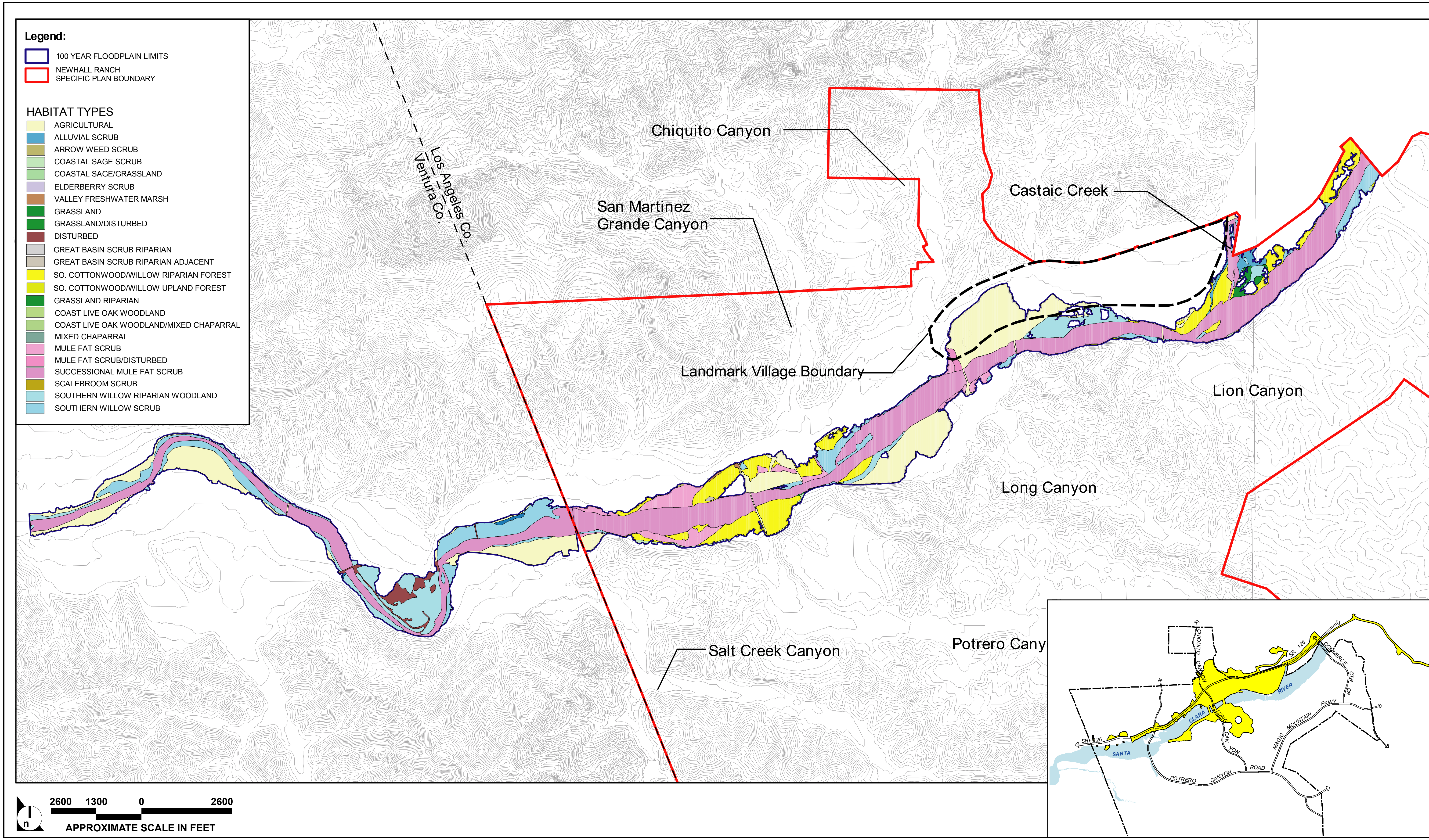


SOURCE: FORMA/Impact Sciences, Inc. – June 2005

FIGURE **4.5-3**

Habitats in the Santa Clara River

32-92•01/09

Table 4.5-5
Summary of Flood Disturbance Frequencies for
Dominant Wetland and Riparian Habitat Types in the River

Habitat	Frequency of Inundation and Disturbance by Flood Flows (years)
Alluvial scrub	20–50
Arroweed scrub	15–20
Cottonwood willow forest	15–20
Mule fat scrub	10–15
Successional mule fat scrub	Annually
Willow woodland	20–30
Willow scrub	10–15

Source: Impact Sciences, Inc.

The Santa Clara River provides year-round and seasonal aquatic habitats that are described in **Table 4.5-6, Summary of Aquatic Habitats in the Santa Clara River**. 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 when flows are present. 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 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 when flows are present.

Table 4.5-6
Summary of Aquatic Habitats in the Santa Clara River

Habitat Type	Description	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 foot [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 in some areas, absent.	Groundwater seepage.	Inundation by flood flows every 1–2 years.
Road crossing ponds and plunge pools	Six 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 mule fat 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 slow moving water, except during the winter. Often densely vegetated with wetlands.	Winter flows, and occasional seepage flow from side canyons. Ephemeral flows.	Disturbance each year from flood flows in the tributaries.

Source: Impact Sciences, Inc.

The year-round effluent-dominated flows in the river have enhanced the aquatic habitats and species in the river. Under natural conditions, there would be very little, if any, open water in the river during the summer. The presence of a year-round source of water provides more habitat for aquatic species and fish, and thereby supports greater populations than would occur under natural conditions. Larger populations in the project area enhance the probability of these species persisting during or after adverse events, such as significant droughts or catastrophic flooding.

(1) Sensitive Species and their Habitats

When there are or have been flows in the river, sensitive aquatic species known to occur along this stretch of the river include unarmored threespine stickleback, arroyo chub, and Santa Ana sucker. The stickleback occurs in quiet water areas along the low flow channel, on- and off-channel ponds. They prefer herbaceous and backwater areas with cool and clear water conditions. Stickleback are weak swimmers and many are washed away in winter floods. The arroyo chub and Santa Ana sucker occur in all aquatic habitats of the river. Chubs prefer slow moving water with muddy bottoms, while suckers occur in narrow channels with a range of flow conditions. All three are within the portions of the river adjacent to the project.

The least Bell's vireo nests in willow woodlands west of the site on lower to middle stream terraces, and forages throughout the riparian corridor for insects. Nesting pairs have been sighted regularly both upstream and downstream of the tract map site, most recently during 2004 bird surveys (Guthrie, 2004). The site provides suitable habitat for the vireo.

Sensitive reptile species that are known to occur on the site include Southwestern pond turtle and two-striped garter snake. The Southwestern pond turtle requires streams, ponds, freshwater marshes or lakes with growth of aquatic vegetation. This species is found in perennial and intermittent streams having rocky or sandy beds and artificially created aquatic habitats containing dense vegetation. This species was observed in the reach of the Santa Clara River adjacent to the tract map site and river and riparian habitats bordering the project provide suitable habitat (Compliance Biology, 2004).

Other sensitive aquatic species that are not known to occur at the project site, but could potentially colonize the river habitats in the greater region where more favorable conditions exist include the arroyo toad and California red-legged frog. These species have been identified as potentially occurring on the project site. Focused surveys conducted on the site failed to detect the presence of the arroyo toad on the project site. Technical reports documenting the methods and results of focused surveys are included within Recirculated Draft EIR **Appendix 4.5**.

The abundance and variety of riparian and wetland habitats that support the foregoing sensitive species are due largely to the natural dynamic riverine processes that occur unimpeded in the Santa Clara River corridor. 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 the sensitive species.

The wide floodplain of the river at the project site facilitates the deposition of debris and meandering of the channel. Additional descriptions of the stickleback, arroyo toad, red-legged frog, southwestern pond turtle and two-striped garter snake and their habitats are presented below.

(a) Unarmored Threespine Stickleback

The unarmored threespine stickleback was designated a federally Endangered species in 1970 (USFWS, 1985) and a state Endangered species in 1971. Populations are restricted to three sections of the upper Santa Clara River including the Newhall Ranch reach, which represents the downstream demarcation of the unarmored species. Currently, critical habitat for unarmored threespine stickleback has not been formally designated under the Endangered Species Act.

The fish is a small, largely annual fish that requires shallow, slow, marginal stream flows with abundant aquatic vegetation for cover. The male guards territories and builds a small nest of decaying vegetation where he guards the eggs until they hatch. Large numbers of stickleback can exist in the summer and fall with the long breeding season in Southern California, and breeding can occur almost all year in dry years when a stream is minimally disrupted by storm flows. Up to a few hundred stickleback per 10 meters of stream can exist under optimum conditions. Strong storm flows usually severely decimate the population until the streams stabilize in spring and the numbers can build up again.

Other populations within the Santa Clara River water shed occur upstream of the project both in Soledad Canyon above Lang Station (about 12 miles upstream) and in San Francisquito Canyon from just below Drinkwater Reservoir upstream to the vicinity of the old St. Francis Dam location (about 11.5 miles upstream of the river). San Francisquito Creek actually enters the Santa Clara River approximately 3 miles upstream of the project near the upper end of the downstream unarmored population. Recently, a population was discovered in upper Bouquet Canyon (Jonathan Baskin, personal communication) about 11 miles above its mouth at the Santa Clara River. Perennial flows occur in the Santa Clara River downstream of the Saugus and Valencia Water Reclamation Plants, which discharges tertiary treated effluent immediately downstream of the Bouquet Canyon Road Bridge over the Santa Clara River. These populations are located upstream of the project and the hydrology and habitat where these populations are situated are clearly not affected by the project.

ENTRIX Survey Results

The entire reach of the Santa Clara River from the mouth of Salt Creek to the Castaic Junction was surveyed on March 31 and April 1, 2004. An additional survey was conducted on November 8, 2004 in the Santa Clara River and Castaic Creek from the mouth to the SR-126 bridge along the tract map site. The surveys focused mainly on evaluating habitat conditions within these reaches and in establishing the relative proximity from the stream side project boundary to in-stream habitats. This work consisted of visual habitat assessments documented by field photographs with special reference to unarmored threespine stickleback and other fish. The work was conducted with a small seine (1.8 x 1.2 meters, 3 mm mesh/6 x 3 feet, 0.125-inch mesh) and aquarium dip nets in habitats that could potentially contain stickleback. Further upstream, below the approved Commerce Center Drive Bridge crossing of the Santa Clara River and Castaic Creek near the I-5 bridge, additional surveys were conducted on December 16, 2004. One last survey was conducted for the reach of the river adjacent to the Landmark Village tract map site on February 1, 2005 to document and evaluate habitat changes associated with the large storm flows associated with recent heavy rains.

The March 31/April 1 survey took place during relatively high spring flows so the river had recently been scoured and fresh sediments were present. Also, virtually all marginal herbaceous vegetation and other cover had been washed out along much of the river. Due to an unusual set of strong October rainstorms, the river was also scoured out during the visits in November and December. Typically, the November and December collections would precede any high flows, marginal herbaceous vegetation would be well developed, and fish would be abundant. Due to the early storms, the habitat conditions noted during the ENTRIX surveys were comparable to those normally associated with early spring conditions. In some drought years, the river goes without being substantially scoured out and fish can remain abundant all year. For the ENTRIX surveys, the habitat was more or less in early spring scoured conditions.

During the March 31/April 1 survey, the river was running a visually estimated 30–40 cfs and was turbid with visibility to about 50 centimeters (cm). Some small spring tributaries and isolated pools were clear. The water temperature ranged from 22–26 degrees Celcius (°C) and at least four areas of upwelling with water at 18–20 °C. The substrate was variously sand, gravel, and cobble and 10–40 percent of the margins of the river had some vegetative cover such as herbaceous vegetation, debris, or overhanging trees or bushes. This marginal vegetation was just beginning to develop, as was green algae in the water. About 30–40 percent of the habitat was low to high gradient riffles with the remaining being runs. Eight to ten standing or backwater pools, more than 1 meter deep, were seen near large obstructions. In the area of the mouth or delta of Castaic Creek in the Santa Clara River, a small flow entered the main river with a few associated pools and backwaters. However, it was emerging from the streambed a few hundred meters upstream since the main Castaic Creek was dry farther upstream. In about 30 seine hauls and 140 dips with aquarium dip nets, throughout the stretch examined over the two days, no stickleback were seen. Arroyo chubs were abundant, and one Santa Ana sucker was identified. Larval arroyo chubs were commonly seen and up to about 15 sucker larvae were observed. Some backwater areas had clawed frogs and about 25 were identified. In addition, several clawed frog larvae were seen in isolated floodplain pools.

The survey on November 8 was restricted specifically to the Landmark Village project area and the well-scoured channel with an estimated 25–30 cfs of flow and sand was about 75 percent of the substrate and gravel, cobble, and rock the other 25 percent in the main river. Visibility was about 50 cm in the main river and some isolated ponds were clearer. Several isolated or spring-fed pools existed in the riparian areas on the north side of the floodplain and were choked with cattails, willows, and arundo. The shores of the main river channel where almost entirely scoured off by the October storms. Ten seine hauls identified six half-grown to adult unarmored threespine stickleback in backwater areas of the main river that serve as small refuges during scouring flows. Arroyo chubs were common in the river, and in the oxbow ponds crayfish (about 20 identified) were common. One large arroyo chub was found in the oxbow ponds, along with one small-clawed frog. A few mosquito fish were collected and others seen in the protected oxbows. Even though some fish were common or very locally abundant, these were in occasional oxbow and marginal areas with most areas of faster flow devoid of fish.

On the December 18 visit, Castaic Creek was dry all the way to the SR-126 bridge and the only wetted areas were near storm drains that were surveyed earlier in the year and found to be fishless. The Commerce Center Drive Bridge area was similar to the river downstream examined by Swift and Howard, but no fish collections were made and no fish were seen. The Commerce Center Drive Bridge is upstream of the Landmark Village project.

Following a severe flood event in January 2005, ENTRIX biologists conducted a one-day reconnaissance survey of the project reach to evaluate the response of habitat conditions. Generally, plant and animal life had been flushed from the active stream channel. Riparian and aquatic vegetation along the stream margins had been scoured. Few or no aquatic insects were observed during numerous spot inspections. The streambed also aggraded in many areas, particularly in backwater pools where significant shallowing or complete filling had occurred. Significant deposition of sand and gravel was observed in the forms of lateral and mid-channel bars. Most exotic aquatic species appeared to have been flushed out by the flooding events.

(b) Arroyo Toad

Arroyo toads occupy the margins of permanent and seasonal streams in coastal foothill canyons and valleys and to a limited extent in the desert, but they require extremely specialized and limited microhabitat within that general habitat type. Most spawning occurs in shallow overflow pools adjacent to inflow channels of third and higher-order streams, and during the remainder of the year adults occupy adjacent sand bars and sandy terraces, nearly always within 100 meters of suitable spawning pools. Suitable spawning pools lack suspended silt, aquatic predators, and dense woody bordering vegetation (Sweet, 1993). Suitable bordering sandbars are usually dampened by capillarity and include some emergent vegetation. The moist substratum keeps metamorphosing juveniles from desiccating during warm weather (Sweet, 1993; Jennings & Hayes, 1994). Suitable terrace habitat includes at least some dense overgrowth, such as California sycamore (*Platanus racemosa*), Fremont cottonwood (*Populus fremontii*), and willows (*Salix* sp.), but the understory is usually barren except for layers of dead leaves (Sweet, 1993). Adult and metamorphosed juvenile arroyo toads are known to forage for various invertebrates around the drip line of large oaks (*Quercus*) and also to forage extensively on ants (Sweet, 1992, 1993). Little is known of arroyo toad winter hibernaculum requirements (USFWS, 1999).

Neither of the museum database queries (CAS, 2004, UC Berkeley, 2004) yielded records of the arroyo toad from the main channel of the Santa Clara River. However, mainstem Santa Clara River CNDDB records for the arroyo toad exist from the "Santa Clara River, just east of Interstate 5" (1994), which is about 2 miles east of the Landmark Village tract map site, and from "Bear Canyon at the Santa Clara River, 6 miles upstream of Solemint," which is about 11 miles east of the project. Arroyo toads were also found recently at the confluence of San Francisquito Creek and the Santa Clara River, about 2.3 miles east of the Landmark Village project (Impact Sciences, 2001). Further, the Aquatic Consulting surveys (2002a) reported arroyo toad tadpoles from pools adjacent to the Valencia WRP and from a pool just upstream of the Landmark Village project area. Among north tributaries to the Santa Clara River, arroyo toads are well-known from the Blue Point area along Piru Creek (CNDDB, LACM, and CAS records); from several sites along Sespe Creek (Ventura County) (CNDDB and LACM records and Sweet [1992]); and from at least one location along Castaic Creek north of Castaic Lake (CNDDB 2004; Compliance Biology, 2004; USFWS 2004). The recent origin of many of the records indicates that the arroyo toad still inhabits suitable habitat within the Santa Clara River basin, including the main channel.

However, although standardized USFWS "protocol" surveys conducted recently within the Landmark Village project site (Impact Sciences 2001; Compliance Biology 2004) showed that all of the components of arroyo toad habitat exist within the Landmark Village project boundaries, these studies did not document the occurrence of arroyo toads within such boundaries. Non-protocol surveys by Aquatic Consulting Services (2002b) identified arroyo toad habitat in the Santa Clara River from the Landmark Village project downstream to the Ventura County line.

ENTRIX Survey Results

The March 31 ENTRIX survey was conducted during daylight hours from just northwest of the Travel Village trailer park along Castaic Creek downstream to the Wolcott Road crossing, with particular attention to the braided Castaic Creek channel complex just upstream of the confluence with the Santa Clara River. A spot survey was also conducted at the Long Canyon crossing downstream of Wolcott Road. Potential arroyo toad spawning habitat in the form of overflow pools with stable gravel or sandbars and nearby terrace vegetation was noted throughout the braided channel, and in the mainstem of the Santa Clara River just downstream of the Wolcott Road crossing on the north and in places on the south sides of the river. Although the water level was fairly high because of winter storm runoff, overflow pools were visible but submerged upstream of the Long Canyon crossing, on the north bank of the river mainstem. No arroyo toads were observed during this reconnaissance surveys, but none would be expected because of the early season and the time of day of the survey.

The November 10 survey was conducted during daylight hours from the junction of Chiquito Creek and SR-126 downstream to the Santa Clara River, then upstream along the mainstem Santa Clara River to the confluence with Castaic Creek, then upstream along Castaic Creek nearly to SR-126. Flows in the mainstem river were lower than they had been the previous March, although they were undoubtedly recently augmented by heavy autumn rains. However, Chiquito Creek was dry between SR-126 and the Santa Clara River, and the Chiquito Creek channel was not incised or otherwise well defined close to the confluence. This suggests that Chiquito Creek flows downstream of SR-126 tend to be very episodic, short term, and sediment-loaded. A long overflow channel was visible along the north side of the Santa Clara River between the Long Canyon crossing and Wolcott Road, but this channel was choked with several generations of emergent vegetation (especially cattails [*Typha*]) and may not be suited to arroyo toad spawning. This is probably the same channel that was submerged but visible during the March 31 survey. The braided complex at the Castaic Creek confluence was mostly dry, but the main channel of Castaic Creek where it parallels and eventually flows into the Santa Clara River just upstream of the Wolcott Road crossing still held substantial water (to about 18 inches depth). How much of this had resulted from the recent rains was not clear. Castaic Creek itself from the braided complex upstream to SR-126 was essentially dry, and overflow channels of the type preferred by arroyo toads as spawning habitat were not evident upstream of the braided complex. However, bordering terrace habitat on the south side of the Santa Clara River and along much of Castaic Creek was clearly well suited to arroyo toads. No arroyo toads were observed during this survey, but none would be expected because of the lateness of the season, the time of day of the survey, and the prevailing cool weather.

Overall, the surveys confirmed that limited potential arroyo toad spawning and foraging habitat exists along the Santa Clara River and possibly Castaic Creek within the Landmark Village project area boundaries. However, the results of the focused USFWS protocol surveys cited above indicate that arroyo toads are very scarce or absent along these reaches, and along the Santa Clara River downstream to the Los Angeles-Ventura County line (Aquatic Consulting Services, 2002).

Following a severe flood event in January 2005, ENTRIX biologists conducted a brief one-day reconnaissance survey of the project reach to evaluate the response of habitat conditions. Generally, plant and animal life had been flushed from the active stream channel. Riparian and aquatic vegetation along the stream margins had been scoured. Few or no aquatic insects were observed during numerous spot inspections. The streambed also aggraded in many areas, particularly in backwater pools where significant shallowing or complete filling had occurred. Significant deposition of sand and gravel was also observed in the forms of lateral and mid-channel bars. Most exotic aquatic species appeared to have been flushed out by the flooding events.

On April 13, 2005, the USFWS issued its Final Designation of Critical Habitat for the arroyo toad. Unit 6, covering a portion of the Newhall Ranch reach of the Santa Clara River and once considered for inclusion in the critical habitat Area, has been removed from the Final Designation of Critical Habitat. The acreage was reduced because the USFWS eliminated the areas of marginal quality in the critical habitat that USFWS did not expect the toad to use, including developed areas, roads and busy thoroughfares, areas with too high of an altitude, and inaccessible streams. Also, USFWS modified the distance away from a stream that is necessary to the toad as critical habitat, from 4,921 feet to 1,640 feet, which drastically reduced the amount of acreage necessary for critical habitat. Lastly, USFWS identified some areas previously considered to be essential to the critical habitat of the toad as no longer essential.

(c) California Red-Legged Frog

California red-legged frog habitat components include spawning pools and their terrestrial borders, spring/summer refuges, and subterranean hibernation sites. These may be combined at single sites or they may be separated by aquatic or terrestrial "dispersal corridors" (Hayes & Jennings, 1989; Jennings & Hayes, 1994). Spawning pools are the ecologically central components of California red-legged frog habitat, because they support all elements of the species' reproductive biology and also provide forage for all red-legged frog life stages. Spawning pools are typically permanent or extended seasonal (through August) ponds or stream/spring pools of 0.7–1.2 meters in depth, with dense bordering, emergent, and surface vegetation. Such pools may be as small as one square meter in surface area, with no known upper area limit. Always present at spawning habitat is a large complex invertebrate fauna for juvenile forage, extensive submerged herbaceous and algal vegetation for tadpole forage, and small terrestrial mammals such as voles (Microtus) that are an important component of adult frog forage (Jennings & Hayes, 1994). Most suitable ponds are also partially to fully sunlit with mud or silt substrata, environmental factors essential to promote dense floating and emergent vegetation. Large populations of exotic predators such as bullfrogs and exotic centrarchid fish are usually absent from California red-legged frog spawning pools.

Newly constructed or impounded ponds rarely support California red-legged frog populations—most spawning sites have existed in stable, relatively undisturbed form for decades (Barry, unpublished; Hayes & Jennings, 1989). Likewise, red-legged frog spawning habitat is usually absent from river bottomland, presumably because high springtime flows would disrupt spawning success by scouring spawning pools and discouraging long-term aquatic vegetative growth. California red-legged frogs are vulnerable to early season floods because they spawn in early to mid-winter.

Adult California red-legged frogs may move in late spring and summer to shaded pools along streams where undercut banks and exposed root masses offer secure refuges. However, an isolated summer refuge component appears not to be critical to population survival because many adult frogs may be found throughout the summer at spawning pools. Hibernaculum preferences probably include lentic substrata (pond bottoms) or any secure subterranean site near spawning or summer refuge habitat, such as rodent burrows, vegetation mats, and root channels.

There are no CNDDB records for the California red-legged frog from the Santa Clara River watershed, Los Angeles and Ventura Counties. However, the Museum of Vertebrate Zoology (UC Berkeley, 2003) lists 17 specimens from Soledad Canyon (Santa Clara River channel) in its collection, from as recently as 1953. More precise locality data are unavailable. The California Academy of Sciences (CAS 2003) also lists a Soledad Canyon specimen, from 1950. The nearest specific locality to the project site is some 15 miles upstream near the confluence with Agua Dulce Creek. Jennings & Hayes (1994) and the CNDDB indicate that this species still occurs in the Santa Clara River watershed, in sites along San Francisquito Creek 5–10 miles northeast of the project site, and in tributaries to the Santa Clara River in Ventura County. The closest documented Ventura County occurrence is in Piru Creek 4.5 miles north of Piru, about 10 miles west to north-west of the project site. (USFWS, 2002) Potential spawning habitat for California red-legged frogs also exists in some of the small tributaries that flow north into the Santa Clara River, within and near the project boundaries. Further, the verified records upstream and downstream of the project site place the project site within the distribution of the California red-legged frog along the Santa Clara River.

ENTRIX Survey Results

The ENTRIX field evaluations indicate that potential spawning or summer habitat for the California red-legged frog is absent from the main channel of the Santa Clara River within the project site. Further, the various USFWS protocol surveys for arroyo toads conducted along the Santa Clara River from Santa Clarita to the Ventura County line during the past few years would probably have found California red-legged frogs if they occurred in the mainstem of the Santa Clara River, but none were reported during these surveys. California red-legged frogs generally avoid large river channels with widely fluctuating flows, because such habitat usually does not permit reproductive activity (Jennings & Hayes 1989). For example, episodic winter flooding (typical of the Santa Clara River stream channel) may dislodge egg masses, and subsequent desiccation before the summer (also typical of the Santa Clara River) would kill tadpoles before they could metamorphose. Conversely, during the late winter and autumn, when California red-legged frogs may be most likely to move randomly (USFWS 2002), the mainstem Santa

Clara River channel can be considered potential "dispersal habitat," primarily because adult frogs can survive in the main channel during that season. Potential sources for such frogs are some of the tributary streams and associated marshlands south of the mainstem Santa Clara River.

Following a severe flood event in January 2005, ENTRIX biologists conducted a one-day reconnaissance survey of the project reach to evaluate the response of habitat conditions. Generally, plant and animal life had been flushed from the active stream channel. Riparian and aquatic vegetation along the stream margins had been scoured. Few or no aquatic insects were observed during numerous spot inspections. The streambed also aggraded in many areas, particularly in backwater pools where significant shallowing or complete filling had occurred. Significant deposition of sand and gravel was also observed in the forms of lateral and mid-channel bars. Most exotic aquatic species appeared to have been flushed out by the flooding events.

The 2001 critical habitat designation for the California red-legged frog was vacated by court order, but the USFWS (2004a) re-proposed critical habitat with substantially the same boundaries on April 13, 2004. Critical habitat was designated for the California red-legged frog in 2006 (71 FR 19244–19346). The critical habitat designation did not include any part of the Santa Clara River or tributaries within the Landmark Village project area.

(d) Southwestern Pond Turtle

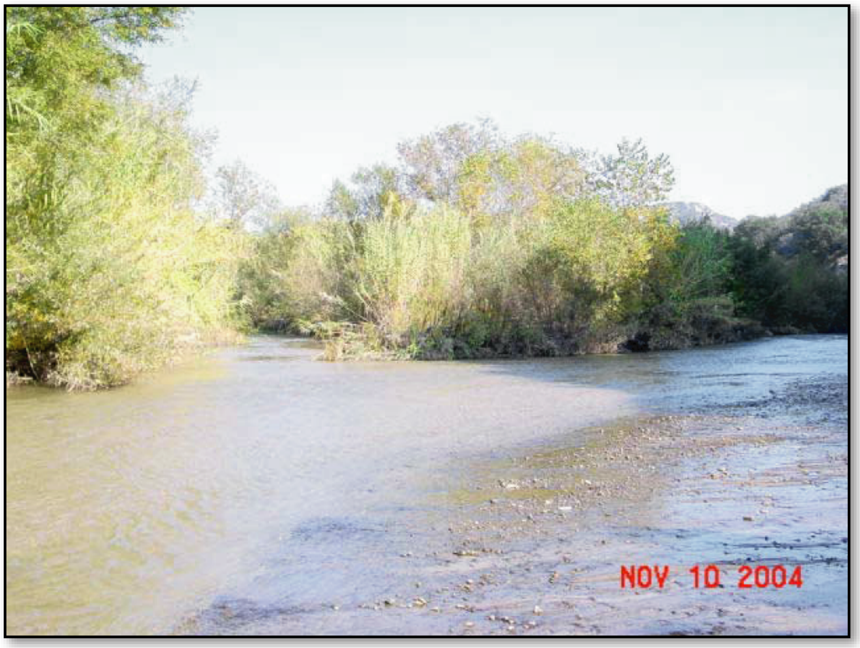
Southwestern pond turtles, a California Species of Concern, require exposed permanent or extended seasonal (through August) slow or still water, bordered by or in the vicinity of suitable upland oviposition (egg deposition) habitat. Suitable oviposition areas are usually gently sloping treeless hillsides well above floodplains, with southern or southwestern exposure and clay or possibly sandy soil (Holland, 1991). Eggs are deposited in flask-shaped vertical excavations from late spring through summer, and hatchlings apparently remain in the nest until the following spring (Holland, 1991). All life history stages of post-emergent pond turtles are highly aquatic. Suitable aquatic habitat for adult pond turtles usually includes relatively deep water (at least 0.5 meter) with secure basking sites (logs, exposed banks, etc) within reach of secure subsurface concealment. The aquatic substratum may be silty, muddy, or rocky. Juveniles are generally more secretive than adults and may favor more secure basking habitat such as densely vegetated sections of ponds and stream pools (Barry, unpbl. obs.). A complex invertebrate fauna and relatively high primary productivity typically also characterize southwestern pond turtle aquatic habitat (Jennings & Hayes, 1994). The most important forage for hatchlings is nektonic plankton, but adults utilize a variety of plant and animal forage sources (Bury, 1986).

Southwestern pond turtles are probably distributed throughout the Santa Clara River watershed, wherever there is sufficient permanent or near-permanent water and oviposition sites to support populations. However, the CNDDB includes only two Santa Clara River records of southwestern pond turtles, from near Castaic Junction (2000) and from downstream near the Ventura County line (1998). Neither of the museum databases includes any Santa Clara River watershed southwestern pond turtle records. Conversely, the Impact Sciences (2001) report states that during those surveys pond turtles were observed numerous times at unspecified sites within the NRMP reaches, presumably where sufficient water existed to satisfy the aquatic habitat requirements discussed previously.

ENTRIX Survey Results

During the March 31, 2004 field reconnaissance survey, ENTRIX biologists observed pond turtles at the confluence of Castaic Creek and the Santa Clara River and at the Long Canyon crossing. The November survey revealed that suitable aquatic habitat remains in the mainstem late in the year (presumably augmented by autumn rains). Neither survey identified specific terrestrial oviposition habitat, but moderate west- and south-facing meadowland slopes in the canyon openings appear to supply oviposition habitat requirements. Some potentially suitable oviposition habitat may also occur along the Castaic Creek embankment between the confluence with the Santa Clara River and I-5. However, firm clay-like soils, a possible oviposition site requirement (Holland, 1991), seem to be absent from the mainstem channel, including the terrace on the north river bank.

Following a severe flood event in January 2005, ENTRIX biologists conducted a one-day reconnaissance survey of the project reach to evaluate the response of habitat conditions. **Figure 4.5-4**, **Channel Conditions Following Severe Flooding**, depicts the state of the channel conditions following this storm. Generally, plant and animal life had been flushed from the active stream channel. Riparian and aquatic vegetation along the stream margins had been scoured. Few or no aquatic insects were observed during numerous spot inspections. The streambed also aggraded in many areas, particularly in backwater pools where significant shallowing or complete filling had occurred. Significant deposition of sand and gravel was also observed in the forms of lateral and mid-channel bars. Most exotic aquatic species appeared to have been flushed out by the flooding events. Based on this survey, the observed flood event would have flushed out most aquatic species due to its size and severity.



Castaic Creek/santa Clara River
Confluence Photographed in
November 2004
Prior to Winter 2005 Floods

Castaic Creek Upstream of Confluence
Following January 2005 Flood
(Note Vegetation Scoured Throughout)

SOURCE: ENTRIX – 2004, 2005

FIGURE **4.5-4**

Channel Conditions Following Severe Flooding

32-92•01/09

(e) Two-Striped Garter Snake

The two-striped garter snake occurs from southern Baja California north to central Monterey and western Fresno Counties (Rossman and Stewart, 1987). These snakes are found most frequently along the margins of rocky and sandy streams with fairly fast water, and they were formerly ubiquitous and abundant in association with such habitat throughout coastal southern California (Jennings & Hayes, 1994). The two-striped garter snake is a California Species of Concern because most of its characteristic habitat in the lowlands of Southern California has been severely degraded and consequently this species has disappeared from substantial portions of its range (Stewart 1968, Jennings & Hayes, 1994). Two-striped garter snakes are believed to feed almost exclusively on fish and tadpoles, which they catch in shallow water by stalking, ambushing, or by cornering against submerged rocks or root masses (Jennings & Hayes, 1994; Barry, unpbl. obs). Thus, although fundamentally terrestrial, they depend entirely on aquatic habitat for forage.

Although the preferred microhabitat for this species is poorly understood, the greatest numbers seemingly occur in areas along stream courses where the combination of in-stream rocky or other cover, terrestrial vegetative or other cover, and easy access to aquatic forage species of the appropriate size range exists (Barry unpbl obs.). For example, along relatively undisturbed reaches of the San Gabriel River in the San Gabriel Mountains these snakes are frequently found along relatively shallow rocky pools that laterally border somewhat deeper reaches, and they also frequent exposed root masses associated with pools created by the fallen trees. Smaller fish and tadpoles are typically abundant and easy for the snakes to capture in the shallow sections and the root mass pools, and larger fish occur in the adjacent deeper sections (Barry, unpbl. obs.). Shoreline rocks, burrows, and dense vegetation (including root masses) offer excellent terrestrial cover, and submerged rocky aggregations offer aquatic refugia. Thus, although these wary snakes are often abundant and easily observed in such habitat, they are difficult to capture because they rarely stray far from secure cover and they flee rapidly into the water when approached (Barry, unpbl. obs.).

Two-striped garter snakes are active nearly year-round in the Southern California lowlands, but in higher elevations they hibernate for a variable time span during the winter, and emerge as early as February. They usually mate soon after emergence, but females of this species can become gravid with sperm stored from matings that occurred as long as two years previously (Stewart, 1972). Two-striped garter snakes bear live young in litters that average 8–10, usually in late July (Rossman and Stewart, 1987). Mortality in newborns is probably fairly high, in particular because newborns may have difficulty securing small amphibian or fish prey in disturbed waterways (Jennings & Hayes, 1994; Barry unpbl. obs.).

Santa Clara River records for the two-striped garter snake in the Newhall Ranch region are absent from the CNDDB and the museum collections. However, the various reports reviewed for this document and personal communications with local biologists indicate that this species occurs somewhat commonly along this reach of the river.

ENTRIX Survey Results

During the March 31, 2004 survey, the ENTRIX biologists observed one two-striped garter snake near an exposed root mass along the braided confluence of Castaic Creek and the Santa Clara River. Exposed root masses are particularly favored by these snakes because they offer secure shelter and they tend to form small shallow backwater pools where small fish congregate and are easy for the snakes to capture (Barry, unpbl. obs.). The November 10, 2004 survey revealed that such isolated complex refugia are very limited along the reach from Castaic Creek to Chiquito Creek, but the survey also revealed that low dense bankside vegetation, another type of favored retreat, occurs almost continuously along the north side of the river from Chiquito Creek upstream nearly to the Wolcott Road crossing. Much of this vegetation is associated with overflow pools that entrap fish during the late spring and early summer, which undoubtedly attracts two-striped garter snakes in greater than typical numbers to exploit this resource. However, subsequent pool drying eliminates this resource and garter snakes consequently disperse, to return during the following spring when the forage resource is renewed (Barry, unpbl. obs.).

Following a severe flood event in January 2005, ENTRIX biologists conducted a one-day reconnaissance survey of the project reach to evaluate the response of habitat conditions. Generally, plant and animal life had been flushed from the active stream channel. Riparian and aquatic vegetation along the stream margins had been scoured. Few or no aquatic insects were observed during numerous spot inspections. The streambed also aggraded in many areas, particularly in backwater pools where significant shallowing or complete filling had occurred. Significant deposition of sand and gravel was also observed in the forms of lateral and mid-channel bars. Most exotic aquatic species appeared to have been flushed out by the flooding events. Based on this survey, the observed flood event would have flushed out most aquatic species due to its size and severity.

6. PROPOSED PROJECT IMPROVEMENTS

a. Flood Protection

The proposed project would provide flood, erosion control and drainage improvements that would occur in and adjacent to the River Corridor SMA/SEA 23, including bank stabilization and various storm water drainage outlet structures. The project also includes construction of Long Canyon Road Bridge across the river, which would involve bridge abutments and piers. The project utilizes innovative techniques to meet the requirements of flood control while maintaining the natural resources within the Santa Clara River. Traditional flood control techniques in use within Los Angeles County rely upon reinforced concrete or grouted rock rip-rap to minimize erosion while maximizing the volume of flood flows carried by the drainage. While exceedingly efficient as a flood control technique, this approach retains none of the natural resource value.

In contrast, the drainage plan for the project provides drainage and flood control protection to developed uses while preserving the river as a natural resource. **Figure 4.5-5**, **Bank Stabilization – Typical Cross Section**, depicts typical cross sections for the buried bank stabilization concept. As shown, this approach uses soil cement that is buried beneath the existing banks of the river. Disturbed areas are then revegetated with native plant species maintaining the natural habitat presently found along the river.

A total of approximately 11,000 LF of bank stabilization will be constructed on the north side of the river plus an additional 6,400 LF of stabilization would be constructed on the south side. In total approximately 18,600 LF would be provided with bank stabilization. Refer to **Figure 4.5-6, Location of Long Canyon Road Bridge and Proposed Bank Stabilization Locations**, for a graphic depiction of the location of buried bank stabilization. Soil cement is used to protect residential and commercial development and the Long Canyon Road Bridge. The soil cement is primarily necessary to protect the proposed residential and commercial development on the project site, the Long Canyon Road Bridge, and the property immediately downstream of the project site from potential erosion due to project implementation. In addition 6,600 linear feet of TRMs (or other non-hardened bank protection methods) would be installed downstream of the project site along the northern edge of the river corridor to protect the utility corridor from Chiquito Canyon to San Martinez Grande Canyon. An additional approximately 1,200 LF of soil cement bank stabilization is located downstream of the project site, and is designed to protect the WRP. The bank stabilization related to the WRP was approved and analyzed at a project-level in the Newhall Ranch Specific Plan Program EIR. Locations where grouted rip-rap or reinforced concrete would be used are limited to outlet structures, access ramps, or bridge abutments.

The drainage plan utilizes several criteria that are to be implemented by projects that develop within the Specific Plan area. The primary criteria used to design the Landmark Village Drainage Concept and the discussion of how the Landmark Village Drainage Concept compares to these criteria is provided below:

- **Flood corridor must allow for the passage of Los Angeles County capital flood flow without the permanent removal of natural river vegetation (except at bridge crossings).** The Landmark Village EIR **Section 4.4, Biota**, discusses impacts to riparian plant communities in detail.

- **The banks of the river will generally be established outside of the "waters of the United States" as defined by federal laws and regulations and as determined by the delineation completed by the ACOE in August 1993.** As illustrated on **Figure 4.5-6**, the proposed bank stabilization locations along the main stem of the Santa Clara River are predominantly located outside of the ACOE jurisdiction. The entire Landmark Village project, inclusive of the utility corridor and borrow site, would permanently impact approximately 0.78 acres of land under ACOE jurisdiction within the Santa Clara River, as well as 0.60 acres of tributaries to the Santa Clara River. The Newhall Ranch Specific Plan Program EIR contemplated this impact.

- **Where the ACOE 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.** The Landmark Village Drainage Concept proposes soil cement on the north side of the river near the confluence with Castaic Creek on agricultural land, north of the existing riparian river corridor. The land located between the existing river corridor and the newly created stabilized bank would be excavated to widen the existing channel, which would increase the area available within the channel and increase the capacity of the river to convey the passage of flood flows.

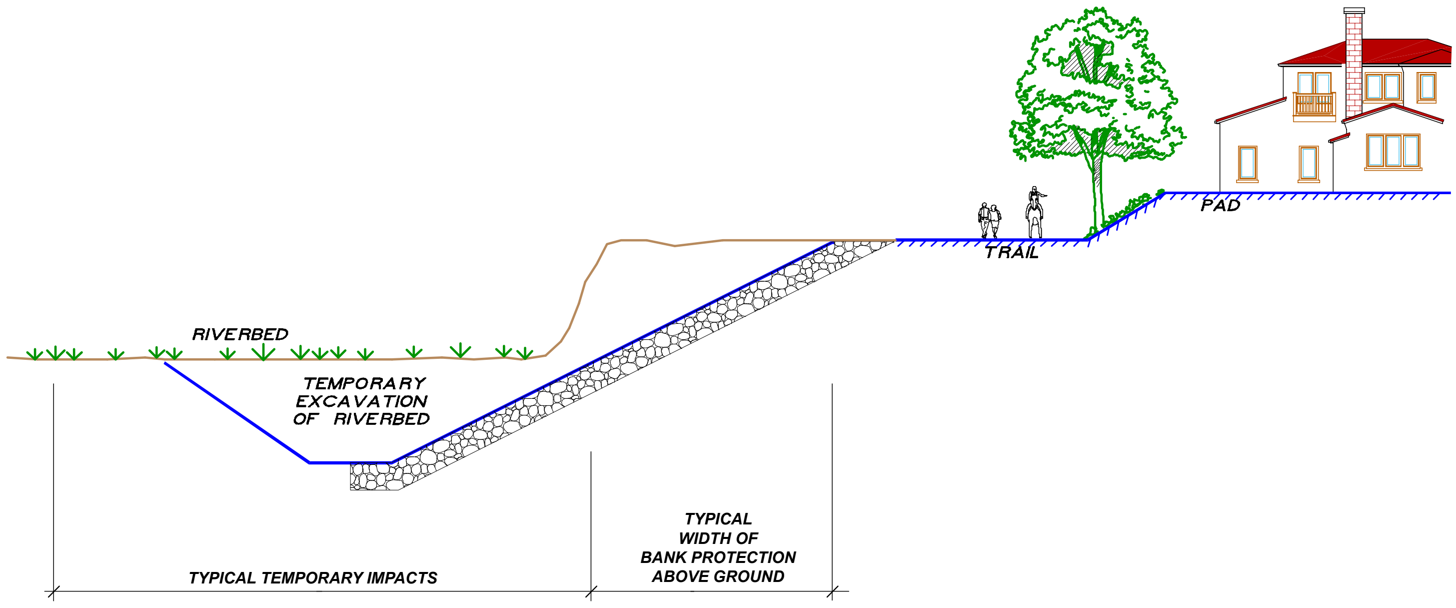
- **Soil cement would occur only where necessary to protect against erosion adjacent to the proposed development. Where existing bluffs are determined to be stable and there is no adjacent proposed development, no bank protection will be built.** In total, approximately 63 percent of the river corridor would be protected with flood protection improvements, while 37 percent of the corridor would remain in a natural state. Approximately 76 percent of the area proposed for flood control protection improvements would consist of buried bank protection. Approximately 20 percent would consist of TRMs, while roughly 4 percent would consist of rip-rap or reinforced concrete.

Installation of soil cement in the vicinity of the approved Newhall Ranch WRP would likely be installed prior to implementation of the project, and impacts of this action were previously evaluated at the project level in the certified Newhall Ranch Specific Plan Program EIR.

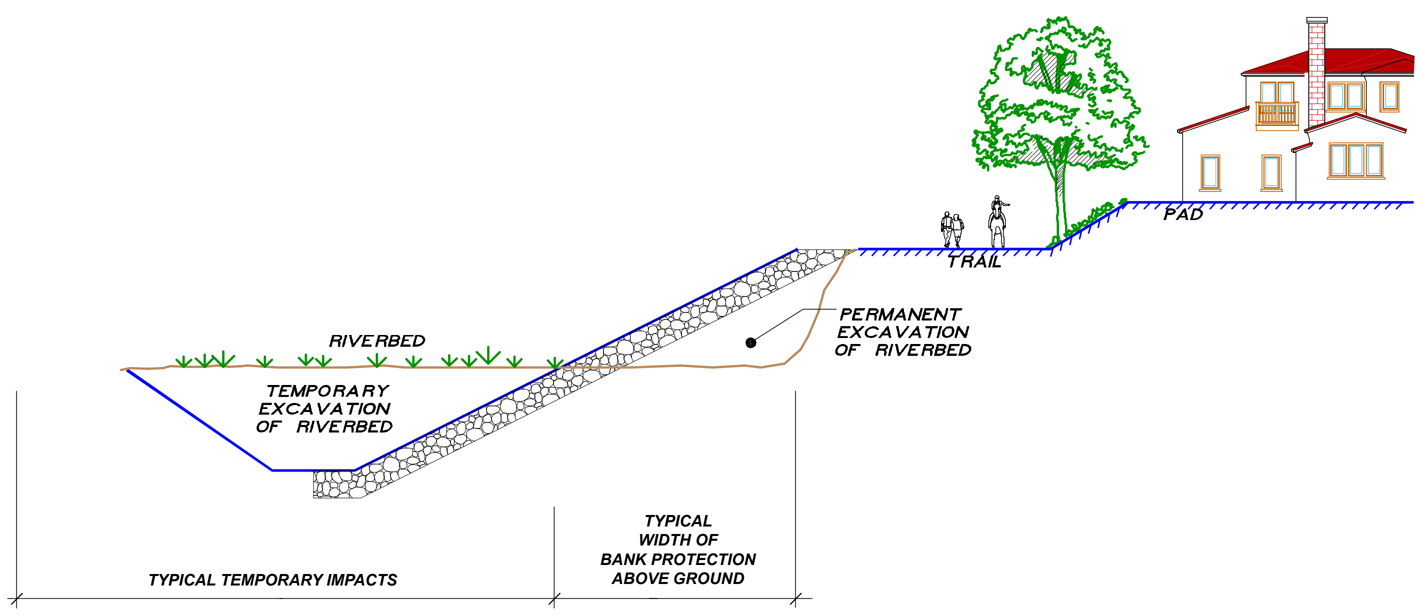
b. On-Site Drainage Control

At project buildout, runoff from the six drainage areas that drain through or onto the project site, as defined by the Psomas *Landmark Village Drainage Concept Report* (March 14, 2005), would continue to flow through the project site to the river. Runoff from the developed portions of the project would be channeled through the proposed storm water conveyance system and discharged to the river after passing through various debris and water quality basins. As required in the Los Angeles County Department of Public Works memorandum entitled, "Level of Flood Protection and Drainage Protection Standards," all on-site drainage systems carrying runoff from developed areas are to be designed for the 25-year design storm (urban flood), while storm drains under major and secondary highways, open channels (main channels), debris carrying systems, and sumps are to be designed for the capital flood.

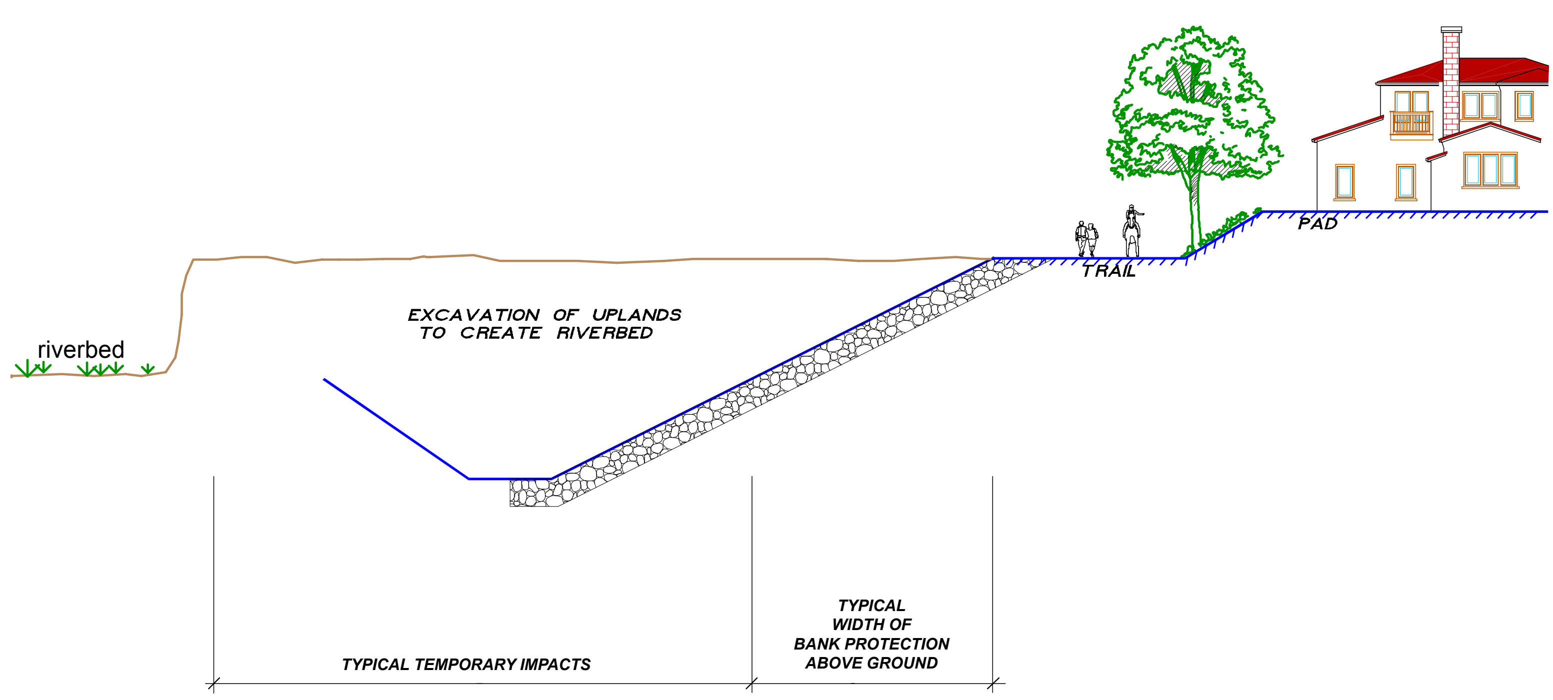
Runoff from the developed portions of the project would be conveyed through the project site using a combination of storm drains, vegetated swales, catch basins, retention/detention basins, water quality basins, outlet structures, and debris basins.



Section A
No Permanent Loss of Riverbed, Only Temporary Impacts



Section B
Permanent Loss of Riverbed and Temporary Impacts



Section C
No Permanent Loss of Riverbed and No Temporary Impacts

35.0 17.5 0 35
APPROXIMATE SCALE IN FEET

SOURCE: FORMA – March 2002

FIGURE **4.5-5**

Bank Stabilization, Typical Cross Section

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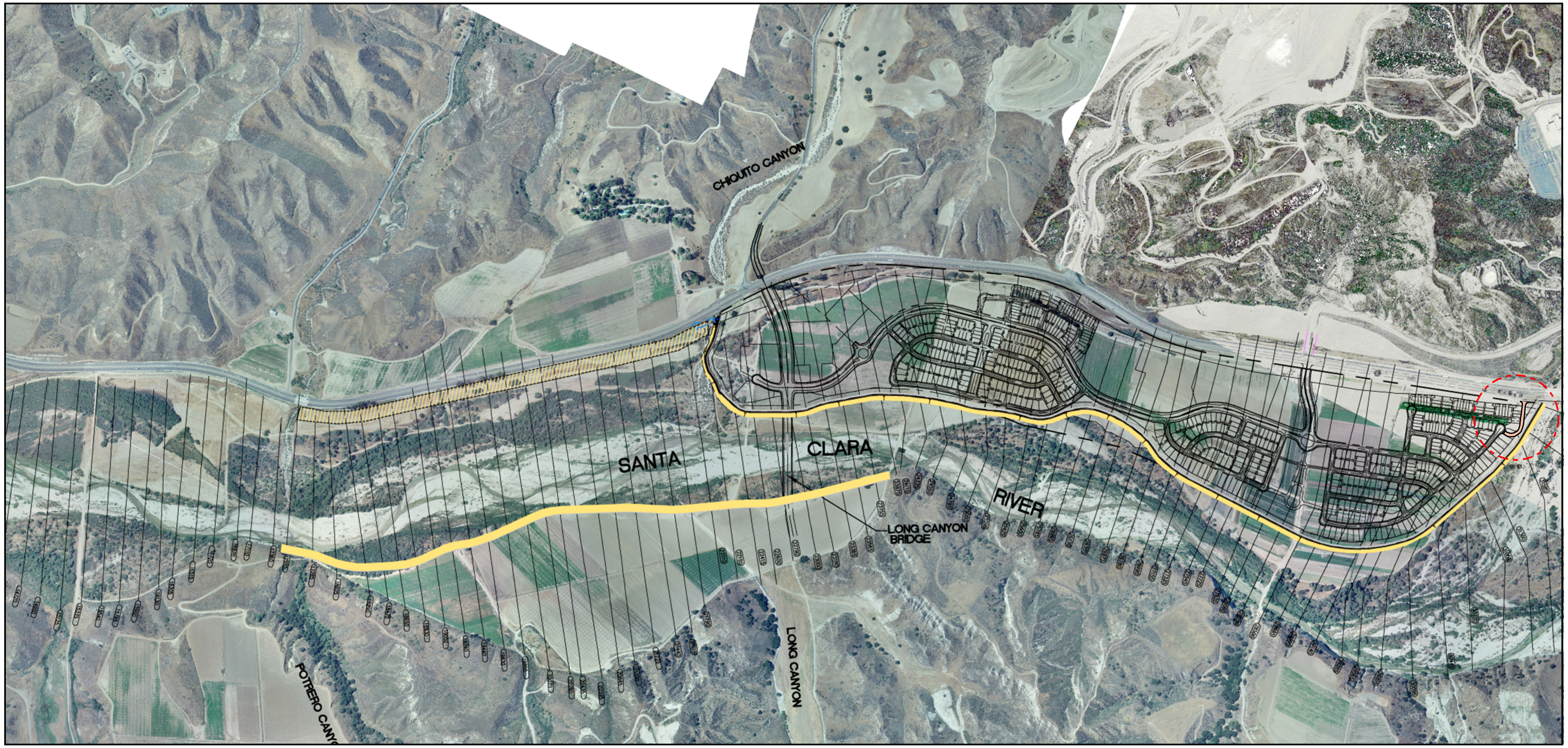
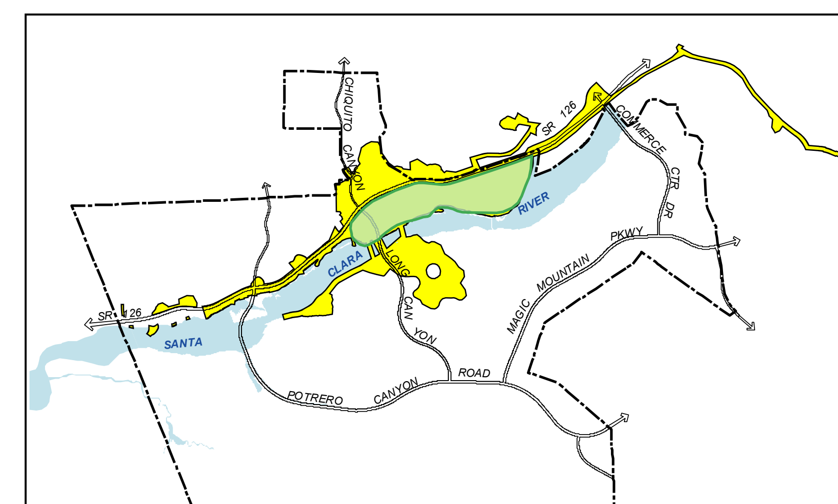




Legend:

- Residential Project Boundary
- Proposed Soil Cement Bank Protection
- Proposed Utility Corridor Bank Protection
- Emergency access road

1200 600 0 1200
APPROXIMATE SCALE IN FEET

SOURCE: PACE Engineering – June 2005

FIGURE **4.5-6**

Location of Long Canyon Road Bridge and Proposed Bank Stabilization Locations

32-92A•03/09

7. PROJECT IMPACTS

a. Significance Threshold Criteria

Based on the thresholds of significance identified in Appendix G of the *State CEQA Guidelines*, the proposed project would result in a significant impact due to floodplain modifications if the project would:

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service; or

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner, which would result in substantial erosion or siltation on or off-site.

The above criteria are subjective and difficult to apply, but they will be considered in the context of modifications to the floodplain that would cause a significant impact to biological resources if changes in hydraulic conditions in the Santa Clara River would: (1) cause widespread and chronic scouring due to increased velocities in the channel bed that removes a significant amount of aquatic, wetland, and riparian habitats from the river channel; (2) substantially modify the relative amounts of these different habitats in the river, essentially altering the nature and quality of the riverine environment; (3) directly remove sensitive habitat by channelization; and/or (4) substantially effect Rare, Endangered, Threatened or sensitive species (collectively, sensitive species).

b. Construction-Related Impacts

The construction-related biological impacts of the proposed project on river corridor habitats and sensitive species are addressed in **Section 4.4, Biota**, of this EIR. Given that construction along the river corridor would likely occur during low or no flow periods, when aquatic special-status species would not be present, any impacts due to changes in river hydraulics is expected to be temporary and not significant.

c. Operation-Related Impacts

The focus of the impact analysis is on the biological consequences of the project-related post-development changes in hydraulic conditions along the river. Key hydraulic impacts that may occur include effects on floodplain boundary and areas, discharge (i.e., river flow amount), flow velocities, and sediment transport and deposition patterns. Changes in these conditions can affect the nature, location, and amount of aquatic, wetland, and riparian habitats along the river, and the sensitive species that use these habitats.

(1) Predicted Hydraulic Conditions

(a) Impact on Flows

Implementation of the project would affect the previously described on-site natural tributary drainage channels. While existing storm water discharges from the project site are not concentrated into centralized outlet structures (as proposed by the project), surface water flows naturally form paths of least resistance and concentrate at existing topographic depressions or cut channels that serve as concentrated discharge locations. Therefore, while the project includes development of a storm drain system with predefined outlets, this condition will not significantly alter existing drainage patterns. The project also includes the use of energy dissipaters at the storm drain outlets to the river. Installation of these improvements would reduce the energy that can cause erosion at the outlets.

Creation of impervious surfaces associated with project development would increase the amount of clear flow runoff from the site. Burned and bulked runoff and debris volumes, however, would be reduced because the developed portions of the project site would be covered with impervious surfaces and non-erodible vegetation, and because debris basins are proposed just upstream of the project site that would reduce the amount of debris and sediment in the runoff. The post-development runoff quantities are provided in **Table 4.2-6** found in **Section 4.2**, **Hydrology**, of this Recirculated Draft EIR. This information indicates that post-development discharge is predicted to total 795 cfs for the project site during a 50-year storm, which is a 36 cfs reduction in 50-year flows when compared to pre-development conditions. This reduction in discharge is largely due to project debris basins that would capture upstream bulk flows and allow debris to settle out from the runoff before it enters the storm system through the developed portion of the site. This small change (<1 percent) shows that existing and proposed project conditions are substantially consistent.

(b) Impact on Velocity

Proposed project improvements will encroach upon portions of the river corridor with placement of buried soil cement, TRMs, bridge abutments and piers, storm drain outlets and energy dissipaters. These improvements have the potential to increase water velocities during storm events. Streambed modification is a result of erosion or sediment deposition and can be evaluated as a function of in-stream velocities, which are indicators for potential riverbed scouring.

Because the Santa Clara riverbed is composed of alluvial materials, the non-erodible velocities (velocities below which no erosion would occur) range from 2.5 feet per second (fine gravels under clear flow conditions) to 5.0 feet per second (alluvial silts transporting colloidal materials) (Chow, 1959). Therefore, a representative velocity of 4.0 feet per second was determined to be the appropriate indicator for potential erosion.

The proposed Long Canyon Road Bridge would be constructed across the river, and would include piers, abutments, and bank protection within the river corridor. In addition, segments of the utility corridor parallel the river and would require protection at certain locations. However, **Figures 4.5-7a** through **4.5-7f** indicate that while localized increases in velocity would occur, particularly at and immediately downstream of the Long Canyon Road Bridge, the project improvements would not cause a significant increase in areas of the river that would be subject to velocities over 4 feet/second during a 2- and 5-year storm event, because flows during these events would be completely spanned by the bridge and bank improvements so they remain unaffected. Additionally, there would be areas of the river where decreases in velocity are experienced during a 10-year through 100-year storm event.

Localized increases at the Long Canyon Road Bridge causes the need for the buried soil cement bank stabilization to extend west of the tract map site along the southern boundary of the river corridor, which is consistent with the bank stabilization improvements described in the certified Newhall Ranch Specific Plan Program EIR. All of these changes are localized within the study area, and no impacts to velocities will occur upstream or downstream of the project.

(c) Impact on Water Surface Elevations

The results of the PACE study indicate that project-related improvements would result in 31 locations where water surface elevation (WSE) changes occur (10 of which exceed 1 foot) and 21 locations where there is a decrease in water surface elevations (1 of which exceeds 1 foot). All of these changes are localized within the study area, and no WSE impacts would occur upstream or downstream of the project. Refer to **Figure 4.5-8a** through **Figure 4.5-8f** which illustrate the locations where the WSE exceeds 1 foot in the post-developed condition for each storm interval.

(d) Impact to River Corridor SMA/SEA 23

As described above, the Newhall Ranch Specific Plan project approvals authorized an adjustment to the existing SEA 23 boundary and permitted Specific Plan development within the revised and approved River Corridor SMA/SEA 23 boundary, including bridge crossings, trails, bank stabilization, development and other improvements. The approved River Corridor SMA/SEA 23 boundary adjustments were intended, in part, to more accurately reflect the location of the sensitive biological resources located within the existing SEA 23.

The effects on flows in the river caused by the introduction of these improvements into the River Corridor SMA/SEA 23 are illustrated above on **Figures 4.5-7a** and **4.5-7b**, which depict areas inundated by flows during high frequency floods (2 and 5 year) and river velocities. As shown, under these conditions, the proposed floodplain modifications would not hinder flows. Instead, these flows would spread across the river channel, unaffected by the bank protection because the river would have sufficient width to allow these flows to meander and spread out as under pre-project conditions. During more infrequent floods (10-, 20-, 50- and 100-year events), river flows would be confined within the river corridor now defined by the bank stabilization (**Figure 4.5-7c** through **4.5-7f**).

Consistent with the findings of the Newhall Ranch Revised Additional Analysis, implementation of the Landmark Village project would not significantly alter river hydrology in the river corridor because the effects associated with the floodplain modifications would be infrequent and would not substantially alter flows, water velocities and depths. Under the project, the river would retain sufficient width to allow natural fluvial processes to continue.

(2) Biological Impacts of Hydraulic Changes

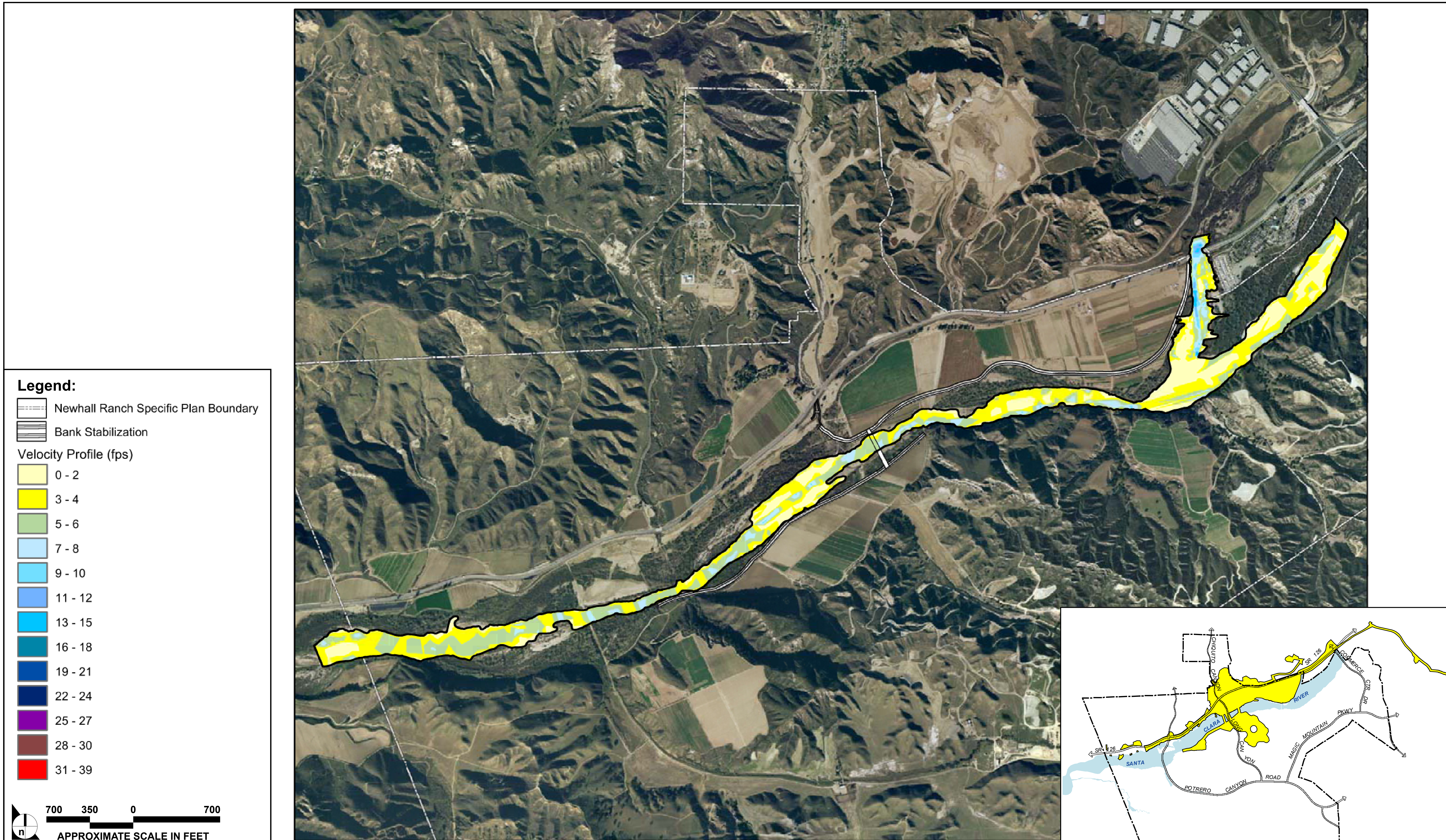
An increase in velocities in the river could result in significant biological impacts if the increase caused: (1) widespread and chronic scouring of the channel bed that removes a significant amount of aquatic, wetland, and riparian habitats from the river channel; and/or (2) substantial modification of the relative amounts of these different habitats in the river, essentially altering the nature and quality of the riverine environment; and/or (3) substantial effects to Rare, Endangered, Threatened or sensitive species.

(a) Impact on Flows

The hydraulic analysis above indicates that implementation of the project would increase clear flows, but decrease burned and bulked flows since project debris basins would capture upstream bulk flows and allow debris to settle out before entering into the river during a given return event. These hydraulic effects would be minor in magnitude and extent (<1 percent), and would not be sufficient to alter the amount, location, and nature of aquatic and riparian habitats in the project area and downstream. Therefore, no significant impacts would occur due to river flows.

(b) Impact on Velocities

The results of the hydraulic analysis indicate that the overall velocities in the river would not change during the frequent storm intervals (i.e., 2- and 5-year events) due to the floodplain modifications associated with the project. Overall, velocities for all return events are not significantly different between existing and proposed conditions at and downstream of the project site.



SOURCE: PACE – August 2006

FIGURE **4.5-7a**

Proposed Conditions – Area Inundated by 2-Year Storm Event

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