

4.7 HYDROLOGY AND WATER QUALITY

INTRODUCTION

The proposed stormwater drainage system for the proposed Via Princessa project would consist of curb and gutters, catch basins, and storm drain culverts crossing the proposed Via Princessa extension. Implementation of the proposed drainage system and compliance with state and local regulations would effectively regulate flow, velocity, and quality of stormwater runoff from the site. As a result, impacts related to drainage patterns, watercourses, erosion, and water quality would be less than significant.

Portions of the impact analysis contained in this section are based on the following technical study that was prepared for the proposed Via Princessa East Extension roadway (proposed project). Refer to **Appendix 4.7** for the report:

- Sikand, *Drainage Concept for Via Princessa East between Golden Valley Road and Sheldon Avenue*, July 2010.

The Sikand report summarizes findings regarding existing hydrology, potentially significant hydrological impacts, and proposes design features (in some instances) for these impacts. The proposed project would include improvements which extend from the western terminus of Via Princessa (south of Sheldon Avenue) to Golden Valley Road.

EXISTING CONDITIONS

Regional Setting

Watershed Hydrology

The proposed project site is located in the Eastern Subarea of the Upper Santa Clara River Hydrologic Area in the Santa Clarita Valley.¹ The Santa Clarita Valley lies near the center of the Transverse Range Geomorphic Province, and drains a watershed area of approximately 600 square miles.² The Eastern Subarea is the largest and most developed groundwater basin in the Santa Clara River Hydrologic Area. The near surface geology of the basin consists of Holocene alluvium, Pleistocene terrace deposits, and the late to early Pleistocene-age Saugus Formation. Locally, groundwater for beneficial use is withdrawn from the Saugus Formation. In addition to groundwater in the Saugus Formation, groundwater is present in the alluvial soils beneath Placerita Canyon.

¹ California Department of Water Resources, Groundwater Bulletin 118, Hydrologic Region South Coast, 2006.

² Los Angeles County Department of Public Works, Water Resources Division, Hydrology Manual, (2006) 21.

Rainfall

The Santa Clarita Valley experiences a Mediterranean climate. The annual precipitation in the region can range from less than 10 inches during drought conditions to near 40 inches in a heavy rainfall year. Approximately 90 percent of the annual rainfall in the Santa Clarita Valley occurs in the winter months from October through April. Occasional summer rainstorms account for the remaining rainfall.

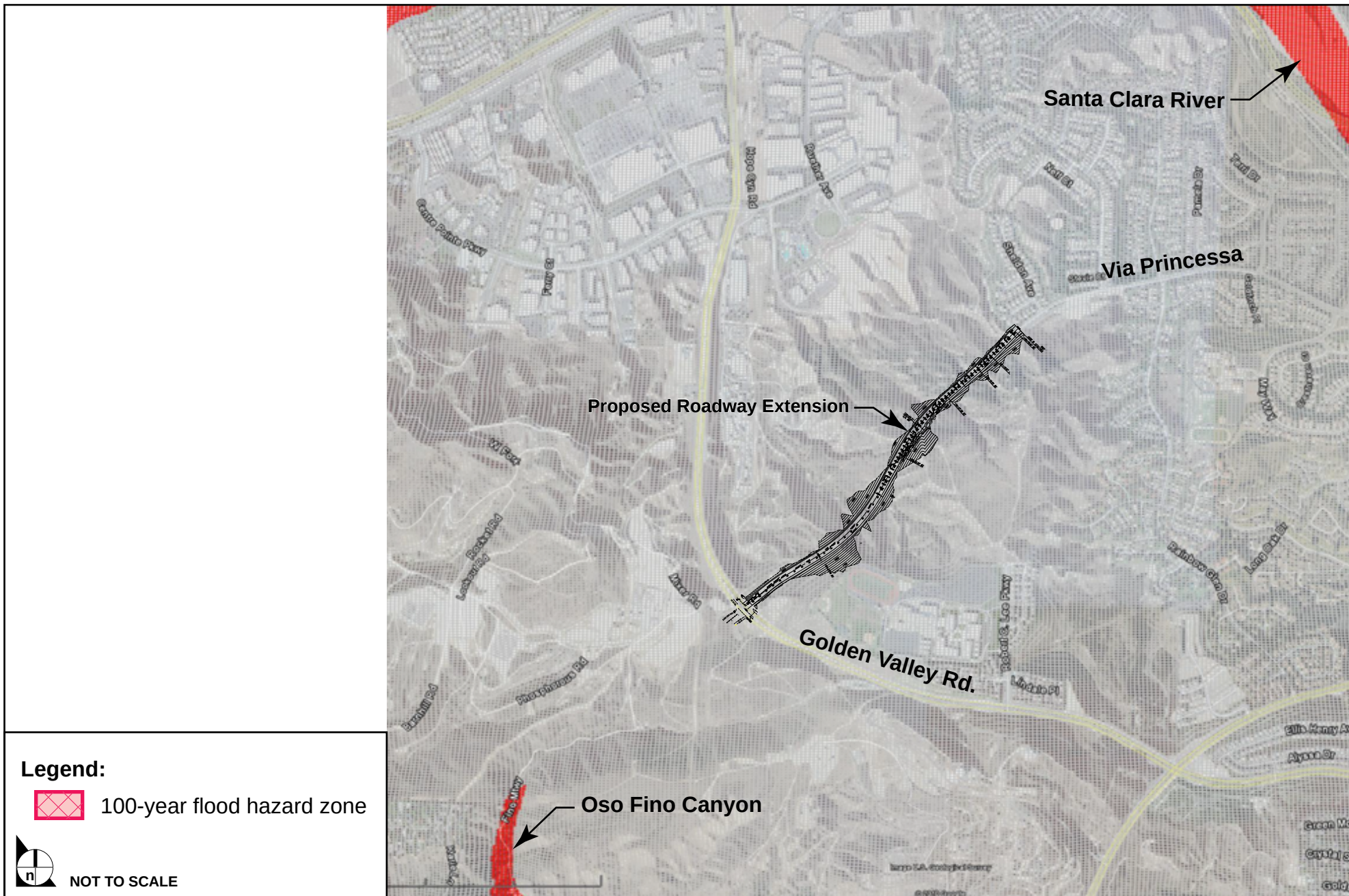
There are no perennial surface water bodies in the proposed project area.

Floodplain

Surface water drainage patterns are dependent on topography, the amount and location of impervious surfaces, and the type of flood control that is located in an area. The size, or magnitude, of a flood is described by a term called a “recurrence interval.” By studying a long period of flow record for a stream, hydrologists estimate the size of a flood that would have a likelihood of occurring during various intervals. For example, a five-year flood event would occur, on the average, once every five years (and would have a 20 percent chance of occurring in any one year). Although a 100-year flood event is expected to happen only once in a century, there is a 1 percent chance that a flood of that size could happen during any year. The magnitude of flood events could be altered if changes are made to a drainage basin, such as by diversion of flow or increased flows generated by additional impervious surface area. Additionally, flood control would help manage the surface runoff that occurs in a particular area.

The Federal Emergency Management Agency (FEMA) has mapped most of the flood risk areas within the United States as part of the National Flood Insurance Program (NFIP). The proposed Via Princessa extension from south of Sheldon Avenue to Golden Valley Road is not designated within a 100-year flood hazard area, shown in **Figure 4.7-1, Existing Flood Hazard Area**.

The Santa Clara River and its tributary streams play a major part in moving the large volume of runoff generated from the Valley and surrounding foothills and mountains. The drainage system, including natural streams as well as constructed storm drain infrastructure within City limits, is adequate to handle normal precipitation in the region (8 to 22 inches per year). With the rapid urbanization of the Valley since 1960, stormwater volumes have increased due to increased impervious surface area from parking lots, rooftops, and streets. Flood control facilities have been constructed to mitigate the impacts of development on drainage patterns throughout City limits. Throughout the central portion of the City of Santa Clarita, some streams have been channelized into soft bottom channels with concrete sides to allow for development in the floodplain of the Santa Clara River.



SOURCE: Google Earth –02010, Impact Sciences, Inc. – September 2010

FIGURE 4.7-1

Existing Flood Hazard Area

Dams and Inundation

Within the City of Santa Clarita, the one major reservoir which could have a significant impact on the City in the event of a dam failure is located in Bouquet Canyon. The Bouquet Canyon Reservoir is located 13 miles to the northwest of the project site. The reservoir has two earth-filled dams, one on the west side overlooking Cherry Canyon, and one on the south side above Bouquet Canyon. The Bouquet Reservoir has a maximum capacity of 36,505 acre-feet of water and 7.6 miles of shoreline. On the Cherry Canyon side, the water would flow west for approximately 2 miles through the Canyon into San Francisco Canyon, and then south for approximately 11 miles into the Santa Clara River. The Bouquet Creek dam would drain south through Bouquet Canyon for 17 miles, into the Santa Clara River. The Santa Clara River is located approximately 0.75 mile to the north and east of the project site and 1.5 miles to the north and west of the project site. Therefore, in the event of dam failure the project site would not be inundated.

The Castaic Dam is located on Lake Hughes Road, 1 mile northeast of Interstate 5, just north of the community of Castaic. This dam is an earth-filled dam located at the confluence of Castaic and Elizabeth Lake Creeks. The dam facing is approximately 1 mile across with a maximum capacity of 350,000 acre-feet of water, covering a surface area of 2,600 acres with 34 miles of shoreline. Should a breach in the dam occur, the water will flow south in Castaic Creek for approximately 5 miles to the Santa Clara River. The Castaic Reservoir is north of the City of Santa Clarita boundaries; a dam failure would result in a flow of floodwater that would not flow through the City's limits and therefore not flow into the project site.

Water Quality

Existing storm drain systems are located within Golden Valley Road and Centre Pointe Parkway west and south of the project site. There is an existing storm drain system located in Via Princessa north approximately 650 feet north of Sheldon Avenue, which drains into an existing debris basin approximately 300 feet southeast of Sheldon Avenue/Via Princessa intersection. Located within Golden Valley Road approximately 350 south of the proposed Via Princessa/Golden Valley Road intersection is an existing 54-inch reinforced concrete pipe (rcp) storm drain system (miscellaneous transfer drain [MTD] 1614) maintained by the City of Santa Clarita. The 54-inch rcp drains into a debris basin on the west side of Golden Valley Road. In addition to the 54-inch rcp located within Golden Valley Road is a 24-inch rcp. The 24-inch rcp drains into the same debris basin west of Golden Valley Road. The debris basin required capacity is 1,069 cubic yards of sedimentation with actual capacity at 3,200 cubic yards (cy) of sedimentation. The existing storm drains were approved in August 2000.

Site Conditions

The project site is undeveloped, consisting of ridges and canyons and is well covered with vegetation, including scattered small trees and dense brush. The existing topography of the project site varies as one

moves southwest to northeast from a point on Golden Valley Road just west of Golden Valley High School. The center of Golden Valley Road is at an elevation of 1,598 feet above mean sea level (msl) and rises to 1,655 feet msl at the highest ridgeline and descends to 1,560 feet msl south of Sheldon Avenue. The existing side slopes are steep and approximately average at least 25 percent, while the canyon channels average about 10 percent.

Hydrology

The drainage pattern flows from southeast to northwest towards existing drainage systems on Golden Valley Road and Centre Pointe Parkway, about 3,500 feet northwest of the project site. The flow ultimately goes to the Santa Clara River. The project site has been divided into seven subareas to describe existing discharge, or surface flow rates [cubic feet per second (cfs)]. **Figure 4.7-2 Existing Site Drainage Conditions**, illustrates each subarea within the project site. The existing discharge rates for the project site are shown in **Table 4.7-1, Existing Discharge Conditions**. The total drainage area is 109 acres.

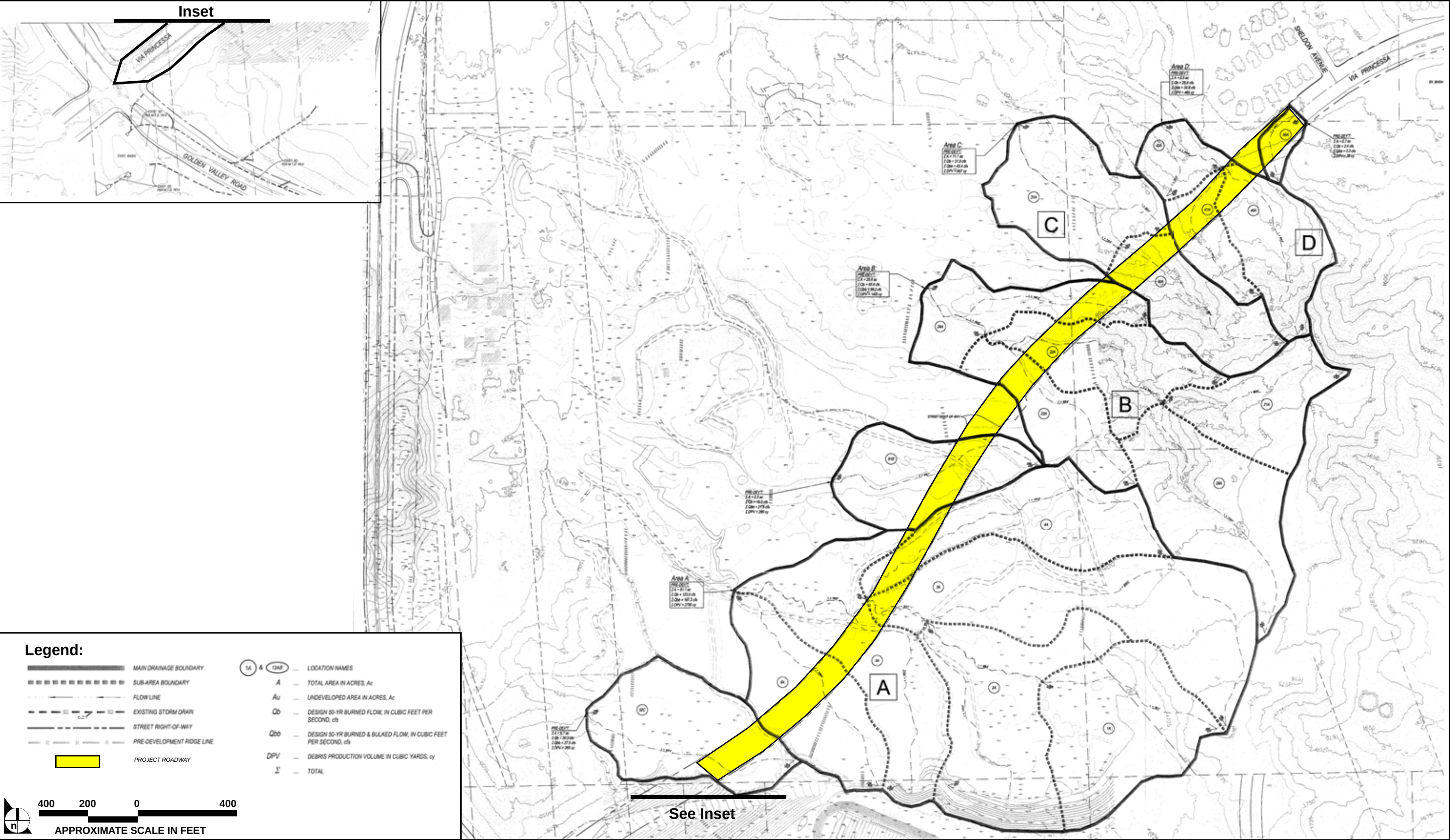
Table 4.7-1
Existing Discharge Conditions

Area Outlet	Area (acres)	Design Frequency (50-year & 25-year)					DPV (cy)
		50-year Burned Flow (cfs)	50- Burned plus 25-year Flow (cfs)	25-year Flow (cfs)	50-year Burned & Bulkied Flow (cfs)	Mixed 50- & 25-year Flow (cfs)	
A	51.1	123.0	--	--	167.3	--	2,795
B	25.6	65.6	--	--	89.2	--	1,400
C	11.1	31.9	--	--	43.4	--	607
D	8.5	25.6	--	--	34.8	--	465
Node 50A	0.7	2.4	--	--	3.3	--	38
Node 51B	5.3	16.0	--	--	21.8	--	290
Node 52C	6.7	20.2	--	--	27.5	--	366

"Burned" = areas such as burned canyons and mountainous areas which add debris to the runoff volume. Therefore, flows from "Burned" areas must be "Bulkied" which reflects increases in runoff volumes and peak flows related to inclusion and transport of sediment and debris (Los Angeles County Department of Public Works, 2006 Hydrology Manual, Chapter 4).

cfs = cubic feet per second; cy = cubic yards; DPV = debris production volume

Source: Sikand, Drainage Concept for Via Princessa East between Golden Valley Road and Sheldon Avenue, July 2010.



SOURCE: Sikand, Drainage Concept for Via Princessa East – July 2010

FIGURE 4.7-2 Existing Site Drainage Conditions

Land use in the area remains unchanged and the total watershed remains constant. Total runoff from a 50-year storm event within subarea “A” is calculated for 167.3 cfs.

Water Quality

Total debris production volume (DPV) within subarea “A” is calculated at 2,795 cy of sedimentation.

REGULATORY SETTING

Federal Regulations

In 1972, the Federal Water Pollution Control Act (also referred to as the Clean Water Act [CWA]) was amended to provide that the discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. The 1987 amendments to the CWA added Section 402(p), which establishes a framework for regulating municipal and industrial storm water discharges under the NPDES Program. On November 16, 1990, the US Environmental Protection Agency (US EPA) published final regulations that established storm water permit application requirements for specified categories of industries. The regulations provide that discharges of storm water to waters of the United States from construction projects that encompass five or more acres of soil disturbance are effectively prohibited unless the discharge is in compliance with an NPDES Permit. Regulations (Phase II Rule) that became final on December 8, 1999, lowered the permitting threshold from 5 acres to 1 acre.

State Regulations

While federal regulations allow two permitting options for storm water discharges (Individual Permits and General Permits), the State Water Board has elected to adopt only one statewide General Permit at this time (September 2009) that will apply to most storm water discharges associated with construction activity.

On August 19, 1999, the State Water Board reissued the General Construction Storm Water Permit (Water Quality Order 99-08-DWQ). On December 8, 1999 the State Water Board amended Order 99-08-DWQ to apply to sites as small as 1 acre.

The General Permit regulates storm water runoff from construction sites. To obtain coverage under this General Permit, dischargers shall electronically file the Permit Registration Documents (PRDs), which includes a Notice of Intent (NOI), Storm Water Pollution Prevention Plan (SWPPP), and other compliance related documents required by this General Permit. It is expected that as the storm water program develops, the Regional Water Quality Control Boards (Regional Water Boards) may issue General Permits

or Individual Permits containing more specific permit provisions. When this occurs, this General Permit will no longer regulate those dischargers.

Dischargers whose projects disturb one or more acres of soil or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 99-08-DWQ). Effective July 1, 2010, all dischargers are required to obtain coverage under the Construction General Permit Order 2009-0009-DWQ adopted on September 2, 2009. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP should contain a site map(s) which shows the construction site perimeter, existing and proposed buildings, lots, roadways, storm water collection and discharge points, general topography both before and after construction, and drainage patterns across the project. The SWPPP must list Best Management Practices (BMPs) the discharger will use to protect storm water runoff and the placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Section A of the Construction General Permit describes the elements that must be contained in a SWPPP.

The proposed project would disturb approximately 550,000 cubic yards of soil, or approximately 341 acre-feet.³

³ 1 acre-foot (1 acre, one foot deep) = 1,613.3 cubic yards. (550,000 cy / 1,613.3 cy = 340.9 acre-feet).

Local Regulations

City

Stormwater and Urban Runoff Pollution Control

Section 10.04.070 of the City's Municipal Code implements federal and state water runoff and discharges within the City of Santa Clarita.

Each person applying to the City for a grading or building permit, for projects for which compliance with regulations governing State Construction Activity Stormwater Permits (SCASP) is required, must submit to the City:

1. NOI to comply with the SCASP has been filed; and
2. satisfactory proof that a stormwater pollution prevention plan has been prepared before the City shall issue any grading or building permit on the construction project. A copy of the NOI and the SWPPP shall be maintained on site during grading and construction and shall be made available for inspection, review, and copying upon the request of any City inspector.

It shall be a violation of this chapter for any person or entity required under federal or state law to comply with the requirements for SCASP for construction activity in the City to conduct, authorize, or permit construction activities in the City at any facility which discharges to the City's MS4 without complying with all applicable requirements for a SCASP.

Each person applying for a grading or building permit for any project for which compliance with regulations governing SCASP is not required shall submit to the City for information, and shall implement a grading and construction activity runoff control program adequate to accomplish all of the following:

1. Retain on site the sediments generated on or brought to the project site, using treatment control or structural BMPs;
2. Retain construction-related materials and wastes, spills and residues at the project site and prevent discharges to streets, drainage facilities, the MS4, receiving waters or adjacent properties;
3. Contain non-stormwater runoff from equipment and vehicle washing at the project site; and
4. Control erosion from slopes and channels through use of effective BMPs, such as limitation of grading during the wet season, inspection of graded areas during rain events; planting and maintenance of vegetation on slopes, if any, and covering any slopes susceptible to erosion.

Additionally, Section 10.04.070 requires that:

- no person generating or producing pavement sawcutting wastes in any street, curb or sidewalk in the City shall fail to recover and properly dispose of such sawcutting wastes, and in no case shall such wastes be permitted or suffered to enter any part of the MS4, including, but not limited to, any storm drain;
- no person performing street and road maintenance in any street in the City shall fail to manage street and road maintenance materials in a manner which prevents such materials from being discharged to the MS4; and
- no person shall wash any concrete truck or any part of any concrete truck, including, but not limited to, any chute, pump or tools, in any place in the City except an area designated for that purpose by the City, if the City has designated such a place. No person shall permit or suffer any concrete rinsewater or washwater from any truck, pump, tool, or equipment to enter any drain, open ditch, street or road or any catch basin or any other part of the MS4.

County Regulations

Los Angeles County Department of Public Works

The Flood Control Division of the Los Angeles Department of Public Works (LACDPW) regulates storm runoff. Per the LACDPW's 1986 memorandum (Level of Flood Protection and Drainage Protection Standards), the proposed project must include storm drainage facilities that are sized and designed for the Capital Flood. The Capital Flood is the burned and bulked (where applicable) runoff from a 50-year frequency design storm falling on a saturated watershed.

In addition to meeting this required level of flood protection, all development in the Santa Clara River watershed must meet standards adopted by the LACDPW for the River and its major tributaries, including those identified in the County's *Sedimentation Manual*.⁴ The design of flood protection facilities for the Santa Clara River shall be based on the following:

- Public Works Capital Flood flow rates (50-year rainfall flow, burned and bulked only)
- Soft bottom waterways with levees
- Protective levees and additional facilities such as drop structures or stabilizers as required, shall be designed using the Public Works criteria

⁴ Los Angeles County Department of Public Works, *Sedimentation Manual, Second Edition*, 2006.

2006 Hydrology Manual

The manual⁵ establishes the Los Angeles County Department of Public Works' hydrologic design procedures and serves as a reference and training guide. The manual contains charts, graphs, and tables necessary to conduct a hydrologic study within the County of Los Angeles.

The primary purpose of the manual is to explain the steps involved in converting rainfall to runoff flow rates and volumes using Public Works' standards. The manual contains procedures and standards developed and revised by the Water Resources Division based on historic rainfall and runoff data collected within the County. The hydrologic techniques in the manual apply to the design of local storm drains, retention and detention basins, pump stations, and major channel projects. The techniques also apply to storm drain deficiency and flood hazard evaluations.

There are numerous instances where a drainage system must provide more than a single level of flood protection. Drainage systems must meet the criteria described in the Hydrology Manual. For example, there may be a natural canyon area tributary to a proposed drainage system that drains an urban area containing a sump. The proposed drainage system must convey the burned and bulked Capital Flood flow from the canyon area, protect the sump from a Capital Flood, and protect the developed area from the Urban Flood. Peak flows from burned watersheds are "bulkied" to account for volume changes caused by debris entrainment. Debris basins remove the sediment so that downstream flows are equal to flows from burned watershed.

PROJECT IMPACTS

Significance Threshold Criteria

According to Appendix G of the *State CEQA Guidelines*, the project would have a significant effect on the environment if it would

- violate any water quality standards or waste discharge requirements;
- substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);

The proposed project is an infrastructure project which would utilize a negligible amount of groundwater for construction purposes. Therefore, the proposed project would not substantially deplete groundwater

⁵ Los Angeles County Department of Public Works, *Hydrology Manual*, January 2006.

supplies. The proposed project is located on topography varies including side slopes which average 25 percent and canyon channels which average 10 percent. Due to the topography of the soil, infiltration rates are low. Therefore, the proposed project would not substantially interfere with groundwater recharge. Therefore, further analysis with regard to the depletion of groundwater supplies is not required and there would be no impacts.

- 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;
- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site;
- create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff;
- otherwise substantially degrade water quality;
- place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;

As the proposed project is an infrastructure project and would not construct any housing, there would be no impact to place housing within a 100-year flood hazard area.

- place within a 100-year flood hazard area structures which would impede or redirect flood flows;

According to **Figure 4.7-1**, the proposed roadway extension is not located within a 100-year flood hazard area. As a result, there would be no impact to place a structure which would impede or redirect flood flows within a 100-year flood hazard area.

- expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of failure of a levee or dam; and

Within the City of Santa Clarita, the one major reservoir which could have a significant impact on the City in the event of a dam failure is located in Bouquet Canyon. The Bouquet Canyon Reservoir is located 13 miles to the northeast of the project site. The Bouquet Creek dam would drain south through Bouquet Canyon for 17 miles, into the Santa Clara River. The Santa Clara River is located approximately 1.5 miles to the north and west of the project site. Therefore, in the event of dam failure the project site would not be inundated.

The Castaic Dam is located on Lake Hughes Road, 1 mile northeast of Interstate 5, just north of the community of Castaic. Should a breach in the dam occur, the water will flow south in Castaic Creek for

approximately 5 miles to the Santa Clara River. The Castaic Reservoir is north of the City of Santa Clarita boundaries; a dam failure would result in a flow of floodwater that would not flow through the City's limits and therefore not flow into the project site. Therefore, there would be no impacts from inundation from failure of a levee or dam and no further analysis for this threshold is required.

- inundation by seiche, tsunami, or mudflow

The proposed project is located in the City of Santa Clarita, inland over 30 miles from the coast. As a result, there would be no impact from a tsunami. A mudflow is a downhill flow of mud and soil loosened by rainfall or melting snow. The proposed roadway extension includes areas identified as an area that has the potential for earthquake-induced landslides. However, the proposed roadway extension would replace approximately 215,000 cy of engineered fill. As a result, the potential for the proposed project to be inundated by a mudflow would be less than significant. A seiche is the movement of surface on an enclosed body of water such as a lake. The nearest large body of water is Castaic Lake located approximately 10 miles northwest of the project site. Therefore, given the distance between the project site and Castaic Lake, there would be no impact to the proposed project by a seiche. No further analysis with regard to seiche, tsunami, or mudflow is required.

Impact Analysis

Impact Threshold 4.7-1 Violate any water quality standards or waste discharge requirements

Impact Threshold 4.7-6 Otherwise substantially degrade water quality

Construction

The construction of the Via Princessa East Extension would include grading (cut) of approximately 550,000 cubic yards (cy) of earth and 215,000 cy of fill. The State Water Board regulates stormwater runoff from construction sites through the General Permit. The General Permit requires dischargers to produce a NOI, a SWPPP, and other compliance related documents in order to obtain coverage under the General Permit. The General Permit applies to projects that disturb one or more acres of soil and, effective July 1, 2010, all dischargers are required to obtain coverage under the General Permit Order 2009-0009-DWQ which was adopted on September 2, 2009, by the State Water Board. As a result, the proposed project would be required to comply with the General Permit.

In addition to the General Permit, the City of Santa Clarita has adopted the Stormwater and Urban Runoff Pollution Control ordinance⁶ that requires applicants applying for a grading permit to submit a

⁶ City of Santa Clarita, Unified Development Code, Section 10.04.070, "Stormwater and Urban Runoff Pollution Control."

NOI and a SWPPP to the City before issuance of a grading permit for the construction site. The project would incorporate as mitigation measures the requirements for both the State General Permit and the City's ordinance to produce an NOI and supply a SWPPP for the construction of the proposed project. Therefore, construction impacts would not violate water quality standards or waste discharge requirements, and impacts would be less than significant.

Operation

The proposed Via Princessa roadway extension (infrastructure) project would be a 116-foot right-of-way full street improvement approximately 4,500 feet in length.

Consistent with the current County of Los Angeles MS4 permit and Standard Urban Stormwater Mitigation Plan (SUSMP), stormwater quality mitigation will be required for the proposed roadway extension being improved. The proposed project comprises of curb and gutters, medians, pavements, striping, catch basins, and storm drain culverts crossing the street. Other storm water quality mitigation measures acceptable to the City of Santa Clarita and County of Los Angeles may be utilized and required during final design plan review. Therefore, implementation of the SUSMP would ensure waste discharge requirements and water quality standards are not violated and impacts would be reduced to less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts

Impacts would be less than significant.

Impact Threshold 4.7-3 **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**

Construction

Construction of the proposed project would involve several phases including excavation/grading and asphalt paving to construct the Via Princessa roadway extension.

The project area is located within an undisturbed area surrounded by residential and commercial land uses. Steep topographic slopes and canyons make up the extent of the project area excluding the

southwestern portion of the site adjacent to Golden Valley Road which has been previously graded. Soil is transferred along the canyons downstream to storm drain facilities within Golden Valley Road and Centre Pointe Parkway, which would ultimately reach the Santa Clara River.

Most of the construction would involve grading, excavation, and paving of the proposed roadway extension which would utilize the existing drainage patterns of the project area. Therefore, the existing drainage patterns for the project area, which direct surface water runoff and sedimentation northwest towards the existing storm drain system in Golden Valley Road and Centre Pointe Parkway, would continue to be utilized. As a result, the proposed project would not substantially alter the existing drainage pattern of the site or area.

Operation

According to **Table 4.7-1**, the calculated existing debris production volume for the total project site is 5,961 cy of sedimentation. According to **Table 4.7-2, Existing plus Proposed Discharge Conditions**, the total project site is calculated to produce 4,884 cy of sedimentation after completion of the proposed roadway extension. The proposed project would reduce sedimentation production within the project area by 1,077 cy.

As detailed in **Table 4.7-2**, the proposed project would continue to utilize the existing drainage patterns of the site (as illustrated on **Figure 4.7-3, Proposed Site Drainage Conditions**). The construction of the inlets beneath the proposed roadway extension would reduce sedimentation production downstream. The inlets would drain into a natural channel.

Storm drains and channels, which drain into a natural or improved soft bottom channel, will generally require an energy dissipater to reduce velocities to a non-erosive magnitude. The type of dissipater structure depends on the approach velocity and the desired natural velocity. In case of sediment laden-flows (bulked flow), the sudden drop in velocity usually causes a buildup of deposits to occur upstream of the energy dissipation structure. The design of the dissipater structure would minimize buildup of sediment and include provisions for access to remove the deposited sediment.⁷ The design concept must be approved by the Department of Public Works prior to proceeding to final design plans. The creation of the bulked inlets would not substantially alter the existing drainage pattern of the project area. Operation of the project would not create any erosion opportunities or potential of siltation. As a result, impacts from erosion or siltation on or off site would not result and impacts would be less than significant.

⁷ Los Angeles County Department of Public Works, Sedimentation Manual, Second Edition, (2006) 69.

Table 4.7-2
Existing plus Proposed Discharge Conditions

Area Outlet	Description	Area (acres)	50-year Burned Flow (cfs)	Design Frequency (50-year & 25-year)				DPV (cy)
				50- Burned plus 25-year Flow (cfs)	25-year Flow (cfs)	50-year Burned & Bulkied Flow (cfs)	Mixed 50- & 25-year Flow (cfs)	
A	Existing	51.1	123.0	--	--	167.3	--	2,795
	Proposed	51.4	--	128.2	--	--	167.3	2,384
B	Existing	25.6	65.6	--	--	89.2	--	1,400
	Proposed	26.0	--	68.4	--	--	89.2	1,203
C	Existing	11.1	31.9	--	--	43.4	--	607
	Proposed	10.9	--	32.1	--	--	42.9	558
D	Existing	8.5	25.6	--	--	34.8	--	465
	Proposed	9.6	--	28.4	--	--	34.8	328
Node 50A	Existing	0.7	2.4	--	--	3.3	--	38
	Proposed	0.9	--	--	3.0	--	--	0
Node 51B	Existing	5.3	16.0	--	--	21.8	--	290
	Proposed	3.2	10.8	--	--	14.3	--	159
Node 52C	Existing	6.7	20.2	--	--	27.5	--	366
	Proposed	5.0	16.8	--	--	22.4	--	252

"Burned" = areas such as burned canyons and mountainous areas add debris to the runoff volume. Therefore, flows from "Burned" areas must be "Bulkied" which reflects increases in runoff volumes and peak flows related to inclusion and transport of sediment and debris (Los Angeles County Department of Public Works, 2006 Hydrology Manual, Chapter 4).

cfs = cubic feet per second; cy = cubic feet; DPV = debris production volume

Source: Sikand, Drainage Concept for Via Princessa East between Golden Valley Road and Sheldon Avenue, July 2010.

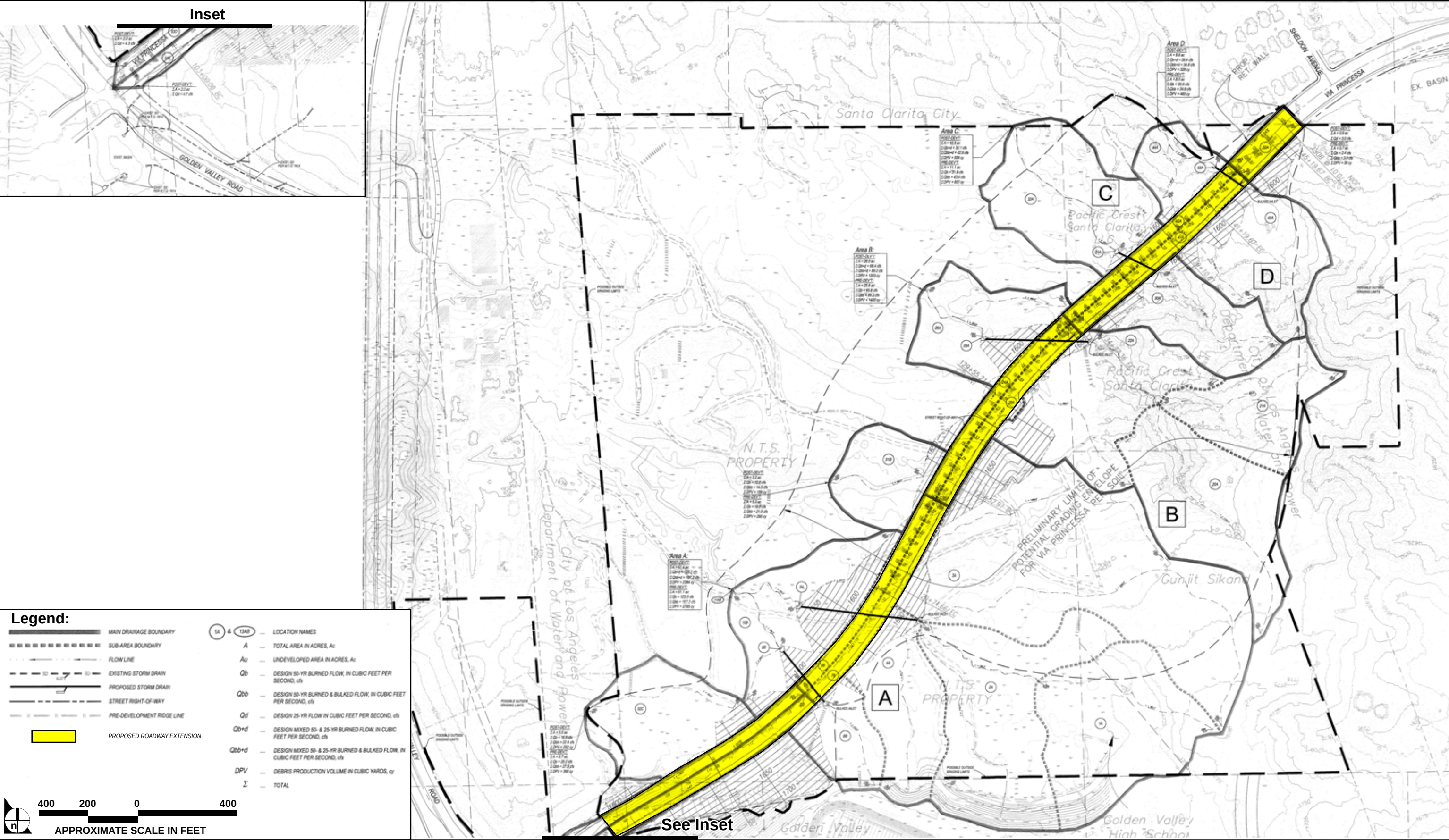


FIGURE 4.7-3

Proposed Site Drainage Conditions

Mitigation Measures

The following mitigation measure shall be incorporated.

MM 4.7-1 Final design plans for the inlet structures shall be submitted to, and reviewed and approved by, the City of Santa Clarita Public Works Department.

Residual Impacts

Impacts would be less than significant.

Impact Threshold 4.7-4 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site

The topography of the project site contains valleys that have an average slope of 25 percent and canyons that slope an average 10 percent. As shown on **Figure 4.7-2**, the project site has been divided into seven subareas to describe the existing drainage flow characteristics. According to **Table 4.7-1**, the existing surface water runoff generated within each subarea of the project area (50-year burned and bulked flow) is:

Subarea "A"	167.3 cfs;	Node 50A	3.3 cfs;
Subarea "B"	89.2 cfs;	Node 51B	21.8 cfs; and
Subarea "C"	43.4 cfs;	Node 52C	20.2 cfs.
Subarea "D"	34.8 cfs;		

As described in **Impact Threshold 4.7-3** above, inlets would be constructed beneath the proposed roadway extension and within the existing drainage patterns of the project site. The proposed drainage inlets would reduce existing surface water flow within each subarea (as identified in **Table 4.7-2**), specifically for the outlets that flow into the natural canyons (subareas "A through D," which were determined using the mixed 50-year and 25-year flow). The flows either would be maintained or would be reduced:

Subarea "A"	167.3 cfs;	Node 50A	3.0 cfs;
Subarea "B"	89.2 cfs;	Node 51B	14.3 cfs; and
Subarea "C"	42.9 cfs;	Node 52C	22.4 cfs.
Subarea "D"	34.8 cfs;		

The project would not create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff. As a result, potential impacts due to flooding on- or off-site would be less than significant.

Mitigation Measures

Mitigation measure **MM 4.7-1** shall be implemented in order to finalize the design of the inlet structures.

Residual Impacts

Impacts would be less than significant.

Impact Threshold 4.7-5 Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff

The roadway improvements of the proposed project would capture/divert runoff along Via Princessa; therefore, no change in runoff is anticipated from the site.

As described above in **Impact Threshold 4.7-3**, the construction of inlet structures would minimize additional sources of sedimentation and pollution that would empty into storm water drainage systems in Golden Valley Road and Centre Point Parkway, and ultimately into the Santa Clara River.

The proposed project would not create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff. As previously discussed, the project would result in similar or decreased surface water flows. Therefore, impacts would be less than significant.

As previous discussed, the proposed project would not result in changes in the rate of flow, currents, or the course and direction of surface water and/or groundwater. The project site is located southwest of Sheldon Avenue/Via Princessa intersection and west of Golden Valley Road, and is south of the Santa Clara River, within the Santa Clarita Valley. The proposed project does not include any features that

would result in changing the course or direction of existing drainage channels. Therefore, impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts

Impacts would be less than significant.

CUMULATIVE IMPACTS

Located within Via Princessa (north of Sheldon Avenue) and within Golden Valley Road (south of the proposed Via Princessa/Golden Valley Road intersection) are existing storm drain systems maintained by the City of Santa Clarita. The storm drain intercepts runoff from Via Princessa on the south and Golden Valley Road on the west, respectively. These storm drains are located outside of the project site.

A catch basin with an existing lateral drain is connected to an existing pipe approximately 650 feet north of the Sheldon Avenue/Via Princessa intersection. There is also an existing storm drain system (per MTD 1614) located within Golden Valley Road south of the proposed Via Princessa/Golden Valley Road intersection which empties into an existing debris basin west of Golden Valley Road.

Impacts resulting from cumulative development within the Eastern Subarea of the Santa Clara River Hydrologic Area would include increased runoff from development. As such, increased surface water flows into the Santa Clara River would result. However, all projects would be required to implement measures to reduce flows and impacts. All projects would be required to comply with the Statewide General NPDES Permit and less than significant impacts.

Additionally, projects in Los Angeles County would be required to develop and implement a SUSMP in accordance with the County's 2000 SUSMP manual. With the implementation of these measures, cumulative impacts would be less than significant.

CUMULATIVE MITIGATION MEASURES

No significant cumulative impacts to hydrology and water quality would result from the proposed project; consequently, no mitigation measures are recommended by this EIR.

UNAVOIDABLE SIGNIFICANT IMPACTS

Project-Specific Impacts

No significant project-specific impacts to hydrology and water quality would occur with project implementation.

Cumulative Impacts

No significant cumulative impacts to hydrology and water quality would result from Valley buildout, which would include the proposed project.