher velocities are in the deeper portions of a channel section. A comparison of the boundaries for different storm return periods indicates that the majority of the drainage is generally contained within the active channel for the 2-year storm event, which is consistent with the "dominant discharge" or channel-forming discharges found in southern California streams. Larger events expand into the overbank areas, particularly in the middle portion of this part of the stream, while the upper and lower portions are constricted and more incised. During the larger storm events, the wider overbank areas in the mid-portion of the stream encompass active agricultural fields.

3.1.3 Biological Characteristics

The area surrounding the channel in Chiquito Canyon within the Newhall Ranch project area is primarily comprised of agricultural land. However, the upstream areas of the watershed outside the project area are dominated by several habitat types including coastal sage scrub (CSS) with patches of chamise chaparral (CC), mixed chaparral (MC), and southern willow scrub (SWS). As noted in the description of the watershed, the upper portion of the drainage at the northern project boundary contains dense vegetation, indicating very low velocity flow during storm events. These habitat types are described as:

Coastal Sage Scrub (CSS): Coastal sage scrub habitat is characterized by a dominance of drought-deciduous plant species of the coastal hills. On the Newhall Ranch property, the dominant species that occur in this plant community include California sagebrush (*Artemisia californica*), purple sage (*Salvia leucophylla*), common encelia (*Encelia californica*), California buckwheat (*Eriogonum fasciculatum*), and California broom (*Lotus scoparius*). Coastal sage scrub habitat is distributed in Newhall Ranch on the drier south-facing slopes of the hilly lowlands, and on north-facing slopes and canyons of the Santa Susana Mountains.

Chamise Chaparral (CC): Chamise chaparral is characterized by relatively homogeneous stands of the shrub chamise (*Adenostoma fasciculatum*).

Mixed Chaparral (MC): The dominant plant species of mixed chaparral communities are comprised of a variety of shrubs at more or less equal densities. Shrub species present in this habitat type on the Newhall Ranch property include hoaryleaf ceanothus (*Ceanothus crassifolius*), coast blue lilac (*Ceanothus tomentosus*), lemonadeberry (*Rhus integrifolia*),

laurel sumac (*Malosma laurina*), toyon (*Heteromeles arbutifolia*), black sage (*Salvia mellifera*), white sage (*Salvia apiana*), and chamise. Understory components are poorly developed due to the dense vegetation cover.

Southern Willow Scrub (SWS): This riparian habitat community type is dominated by willow shrubs and small trees, such as arroyo willow (*Salix lasiolepis*), red willow (*Salix laevigata*), and narrow-leaved willow. Mule fat shrubs are often co-dominant with the willows. These thickets often lack a well-developed understory. Southern willow scrub is found along the Santa Clara River along the banks of the low-flow channel where frequent flood disturbance prevents the community from developing into riparian woodland. The habitat is also found in the drainages within Chiquito Canyon, Potrero Canyon, and Salt Creek Canyon. This habitat type includes areas where grazing, clearing, or other factors have opened the willow scrub habitat, allowing either giant cane to invade or an herbaceous layer to develop in the openings.

Like many willow-dominated riparian habitats in California, southern willow scrub has been greatly reduced throughout its range, and provides valuable habitat for many special wildlife species, particularly songbirds.

In contrast to the vegetation found in the upper portion of Chiquito Canyon within the project area, the vegetation found in the downstream portion of the drainage within the project area is quite diverse, supporting scalebroom scrub (SS), coast live oak woodlands (LOW), and Great Basin scrub (GBS). These habitat types are described as:

Scalebroom Scrub (SS): Similar to alluvial scrub, scalebroom scrub (*Lepidospartum* scrub) is characterized by homogeneous stands of scalebroom that grow in arroyos and washes. Due to the sparse, nearly pure stands of scalebroom, wildlife use of this community type tends to be low, but similar to the other scrub habitat situated within drainages (i.e., alluvial scrub, Great Basin scrub).

Coast Live Oak Woodland (LOW): Coast live oak woodlands are typically located in riparian areas on the drier margins of the drainage where trees of coast live oak (*Quercus agrifolia*) dominate the community. Coast live oak woodlands in the study area occur on the outer, drier portions of the Santa Clara River drainage, especially on the south side of the river near the foothills and slopes of the surrounding hills. Isolated individuals of coast live oak occur on the terraces of drier sites.

Great Basin Scrub (GBS): Great basin scrub is characterized by an almost pure stand of big sagebrush (*Artemisia tridentata*). This habitat occurs on Newhall Ranch within the arroyos and on the upper terraces adjacent to the riparian areas along the major drainages.

3.2 LONG CANYON EXISTING CHARACTERISTICS

3.2.1 Watershed Description and Characteristics

The 1.53-square mile (981-acre) Long Canyon watershed is a tributary to the southern canyon side of the Santa Clara River within the Newhall Ranch project area (Figure 3-1). Approximately 390 acres of Long Canyon, or almost 40 percent of the watershed area, is located upstream and offsite of the Newhall Ranch property boundary. The major drainage course within the watershed flows generally in an easterly to westerly direction, joining the Santa Clara River Valley.

The overall watershed boundary, as defined by the topography and ridgelines, is very long and linear in shape, which influences the watershed response to rainfall. The width of the watershed boundary is fairly uniform with limited variation. The average width measured between ridgelines is approximately 3,000 feet and varies from 2,000 to 3,500 feet. The shape of the watershed has an important effect on the runoff response from the drainage area since it influences when runoff reaches the outlet. A linear watershed such as Long Canyon will distribute the runoff more uniformly over time, spreading the effect of the tributary drainage area and a flattening or spreading of the runoff hydrograph. Another indicator of the watershed shape is the length to width ratio, which has a value of approximately 6, and would describe a long watershed. The distance from the upper headwaters to the canyon mouth outlet is approximately 18,000 feet, with an average overall slope of 0.055. The major natural main stem drainage course within the watershed has an average slope that varies in the upper watershed from 0.039 to approximately 0.026 in the lower reaches of the watershed through the Newhall Ranch property.

The majority of the Long Canyon watershed is characterized by both rugged and steeply developed foothills that have numerous smaller linear tributary canyons that enter the watershed, connecting to the narrow alluvial valley associated with the main stem creek. Approximately 80 percent or more of the watershed consists of the rugged foothill topography, with the remainder being the narrow valley floor. The topography for the watershed varies from a maximum elevation of 1,918 feet amsl in the headwaters, to a low elevation of 934 feet amsl near the mouth of the canyon at the Santa Clara River Valley.

Generally, the soils in the watershed are characterized as silty clay loams from both the Castaic and Saugus formations. Also, the soils within the Long Canyon watershed can be predominately classified as being in hydrologic soil group C (higher runoff potential) with exception of areas adjacent to the main stem creek and canyon floor that are Type A (lower runoff potential) and Type B in the lower reaches. Detailed hydrologic modeling has been performed to evaluate the baseline existing watershed conditions, and the results of the

estimated peak discharges for several storm return periods at the downstream canyon mouth are summarized in the following table:

TABLE 3-2
LONG CANYON EXISTING WATERSHED
HYDROLOGY PEAK DISCHARGES

Return Period	Canyon Mouth	Upstream Newhall Boundary
	Area = 1.53 sq. miles	Area = 0.61 sq. miles
2-year	62 cfs	30 cfs
5 – year	159 cfs	75 cfs
10-year	367 cfs	175 cfs
20-year	862 cfs	395 cfs
50-year	1163 cfs	535 cfs
100-year	1455 cfs	663 cfs

3.2.2 Stream Characteristics

The lower Long Canyon drainage extends from the mouth of the canyon at the Santa Clara River to the Newhall Ranch boundary, approximately 8,600 feet upstream of the canyon mouth. The geomorphology of the active stream reflects a long and mildly sinuous alignment with long linear meanders reflecting the influence of the physiographic features. The meanders of the active channel tend to reflect off the canyon walls, and the meanders alternate from the sides of the canyon. The average streambed slope of the channel indicated by the topographic data varies with the upstream portion steeper, and the lower portion tending to flatten out proceeding downstream. The average slopes ranges from 0.039 in the upper reaches to 0.026, with the streambed indicating this average trend through the length of the drainage. There are minor variations in the streambed slope where minor depositional areas are encountered associated with contractions in the creek geometry (Figure 3-7).

The downstream 2,000 feet has a less defined active channel and a much wider canyon floor that reflects a classic alluvial canyon depositional form associated with the sediment delivered from the upper canyon. The canyon widens in this area to approximately 400 feet. The remaining portion of the creek is more incised and the canyon floor is much narrower, averaging 100 feet or less. Representative cross sections illustrating the geometry of the drainage and the active channel are shown for the lower, middle, and upstream reaches for Long Canyon (Figures 3-8, 3-9, and 3-10). There are no manmade structures along the drainage that influence the hydraulic operation.

Detailed hydraulic modeling of the existing drainage was performed and indicated that this entire lower reach of Long Canyon was hydraulically "steep" (Froude numbers greater than a value of 1.0), generating higher velocities than a "mild" channel.

A brief description of the hydraulic operation of this 8,600-foot-length drainage for Long Canyon from the downstream canyon mouth to the upstream Newhall Ranch boundary includes the following:

Lower Reach

1. The lower 2,000 feet of drainage near the canyon mouth to the Santa Clara River Valley is very wide, much larger than the upper portion of the drainage by a factor of five, because the channel is less defined and the slopes are flatter, which has resulted in deposits creating a wide valley floor.

2. The wide drainage in the lower reach also reflects much lower velocities across its entire width in the canyon floor.

Middle Reach

3. Immediately upstream of the wider valley floor, the channel becomes more incised and deeper.

4. This mid-portion of the stream follows an extremely linear alignment, and the width is very constant with very limited overbank flows.

Upper Reach

5. Continuing upstream in the upper portion of the stream are a series of contraction areas that results in larger drainage expansions resulting in some depositional areas.

6. The upper portion of the drainage generally extends across the entire canyon bottom, but the canyon is also narrower than farther downstream.

7. The upper canyon is slightly wider than the mid-portion because there are some overbank flows, and this portion is less deeply incised than the mid-portion of the canyon.

The hydraulic characteristics of the 100-year storm event generated by the hydraulic modeling indicates that:

1. The average depth is approximately 2.4 feet, ranging from 6.7 feet to 0.7 feet

2. The average velocity is approximately 7.8 fps, ranging form 17 fps to 3.5 fps

3. The width of the stream water surface averages 140 feet, ranging from 420 feet to 29 feet at a constriction in the mid-portion of the channel

Higher velocities generally occur within the contracted and incised portions of the drainage, with lower velocities in expansion areas and flatter longitudinal streambed slopes. The wider drainage areas near the mouth of the canyon reflect the sediment deposits that have occurred in the fan-type formation in the canyon floor. Lower velocities occur along the fringes of the drainage, while the higher velocities occur in the deeper portions of a channel section.

3.2.3 Biological Characteristics

Both sides of this watershed contain habitat types comprised primarily of coastal sage scrub (CSS), with small pockets of chamise chaparral (CC), and grassland (G) present. Within the stream channel, there is a mixture of grassland, elderberry scrub (ES), live oak woodland (LOW), alluvial scrub (AS), great basin scrub (GBS), mixed chaparral (MC), and alluvial scrub. Habitat types not described in Section 3.1.3 are described as:

Grassland (G): The grassland areas of the Newhall Ranch property are dominated by non-native grasses, such as ripgut grass, smooth brome, foxtail chess, and downy brome (*Bromus diandrus, B. hordaceous, B. madritensis* ssp. *rubens*, and *B. tectorum*, respectively); wild oats and slender wild oats (*Avena fatua* and *A. barbata*, respectively); hare barley (*Hordeum leporinum*); and rattail fescue (*Vulpia myorus* var. *hirsuta*). Some native and non-native herbaceous species that occur among the grasses are dove weed (*Eremocarpus setigerus*), common cryptantha (*Cryptantha intermedia*), purple owl's clover (*Castilleja exserta*), white-stemmed filaree (*Erodium cicutarium*), short-pod mustard (*Hirschfeldia incana*), radish (*Rhaphanus sativa*), cheeseweed (*Malva parviflora*), and London rocket (*Sisymbrium irio*).

Elderberry Scrub (ES): Thickets of blue elderberry (*Sambucus mexicana*) characterize this community type. It generally occurs on the Newhall Ranch property in association with riparian and scrub communities. Elderberry scrub is not a common vegetation type and has been greatly reduced throughout its range, particularly in southern California.

Alluvial Scrub (AS): Alluvial scrub habitat is characterized as a mixture of shrubs that colonize alluvial materials within intermittent creeks, arroyos, and the drier terraces within large washes. Alluvial scrub typically occurs adjacent to and intergrades with sage scrub communities on higher ground, and with riparian communities in the drainage. These sandy-

gravelly flood-deposited soils have a deeper permanent water table and flood infrequently; thus, they support a primarily upland plant association. Plant species observed in this habitat type on the ranch include big sagebrush, scalebroom (*Lepidospartum squamatum*), blue elderberry, big saltbush (*Atriplex lentiformis*), and squaw bush (*Rhus trilobata*), with some areas having high densities of big sagebrush. There are generally three phases of alluvial scrub growth, which are directly related to elapsed time since the last scouring flood event: pioneer, intermediate, and mature. Alluvial scrub is situated within the drier portions of the arroyos and washes.

3.3 SAN MARTINEZ GRANDE CANYON EXISTING CHARACTERISTICS

3.3.1 Watershed Description and Characteristics

The 3.3-square mile (2,111-acre) San Martinez Grande Canyon watershed is a tributary to the northern bank of the Santa Clara River within the Newhall Ranch project area (Figure 3-1). Approximately 200 acres of San Martinez Grande Canyon, or only 10 percent of the watershed area, is located within the Newhall Ranch property boundary, with the majority being upstream or offsite. The drainage in the headwaters flows generally west to east, while the remaining lower portion of the creek flows north to south, similar in alignment to Chiquito Canyon and joining the Santa Clara River Valley.

The shape of the overall watershed has a dogleg-type appearance similar to Chiquito Canyon, which is the adjacent watershed. The overall watershed boundary, based upon the topography and ridgelines, develops a shape such that a larger portion of the drainage area is tributary in the mid-portion of the watershed. The width of the watershed narrows in both the upstream and downstream tails of the watershed while the central portion of the watershed widens to approximately 6,800 feet in width. The shape of the watershed is important since it influences when runoff reaches the outlet. Although the watershed is relatively long, the large width in the central portion of the watershed will result in delivering more runoff in a shorter amount of time, and with less influence from the upper watershed drainage area.

The distance from the upper headwaters to the canyon mouth is approximately 20,000 feet with an average overall slope of 0.059. The major natural main stem drainage course within the watershed has an average slope in the lower reaches of the watershed through the Newhall Ranch property of approximately 0.022 (Figure 3-11).

The majority of the San Martinez Grande Canyon watershed is characterized by both rugged and steeply developed foothills that have numerous smaller tributary canyons that dissect the watershed, connecting to the narrow alluvial valley associated with the main stem creek. Approximately 90 percent or more of the watershed consists of the rugged foothill

topography with the remainder being the narrow valley floor. The topography for the watershed varies from a maximum elevation of 2,062 feet amsl in the headwaters, to a low elevation of 890 feet amsl near the mouth of the canyon at the Santa Clara River Valley.

Generally, the soils in the watershed are characterized as silty clay loams from both the Castaic and Saugus formations. Also, the soils within the San Martinez Grande Canyon watershed can be predominately classified as being in hydrologic soil group C (higher runoff potential) with exception of areas adjacent to the main stem creek that are Type A (lower runoff potential) and Type B in the lower reaches.

There are no major flood control improvements or dams within the watershed, other than several road culvert/bridge crossings such as the SR 126, which would influence the watershed response to rainfall events. Detailed hydrologic modeling has been performed to evaluate the baseline existing watershed conditions, and the results of the peak discharges for several storm return periods at the downstream canyon mouth are summarized in Table 3-3.

TABLE 3-3
SAN MARTINEZ GRANDE CANYON
EXISTING WATERSHED HYDROLOGY

Return Period	Canyon Mouth	Upstream Newhall Boundary
	Area = 3.3 sq. miles	Area = 2.9 sq. miles
2-year	116 cfs	105 cfs
5-year	304 cfs	276 cfs
10-year	719 cfs	655 cfs
20-year	1727 cfs	1564 cfs
50-year	2346 cfs	2152 cfs
100-year	2951 cfs	2653 cfs

3.3.2 Stream Characteristics

The lower San Martinez Grande Canyon Creek extends approximately 4,800 feet upstream from the canyon mouth at the Santa Clara River Valley to the Newhall Ranch boundary. The geomorphology of the active creek reflects a more highly variable and sinuous alignment that indicates the influence of the physical and topographic features. There is also a much greater variation of the active channel geometry (i.e. width and depth) along this relatively short reach of channel. Representative cross sections illustrating the geometry of the drainage and the active channel are shown for the lower, middle, and upstream reaches of San Martinez Grande Canyon (Figures 3-12, 3-13, and 3-14). The active portion of the creek is more deeply incised below the canyon valley floor. The drainage is generally entirely contained within the active creek banks, and there is little overbank flow. The changes in creek

geometry and form may indicate influences from the upper watershed that affect the sediment delivery.

The changes in channel geometry are also reflected in coincidental variations of the streambed slope. The slope variations are generally higher in the contractions of the channel geometry and flatter in the expansion areas, upstream and downstream. The average streambed slope of the channel indicated by the topographic data is approximately 0.022. The average slope ranges are from 0.08 in the contraction to 0.005 in the wider expansion zones located generally upstream of the contractions. The most upstream 500 feet near the Newhall Ranch project boundary has a less defined active channel and a much wider canyon floor, which reflects depositional area, and which contains increased riparian vegetation. The only manmade structure that influences the hydraulic operation is the roadway culvert crossing for SR 126, but this appears to have sufficient hydraulic capacity with minimal effects to the drainage.

Detailed hydraulic modeling of the existing drainage was performed and indicated that approximately 50 percent of the lower reach of the San Martinez Grande Canyon was hydraulically "steep" (Froude numbers greater than a value of 1.0), while the remainder of the canyon, primarily the upper portion near the Newhall Ranch boundary, was hydraulically a "mild" channel. The hydraulic analysis also indicated at several locations the influence of contractions in the channel geometry, which controlled the hydraulics upstream and downstream of these locations. A brief description of the hydraulic operation of this 4,800-foot length drainage for San Martinez Canyon from the downstream canyon mouth to the upstream Newhall Ranch boundary includes the following:

Lower Reach

1. The immediate downstream portion of the drainage near the canyon mouth to the Santa Clara River is associated with a more prismatic earthen section that connects to the SR 126 roadway crossing, and velocities downstream of the bridge increase from its influence.

2. Upstream of the bridge crossing, the channel significantly widens into a large incised erosional feature that reduces the velocities.

3. Continuing upstream into the canyon mouth, the creek geometry contracts and the velocities accelerate in this area along with the streambed slopes being steeper.

4. Continuing still through the topographic canyon mouth feature where the canyon narrows, the creek passes through several additional contractions and large expansion

zones, which is also indicated by the zones of riparian vegetation that occur in the expansion zones.

5. The velocities in the contractions can range from 12 fps to 16 fps, while the expansion areas are in the 6 fps range.

Middle Reach

6. Continuing through the mid-portion of the canyon, the channel is fairly incised with the velocities averaging from 9 fps to 12 fps and encountering some variation in the channel geometry.

Upper Reach

7. The upstream 500 to 800 feet of the drainage significantly widens, which reflects the limited channel depth or incision, and the wider alluvial deposits that appear to have occurred from a significant contraction in the channel geometry influencing the upstream hydraulic operation.

The hydraulic characteristics of the 100-year storm event generated by the hydraulic modeling indicates that:

1. The average depth is approximately 6.4 feet, ranging from 15 feet to 2.9 feet

2. The average velocity is approximately 8.9 fps, ranging form 19 fps to 2.2 fps

3. The width of the creek water surface averages 110 feet, ranging from 220 feet to 42 feet consistent with the various channel constrictions

Higher velocities generally occur within the contracted and incised portions of the drainage and lower velocities within expansion areas and flatter longitudinal streambed slopes. Lower velocities occur along the fringes of the drainage, while the higher velocities are in the deeper portions of a channel section.

3.3.3 Biological Characteristics

The San Martinez Grande watershed contains a diverse variety of habitats including Great Basin scrub (GBS), mule fat scrub (MFS), coastal sage scrub (CSS), and some grassland (G). Two small patches of elderberry scrub (ES) exist near the northern boundary of the project footprint. The area just upstream of the Santa Clara River confluence is dominated by arrow

weed scrub (AWS). San Fernando Valley spineflower was also found to be present within this watershed. Habitat types not previously described in Sections 3.1.3 or 3.2.3 include:

Mule Fat Scrub: Mule fat scrub is typically a mature riparian habitat dominated by mule fat shrubs (*Baccharis salicifolia*). Co-dominant plant species include narrow-leaved willow (*Salix exigua*), giant cane (*Arundo donax*), and some tamarisk (*Tamarix* sp.). This habitat type is found along the Santa Clara River on upper terraces and on some levees on the ranch property.

Arrow Weed Scrub (AWS): This shrub-dominated plant community is characterized by a nearly pure stand of arrow weed shrubs. Big saltbush (*Atriplex lentiformis*) and mule fat shrubs are often co-dominants in more open stands, especially along road cuts. Wet areas where this habitat has developed may also have some freshwater marsh species occurring with the arrow weed. On Newhall Ranch, this plant community is located on the upper Santa Clara River terraces at the edges of woodlands and along the manufactured slopes near SR-126.

A species of particular interest in this watershed is the San Fernando Valley Spineflower (*Chorizanthe parryi* var. *Fernandina*), which is a state-listed endangered species, a candidate for federal listing, and found on List 1B of the California Native Plant Society (CNPS) Inventory. This species was thought to be extinct until its rediscovery at Ahmanson Ranch in Ventura County in 1999. This species was previously thought to occur in sandy to gravelly soils of washes, riverbeds, and upland areas, primarily on the margins of the San Fernando Valley at the base of the Santa Susana Mountains, San Gabriel Mountains, and the Simi Hills. Subsequent to that 1999 rediscovery, this species has been identified at several locations within the Newhall Ranch project boundary, including the San Martinez Grande Canyon (Dudek, 2002).

The northern, upstream reaches of Mid Martinez Canyon drainage are dominated by coastal sage scrub (CSS) on the west bank, and by grassland (G) on the east. The channel then flows through areas of alluvial scrub and coastal sage scrub, and through agricultural fields (AG) to the Santa Clara River.

3.4 POTRERO CANYON

3.4.1 Watershed Description and Characteristics

The 4.59-square mile (2,936-acre) Potrero Canyon watershed is a tributary to the northern bank of the Santa Clara River within Newhall Ranch (Figure 3-2). The overall watershed drainage pattern is in an east to west direction to the river outlet. The watershed is long compared to the width of the watershed, and the average length-to-width ratio is approximately 3.8. The width of the watershed varies from 4,500 feet to 8,300 feet, as defined by the topographic ridgelines between the adjacent canyons. The larger width of the watershed and greater tributary area occurs in the upper watershed. The shape of the watershed is important since it influences when runoff reaches the outlet. This particular watershed configuration will dominate peak discharges through delaying the runoff but increasing the discharge at the end of the hydrograph. The distance from the upper headwaters to the canyon mouth is approximately 23,000 feet with an average overall slope of 0.045. The major natural main stem drainage course within the watershed has an average slope of approximately 0.02 (Figure 3-15).

The majority of the Potrero Canyon watershed is characterized by both rugged and steeply developed foothills that have numerous smaller tributary canyons that dissect the watershed, connecting to the narrow alluvial valley associated with the main stem creek. There are approximately seven of these smaller tributaries that contribute significant drainage area and function as separate watershed streams. Approximately 65 percent or more of the watershed consists of the rugged foothill topography, with the remainder being the wider valley floor. The topography for the watershed varies from a maximum elevation of 1916 feet amsl in the headwaters, to a low elevation of 866 feet amsl near the mouth of the canyon at the Santa Clara River valley.

Generally, the soils in the watershed are characterized as silty clay loams from both the Castiac and Saugus formations. Also, the soils within the Potrero Canyon watershed can be predominately classified as being in hydrologic soil group C (higher runoff potential) with exception of areas adjacent to the main stem creek that are Type A (lower runoff potential) and Type B in the lower reaches.

Detailed hydrologic modeling has been performed to evaluate the baseline existing watershed conditions, and the results the peak discharges for several storm return periods at the downstream canyon mouth are summarized in Table 3-4.

TABLE 3-4
POTRERO CANYON EXISTING WATERSHED HYDROLOGY

Return Period	Canyon Mouth	Upper Drainage
	Area = 4.59 sq. miles	Area = 1.07 sq. miles
2-year	133 cfs	70 cfs
5-year	337 cfs	183 cfs
10-year	774 cfs	400 cfs
20-year	1853 cfs	851 cfs
50-year	2619 cfs	1115 cfs
100-year	3309 cfs	1363 cfs

3.4.2 Stream Characteristics

The portion of Potrero Canyon Creek that was evaluated consisted of the lower 18,300 feet extending upstream from the canyon mouth at the Santa Clara River Valley. The lower 50 percent of Potrero Canyon has been influenced through manmade activities that had 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 appeared to be less historical farming operations and impact to the natural active creek channel. However, the active channel has limited hydraulic capacity, particularly in the lower portion of the canyon, which results in overtopping and creation of a secondary sheet flow on the southern side of the canyon, consistent with the large meadow area. The engineered portions of the active channel follow a very linear alignment, and the channel is generally located adjacent to the roadway along the canyon floor. The canyon floor is characterized by a very large and flat width in the valley as compared to the other tributary canyon watersheds. The drainage characteristics and trends also reflect that of a wide, stable valley system, with little tendency to deeply incise beyond the minor active channel. Representative cross sections illustrating the geometry of the drainage and the active channel are shown for the lower, middle, and upstream reaches for Potrero Canyon (Figures 3-16, 3-17, and 3-18). The average streambed slope indicated by the topographic data is relatively constant along the majority of the streambed at approximately 0.020, while the downstream 3,000 feet through the canyon mouth increase to a slope of 0.038. This relatively constant slope is also reflected in the reduced drainage width near the canyon mouth, and in higher velocities.

Detailed hydraulic modeling of the existing creek was performed and indicated that this entire lower reach of Potrero Canyon was hydraulically "steep," generating higher velocities than a "mild" channel. A brief description of the hydraulic operation of the drainage from the downstream canyon mouth to upstream along the 18,300 feet reach includes the following:

Lower Reach

1. The majority of the storm event flows through the lower 3,000 feet of the canyon to the Santa Clara River Valley are conveyed on the southerly side of the canyon and not in the active channel on the northern side because of its limited capacity.

2. The drainage significantly widens upstream of the steeper portion near the canyon mouth, but is still separated from the active channel on the opposite side.

3. The wide drainage area reflects low velocities in the overbank area of the valley floor.

Middle Reach

4. Continuing upstream, the canyon narrows slightly and reduces the width of the drainage, which increases the velocities and depths.

5. Within this lower mid portion of the drainage, the active channel and sheet flow area on the southerly side of the canyon rejoin.

6. The drainage then follows a rather linear alignment through the mid portion of the canyon with fairly constant widths.

Upper Reach

7. Through the oil field area, the drainage width varies with several contraction and large expansion areas, as indicated by historical deposition and by the variation in average velocity.

8. Continuing through the upper portion of the drainage, it becomes more incised and is generally fully contained in the active channel.

9. The last remaining 1,000 feet of the drainage widens significantly since the channel is not well defined or incised, which reduces the velocities.

The hydraulic characteristics of the 100-year storm event generated by the hydraulic modeling indicates that:

1. The average depth is approximately 2.9 feet, ranging from 6.5 feet to 0.5 feet

2. The average velocity is approximately 7.7 fps, ranging from 19.4 fps to 3.6 fps
3. The width of the creek water surface averages 300 feet, ranging from 840 feet to 35 feet at the roadway crossing

Higher velocities generally occur within the contracted and incised portions of the drainage, and lower velocities occur within expansion areas and flatter longitudinal streambed slopes. Along the fringes of the drainage, lower velocities occur while the higher velocities are in the deeper portions of a channel section.

3.4.3 Biological Characteristics

Habitat types in the Potrero Canyon drainage are comprised primarily of grassland (G) and coastal sage scrub (CSS), although a wide variety of habitat is represented. Live oak woodland (LOW), mule fat scrub (MFS), great basin scrub (GBS), mesic meadow (MM), elderberry scrub (ES), and valley oak woodland (VOW) are all present within the Potrero watershed, along with agricultural land (AG). The habitat type not previously described in Sections 3.1.3, 3.2.3, and 3.3.3 is:

Mesic Meadow: Mesic meadows form in grassland areas where seeps, springs, or groundwater surfaces are present. In these areas, soils remain saturated most of the year. Plant species found in mesic meadows can tolerate the moist conditions for prolonged periods. Herbaceous species present include yerba mansa (*Anemopsis californica*), curly dock (*Rumex crispus*), spike rush (*Eleocharis* sp.), annual beard grass (*Polypogon monspeliensis*), rush (*Juncus* sp.), and saltgrass (*Distichlis spicata*). Mesic meadows on the ranch are located within Potrero Creek, on an unnamed drainage at the east end of Middle Potrero Canyon, and in Via Canyon.

3.5 SALT CREEK

3.5.1 Watershed Description and Characteristics

The Salt Creek watershed encompasses approximately 5,816 acres (Figure 3-2). A steep ridgeline between Potrero Canyon and Salt Creek Canyon/Grave Canyon form the eastern limit of the Salt Creek watershed in Los Angeles County. The ridgeline of the Santa Susana Mountains (3,100 feet amsl) forms the southern limits of the Salt Creek watershed in both Los Angeles and Ventura Counties. The western limit of the Salt Creek watershed is in Ventura County, and is formed by a ridgeline that separates Tapo Canyon and Salt Creek Canyon. The Salt Creek watershed terminates to the north where Salt Creek Canyon merges with the Santa Clara River Valley in Ventura County (825 feet amsl).

3.5.2 Creek Characteristics

While the Salt Creek drainage is one of the largest found within the boundaries of the Newhall Ranch project area, it was not subjected to detailed hydrologic/hydraulic modeling because it is contained within the High Country set-aside where no development will occur. 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. Construction of a small visitors' center located outside the jurisdictional area would serve as the gateway into the High Country. Otherwise, this area will be maintained in its present state in perpetuity.

3.5.3 Biological Characteristics

The vast majority of this watershed is covered by coastal sage scrub (CSS). Agriculture (AG), great basin scrub (GBS), and grassland (G) habitat types comprise most of the remaining area, although valley oak woodland (VOW), mule fat scrub (MFS), alluvial scrub (AS), and live oak woodland (LOW) are present in small patches.

At the confluence of the middle and east forks of Salt Creek, wetland conditions are present and persist from approximately 750 feet upstream to 700 feet downstream of the confluence. The total area of this wetland is approximately 8.5 acres, and dominant flora include saltgrass (*Distichlis spicata*, 50-60 percent cover), mulefat (*Baccharis salcifolia*, 30-40 percent cover), Arroyo willow (*Salix lasiolepis*), and the sedge, *Scirpus americanus*. In the vicinity of the wetland area, the vast majority of the vegetation is native, and very few weeds are present. Occasional weeds located in the wet portion of the drainage included rabbit's foot grass (*Polypogon spp.*) and tamarisk (*Tamarix spp.*). Other weeds, including tree tobacco, yellowstar thistle, prickly wild lettuce, black mustard, white sweet clover, and fivehook bassia, are primarily located near the road, and cover less than 5 percent of the area sampled. As the Salt Creek drainage has been designated a permanent open space, no impacts to this wetland area are anticipated from the proposed project.

3.6 OTHER JURISDICTIONAL DRAINAGES

The Newhall Ranch project area contains several other smaller jurisdictional tributary watersheds comprised of small, ephemeral drainages. Habitat types found in each of these drainages are briefly described below (Figures 3-1 and 3-2).

Homestead Canyon: This watershed is dominated by coastal sage scrub (CSS), but also contains one thin strip of great basin scrub (GBS) lining the stream channel near the lower end, and patches of dispersed grassland (G).

Unnamed Drainage: This drainage is located to the west of Homestead Canyon and abutting the western project boundary north of SR 126 with only a very short segment of it found within the project footprint. The drainage itself runs through grassland (G) and great basin scrub (GBS), although the watershed is dominated by coastal sage scrub (CSS). The drainage also includes one small patch of agricultural land (AG) on the downstream end.

Off-Haul Canyon: The upper reaches of Off-Haul Canyon drainage contain a mixture of coastal sage scrub (CSS) and alluvial scrub (AS). Lower areas, in the vicinity of State Route 126, are dominated by agricultural land (AG).

Humble Canyon: The habitat types found in the upper reaches of the Humble Canyon watershed consist primarily of mixed chaparral (MC), grassland (G), and alluvial scrub (AS). The lower portions of the watershed contain a mixture of alluvial scrub, live oak woodland (LOW), coastal sage scrub (CSS) and, in the area directly adjacent to the Santa Clara River, Southern Willow Scrub (SWS). San Fernando Valley spineflower populations are also present within this watershed.

Unnamed Drainages (2): These two adjacent unnamed drainages are located between Long and Humble canyons. They are dominated by coastal sage scrub (CSS) with pockets of mixed chaparral (MC) sparsely interspersed. At the canyon mouths, along the south bank of the Santa Clara River, live oak woodland (LOW) and great basin scrub (GBS) are also present.

Ayres Canyon: This stream is lined with southern willow scrub (SWS) and alluvial scrub (AS), with some live oak woodland (LOW) present along the south bank. Habitat types within this watershed are dominated by coastal sage scrub (CSS) and grassland (G).

Lion Canyon: The upper reaches of the Lion Canyon watershed, which contains several branches, contains mostly mixed chaparral (MC) and coastal sage scrub (CSS). Along the channel, alluvial scrub (AS), live oak woodland (LOW), grassland (G), scalebroom scrub (SS), and chamise chaparral (CC) are present. The two easternmost branches of this drainage also contain great basin scrub (GBS), which is absent from the watershed of the western branch.

Middle Canyon: This watershed is dominated by coastal sage scrub (CSS), with small pockets of mixed chaparral (MC) and grassland (G). The stream channel flows through grassland, agricultural areas (AG), alluvial scrub (AS), and live oak woodland (LOW). A freshwater marsh is present at the Santa Clara River confluence. San Fernando Valley spineflower populations are also present within this watershed.

Exxon Canyon: This drainage is dominated by coastal sage scrub (CSS), live oak woodland (LOW), and mixed chaparral (MC). On both branches, alluvial scrub (AS) is also present along the stream channel.

Magic Mountain Canyon: The small segment of this stream that passes through the project area is surrounded by coastal sage scrub (CSS) and great basin scrub (GBS), with one pocket of mixed chaparral (MC) and one pocket of agricultural land (AG).

Dead-End Canyon: This watershed consists almost exclusively of coastal sage scrub (CSS), although isolated pockets of grassland (G), elderberry scrub (ES), mixed chaparral (MC), and live oak woodland (LOW) are present as well.

3.7 SANTA CLARA RIVER

This description of the hydrologic characteristics of the Santa Clara River is derived from the Draft Additional Analysis, Vol. 1, April 2001, Section 2.3-4, prepared for Los Angeles County Department of Regional Planning (Impact Sciences, 2002).

3.7.1 Watershed Description and Characteristics

The Santa Clara River (SCR) is the largest watercourse in the project area, and all other drainages within the project area are tributary to this river (Figure 3-1). The reach of the Santa Clara River within the Specific Plan area has year-round flows created by tertiary treated effluent discharges from two upstream water reclamation plants operated by the Sanitation Districts of Los Angeles County, rising ground water, and from storm water runoff. Storm flows that occur during winter months due to storm water runoff, and these flows fluctuate significantly from year to year. During the summer months, short-term releases from Castaic Lake reach the river via Castaic Creek, which joins the river upstream of the Newhall Ranch project area.

The average discharges for floods of different return events (2-year, 5-year, 10-year, 20-year, 50-year, and 100-year) at the upstream and downstream ends of the project area are given in Table 3-5.

TABLE 3-5
EXISTING CONDITIONS: DISCHARGES IN SCR
AT NEWHALL RANCH PROJECT AREA

Return Period	Offsite, Between Newhall Ranch Project Area and Castaic Creek	Downstream End of Newhall Ranch Project Area at Los Angeles County Line
2-Year	2,527 cfs	2,600 cfs
5-Year	8,232 cfs	8,480 cfs
10-Year	14,942 cfs	15,400 cfs
20-Year	24,157 cfs	24,900 cfs
50-Year	41,141 cfs	42,400 cfs
100-Year	58,207 cfs	60,000 cfs

3.7.2 River Characteristics

The area of ground surface covered by water in the Newhall Ranch project area between the Commerce Center Drive bridge and a point 4 miles east of the County line during different return events is shown in Table 3-6. This area increases as the discharge and associated water level increase. The width of the active river channel (area inundated by a two-year storm event) within the Newhall Ranch project area varies from 200 to 800 feet. During a 100-year storm event, the maximum width of the inundated river channel is 2,200 feet.

The average width of the low-flow channel during summer months is approximately 50 to 100 feet, with an average depth of about 1 foot. The low flow channel through the project area has a low to moderate sinuosity. Approximately half of this reach is contained within a single channel, while the remainder consists of braided channels and broad, shallow flows.

3.7.2.1 Water Velocity and Depth

Water velocity and depth along the river also increase with higher discharges (i.e., flows). An example of this relationship is provided in Table 3-7 for a location along the river in the Newhall Ranch project area (Figure 3-19). These data indicate that velocities, measured in fps, more than double from the 2-year to the 100-year storm event, while water depth increases three-fold. In contrast, discharge increases thirty-fold from the 2-year to the 100-year storm event.

TABLE 3-6
SCR EXISTING CONDITIONS: FLOODED AREA DURING DIFFERENT RETURN EVENTS

Return Period	Newhall Ranch Project Area, Between Commerce Center Drive and LA County Line	From County Line to Point 4 Miles Downstream in Ventura County
2-Year	246 acres	86 acres
5-Year	309 acres	131 acres
10-Year	361 acres	160 acres
20-Year	482 acres	198.5 acres
50-Year	664 acres	257 acres
100-Year	766 acres	298 acres

Velocity and water depth increases do not correspond to the discharge increases because the wide river channel allows flow to spread out as discharge volumes increase.

TABLE 3-7
EXAMPLE OF INCREASING DEPTH AND VELOCITY WITH DISCHARGE – EXISTING CONDITIONS AT THE COUNTY LINE

Return Event (Years)	Discharge (cfs)	Average Water Depth (ft)	Average Water Velocity (fps)
2	2,000	2.34	5.32
5	8,480	3.38	7.09
10	15,400	4.13	8.97
20	24,900	5.08	10.40
50	42,400	6.47	11.71
100	60,000	7.45	12.53

3.7.2.2 River Conditions

The difference in elevation between the channel bottom and the adjacent jurisdictional margins of the river varies greatly within the Newhall Ranch project area. This difference ranges from 9 to 20 feet, and is dependent upon the width of the river channel. For example, in wider portions of the river channel where flows spread out with low velocities, there is only a small elevation difference between the channel bottom and the adjacent jurisdictional boundary. Representative cross sections of the active channel illustrate the geometry, and are provided for the lower, middle, and upstream reaches of the river (Figures 3-20, 3-21, and 3-22). In contrast, the channel is often deep where it is narrower, creating a large elevation difference between the channel bottom and the jurisdictional boundary.

The existing river channel contains a variety of vegetation types. The active river channel is mostly barren due to annual scouring. However, vegetation types on the adjacent terraces vary based on elevation relative to the active channel bottom and the frequency of storm events. The following series of vegetation types occur along a vertical gradient from the channel bottom to the highest river terrace: emergent herbaceous, woody shrubs, and trees.

The substrate of the river channel (i.e., top layer of the river bottom) is primarily sand, which is actively eroded and deposited in flood events. Previous studies by the Los Angeles County Flood Control District have demonstrated that sediment deposition and scouring along the upper Santa Clara River are generally in equilibrium, and that there are no major trends of channel degradation or aggradation. However, some localized areas may experience either greater scouring or sand deposition.

3.7.3 Biological Characteristics

3.7.3.1 Existing Aquatic, Wetland, and Riparian Habitats Along the River

The Santa Clara River corridor in the Newhall Ranch project area supports three general categories of habitat:

- Aquatic habitats, consisting of flowing or ponded water
- Wetland habitats, consisting of emergent herbs rooted in ponded water or saturated soils along the margins of the flowing water
- Riparian habitat, consisting of woody vegetation along the margins of the active channel and adjacent terraces

The key characteristics of the dominant aquatic, wetland, and riparian habitats in the Santa Clara River corridor in the Newhall Ranch project area (Commerce Center Drive bridge site to the County line) are summarized in Table 3-8. This table does not include upland habitats, or disturbed or cultivated habitats in the river corridor.

The density, biomass, and location of the vegetation in relation to the channel bottom are directly dependent upon the frequency of disturbance by flood flows. Successional mulefat scrub (SMFS) occupies the active channel and is disturbed annually by flows. This habitat also includes all aquatic features such as pools and flowing water, as well as most of the emergent wetlands in the river corridor because of the presence of water. In contrast, willow woodland and cottonwood-willow woodland is located above the active river channel and is

only flooded during infrequent storm events, which allows large trees to become established between events.

TABLE 3-8
SUMMARY OF DOMINANT WETLAND AND RIPARIAN HABITAT TYPES IN THE RIVER AT THE NEWHALL RANCH PROJECT AREA

Habitat	Dominant Species	Structure	Location in the River	Height Above Channel Bottom (ft)
Alluvial scrub	Sagebrush and scalebroom	Open, sparse mixture of shrubs	Upper dry terraces; old braided channels	8
Arrow weed scrub	Arrow weed	Dense monoculture	Upper terraces	8
Cottonwood willow forest	Fremont cottonwood and red willow	Mature woodland with large overstory trees and dense understory	Upper terraces, near or at upland boundary	9.5
Mulefat scrub; contains some wetland areas	Mulefat, giant reed, narrow-leaf willow	Moderately dense shrubs, 6 to 10 feet in height; patches of emergent wetlands	Terrace adjacent to active channel	5.5
Successional mule fat scrub (includes aquatic and wetland habitats)	Mulefat, giant reed, narrow-leaf willow	Mostly barren with scattered small shrubs; flowing water; pools; emergent wetlands	Active channel that is continually disturbed by flows	1.5
Willow woodland	Red and arroyo willow, Fremont cottonwood	Mature woodland with large overstory trees and dense understory	Upper terraces, near or at upland boundary	9
Willow scrub	Arroyo willow	Dense willow plants, 10 to 12 feet in height	Mid-level terraces	6.5

Mule Fat Scrub (MFS): Mule fat scrub (previously described) is typically a mature riparian habitat dominated by mule fat shrubs (*Baccharis salicifolia*). Co-dominant plant species include narrow-leaved willow (*Salix exigua*), giant cane (*Arundo donax*), and some tamarisk (*Tamarix* sp.). This habitat type is found along the Santa Clara River on upper portions of the terraces and on some levees on the ranch property.

Successional Mule Fat Scrub (SMFS): A subclass of mule fat scrub was used to denote the development of this plant community along the active channel of the Santa Clara River. Successional mule fat scrub (SMFS) denotes a young, successional community dominated by young saplings of predominantly mule fat and narrow-leaved willow. This subclass is found

within the low flow (active) channel of the Santa Clara River on sand bars where frequent scouring by floods prevents it from fully developing into mature mule fat scrub.

The Santa Clara River characteristics provide year-round and seasonal aquatic habitats, as described in Table 3-9. All aquatic habitats are subject to periodic disturbances from winter flood flows. These flows inundate areas that are dry most of the year. They also carry and deposit sediments, seeds, and organic debris (e.g., stems, downed trees).

New sandbars are formed and old ones are destroyed. Stands of vegetation are eroded by high flows, and new areas are created where vegetation becomes established by seeds or buried stems. Flows can change the alignment of the low flow channel, the number and location of pools, and the depth of pools. In years with low winter flows, there may be very little change in the aquatic habitats of the river. In such years, wetland vegetation along the margins of the low flow channel and pools would increase. In high flow years, this vegetation would be removed, but would become re-established during the spring and summer due to natural colonization processes. As can be seen, the aquatic habitats of the river are in a constant state of creation, development, disturbance, and destruction. The diversity of habitat conditions in the river at any one time supports a variety of aquatic invertebrates, aquatic plants, and fish.

The abundance and variety of riparian and wetland habitats in the river corridor that support sensitive habitats and species are due largely to the natural dynamic riverine processes that occur unimpeded in the project area. The continual creation and destruction of habitats due to flooding and drought periods provides a mosaic of different types and ages of habitats. This mosaic is a key element in sustaining the habitat of sensitive species.

TABLE 3-9
CHANNEL CHARACTERISTICS OF THE SANTA CLARA RIVER AT THE NEWHALL RANCH PROJECT AREA

Channel Feature	Description/Characteristics	Source of Water	Frequency of Disturbance
Low-flow channel	Highly variable depth, dimensions, and locations. Emergent wetlands form along edges each spring and summer. Mostly sandy substrate with unstable banks. Mostly exposed runs and scattered riffles. Shallow depth (<1 ft).	Year-round treated effluent and winter runoff.	Annual disturbance from flood-related flows. Daily changes in water depth and flow due to variable effluent flows.
On-channel pools	Small scattered pools (less than 20 ft long) that form in the main channel in response to debris dams or sandbars. Emergent wetlands and young woody willows along margins. Shallow depths (<1 ft).	Year-round treated effluent and winter runoff.	Annual disturbance from flood-related flows. Daily changes in water depth and flow due to variable effluent flows.
Off-channel pools	Highly variable size. Generally < 2 ft depth. Vegetation along the margin may be dense emergent or riparian shrubs, or are absent in some areas.	Groundwater seepage.	Inundation by flood flows every 1-2 years.
Road crossing ponds and plunge pools	Four at-grade river crossings create upstream ponds and downstream plunge pools with depths of 3 feet. Aquatic vegetation along the margins.	Year-round treated effluent and winter runoff.	Annual disturbance from flood-related flows. Crossings are re-built every year.
Winter secondary channels and overflow areas	Highly variable areas where winter flood flows occur when the low-flow channel is full. Ranging from discrete channels to sheet flow areas. Usually containing young mulefat scrub.	Winter flood related flows. Ephemeral aquatic features. May only persist for several days to weeks after a flood.	Inundation and scouring every 1-2 years.
Tributary channels	Highly variable channels that convey water from tributaries to the river channel. Usually small channels with ephemeral or slow moving water, except during the winter. Generally sparsely vegetated except for Potrero, San Martinez, and Salt Creek.	Winter flows, and occasional seepage flow from side canyons; ephemeral flows.	Disturbance each year from flood flows in the tributaries.

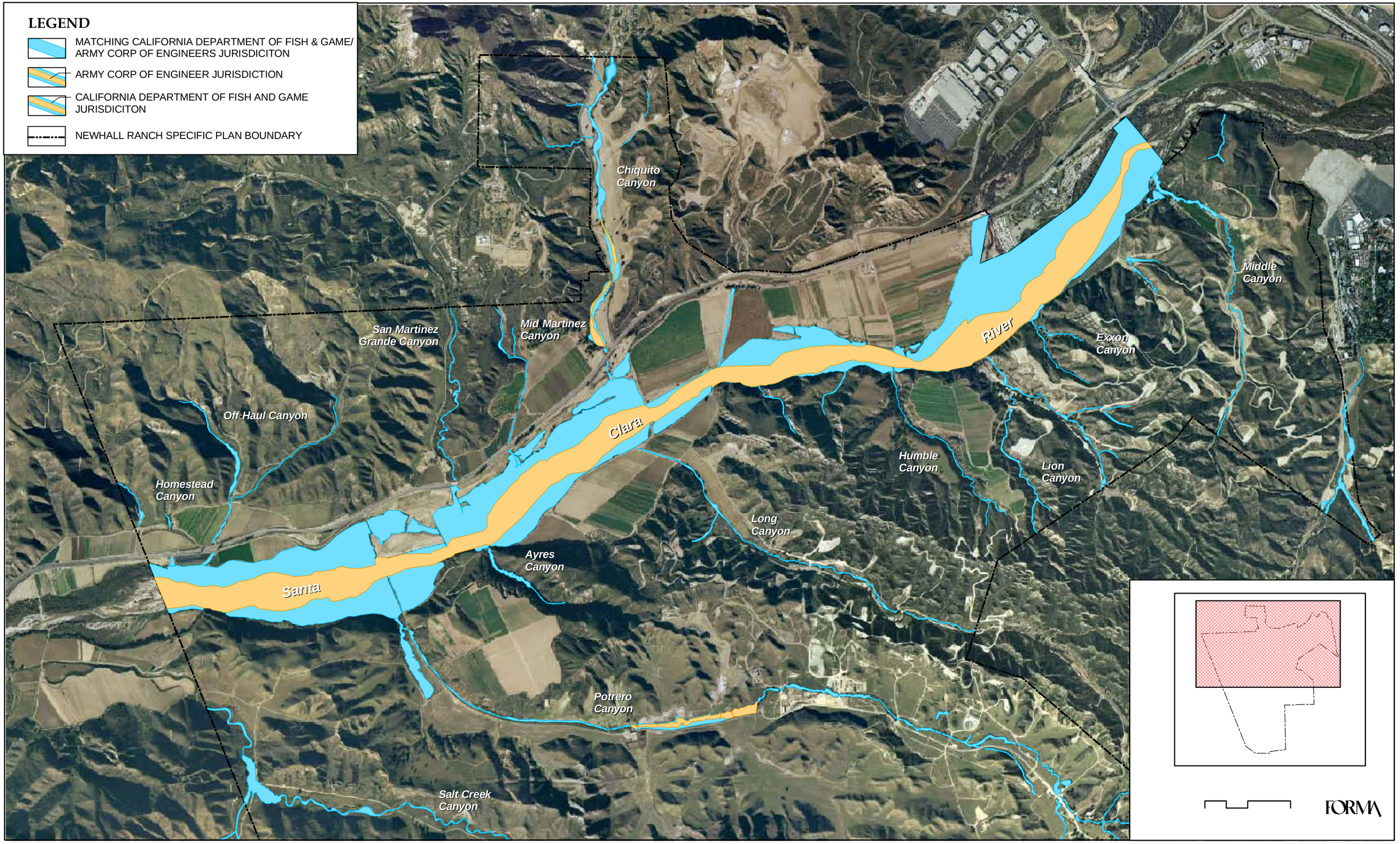


Figure 3-1 CALIFORNIA DEPARTMENT OF FISH AND GAME AND ARMY CORPS OF ENGINEERS JURISDICTION COMPARISON - EXTENT A

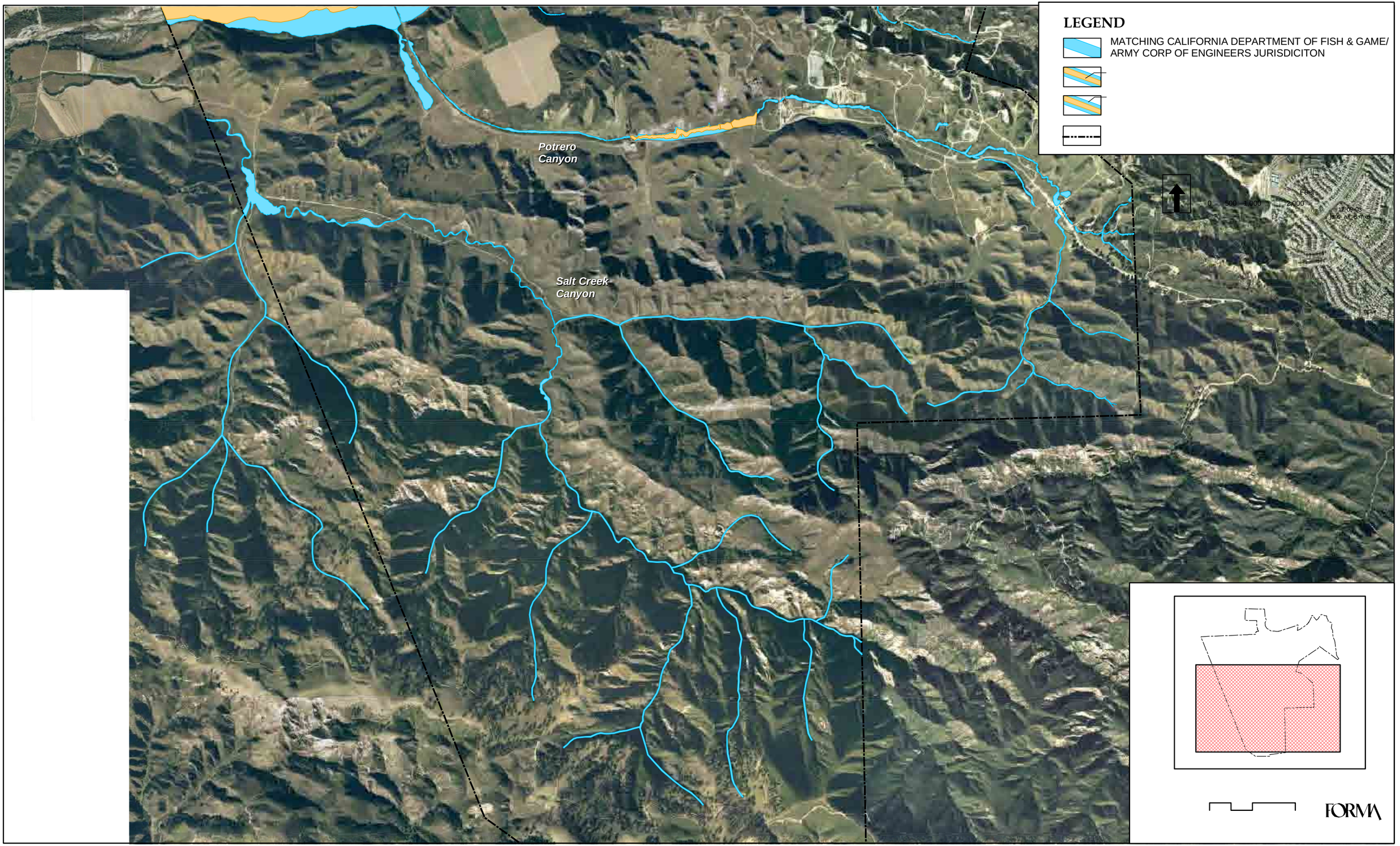


Figure 3-2 CALIFORNIA DEPARTMENT OF FISH AND GAME AND ARMY CORPS OF ENGINEERS JURISDICTION COMPARISON - EXTENT B

T:\Newhall\cad\Chiquito PF.dwg 12/12/03

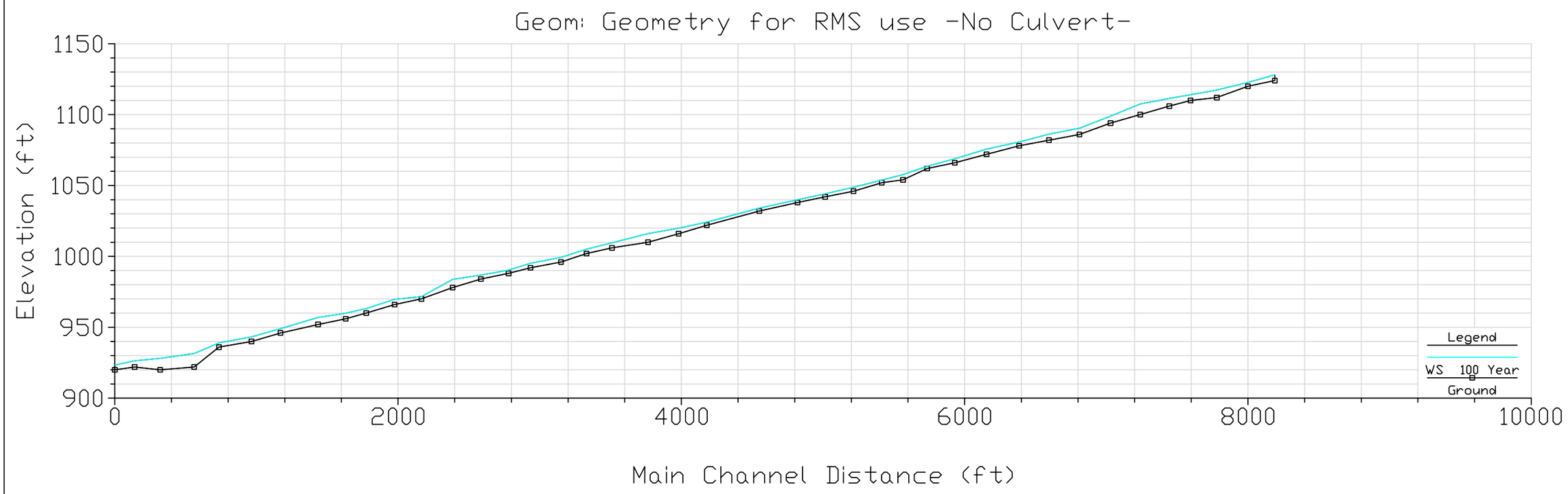


Figure 3-3
STREAM PROFILE SHOWING EXISTING CONDITIONS IN CHIQUITO CANYON

T:\Newhall\cad\Chiquito 1735.dwg 12/12/03

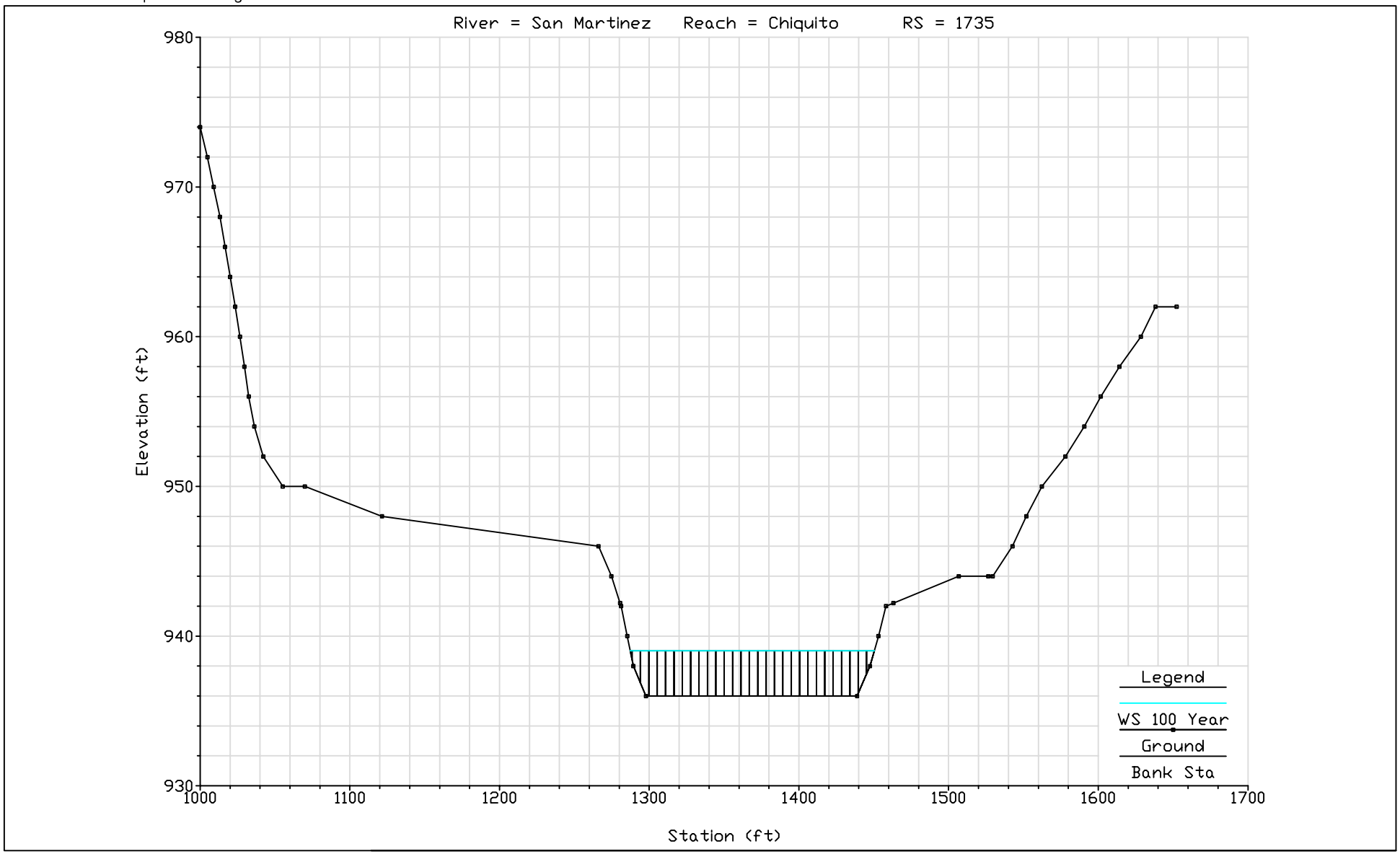


Figure 3-4

SPECIFIC CROSS SECTION SHOWING EXISTING GEOMORPHIC CONDITIONS IN CHIQUITO CANYON DOWNSTREAM STATION

T:\Newhall\cad\Chiquito 5820.dwg 12/12/03

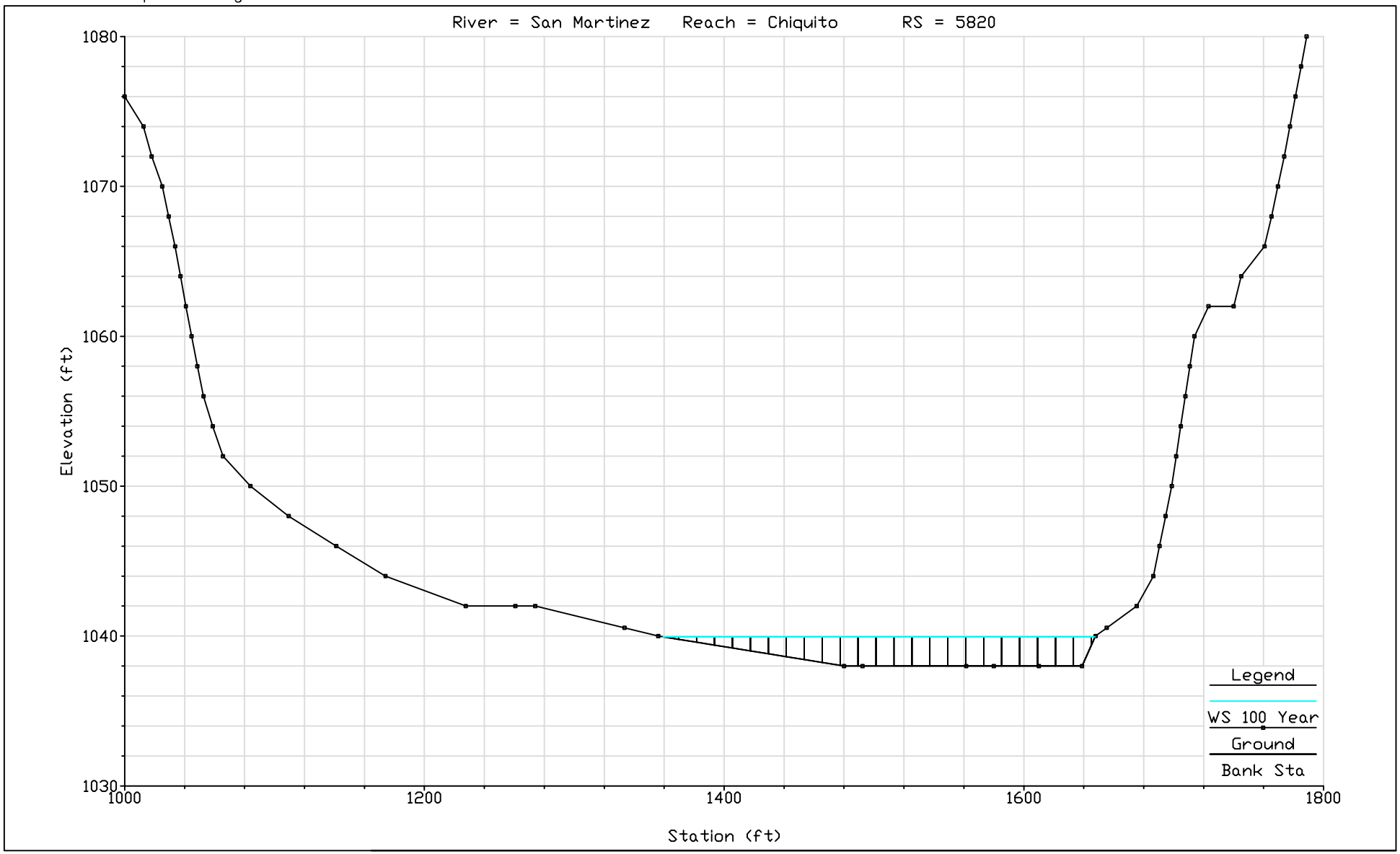


Figure 3-5

SPECIFIC CROSS SECTION SHOWING EXISTING GEOMORPHIC CONDITIONS IN CHIQUITO CANYON MIDDLE STATION

T:\Newhall\cad\Chiquito 8780.dwg 12/12/03

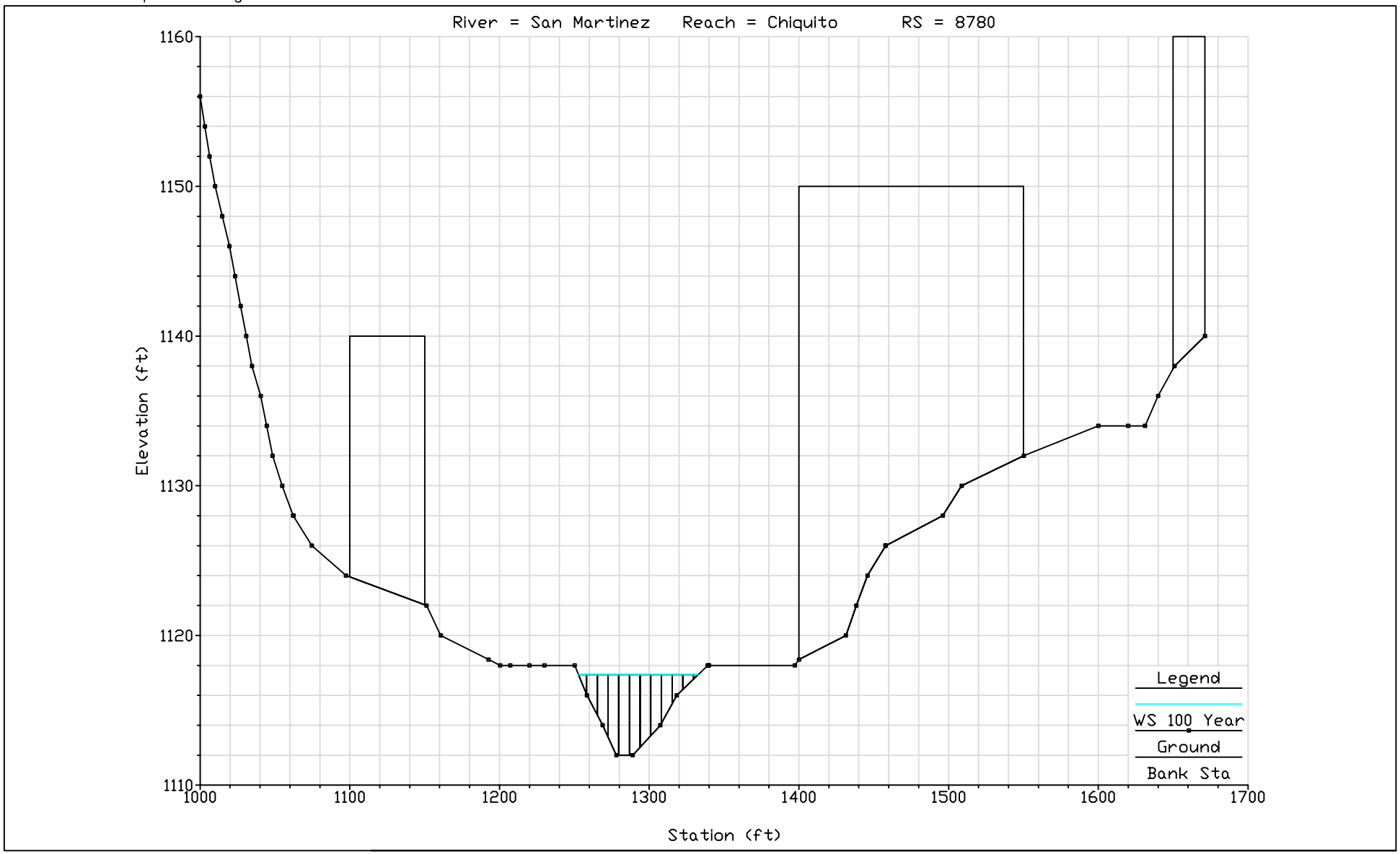


Figure 3-6

SPECIFIC CROSS SECTION SHOWING EXISTING GEOMORPHIC CONDITIONS IN CHIQUITO CANYON UPSTREAM STATION

T:\Newhall\cad\Long PF.dwg 12/12/03

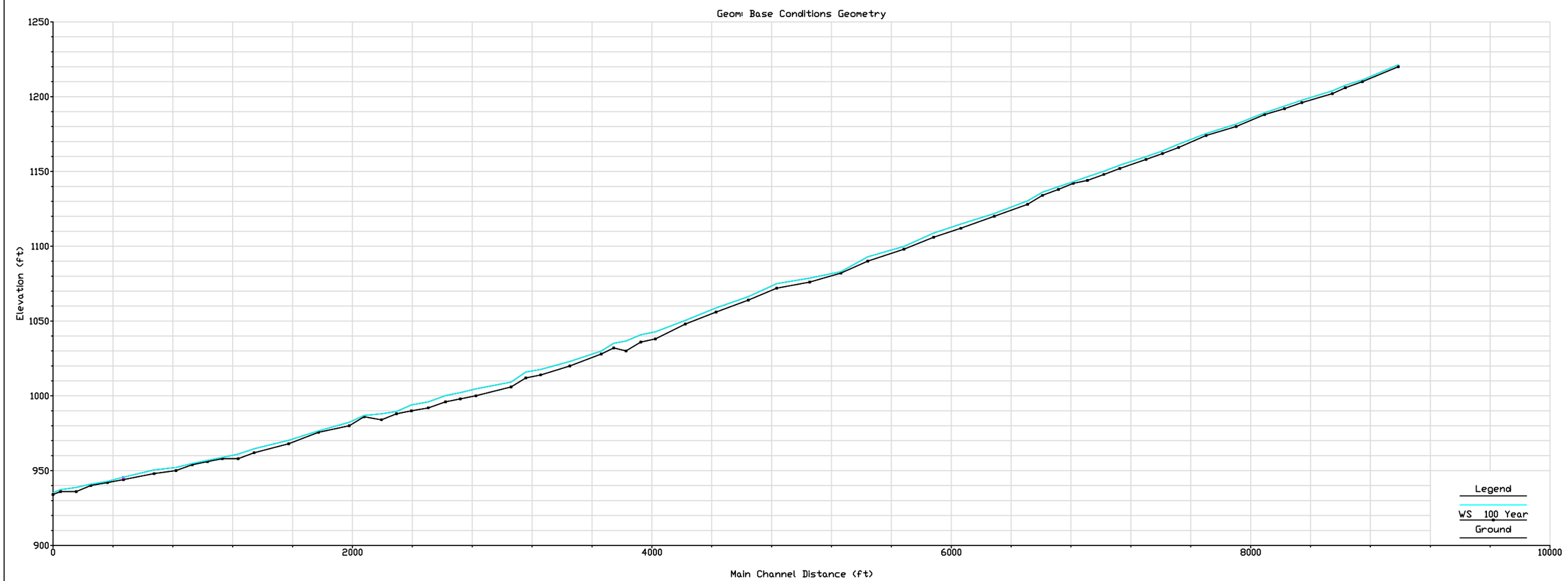


Figure 3-7
STREAM PROFILE SHOWING EXISTING CONDITIONS IN LONG CANYON

T:\Newhall\cad\Long 1000.dwg 12/12/03

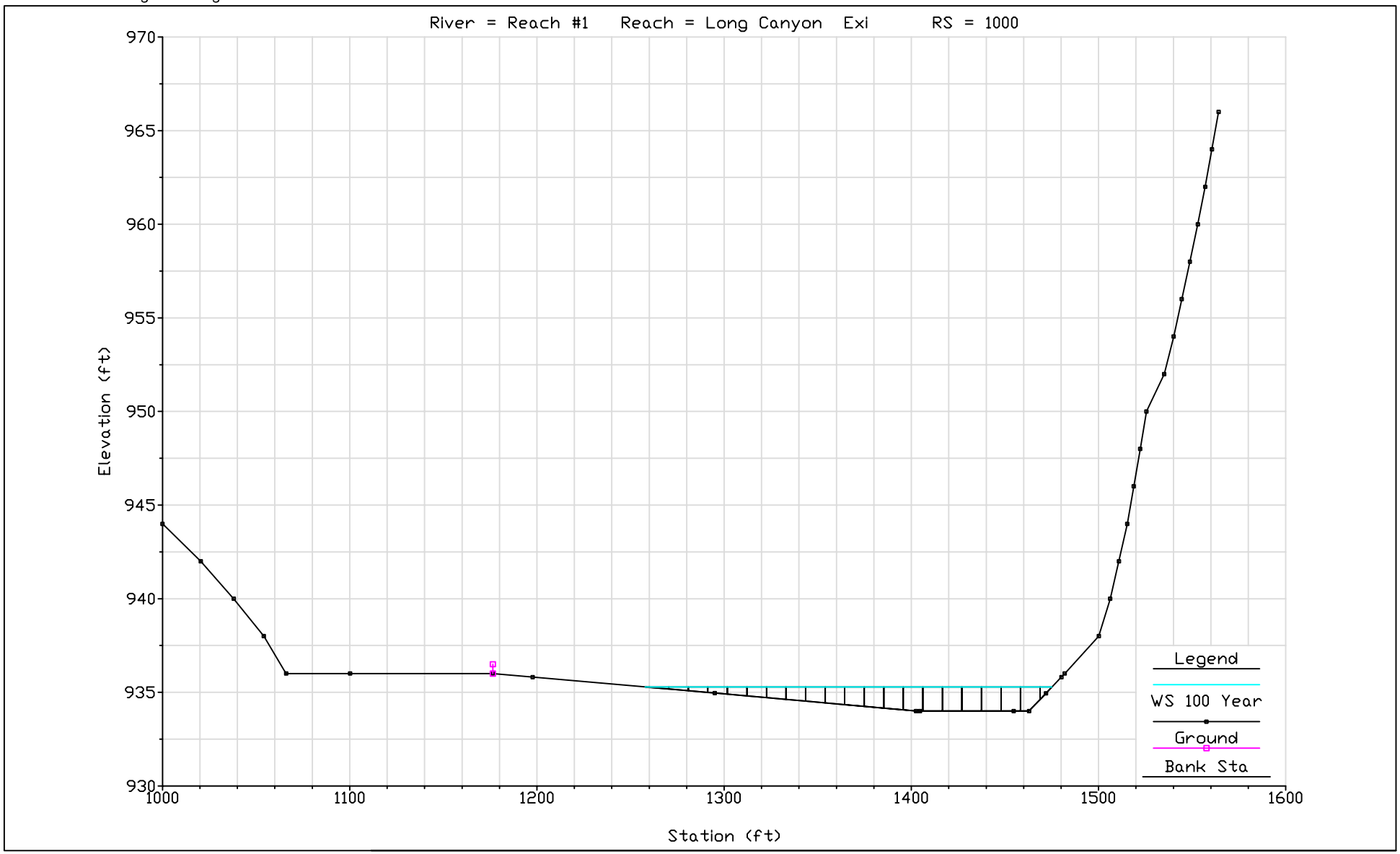


Figure 3-8

SPECIFIC CROSS SECTION SHOWING EXISTING GEOMORPHIC CONDITIONS IN LONG CANYON DOWNSTREAM STATION

T:\Newhall\cad\Long 4600.dwg 12/12/03

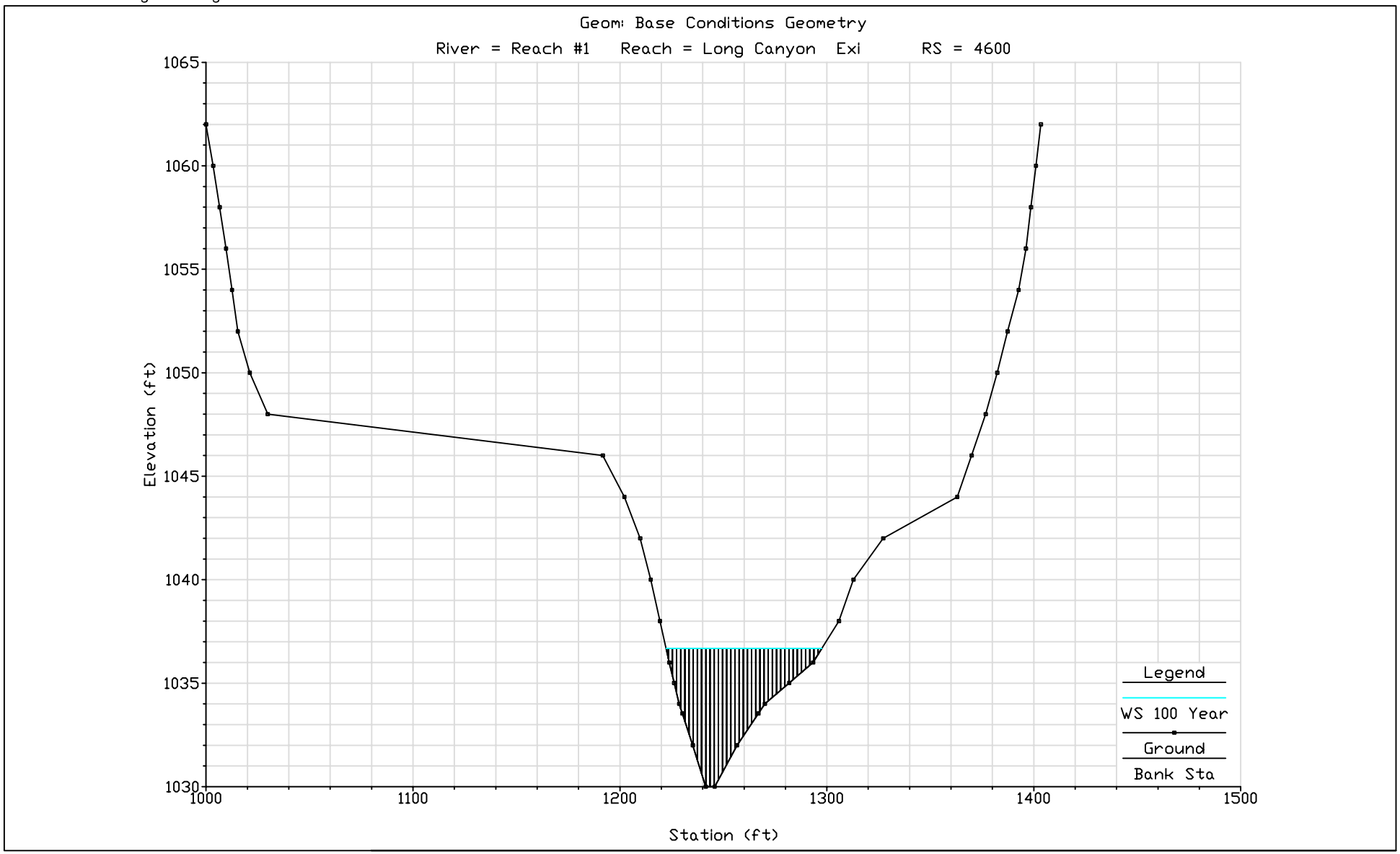


Figure 3-9

SPECIFIC CROSS SECTION SHOWING EXISTING GEOMORPHIC CONDITIONS IN LONG CANYON MIDDLE STATION

T:\Newhall\cad\Long 9400.dwg 12/12/03

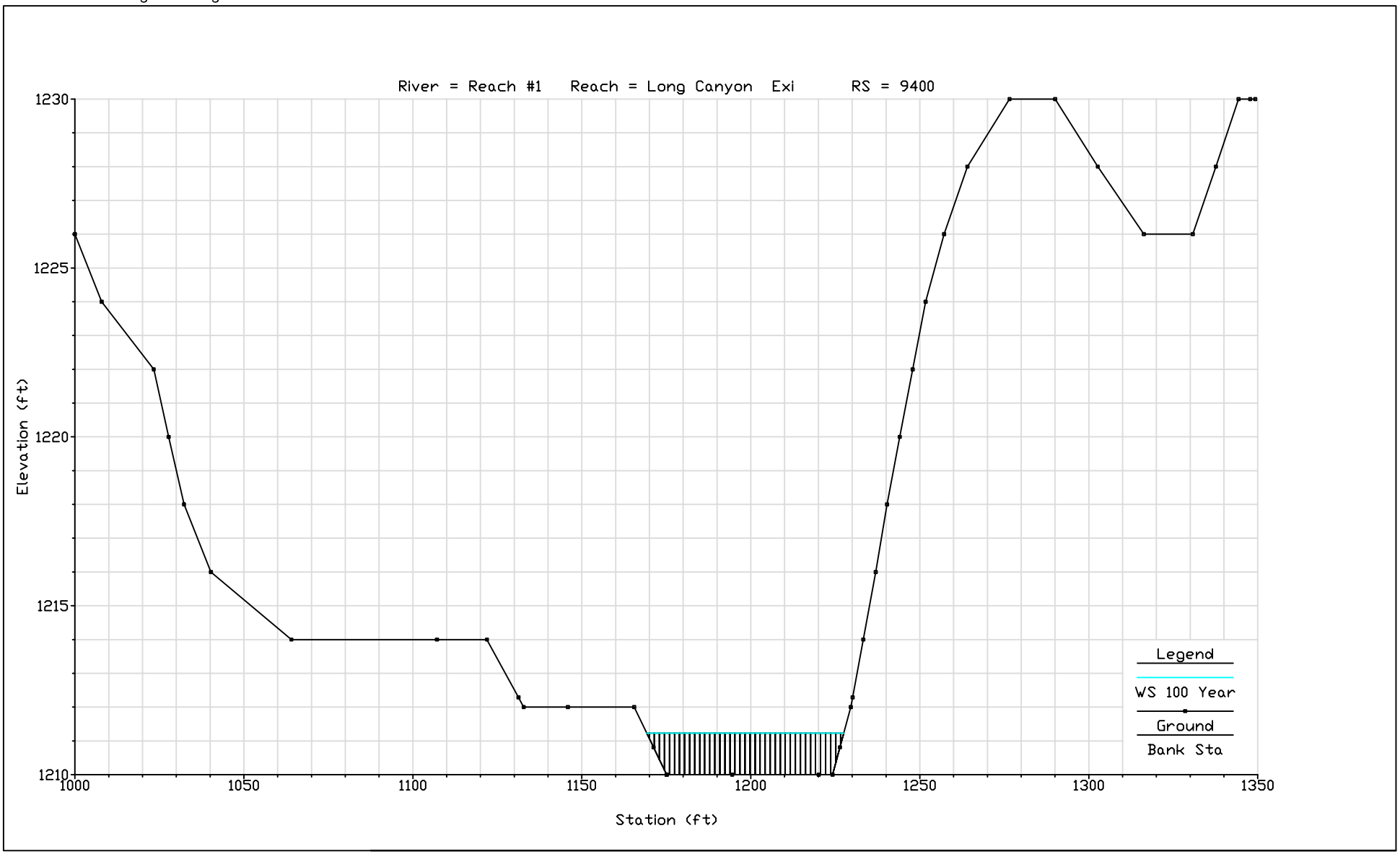


Figure 3-10

SPECIFIC CROSS SECTION SHOWING EXISTING GEOMORPHIC IN LONG CANYON UPSTREAM STATION

T:\Newhall\cad\Grande PF.dwg 12/12/03

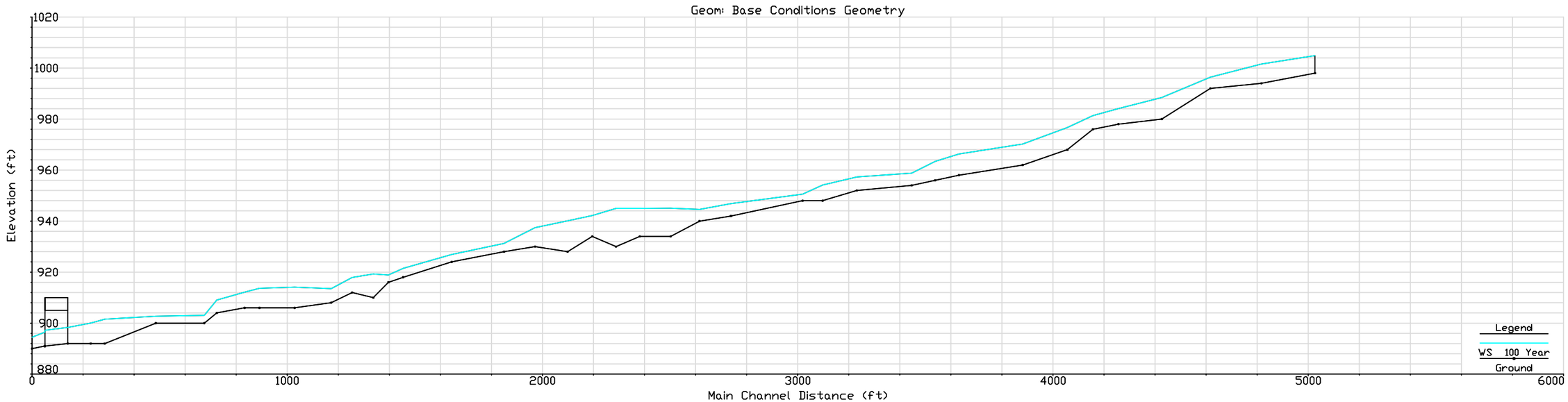


Figure 3-11
STREAM PROFILE SHOWING EXISTING CONDITIONS
IN SAN MARTINEZ GRANDE CANYON

T:\Newhall\cad\Grande 1485.dwg 12/12/03

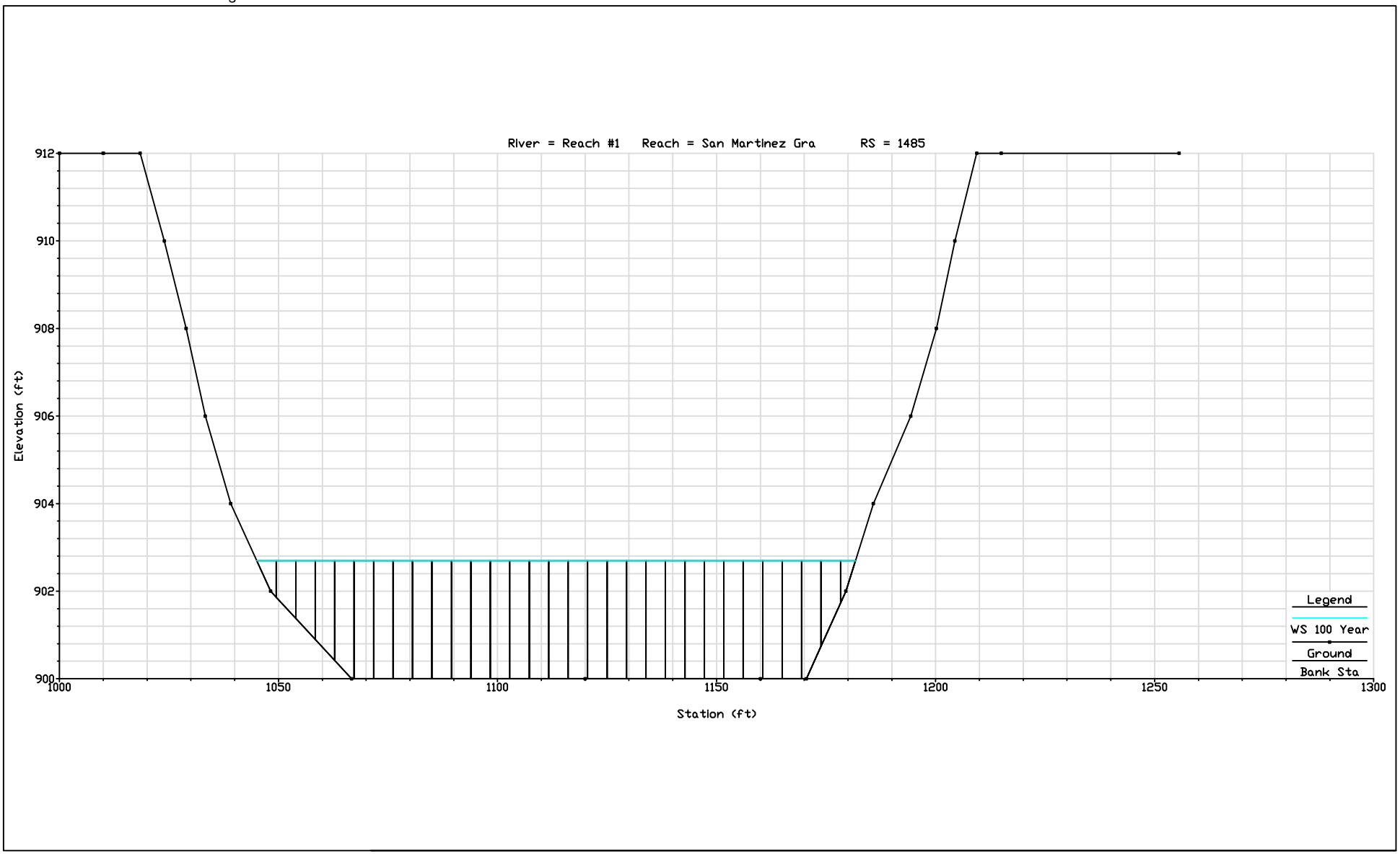


Figure 3-12

SPECIFIC CROSS SECTION SHOWING EXISTING GEOMORPHIC CONDITIONS IN SAN MARTINEZ GRANDE CANYON DOWNSTREAM STATION

T:\Newhall\cad\Grande 2155.dwg 12/12/03

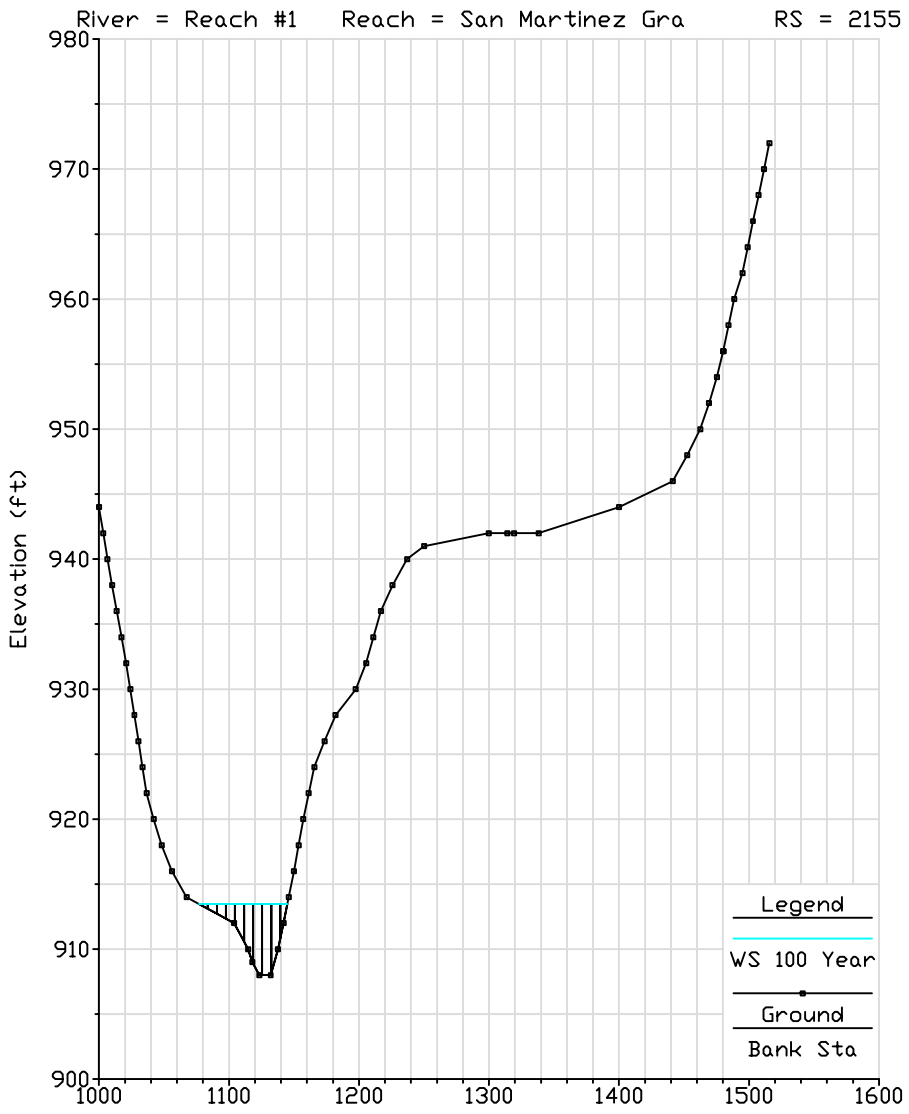


Figure 3-13

SPECIFIC CROSS SECTION SHOWING EXISTING GEOMORPHIC CONDITIONS IN SAN MARTINEZ GRANDE CANYON MIDSTREAM STATION

T:\Newhall\cad\Grande 5850.dwg 12/12/03

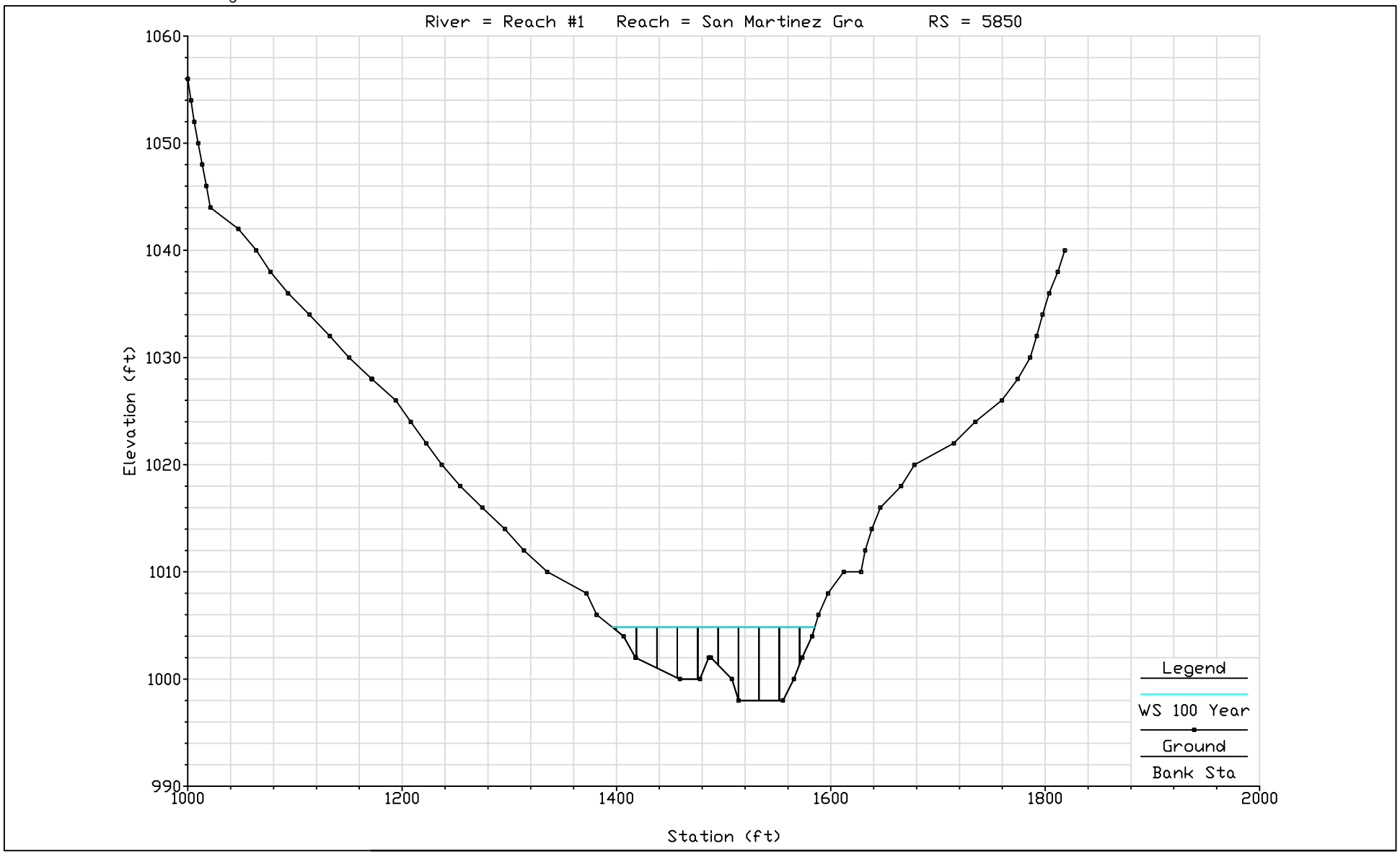


Figure 3-14

SPECIFIC CROSS SECTION SHOWING EXISTING GEOMORPHIC CONDITIONS IN SAN MARTINEZ GRANDE CANYON UPSTREAM STATION

T:\Newhall\cad\Potrero PF.dwg 12/12/03

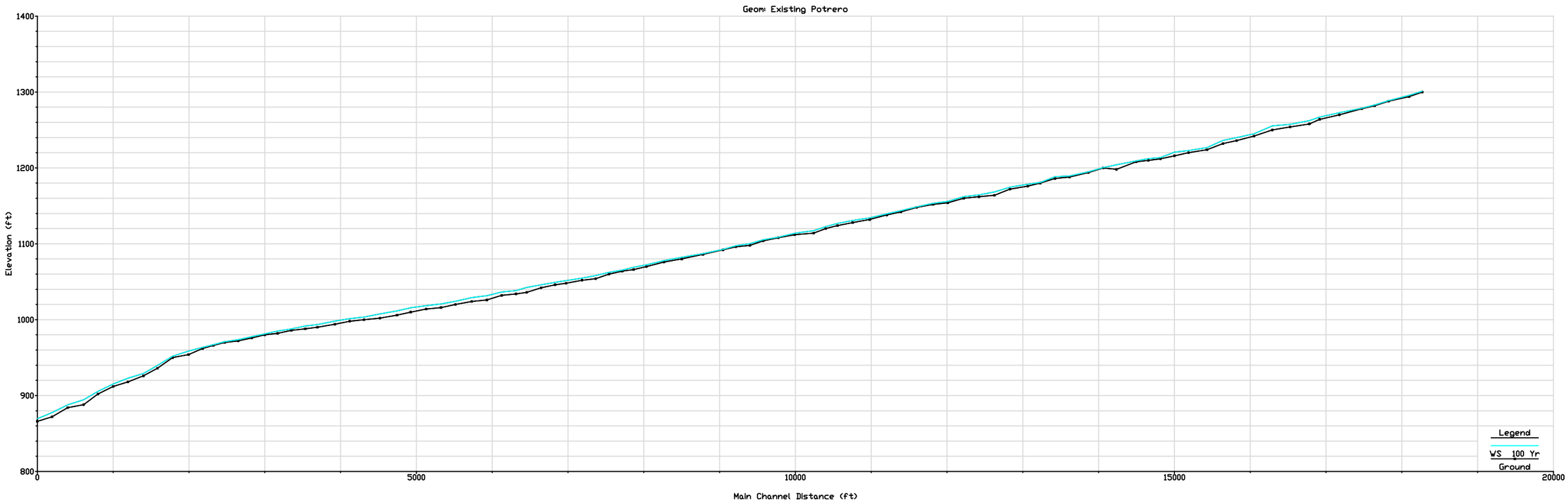


Figure 3-15
STREAM PROFILE SHOWING EXISTING CONDITIONS IN POTRERO CANYON

T:\Newhall\cad\Potrero 1800.dwg 12/12/03

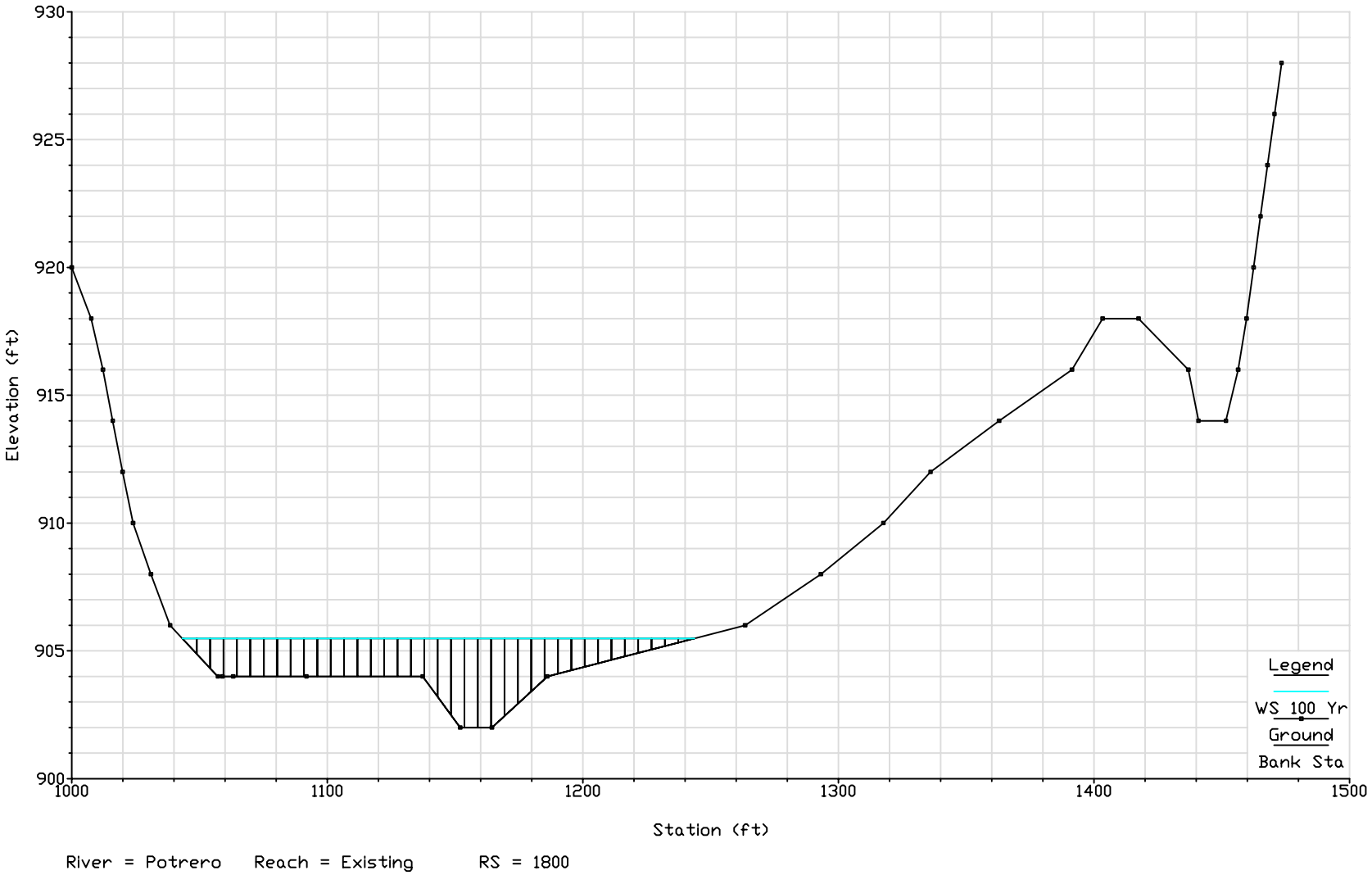


Figure 3-16

SPECIFIC CROSS SECTION SHOWING EXISTING GEOMORPHIC CONDITIONS IN POTRERO CANYON DOWNSTREAM STATION

T:\Newhall\cad\Potrero 9780.dwg 12/12/03

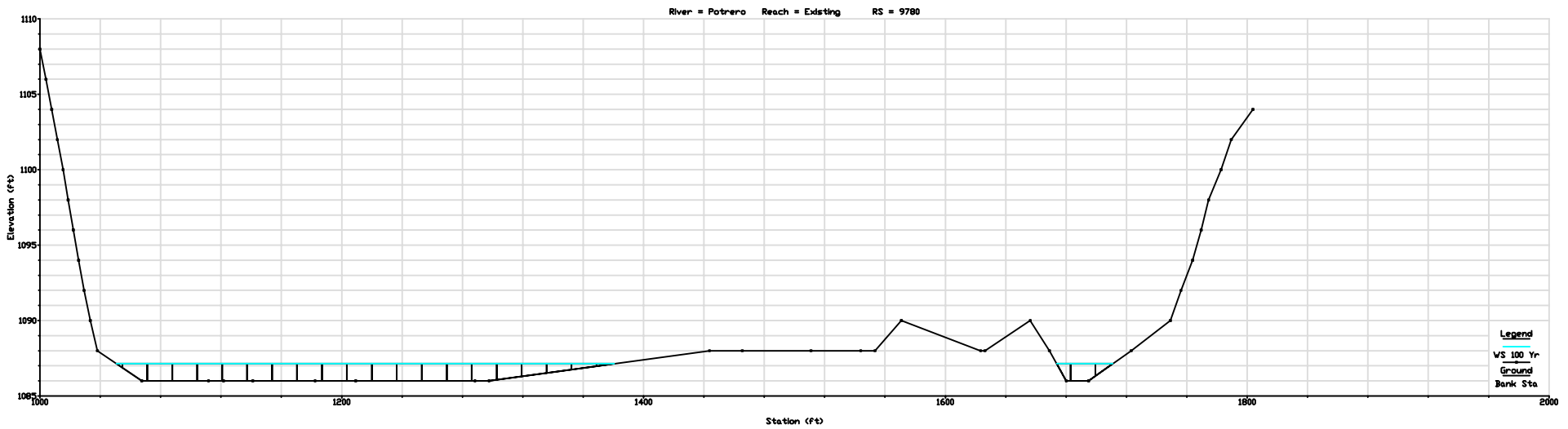


Figure 3-17

SPECIFIC CROSS SECTION SHOWING EXISTING GEOMORPHIC CONDITIONS IN POTRERO CANYON MIDDLE STATION

T:\Newhall\cad\Potrero 17915.dwg 12/12/03

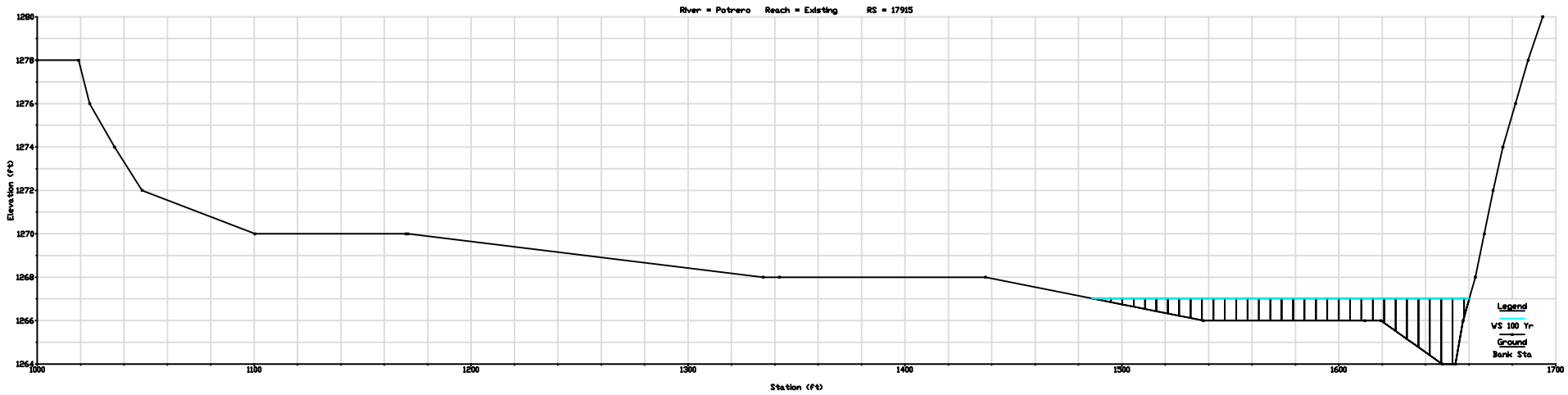


Figure 3-18

SPECIFIC CROSS SECTION SHOWING EXISTING GEOMORPHIC CONDITIONS IN POTRERO CANYON UPSTREAM STATION

T:\Newhall\cad\Santa Clara River PF.dwg 12/12/03

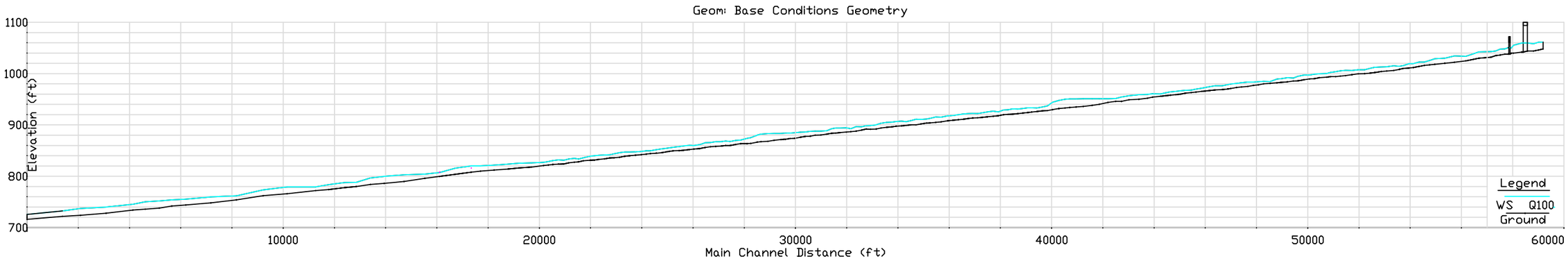


Figure 3-19

STREAM PROFILE SHOWING EXISTING CONDITIONS IN SANTA CLARA RIVER

T:\Newhall\cad\SCR 9220.dwg 12/12/03

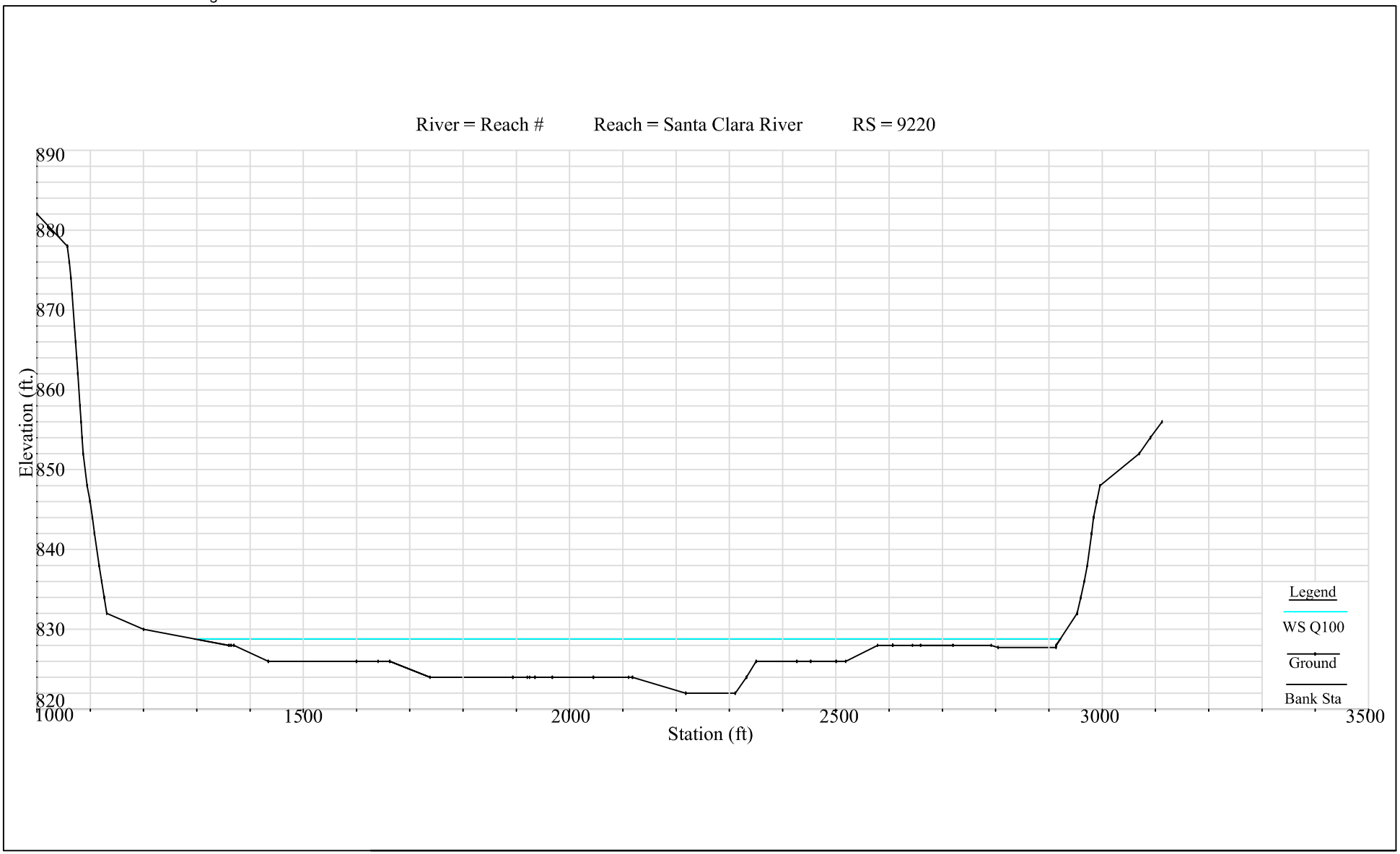


Figure 3-20

SPECIFIC CROSS SECTION SHOWING EXISTING GEOMORPHIC CONDITIONS IN SANTA CLARA RIVER CANYON DOWNSTREAM STATION

T:\Newhall\cad\SCR 15335.dwg 12/12/03

River = Reach #1 Reach = Santa Clara River RS = 15335

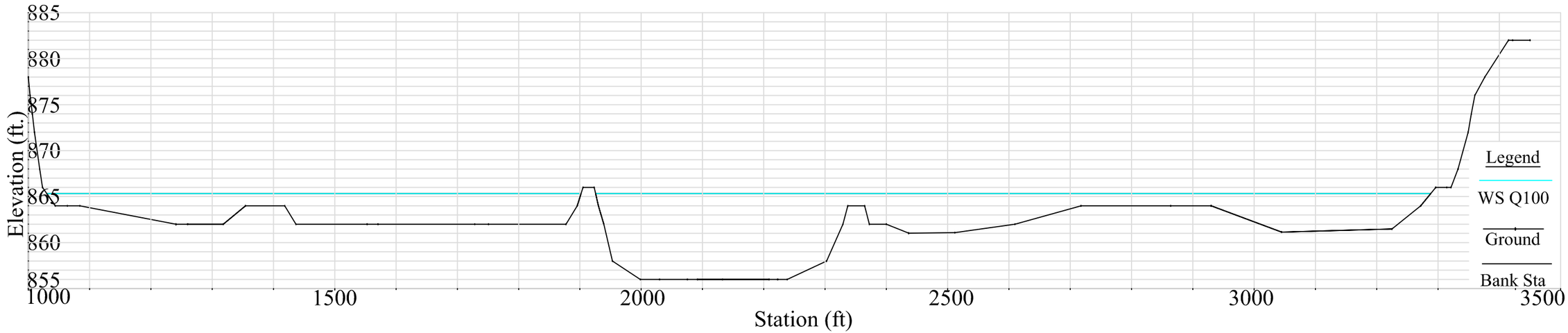


Figure 3-21

SPECIFIC CROSS SECTION SHOWING EXISTING GEOMORPHIC CONDITIONS IN SANTA CLARA RIVER CANYON MIDDLE STATION

T:\Newhall\cad\SCR 45545.dwg 12/12/03

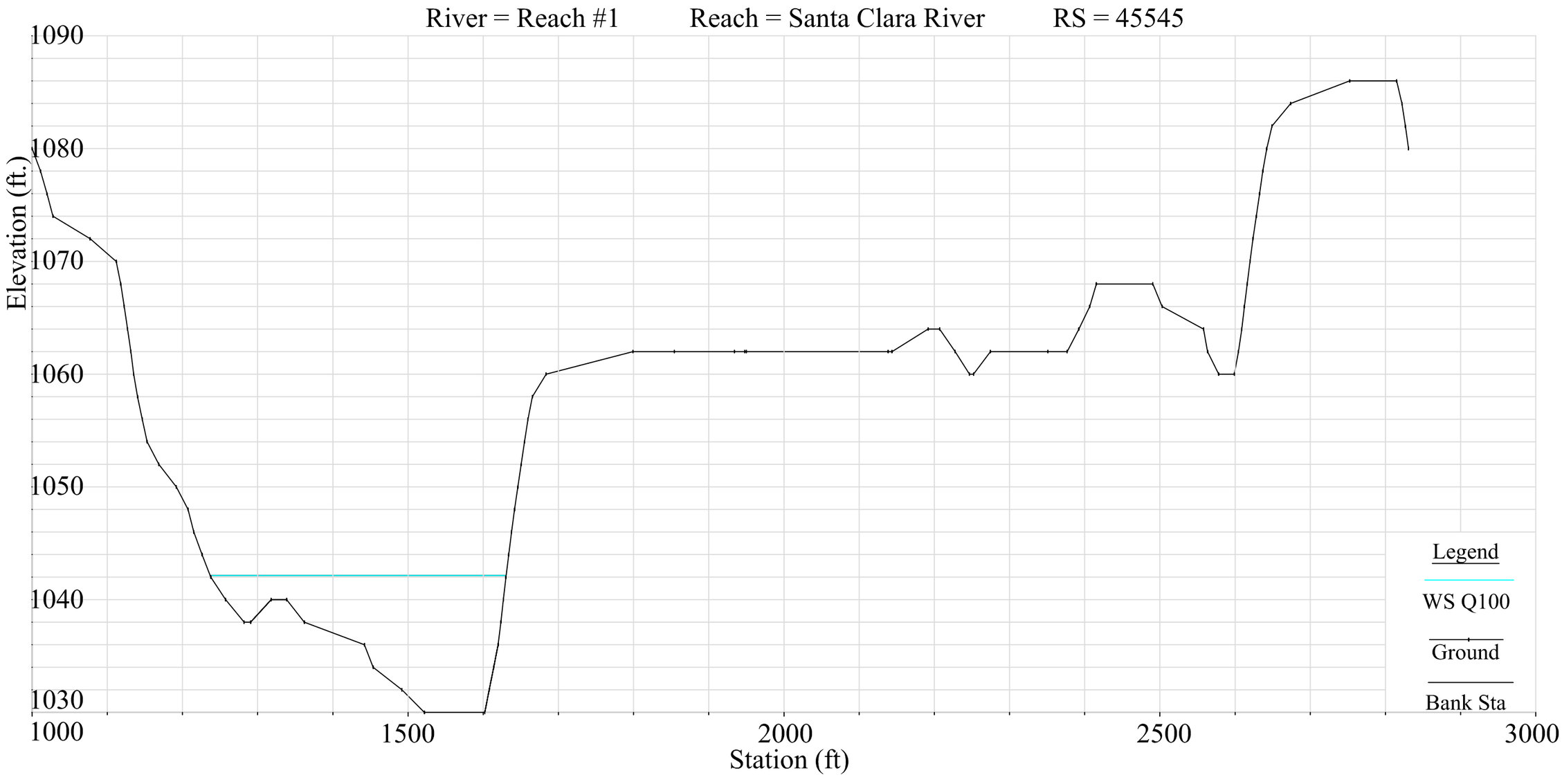


Figure 3-22

SPECIFIC CROSS SECTION SHOWING EXISTING GEOMORPHIC CONDITIONS IN SANTA CLARA RIVER CANYON UPSTREAM STATION

As stated earlier, this jurisdiction delineation has been derived from a process that included extensive coordination with representatives of the Corps, CDFG, USFWS, and other agencies through multiple field visits and planning meetings. Previous jurisdictional determinations by the Corps and CDFG formed the basis for the current delineation. Aerial photo interpretation used in conjunction with topographic data and GIS technology provided a means to update the delineation prior to field verification. The hydrologic/hydraulic modeling also provides the context for defining agency jurisdiction within each watershed evaluated.

Once the digital analysis was completed, field assessments were then used to verify the jurisdictional delineations derived from digital technology, and to gather additional locational data using GPS equipment. This allowed for further refinement of the jurisdictional areas under the purview of the Corps and CDFG. The Corps and CDFG jurisdictional areas by drainage are presented below in Tables 4-1 and 4-2.

As indicated on Figures 3-1 and 3-2, unless otherwise noted, Corps jurisdiction lies within the broader jurisdictional areas under CDFG purview. Hence, the total acreage that falls under Corps jurisdiction is less than that of CDFG. For the purposes of this delineation, it is assumed that on the small side drainages in each watershed evaluated, unless otherwise noted, the area contained within the jurisdictional area is the same for both agencies[1].

TABLE 4-1
CORPS OF ENGINEERS JURISDICTION BY DRAINAGE

Drainage	Total Jurisdictional Area
Chiquito Canyon	13.9 Acres
Long Canyon	5.7 Acres
San Martinez Grande Canyon	2.5 Acres
Potrero Canyon	36.7 Acres
Lion Canyon	6.8 Acres
Salt Creek	77.9 Acres
Santa Clara River	316.1 Acres
Other Drainages Within Project Area	33.3 Acres
Total	492.9 Acres

[1]Newhall Land's attorneys, Downey Brand LLP, believe that in some areas the CDFG asserts 1603 jurisdiction in areas beyond where the statute envisions jurisdiction, e.g., riparian areas contiguous to, but beyond, the bank and/or 100 year floodplain areas beyond the bank. This delineation broadly construed CDFG jurisdiction, and thus may, in the opinion of Newhall's attorneys, include some areas beyond the CDFG's jurisdiction.

TABLE 4-2
CALIFORNIA DEPARTMENT OF FISH AND GAME JURISDICTION BY DRAINAGE

Drainage	Total Jurisdictional Area
Chiquito Canyon	18.3 Acres
Long Canyon	5.7 Acres
San Martinez Grande Canyon	2.5 Acres
Potrero Canyon	41.8 Acres
Lion Canyon	6.8 Acres
Salt Creek	77.9 Acres
Santa Clara River	759.1 Acres
Other Drainages Within Project Area	33.3 Acres
Total	945.4 Acres

Dudek and Associates. 2002. 2002 Sensitive Plant Survey Results for Newhall Ranch Specific Plan Area. November 20, 2002.

Impact Sciences, Inc. 2002. Revised Draft Additional Analysis to the Newhall Ranch Specific Plan and Water Reclamation Plant Final Environmental Impact Report. November 2002.

U.S. Army Corps of Engineers (USACE). 2001. Final Summary Report: Guidelines for Jurisdictional Determinations for Waters of the United States in the Arid Southwest. June 2001.