3.5 GEOLOGY, SOILS AND HYDROLOGY (INCLUDING STORM WATER DRAINAGE)

This section describes the existing geology and soils conditions on the Project Site, identifies potential environmental impacts that could occur, and recommends mitigation measures as appropriate to reduce or avoid any impacts. The information and analysis in this section is based on the following reports contained in the appendices to this RDEIR:

- Final Geologic and Soils Engineering Report, Response to City of Los Angeles Correction Letter, Proposed Parking Structure and Pedestrian Bridge, Byer Geotechnical, Inc., May 18, 2015 (**Appendix E.1**)
- Third-Party Geologic and Soils Engineering Review, Grover-Hollingsworth and Associates, October 23, 2015 (**Appendix E.1a**)
- City of Los Angeles, Department of Building and Safety, Geology and Soils Report Approval Letter, July 21, 2015 (**Appendix E.1b**)
- Hydrology Study, KPFF, ~~August 12, 2013~~ April 10, 2015 (**Appendix E.2**)
- City of Los Angeles Low Impact Development Plan (which includes measures to comply with Standard Urban Storm Water Mitigation Plan -- SUSMP), KPFF Consulting Engineers, April 10, 2015, ~~August 12, 2013~~ **(Appendix E.3**).

EXISTING CONDITIONS

Regional Setting

The ~~proposed~~ Project Site is located within a southern portion of the San Fernando Valley, which is an elongated valley, roughly 22 miles long in an east-west direction and generally approximately 9 miles wide in a north-south direction, although stretching to 12 miles wide at its widest point. Situated within the Transverse Ranges geomorphic province of California, the San Fernando Valley is bounded by the San Gabriel and Santa Susana Mountains to the north, the Santa Monica Mountains to the south, the Verdugo Mountains to the east, and the Simi Hills to the west. Geomorphic provinces are large natural regions, dominated by similar rocks or geologic structures.

The Transverse Ranges geomorphic province is composed of several mountain ranges oriented in an east-west direction and extending over 320 miles from the Mojave and Colorado Desert Provinces to Point Arguello at the Pacific Ocean. Included within the Transverse Ranges are portions of Riverside, San Bernardino, Los Angeles, and Ventura Counties. Acting as a northern boundary, the Transverse Ranges truncate the northwest trending structural grain of the Peninsular Ranges geomorphic province, which is composed of multiple mountain ranges and valleys extending southward 775 miles past the US-Mexican Border. The Peninsular Ranges geomorphic province is the largest province in North America.

Southern California is seismically active, being situated at the convergence of the North American and Pacific tectonic plates. A map showing major faults in the region is shown in **Figure 3.5-1**. Earthquakes along the San Andreas fault relieve convergent plate stress in the form of right lateral strike slip offsets. The Transverse Ranges work as a block causing the San Andreas fault to bend or kink, producing compressional stresses that are manifest as reverse, thrust, and right lateral faults. Faulting associated with the compressional forces creates earthquakes and is primarily responsible for the mountain building, basin development, and regional upwarping found in this area. As rocks are folded and faulted within the rising mountain ranges, landsliding and erosion transport sediment or alluvium into the San Fernando Valley, creating a deep sedimentary basin.

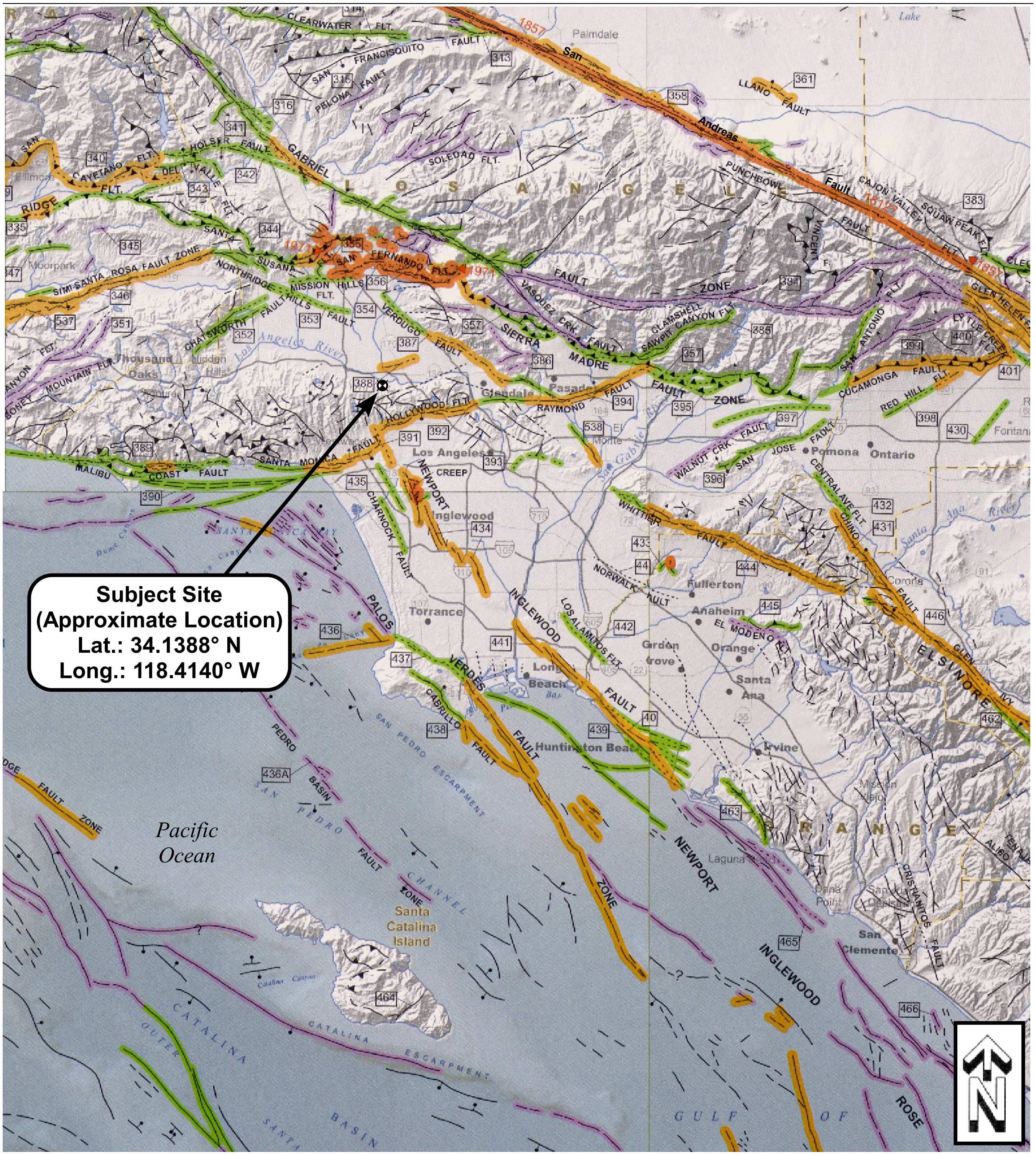


Figure 3.5-1
Regional Fault Map

Mountain ranges surrounding the San Fernando Valley contain rocks varying in age from the Pre-Cambrian eon to the Tertiary period and younger sedimentary and volcanic rocks that range from Tertiary period to Quaternary period. As ages of the rocks vary greatly, so does the composition of the rocks surrounding the valley: from igneous and metamorphic crystalline complexes to marine and non-marine sediments.

Topography, Slopes and Major Drainage

The floor of the San Fernando Valley slopes gently to the east at about a one percent gradient. Elevations of the valley floor vary from 1,000 feet above mean sea level (AMSL) at the north and northwestern ends of the valley, to 500 feet AMSL at the Los Angeles River Narrows, the southeastern end of and point at which the Los Angeles River exits the valley. The Los Angeles River Narrows act as base level for the river and the valley.

Sediments from the bounding mountain ranges are carried into and across the San Fernando Valley through numerous seasonal streams flowing to the Los Angeles River, the master drainage for the valley, which flows west to east.

The average elevations of the mountains surrounding the San Fernando Valley range from 1,700 feet AMSL for the Santa Monica Mountains, 1,800 feet AMSL for the Simi Hills, to 2,000 feet AMSL for the Santa Susana Mountains. The highest point in the area is San Fernando Peak in the Santa Susana Mountains, having an elevation of 3,741 feet AMSL.

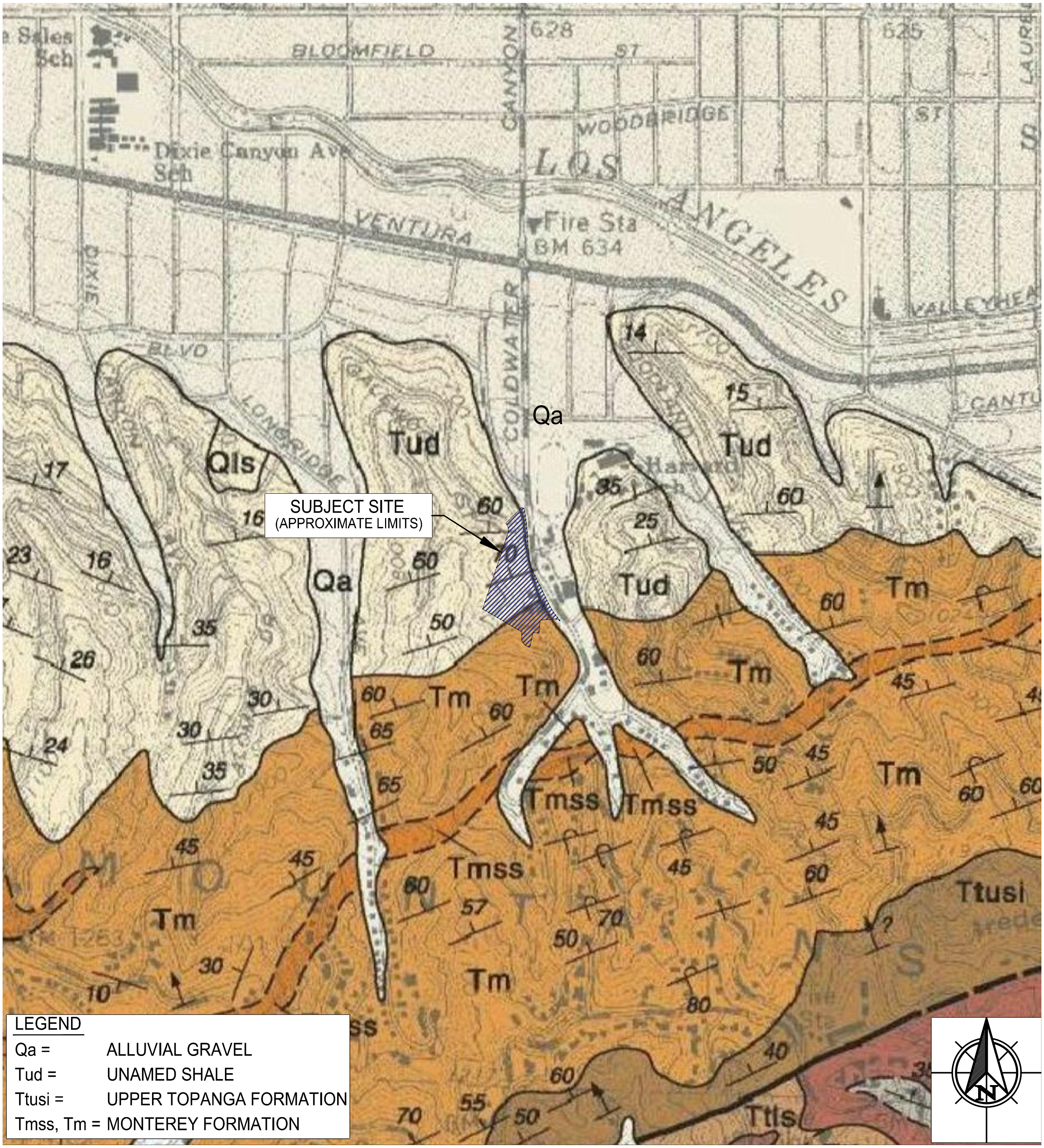
The Development Site is located within sloped lots extending upwards to the west from Coldwater Canyon Avenue. The lots contain graded building pads previously occupied by four ~~two~~ residences (two were removed following the 1994 Northridge earthquake and two were demolished in 2011), one vacant residence (owned by Harvard-Westlake School), a larger graded area, driveways, and vacant sloped land. A retaining wall with a height of up to approximately 8 feet runs along a portion of the driveway to the upper vacant building pad. The Development Site is heavily vegetated outside the graded lots with grasses, chaparral, and trees.

The Development Site is bounded on the west ~~north~~ by the undeveloped slopes of Coldwater Canyon Open Space, on the east by Coldwater Canyon Avenue, and on the south and north ~~west~~ by slopes with residences at the top.

The western ~~east facing natural~~ slope extends ~~ing~~ upward from Coldwater Canyon Avenue to ~~has~~ a height of greater than 200 feet. The southern ~~north facing natural~~ slope has a height of approximately 100 feet to the residence near the top. The northern slope reaches a height of approximately 150 feet. In general, the slopes have an inclination of steeper than 2:1 (horizontal:vertical). In between these slopes, there exist drainage valleys or fills within former drainage valleys. The topography at the Development Site is shown in **Figure 3.5-2**.

Local Geology and Soils

Holocene to Pleistocene alluvial and older elevated alluvial soils comprise the majority of geologic material exposed at the surface of the San Fernando Valley. Quaternary-age Saugus formation exposures are present northeast of the Proposed Project.



SOURCE: Byer Geotechnical, Inc., 2015; Dibblee, Geologic Map of Beverly Hills and Van Nuys, 1991

Figure 3.5-2

Regional Geologic Map

Field investigations undertaken on the Development Site in 1998, 2009, and 2014 ~~for the Project~~ (see **Appendix E.1**) indicate the Development Site includes undocumented fills underlain by natural soils and/or bedrock. Compacted fills up to 20 ~~of less than 5~~ feet were encountered in the borings~~ although deeper fills are anticipated at the site~~. The natural soils and alluvium encountered within the Development Site consist primarily of silty clay, sandy silt, silt, and clayey silt. These soils were encountered within the areas of the current or former drainage valleys. The thickness of native soils and alluvium extends to depths of up to 32 ~~23~~ feet below existing grade on the west side of Coldwater Canyon Avenue and up to 31 feet below existing grade on the east side of Coldwater Canyon Avenue. These materials range from dry to wet and generally exhibit low strength and high compressibility characteristics.

Upper Miocene age bedrock consisting of diatomaceous siltstone, shale, mudstone, and occasional siliceous shale and sandstone was encountered under the undocumented fill and natural soils extending to the depth of the borings. The diatomaceous siltstone and shale were encountered in the central and northern portions of the site, while the mudstone was encountered in the southern portion. These materials are very moist to wet~~. These materials~~ and generally exhibit moderate to high strength, with the diatomaceous material being somewhat stronger, and low to moderate compressibility characteristics. Initial testing of the siltstone suggested ~~indicated~~ that on-site materials might be ~~are~~ moderately to highly expansive (see **Appendix E.1**) as a result of high liquid and plastic limits. However, such results are a reflection of the diatomaceous content of the bedrock (which, owing to its biological composition, typically has high liquid and plastic limits). Expansion index tests were performed and support this conclusion.

Groundwater was not encountered on the west side of Coldwater Canyon Avenue during the six borings conducted in 1998 (to a maximum depth of 43 feet), ten borings conducted in 2009 (to a maximum depth of 71 feet), and eight borings conducted in 2014 (to a maximum depth of 76 feet). On the east side of Coldwater Canyon Avenue, groundwater was observed at a depth of 29 feet during a 2011 boring relating to the construction of the Harvard-Westlake School pool but not during the 2014 boring conducted in the area of the eastern bridge support (to a maximum depth of 41 feet).

Faulting and Seismicity

Southern California is a geologically complex and diverse area, dominated by the compressional forces created as the North American and Pacific tectonic plates slide past one another along a transform fault known as the San Andreas. Regional tectonic compressional forces shorten and thicken the earth’s crust, creating and uplifting the local transverse mountain ranges, including the Santa Susana, Santa Monica, and San Gabriel. A variety of fractures within the crust are created to accommodate the compressional strain, allowing one rock mass to move relative to another rock mass; this is a fault.

Within Southern California, several fault types are expressed, including lateral or strike slip faults, vertical referred to as normal and reverse or thrust faults, and oblique faults accommodating both lateral and vertical offset. Earthquakes are the result of sudden movements along faults, generating ground motion (sometimes violent) as the accumulated stress within the rocks is released as waves of seismic energy.

The Project area is geologically complex with numerous slow moving faults such as the blind thrust responsible for the magnitude (Mw) 6.7 Northridge earthquake of 1994. Many faults shown on regional geologic maps within a 100-mile radius of the Project Site were recognized to be active (Holocene displacement) or potentially active (Quaternary displacement) by CGS and the USGS.

Figure 3.5-1 depicts the location of recognized faults within Los Angeles and San Fernando Valley areas. Known faults within the area, classified as either active or potentially active are listed in **Table 3.5-1**. The most significant fault in the proximity of the Development Site is the Hollywood Fault, which is located approximately 3.4 ~~1.2~~ miles south of the Development Site. However, unlike the southern boundary of the Santa Monica Mountains, the northern boundary is not separated from the valley alluvium by a fault.

In many cases, only portions of the known length of a fault are included within an Alquist Priolo earthquake fault zone. Inclusion within an earthquake fault zone occurs when, for example, the ground surface is ruptured by a fault, as exemplified by the San Fernando segment of the Sierra Madre fault zone during the 1971 San Fernando earthquake. Portions of earthquake fault zoned faults that have not experienced recent ground rupture or have not been investigated are not necessarily included within an earthquake fault zone. No earthquake fault zoned faults extend into or cross the Project area at this time.
Several faults are present in Southern California that have no surface expression. These faults are generally known as blind thrust faults. Both the Whittier Narrows earthquake (1987) and the Northridge earthquake (1994) occurred on blind thrust faults. Blind thrust faults are low angle reverse faults that do not extend to the surface; therefore, identifying their locations from surface mapping is difficult at best. Rather deep bore holes and seismic records provide details about the geometry of these faults. Blind thrust faults may produce ground shaking at the Development Site but there is no potential for surface rupture given the distance to the nearest known fault.

The Project Site is located in the Santa Monica Mountains on the west canyon wall of Coldwater Canyon, one of many north-flowing canyons that drain toward the San Fernando Valley. The area is within moderate to steep hillside terrain on the north flank of the east-west trending Santa Monica Mountains.

As shown in **Figure 3.5-2**, the Project Site and surrounding area are underlain by sedimentary bedrock of unnamed shale. The geologic structure of the area is relatively simple, with bedding striking nearly east-west and dipping steeply (60 to 70 degrees) to the north.

Bedrock underlying the Development Site is overlain by clayey, native residual soils and colluvium on the natural hillsides, and fine-grained alluvium, virtually indistinguishable from the colluvial soils, in the east flowing drainage in the southern portion of the site. The maximum thickness of alluvium observed was approximately 32 ~~23~~ feet in the middle of the site adjacent to Coldwater Canyon Avenue.

~~Fill deposits, placed during a previous grading operation of unknown purpose, are present within two east flowing drainages. The fill deposits are undocumented and have an estimated maximum thickness of approximately 20 feet.~~

Strong Ground Motion

Ground shaking intensity is influenced by several factors, including but not limited to the distance of the epicenter from the Project Site and depth at which the earthquake occurred, the magnitude of the earthquake, subsurface geologic structures, as well as surface topography, depth of groundwater, and strength of the earth materials underlying the Project Site.

TABLE 3.5-1: SIGNIFICANT FAULTS IN PROJECT AREA

Fault Name Relative Fault Geometry (ss) strike slip, (r) reverse, (n) normal, (rl) right lateral, (ll) left lateral, (o) oblique, (t) thrust	Fault Class	Fault Length (miles)	Dip angle, direction	Alquist Priolo Earthquake Fault Zoned
Chatsworth - r	B	12	N	NO
Northridge Hills3 - r	B	10	N	NO
Mission Hills - r	B	7	N	NO
Sierra Madre (Santa Susana) - r	B	35.4	45°, N	YES
Simi Santa Rosa - r	B	25	60°, N	YES
Northridge - r	B	19.3	42°, S	NO
Sierra Madre (San Fernando) - r	B	11.2	45°, N	YES
Verdugo - r	B	18	45°, NE	NO
Holser - r	B	12.4	65°, S	YES
Malibu Coast - ll,r,o	B	23	75°, N	YES
Oak Ridge (onshore) - r	B	30.5	65°, S	YES
San Gabriel - ss, rl	B	44.7	90°	YES
Santa Monica (Onshore) - ll,r,o	B	17.4	75°, N	NO
Hollywood - ll,r,o	B	10.56	70°, N	PARTIAL ~~NO~~
Anacapa- Dume - r,II,o	B	46.6	50°, N	NO
San Cayetano - r	B	26	60°,N	YES
Sierra Madre (Sierra Madre B) - r	B	35.4	45°, N	YES
Newport - Inglewood (Rose Canyon) - rl,ss	B	41	90°	YES
Upper Elysian Park - r	B	12.4	50°, NE	NO
Palos Verdes (Offshore) - rl,ss	B	59.6	90°	NO
Puente Hills Blind Thrust - r	B	27.3	25°, N	NO
Raymond - ll,r,o	B	14.3	75°, N	YES
Santa Ynes - east segment, II – ss	B	42.2	80°	YES
San Andreas (Mojave) - ss,rl	A	64	90°	YES
San Andreas (Cholame) - ss,rl	A	39	90°	YES
Elsinore (Whittier) - rl,r,o	A	23.6	75°, NE	YES

Source: Based on information in Canoga Transportation Corridor 2008 Final EIR – which used the following source documentation: Cao, T., Bryant, W.A., Rowshandel, B., Branum, D., and Willis, C.J., 2003, *Revised 2002 California Probabilistic Seismic Hazard Maps*, June 2003 www.data.scec.org, Baldwin, J. N., Kelson, I. K., Paleoseismic Investigation of the Northridge Hills fault, Northridge, CA, 1998

An earthquake's intensity is the effect the ground shaking has on the earth's surface. Several methods for rating earthquakes have been developed, but within the United States, the Modified Mercalli Intensity (MMI) is used. This system is not mathematically derived, but is simply based on observation of destruction, indexed to the roman numerals I through XII, with an "I" representing an event that was nearly unperceivable, to "XII," which represents near total destruction of all structures and the land surface is deformed.

Measurements of ground motion or magnitudes of the amount of energy released by an earthquake are quantified and recorded on various scales, the first of which was originally developed by Charles F. Richter in 1935. The scales are based on a logarithm of the amplitude of waves recorded by seismographs. Several scales have been developed, but most commonly used are the Richter magnitude or local magnitude (ML), the surface-wave magnitude (Ms), the body wave magnitude (Mb), and the moment magnitude (Mw). Currently, the moment magnitude is most commonly reported, as it is based on the concept of seismic moment and is the most accurate scale for large magnitude earthquakes.

Earthquake-induced ground motion intensity can be described using peak site accelerations, represented as a fraction of the acceleration of gravity (g). Peak bedrock accelerations for design level earthquakes on a nearby fault can be calculated using any of a number of different attenuation relationships.

Given the proximity of the ~~proposed Project~~ Development Site ~~area~~ with respect to the faults listed within **Table 3.5-1** and shown on **Figure 3.5-1**, in conjunction with known damage associated with both the 1971 San Fernando Earthquake (6.7 Mw), and the 1994 Northridge earthquake (6.7 Mw) intense ground shaking should be expected in the future. The strongest ground acceleration ever measured instrumentally within an urban area of North America (Southern California Earthquake Center [SCEC]) was measured during the Northridge earthquake to be 1.8g, recorded on Tarzan Hill.[1] The reason for this anomalously high result is not well known. Significant damage, as would be expected given the high acceleration, was not found to the nearby homes.

Liquefaction and Related Ground Failures

Liquefaction occurs when saturated, low relative density, low plastic materials are transformed from a solid to a near-liquid state. This phenomenon occurs when moderate to severe seismic ground shaking causes pore-water pressure to increase. Site susceptibility to liquefaction is a function of the depth, density, soil type, and water content of granular sediments, along with the magnitude and frequency of earthquakes in the surrounding region. Saturated, unconsolidated silts, sands, and silty sands within 50 feet of the ground surface are most susceptible to liquefaction. Liquefaction-related phenomena include lateral spreading, ground oscillation, flow failures, loss of bearing strength, subsidence, and buoyancy effects.[2]

Groundwater was not encountered in exploratory borings to depths of 76 ~~71~~ feet below the existing ground surface on the west side of Coldwater Canyon Avenue. Perched groundwater may be encountered within excavations at the bottom of the drainage valleys. ~~A historical depth to groundwater has been determined for the site to be greater than 40 feet below existing grades~~ Groundwater was encountered in connection with excavation for the recently-constructed pool, at 29 feet below grade on the east side of Coldwater Canyon Avenue but was not detected in a 2014 boring in the area of the eastern bridge abutment to a maximum depth of 41 feet (see **Appendix E.1**). Seasonal fluctuations in groundwater levels occur due to variations in climate, irrigation, development, and other factors. Groundwater levels may also differ across the Project Site. The bedrock that underlies the east and west flanks of Coldwater Canyon is not a permeable bedrock formation. The Campus to the east is within Coldwater Canyon, which drains a large tributary area from Mulholland Drive north. Since the bedrock is relatively impermeable, water remains perched near bedrock on the east side of Coldwater Canyon Avenue. Therefore, the groundwater levels on the east and west sides of Coldwater Canyon Avenue differ. Groundwater in Coldwater Canyon flows north to the alluvium of the San Fernando Valley.

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1 Shakal, A., M. Huang, R. Darragh, T. Cao R. Sherburne, P. Malhotra, C. Cramer, R. Sydnor, V. Graizer, G. Maldonado, C. Peterspm, and J. Wampole, 1994, *CSMIP Strong Motion Records from the Northridge, California, Earthquake of 17 January 1994*, report OSMS 94-07, California Division of Mines and Geology, Sacramento, California.

2 Youd, T.L. and Perkins, D M., 1978, *Mapping Liquefaction-Induced Ground Failure Potential*, Proceedings of the American Society of Civil Engineers, Journal of the Geotechnical Engineering Division, v. 104, no. GT4, pp. 433-446.

Subsidence

Subsidence is a general term for the slow, long-term regional lowering of the ground surface with respect to sea level. It can be caused by natural forces such as the consolidation of recently deposited sediments or by man-induced changes such as the withdrawal of oil field fluids or the dewatering of an aquifer. Subsidence occurs as a gradual change over a considerable distance (miles) or, less commonly, it can occur in discrete zones. Significant subsidence during a strong earthquake is not expected to occur if appropriate earthwork is undertaken.

Expansive Soils

Expansive soils, also known as Shrink-Swell soils, are primarily clay-rich soils subject to changes in volume with changes in moisture content. The resultant shrinking and swelling of soils can influence all fixed structures, utilities and roadways. Included within the definition of expansive soils are certain bedrock formations with expansive rock strata and weathered horizons. Based on soil Descriptions noted in the boring logs reviewed point to the existence of moist soil content, confirmed via liquid and plastic limit tests., there is the potential for presence of expansive soils within the near surface Low results from expansion index testing, however, confirm that such observations simply reflect the diatomaceous content of the bedrock. Regardless, the Project will derive its support from piles founded directly into bedrock and thus remove any potential impact from expansive soils.

Seismically Induced Settlement

Strong groundshaking can cause the densification of soils, resulting in local or regional settlement of the ground surface. During strong groundshaking, soil grains may become more tightly packed due to the collapse of voids or pore spaces, resulting in a reduction in the thickness of the soil column. This type of ground failure typically occurs in loose granular, cohesionless soils, and can occur in either wet or dry conditions. Artificial fills may also experience seismically induced settlement. Seismic-induced settlement is not expected at the Development Site if the recommended earthwork is completed.

Slope Instability and Erosion

Landslide and mudflow are terms used to designate certain forms of natural or man-induced slope instability or movement. These processes can that may adversely influence life or property. Included are a number of different processes that range from very slow (a few inches in a hundred years) to extremely rapid (70 or more miles per hour). Included within the definition of this hazard are all gravity-induced downslope movements including the separate phenomena of rockfall, soil creep, soil failures, dry raveling, rotational and transitional slides, flows, slumps and complex combinations of the above phenomena. The hazard applies to both natural and constructed slopes. Contributing factors include rainfall erosion, earthquake ground shaking, brush fires, and groundwater.

Erosion is the wearing away or deposition of the land surface by wind or water. Erosion occurs naturally from weather or runoff, but can be intensified by land clearing practices.

Hydrology

The drainage area ~~of~~ tributary to the ~~Project~~ Development Site is approximately 15.34 ~~3.6~~ acres (**Appendix E.2** ~~Preliminary~~ Hydrology ~~Report~~ Study). The area is sloping from southwest toward the northeast direction. The drainage area is composed of natural landscape, driveways, small building facilities and dirt. The existing run off is draining towards a northeast direction to Coldwater Canyon Avenue.

Flood Potential

The Project ~~area~~ Site is not located within a flood plain, flood hazard zone or regulatory floodway and therefore, impacts associated with the placement of housing within a 100-year flood hazard or the proposed Project's ability to impede or redirect flood flows would be less than significant.

The Project ~~area~~ Site is not located within an area subject to levee or dam failure and would not be subject to seiche, tsunami, or mudflow.

REGULATORY FRAMEWORK

Federal

Water Quality Act. The Water Quality Act of 1987 added Section 402(p) to the 1972 Federal Clean Water Act (CWA) (33 U.S.C § 1251-1387). This section requires the USEPA to establish regulations setting forth National Pollutant Discharge Elimination System (NPDES) requirements for storm water discharges in two phases. On November 16, 1990, Phase I storm water regulations were directed at municipal separate storm sewer systems (MS4s) serving a population of 100,000 or more, including construction activities. On December 8, 1999, Phase II storm water regulations were directed at storm water discharges not covered in Phase I, including small MS4s (municipal systems serving a population of less than 100,000), small construction projects (one to five acres), municipal facilities with delayed coverage under the Intermodal Surface Transportation Efficiency Act of 1991.

Federal Antidegredation Policy. The Federal Antidegradation Policy (40 Code of Federal Regulations 131.12) requires states to develop statewide anti-degradation policies and identify methods for implementing them. Pursuant to the Code of Federal Regulations ~~(CFR)~~, state anti-degradation policies and implementation methods shall, at a minimum, protect and maintain (1) existing in-stream water uses; (2) existing water quality, where the quality of the waters exceeds levels necessary to support existing beneficial uses, unless the state finds that allowing lower water quality is necessary to accommodate economic and social development in the area; and (3) water quality in waters considered an outstanding national resource.

State

Alquist-Priolo Geologic Hazards Zone Act. The Alquist-Priolo Geologic Hazards Zone Act was passed in 1972 by the State legislature ~~of California~~ to mitigate the hazard of surface faulting to structures for human occupancy. The Alquist-Priolo Geologic Hazards Zone Act has been amended 10 times and was renamed the Alquist-Priolo Earthquake Fault Zoning Act on January 1, 1994. The Alquist-Priolo Earthquake Fault Zoning Act's main purpose is to prevent the construction of structures used for human occupancy on the surface trace of active faults as documented in Special Publication 42 by CGS. The Alquist-Priolo Earthquake Fault Zoning Act only addresses the hazard of surface fault rupture and is not directed toward other earthquake hazards.

Seismic Hazards Mapping Act of 1990. The Seismic Hazards Mapping Act of 1990 (Seismic Act) was enacted, in part, to address seismic hazards not included in the Alquist-Priolo Earthquake Fault Zoning Act, including strong ground shaking, landslides, and liquefaction. Under ~~this~~ the Seismic Act, the State Geologist is assigned the responsibility of identifying and mapping seismic hazards. California Geological Survey (CGS) Special Publication 117, adopted in 1997 by the State Mining and Geology Board, constitutes guidelines for evaluating seismic hazards other than surface faulting, and for recommending mitigation measures as required by Public Resources Code Section 2695 (a). In accordance with the mapping criteria, the CGS seismic hazard zone maps use a ground shaking event that corresponds to 10 percent probability of exceedance in 50 years.

California Building Code (CBC) [California Code of Regulations (CCR), Title 24]. The California Building Code (CBC) [California Code of Regulations (CCR), Title 24] is a compilation of building standards, including seismic safety standards for new buildings. CBC standards are based on building standards that have been adopted by State agencies without change from a national model code; building standards based on a national model code that have been changed to address particular California conditions; and building standards authorized by the California legislature but not covered by the national model code. Given the State's susceptibility to seismic events, the seismic standards within the CBC are among the strictest in the world. The CBC applies to all occupancies in California, except where stricter standards have been adopted by local agencies. The State has adopted the ~~2010~~ 2013 CBC, which became effective on ~~January~~ July 1, 2014 ~~2011~~. Specific CBC building and seismic safety regulations have been incorporated by reference in the LAMC ~~Los Angeles Municipal Code~~ with local amendments.

California Water Code (CWC). The State Water Resources Control Board has the overall responsibility to develop and implement state water quality control policy and is the EPA-designated agency for administering applicable Federal CWA programs, including adopting water quality standards for waters of the state. The California Water Code (CWC) establishes nine administrative areas in the State, which are administered by the Regional Water Quality Control Boards (RWQCB), which adopts Water Quality Control Plans for their respective regions. The Water Quality Control Plans designate beneficial uses for each receiving water body and establish water quality objectives to ensure reasonable protection of the beneficial uses. The primary method of plan implementation for point discharges is through the issuance of permits.

Porter-Cologne Water Quality Control Act (Porter Cologne Act). In 1969, the California Legislature enacted the Porter-Cologne Water Quality Control Act (Porter- Cologne Act) to preserve, enhance and restore the quality of the State's water resources. The Porter-Cologne Act established the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards RWQCBs as the principal state agencies with the responsibility for controlling water quality in California. Under the Porter-Cologne Act, water quality policy is established, water quality standards are enforced for both surface and ground water, and the discharges of pollutants from point and non-point sources are regulated. The Porter-Cologne Act authorizes the ~~State Control Board~~ SWRCB to establish water quality principles and guidelines for long range resource planning including ground water and surface water management programs and control and use of recycled water. Sections of the Porter-Cologne Act were used as a basis for the 1972 CWA and responsibility for implementing the Federal provisions was assumed by the State. The Porter-Cologne Act was amended by the State legislature in 2010 to add several modifications including a Watershed Improvement Act.

The Project ~~area~~ site is located in the Los Angeles Regional Water Quality Control Board (LARWQCB) Region 4.

General Construction Activity Storm Water Permit (92-08-DWQ). The General Construction Activity Storm Water Permit (92-08-DWQ) adopted September 8, 1992 covered construction activities disturbing 5 acres or more. On August 19, 1999 the SWRCB reissued the General Construction Storm Water Permit (99-08-DWQ) that decreased the covered project size from 5 to 1 acre. Construction activity subject to this permit includes clearing, grading and disturbances to the ground such as stockpiling, or excavation. 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) that 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.

Under Section 303(d) of the ~~1972~~ CWA, states are required to list impaired water-bodies and develop and implement Total Maximum Daily Loads (TMDLs) for these water-bodies. California listed the Los Angeles River Reach 6 (above Sepulveda Flood Control Basin and in the vicinity of the Project) as a water quality limited segment in 2006. Pollutants identified are 1,1-Dichloroethylene(1,1-DCE)/ Vinylidene chloride, Coliform Bacteria, Tetrachloroethylene/ PCE, and Trichloroethylene/TCE.

Water Quality Control Plan, Los Angeles Region: Basin Plan (1994). The Water Quality Control Plan, Los Angeles Region: Basin Plan (1994) prepared by the California Regional Water Quality Control Board, Los Angeles Region (LARWQCB), designates beneficial uses for surface and ground waters, sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's anti-degradation policy, and describes implementation programs to protect all waters in the region.

The ~~RWQCB~~ LARWQCB on September 19, 2001, adopted amendments to the Basin Plan, to incorporate TMDLs for trash in the Los Angeles River (Resolution No. 01-013). On August 9, 2007, the LARWQCB adopted a new trash TMDL (Resolution No. 07-012). This amendment indicates that trash in the Los Angeles River is causing impairment of beneficial uses and storm water discharge is the major source of trash in the river. Compliance with the final waste load allocation may be achieved through a full capture system. A full capture system is any device or series of devices that traps all particles retained by a 5mm mesh screen and has a design treatment capacity of not less that the peak flow rate resulting from a 1-year, 1-hour storm. The numeric target of the TMDL is zero trash in the river, with a phased reduction for a period of 9 years.

The LARWQCB on June 2, 2005, adopted amendments to the Basin Plan, to incorporate TMDLs for metals in the Los Angeles River (Resolution No. R2005-006). On September 6, 2007, the LARWQCB, revised the metals TMDL (Resolution No. R2007-014). This amendment indicates that metals including copper, cadmium, lead, zinc, aluminum and selenium in the Los Angeles River are causing impairment of beneficial uses and during wet weather, most of the metals loadings are in the particulate form and are associated with wet-weather storm water flow. There are separate targets for dry-weather and wet weather.

The LARWQCB on July 10, 2003, adopted amendments to the Basin Plan, to incorporate TMDLs for nutrients in the Los Angeles River (Resolution No. R2003-009). On December 4, 2003, the LARWQCB, revised the nutrients TMDL (Resolution No. R2003-016). This amendment indicates that nitrogen compounds (ammonia, nitrate, and nitrite) in the Los Angeles River are causing impairment of beneficial uses. The principal source of nitrogen compounds are three water reclamation plants, however, urban runoff, storm water, groundwater discharge may also contribute nitrate loads.

The Basin Plan establishes the following water quality objectives for the reach of the Los Angeles Watershed in the Project area: Total dissolved solids – 950 mg/l; Chloride – 150mg/l; Nitrogen – 8 mg/l; Sulfate – 300 mg/l.

In the State of California, the State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCB) are responsible for implementing the NPDES permit program. The Clean Water Act requires storm water discharges to surface waters associated with construction activity, including demolition, clearing, grading, and excavation, and other land disturbance activities (except operations that result in disturbance of less than one acre of total land area and which are not part of a larger common plan of development or sale), to obtain coverage under a NPDES construction permit. The NPDES construction permit requires implementation of Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) to reduce or eliminate pollutants in storm water runoff. The NPDES construction permit also includes additional requirements necessary to implement applicable water quality standards.

Under Section 402(p) of the Clean Water Act,municipal NPDES permits shall prohibit the discharge of non-storm water except under certain conditions and require controls to reduce pollutants in discharges to the maximum extent practicable. Such controls include BMPs, as well as system, design, and engineering methods. A municipal NPDES permit was issued to the County ~~of Los Angeles~~ and 84 incorporated cities including the City ~~of Los Angeles~~, in December 2001.[3] The ~~Los Angeles~~ County Municipal NPDES Permit required implementation of the Storm Water Quality Management Program prepared as part of the NPDES approval process. The Storm Water Quality Management Program requires the County ~~of Los Angeles~~ and the 84 incorporated cities to:

- Implement a public information and participation program to conduct outreach on storm water pollution;
- Control discharges at commercial/industrial facilities through tracking, inspecting, and ensuring compliance at facilities that are critical sources of pollutants;
- Implement a development planning program for specified development projects;
- Implement a program to control construction runoff from construction activity at all construction sites within the relevant jurisdiction;
- Implement a public agency activities program to minimize storm water pollution impacts from public agency activities; and
- Implement a program to document, track, and report illicit connections and discharges to the storm drain system.

General Construction Activity Storm Water Permit (99-08-DWQ). The General Construction Activity Storm Water Permit (99-08-DWQ) requires (Section A.10 – SWPPP) permittees to implement post-construction storm water management requirements and comply with the numerical criteria for mitigating storm water runoff through infiltration, or detention and retention as adopted in Board Resolution R-00-02, Standard Urban Storm Water Mitigation Plan (SUSMP). Effective July 1, 2010, all dischargers are required to obtain coverage under Construction General Permit Order No. 09-09-DWQ.

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3 County of Los Angeles Municipal Permit (NPDES No. CAS004001, Order No 01-182).

Los Angeles Municipal Storm Water Permit (NPDES Permit No: CAS004001, December 13, 2001. The Los Angeles Municipal Storm Water Permit_(NPDES Permit No: CAS004001, December 13, 2001; amended September 14, 2006 by Order R4-2006-0074, and August 9, 2007 by Order R4-2007-0042) requires new development and redevelopment projects to incorporate SUSMPs. Project categories for which SUSMPs are applicable include "Parking Lots" of 5,000 square feet or larger, or with 25 or more parking spaces. General requirements of the SUSMP include 1) post-development peak storm water runoff discharge rates shall not exceed the estimated pre-development rate where the increased peak storm water discharge rate will result in increased potential for downstream erosion, 2) conserve natural areas, 3) minimize storm water pollutants of concern, 4) protect slopes and channels, 5) provide storm drain stenciling and signage, 6) properly design outdoor material storage areas, 7) properly design trash storage areas, 8) provide proof of ongoing BMP maintenance, 9) post-construction treatment control BMPs are required to incorporate, at a minimum, either a volumetric or flow based treatment control design standard or both, to mitigate (infiltrate, filter, or treat) storm water runoff.

City of Los Angeles

General Plan Safety Element. The City's General Plan Safety Element, which was adopted in 1996, addresses public safety risks due to natural disasters including seismic events and geologic conditions, as well as sets forth guidance for emergency response during such disasters. The Safety Element also provides maps of designated areas within the City that are considered susceptible to earthquake-induced hazards such as fault rupture and liquefaction.

Los Angeles Building Code. Earthwork activities, including grading, are governed by the Los Angeles Building Code, which is contained in Los Angeles Municipal Code (LAMC), Chapter IX, Article 1. Specifically, Section 91.7006.7 includes requirements regarding import and export of material; Section 91.7010 includes regulations pertaining to excavations; Section 91.7011 includes requirements for fill materials; Section 91.7013 includes regulations pertaining to erosion control and drainage devices; Section 91.7014 includes general construction requirements as well as requirements regarding flood and mudflow protection; and Section 91.7016 includes regulations for areas that are subject to slides and unstable soils. Additionally, the Los Angeles Building Code includes specific requirements addressing seismic design, grading, foundation design, geologic investigations and reports, soil and rock testing, and groundwater. The Los Angeles Building Code incorporates by reference the CBC, with City amendments for additional requirements. The City Department of Building and Safety is responsible for implementing the provisions of the Los Angeles Building Code.

Water Quality Compliance Master Plan for Urban Runoff. The City of Los Angeles is required by the RWQCB to address water quality impairments in water bodies in their jurisdiction, including the Los Angeles River and 303(d) listed tributaries. The RWQCB has adopted Total Maximum Daily Loads (TMDLs) for specific contaminants as well as a schedule for developing Implementation Plans to achieve target dry weather and wet weather load allocations.

On March 2, 2007, City Council Motion 07-0663 was introduced by the City of Los Angeles City Council to develop a water quality master plan with strategic directions for planning, budgeting and funding to reduce pollution from urban runoff in the City of Los Angeles. The Water Quality Compliance Master Plan for Urban Runoff was developed by the Bureau of Sanitation, Watershed Protection Division in collaboration with the stakeholders to address the requirements of this Council Motion. The primary goal of the Water Quality Compliance Master Plan for Urban Runoff is to help in meeting water quality regulations. Implementation of the Water Quality Compliance Master Plan for Urban Runoff over the next 20 to 30 years will result in cleaner neighborhoods, rivers, lakes and bays, augmented local water supply, reduced flood risk, more open space, and beaches that are safe for swimming. The Water Quality

Compliance Master Plan for Urban Runoff also supports the Mayor and Council's efforts to make Los Angeles the greenest major city in the nation.

The Water Quality Compliance Master Plan for Urban Runoff identifies and describes the various watersheds in the City, summarizes the water quality conditions of the City's waters, identifies known sources of pollutants, describes the governing regulations for water quality, describes the BMPs that are being implemented by the City, discusses existing TMDL Implementation Plans and Watershed Management Plans. Additionally, the Water Quality Compliance Master Plan for Urban Runoff provides an implementation strategy that includes the following three initiatives to achieve water quality goals:

- Water Quality Management Initiative, which describes how Water Quality Management Plans for each of the City's watersheds and TMDL-specific Implementation Plans will be developed to ensure compliance with water quality regulations.
- The Citywide Collaboration Initiative, which recognizes that urban runoff management and urban (re)development are closely linked, requiring collaborations of many City agencies. This initiative requires the development of City policies, guidelines, and ordinances for green and sustainable approaches for urban runoff management.
- The Outreach Initiative, which promotes public education and community engagement with a focus on preventing urban runoff pollution.

Development Best Management Practices Handbook, Part A Construction Activities, 3rd Edition. The City of Los Angeles Development Best Management Practices Handbook, Part A Construction Activities, 3rd Edition, adopted by the City of Los Angeles Department of Public Works in September 2004, and associated ordinances reinforce the policies of the Construction General Permit. The handbook and ordinances also have specific minimum BMP requirements for all construction activities and require dischargers whose construction projects disturb one acre or more of soil to prepare a SWPPP and file a NOI with the RWQCB. Requirements of the Los Angeles County Municipal NPDES permit are mirrored within the City of Los Angeles' Development Best Management Practices Handbook, Part B Planning Activities, 3rd Edition, adopted by the City of Los Angeles Department of Public Works in June 2004. The manual provides guidance for developers in complying with the requirements of the Development Planning Program regulations of the City's Storm Water Program. Compliance with the requirements of this manual is required by City of Los Angeles Ordinance No. 173,494. The requirement to incorporate storm water BMPs into the SUSMP is implemented through the City's plan review and approval process. During the review process, project plans are reviewed for compliance with the City's General Plans, zoning ordinances, and other applicable local ordinances and codes, including storm water requirements. Plans and specifications are reviewed to ensure that the appropriate BMPs are incorporated to address storm water pollution prevention goals.

Los Angeles Municipal Code. Earthwork activities, including grading, are governed by the Los Angeles Building Code, which is contained in Los Angeles Municipal Code (LAMC), Chapter IX, Article 1. Specifically, Section 91.7013 includes regulations pertaining to erosion control and drainage devices and Section 91.7014 includes general construction requirements as well as requirements regarding flood and mudflow protection. Section 64.70 of the LAMC sets forth the City's Storm Water and Urban Runoff Pollution Control Ordinance. The ordinance prohibits the discharge of the following into any storm drain system:

- Any liquids, solids, or gases which by reason of their nature or quantity are flammable, reactive, explosive, corrosive, or radioactive, or by interaction with other materials could result in fire, explosion or injury.

- Any solid or viscous materials, including oil and grease, which could cause obstruction to the flow or operation of the storm drain system.
- Any pollutant that injures or constitutes a hazard to human, animal, plant, or fish life, or creates a public nuisance.
- Any noxious or malodorous liquid, gas, or solid in sufficient quantity, either singly or by interaction with other materials, which creates a public nuisance, hazard to life, or inhibits authorized entry of any person into the storm drain system.
- Any medical, infectious, toxic or hazardous material or waste.

Any proposed drainage improvements within the street right of way requires the approval of a B-permit (Section 62.105, LAMC). Under the B-permit process, storm drain installation plans are subject to review and approval by the City of Los Angeles Department of Public Works Bureau of Engineering.[4] Additionally, any connections to the City's storm drain system from a property line to a catch basin or a storm drainpipe requires a storm drain permit from the City of Los Angeles Department of Public Works, Bureau of Engineering.

Proposition O. On November 2, 2004, Los Angeles voters passed Proposition O with an overwhelming majority of 76 percent. The $500 million bond authorizes the City to fund projects that protect public health, capture storm water for reuse and meet the Federal Clean Water Act through removal and prevention of pollutants entering regional waterways. In addition to larger projects, Proposition O funds were used for the Catch Basin Screen Cover and Insert Project, which provided for the installation of catch basin inserts and screen covers throughout the City.

Low Impact Development (LID) Ordinance. On January 15, 2010, the City of Los Angeles approved the Low Impact Development (LID) Ordinance requiring a variety of BMPs to manage storm water and urban runoff and reduce runoff pollution. The LID Ordinance builds on the City's SUSMP process incorporating environmental practices including infiltration, capture and use and biofiltration.

THRESHOLDS OF SIGNIFICANCE

Appendix G of the CEQA Guidelines, as amended through January 1, 2010, provides criteria under which a project could have a significant impact. Specifically, ~~the Proposed Project~~ a project would have a significant geology and soils impact if it results in any of the following and cannot be adequately mitigated:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
   - i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault;
   - ii) Strong seismic ground shaking;
   - iii) Seismic-related ground failure, including liquefaction; or
   - iv) Landslides.

b) Result in substantial soil erosion or the loss of topsoil;

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[4] Los Angeles County Department of Public Works, Bureau of Engineering, http://eng.lacity.org/index.cfm; accessed April 30, 2010.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property; or
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

The ~~City of Los Angeles~~ L.A. CEQA Thresholds Guide states that a project would normally have a significant geology and soils impact if the project would:

Geologic Hazard

- Cause or accelerate geologic hazards, which would result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

Sedimentation and Erosion

- Constitute a geologic hazard to other properties by causing or accelerating instability from erosion; or
- Accelerate natural processes of wind and water erosion and sedimentation, resulting in sediment runoff or deposition that would not be contained or controlled on-site.

Landform Alteration

- One or more distinct and prominent geologic or topographic features would be destroyed, permanently covered, or materially and adversely modified as a result of a project. Such features may include, but are not limited to, hilltops, ridges, hillslopes, canyons, ravines, rock outcrops, water bodies, streambeds, and wetlands.

Hydrology and Water Quality

In accordance with Appendix G to the State CEQA Guidelines, ~~the~~ a project would have a significant impact on hydrology and water quality if it would result in any of the following and cannot be adequately mitigated:

- 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 preexisting nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);

- 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;

- Place within a 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; or

- Inundation by seiche, tsunami, or mudflow.

- Cause flooding during the projected 50-year developed storm event which would have the potential to harm people or damage property or sensitive biological resources;

- Substantially reduce or increase the amount of surface water in a water body;

- Result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the current or direction of water flow; or

- Result in discharges that would create pollution, contamination or nuisance as defined in Section 13050 of the California Water Code ~~(CWC)~~ or that cause regulatory standards to be violated, as defined in the applicable NPDES storm water permit or Water Quality Control Plan for the receiving water body.[5]

The ~~City of Los Angeles~~ L.A. CEQA Thresholds Guide states that a project would normally have a significant hydrology or water quality impact if the project would:

- Cause flooding during the projected 50-year developed storm event, which would have the potential to harm people or damage property or sensitive biological resources;

- Substantially reduce or increase the amount of surface water in a water body;

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5 The ~~CWC~~ California Water Code provides the following definitions: "Pollution" means an alteration of the quality of the waters of the State to a degree which unreasonably affects either of the following: 1) the waters for beneficial uses or 2) facilities which serve these beneficial uses. Pollution may include contamination. "Contamination" means an impairment of the quality of the waters of the State by waste to a degree that creates a hazard to the public health through poisoning or through the spread of diseases. Contamination includes any equivalent effect resulting from the disposal of waste whether or not waters of the State are affected. "Nuisance" means anything which meets all of the following requirements: 1) is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property so as to interfere with the comfortable enjoyment of life or property; 2) affects at the same time an entire community or neighborhood, or any considerable number of persons although the extent of the annoyance or damage inflicted upon individuals may be unequal; and 3) occurs during or as a result of the treatment or disposal of wastes.

- Result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the current or direction of water flow.

- Result in discharges that create pollution, contamination or nuisance as defined in Section 13050 of the California Water Code (CWC) or that cause regulatory standards to be violated, as defined in the applicable NPDES storm water permit or Water Quality Control Plan for the receiving water body.

- Change potable water levels sufficiently to:
  - - Reduce the ability of a water utility to use the groundwater basin for public water supplies, conjunctive use purposes, storage of imported water, summer/winter peaking, or to respond to emergencies and drought;
  - Reduce yields of adjacent wells or well fields (public or private); or
  - Adversely change the rate or direction of flow of groundwater; or

- Result in demonstrable and sustained reduction of groundwater recharge capacity.

- Affect the rate or change the direction of movement of existing contaminants;

- Expand the area affected by contaminants;

- Result in an increased level of groundwater contamination (including that from direct percolation, injection or salt water intrusion); or

- Cause regulatory water quality standards at an existing production well to be violated, as defined in the California Code of Regulations (CCR), Title 22, Division 4, and Chapter 15 and in the Safe Drinking Water Act.

The ~~*City of Los Angeles*~~ L.A. CEQA Thresholds identified above are used in the following analysis.

IMPACTS

Geologic Hazards

~~Undocumented f~~ Fills on the Development Site will be removed by the planned cuts for the Parking Structure, the recommended removal and recompaction activities for the debris basin, and the recommended compaction for the retaining wall backfill.

Available maps indicate that the Proposed Project is not located within an Alquist-Priolo Earthquake Fault Zone and therefore, the potential for fault rupture is considered negligible. Nonetheless, as is the case with much of Southern California, and as noted above, intense groundshaking is to be expected in the area as a result of proximity to known faults.

One geologic map of the area indicates that where the shale meets the siltstone in the vicinity of the Development Site there is potential for a fault. However, borings on the Development Site indicate no ~~shearing or other~~ evidence of any active faulting~~, and therefore in the opinion of the geologists who undertook the Geology Report~~ (**Appendix E.1**)~~ the shale/siltstone interface was caused by deposition of geologic materials over time rather than by faulting~~.

The on-site geologic investigations generally confirmed that bedding generally strikinges nearly east-west and dippings steeply to the north, except in the extreme southerly portion of the Development Site, where bedding generally steepens, overturns, and dips to the south. No evidence of faulting, such as shearing, was observed in the borings. The geologic map by Dibblee (**Figure 3.5-2**) shows several areas of overturned bedding in areas to the immediate south and east of the site. The bedding reversal is most likely due to simple overturning of steeply dipping bedding.

In general, bedding is favorably oriented with respect to proposed cuts at the toes of the western and northern east and south facing existing natural slopes. Along a portion of the southern north-facing slope on the south side of the proposed Parking Structure, steeply dipping bedding will be day-lighted by the proposed cut for the Parking Structure wall. Evidence of bedrock shearing along the southern section of the Development Site was observed in boring GHB-3. The design of the retaining wall system incorporates this adverse condition.

The Preliminary Final Geologic and Soils Engineering Geotechnical Report (**Appendix E.1**) includes investigation of a questioned landslide encompassing the ridgeline on the southern portion of the property. The geologists undertook four borings to determine whether a landslide exists in that location. No evidence of landsliding was found.

During the life of the Project, the Project Site will likely be subject to strong ground motions due to earthquakes on nearby faults. Based on probabilistic and deterministic ground motion analysis (see **Appendix E.1**), the Project Site could be subjected to a peak ground acceleration (adjusted for site class effects) of 0.583g (defined as two thirds of the Peak Ground Acceleration) 0.40g (updated in a letter from GPI dated February 5, 2013 – see **Appendix E.1** -- from 0.56g). This acceleration has a 10 percent chance of being exceeded in 50 years. Slope stability analyses and soil-nail wall design analyses were performed considering the ground motion discussed above and meet the City-required safety factors.

Southern California is a seismically active region capable of generating earthquakes (including groundshaking) of considerable magnitude. As noted in **Table 3.5-1**, there are active faults located within close proximity of the Project area. Movement along these faults could generate an earthquake capable of causing considerable damage to buildings and infrastructure on the Project Site; similar risks exist for adjacent areas. The California Building Code requires that structures built in the State be constructed to address the seismic nature of the region. As such, the Proposed Project would not expose people to unknown safety issues associated with seismicity (including groundshaking). Therefore, impacts to the Proposed Project from seismicity (including groundshaking) would be less than significant.

Geotechnical Design

The Final Geologic and Soils Engineering Report (May 18, 2015), approved by the City of Los Angeles is included in **Appendix E.1** (a peer review, concurring with the findings of the Final Geologic and Soils Engineering Report, is included in **Appendix E.1a** and the approval letter from the City of Los Angeles is included in **Appendix E.1b**). Byer Geotechnical, Inc. (Byer) prepared the Final Geologic and Soils Engineering Report (also referred to as the Byer Report below) that includes an analysis of the geotechnical conditions affecting the Project and includes recommendations for structural design to address site-specific conditions. (The Final Geologic and Soils Engineering Report addresses comments raised in the Los Angeles Department of Building and Safety Geology and Soils Report correction letter dated April 3, 2013.)

The Final Geologic and Soils Engineering Report represents a comprehensive examination of prior Development Site and area geologic studies, as well as the inclusion of new borings, pits, and laboratory tests that were specifically chosen for their applicability to the Development Site and design.

The Final Geologic and Soils Engineering Report concludes, on the basis of evidence and analysis that exceeds the level of detail typically required during an entitlement process, that the Project could be constructed and operated in a safe manner in accordance with the City's building code and standards.

Byer Geotechnical Inc. (Byer) prepared the Final Geologic and Soils Engineering Report in consultation with geotechnical engineers Grover-Hollingsworth and Associates, Inc. (Hollingsworth), civil engineers KPFF Consulting Engineers (KPFF) and soil nail engineers DRS Engineering, Inc. (DRS) to update the following:

1. Bedrock Strength
2. Soil Nail Retaining Wall Design
3. Hydrology and Drainage

Bedrock Strength

During late 2014, Byer and Hollingsworth excavated eight bucket-auger borings, to a maximum depth of 76 feet, and three test pits, to a maximum depth of 10.5 feet. Byer and Hollingsworth also conducted laboratory tests on soil and bedrock samples. The Byer Report's findings relating to bedrock strength are based on a far greater number of shear test results than were performed in the past or are normally performed for similar projects in the City, and Byer's onsite knowledge of and experience with the Modelo bedrock formation that underlies the Development Site. The selected shear strength parameters were shared with DRS so that the strength parameters and soil and bedrock conditions could be incorporated into the design and stability modeling of the soil nail and conventional retaining wall systems.

In addition, Byer evaluated the region's seismology, including existing fault maps, the California Geological Survey, and a US Geologic Survey of all earthquakes that occurred between April 1989 and April 2015 with a magnitude of 2.0 or greater and within a 32-kilometer radius of the Project Site. This timeframe includes the 1994 Northridge Earthquake and the 2014 M4 earthquakes under the Sepulveda Pass. Byer's analysis concluded that the Project will be subject to ground shaking during an earthquake, as are all structures located in the San Fernando Valley. The Byer Report contains recommendations to resist the ground shaking, including the use of pile foundations that are anchored at least 8 feet into bedrock. The Project includes drilled piles throughout the majority of the parking structure itself as well as the pedestrian bridge landing on the east side of Coldwater Canyon. Additionally, the Project's structural engineer, John A. Martin & Associates, reviewed this seismic information and incorporated compensating elements into the Project design, such as moment frames, and, at Harvard-Westlake School's request, used seismic loads 50 percent in excess of those required by the City's Building Code.

Surface rupture is not considered a Project risk given the lack of any proximate, active fault. Liquefaction is also not considered to be a risk as groundwater has not been detected to the west of Coldwater Canyon Avenue, groundwater was not detected to the east of Coldwater Canyon Avenue at the bridge support location during the 2014 borings, and bedrock is shallower than the previously detected groundwater found at a depth of 29 feet east of Coldwater Canyon during 2011 borings. Regardless, the use of pile foundations extending into bedrock for the pedestrian bridge landing and the Parking Structure eliminate the need to consider the possible effects of potential groundwater.

Soil conditions and tests indicate that the hillsides surrounding the Project Site to the south, west, and northwest are grossly and seismically stable at levels in excess of City requirements. The hillsides would not be compromised or otherwise destabilized by the Project. Byer's and Hollingsworth's tests identified an area along the southern section of the Project with potentially adverse bedrock shear and joint planes, as well as a higher clay content in the bedrock than the rest of the Development Site. The test soil strength parameters reflect these conditions and the soil nail design and safety calculations factor in these geological conditions.

Soil Nail Design

Using the conservative soil and bedrock properties and shear strengths, a comprehensive design for conventional and soil nail retaining walls was created. The construction-level information in the Final Geologic and Soils Engineering Report includes specifications for the soil nails, degree of nail inclination below horizontal, nail spacing, nail length, attachment points and hardware, temporary and permanent wall facing, proof nails, and a permanent monitoring regimen following construction. At the request of Harvard-Westlake School, the soil nails are to be installed with redundant corrosion protection – a provision that exceeds City requirements for soil nail walls and is a conservative engineering element.

Detailed calculations, using methods and standards prescribed by both the City and the Federal Highway Administration, show that the soil nail and conventional retaining walls will be gross and seismically stable.

Surficial Stability

Natural slopes on and near the Project Site were evaluated for surficial stability. Southern and western slopes were determined to be surficially stable, indicating very limited potential for debris flow or landslides. To the northwest, a small offsite area with slopes in excess of 28 degrees has the potential for surficial instability. Accordingly, KPFF has designed a system of deflection walls and a swale along that section of retaining wall to redirect, slow, and drain any such debris. The capacity of the swale exceeds the City's Building Code requirements for potential debris, as well as the potential flow of water resulting from 50, 25, 10, and 2-year storms, per the County Hydrology Manual, factoring in the infeasibility of infiltration due to the City's Hillside Grading Ordinance.

While there is limited potential for debris flow, given the area's surficial stability as previously discussed, a significant rain event could produce water runoff. Accordingly, the Project design includes an earthen debris basin. The debris basin is located to the southwest of the Parking Structure, and would collect such water and direct it to flow-through planters where it would be treated and slowed before being discharged. The area tributary to the proposed debris basin is 7.38-acres. The debris basin can accommodate potential runoff from 8 acres, exceeding the actual tributary area in accordance with the City's Building Code and the County's Hydrology Manual.

Overall, according to the Final Geologic and Soils Engineering Report and associated hydrological modeling, the Project retaining walls, drainage swale, and debris basin may even reduce the possibility of landslides or volume of surficial runoff onto Coldwater Canyon Avenue.

Liquefaction

The majority of the Development Site is not located within an area identified by the State as having a potential for soil liquefaction. Within this area, soil liquefaction is not likely to occur because the majority of the soils encountered are sedimentary bedrock and groundwater is deep.

A small portion of the Parking Structure is located within an area mapped by the State of California as having a potential for soil liquefaction ~~(see **Appendix E.1**)~~. Groundwater was not encountered to the depth of the bedrock within this liquefaction zone. Although Zimas indicates that landslides and liquefaction are potential issues to be addressed at the Development Site, the Project specific ~~Preliminary Geotechnical~~ Final Geologic and Soils Engineering Report (**Appendix E.1**) indicates that there are no landslides and that, as noted above, the proposed pile foundation, anchored at least 8 feet into bedrock, would address site soil and geological conditions to ensure a high level of safety. ~~the small area of liquefiable soils would be removed as part of the Project~~.

~~In addition, it is anticipated that most potentially liquefiable soils within the alluvium and colluvium under the foundations of Parking Structure will be removed during remedial grading.~~

~~Subsidence~~ Foundation Settlement

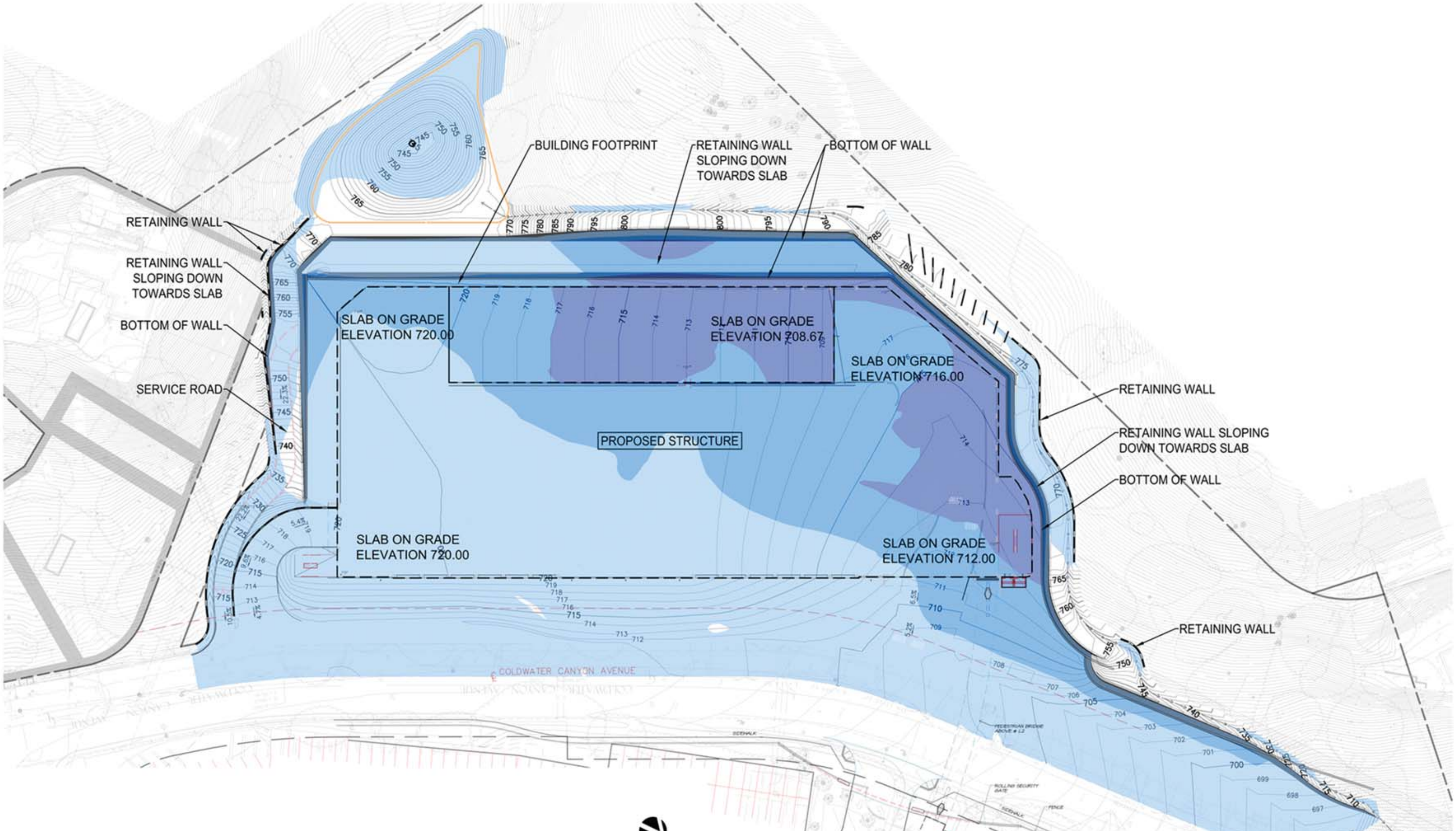
Settlement of the foundation system is expected to occur on completion of the Parking Structure. A settlement of one-half to one inch could occur. Differential settlement should not exceed one-half inch (**Appendix E.1**). ~~Loss of soil volume caused by compaction of fills to a higher density than before grading could occur. Subsidence is the settlement of in-place subgrade soils caused by loads generated by large earthmoving equipment. For earthwork volume estimating purposes, an average shrinkage value of 10 to 15 percent may be assumed for the surficial soils (upper 5 feet) and alluvium/colluvium soils within the drainage valleys. Subsidence is expected to be less than 0.1 feet. (These values are estimates only and exclude losses due to removal of vegetation or debris. Actual shrinkage and subsidence will depend on the types of earthmoving equipment used and would be determined during grading.) For the Parking Structure, total static settlement of the column footings is expected to be less than 1.5 inches provided the footings are supported on competent bedrock or properly compacted fills (**Appendix E.1**).~~

~~Expansive Soils~~

~~The siltstone within the footprint of the proposed structure has moderate to high expansivity, therefore, the upper 2 feet of the subgrade soils consisting of siltstone should be removed and as necessary replaced with imported, non-expansive sandy soils.~~

Slope Stability

As noted previously, after investigation, no landslides have been identified on the Development Site. The Project includes substantial cuts in to site soils (see **Figure 3.5-3**). Four soil nail retaining walls are proposed on the Development Site in order to protect the adjacent hillsides and to construct the Parking Structure. The first soil nail retaining wall is located along the rear (west side) of the Parking Structure and is the lower portion of a stepped wall design along that section. It varies in height from 28 feet to 30 feet (south to north). The second soil nail retaining wall is the upper portion of the stepped retaining wall along the west side of the Parking Structure and also extends around the north and south sides of the Parking Structure. The south face of the second soil nail retaining wall would vary in height from 18 feet to 58 feet (from east to west), and at its eastern endpoint is directly abutted by a conventional retaining wall that gradually transitions to grade along the proposed southern access road. The west face of the second soil nail retaining wall varies from 52 feet to 90 feet in height (including the height of the first soil nail retaining wall), and the north face from 46 feet to 62 feet (from east to west). The third soil nail retaining wall would be located on the north end of the Development Site, parallel to Coldwater Canyon



ESTIMATED EARTHWORK QUANTITIES:	
TOTAL ESTIMATED EARTHWORK	– NET CUT: 137,000 CUBIC YARDS

CUT DEPTH TABLE

MIN DEPTH	MAX DEPTH	COLOR
−68.50	−45.00	
−45.00	−25.00	
−25.00	0.00	

SOURCE: KPFF Consulting Engineers, 2012

Harvard-Westlake Parking Structure ■

Figure 3.5-3

Depth of Excavation

Avenue. This soil nail retaining wall would vary in height from 17 to 44 feet (from north to south). The northern end of the third soil nail retaining wall terminates at an energy dissipation structure that, along with flow-through planters, treats and controls the flow of storm water so that it can be safely discharged onto Coldwater Canyon Avenue. The fourth soil nail retaining wall would be on the south end behind the south side of the second soil nail retaining wall and would vary in height from 4 feet to 23 feet (from east to west). All retaining wall height measurements include a 3-foot high protective fence. The relocation of the southern retaining walls (the south face of the second retaining wall and the fourth retaining wall) and the soil nail design resulted in the addition of parcels, owned by Harvard-Westlake, to the Development Site. ~~Two retaining walls are proposed on the Development Site to secure the hillside to the west. The primary retaining wall would be located on three sides (north, west and south) of the Parking Structure. Along the rear (west side) of the Parking Structure, the retaining wall would step back from east to west at the third level of the Parking Structure and would vary in height from 50 feet to 87 feet. The south face of the retaining wall would vary in height from 20 feet to 60 feet (from east to west), and the north face of the wall would vary in height from 30 feet to 70 feet (from east to west). The second retaining wall would be located on the north end of the Development Site, parallel to Coldwater Canyon Avenue. This retaining wall would vary in height from 4 feet to 28 feet (from north to south).~~

~~Due to the topography of the Development Site, the retaining walls are necessary to protect the adjacent hillsides and to construct the Parking Structure.~~ As discussed above, the retaining walls would be anchored with soil nails. Soil nail walls consist of steel bar encased in grout constructed from the top down in increments and completed with a wire mesh and shotcrete surface.

With ~~proper~~ the proposed design of the soil nail walls, impacts associated with slope stability on the ~~Proposed Project~~ Development Site are anticipated to be less than significant.

~~Natural slopes of varying heights exist above the proposed Parking Structure and the proposed retaining wall system. The slopes to the south of the Development Site extend to heights on the order of approximately 100 feet. The slopes to the west and north side of the site extend to heights on the order of 200 feet. The natural slopes above the proposed retaining wall system, have inclinations, in general, of approximately 1.6:1 or flatter. Existing slopes with favorable bedrock bedding inclined at 1.5:1 were determined to exhibit the minimum generally accepted factors of safety for stability (see **Appendix E.1**).~~

~~Existing slopes consisting of colluvium and alluvium at the surface do not have the generally accepted factors of safety for surficial stability thus “creep” of the colluvium on the natural soils has been observed.~~

~~The existing slopes will be modified as part of the construction of the retaining walls with soil nails. Details regarding the length of the soil nails will be completed by the wall designer. In addition to internal stability, the wall designer will evaluate the global stability of the slopes as the length of the nails determines the stability of the slopes. Fill slopes may be constructed at inclinations of 2:1 (horizontal:vertical) or flatter.~~

Erosion and Sedimentation

During construction, the potential for erosion and sedimentation during the rainy season exists. The Project would be required to implement Best Management Practices (BMPs) to reduce erosion and sedimentation impacts to an acceptable level.

Implementation of the Proposed Project would increase the area of impermeable surfaces in the drainage tributaries from 5-10 percent at present to a post-construction 14 percent, thereby increasing the potential runoff from the Development Site during storms. The Project would include a bio-swale flow-through planters that would be designed to increase storm water infiltration. The surface runoff from the Development Site would be collected at multiple points through catch basins with flow guard filter insert and discharged to the bio-swale flow-through planters. The is designed to treat storm water for the first 0.75 inches of rainfall. The storm water passes through a grass mix with plant sustaining soil at the top and granular soil at the bottom layer. A 4" perforated pipe would run at the bottom to collect the infiltrated water. The sides and bottom of the grassy swale would be protected with impermeable membrane to avoid any infiltration to the ground.

Structural BMPs for the Project have been designed to treat storm water runoff from the greater of the first 0.75 inches of rainfall and the 85th percentile rainfall both multiplied by a factor of 1.5 all storms up to and including the 85th percentile 24-hour storm event (the factor of 1.5 is a result of the infeasibility of infiltration due to the Hillside Grading Ordinance). The peak mitigated discharge value (QPM) has been calculated to be 0.59 1.48 cubic feet per second (cfs) or an equivalent volume of 8,115 10,296 cubic feet. Thus, the calculated minimum size of the flow-through planters, using the City Department of Public Works Best Management Practices Handbook, 4th edition, is 7,676 square feet. The Project's flow-through planters have been designed for a capacity of 9,000 square feet. (This value was determined using the Los Angeles County Department of Public Works method for calculating standard urban storm water mitigation plan flow rates and volumes based on 0.75-inches of rainfall.)

Water not deretained on-site would be conveyed to existing storm water conveyance facilities, thereby reducing the potential for erosion occurring on-site. As such, implementation of the Proposed Project would result in less than significant impacts related to soil erosion and sedimentation.

Landform Alteration

The Project includes excavation and export of approximately 135,000 137,000 cubic yards (140,000 cubic yards has been used conservatively) of soil to allow construction of the Parking Structure partially within the hillside (see **Figure 3.5-3**). Review and approval of a haul route will be required to be obtained from the City of Los Angeles Board of Building and Safety Commissioners. Compliance with conditions and mitigation measures imposed through the haul route permit process will ensure that impacts resulting from the export of earth materials will be less than significant (see Section 3.8 Transportation, Circulation and Parking for a discussion of construction traffic impacts including the haul route).

Water Quality Impacts During Construction

Construction activities would entail the use of machinery and materials handling and storage (e.g., gravel, asphalt) during all phases of the Proposed Project. These activities would entail the use of graders and other earthmoving equipment during initial preparation of each construction site. The use of this machinery and other vehicles would generate dust and would require the use of water trucks to meet South Coast Air Quality Management District (SCAQMD) fugitive dust requirements (see Section 3.2 Air Quality for a discussion of regulatory and mitigation requirements). Increased erosion and siltation could occur as a result of construction activities and the modification of existing drainage patterns. The use of water trucks to reduce dust could increase the potential for urban pollutants and silt to enter the Los Angeles River.

Accidental on-site spills of hazardous materials (e.g., fuels, solvents, paint) could also enter ground and/or surface waters, if not properly contained.

The Project would be subject to a General Construction Activity Permit because it would disturb more than one acre of soil and as such, the applicant is required to prepare and implement a Stormwater Pollution and Prevention Plan (SWPPP) to meet the requirements of the General Permit.

All construction activities would be required to implement storm water prevention measures identified in the SWPPP during all phases of construction. Adherence to the SWPPP and the implementation of standard best management practices (BMPs) during construction would reduce the potential for increased siltation, erosion and hazardous materials spills. Therefore, construction impacts associated with water quality would be less than significant.

Hydrology and Water Quality Impacts During Operation

The Proposed Project would increase the amount of impervious area on the Development Site. However, hydrological modeling indicates that surface runoff is not anticipated to substantially increase compared to existing conditions primarily because of the change in slopes (see **Appendix E.2**). The Proposed Project would not affect the runoff rates before and after the construction for 50 and 25-year storm events. For smaller storm frequency of 10 and 2 year, the Project would result in a slight increase in runoff due to the increase in impervious surfaces. However, the peak mitigated runoff and volume from the proposed development areas would be captured and treated by appropriate BMPs before discharging into the road (see below).

It is anticipated that the new Parking Structure would not only help secure the previously exposed soil and natural landscaped areas from potential mudslides, but could also help slow high storm water runoff flows from the adjacent hillside to Coldwater Canyon Avenue, especially during large storm events such as the Los Angeles County Capitol Flood 50-year storm. The new Parking Structure and supporting storm water management system infrastructure provide additional flood control and mudslide protection to Coldwater Canyon Avenue. Part of the mudslide infrastructure is a debris basin that is proposed to collect and provide temporary storage for 400 cubic yards per acre of mud/debris to meet Los Angeles Public - Building Code 2002-064. As noted above, the debris basin would provide temporary storage for close to 8 acres. The area tributary to the basin is 7.38 acres. At the north end of the Development Site, a swale to carry 10 cubic feet per second per acre would be provided to address the supplementary required debris flow of 42.5 cubic feet per second. The swale to convey the supplementary debris flow has a capacity of 51.53 cubic feet per second at the flattest section with a slope of 4 percent (**Appendix E.2**)

The surface runoff would be collected at multiple points through catch basins with filter inserts and discharged in a bio-swale directed in to flow-through planters. The bio-swale is flow-through planters are designed to treat first flush volume of storm water, which is the greater of the first 0.75 inches of rainfall or the 85th percentile rainfall, both multiplied by a factor of 1.5. The factor of 1.5 is a result of the infeasibility of infiltration due to the hillside grading ordinance. Flow-through planters are designed to treat and detain runoff without allowing seepage into the underlying soil. Pollutants are removed as the runoff passes through the soil layer and is collected in an underlying layer of gravel or drain rock. The storm water passes through the grass mix at the top with plant sustaining soil at the top and granular soil at the bottom layer. A 4" perforated pipe would run at the bottom to collect the treated runoff. The sides and bottom of the grassy swale would be protected with impermeable membrane to avoid any infiltration to the ground water. The treated storm water would be day lighted to the street through a 4" curb drain. If the first flush volume were more than the Bio-swale capacity, a hydrodynamic separator or storm filter system would be added to the system.

Increased development, increased density, increased human activity including vehicular activity result in increased pollutants that could enter surface and groundwater, potentially resulting in a significant impact to water quality. Pollutants of concern include trash and dried leaves, twigs from the trees and shrubs, silt, pesticides and fertilizers in the planter areas.

The Proposed Project would provide runoff and water quality treatments. Such treatments would include the reduction of storm water runoff entering the storm drainage system and on-site treatment and infiltration of storm water (see Regulatory Compliance Measures and Project Design features identified below). The Proposed Project would meet Design Guidelines recommending treating 100 percent of the 85th percentile of storm water and would providing detention capacity to retain a rainfall intensity of 0.5 inches per hour. Therefore, the Project would result in less than significant impacts associated with water quality impacts during operation of the Project.

The Project has prepared a plan to address the City of Los Angeles Low Impact Development (LID) Ordinance (which includes requirements to for a Standard Urban Stormwater Mitigation Plan -- SUSMP), see **Appendix E.3,** to identify and mitigate anticipated flows to the existing on- and off-site storm drain facilities and to ensure that these flows could be accommodated by existing facilities. The peak mitigated discharge value (QPM) has been calculated to be 1.48 0.59 cfs or an equivalent volume of 10,296 8115 cf. The SUSMP identifies appropriate treatments/BMPs to ensure that impacts would be less than significant.

The surface runoff from the site will be collected at multiple points through catch basins with flow guard filter insert and discharged to the bio-swale. A bio-swale will be designed to treat storm water for the first 0.75 inches of rainfall. The storm water passes through the grass mix at the top with plant sustaining soil at the top and granular soil at the bottom layer. 4" perforated pipe runs at the bottom to collect the infiltrated water. The sides and bottom of the grassy swale is protected with impermeable membrane to avoid any infiltration to the ground water. The treated storm water will be day lighted to the street through a 4" curb drain.

CUMULATIVE IMPACTS

Impacts associated with geology and soils are typically confined to a project site or within a very localized area and do not affect off-site areas. Cumulative development in the area could increase the overall potential for exposure to seismic hazards by potentially increasing the number of people exposed to seismic hazards. Cumulative development would be subject to established guidelines and regulations pertaining to building design and seismic safety, including those set forth in the CBC and the LAMC. As such, adherence to applicable building regulations and standard engineering practices would ensure that cumulative impacts would be less than significant.

The Project could increase the volume of storm water runoff and contribute to pollutant loading in storm water runoff, resulting in cumulative impacts to hydrology and surface water quality. However, all cumulative development would also be subject to State NPDES as well as local requirements including the LID Ordinance within the City of Los Angeles, regarding storm water quality for both construction and operation. Each project would be evaluated individually to determine appropriate BMPs and treatment measures to avoid impacts to water quality. In addition, the City of Los Angeles Department of Public Works reviews all construction projects on a case-by-case basis to ensure that sufficient local and regional drainage capacity is available. Thus, cumulative impacts to surface water hydrology and surface water quality would be less than significant.

REGULATORY COMPLIANCE MEASURES

The areas of geology, seismicity, hydrology and drainage are well-regulated. Compliance with regulatory requirements would ensure that impacts would be less than significant.

RC-GEO-1: The applicant ~~shall~~ has prepared a detailed Final Geologic and Soils Engineering ~~Geotechnical~~ Report to address site-specific geologic constraints of the site including soil conditions (including expansive soils) and stability. The Final Geologic and Soils ~~Geotechnical~~ Report ~~shall~~ ~~incorporates~~ includes ~~recommendations~~ ~~from the Preliminary Geotechnical Report~~ ~~including~~ recommendations related to erosion control, soil nail wall design, shoring and other site-specific conditions including seismicity, bedrock material, corrosivity and compressibility of soils, undocumented fill, etc. for design and construction of the Parking Structure. The applicant/contractor shall comply with all recommendations of the Final ~~Geotechnical/~~ Geologic and Soils Engineering Report and the associated approval letter from the ~~Los Angeles~~ City Department of Building and Safety. A registered geologist shall monitor that recommendations of the Final Geologic and Soils Engineering ~~Geotechnical~~ Report are implemented as appropriate.

RC-GEO-2: The Project shall be constructed in compliance with the LAMC and California Building Code and all other applicable regulations.

RC-GEO-3: The Project shall comply with the following City Department of Building and Safety requirements, prior to issuance of a grading permit for the Project:

- Prior to the issuance of a grading permit by the City Department of Building and Safety, the consulting geologist and soils engineer shall review and approve Project grading plans. This approval shall be conferred by signature on the plans which clearly indicate the geologist and/or soils engineer have reviewed the plans prepared by the design engineer and that the plans include the recommendations contained in the report.

- Prior to the commencement of grading activities, a qualified geotechnical engineer and engineering geologist shall be employed for the purpose of observing earthwork procedures and testing fills for conformance to the recommendations of the City Engineer, approved grading plans, applicable grading codes, and the geotechnical report approved to the satisfaction of the City Department of Building and Safety.

- During construction, all grading shall be carefully observed, mapped and tested (as appropriate) by the Project engineer. All grading shall be performed under the supervision of a licensed engineering geologist and/or soils engineer in accordance with applicable provisions of the LAMC and California Building Code and to the satisfaction of the City Engineer and the Superintendent of Building and Safety.

- Any recommendations prepared by the consulting geologist and/or soils engineer for correction of geologic hazards, if any, encountered during grading shall be submitted to the City Department of Building and Safety for approval prior to issuance of a Certificate of Occupancy for the Project.

- Grading and excavation activities shall be undertaken in compliance with all relevant requirements of the California Division of Industrial safety, the Occupational Safety and Health Act of 1970 and the Construction Safety Act.

RC-GEO-4: The Project shall conform to applicable criteria set forth in the Recommended Lateral Force Requirements and Commentary by the Structural Engineers Association of California.

RC-GEO-5: The Project shall comply with the parameters outlined in the most recent California Building Code as designated for site-specific soil conditions.

RC-GEO-6: The Project shall be designed to conform to the City of Los Angeles Seismic Safety Plan and additional seismic safety requirements not encompassed by compliance with the LAMC and California Building Code as may be identified by the City Department of Building and Safety prior to Plan Check approval on each building.

RC-GEO-7: During the rainy season (between October 1 and April 15 per the Los Angeles Building Code, Sec. 91.7007.1), an erosion control plan that identifies Best Management Practices (BMPs) shall be implemented to the satisfaction of the City of Los Angeles Department of Building and Safety to minimize potential erosion during construction. The erosion control plan shall be a condition to issuance of any grading permit.

RC-GEO-8: Appropriate erosion control and drainage devices shall be incorporated to the satisfaction of the City Department of Building and Safety. Such measures include interceptor terraces, berms, vee-channels, and inlet and outlet structures,

RC-GEO-9: If temporary excavation slopes are to be maintained during the rainy season, all drainage shall be directed away from the top of the slope. No water shall be allowed to flow uncontrolled over the face of any temporary or permanent slope.

RC-GEO-10: Provisions shall be made for adequate surface drainage away from areas of excavation as well as protection of excavated areas from flooding. The grading contractor shall control surface water and the transportation of silt and sediment.

RC-GEO-11: The owner or contractor shall keep the construction area sufficiently dampened to control dust caused by grading and hauling, and at all times shall provide reasonable control of dust caused by wind, at the sole discretion of the grading inspector.

RC-GEO-12: Hauling and grading equipment shall be kept in good operating condition and muffled as required by law.

RC-GEO-13: The Traffic Coordinating Section of the Los Angeles Police Department shall be notified at least 24 hours prior to the start of hauling.

RC-GEO-14: Loads shall be secured by trimming or watering or may be covered to prevent the spilling or blowing of the earth material. If the load, where it contacts the sides, front, and back of the truck cargo container area, remains six inches from the upper edge of the container area, and if the load does not extend, at its peak, above any part of the upper edge of the cargo container area, the load is not required to be covered, pursuant to California Vehicle Code Section 23114 (e) (4).

RC-GEO-15: Trucks are to be watered at the export site to prevent blowing dirt and are to be cleaned of loose earth at the export site to prevent spilling.

RC-GEO-16: Streets shall be cleaned of spilled materials at the termination of each workday.

RC-GEO-17: The applicant shall be in conformance with the State of California, Department of Transportation policy regarding movements of reducible loads.

RC-GEO-18: The applicant shall comply with all regulations set forth by the State of California Department of Motor Vehicles pertaining to the hauling of earth.

RC-GEO-19: A copy of the approval letter from the City, the approved haul route and the approved grading plans shall be available on the job site at all times.

RC-GEO-20: The applicant shall notify the Street Services Investigation & Enforcement Division at least 72 hours prior to the beginning of hauling operations and shall also notify the Division immediately upon completion of hauling operations.

RC-GEO-21: No person shall perform any grading within areas designated "hillside" unless a copy of the permit is in the possession of a responsible person and available at the site for display upon request.

RC-GEO-22: A log noting the dates of hauling and the number of trips (i.e. trucks) per day shall be available on the job site at all times.

RC-GEO-23: "Truck Crossing" warning signs shall be placed 300 feet in advance of the exit in each direction.

RC-GEO-24: Flag persons shall be required at the job site to assist the trucks in and out of the Project area. Flag persons and warning signs shall be in compliance with Part II of the latest Edition of "Work Area Traffic Control Handbook." The pedestrians shall be allowed to clear first prior to permitting the trucks to ingress or egress.

RC-HYDRO-1: The Project shall comply with the Low Impact Development (LID) Ordinance. Construction contractors of individual projects shall be required to control erosion and runoff as necessary through the use of site appropriate grading practices. Specifically, the construction contractor shall plan for and implement Best Management Practice (BMP) during construction to the satisfaction of the City Department of Public Works, Bureau of Engineering, Stormwater Management Division City of Los Angeles, and/or other designated responsible agencies/departments.

RC-HYDRO-2: Sufficient area shall be available so that runoff can be collected in flow-through planters ~~bio swales~~ as appropriate and directed to existing curb and gutter or storm drains. ~~Swale~~ Flow-through planter design shall be coordinated with on-site hazardous materials issues as necessary.

RC-HYDRO-3: The Project shall comply with applicable NPDES permit requirements, including preparation and implementation of a Stormwater Pollution Prevention Plan and Standard Urban Stormwater Mitigation Plan (SUSMP) in accordance with the Los Angeles Municipal Strom Water permit. The SUSMP shall identify post development peak runoff, conserve natural areas, minimize storm water pollutants, protect slopes and channels, and post construction Best Management Practices (BMPs) and other items as required by the permit.

RC-HYDRO-4: Runoff shall be treated, as required by SUSMP regulations, prior to discharging into existing storm drain systems.

RC-HYDRO-5: All wastes from construction shall be disposed of properly. Appropriately labeled recycling bins shall be used to recycle construction materials including: solvents, water-based paints, vehicle fluids, broken asphalt and concrete; wood, and vegetation. Non-recyclable materials/wastes shall be taken to an appropriate landfill. Toxic wastes shall be discarded at a licensed regulated disposal site.

RC-HYDRO-6: Leaks, drips, and spills shall be cleaned up immediately to prevent contaminated soil on paved surfaces that can be washed away into the storm drains.

RC-HYDRO-7: Material spills shall not be hosed down at the pavement if alternative clean-up methods are available, such as dry cleanup methods.

RC-HYDRO-8: Dumpsters shall be covered and maintained. Uncovered dumpsters shall be required to be placed under a roof or covered with tarps or plastic sheeting.

RC-HYDRO-9: Gravel approaches and dirt-tracking devices shall be used to reduce soil compaction and limit the tracking of sediment into streets.

RC-HYDRO-10: All vehicle/equipment maintenance, repair, and washing shall be conducted away from storm drains. All major repairs shall be required to be conducted at an appropriate location. Drip pans or drop cloths shall be required to catch drips and spills.

RC-HYDRO-11: Project construction shall comply with the General Construction Activity Stormwater Permit (General Permit) and the City's Development Construction Program pursuant to the NPDES Permit (Permit No. CA00401).

RC-HYDRO-12: Article 4.4 of Chapter IV of the LAMC specifies Stormwater and Urban Runoff Pollution Control requirements, including the application of Best Management Practices (BMPs). Chapter IX, Division 70 of the LAMC addresses grading, excavations, and fills. Applicants must meet the requirements of the Standard Urban Stormwater Mitigation Plan (SUSMP) approved by the Los Angeles Regional Water Quality Control Board, including the following, where applicable:

- The Project applicant shall implement storm water BMPs to treat and infiltrate the runoff from a storm event producing 3/4 inch of rainfall in a 24-hour period. The design of structural BMPs shall be in accordance with the Development Best Management Practices Handbook Part B Planning Activities. A signed certificate from a California licensed civil engineer or licensed architect that the proposed BMPs meet this numerical threshold standard is required.

- Post development peak storm water runoff discharge rates shall not exceed the estimated predevelopment rate for developments where the increase peak storm water discharge rate will result in increased potential for downstream erosion.

- Clearing and grading of native vegetation at the Project Site shall be limited to the minimum needed to construct the Project, allow access, and provide fire protection.

- Trees and other vegetation shall be maximized by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants.

- Natural vegetation shall be promoted in landscaped areas.

- Any identified riparian areas shall be preserved.

- Appropriate erosion control and drainage devices, such as interceptor terraces, berms, vee-channels, and inlet and outlet structures, as specified by Section 91.7013 of the Building Code will be incorporated.

- Outlets of culverts, conduits or channels from erosion by discharge velocities shall be protected by installing a rock outlet protection. Rock outlet protection is physical devise composed of rock, grouted riprap, or concrete rubble placed at the outlet of a pipe. Sediment traps shall be installed below the pipe-outlet. Inspect, repair, and maintain the outlet protection after each significant rain.

- Any connection to the sanitary sewer will have authorization from the Bureau of Sanitation.

- Impervious surface area will be reduced by using permeable pavement materials where appropriate. These include pervious concrete/asphalt; unit pavers, i.e. turf block; and granular materials, i.e. crushed aggregates, cobbles.

- Roof runoff systems will be installed where site is suitable for installation.

- Messages that prohibit the dumping of improper materials into the storm drain system adjacent to storm drain inlets shall be painted.

- All storm drain inlets and catch basins within the Project area shall be stenciled with prohibitive language (such as NO DUMPING - DRAINS TO OCEAN) and/or graphical icons to discourage illegal dumping.

- Signs and prohibitive language and/or graphical icons, which prohibit illegal dumping, must be posted at public access points along channels and creeks within the Project area.

- Legibility of stencils and signs must be maintained.

- Materials with the potential to contaminate storm water must be: (1) placed in an enclosure such as, but not limited to, a cabinet, shed, or similar storm water conveyance system; or (2) protected by secondary containment structures such as berms, dikes, or curbs.

- The storage area will be paved and sufficiently impervious to contain leaks and spills.

- The storage area shall have a roof or awning to minimize collection of storm water within the secondary containment area.

- An efficient irrigation system shall be designed to minimize runoff including: drip irrigation for shrubs to limit excessive spray; shutoff devices to prevent irrigation after significant precipitation; and flow reducers.

- Cleaning of oily vents and equipment will be performed within designated covered area, sloped for wash water collection, and with a pretreatment facility for wash water before discharging to properly connected sanitary sewer with a CPI type oil/water separator. The separator unit must be: designed to handle the quantity of flows; removed for cleaning on a regular basis to remove any solids; and the oil absorbent pads must be replaced regularly according to manufacturer's specifications.

- Trash dumpsters will be stored both under cover and with drains routed to the sanitary sewer or use non-leaking and water tight dumpsters with lids. Containers will be washed in an area with properly connected sanitary sewer.
- Wastes, including paper, glass, aluminum, oil and grease will be reduced and recycled.
- Liquid storage tanks (drums and dumpsters) will be stored in designated paved areas with impervious surfaces in order to contain leaks and spills. A secondary containment system such as berms, curbs, or dikes shall be installed. Drip pans or absorbent materials whenever grease containers are emptied will be used.
- The owner(s) of the property will prepare and execute a covenant and agreement (Planning Department General form CP-6770) satisfactory to the Planning Department binding the owners to post construction maintenance on the structural BMPs in accordance with the Standard Urban Storm water Mitigation Plan and or per manufacturer's instructions.

The Draft SUSMP prepared for the Project includes the following project-specific BMPs:

A. Structural BMPs

1. Kristar FloGard Plus Catch Basin Filter Inserts. Kristar Catch Basin Filter Inserts, LA City research reference RR#5591 and LA City approval reference RR#5584, by KriStar Enterprises, Inc., which will be installed in ~~both~~ catch basins~~, are being proposed~~ as structural BMPs for the removal of silt and debris in storm water runoff. The filter inserts have been selected to accommodate, up to and including, the 85th percentile storm event multiplied by a factor of 1.5. ~~See appendix "A" for calculations. See Appendix "B" for additional information including details and flow capacities.~~

2. Flow-through Planter Box. In addition to the catch basin filter insert, a flow-through planter box is ~~being~~ proposed as a structural BMP~~s~~ for the removal of silt and debris in storm water runoff. The ~~bio-swale~~ flow-through planter box has been designed to accommodate, up to and including, the 85th percentile storm event multiplied by a factor of 1.5. See Exhibit 1 of **Appendix E.2**. for details.

3. *Permeable Pavement.* Pervious concrete pavement along with permeable brick pavers will be considered in the final design to assist with decreasing the post-construction impervious areas. It is important to note that these pavement sections will require a geotextile liner along with an under-drain system to mitigate large storm events.

~~Exhibits 1 and 2 in **Appendix E.2** show the proposed Grading and Drainage Plan and the SUSMP Exhibit respectively.~~

B. Non-structural BMPs

1. Open Paved Areas and Planter Areas.

a. Regular sweeping of all open and planter areas, at a minimum, on a weekly basis in order to prevent dispersal of pollutants that may collect on those surfaces.

b. Regular pruning of the trees and shrubs in the planter areas to avoid formation of dried leaves and twigs, which are normally blown by the wind during windy days. These dried leaves are likely to clog the surface inlets of the drainage system when rain comes, which would result to flooding of the surrounding area due to reduced flow capacities of the inlets.

c. Trash and recycling containers shall be used such that, if they are to be located outside or apart from the principal structure, they are fully enclosed and watertight in order to prevent contact of storm water with waste matter, which can be a potential source of bacteria and other pollutants in runoff. These containers shall be emptied and the wastes disposed of properly on a regular basis.

2. Education and Training. The Harvard-Westlake School Facilities Department shall be aware of the structural BMPs installed in the Project. Information materials, such as brochures, shall be available in the Facilities Department offices for their complete information. The Harvard-Westlake School Facilities Department staff shall also be briefed about chemical management and proper methods of handling and disposal of wastes and should understand the on-site BMPs and their maintenance requirements.

3. Landscaping. Minimize the use of pesticides and fertilizers to the maximum extent practical.

4. Monitoring and Maintenance

a. All BMPs shall be operated, monitored, and maintained for the life of the Project and at a minimum, all structural BMPs shall be inspected, cleaned-out, and where necessary, repaired, at the following minimum frequencies: 1) prior to October 15th each year; 2) during each month between October 15th and April 15th of each year and, 3) at least twice during the dry season (between April 16 and October 14 of every year).

b. Maintenance procedures and recommendations outlined by KriStar Enterprises, Inc. shall be followed by the owner to ensure proper performance of the filter insert.

c. Debris and other water pollutants removed from structural BMPs during cleanout shall be contained and disposed of in a proper manner.

d. The drainage system and the associated structures and BMPs shall be maintained according to manufacturer's specification to ensure maximum pollutant removal efficiencies.

SIGNIFICANCE AFTER MITIGATION

With implementation of the Regulatory Compliance Measures identified above, the potential for the Proposed Project to result in impacts related to geology, soils and hydrology would be similar to other projects in Southern California and considered less than significant.