5.2 HYDROLOGY AND WATER QUALITY

This section of the EIR evaluates the impacts of the proposed project on hydrology/drainage and water quality. The discussion of hydrology and water quality impacts presented in this section is based on the assumptions, calculations, and analysis contained in the project's *Hydrology and Water Quality Technical Report*, performed by Diamond West Engineering (August 2005).[1] The *Hydrology and Water Quality Technical Report* is included in its entirety as Appendix I. The assessments and technical analysis presented herein are in compliance with the Clean Water Act, of 1972, as amended, the Statewide General NPDES Permit, the Water Quality Control Plan (Basin Plan) as adopted by the Regional Water Quality Control Board – LA Region, and the local drainage policies and requirements for the County of Los Angeles adopted by the Los Angeles Regional Water Quality Control Board, and the California Environmental Quality Act (CEQA) of 1970, as amended. The hydrology analysis and drainage assessments have been prepared at a preliminary engineering level based upon the details of the available information. For a discussion of potential impacts and mitigation measures related to wetlands and other on-site water bodies, refer to Section 5.6, Biological Resources, in this EIR.

5.2.1 ENVIRONMENTAL SETTING

The purpose of this existing conditions evaluation is to establish a baseline for comparison of the pre-project and the post-project conditions. Baseline conditions investigated include: land use, hydrology with a burned and a debris producing condition, floodplain mapping, and surface water quality. On-site as well as upstream off-site areas are considered in the analysis.

EXISTING WATERSHED CONDITIONS

Existing Land Use

The site is currently vacant and covered with approximately 1856 oak trees and scattered vegetation. The property is bounded by vacant land uses on the west and south. To the east are The Old Road and Interstate 5. Across Interstate 5 is residential development. To the north is a small business park and residential development. The entire watershed upstream of the project is open space.

Existing Facilities

There are currently several drainage improvements along the site's easterly boundary that convey runoff eastwards under The Old Road and Interstate 5 to the South Fork of the Santa Clara River. The majority of the runoff exits at a double 8-foot by 8-foot box culvert at the northeast corner of the site. This culvert is currently about 75% filled with sediment and debris. Thus its discharge capacity is significantly reduced. Any subsequent existing discharge capacity determinations will be based on the facility being free of any debris. Numerous storm drain pipes convey flow from southeast portions of the site eastwards. Refer to Table 5.2-1, Watershed Area – Existing Conditions, for a list of all existing facilities.

[1] Diamond West Engineering. *Lyons Canyon Ranch, Hydrology and Water Quality Technical Appendix*. August 2005.

Watershed Description

A regional drainage master plan which includes analysis of the project site has not been prepared. However, per a field inspection and the 1996 Thomas Guide, the proposed project watershed is ultimately tributary to the South Fork of the Santa Clara River. The majority of on-site flow generally drains from southwest to northeast via Lyon Canyon Creek, which is a blue line stream identified on a United States Geological Survey topographic map for the project site (named Oat Mountain Quadrangle). Southeast portions of the project site flow eastwards into the South Fork of the Santa Clara River. Refer to Exhibit 5.2-1, Hydrology Map – Existing Conditions, for current drainage patterns.

The maximum elevation differential of the local tributary watershed is approximately 541 feet from an elevation of 1,654 feet at the southwest end of the site to 1,296 at the northeast end of the site. Slopes are mostly steep, and range from 10 percent to 38 percent in the project area.

The project area has been divided into 27 existing watersheds, which are illustrated in Exhibit 5.2-1. The majority of the site is undeveloped. Table 5.2-1 summarizes the watershed acreages.

The project site has mainly natural cover throughout, and thus the percentage impervious factor (i.e., percentage of non-permeable ground surface) was one percent for a majority of the area per County standards.

Table 5.2-1
Watershed Area – Existing Conditions

Concentration Point	Watershed	Area (acres)
Double 8-foot by 8-foot Box Culvert	1A	37.8
	3A	41.0
	5A	40.6
	7A	30.4
	10B	17.8
	12A	34.8
	14A	28.3
	16A	23.8
	18A	30.8
	20A	32.0
	22A	13.3
	23C	46.5
	27C	21.3
	28D	35.9
	30D	33.1
	33A	23.9
	36E	48.0
	38F	56.8
	40F	41.5
	42A	40.1
	44A	41.5
	45G	29.7
	47G	33.8

Concentration Point	Watershed	Area (acres)
	49G	28.4
	53G	27.4
	55A	37.4
	58H	18.4
48-inch Pipe	62K	36.5
30-inch Pipe	64L	38.0

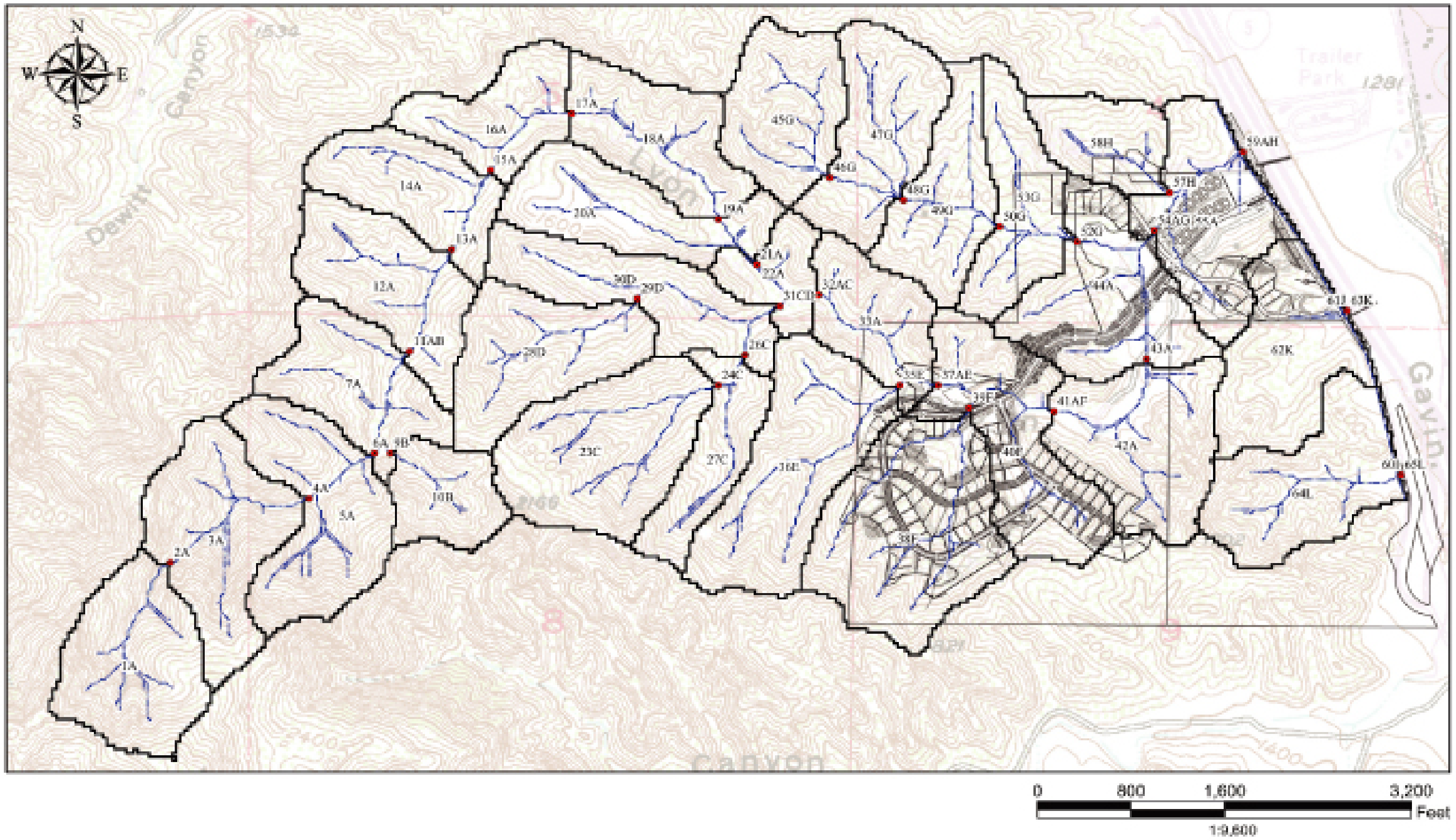
HYDROLOGY

Previous conceptual on-site hydrology analysis was completed by Diamond West Engineering, Inc.[2] and RBF Consulting. The analysis presented in the current project's Hydrology and Water Quality Technical Report included the review of the original Diamond West Engineering and RBF report's hydrologic analysis and the preparation of another independent analysis. The purpose of this additional analysis is based on the change of the project design. Additionally, the hydrologic parameters used in the analysis are presented in the Addendum to the 1991 Hydrology and Sedimentation Manual (June 2002).

Hydrologic calculations to evaluate surface water runoff associated with the 50-year, 24-hour design storm frequency were performed for the off-site and on-site drainage areas. These calculations were performed using the Modified Rational (MODRAT) Method as defined in the program named WMS. The watershed area boundaries were delineated utilizing the existing USGS topographic mapping and site mapping, and were verified with a site visit and the previous reports. As indicated previously, Exhibit 5.2-1 shows the hydrology map for the existing conditions at the project site.

Hydrologic properties such as slope, length, soil type, vegetation and land use were characterized for each watershed area. Table 5.2-2, Existing Watershed Characteristics, contains a summary of the existing watershed area characteristics.

[2] Diamond West Engineering, Inc. *County of Los Angeles, Tentative Tract No. 53653, Lyons Canyon Ranch, Drainage Concept / SUSMP Study*. June 2004.



Hydrology Map-Existing Conditions

Exhibit 5.2-1

Table 5.2-2
Existing Watershed Characteristics

Watershed Area ID	Length (ft)	Slope (ft/ft)	Soil Type	Percent Impervious	Land Use (Acres)		Total Area (Acres)
					Other	Open Space	
1A	2,082	0.3564	93	0.01		37.8	37.8
3A	2,523	0.3107	93	0.01		41.0	41.0
5A	2,129	0.3711	93	0.01		40.6	40.6
7A	1,941	0.2112	91	0.01		30.4	30.4
10B	1,277	0.2653	91	0.01		17.8	17.8
12A	1,723	0.1833	91	0.01		34.8	34.8
14A	1,942	0.1767	91	0.01		28.3	28.3
16A	1,834	0.1172	91	0.01		23.8	23.8
18A	2,189	0.1019	91	0.01		30.8	30.8
20A	2,490	0.1000	91	0.01		32.0	32.0
22A	1,200	0.1325	91	0.01		13.3	13.3
23C	2,332	0.2310	91	0.01		46.5	46.5
27C	2,255	0.2310	91	0.01		21.3	21.3
28D	2,335	0.2188	91	0.01		35.9	35.9
30D	2,925	0.1180	91	0.01		33.1	33.1
33A	1,994	0.1023	91	0.01		23.9	23.9
36E	2,808	0.1901	91	0.01		48.0	48.0
38F	2,514	0.1714	91	0.01		56.8	56.8
40F	2,103	0.1155	91	0.01		41.5	41.5
42A	2,043	0.1581	91	0.01		40.1	40.1
44A	2,090	0.1345	97	0.01		41.6	41.6
45G	1,748	0.1744	97	0.01		29.7	29.7
47G	1,814	0.1868	97	0.03	2.0	31.8	33.8
49G	1,680	0.1660	97	0.05	3.0	25.4	28.4
53G	2,085	0.1506	97	0.07	3.0	24.4	27.4
55A	2,283	0.0720	97	0.08	2.4	35.0	37.4
58H	1,566	0.1705	97	0.23	10.0	8.4	18.4

Rational Method

The Rational Method and Modified Rational Method are computation procedures for developing a peak runoff rate (discharge) for storms of a specific recurrence interval. Rational Method equations are based on the assumption that the peak flow rate is directly proportional to the drainage area, rainfall intensity, time of concentration, land use and soil type. The design discharges were computed by generating a hydrologic "link-node" model, which divides the area into drainage subareas. These subareas are tributary to concentration points, or hydrologic "node" points, determined by the existing terrain and street layout.

Burned Flow Rates

Based on on-site vegetation, climatic conditions, and the fact that a brush fire in 2003 burned the site, it was determined that the project site has a significant risk for fire, and thus a burned flow rate calculation was performed. When a watershed burns, the perviousness of the soil (i.e., the ability of water to be absorbed into soil) decreases because of a loss of vegetation and physical changes in the soil (*Los Angeles County Hydrology Manual Section 3-C-2.3*). The calculations were performed using the current *Los Angeles County Hydrology Manual* and its Appendices. The burned runoff coefficients versus rainfall intensities were input into the MODRAT program as new soil types. These new soil types represent the burned conditions, and are presented in Appendix A of Appendix I, *Hydrology and Water Quality Technical Report* along with all other burned condition calculations.

Burned and Bulked Flow Rates

Once the difference in imperviousness and soil characteristics due to the burned condition have been factored in flow calculations, the bulking effect must be considered. The bulking effect is the rise in flow rate due to the inclusion of sediment in the burned condition. The methodology for calculating the bulked flow rates from the burned flow rates is found in the *Los Angeles County Sedimentation Manual, Section 3-C-1*. The bulking factors were found using Appendix P-5 of the Manual, and are listed below in Table 5.2-3, Bulking Factors – Existing Conditions.

Table 5.2-3
Bulking Factors – Existing Conditions

Concentration Point	Bulking Factor $BF_{(A)}$
Double 8-foot by 8-foot Box Culvert	1.46
48-inch Pipe	1.62
30-inch Pipe	1.62

Surface Water Hydrology – Existing Conditions

The project site comprises approximately 232 acres of vacant land. In addition to the project site, the tributary watershed considered in this analysis includes an additional 738 acres of undeveloped land upstream of the site. Thus, the total area that contributes runoff to the South Fork of the Santa Clara River is approximately 970 acres.

To establish the baseline hydrologic conditions for the project area, the 50-year and 10-year, 24-hour frequency storms were analyzed with burned and bulked conditions. The hydrology map for the existing condition rational method model is shown in Exhibit 5-2-1. Appendix A of Appendix I, *Hydrology and Water Quality Technical Report* contains the results of the Modified Rational Method analyses. Results of the existing condition hydrologic analysis are summarized below in Table 5.2-4, Hydrology Summary – Existing Conditions.

Table 5.2-4
Hydrology Summary – Existing Conditions

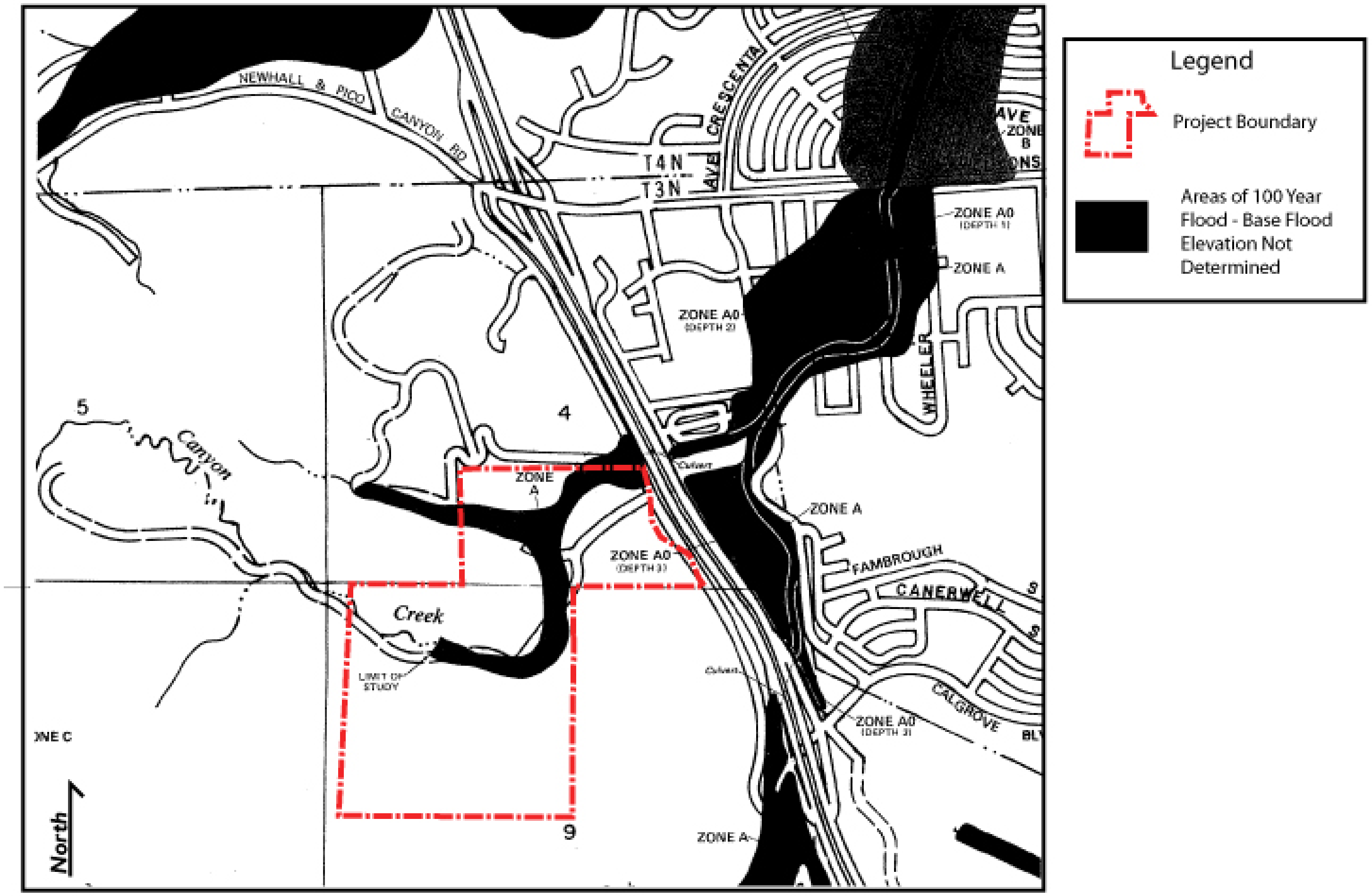
Description	Effective Total Area (acres)	50-year (Burned and Bulked) Flowrate (cfs)	10-year (Burned and Bulked) Flowrate (cfs)
Double 8-foot by 8-foot Box Culvert	894.0	1,923	1,373
48-inch Pipe	36.5	183	131
30-inch Pipe	38.0	190	136

FLOODPLAIN MAPPING

The County of Los Angeles paticipates in the National Flood Insurance Program (NFIP). Communities participating in the NFIP must adopt and enforce minimum floodplain management standards, including identification of flood hazards and flooding risks. Participation in the NFIP allows communities to purchase low-cost insurance protection against losses from flooding.

The published Flood Insurance Rate Map (FIRMs) for the project site is included on Community Panel No. 065043-0460-B, effective date December 2, 1980. The main watercourse flowing northeasterly through the site is located directly in Zone A. The off-site downstream outlet of the double 8-foot by 8-foot box culvert is also located in an area designated as Zone A. See Exhibit 5.2-2, FIRM – Flood Insurance Rate Map, for the location of the floodplain.

Zone A is defined as: "Areas of 100 year flood. Base flood elevations and flood hazards factors not determined."



Flood Insurance Rate Map of Project Site

Exhibit 5.2-2

STORMWATER QUALITY

Stormwater quality is a significant concern in California. The project's major downstream watercourse, Reach 8 of the Santa Clara River, is listed on the 303(d) list of the Los Angeles Regional Water Quality Control Board. This 303(d) listing raises a significant concern for certain pollutant runoff from the site. There currently are no stormwater quality systems on-site.

This section discusses typical pollutants found in stormwater runoff and discusses the types of contaminants that may be found in existing stormwater runoff from the project site.

Significant Pollutants From 303(d) Listing

Under Section 303(d) of the 1972 Clean Water Act, areas are required to declare a list of water quality-limited segments. Watercourses on this list do not meet water quality standards, even after installing the minimum level of pollutant control technology on point sources, and must develop action plans, known as Total Maximum Daily Loads (TMDL), to improve water quality. A TMDL is a written plan that describes how an impaired waterbody will meet water quality standards. It contains:

1. a measurable feature to describe attainment of the water quality standard(s);
2. a description of the required actions to remove the impairment;
3. an allocation of responsibility among dischargers to act in the form of actions on water quality conditions for which each discharger is responsible.

The project site is tributary to the South Fork of the Santa Clara River, which is tributary to Reach 8 of the Santa Clara River (West Pier Highway 99 to Bouquet Canyon Road Bridge). Because Reach 8 of the Santa Clara River is on the 303(d) list of the Los Angeles Regional Water Quality Control Board, the project site is within a watershed that does not meet water quality standards for certain pollutants. The Los Angeles Regional Water Quality Control Board indicates that the current pollutants in this watershed include chloride and coliform, both coming from point and non-point sources. One specific, notable source of chloride is "non-contained" water softening systems, discharges from which are conveyed to the local sanitary sewer system and contain high levels of chloride. The RWQCB adopted a Chloride TMDL and a Nitrate/Nitrite TMDL for the Upper Santa Clara River (including Reach 8) in March 2004[3].

[3] US Environmental Protection Agency website
http://oaspub.epa.gov/pls/tmdl/enviro.control?p_list_id=CA403%2E2690R%20SN%20CLARA%20R%20R8&p_cycle=2002

Non-Point Source Pollutants

A net effect of urbanization can be to increase pollutant export. However, an important consideration in evaluating stormwater quality from a project is to assess if it impairs the beneficial use of the receiving waters. Non-point source pollutants have been characterized by the following major categories, discussed below, in order to assist in determining the pertinent data and their use. Receiving waters can assimilate a limited quantity of various constituent elements, however there are thresholds beyond which the measured amount becomes a pollutant and results in an undesirable effect on water quality. Background of these standard water quality categories provides an understanding of typical urbanization impacts.

Sediment

Sediment is made up of tiny soil particles that are washed or blown into surface waters. It is the major pollutant by volume in surface water. Suspended soil particles can cause the water to look cloudy or turbid. The fine sediment particles also act as a vehicle to transport other pollutants including nutrients, trace metals, and hydrocarbons. Construction sites are typically the largest source of sediment for urban areas under development. Another major source of sediment is streambank erosion, which may be accelerated by increases in peak rates and volumes of runoff due to urbanization.

Nutrients

Nutrients are a major concern for surface water quality. Phosphorous and nitrogen are of special concern because they can cause algal blooms and excessive vegetative growth. Of the two, phosphorus is usually the limiting nutrient that controls the growth of algae in lakes. The orthophosphorous form of phosphorus is readily available for plant growth. The ammonium form of nitrogen can also have severe effects on surface water quality. The ammonium is converted to nitrate and nitrite forms of nitrogen in a process called nitrification. This process consumes large amounts of oxygen, which can impair the dissolved oxygen levels in water. The nitrate form of nitrogen is very soluble and is found naturally at low levels in water. When nitrogen fertilizer is applied to lawns or other areas in excess of plant needs, nitrates can leach below the root zone, eventually reaching ground water. Orthophosphate from auto emissions also contributes phosphorus in areas with heavy automobile traffic. As a general rule of thumb, nutrient export is greatest from development sites with the most impervious area. Other problems resulting from excess nutrients are surface algal scums; water discolorations; odors; toxic releases; and overgrowth of plants. Common measures for nutrients are total nitrogen, organic nitrogen, total Kjeldahl nitrogen (TKN), nitrate, ammonia, total phosphate, and total organic carbon (TOC).

Trace Metals

Trace metals are primarily a concern because of their toxic effects on aquatic life and their potential to contaminate drinking water supplies. The most common trace metals found in urban runoff are lead, zinc, and copper. Fallout from automobile emissions is also a major source of lead in urban areas. A large fraction of the trace metals in urban runoff are attached to sediment and this effectively reduces the level that is immediately available for biological uptake and subsequent bioaccumulation. Metals associated with the sediment settle out rapidly and accumulate in the soils. Also, urban runoff events typically occur over a shorter duration, thereby reducing the amount of exposure, which could be toxic to the aquatic environment. The toxicity of trace metals in runoff varies with the hardness of the receiving water. As total hardness of the water increases, the threshold concentration levels for adverse effects increases.

Oxygen-Demanding Substances

Aquatic life is dependent on the dissolved oxygen (DO) in the water, and when organic matter is consumed by microorganisms, DO is consumed in the process. A rainfall event can deposit large quantities of oxygen-demanding substance in lakes and streams. The biochemical oxygen demand of typical urban runoff is on the same order of magnitude as the effluent from an effective secondary wastewater treatment plant. A problem resulting from low DO occurs when the rate of oxygen-demanding material exceeds the rate of replenishment. Oxygen demand is estimated by direct measure of DO, and indirect measures such as biochemical oxygen demand (BOD), chemical oxygen demand (COD), oils and greases, and total organic carbon (TOC).

Bacteria

Bacteria levels in undiluted urban runoff exceed public health standards for water contact recreation almost without exception. Studies have found that total coliform counts exceeded EPA water quality criteria at almost every site, and almost every time it has rained. The coliform bacteria that are detected may not be a health risk on their own, but are often associated with human pathogens.

Oil and Grease

Oil and grease contain a wide variety of hydrocarbons, some of which could be toxic to aquatic life in low concentrations. These materials initially float on water and create the familiar rainbow-colored film. Hydrocarbons have a strong affinity for sediment and quickly become absorbed by it. The major source of hydrocarbons in urban runoff is through leakage of crankcase oil and other lubricating agents from automobiles. Hydrocarbon levels are highest in the runoff from parking lots, roads, and service stations. Residential land uses generate less hydrocarbons export, although illegal disposal of waste oil into stormwater flows can be a local problem.

Other Toxic Chemicals

Priority pollutants are generally related to hazardous wastes or toxic chemicals and sometimes can be detected in stormwater. Priority pollutant scans have been conducted in previous studies of urban runoff, which evaluated the presence of over 120 toxic chemicals and compounds. The scans rarely revealed toxins that exceeded the current safety criteria. The urban runoff scans were primarily conducted in suburban areas not expected to have many sources of toxic pollutants (with the possible exception of illegally disposed or applied household hazardous wastes). Measures of priority pollutants in stormwater include phthalate (plasticizer compound); phenols and creosols (wood preservatives); pesticides and herbicides; oils and greases; and metals.

PHYSICAL CHARACTERISTICS OF SURFACE WATER QUALITY

Standard parameters that assess the quality of stormwater provide a method of measuring impairment. A background of these typical characteristics assists in understanding water quality requirements. The quantity of a material in the environment and its characteristics determine the degree of availability as a pollutant in surface runoff. In an urban environment, the quantity of certain pollutants in a given area is a function of the intensity of the land use. For instance, a high volume of automobile traffic makes a number of potential pollutants (such as lead and hydrocarbons) more available. The availability of a material, such as a fertilizer, is a function of the quantity and the manner in which it is applied. Applying fertilizer in quantities that exceed plant needs leaves the excess nutrients available for loss to surface or ground water.

The physical properties and chemical constituents of water traditionally have served as the primary means for monitoring and evaluating water quality. Evaluating the condition of water through a water quality standard refers to its physical, chemical, or biological characteristics. Water quality parameters for stormwater comprise a long list and are classified in many ways. In many cases, the concentration of an urban pollutant, rather than the annual load of that pollutant, is needed to assess a water quality problem. Some of the physical, chemical or biological characteristics that evaluate the quality of the surface runoff are described below.

Dissolved Oxygen

Dissolved oxygen in the water has a pronounced effect on the aquatic organisms and the chemical reactions that occur. It is one of the most important biological water quality characteristics in the aquatic environment. The dissolved oxygen concentration of a water body is determined by the solubility of oxygen, which is inversely related to water temperature, pressure, and biological activity. Dissolved oxygen is a transient property that can fluctuate rapidly in time and space. Dissolved oxygen represents the status of the water system at a particular point and time of sampling. The decomposition of organic debris in water is a slow process and the resulting changes in oxygen status respond slowly also. The oxygen demand is an indication of the pollutant load and includes measurements of biochemical oxygen demand or chemical oxygen demand.

Biochemical Oxygen Demand (BOD)

The biochemical oxygen demand (BOD) is an index of the oxygen-demanding properties of the biodegradable material in the water. Samples are taken from the field and incubated in the laboratory at 20 degrees Celsius, after which the residual dissolved oxygen is measured. The BOD value commonly referenced is the standard 5-day values. These values are useful in assessing stream pollution loads and for comparison purposes.

Chemical Oxygen Demand

The chemical oxygen demand (COD) is a measure of the pollutant loading in terms of complete chemical oxidation using strong oxidizing agents. It can be determined quickly because it does not rely on bacteriological actions as with BOD. COD does not necessarily provide a good index of oxygen demanding properties in natural waters.

Total Dissolved Solids (TDS)

TDS concentration is determined by evaporation of a filtered sample to obtain residue whose weight is divided by the sample volume. The TDS of natural waters varies widely. There are several reasons why TDS is an important indicator of water quality. Dissolved solids affect the ionic bonding strength related to other pollutants such as metals in the water. TDS are also a major determinant of aquatic habitat. TDS affects saturation concentration of dissolved oxygen and influences the ability of a water body to assimilate wastes. Eutrophication rates depend on total dissolved solids.

pH

The pH of water is the negative log, base 10, of the hydrogen ion (H^+) activity. A pH of 7 is neutral; a pH greater than 7 indicates alkaline water; a pH less than 7 represents acidic water. In natural water, carbon dioxide reactions are some of the most important in establishing pH. The pH at any one time is an indication of the balance of chemical equilibrium in water and affects the availability of certain chemicals or nutrients in water for uptake by plants. The pH of water directly affects fish and other aquatic life and generally toxic limits are pH values less than 4.8 and greater than 9.2.

Alkalinity

Alkalinity is the opposite of acidity, representing the capacity of water to neutralize acid. Alkalinity is also linked to pH and is caused by the presence of carbonate, bicarbonate, and hydroxide, which are formed when carbon dioxide is dissolved. A high alkalinity is associated with a high pH and excessive solids. Most streams have alkalinities less than 200 mg/l and ranges of alkalinity of 100-200mg/l seem to support well-diversified aquatic life.

Specific Conductance

The specific conductivity of water, or its ability to conduct an electric current, is related to the total dissolved ionic solids. Long term monitoring a project waters can develop a relationship between specific conductivity and TDS. Its measurement is quick and inexpensive and can be used to approximate TDS. Specific conductivities in excess of 2000 ohms/cm indicate a TDS level too high for most freshwater fish.

Turbidity

The clarity of water is an important indicator of water quality that relates to the ability of photosynthetic light to penetrate. Turbidity is an indicator of the property of water that causes light to become scattered or absorbed. Suspended clays and other organic particles cause turbidity. It can be used as an indicator of certain water quality constituents such as predicting the sediment concentrations.

Nitrogen (N)

Sources of nitrogen in stormwater are from the additions of organic matter to water bodies or chemical additions. Ammonia and nitrate are important nutrients for the growth of algae and other plants. Excessive nitrogen can lead to eutrophication since nitrification consumes dissolved oxygen in the water. Nitrogen occurs in many forms. Organic Nitrogen breaks down into ammonia, which eventually becomes oxidized to nitrate-nitrogen, a form available for plants. High concentrations of nitrate-nitrogen (N/N) in water can stimulate growth of algae and other aquatic plants, but if phosphorus (P) is present, only about 0.30 milligrams per liter (mg/l) of nitrate-nitrogen is needed for algal blooms. Some fish life can be affected when nitrate-nitrogen exceeds 4.2 mg/l. There are a number of ways to measure the various forms of aquatic nitrogen. Typical measurements of nitrogen include Kjeldahl nitrogen (organic nitrogen plus ammonia); ammonia; nitrite plus nitrate; nitrite; and nitrogen in plants. The principal water quality criteria for nitrogen focus on nitrate and ammonia.

Phosphorus (P)

Phosphorus is an important component of organic matter. In many water bodies, phosphorus is the limiting nutrient that prevents additional biological activity from occurring. The origin of this constituent in urban stormwater discharge is generally from fertilizers and other industrial products. Orthophosphate is soluble and is considered to be the only biologically available form of phosphorus. Since phosphorus strongly associates with solid particles and is a significant part of organic material, sediments influence concentration in water and are an important component of the phosphorus cycle in streams. The primary methods of measurement include detecting orthophosphate and total phosphorus.

Existing Stormwater Quality

The project site is currently vacant with oak trees and some grassland vegetation. Because the major downstream watercourse for the site is on the 303(d) list, the site is included in a watershed that does not meet water quality standards for chloride and coliform. Currently there are no on-site stormwater quality mitigation systems.

5.2.2 SIGNIFICANCE THRESHOLD CRITERIA

Appendix G of the CEQA Guidelines contains the Initial Study Environmental Checklist form used during preparation of the project Initial Study, which is contained in Appendix A of this EIR. The Initial Study includes questions relating to hydrology, drainage, and flooding. The issues presented in the Initial Study Checklist have been utilized as thresholds of significance in this Section. Accordingly, a project may create a significant environmental impact if one or more of the following occurs:

- 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;
- Modify a wash, channel creek or river;
- Change the rate of flow, currents, or the course and direction of surface water;
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems;
- Place within 100-year flood hazard area structures, which would impede or redirect flood flows;
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam;
- Be inundated by seiche, tsunami, or mudflow;
- 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;
- Cause a significant environmentally harmful increase in the flow velocity or erosive volume of stormwater runoff; and/or
- Cause a significant and environmentally harmful increase in erosion of the project site or surrounding areas.

The purpose of the technical evaluation presented in the project's *Hydrology and Water Quality Technical Report* is to determine the impact the proposed development has on surface water drainage and stormwater quality within the County of Los Angeles and the watershed tributary to the South Fork of the Santa Clara River (via Lyon Canyon Creek). Standard practice dictates that should the analysis determine that the proposed project would significantly impact surface water drainage or stormwater quality, appropriate mitigation would be identified to minimize the project impacts to a level less than significant.

The Clean Water Act amendments of 1987 established a framework for regulating stormwater discharges from municipal, industrial, and construction activities under the NPDES program. The primary objectives of the municipal stormwater program requirements are to:

1. Effectively prohibit non-stormwater discharges, and
2. Reduce the discharge of pollutants from the stormwater conveyance system to the "Maximum Extent Practicable".

For the purposes of this analysis, impacts to stormwater quality would be considered significant if the project did not address stormwater pollution to the maximum extent practicable. Currently, however, there are no definitive water quality standards for individual pollutants. Therefore, impacts to stormwater quality would be considered significant if the project failed to meet the discharge requirements of the Los Angeles Regional Water Quality Control Board and the County of Los Angeles.

Such requirements for residential/institutional developments include the following:

1. Post-development peak storm discharge rates shall not exceed the estimated pre-development rate for developments where increased peak stormwater discharge rate would result in increased potential for downstream erosion.
2. Conserve natural areas by using cluster development, limiting clearing and grading of native vegetation, maximize trees and other vegetation, promote natural vegetation, and preserve riparian area and wetlands.
3. Minimize stormwater pollutants of concern by incorporating Best Management Practices (BMPs) or combinations of BMPs best suited to maximize the reduction of pollutant loadings (including Total Maximum Daily Load (TMDL) standards developed for the Santa Clara River by the Regional Water Quality Control Board) in runoff to the maximum extent practicable.
4. Protect slopes and channels to decrease the potential for erosion and the subsequent impacts to stormwater runoff.
5. Provide storm drain system stenciling and signage.
6. Properly design outdoor material storage areas.
7. Properly design trash storage areas.
8. Provide proof of ongoing BMP maintenance.
9. Comply with SUSMP standards for design of structural or treatment control BMPs.
10. Properly design loading/unloading dock areas.
11. Properly design repair/maintenance bays.
12. Properly design vehicle/equipment wash areas.
13. Design parking areas to reduce impervious land coverage in order to encourage the infiltration and treatment of runoff before it enters the storm drain system.

5.2.3 IMPACTS AND MITIGATION MEASURES

The following is an analysis of the proposed project conditions, which is compared to the existing conditions analysis, to determine impacts associated with development of the property. As mentioned previously, on-site and upstream off-site areas are considered in the analysis presented in the project's *Hydrology and Water Quality Technical Report.* Proposed conditions investigated include land use, assumed roadway drainage, hydrology with a burned and debris-producing condition (due to the high potential for brush fires on-site), floodplain mapping, and surface water quality.

DRAINAGE

◆ ***DEVELOPMENT ASSOCIATED WITH THE PROPOSED PROJECT WOULD ALTER THE DRAINAGE PATTERN OF THE PROJECT SITE.***

Level of Significance Before Mitigation: Significant Impact.

Impact Analysis: Almost all on-site flows from the project site, once developed, would ultimately be conveyed northeast through the double 8-foot by 8-foot box culvert that runs from west to east under The Old Road and Interstate 5. Other storm drain pipes would convey flow from southeast edges of the site eastwards into the South Fork of the Santa Clara River.

The entire project site is ultimately tributary to the South Fork of the Santa Clara River, and all runoff from the project site is eventually routed east into this fork, which flows northeast and joins the main reach of the Santa Clara River.

The proposed storm drain system consists of detention basins, debris basins, desilting inlets, culverts, catch basins, and storm drain piping. Table 5.2-5, *W*atershed Area – Proposed Conditions, provides an area summary for the proposed hydrology.

Table 5.2-5
Watershed Area – Proposed Conditions

Concentration Point	Watershed	Area (acres)
Double 8-foot by 8-foot Box Culvert	1A	37.8
	3A	41.0
	5A	40.6
	7A	30.4
	10B	17.8
	12A	34.8
	14A	28.3
	16A	23.8
	18A	30.8
	20A	32.0
	22A	13.3
	23C	46.5
	27C	21.3
	28D	35.9
	30D	33.1
	33A	23.6
	36E	46.5
	40A	12.3
Double 8-foot by 8-foot Box Culvert	43F	6.7
	46G	1.8
	49H	4.6
	52I	9.2
	54H	5.4
	61J	7.2
	64K	1.9
	67L	14.4
	70M	1.9
	73N	3.4
	76O	8.9
	79P	9.1
	91J	6.3
	98A	1.5
	102A	54.1
	103Q	4.6
	107A	21.8
	108R	29.7
	110R	33.8
	112R	28.4
	114R	27.3
	119S	4.8
	122T	6.2
	127U	1.2
	133A	29.3
	138V	7.4
	139W	6.0

Table 5.2-5 (continued)
Watershed Area – Proposed Conditions

Concentration Point	Watershed	Area (acres)
48-inch Pipe	146Y	3.5
	151Z	6.0
	156B	26.6
30-inch Pipe	144X	38.0

Hydrologic properties such as slope, assumed drainage patterns, soil type, vegetation and land use were characterized for each subarea of the project site. The watershed subareas were utilized to develop a "link-node" model, which allows transformation of a physical process into a mathematical simulation, or model. Table 5.2-6, Proposed Watershed Characteristics, contains a summary of the sub-watershed characteristics.

Table 5.2-6
Proposed Watershed Characteristics

Watershed Area ID	Length (ft)	Slope (ft/ft)	Soil Type	Percent Impervious	Land Use (Acres)					Total Area (Acres)
					Open Space Or Park	Residential		Commercial	Paved Street	
						Single Family	Multi Family Or Senior Home			
1A	2,082	0.3564	93	0.01	37.8					37.8
3A	2,523	0.3107	93	0.01	41.0					41.0
5A	2,129	0.3711	93	0.01	40.6					40.6
7A	1,941	0.2112	91	0.01	30.4					30.4
10B	1,277	0.2653	91	0.01	17.8					17.8
12A	1,723	0.1833	91	0.01	34.8					34.8
14A	1,942	0.1767	91	0.01	28.3					28.3
16A	1,834	0.1172	91	0.01	23.8					23.8
18A	2,189	0.1019	91	0.01	30.8					30.8
20A	2,490	0.1000	91	0.01	32.0					32.0
22A	1,200	0.1325	91	0.01	13.3					13.3
23C	2,332	0.2310	91	0.01	46.5					46.5
27C	2,255	0.2310	91	0.01	21.3					21.3
28D	2,335	0.2188	91	0.01	35.9					35.9
30D	2,925	0.1180	91	0.01	33.1					33.1
33A	1,994	0.1023	91	0.01	23.9					23.9
36E	2,392	0.1911	91	0.02	46.5					46.5
40A	1,150	0.1256	91	0.03	12.3					12.3

Table 5.2-6 (continued)
Proposed Watershed Characteristics

Watershed Area ID	Length (ft)	Slope (ft/ft)	Soil Type	Percent Impervious	Land Use (Acres)					Total Area (Acres)
					Open Space Or Park	Residential		Commercial	Paved Street	
						Single Family	Multi Family Or Senior Home			
43F	940	0.0693	91	0.03	6.7					6.7
46G	355	0.1335	91	0.42		1.8				1.8
49H	625	0.0136	91	0.42		4.6				4.6
52I	1,120	0.3332	91	0.03	9.2					9.2
54H	790	0.0148	91	0.42		5.4				5.4
61J	1,100	0.1953	91	0.42		7.2				7.2
64K	352	0.2334	91	0.42	1.9					1.9
67L	893	0.0825	91	0.42		14.4				14.4
70M	400	0.3870	91	0.03	1.9					1.9
73N	450	0.2188	91	0.03	3.4					3.4
76O	860	0.3725	91	0.03	8.9					8.9
79P	840	0.4072	91	0.03	9.1					9.1
91J	880	0.0468	91	0.42		6.3				6.3
98A	625	0.1941	91	0.03	1.5					1.5
102A	2360	0.1011	97	0.03	54.1					54.1
103Q	772	0.1075	91	0.50	2.6	2.0				4.6
107A	1,655	0.1018	97	0.03	21.8					21.8
108R	1,748	0.1744	97	0.01	29.7					29.7
110R	1,814	0.1868	97	0.03	31.8	2.0				33.8
112R	1,680	0.1660	97	0.05	25.4	3.0				28.4
114R	2,085	0.1506	97	0.07	24.3	3.0				27.3
119S	877	0.1421	97	0.42		4.8				4.8
122T	570	0.1056	97	0.42		6.2				6.2
127U	723	0.2122	97	0.65	0.5				0.7	1.2
133A	2,215	0.0657	97	0.23	17.3	10.0		2.0		29.3
138V	830	0.0145	20	0.68			7.4			7.4
139W	650	0.0379	20	0.03	6.0					6.0
146Y	466	0.2905	97	0.03	3.5					3.5
151Z	796	0.0930	97	0.42		6.0				6.0
156B	1,601	0.1641	97	0.03	26.6					26.6

"Percentage impervious" factors (or percent of impervious surface proposed) for the project site range from approximately one percent for open space and park, 42 percent for single-family housing, 68 percent for senior housing, and 84 percent for paved streets. For watershed areas comprised of less than approximately 50 percent paved streets, the streets were assumed to have the same imperviousness as the surrounding area. For areas that included significant portions of two or more land uses, the weighted average imperviousness was calculated.

Although the hydrology shows that the proposed project does not increase flows at the double 8-foot by 8-foot box culvert, it is still an area of significant concern. It was determined through hydraulic analysis that the box culvert cannot handle the existing 50-year storm burned and bulked flow rate even when it is free of sediment buildup. Therefore adjacent property may be flooded during such a storm event.

The proposed project would alter drainage patterns due to on-site grading, new storm drain, and increases in the amount of impervious area relative to existing drainage patterns. This could result in increased local erosion and runoff. The difference between existing and proposed condition drainage areas can be seen by comparing Exhibit 5.2-1 and Exhibit 5.2-3, Hydrology Map – Proposed Conditions, respectively.

With the construction of about 60 acres of proposed residential development on the project site, drainage boundaries would be altered due to grading. This would increase the overall imperviousness for the project site from one percent impervious in the existing condition to approximately 12 percent in the developed condition, as well as increase the overall imperviousness for the entire watershed from one percent impervious in the existing condition to approximately six percent in the developed condition.

Drainage impacts are considered potentially significant if not mitigated. However, providing the mitigation listed below would reduce the impacts to a less than significant level.

Mitigation Measures:

HWQ1 Debris/detention basins are planned on the westerly side of the intersection of "A" Street and "F" Street and the northerly side of the intersection of "A" Street and "D" Street. In addition to the debris basins, additional detention basins will be placed in series above each debris basin to prevent the debris basins from becoming jurisdictional dams under the California Division of Safety of Dams. The result of these basins will not only retain the debris that would usually accumulate at the existing double 8-foot by 8-foot box culvert but they will significantly retard the design storm water runoff from the project area. Table 5.2-7, Proposed Debris/Detention Basin Characteristics, contains a summary of the basin dimensions. In addition to these drainage improvements the following items will also be required:

a) The development area adjacent to the double 8-foot by 8-foot culvert shall be raised to reduce the flooding potential. The final elevation shall be determined by FEMA during their review of a Conditional Letter of Map Revision request.

b) In addition, the County of Los Angeles shall require the developers to obtain a drainage acceptance letter from the property owner immediately downstream of the double 8-foot by 8-foot culvert (mobile home park) prior to issuance of grading permits.

c) The proposed debris/detention basin shall be cleared/maintained as necessary by the Los Angeles County Department of Public Works Flood Control Division, as appropriate.

Table 5.2-7
Proposed Debris/Detention Basin Characteristics

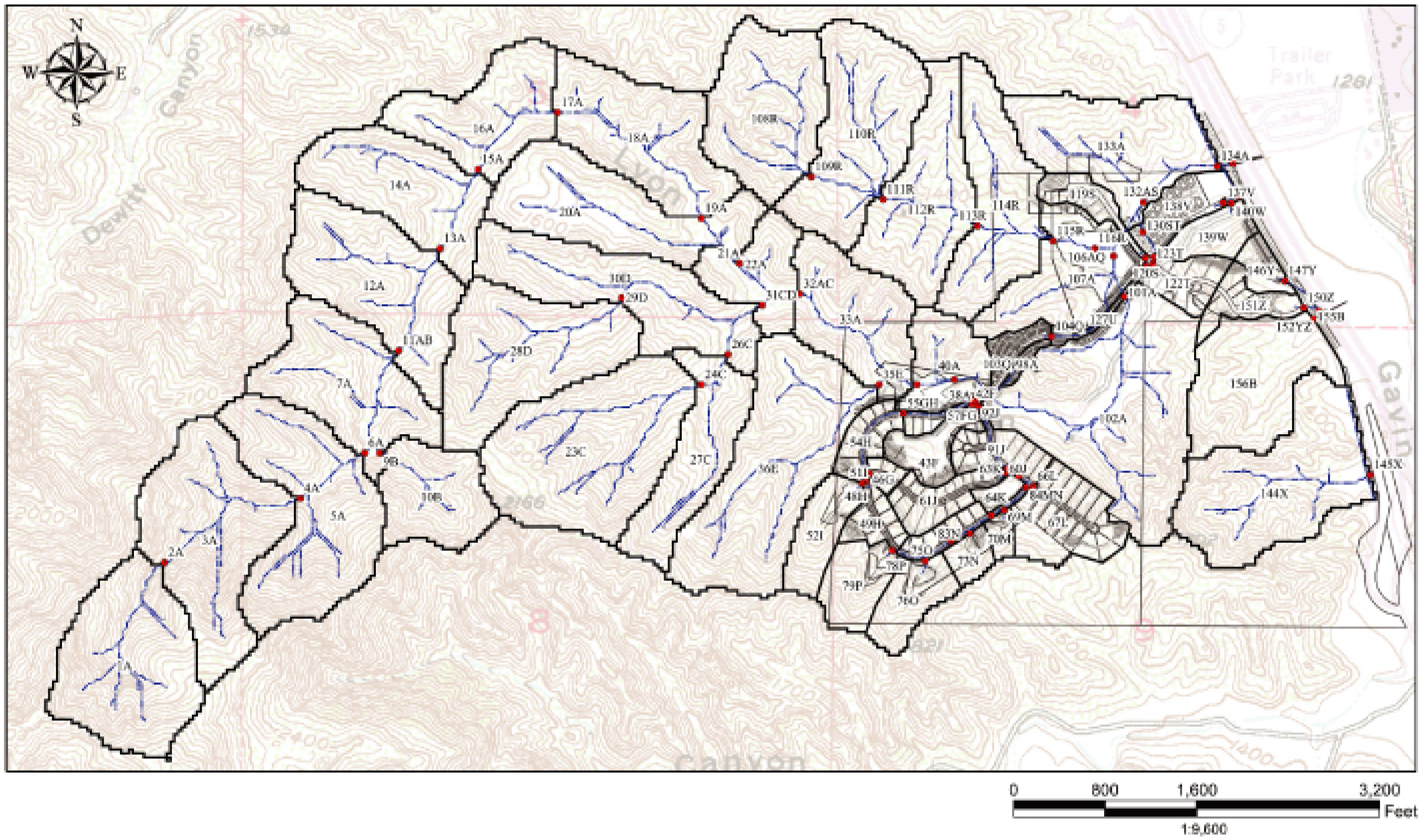
basin id	model node	max. storage elev. (feet)	storage capacity (ac-ft) [4.]	max. storage height (feet) [4.]	outlet culvert				50-yr, 24-hr water surface (feet) [3.]
					size [3.]	type	invert in (ft.)	invert out (ft.)	
1 (DB)	39A	1,415.0	41.4	24.5	5'-0" [1.]	std. 3097	1,392.0 / 1,396.5	1,390.5	1,402.5
2 (DT)	38A	1,415.0	44.9	17.0	2 - 48"	CMP	1,398.5	1,398.0	1,411.9
3 (DT)	37AE	1,415.0	13.1	10.0	4 - 60"	CMP	1,405.5	1,405.0	1,414.0
4 (DT)	106AQ	1,355.5	47.1	17.5	2 - 48"	CMP	1,338.5	1,338.0	1,349.4
5 (DT)	-	1,355.5	47.1	16.5	1 - 48"	CMP	1,339.5	1,339.0	-
6 (DB)	117AR	1,355.5	47.0	24.5	5'-0" [2.]	std. 3097	1332.5 / 1,337.0	1,331.0	1,343.1
7 (DT)	116R	1,355.5	48.1	17.5	1 - 48"	CMP	1,338.5	1,338.0	1,341.9
8 (DT)	115R	1,355.5	45.3	15.5	1 - 48"	CMP	1,340.5	1,340.0	1,348.3

1. total structure height ≈19.0 feet.
2. total structure height ≈10.5 feet.
3. subject to change based on final design
4. to remain a non-jurisdictional dam the volume and height should be below 50 ac-ft and 25 ft respectively.

HWQ2 Storm drains, culverts, channels, and outlets shall be designed per County of Los Angeles and Federal Emergency Management Agency (FEMA) Design Standards.

HWQ3 Erosion protection (or energy dissipating structures) shall be placed at outlets to natural drainage channels in order to minimize the potential for erosion, subject to approval by the Los Angeles County Department of Public Works Flood Control Division, as appropriate.

Level of Significance After Mitigation: Less Than Significant Impact.



Hydrology Map-Proposed Conditions

Exhibit 5.2-3

HYDROLOGY

◆ ***DEVELOPMENT ASSOCIATED WITH THE PROPOSED PROJECT WOULD INCREASE STORMWATER FLOW RATES.***

Level of Significance Before Mitigation: Significant Impact.

Impact Analysis: Project hydrology (based on assumed flow paths, grading plan, lot location and proposed storm drain locations) was completed by Diamond West Engineering to determine the local impacts that the proposed development would have on runoff. Hydrologic calculations to evaluate surface runoff associated with a 50-year and 10-year design storm frequency from the local drainage areas were performed using the Modified Rational Method.

The watershed sub-area boundaries were delineated based on the Diamond West Engineering report. Topographic mapping and on-site grading, as shown on the tentative tract map, were then used to refine the proposed drainage patterns used in the analysis presented in the project's *Hydrology and Water Quality Technical Report*. The proposed conditions hydrology map is illustrated in Exhibit 5.2-3.

The proposed project includes approximately 232 acres of currently vacant land, with over 60 percent dedicated to open space and parks. In addition to the project site, the watershed considered in this analysis also includes 738 acres undeveloped land upstream of the site. Thus, the total area that would contribute runoff to the South Fork of the Santa Clara River is approximately 970 acres.

Rational Method

Hydrologic calculations to evaluate surface runoff were performed using the Modified Rational Method (MODRAT) Hydrology Program found in the program WMS. Refer to the project's *Hydrology and Water Quality Technical Report* for a detailed explanation of the methodology.

Burned Flow Rates

It was determined that the proposed project has a significant risk for fire, given vegetation types, climatic conditions, and the 2003 on-site brush fire, and thus a burned flow rate calculation was performed.

Burned and Bulked Flow Rates

For reasons previously stated, the bulking effect of sediments in stormwater flows were considered for this site. The methodology for calculating the bulked flow rates from the burned flow rates is found in the *Los Angeles County Sedimentation Manual, Section 3-C-1*. The bulking factors used can be found in Appendix P-5 of the Manual, and are listed in Table 5.2-8, Bulking Factors – Proposed Conditions.

Table 5.2-8
Bulking Factors – Proposed Conditions

Concentration Point	Bulking Factor (For Total Area) $BF_{(A)}$	Bulking Factor (For Total Undeveloped Area) $BF_{(Au)}$
At inlet to Double 8-foot by 8-foot Box Culvert	1.463	1.465
48-inch Pipe	1.62	1.62
30-inch Pipe	1.62	1.62

Areas where proposed debris basins and desilting inlets contained sediment flow were assumed to be contributors of bulk sediment. Residential, commercial, and paved street areas were also assumed to be non-contributors of bulk sediment. The bulk sediments from upstream off-site undeveloped areas would be collected at the proposed debris basins and desilting inlets.

Hydraulic Analysis of Double 8-foot by 8-foot Box Culvert & Proposed Lateral Confluence

The project proposes a "lateral" storm drain pipe that would be located beneath "A" Street and would cross under The Old Road and outlet at the south side of the double 8-foot by 8-foot box culvert on the east side of The Old Road. This outlet point would represent the confluence of flows from the lateral pipeline and the double box culvert. The proposed lateral confluence at this point should not have an impact on the floodplain upstream of the double box culvert, since the proposed upstream basins are reducing the volume of stormwater that would normally flow through the culvert from the west side of The Old Road. The proposed lateral confluence conveys runoff from Subareas 138V and 139W.

Surface Water Hydrology – Proposed Conditions

Appendix B of Appendix I, *Hydrology and Water Quality Technical Report* includes the results from the 50-year and 10-year burned and bulked flows. Results of the proposed condition hydrologic analysis are summarized in Table 5.2-9, Hydrology Summary – Proposed Conditions.

Table 5.2-9
Hydrology Summary – Proposed Conditions

Description	Effective Total Area (acres)	50-year (Burned) Flowrate (cfs)	10-year (Burned) Flowrate (cfs)
At Inlet to Double 8-foot by 8-foot Box Culvert	890.0	404	288
48-inch Pipe	36.1	121	86
30-inch Pipe	38.0	117	84

The proposed project would result in an increase in impervious areas on-site, as mentioned previously. Drainage patterns were assumed for the hydrologic analysis contained in the project's *Hydrology and Water Quality Technical Report*, based on information collected from the current proposed site grading and lot layout. On-site grading and new storm drains would alter drainage patterns.

As discussed previously, the existing double 8-foot by 8-foot box culvert would not be able to fully convey the 50-year post-development burned and bulked flow to off-site drainage facilities. Thus, hydrology/drainage impacts are considered potentially significant if not mitigated.

Table 5.2-10, Flow Rate Comparison, compares the overall existing and proposed flow rates for the various exit points along the eastern boundaries of the project site.

Table 5.2-10
Flow Rate Comparison

Concentration Point	50-year (Burned and Bulked) Flow Rate (cfs)	
	Existing Condition	Proposed Condition
Double 8-foot by 8-foot Box Culvert	1923	404
48-inch Pipe	183	121
30-inch Pipe	190	117

The overall flows would decrease for all areas. This is mainly attributed to the proposed debris/detention basins. With implementation of mitigation measures listed below, impacts would be reduced to a less than significant level.

Mitigation Measures: Refer to mitigation measures HWQ1 through HWQ3. No additional mitigation measures are required.

Level of Significance After Mitigation: Less Than Significant Impact.

FLOODPLAIN

◆ ***DEVELOPMENT ASSOCIATED WITH THE PROPOSED PROJECT COULD PLACE STRUCTURES IN A DESIGNATED FLOOD HAZARD ZONE.***

Level of Significance Before Mitigation: Significant Impact.

Impact Analysis: The main watercourse flowing northeasterly through the project site is located directly in an area designated as Zone A. The off-site downstream outlet of the double 8-foot by 8-foot box culvert is also directly in Zone A. Zone A is defined as: "Areas of 100 year flood. Base flood elevations and flood hazards factors not determined."

According to the preliminary hydraulic analysis, the existing condition design water surface at the box culvert could possibly flood The Old Road (elevation 1,310 feet), the proposed senior residences, the proposed fire station lot, and the existing business center parking lot (elevation 1,314.8 feet) to the north for a 50-year burned and bulked storm runoff. Therefore, impacts to the floodplain mapping are considered potentially significant if not mitigated.

Construction of the debris/detention basins and their associated culverts along the main watercourse as part of the proposed project would change the existing Zone A flood limits so that all proposed habitable structures will be outside of the Zone A flood limits. Thus, for these culverts and any other construction within the Zone A flood limits, a Conditional Letter of Map Revision must be approved by the Federal Emergency Management Agency (FEMA) prior to issuance of grading permits. To ensure compliance with FEMA flood hazard policies, all proposed structures are currently proposed at pad elevations at least 1 foot above or entirely outside the limits of on-site flooding.

Mitigation Measures:

Refer to mitigation measure HWQ1 regarding drainage facilities. Additionally, the mitigation measure listed below would serve to further address floodplain impacts.

HWQ4 Any construction in the FEMA Zone A shall require a Conditional Letter of Map Revision prior to issuance of grading permits. The developer shall obtain a Letter of Map Revision prior to occupancy of any building within the Zone A designation.

Level of Significance After Mitigation: Less Than Significant Impact.

WATER QUALITY

◆ ***DEVELOPMENT ASSOCIATED WITH THE PROPOSED PROJECT WOULD INCREASE POLLUTANT LOADS IN THE LOCAL STORM DRAIN SYSTEM AND RECEIVING WATER BODIES.***

Level of Significance Before Mitigation: Significant Impact.

Impact Analysis: The site's major downstream watercourse, the Santa Clara River, is on the 303(d) list of the Los Angeles Regional Water Quality Control Board. This 303(d) listing raises a significant concern for chloride and nitrate/nitrite runoff from the site.

In addition, the general water quality of the project site is expected to decrease as a result of the proposed project. Expected pollutants include: trash, debris, nutrients, bacteria, pesticides, herbicides, oil and grease and household hazardous wastes. This is due to the proposed large increase in impervious area and flow conveyed in proposed streets.

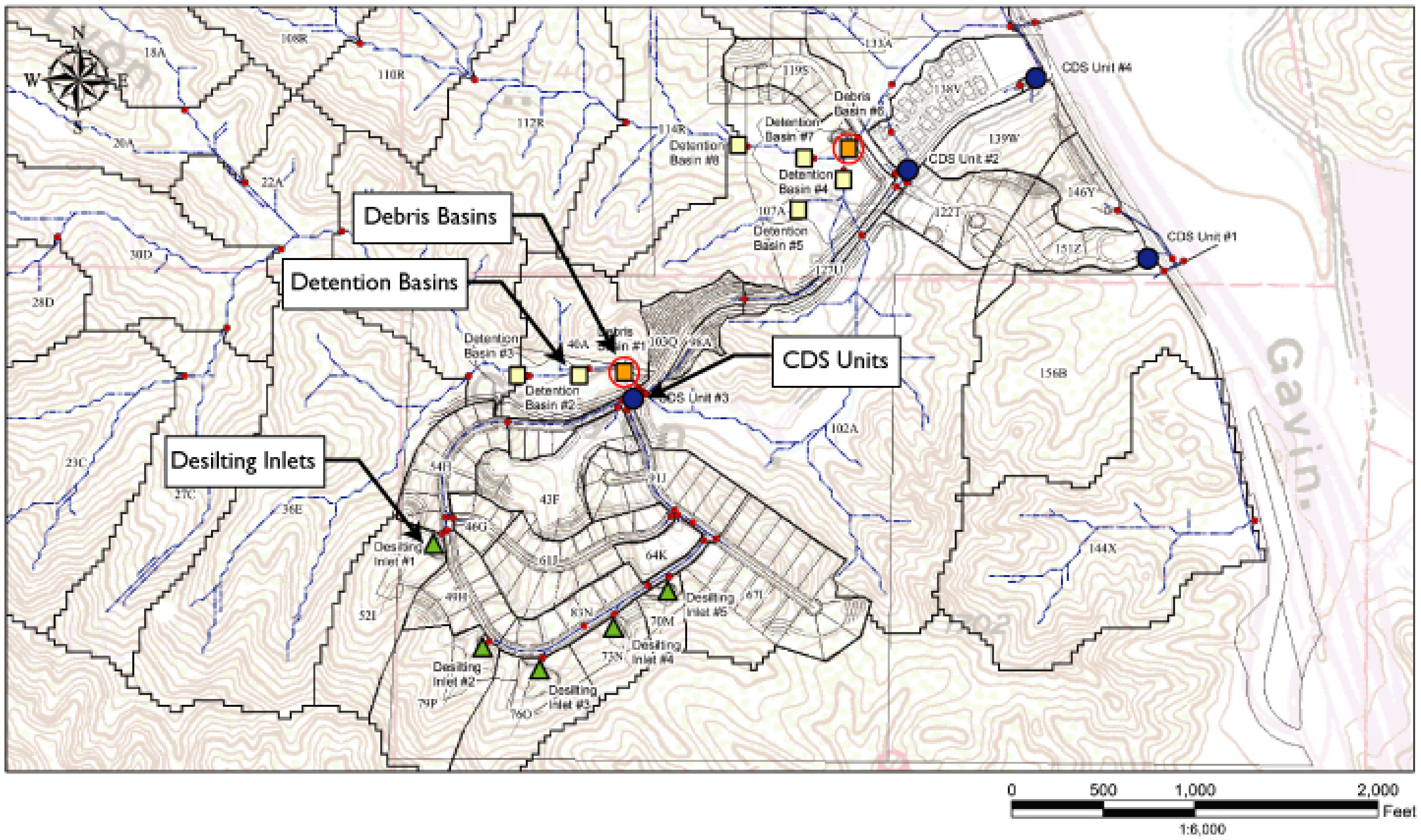
To deal with debris and silt from several undeveloped areas within the project site, several debris basins, desilting inlets, and continuous deflective screening (CDS) units are proposed.

CDS units are the project applicant's preferred method of mitigating stormwater quality. Sizing of the CDS units required computing flows using the Standard Urban Stormwater Mitigation Plan (SUSMP) Manual. The manual specifies that a 0.75-inch rainfall depth be used to represent the amount of runoff that must be mitigated. The flow calculations for the SUSMP condition are included in Appendix C of Appendix I, *Hydrology and Water Quality Technical Report*.

Refer to Exhibit 5.2-4, SUSMP Facilities – Preferred Placement, for the project applicant's preferred placement of debris basins, desilting inlets, and CDS units.

As previously discussed, the project site's major downstream watercourse, the Santa Clara River, is included on the 303(d) list of the Los Angeles Regional Water Quality Control Board. This 303(d) listing raises a significant concern for chloride and Nitrate/Nitrite laden runoff from the site. Untreated waste from pets could mix with stormwater runoff and increase the amount of pollutants leaving the site.

The proposed project would increase impervious areas, resulting in impacts to stormwater quality, and could affect pollutant loading immediately off-site. Mitigation measures that address water quality impacts, listed below, would reduce water quality impacts to a less than significant level.



SUSMP Facilities - Preferred Locations

Exhibit 5.2-4

Post-Construction

Operation of the proposed project, once construction is completed, would increase trash, nutrients, bacteria, pesticides and herbicides, oil and grease, and household hazardous wastes from the development and increased activity. Water quality impacts due to the development of the site are considered potentially significant if not mitigated.

Construction

There would be additional impacts to stormwater quality due to construction and associated earth moving. Construction of the proposed project has the potential to produce typical pollutants such as nutrients, heavy metals, pesticides and herbicides, toxic chemicals related to construction and cleaning, waste materials including wash water, paints, wood, paper, concrete, food containers, sanitary wastes, fuel, and lubricants. Prior to construction, a Notice of Intent (NOI) and Stormwater Pollution Prevention Plan (SWPPP) would be required to reduce pollutant loadings. Impacts to water quality due to construction are considered potentially significant if not mitigated.

Mitigation Measures:

HWQ5 Project developers shall prepare and submit a Notice of Intent to comply with the Construction General Permit to the State Water Resources Control Board.

HWQ6 Project developers shall prepare a Stormwater Pollution Prevention Plan (SWPPP) to be approved *by the Los Angeles County DPW* per requirements of the Construction General NPDES Permit.

HWQ7 Project developers shall comply with post-construction Best Management Practice (BMP) requirements as detailed in the L.A. County Standard Urban Stormwater Mitigation Plan (SUSMP).

HWQ8 The project developer shall construct and maintain all structural stormwater filtration devices as shown on Figure 5.2-4 above. The final location of the proposed structural stormwater filtration systems shall be determined by the Los Angeles County Department of Public Works prior to issuance of building permits.

HWQ9 In order to limit the amount of pollutants leaving the site in stormwater runoff, project developers shall implement public education programs for residents concerning the clean up of pet waste. Also, pet waste disposal bags and containers shall be provided by the project's HOA and their use described within the CC&Rs around parks and other areas of high pet traffic.

HWQ10 The Los Angeles County Department of Public Works shall be responsible for the operation and maintenance of any debris/detention basins on the site, which include:

- Dispersion of alluvial sediment deposition at inlet structures, thus limiting the extended localized ponding of water.
- Periodic sediment removal to ensure adequate storage and treatment volume.
- Monitoring of the basin to ensure it is completely and properly drained.
- Outlet riser cleaning.
- Vegetation management to prevent marsh vegetation from taking hold, and to limit the growth of habitat for disease-carrying fauna.
- Removal of graffiti, litter, vegetative and other debris.
- Preventative maintenance on monitoring equipment.
- Vegetative stabilization of eroding banks.

HWQ11 The project's Homeowners' Association or the Los Angeles County Department of Public Works shall be responsible for the operation and maintenance of any storm water filters on the site, to include:

- Providing adequate access for inspection and maintenance.
- Removal of accumulated trash, paper and debris.
- Corrective maintenance including removal and replacement of top layers of media.
- Complete replacement of filter media every 3 to 5 years.
- Periodic removal of vegetative growth.

HWQ12 The project's homeowners' association or the Los Angeles County Department of Public Works shall be responsible for the operation and maintenance of any storm water clarifiers on the site, which include:

- Inspection prior to the beginning of the storm season.
- Regular inspection following storm events.
- Removal of accumulated sediment, trash and debris.

HWQ13 Pesticide applications shall be managed through educational and other source control efforts, including the installation of efficient landscape irrigation systems in common areas and the development of guidance on applying these types of chemicals for contractors maintaining landscape areas. Examples of material which may be used for education may include educational pamphlets currently available through L.A. County and/or other sources (i.e., http://www.americanoceans.org/runoff/epa-bro.htm). Because of the concerns regarding indicators of human pathogens, education programs shall emphasize animal waste management, such as the importance of cleaning up after pets and not feeding wild animals, such as pigeons, seagulls, ducks and geese. The project applicant shall create and distribute these pamphlets to landscape contractors prior to on-site planting.

HWQ14 The project applicant shall prepare an herbicide/pesticide program to be utilized by landscaping contractors on commonly owned landscaped areas. This program shall include requirements to minimize the use of herbicides and pesticides in these landscaped areas and shall be prepared and in place prior on-site planting.

Level of Significance After Mitigation: Less Than Significant Impact.

5.2.4 MITIGATION MEASURES ALREADY INCORPORATED INTO PROJECT DESIGN

- To reduce pollution from impacts from the "first flush" runoff, a series of pipes and outlets would be constructed pursuant to Los Angeles County Department of Public Works requirements to intercept first flush runoff from paved developed areas and channel it to above ground and/or subsurface water quality control basins.

- The project is required to comply with the RWQCB Municipal Permit (General MS4 Permit) Order No. 01-182, NPDES No. CAS004001 (adopted December 13, 2001) to reduce the discharge of pollutants to the maximum extent practicable.

- To treat storm water, two water quality detention basins, and hydrodynamic separator systems would be constructed.

- Post-construction structural or treatment control BMPs to minimize or prevent storm water pollutants from discharging into the Santa Clara River shall, at minimum, include:
  - water quality detention basins;
  - hydrodynamic separator systems, such as Continuous Deflective Separator (CDS) units.

- Additional equivalent BMPs that could alternatively be implemented at the project site include:
  - catch basin inserts;
  - storm water filters; and
  - storm water clarifiers.

5.2.5 CUMULATIVE IMPACTS AND MITIGATION MEASURES

◆ ***DEVELOPMENT ASSOCIATED WITH THE PROPOSED PROJECT AND OTHER CUMULATIVE PROJECTS WOULD CONTRIBUTE TO CUMULATIVE HYDROLOGY AND WATER QUALITY IMPACTS.***

Level of Significance Before Mitigation: Significant Impact.

Impact Analysis: During public hearings held for the preparation of the Santa Clara River Enhancement and Management Plan (a draft was completed in January 2004), the Ventura County Public Works Agency, Flood Control District estimated that approximately 4 percent of the Santa Clara River watershed within Los Angeles County and 2.5 percent of the Santa Clara River watershed within Ventura County would be developed.[4] It is acknowledged that each development project in the Santa Clara River watershed (1,634 sq. miles) will be of varying character and size, will have its own unique topographic and geologic characteristics, will have flood and water quality impacts that will be unique to the geologic/soil conditions of the site, will contribute directly or indirectly to either the Santa Clara River, or its tributary watershed, and will be subject to the development criteria of the jurisdiction in which it is located. In addition, it is acknowledged that the development projects in the same watershed as the proposed project may cumulatively impact watershed drainage, hydrology, and water quality.

All current and future development within the portion of the watershed of the Santa Clara River located in Los Angeles County, has been or will be required to comply with the LACDPW requirements to ensure that upstream or downstream flooding does not occur and to ensure that downstream erosion and sedimentation do not occur. Compliance with these requirements ensures consistency with the County's regional flood control model. Pursuant to LACDPW requirements, all drainage systems in developments that carry runoff from developed areas must be designed for the 25-year Urban Design Storm, while storm drains under major and secondary highways, open channels (main channels), debris carrying systems, and sumps must be designed for the 50-year Capital Flood Storm. LACDPW also prohibits significant increases in off-site post-development storm flows and significant increases in storm flow velocities. Development in the Los Angeles County portion of the watershed must also comply with LACDPW design criteria. As a result of compliance, overall storm runoff discharge quantities from the watershed under post-development runoff conditions would be less than or equal to existing conditions largely because the runoff would be free of the debris that is typical of undeveloped watersheds and flow velocities would not increase significantly. Because on-site facilities would already have been built for burned and bulked flows from undeveloped areas, they would have more than adequate capacity to accommodate off-site flows as the off-site portions of the drainage areas develop.

[4] Alex Sheydayi, Deputy Director, Ventura County Public Works Agency, Flood Control Department, statement made at the Santa Clara River Enhancement and Management Plan Steering Committee Meeting, May 30, 1995.

Further, all development within the portion of the watershed of the Santa Clara River located within the jurisdiction of the RWQCB, including that within the unincorporated portions of Los Angeles County, is required to comply with the orders and regulations issued by the RWQCB, as well as those issued by the SWRCB, the NPDES, Standard Urban Stormwater Mitigation Plans (SUSMP) as required by the County of Los Angeles, and federal water quality laws applicable during both construction and operation of the project. Further, each current and future development in the Santa Clarita Valley will also be required to meet all of those requirements for the control storm water discharges of pollutants of concern for each such development (i.e. TMDLs).

Because the cumulative project storm water quality improvements in the Santa Clarita Valley would be required to conform to all of the above-referenced requirements, no potentially significant cumulative project flooding impacts are expected to occur from the incremental impacts of the project. In addition, the applicable water quality standards will ensure that no potentially significant cumulative impacts will occur.

Mitigation Measures: Refer to Mitigation Measures HWQ 1 through HWQ 14.

Level of Significance After Mitigation: Less Than Significant Impact.