

Existing tree planters are inadequate in size, with no under story plantings. They are detrimental to the health of the tree, and aesthetically undesirable.



Typical Existing Conditions



Adjacent to landscape islands are pervious parking spaces. These spaces provide expanded infiltration areas, while maintaining the current parking capacity.



Concept 1: Enhanced Landscape Islands with adjacent pervious parking

Expanded landscape islands are enhanced with native vegetation. In accordance with the Arroyo Seco Master Plan, use of native vegetation would require less maintenance and help define a "sense of place".

Large stones, as described in the Arroyo Seco Master Plan will be used around the perimeter of the landscape islands for protection from vehicular and pedestrian traffic which causes soil compaction in the root zone. The boulders will also serve as an inpromptu seating area.

The Large Tree Concept is adequately named, as it gives existing trees the best opportunity to grow and thrive. This is achieved by maximizing the size of the planting area. Large trees will reduce stormwater runoff, as well as the heat generated by the pavement.

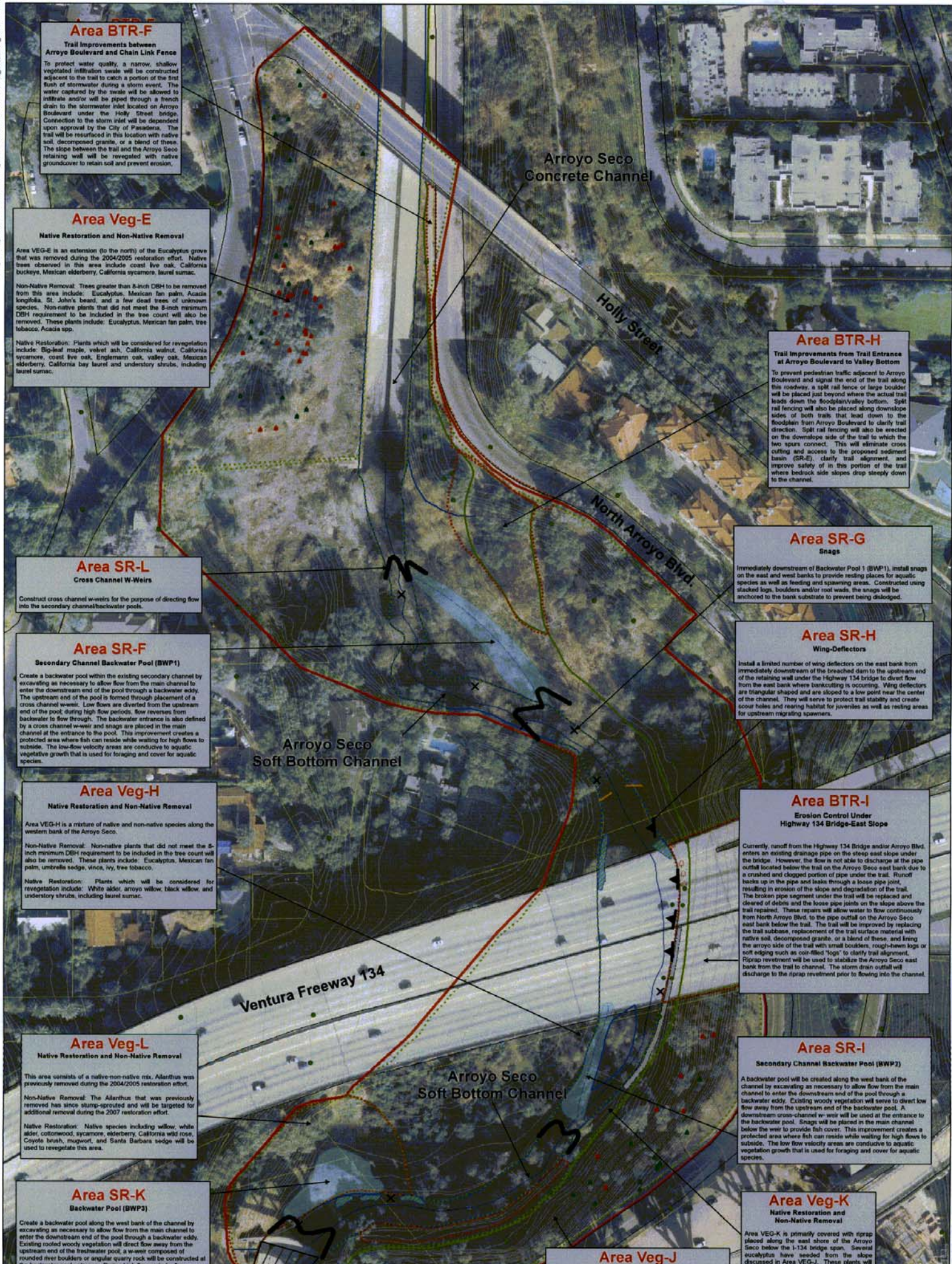


Concept 2: Expanded landscape islands with native plant species

Expanded landscape islands are enhanced with native vegetation. In accordance with the Arroyo Seco Master Plan, use of native vegetation would require less maintenance and help define a "sense of place".

Large stones, as described in the Arroyo Seco Master Plan will be used around the perimeter of the landscape islands for protection from vehicular and pedestrian traffic which causes soil compaction in the root zone. The boulders will also serve as an inpromptu seating area.

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Area BTR-F
Trail Improvements between Arroyo Boulevard and Chain Link Fence

To protect water quality, a narrow, shallow vegetated infiltration swale will be constructed adjacent to the trail to catch a portion of the first flush of stormwater during a storm event. The water captured by the swale will be allowed to infiltrate and/or will be piped through a french drain to the stormwater inlet located on Arroyo Boulevard under the Holly Street bridge. Connection to the storm inlet will be dependent upon approval by the City of Pasadena. The trail will be resurfaced in this location with native soil, decomposed granite, or a blend of these. The slope between the trail and the Arroyo Seco retaining wall will be revegetated with native groundcover to retain soil and prevent erosion.

Arroyo Seco Concrete Channel

Area Veg-E
Native Restoration and Non-Native Removal

Area VEG-E is an extension (to the north) of the Eucalyptus grove that was removed during the 2004/2005 restoration effort. Native trees observed in this area include coast live oak, California buckeye, Mexican elderberry, California sycamore, laurel sumac.

Non-Native Removal: Trees greater than 8-inch DBH to be removed from this area include: Eucalyptus, Mexican fan palm, Acacia longifolia, St. John's beard, and a few dead trees of unknown species. Non-native plants that did not meet the 5-inch minimum DBH requirement to be included in the tree count will also be removed. These plants include: Eucalyptus, Mexican fan palm, tree tobacco, Acacia spp.

Native Restoration: Plants which will be considered for revegetation include: Big-leaf maple, velvet ash, California walnut, California sycamore, coast live oak, Englemann oak, valley oak, Mexican elderberry, California bay laurel and understory shrubs, including laurel sumac.

Area BTR-H
Trail Improvements from Trail Entrance at Arroyo Boulevard to Valley Bottom

To prevent pedestrian traffic adjacent to Arroyo Boulevard and signal the end of the trail along the roadway, a split rail fence or large boulder will be placed just beyond where the actual trail leads down the floodplain/valley bottom. Split rail fencing will also be placed along downslope sides of both trails that lead down to the floodplain from Arroyo Boulevard to clarify trail direction. Split rail fencing will also be erected on the downslope side of the trail to which the two spurs connect. This will eliminate cross cutting and access to the proposed sediment basin (SR-I), clarify trail alignment and improve safety of in this portion of the trail where bedrock side slopes drop steeply down to the channel.

Area SR-L
Cross Channel W-Weirs

Construct cross channel w-weirs for the purpose of directing flow into the secondary channel/backwater pools.

Area SR-G
Snags

Immediately downstream of Backwater Pool 1 (BWP1), install snags on the east and west banks to provide resting places for aquatic species as well as feeding and spawning areas. Constructed using stacked logs, boulders and/or root wads, the snags will be anchored to the bank substrate to prevent being dislodged.

Area SR-F
Secondary Channel Backwater Pool (BWP1)

Create a backwater pool within the existing secondary channel by excavating as necessary to allow flow from the main channel to enter the downstream end of the pool through a backwater eddy. The upstream end of the pool to form through placement of a cross channel w-weir. Low flows are diverted from the upstream end of the pool; during high flow periods, flow reverses from backwater to flow through. The backwater entrance is also defined by a cross channel w-weir and snags are placed in the main channel at the entrance to the pool. This improvement creates a protected area where fish can reside while waiting for high flows to subside. The low-flow velocity areas are conducive to aquatic vegetative growth that is used for foraging and cover for aquatic species.

Area SR-H
Wing-Deflectors

Install a limited number of wing deflectors on the east bank from immediately downstream of the breached dam to the upstream end of the retaining wall under the Highway 134 bridge to divert flow from the east bank where bankcutting is occurring. Wing deflectors are triangular shaped and are spaced to a low point near the center of the channel. They will serve to protect trail stability and create scour holes and rearing habitat for juveniles as well as resting areas for upstream migrating spawners.

Area Veg-H
Native Restoration and Non-Native Removal

Area VEG-H is a mixture of native and non-native species along the western bank of the Arroyo Seco.

Non-Native Removal: Non-native plants that did not meet the 5-inch minimum DBH requirement to be included in the tree count will also be removed. These plants include: Eucalyptus, Mexican fan palm, umbrellae sedge, vinec, ivy, tree tobacco.

Native Restoration: Plants which will be considered for revegetation include: White alder, arroyo willow, black willow, and understory shrubs, including laurel sumac.

Arroyo Seco Soft Bottom Channel

Area BTR-I
Erosion Control Under Highway 134 Bridge-East Slope

Currently, runoff from the Highway 134 Bridge and/or Arroyo Blvd, enters an existing drainage pipe on the steep east slope under the bridge. However, the flow is not able to discharge at the pipe outlet located below the trail on the Arroyo Seco east bank due to a crushed and clogged portion of pipe under the trail. Runoff backs up in the pipe and leaks through a loose pipe joint, resulting in erosion of the slope and degradation of the trail. The broken pipe segment under the trail will be replaced and cleared of debris and the loose pipe joints on the slope above the trail repaired. These repairs will allow water to flow continuously from North Arroyo Blvd, to the pipe outlet on the Arroyo Seco east bank below the trail. The trail will be improved by replacing the trail subbase, replacement of the trail surface material with native soil, decomposed granite, or a blend of these, and bring the arroyo side of the trail with small boulders, rough-hewn logs or soft edging such as cool-filled "logs" to clarify trail alignment. Riprap treatment will be used to stabilize the Arroyo Seco east bank from the trail to channel. The storm drain outlet will discharge to the riprap treatment prior to flowing into the channel.

Ventura Freeway 134

Area Veg-L
Native Restoration and Non-Native Removal

This area consists of a native-non-native mix. *Alnus* was previously removed during the 2004/2005 restoration effort.

Non-Native Removal: The *Alnus* that was previously removed has since stump-sprouted and will be targeted for additional removal during the 2007 restoration effort.

Native Restoration: Native species including willow, white alder, cottonwood, sycamore, elderberry, California wild rose, Coyote brush, mugwort, and Santa Barbara sedge will be used to revegetate this area.

Arroyo Seco Soft Bottom Channel

Area SR-I
Secondary Channel Backwater Pool (BWP2)

A backwater pool will be created along the west bank of the channel by excavating as necessary to allow flow from the main channel to enter the downstream end of the pool through a backwater eddy. Existing woody vegetation will serve to divert low flow away from the upstream end of the backwater pool. A downstream cross-channel w-weir will be used at the entrance to the backwater pool. Snags will be placed in the main channel below the weir to provide fish cover. This improvement creates a protected area where fish can reside while waiting for high flows to subside. The low flow velocity areas are conducive to aquatic vegetative growth that is used for foraging and cover for aquatic species.

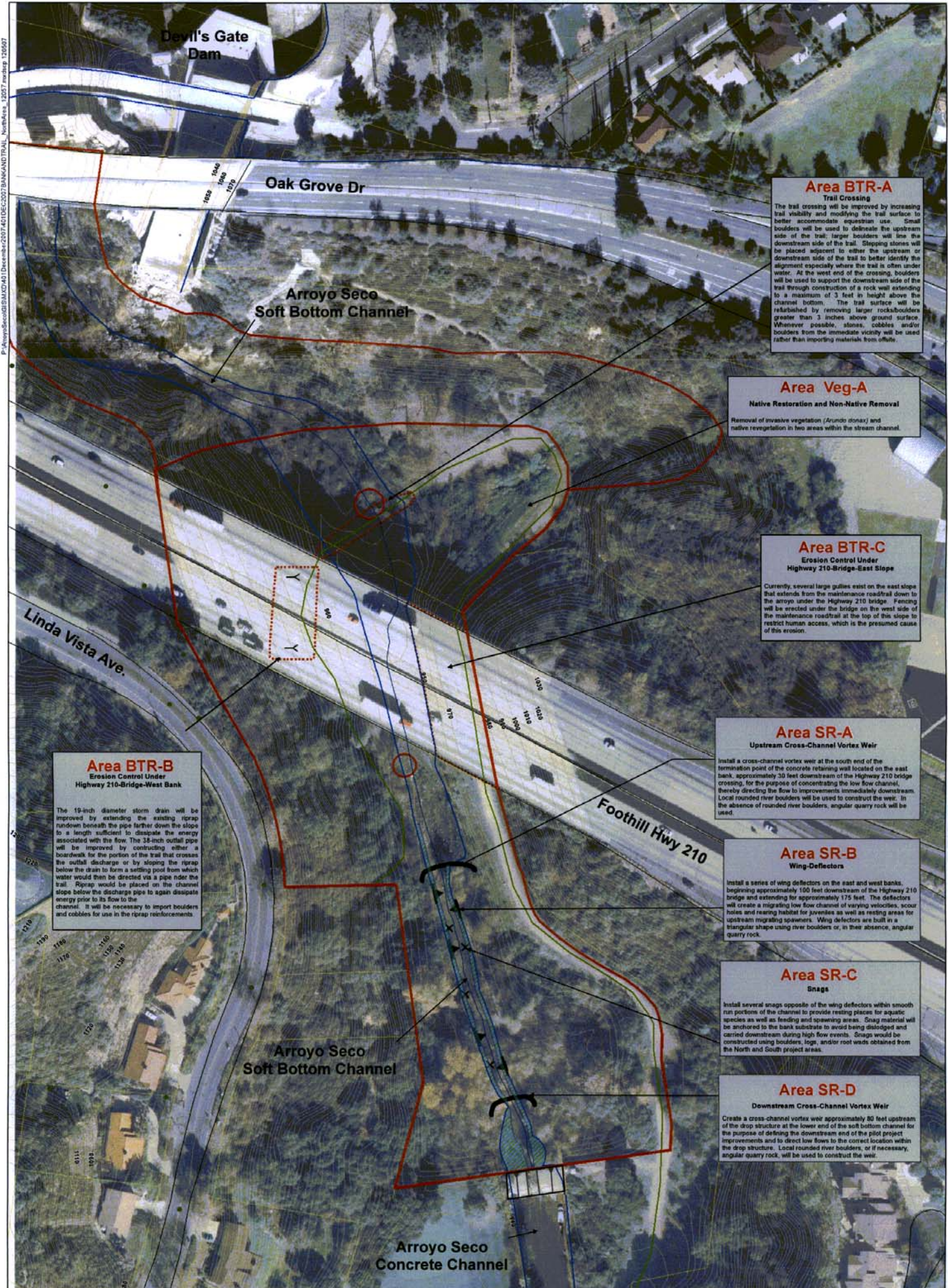
Area SR-K
Backwater Pool (BWP3)

Create a backwater pool along the west bank of the channel by excavating as necessary to allow flow from the main channel to enter the downstream end of the pool through a backwater eddy. Existing rooted woody vegetation will direct flow away from the upstream end of the backwater pool; a weaver composed of rounded river boulders or angular quarry rock will be constructed at the backwater pool entrance. During high flow periods, flow

Area Veg-J
Native Restoration and Non-Native Removal

Area Veg-K
Native Restoration and Non-Native Removal

Area VEG-K is primarily covered with riprap placed along the east shore of the Arroyo Seco below the 1-134 bridge span. Several eucalyptus have seeded from the slope discussed in Area VEG-L. These plants will be removed without replacement.



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Devil's Gate Dam

Oak Grove Dr

Arroyo Seco Soft Bottom Channel

Linda Vista Ave

Foothill Hwy 210

Arroyo Seco Soft Bottom Channel

Arroyo Seco Concrete Channel

Area BTR-A

Trail Crossing

The trail crossing will be improved by increasing trail visibility and modifying the trail surface to better accommodate equestrian use. Small boulders will be used to delineate the upstream side of the trail; larger boulders will line the downstream side of the trail. Sleeping stones will be placed adjacent to either the upstream or downstream side of the trail to better identify the alignment especially where the trail is often under water. At the west end of the crossing, boulders will be used to support the downstream side of the trail through construction of a rock wall extending to a maximum of 3 feet in height above the channel bottom. The trail surface will be rehabilitated by removing larger rocks/boulders greater than 3 inches above ground surface. Whenever possible, slabs, cobbles and/or boulders from the immediate vicinity will be used rather than importing materials from offsite.

Area Veg-A

Native Restoration and Non-Native Removal

Removal of invasive vegetation (*Arundo donax*) and native revegetation in two areas within the stream channel.

Area BTR-C

Erosion Control Under Highway 210-Bridge-East Slope

Currently, several large gullies exist on the east slope that extends from the maintenance road/trail down to the arroyo under the Highway 210 bridge. Fencing will be erected under the bridge on the west side of the maintenance road/trail at the top of this slope to restrict human access, which is the presumed cause of this erosion.

Area SR-A

Upstream Cross-Channel Vortex Weir

Install a cross-channel vortex weir at the south end of the termination point of the concrete retaining wall located on the east bank, approximately 30 feet downstream of the Highway 210 bridge crossing, for the purpose of concentrating the low flow channel, thereby directing the flow to improvements immediately downstream. Local rounded river boulders will be used to construct the weir. In the absence of rounded river boulders, angular quarry rock will be used.

Area SR-B

Wing-Deflectors

Install a series of wing deflectors on the east and west banks, beginning approximately 100 feet downstream of the Highway 210 bridge and extending for approximately 175 feet. The deflectors will create a migrating low flow channel of varying velocities, scour holes and nesting habitat for juveniles as well as resting areas for upstream migrating spawners. Wing deflectors are built in a triangular shape using river boulders or, in their absence, angular quarry rock.

Area SR-C

Snags

Install several snags opposite of the wing deflectors within smooth run portions of the channel to provide resting places for aquatic species as well as feeding and spawning areas. Snag material will be structured to the bank substrate to avoid being dislodged and carried downstream during high flow events. Snags would be constructed using boulders, logs, and/or root wads obtained from the North and South project areas.

Area SR-D

Downstream Cross-Channel Vortex Weir

Create a cross-channel vortex weir approximately 80 feet upstream of the drop structure at the lower end of the soft bottom channel for the purpose of defining the downstream end of the pilot project improvements and to direct low flows to the correct location within the drop structure. Local rounded river boulders, or if necessary, angular quarry rock, will be used to construct the weir.

Area BTR-B

Erosion Control Under Highway 210-Bridge-West Bank

The 19-inch diameter storm drain will be improved by extending the existing riprap rundown beneath the pipe farther down the slope to a length sufficient to dissipate the energy associated with the flow. The 24-inch outfall pipe will be improved by constructing either a boardwalk for the portion of the trail that crosses the outfall discharge or by sloping the riprap below the drain to form a settling pool from which water would then be directed via a pipe under the trail. Riprap would be placed on the channel slope below the discharge pipe to again dissipate energy prior to its flow to the channel. It will be necessary to import boulders and cobbles for use in the riprap reinforcements.