IV. ENVIRONMENTAL IMPACT ANALYSIS

C. GEOLOGY AND SOILS

The following analysis of geology, soils and seismic hazards is based primarily upon the technical report *Geotechnical Engineering Investigation Proposed Fashion Square Expansion*, prepared by Krazan & Associates, Inc. and dated September 27, 2006. This study is provided in Appendix E: Geotechnical and Soils of this DEIR.

1. ENVIRONMENTAL CONDITIONS

a. Physical Setting

(1) Geologic Conditions

The project site is relatively level with an overall change in grade of 22 feet from west to east (i.e., less than 1% grade). The average elevation of the project site is approximately 640 feet above mean sea level. Immediate adjacent properties are characterized by similar elevations and slopes.

The project site is underlain by Holocene and Pleistocene alluvium deposited in the San Fernando Valley, a structural basin surrounded by mountains on all four sides[1]. The alluvium is estimated to be several hundred feet thick. These deposits are generally fine grained consisting of mixtures of clay, silt, and sand.

(2) Seismic Hazards

Seismicity is a general term relating to the abrupt release of accumulated strain energy in the rock materials of the earth's crust in a given geographical area, generally due to earthquakes. The recurrence of accumulation and subsequent release of strain have resulted in faults and fault systems. The degree of seismic risk is generally determined or estimated by the seismic record in any given region.

The project site is not located within a designated Alquist - Priolo study zone or City of Los Angeles fault rupture study area[2]. However, Southern California is seismically active and will experience future earthquakes that will affect the project site. The earthquakes are predominately generated by periodic slip along the northwesterly trending faults associated with the San Andreas fault system and the east-west trending faults along the northern margin of the Los Angeles Basin. See *Figure 34: Fault Map*, for the location of local and regional faults relative the project site. In addition to these probable earthquake sources, recent earthquakes in the region have occurred on previously unknown faults having no surface expression (1987 Whittier Narrows and the 1994 Northridge earthquakes).

[1] Krazan & Associates, Inc. 2006. *Geotechnical Engineering Investigation Proposed Fashion Square Expansion*. Clovis, CA: Author. [See Appendix E of this Draft EIR]

[2] Figure GS-8 *Alquist-Priolo Special Study Zones and Fault Rupture Study Areas in the City of Los Angeles*. Los Angeles, City of. 1995. *The Citywide General Plan Framework An Element of the City of Los Angeles General Plan*. Agoura Hills, CA: Envicom Corporation. 19 May 2008 <http://cityplanning.lacity.org/>. . Available at the City of Los Angeles Department of City Planning.

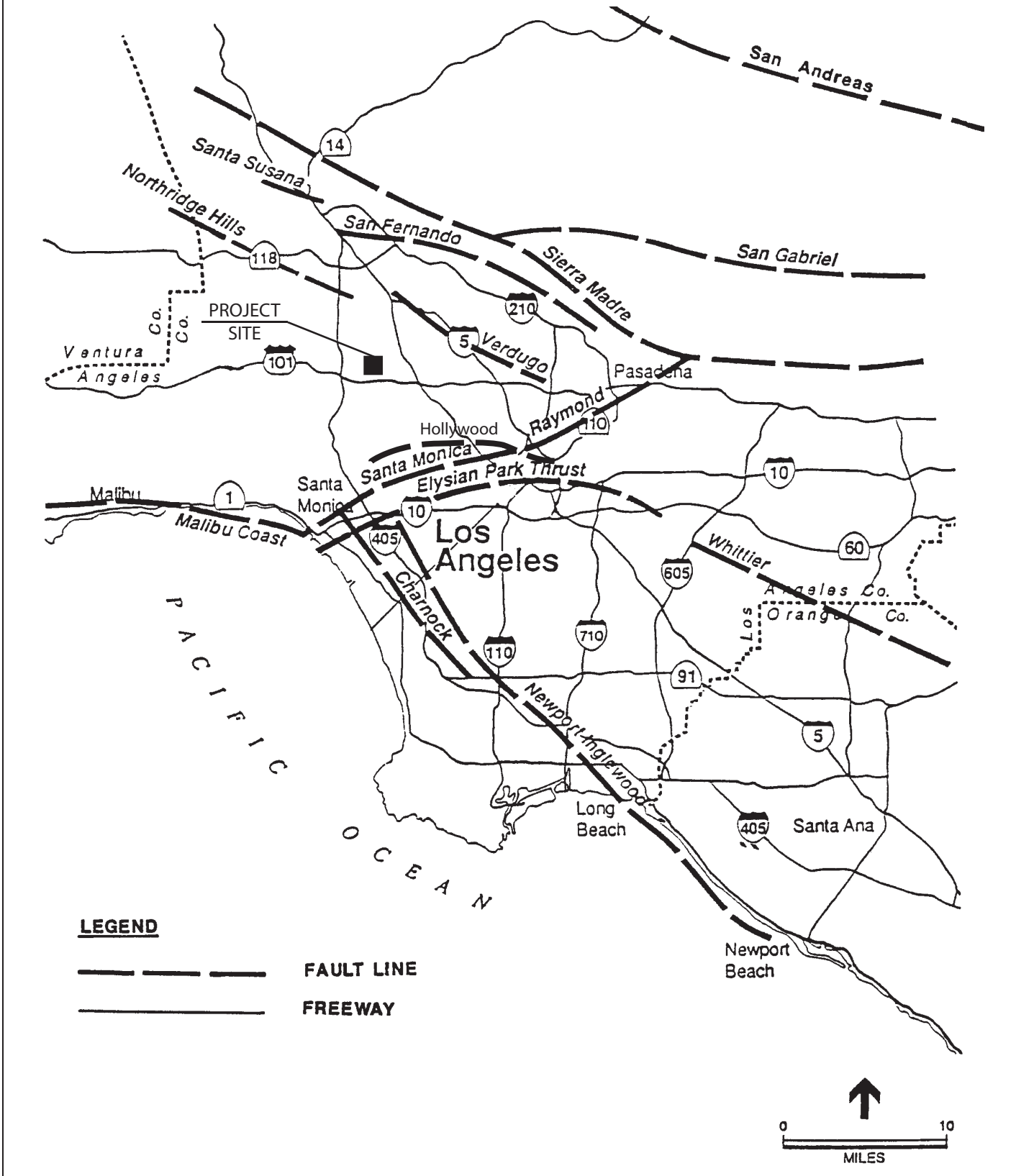

FIGURE 34
FAULT MAP

MAP SOURCE: PLANNING ASSOCIATES, INC.

The seismic hazard most likely to impact the project site is groundshaking due to a large earthquake on one of the major active regional faults. The Hollywood Fault is the nearest active fault to the project site, and is located approximately 4.8 kilometers (3.0 miles) to the south. The Santa Monica, Verdugo and Malibu Coast Fault Zones are located approximately 6.1, 9.8 and 14.3 kilometers (approximately 3.8, 6.1, and 8.9 miles) from the project site, respectively. During the Northridge Earthquake (1994), newer portions of buildings at the existing shopping center suffered little to no structural damage. All older portions of buildings at the existing shopping center that suffered structural damage were retrofitted in compliance with current seismic standards in the Uniform Building Code.

Secondary hazards of earthquakes include rupture, seiche, landslides, liquefaction, and subsidence. Since there are no known faults within or immediately adjacent to the project site area, ground rupture from surface faulting should not be a potential problem. Seiche and landslides are not known hazards in the area either as the project site is not near large bodies of water or steep hillsides that contribute to these concerns. The area in consideration shows no mapped faults on-site according to maps prepared by the California Geological Survey (CGS) (previously know as the California Department of Conservation, Division of Mines and Geology). No evidence of surface faulting was observed on the property during reconnaissance.

According to the Los Angeles City-wide General Plan Framework, the project site is located within an area of potential liquefaction[3]. The CGS map also identifies that the site is located within an area of potential liquefaction. Soil liquefaction is a state of soil particle suspension caused by a complete loss of strength when the effective stress drops to zero. Liquefaction normally occurs under saturated conditions in soils such as sand in which the strength is purely frictional and often triggered by seismic activity. Areas of known or potential liquefaction, where historic occurrences of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements, are required to provide mitigation as defined in Public Resources Code Section 2693(c).

Based on the findings of the geotechnical report (see Appendix E: Geotechnical and Soils), soils underneath the project site are considered loose to medium dense, sandy soils that have a low to moderate potential for liquefaction under seismic conditions[4]. The total liquefaction-induced settlement was calculated to be on the order of one inch with a differential settlement estimated to be one-half inch over a distance of 50 feet.

The Los Angeles City-wide General Plan Framework Final EIR does not designate the project site as being an inundation and tsunami hazard area. The site is not located downslope of any confined bodies of water that would adversely affect the site in the event of earthquake-induced failures or seiches (defined as wave oscillations in an enclosed or semi-enclosed body of water). The site is not located within a coastal zone, where tsunamis (seismically induced sea waves) are a potential hazard.

[3] Figure GS-5 *Areas Susceptible to Liquefaction in the City of Los Angeles*. Los Angeles, City of. 1995. *The Citywide General Plan Framework An Element of the City of Los Angeles General Plan*. Agoura Hills, CA: Envicom Corporation. 19 May 2008 <http://cityplanning.lacity.org/>. Available at the City of Los Angeles Department of City Planning.
[4] Krazan & Associates, Inc. 2006. *Geotechnical Engineering Investigation Proposed Fashion Square Expansion*. Clovis, CA: Author. [See Appendix E of this Draft EIR]

(3) Soils and Stability

According to a geotechnical/soils analysis prepared for the project (see Appendix E: Geotechnical and Soils), subsurface conditions encountered at the project site appear typical of those found in the geologic region[5]. Soils within the depth of exploration consist of up to five feet of fill underlain by native alluvium. Below the soils, alternative layers of clayey silt, sandy silt, silty clay, silty sand and sand were encountered. Field and laboratory tests suggest that native soils are moderately strong and slightly compressible. For a more detailed description of the soil conditions encountered, please refer to the boring logs in Appendix A of Appendix E: Geotechnical and Soils to this DEIR.

According to the Los Angeles City-wide General Plan Framework, the project site is not located within an area susceptible to landslides[6]. The CGS map does not identify that the site is located within an area susceptible to earthquake induced landslides[7]. There are no known landslides in the site vicinity and the site is not in the path of any known or potential landslides.

(4) Groundwater

During and immediately following the drilling of six test borings within the project site, the test boring locations were checked for the presence of groundwater. Free groundwater was encountered in three of six total borings at the project site, with groundwater encountered at depths of 34, 43.5 ad 44.5 feet during field explorations. The depth of the water table elevation may fluctuate with time and groundwater can be expected to fluctuate both seasonally and from year to year. Fluctuations in the groundwater level may occur due to variations in precipitation, irrigation practices at the site and in the surrounding areas, climatic conditions, flow in adjacent or nearby canals, pumping from wells and possibly as the result of other factors that were not evident at the time of the geotechnical investigation. Long-term monitoring in observation wells, sealed from the influence of surface water, is often required to more accurately define the potential range of groundwater conditions on a site.

(5) Mineral Resources

The project site does not contain any known mineral resources. Further, the project site is not designated as a Mineral Resource Zone (MRZ) by the State of California and it is not identified in the Conservation Element of the City of Los Angeles General Plan as being of local importance for mineral resources.

[5] Krazan & Associates, Inc. 2006. *Geotechnical Engineering Investigation Proposed Fashion Square Expansion*. Clovis, CA: Author. [See Appendix E of this Draft EIR]
[6] Figure GS-4 *Landslide Inventory and Hillside Areas in the City of Los Angeles*. Los Angeles, City of. 1995. *The Citywide General Plan Framework An Element of the City of Los Angeles General Plan*. Agoura Hills, CA: Envicom Corporation. 19 May 2008 <http://cityplanning.lacity.org/>. Available at the City of Los Angeles Department of City Planning.
[7] California Department of Conservation, Division of Mines and Geology [now California Geological Survey]. 1998. *Seismic Hazard Zones Van Nuys Quadrangle Official Map*. 20 May 2008 <http://www.conservation.ca.gov/cgs/shzp/Pages/Index.aspx>.

b. Regulatory and Policy Setting

(1) California Geological Survey

The CGS provides guidance on seismic hazards. Under the CGS's Seismic Hazards Mapping Act (CA Public Resources Code, Chapter 7.8), seismic hazard zones are identified and mapped to assist local governments in planning and developing with the intent to protect the public health and safety from the effects of strong ground shaking, liquefaction, landslides, or other ground failure and other seismic hazards caused by earthquakes.

Under the Seismic Hazards Mapping Act, the CGS is tasked with compiling maps that identify seismic hazard zones, and which in turn are provided to all affected cities, counties, and state agencies for review and consideration. Each city and county, in preparing the safety element to its general plan pursuant to subdivision (g) of Section 65302 of the Government Code, and in adopting or revising land use planning and permitting ordinances, shall take into account the information provided in available seismic hazard maps.

(2) City of Los Angeles

Specific grading requirements and geotechnical hazard ameliorating regulations are provided in the Los Angeles Municipal Code (LAMC). For example, Chapter IX, Division 70 of the LAMC includes general construction, grading and site excavation requirements that would apply to the Proposed Project.

2. THRESHOLDS OF SIGNIFICANCE

Unless otherwise indicated, the thresholds of significance identified in this section are used to determine the Proposed Project environmental effects are based on direction from the Los Angeles CEQA Thresholds Guide (as adopted 2006).

(1) Geologic Hazards

A project would normally have a significant geologic hazard impact if it would cause or accelerate geologic hazards, which would result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

(2) Sedimentation and Erosion

A project would normally have significant sedimentation or erosion impacts if it would:

- 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 which would not be contained or controlled on-site.

(3) Landform Alteration

A project would normally have a significant impact on landform alteration if one or more distinct and prominent geologic or topographic features would be destroyed, permanently covered or materially and adversely modified. Such features may include, but are not limited to, hilltops, ridges, hillslopes, canyons, ravines, rock outcrops, water bodies, streambeds and wetlands.

(4) Mineral Resources

The determination of significance shall be made on a case-by-case basis, considering the following factors:

- Whether, or the degree to which, the project might result in the permanent loss of, or loss of access to, a mineral resource that is located in a MRZ-2 or other known or potential mineral resource area; and

- Whether the mineral resource is of regional or statewide significance, or is noted in the Conservation Element as being of local importance.

3. ENVIRONMENTAL IMPACTS

a. Relevant Project Characteristics

The Proposed Project involves demolition of one multi-level parking structures and construction of a new addition, comprised of two multi-level parking structures and retail space, to the south and east of the existing mall buildings. One level of subterranean parking will be provided under the westerly portion of the new construction. The mall addition is planned to be of two to three - story, reinforced concrete construction. Per recommendation of the geotechnical report, proposed structures for the Proposed Project will be supported on deep foundations. Portions of the project site not covered with structures will be paved for surface parking. Landscaping will be provided primarily along the project site and mall buildings perimeters, and within the surface parking lot area, as generally shown in the Conceptual Landscape Plan (see *Figure 18: Conceptual Landscape Plan -1* and *Figure 19: Conceptual Landscape Plan -2*)

Grading of the site is expected to entail minor cuts and fills from the existing grades to establish the building pads and to provide surface drainage of the site. Excavation depths to accommodate the subterranean parking and deep foundations will generally not exceed 18 feet in depth. Total earth movement volumes include and estimated 147,016 cubic yards of cut. No soils are expected to be imported to the project site; however, an estimated 147,016 cubic yards of earth materials from site excavation will be required.

The analysis assumes that the following Project Design Features are supported by the Proposed Project:

- The Proposed Project would incorporate permeable (porous) pavement materials in specific locations that would allow water to drain down to the underlying soil and

reduce the volume of wet weather urban runoff. This could include a combination of porous concrete, pervious asphalt, pervious pavers, grass/gravel pavers, and crushed stone, which would be incorporated into the landscape plan and design of surface parking areas, as functionally appropriate.

The analysis assumes that the Proposed Project will be constructed and operated in accordance with all applicable codes, regulations and standard practices, including the following:

- Design and construction of the project shall conform to the Uniform Building Code seismic standards as approved by the Department of Building and Safety.

- All grading and earthwork shall be performed in accordance with the Grading Ordinances of the City of Los Angeles and the applicable portions of the General Earthwork Specifications in an approved Geotechnical Report.

- Areas of known or potential liquefaction are required to provide mitigation as defined in Public Resources Code Section 2693(c).

b. Project Impacts

An Initial Study (IS) was prepared for the Proposed Project. Based on the IS, potential impacts for a number of environmental issues were determined to be less than significant. The scope of the following analysis focuses only on those impacts that were determined through the Notice of Preparation (NOP) and IS process to have a potential significant environmental effect. Issues related to Geology and Soils that were determined to be less than significant, and therefore are not addressed below, include: surface rupture (due to seismic activity); landslides, tsunamis, seiche and mudflows; landform alteration; and mineral resources. An explanation supporting this conclusion is provided in Section VI: Other Environmental Considerations: A-Effects Not Found To Be Significant.

(1) Seismic and Geologic Hazards

(a) Groundshaking and Liquefaction

Due to the location of the project site within the seismically active Southern California region, the project site has the potential to experience strong ground shaking as a result of earthquakes occurring on regional faults. Although the project site could be subjected to strong ground shaking in the event of an earthquake, this hazard is common in Southern California and the effects of ground shaking can be mitigated to a less than significant level by proper engineering design and construction in conformance with current building codes and engineering practices.

During the Northridge Earthquake in 1994, newer portions of buildings (constructed in 1990's) at the existing shopping center suffered minimal structural damage. All older portions of buildings (constructed in 1960's) at the existing shopping center that suffered structural damage were retrofitted in compliance with current seismic standards in the Uniform Building Code. The Proposed Project includes expansion of the existing shopping center/retail facilities located

at the project site. The potential for exposure to strong seismic ground shaking at the project site would not be greater than normal seismic risk as compared to other areas in Southern California. Buildings constructed under the Proposed Project will be constructed in compliance with current seismic standards in the Uniform Building Code.

(b) Soil and Slope Stability

The project site and soil conditions, with the exception of the existing structures, undocumented fill, seismic-induced settlements and expansive clayey soils, appear to be conducive to the development of the Proposed Project if developed in accordance with standard geotechnical engineering practices that take the underlying soil conditions into account. The project site has been developed with structures and/or pavement since approximately the early 1960s. During this time, there has been no indication of building or structural damage caused by unstable soil with the exception of the Northridge Earthquake. Recommendations pertaining to the removal and recompaction of loose soils, site preparation for deep foundation support, and similar construction activities are identified in the mitigation section below. With implementation of the geotechnical engineering recommendations, it is anticipated that the Proposed Project will not result in, or be affected by, design or construction concerns related to soils and slope stability.

The estimated soil settlements for moderately loaded structures are anticipated to be excessive utilizing a shallow foundation system. In addition, all the current structures are supported on deep foundations. It is recommended that the proposed structures for the Proposed Project be supported on similar deep foundations. Design values for drilled piles (using sonic pile drivers) with various diameters are provided in the Geotechnical Report and approved by the City Department of Building and Safety.

Associated with the existing development are buried structures, such as footings, septic systems, backfilled excavations, and utility lines. These buried structures should be properly removed and the resulting excavations backfilled with engineered fill. Any other buried structures encountered during construction should be removed and backfilled in accordance with the recommendations of the Soils Engineer. The project site should be inspected for possible buried fill material, using heavy excavating equipment. If loose fill material is encountered, excavations should extend to native ground. Limits of recompaction should extend 5 feet beyond structural elements. It is recommended that any fill material encountered within proposed pavement areas be removed and/or recompacted. The shrinkage on recompacted soil and fill placement is estimated at 10 to 15 percent. This value is an estimate and may vary significantly depending on several items including soil conditions, compaction effort, weather, etc.

Based on the soil information obtained from the borings and the test results from the previous investigation, the clayey soils have an expansion potential of moderately high. The estimated swell pressure of the clayey material may cause movement affecting slabs and brittle exterior finishes. To minimize the potential soil movement, it is recommended that the upper 24 inches of soil within the building slab and exterior flatwork areas be replaced with "non-expansive" soils (with El<20).

With the anticipated seismic-induced settlements, the foundation shallower than 30 feet should be designed to tolerate seismic settlements of one inch total and one-half inch differential over a distance of 50 feet. The static settlements are anticipated to be less than one-half inch total and one-quarter inch differential over a distance of 50 feet.

Sandy soil conditions were also encountered at the site. These cohesionless soils have a tendency to cave in trench wall excavations. Shoring or sloping back trench sidewalls may be required within these loose cohesionless soils.

Groundwater was encountered at depths ranging between 34 to 45 feet below the surface at the project site. However, based on the findings of the soils analysis and historical records, it is not anticipated that groundwater will rise within the zone of structural influence or affect the construction of foundations and pavements for the project. However, if earthwork is performed during or soon after periods of precipitation, the subgrade soils may become saturated, "pump," or not respond to densification techniques. Typical remedial measures include: discing and aerating the soil during dry weather; mixing the soil with dryer materials; removing and replacing the soil with an approved fill material; or mixing the soil with an approved lime or cement product.

(2) Sedimentation and Erosion

The project site has been fully developed with structures and pavement since the 1960's, and with the exception of negligible areas of landscaping, is considered to be (for purposes of this evaluation) totally impervious. The site is currently graded, paved, and improved for storm drainage and would continue to function under similar conditions post construction and is anticipated to have a less than significant impact for potential soil erosion and sediementation during the long-term operation of the Proposed Project.

The Proposed Project has the potential to result in the erosion of soil during the construction activities. However, erosion is typically reduced by implementation of appropriate erosion and sedimentation control measures during grading, site preparation, and ultimately the landscaping and operation of the project. Minor amounts of erosion and siltation could occur during site demolition and grading when soil surfaces are disrupted. However, the potential for erosion is low due to the relatively level topography of the project site and the relatively low volume of mass grading required to implement the development.

All grading activities would require grading permits from the City Department of Building and Safety, which include standard requirements and procedures for conducting grading in a controlled manner. In addition, all on-site grading and site preparation activities would be required to comply with sections of the LAMC (Chapter IX, Division 70) that address grading, excavations and fills. The Proposed Project is also required to comply with Best Management Practices (BMPs) identified in Section IV: Environmental Impact Analysis: E-Hydrology and Water Quality of this DEIR. As a result, substantial erosion during construction activities is not anticipated and potential impacts due to soil erosion would be less than significant.

(3) Consistency with Applicable Plans and Policies

Consistency of applicable plans and policies s discussed in detail in Section IV: Environmental Impact Analysis: F-Land Use, Planning and Urban Decay, of this EIR.

(4) Cumulative Impacts

Aside from regionally significant seismic events, geologic and soil-related issues are considered to be site specific. A Geotechnical Report was prepared for the Proposed Project and it was determined that with incorporation of the proposed mitigation measures, the Proposed Project will result in a less than significant geologic hazards impact would not contribute to a potential cumulative geologic hazards impact. A separate, site-specific environmental analysis will be prepared for each related project to assess and mitigate related project-specific potential impacts to geologic hazards. Related projects would require municipal government (i.e., City) approvals of design, and the implementation of mitigation measures, where needed and will comply with building codes which address seismic engineering and soils stability. Significant cumulative grading and geotechnical impacts resulting from the potentially concurrent construction of the related projects are not anticipated.

4. MITIGATION PROGRAM

MM GEO-1: Design and construction of the project shall conform to the Uniform Building Code seismic standards as approved by the Department of Building and Safety.

MM GEO-2: All grading and earthwork shall be performed in accordance with the Grading Ordinances of the City of Los Angeles and the applicable portions of the General Earthwork Specifications in an approved Geotechnical Report.

MM GEO-3: All earthwork and construction shall be completed in accordance with mitigation as defined in Public Resources Code Section 2693(c) to ensure that issues of potential liquefaction are addressed.

MM GEO-4: To address potential soil settlement, all new building construction shall be supported on deep foundations. Design values for drilled piles shall be consistent with the recommendations of the approved Geotechnical Report.

MM GEO-5: To address potential stability concerns due to buried structures, such as footings, septic systems, backfilled excavations, and utility lines. Any buried structures should be properly removed and the resulting excavations backfilled with engineered fill. Any other buried structures encountered during construction should be removed and backfilled in accordance with the recommendations of the Soils Engineer. The site should be inspected for possible buried fill material, using heavy excavating equipment. If loose fill material is encountered, excavations should extend to native ground. The exposed native subgrade should be scarified to a minimum of 6 inches,

moisture-conditioned as necessary, and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. Limits of recompaction should extend 5 feet beyond structural elements. Prior to fill placement, a qualified geotechnical engineer shall inspect the bottom of the excavation to verify no additional excavation will be required.

Any buried structures or loosely backfilled excavations encountered during construction should be properly removed and the resulting excavations backfilled with engineered fill. Excavations, depressions, or soft and pliant areas extending below planned finished subgrade levels should be cleaned to firm, undisturbed soil and backfilled with engineered fill. In general, any septic tanks, debris pits, cesspools, or similar structures should be entirely removed. Concrete footings should be removed to an equivalent depth of at least 3 feet below proposed footing elevations or as recommended by the Soils Engineer. Any other buried structures should be removed in accordance with the recommendations of the Soils Engineer. The resulting excavations should be backfilled with engineered fill.

MM GEO-6: Any fill material encountered within proposed pavement areas shall be removed and/or recompacted. The fill material shall be moisture-conditioned to near optimum moisture and compacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. At a minimum it is recommended that the upper 12 inches of subgrade soil be moisture-conditioned to at or above optimum moisture and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

MM GEO-7: To minimize the potential soil movement, the upper 24 inches of soil within the building slab and exterior flatwork areas shall be replaced with "non-expansive" soils (with El<20).

MM GEO-8: To minimize seismic-induced settlements, foundations shallower than 30 feet shall be designed to tolerate seismic settlements of one-half inch total and one-quarter inch differential over a distance of 50 feet.

MM GEO-9: To address cohesionless sandy soil conditions, shoring or sloping back trench sidewalls shall be required within these loose cohesionless soils.

MM GEO-10: If groundwater is encountered during the course of earthwork at the project site and subgrade soils appear to become saturated, "pump," or not respond to densification techniques, remedial measures as prescribed by a qualified geotechnical engineer shall be employed. Groundwater remedial measures include: discing and aerating the soil during dry weather; mixing the soil with dryer materials; removing and replacing the soil with an approved fill material; or mixing the soil with an approved lime or cement product.

MM GEO-11: General site clearing shall include removal of vegetation and existing utilities; structures; including foundations basement walls and floors; existing stockpiled soil; trees and associated root systems; rubble; rubbish; and any loose and/or saturated materials. Site stripping shall extend to a minimum depth of 2 to 4 inches, or until all organics in excess of 3 percent by volume are removed. Deeper stripping may be required in localized areas. These materials will not be suitable for reuse as engineered fill, however, stripped topsoil may be stockpiled and reused in landscape or non-structural areas.

MM GEO-12: The upper 24 inches of soil within proposed building and exterior flatwork areas shall consist of non-expansive engineered fill. The intent is to support the proposed slab-on-grade and exterior flatwork areas with 24 inches of non-expansive fill. The non-expansive fill material should be a well-graded silty sand or sandy silt soil. A clean sand or very sandy soil is not acceptable for this purpose. A sandy soil will allow the surface water to drain into the expansive clayey soils below, which may result in soil swelling. Imported fill should be approved by the Soils Engineer prior to placement. The fill shall be placed as specified as engineered fill.

The organic-free, on-site, upper soils are predominately silty sand and sandy silt with various amount of clay. Some of these soils may be suitable for reuse as non-expansive engineered fill, provided they are cleansed of excessive organics and debris. The soils with Expansion Index greater than 20 shall not be used within the upper 24 inches of the building pad and exterior flatwork areas.

MM GEO-13: Within the proposed pavement areas, the upper 12 inches of subgrade soil shall be moisture-conditioned to near optimum moisture and recompacted to a minimum of 90 percent of maximum density based on ASTM D1557 Test Method.

MM GEO-14: The upper soils, during wet winter months, may become very moist due to the absorptive characteristics of the soil. Earthwork operations performed during winter months may encounter very moist unstable soils, which may require removal to grade a stable building foundation. Project site winterization consisting of placement of aggregate base and protecting exposed soils during the construction phase shall be performed.

MM GEO-15: A qualified geotechnical engineer shall be present during all site clearing and grading operations to test and observe earthwork construction, as acceptance of earthwork construction is dependent upon compaction and stability of the material. The Soils Engineer shall reject any material that does not meet compaction and stability requirements.

MM GEO-16: The preferred materials specified for engineered fill are suitable for most applications with the exception of exposure to erosion. Project site

winterization and protection of exposed soils during the construction phase shall be the sole responsibility of the contractor, since he has complete control of the project site at that time. Imported non-expansive fill shall consist of a well-graded, slightly cohesive, fine silty sand or sandy silt soil, with relatively impervious characteristics when compacted. This material shall be approved by the Soils Engineer prior to use and shall typically possess the following characteristics:

Fill soils shall be placed in lifts approximately 6 inches thick, moisture-conditioned as necessary, and compacted to achieve at least 90 percent of maximum density as determined by ASTM D1577 Test Method. Additional lifts shall not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable.

MM GEO-17: All excavations shall comply with the current OSHA requirements. All cuts greater than 3 feet in depth should be sloped or shored. Temporary excavations should be sloped at 1:1 (horizontal to vertical) or flatter, up to a maximum depth of 10 feet. Heavy construction equipment, building materials, excavated soil, and vehicular traffic should not be allowed within five feet of the top (edge) of the excavation.

Where sloped excavations are not feasible due to site constraints, excavations shall require shoring. The design of the temporary shoring shall take into account lateral pressures exerted by the adjacent soil, and, where anticipated, surcharge loads due to adjacent buildings and any construction equipment or traffic expected to operate alongside the excavation.

MM GEO-18: To maintain the desired support for existing or new foundations, new utility trenches shall be located such that the base of the trench excavation is located above an imaginary plane having an inclination of 1.0 horizontal to 1.0 vertical, extending downward from the bottom edge of the adjacent footing. Utility trenches shall be excavated according to accepted engineering practices following OSHA standards by a contractor experienced in such work. The responsibility for the safety of open trenches should be borne by the contractor. Traffic and vibration adjacent to trench walls should be kept to a minimum; cyclic wetting and drying of excavation side slopes should be avoided. Depending upon the location and depth of some utility trenches, groundwater flow into open excavations could be experienced, especially during or shortly following periods of precipitation.

MM GEO-19: With the exception of specific requirements of the local utility companies or building department, pipe bedding and shading shall consist of clean medium-grained sand. The sand shall be placed in a damp state and should be compacted by mechanical means prior to the placement of backfill soils. Above the pipe zone, underground utility trenches shall be backfilled with

either free-draining sand, on-site soil or approved imported soil. The trench backfill shall be compacted to at least 90 percent relative compaction.

MM GEO-20: Concrete slab-on-grade floors shall be underlain by a water vapor retarder. The water vapor retarder shall be installed in accordance with ASTM Specification E 1643-98. In addition, utility trenches within the structure shall be compacted to minimize the transmission of moisture through the utility trench backfill.

MM GEO-21: Positive drainage shall be established away from the structure and shall be maintained throughout the life of the structure. Ponding of water shall not be allowed adjacent to the structure. Over-irrigation within landscaped areas adjacent to the structure shall not be performed.

MM GEO-22: Retaining walls shall be constructed according to the recommendations of the approved Geotechnical Report.

5. SIGNIFICANT PROJECT IMPACTS AFTER MITIGATION

Based on standards of acceptable risk reflected in the City of Los Angeles Building Code, the Uniform Building Code, and performance review procedures of current standard engineering practices, no significant geology impacts would occur as a result of the Proposed Project with implementation of the applicable standard conditions of approval, project design features and recommended mitigation measures.