4.4 GEOLOGIC AND SEISMIC HAZARDS

INTRODUCTION

This section identifies and evaluates geologic and soils conditions at the project site that could affect, or be affected by implementation of the proposed project and recommends mitigation measures to avoid or lessen potential impacts. This section incorporates information contained in a Geotechnical Evaluation prepared by MACTEC Engineering and a Preliminary Geotechnical Design Study prepared by Kleinfelder, Inc. Copies of both the MACTEC Evaluation and Kleinfelder Study are provided in ***Appendix 4.4****. This section also incorporates information contained in the City of Glendale Safety Element (August 2003), which introduces standards and plans to reduce the loss of life, injury, damage to property, and economic and social dislocations as the result of natural and urban-related disasters.*

ENVIRONMENTAL SETTING

Existing Conditions

Topography and Geologic Setting

The Glendale Town Center project site is located in the southeastern portion of the San Fernando Valley on a gently sloping alluvial surface. The San Fernando Valley is an elliptical-shaped alluvium-filled basin, approximately 23 miles wide and 12 miles long, formed by deposition from streams and rivers that have transported sediments from the surrounding upland areas. The underlying alluvial soils in Glendale were derived from the nearby Verdugo Mountains to the north and the San Rafael Hills to the east.

Regionally, the site is located in the Transverse Ranges geomorphic province. This province is characterized by east-west trending geologic structures that include the Santa Monica Mountains and the active San Fernando Fault zone. The trend of the San Fernando Valley reflects the overall trend of the Transverse Ranges, where major structural features exhibit an east-west orientation in contrast to the north-west trend that dominates in the rest of California. The San Fernando Valley is an area of compression between the San Gabriel Mountains on the northeast and the Santa Monica Mountains on the south.

The topography of the site slopes gently to the south-southwest. Elevations at the project site range from approximately 515 to 525 feet, with an average elevation of approximately 520 feet above mean sea level.

Soils

Based on materials encountered during drillings on adjacent properties and on published geologic maps, the project site is predominately underlain by Holocene Age alluvium consisting of young alluvial fan deposits followed underneath by Pleistocene Age materials and Tertiary Age sedimentary rocks. The alluvial fan deposits generally consist of loose to moderately dense sand and silty sand with minor amounts of clay. Specifically, soils underneath the site appear to be generally uniform and consist of silty sand to a depth of 10 feet followed by a denser layer of sand to a depth of 80 feet.[1]

The less dense silty sand deposits on site have the potential to become weaker and more compressible when wet, while the underlying denser sand deposits are less likely to become affected by moisture. However, neither type of soil is expansive and will not expand or shrink significantly with an increase in moisture content.[2] In addition, small amounts of fill soils are present throughout the site as a result of the construction of existing structures and utility lines. The depth of these small fills varies between 3 to 5 feet.[3]

Groundwater

Based on the reported depth to water at the nearest ground water monitoring well and historic high water levels reported by the California Division of Mines and Geology, the depth to ground water beneath the site is believed to be greater than 80 feet.[4] For a more in depth discussion of groundwater, see **Section 4.12.1 Water Services.**

Tectonic Setting

Active, potentially active, and inactive faults exist throughout the Southern California region. Categorization of these faults is based on criteria developed by the California Geological Survey (formerly the California Division of Mines and Geology) for the Alquist-Priolo Earthquake Fault Zoning Program. By definition, an active fault is one that has had surface displacement of Holocene Age deposits within the last 11,000 years. A potentially active fault is a fault that has demonstrated surface displacement of Quaternary Age deposits in the last 1.6 million years. Inactive faults have not moved in

1 MACTEC, *Report of Geotechnical Evaluation for use in Environmental Impact Report Proposed Glendale Town Center*, 2002, pg. 2.

2 Ibid.

3 Kleinfelder, Inc., *Preliminary Geotechnical Design Information*, pg.1.

4 MACTEC, *Report of Geotechnical Evaluation for use in Environmental Impact Report Proposed Glendale Town Center*, 20002, pg. 4.

the last 1.6 million years.[5] A list of nearby active faults and the distance in miles between the project site and the nearest point on the fault, the maximum magnitude, and the slip rate for the fault are given in **Table 4.4-1**. A similar list of potentially active faults is presented in **Table 4.4-2**. The location of these faults in relation to the site is illustrated in **Figure 4.4-1**.

Active Faults

The closest active fault to the project site is the Verdugo Fault, which is located approximately 1.7 miles to the northeast. The Verdugo Fault extends across the central portion of the City and is considered a left-lateral strike-slip fault. Since the Verdugo Fault lies under several portions of the City where development exists, a worst-case scenario earthquake for Glendale would involve rupture of the fault.[6] Other active faults that may severely impact the City are listed in **Table 4.4-1**.

Table 4.4-1
Major Active Faults within 30 miles
of the Glendale Town Center

Fault (in increasing Distance)	Maximum Magnitude	Slip Rate (mm/yr.)	Distance from Site (Miles)	Direction From Site
Verdugo	6.7	0.5	1.7	NE
Hollywood	6.4	1.0	2.9	S
Raymond	6.5	0.5	3.2	SE
Elysian Park Thrust	6.7	1.5	6.5	SE
Compton-Los Alamitos	6.8	1.5	9.0	S
Sierra Madre	7.0	3.0	9.6	NE
Northridge Thrust	6.9	1.5	11.5	WNW
San Andreas (Southern Segment)	7.4	24.0	28.0	NE

Source: MACTEC, November 2002.

Potentially Active Faults

While no potentially active faults pass near the project site, several potentially active faults in the vicinity have the potential to generate earthquakes that could affect the project site. The closest potentially active fault to the site is the MacArthur Park Fault, which is located approximately 5.2 miles to the south-southwest.[7] Other inactive faults in the area are listed in **Table 4.4-2**. As with active faults located

5 MACTEC, pg. 5.
6 City of Glendale, *General Plan Safety Element*, 2003, pg. 3-3.
7 Ibid., pg. 8.

outside the City limits, these faults have the potential to generate strong earthquakes that could be felt in Glendale.

Table 4.4-2
Major Inactive Faults within 15 miles of the Glendale Town Center

Fault (in increasing Distance)	Maximum Magnitude	Slip Rate (mm/yr.)	Distance from Site (Miles)	Direction From Site
MacArthur Park	5.7	3.0	5.2	SSW
Coyote Pass	6.7	0.1	8.0	SSE
Northridge Hills	6.6	1.2	11.5	NW
Overland	6.0	0.1	12.0	SW

Source: MACTEC, 2002.

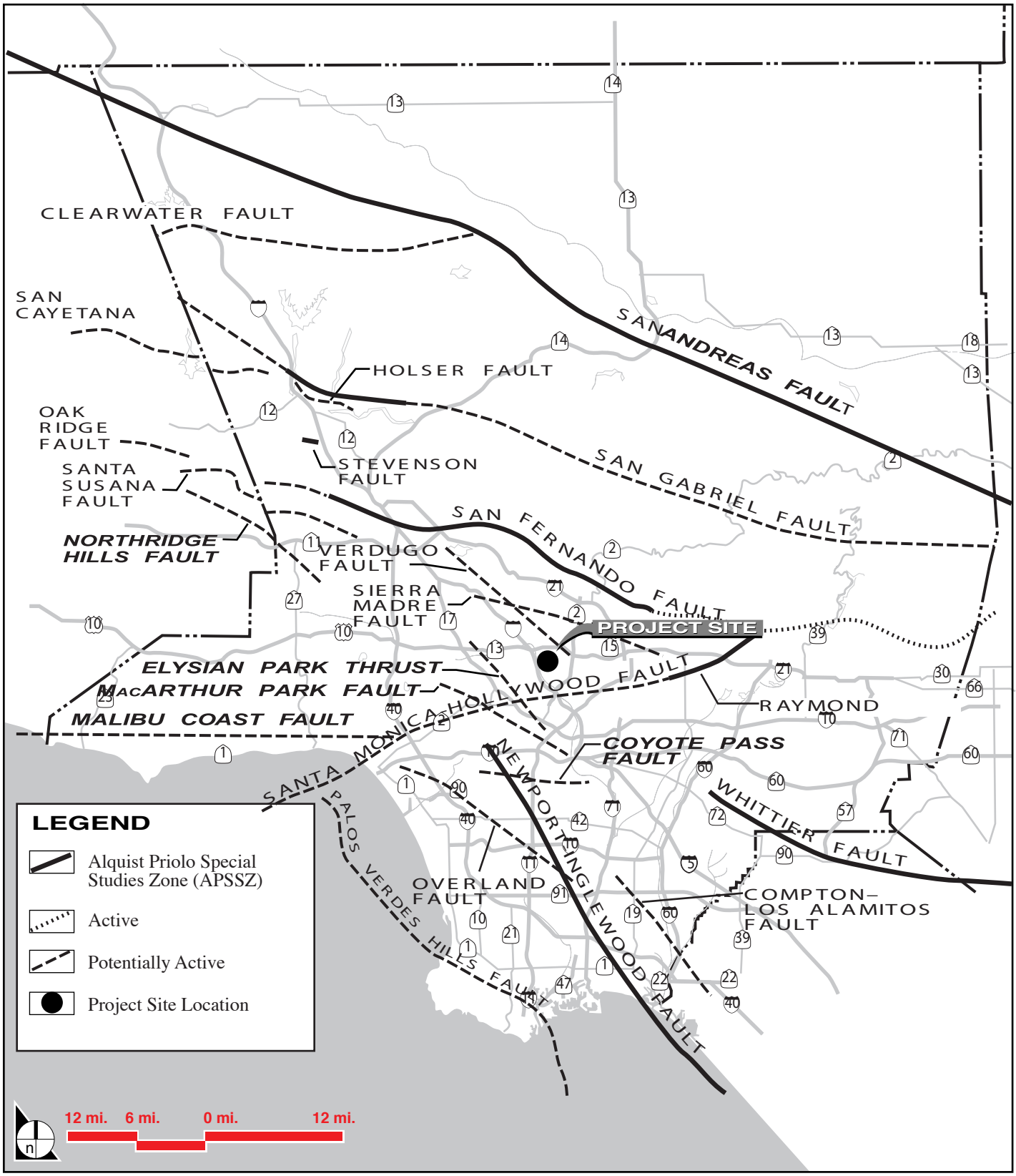
REGULATORY FRAMEWORK

Building and construction within the City of Glendale are subject to Chapter 15.12 of the Municipal Code, which governs grading, fill, and excavation activities. In addition, seismic design criteria are contained within the Uniform Building Code (UBC). Furthermore, the City of Glendale Safety Element (August 2003) includes standards and plans to reduce the loss of life, injuries, damage to property, and economic and social dislocations resulting from natural and urban-related hazards. A discussion of all goals and policies contained in the Safety Element is listed in **Section 4.1, Land Use and Planning**.

ENVIRONMENTAL IMPACTS

Methodology

The geotechnical evaluations included a review of previous geotechnical reports on an adjacent site, as well as nearby commercial and municipal projects. In addition, both published and unpublished literature pertaining to the project site was reviewed, including State of California Alquist-Priolo Earthquake Fault Zone Maps and Seismic Hazard Zone Maps, the City of Glendale Safety Element, and the County of Los Angeles Seismic Safety Element.



Source: Impact Sciences, 1997: Allan E. Seward, Engineering Geology 1997.

FIGURE **4.4-1**

Regional Fault Locations

618-01•12/03

Thresholds of Significance

The following thresholds for determining the significance of impacts related to geology and soils conditions are contained in the environmental checklist form contained in Appendix G of the most recent update of the California Environmental Quality Act (CEQA) *Guidelines*. Impacts related to geology and soils conditions are considered significant if the proposed project would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
    - 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. (Refer to Division of Mines and Geology Special Publication 42.)
    - Strong seismic ground shaking.
    - Seismic-related ground failure, including liquefaction.
    - Landslides.
- Result in substantial soil erosion or the loss of topsoil.
- 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.
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life and property.
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater (issue is addressed within **Section 5.0, Effects Found Not to be Significant**).

Impact Analysis

Each applicable threshold of significance is listed below followed by an analysis of the significance of any potential impacts, identification and discussion of any design features of the project that would lessen or avoid potential impacts as well as other measures identified that would lessen or avoid potential impacts. Finally, the significance of potential impacts after the implementation of all identified mitigation measures is presented.

Threshold: **Expose people or structures to potential 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. (Refer to Division of Mines and Geology Special Publication 42.).

ii. Strong seismic ground shaking.

iii. Seismic-related ground failure, including liquefaction.

iv. Landslides.

Impact Analysis:

Fault Rupture – The project site is not located within an established Alquist-Priolo Earthquake Fault Zone for surface fault rupture hazards. While the Verdugo Fault is the closest active fault to the project site, the closest Alquist-Priolo Earthquake Fault Zone is located approximately 3.1 miles to the east-southeast along the Raymond Fault.[8] Based on the available geologic data, active or potentially active faults with the potential for surface fault rupture are not known to be located directly beneath or projecting toward the project site. Therefore, the potential for surface rupture as a result of fault plane displacement during the design life of the project is less than significant.[9]

Strong Seismic Ground Shaking – The project site could be subject to strong ground shaking in the event of an earthquake originating along one of the faults listed as active or potentially active in **Table 4.4-1** and **Table 4.4-2**.[10] This hazard exists throughout Southern California and could pose a risk to public safety and property by exposing people, property or infrastructure to potentially adverse effects including strong seismic ground shaking. Because all structures shall be designed in accordance with the Uniform Building Code (UBC) and applicable City codes to ensure safety in the event of an earthquake, this impact would be reduced to less than significant.

Seismic Related Ground Failure, including Liquefaction – In general, liquefaction potential is greatest where the ground water level is shallow, and submerged loose, fine sands occur within a depth of about 50 feet or less below the ground surface. Historic and current groundwater levels beneath the project site are at depths greater than 80 feet below the existing ground surface. As a result, the project site is not within a liquefaction hazard zone, as designated by the State of California and the City of Glendale. The potential for liquefaction on site is not significant.[11]

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8 MACTEC, *Report of Geotechnical Evaluation for use in Environmental Impact Report Proposed Glendale Town Center*, 20002, pg.10.

9 Ibid., pg. 10.

10 Ibid., pg. 11.

11 MACTEC, *Report of Geotechnical Evaluation for use in Environmental Impact Report Proposed Glendale Town Center*, 20002, pg. 12.

Based on the boring conducted at an adjacent property and due to the generally dense nature of upper natural soils, seismic-induced settlement is anticipated to be small and relatively uniform, resulting in little, if any, distress to hardscape, utilities or structures. The potential for seismic-related ground failure is less than significant. Please refer the discussion later within this section regarding soil stability for fill materials.

Landslides – The topography of the project site and its immediate built environment is relatively flat, and thus devoid of any distinctive landforms. There are no known landslides near the project site, nor is the project site in the path of any known or potential landslides.[12] Therefore, the potential for impacts from landslides is not significant.

Project Design Features:

PDF 4.4-1 (a) All structures shall be designed in accordance with the Uniform Building Code (UBC) and applicable City codes to ensure safety in the event of an earthquake.

Level of Significance Before Mitigation: Less than significant.

Mitigation Measures: None are required.

Level of Significance After Mitigation: Less than significant.

***Threshold*: Result in substantial soil erosion or the loss of topsoil.**

Impact Analysis: Construction activity associated with project site development may result in wind and water driven erosion of soils due to grading activities if soil is stockpiled or exposed during construction. This potential impact is considered potentially significant. This impact is considered short-term in nature since the potential for significance will end after construction is finished due to covering the site with pavement and landscaping. As part of the project, the Applicant would be required to adhere to conditions under the NPDES Permit set forth by the Regional Water Quality Control Board (RWQCB), and prepare and submit a Storm Water Pollution Prevention Plan (SWPPP) to be administered throughout project construction. The SWPPP would incorporate Best Management Practices (BMPs) to ensure that potential water quality impacts during construction from water erosion would be reduced to less than significant. In addition, the Applicant would be required to adhere to SCAQMD Rule 403 – Fugitive Dust, which would further reduce the impacts associated with wind erosion to less than significant. Refer to **Project Design Features 4.4-1(b)** and **4.4-1(c)**.

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12 Ibid.

Project Design Features:

PDF 4.4-1(b) Prior to start of soil-disturbing activities at the site, a Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWPPP) shall be prepared in accordance with, and in order to partially fulfill, the California State Water Resources Control Board Order No. 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002 (General Construction Permit), and Chapter 13.29, Storm Water and Urban Runoff Pollution Prevention Control and Standard Urban Storm Water Mitigation Plan of the Glendale Municipal Code. The SWPPP shall meet the applicable provisions of Sections 301 and 402 of the CWA and Chapter 13.29, Storm Water and Urban Runoff Pollution Prevention Control and Standard Urban Storm Water Mitigation Plan of the Glendale Municipal Code, by requiring controls of pollutant discharges that utilize best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT) to reduce pollutants.

PDF 4.4-1(c) The project Applicant shall implement dust control measures consistent with SCAQMD Rule 403 – Fugitive Dust during the construction phases of new project development. The following actions are currently recommended to implement Rule 403 and have been quantified by the SCAQMD as being able to reduce dust generation between 30 and 85 percent depending on the source of the dust generation:

- Apply water and/or approved nontoxic chemical soil stabilizers according to manufacturer's specification to all inactive construction areas (previously graded areas that have been inactive for 10 or more days);
- Replace ground cover in disturbed areas as quickly as possible;
- Enclose, cover, water twice daily, or apply approved chemical soil binders to exposed piles with 5 percent or greater silt content;
- Water active grading sites at least twice daily during construction activities;
- Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour over a 30-minute period;
- All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least 2 feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer), in accordance with Section 23114 of the California Vehicle Code;

- Sweep streets at the end of the day if visible soil material is carried over to adjacent roads;
- Install wheel washers or gravel construction entrances where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip; and
- Post and enforce traffic speed limits of 15 miles per hour or less on all unpaved roads.

Level of Significance Before Mitigation: Less than significant.

Mitigation Measures: None are required.

Level of Significance After Mitigation: Less than significant.

***Threshold*: 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.**

Impact Analysis: The relatively flat-lying topography at the project site precludes both stability problems and the potential for lurching, which is earth movement at right angles to a cliff or steep slope during ground shaking.[13] Due to the depth of the groundwater table and the lack of naturally occurring petroleum deposits below the project site, the proposed project is not considered to be located within an area of known subsidence associated with fluid withdrawal from groundwater and petroleum extraction.[14] In addition, given the sandy nature and absence of large amounts of organic material in the soil, the proposed project is not located within an area of known subsidence associated with hydrocompaction, defined as the settling and hardening of land due to application of large amounts of water, or peat oxidation, defined as the decomposition of organic materials.[15]

The upper silty sand soils on the project site are not suitable for support of major buildings on shallow footings, building floor slabs and/or adjacent concrete walkways.[16] In addition, the existing fill materials on the project site are not suitable for support of foundations and/or on-grade concrete slabs on the project site. Therefore, development of large buildings upon these soil conditions represents a potentially significant impact. With the incorporation of the project design features that include the removal of

13 MACTEC, *Report of Geotechnical Evaluation for Use in Environmental Impact Report Proposed Glendale Town Center*, 2002, pg. 11.
14 Ibid., pg. 13.
15 Ibid., pg. 13.
16 Ibid., pg. 14.

upper silty sand and existing fill materials and the replacement of these materials with engineered fill, potential impacts would be reduced to less than significant.

Alluvial deposits on the project site are horizontally stratified and lack any well-defined planar features or discontinuities (such as bedding or joints) that would act as planes of weakness. Therefore, soil conditions will not significantly impact subterranean construction. Also, the geologic conditions at the project site will not create an additional surcharge on the proposed subterranean wall because of the horizontal stratifications. However, the sandy alluvial deposits could be prone to local raveling or caving during construction.[17] With the incorporation of the project design features which include shoring and bracing temporary evacuations, potential impacts would be reduced to less than significant.

Project Design Features:

The following are project design features that will mitigate impacts associated with unstable soil on the project site.

PDF 4.4-2 (a) Before building foundations are emplaced, existing fill shall be required to be replaced with engineered fill. For structures with no basement, over-excavation of the upper native soils to 3 to 5 feet below grade shall also be required to provide uniform support of the structures. It is anticipated that on-site soils are suitable for use in engineered fill once any existing debris and otherwise unsuitable materials are removed.[18]

PDF 4.4-2 (b) The upper silty sand soils shall be removed as necessary to allow placement of at least 18 inches of properly compacted fill beneath the floor slabs and adjacent concrete walks. The placement of compacted fill soils will not be required for the floor slab of the lower subterranean level. However, all loose and disturbed natural soils at the bottom of the lower subterranean level shall be removed and replaced as properly compacted fill.[19]

PDF 4.4-2 (c) All compaction shall be made in 6-inch lifts and will be compacted to at least 90 percent or 95 percent or maximum dry density according to ASTM D1557-91. A compaction requirement of 95 percent is recommended below footings with a 4,000 per square-foot (psf) bearing value, where the depth of new fill exceeds 6 feet.[20]

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17 Ibid., pg. 12.

18 Kleinfelder, Inc., *Preliminary Geotechnical Design Information*, pg.2.

19 MACTEC, *Report of Geotechnical Evaluation for use in Environmental Impact Report Proposed Glendale Town Center*, 20002, pg. 14.

20 Kleinfelder, Inc., *Preliminary Geotechnical Design Information*, pg.2.

PDF 4.4-2 (d) Shallow spread footings shall be established where at least one subterranean level underlies a building. Deep spread footings shall be required where a building is not underlain by a subterranean level.[21]

PDF 4.4-2 (e) On-grade low-rise buildings and minor structures that are separated from the major buildings shall be supported on shallow spread footings established in fill soils. Such footings shall be underlain by at least 2 feet of properly compacted fill and the compacted fill shall extend at least 2 feet beyond the footings in the plan.[22]

PDF 4.4-2 (f) Permanent slopes shall be constructed at a maximum inclination of 2:1 (H:V).[23]

PDF 4.4-2 (g) For preliminary design, properly drained walls below grade shall be designed with an active earth pressure of 35 pounds per cubic-foot and at rest earth pressure of 35 to 50 pounds per cubic-foot. Basement walls (braced walls) shall be designed for a trapezoidal pressure distribution with a maximum pressure of 20H psf where H is the height of the wall in feet.[24]

PDF 4.4-2 (h) Adequate drainage and waterproofing shall be provided for basement walls. An additional 100 pounds per square-foot for the upper 10 feet of the basement walls shall be used for adjacent traffic surcharge loads.[25]

PDF 4.4-2 (i) Preliminary asphalt pavements shall consist of 4 to 7 inches of asphalt concrete over 4 to 8 inches of base course for various levels of parking and driveways. Preliminary concrete (PCC) pavements sections shall consist of 4 to 7 inches of PCC over 6 to 12 inches of aggregate base. Pavements shall be underlain by compacted native soils or engineered fill.[26]

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21 MACTEC, *Report of Geotechnical Evaluation for use in Environmental Impact Report Proposed Glendale Town Center*, 20002, pg. 14.
22 Ibid.
23 Ibid., pg. 3.
24 Ibid.
25 Ibid.
26 Ibid.

PDF 4.4-2 (j) Cantilevered shoring for excavations less than 15 feet deep shall be designed for an active fluid pressure of 30 pounds per cubic-foot. If bracing is required, a trapezoidal distribution of pressure with a maximum pressure of 20H psf shall be used.[27]

PDF 4.4-2 (k) Soldier piles shall be designed for an average capacity of 600 pounds per square-foot. Due to silty sandy soils, caving and raveling should be expected in the drilling of the piles.[28]

PDF 4.4-2 (l) Lagging shall be required for shoring. An additional 100 psf shall be used for traffic surcharge loads. For excavations deeper than 15 feet or if additional support is required, tie back or raker braced shoring shall be required.[29]

PDF 4.4-2 (m) Where space is available, uncharged excavations more than 4 feet in depth shall be sloped back at 1:1 without shoring. Shoring will be required where space is not available for sloped excavations.[30]

PDF 4.4-2 (n) Temporary excavations greater than 5 feet in depth shall be shored or braced for safety in accordance with OSHA requirements.[31] Other preliminary temporary excavation slopes are presented below:

- 1/2:1 (H:V) for excavations with a maximum height of approximately 8 feet.
- 3/4:1 (H:V) for excavations with a maximum height of approximately 12 feet.
- 1:1 (H:V) for excavations with a maximum height of approximately 20 feet.

PDF 4.4-2 (o) Where underpinning of adjacent structures is necessary, an average resistance of 800 to 900 psf shall be used. Due to the sandy nature of the soils, caving and raveling shall be considered during drilling of the piers. Each structure to be underpinned shall be specifically evaluated from a geotechnical and structural standpoint.[32]

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27 Ibid.
28 Ibid.
29 Ibid.
30 MACTEC, *Report of Geotechnical Evaluation for use in Environmental Impact Report Proposed Glendale Town Center*, 20002, pg. 14.
31 Kleinfelder, Inc., *Preliminary Geotechnical Design Information*, pg. 4.
32 Ibid.

Level of Significance Before Mitigation: Less than significant.

Mitigation Measures: None are required.

Level of Significance After Mitigation: Less than significant.

***Threshold*:** **Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life and property.**

Impact Analysis: The natural soils underlying the project site are silty sand soils, which are materials that do not substantially expand or shrink with an increase in the moisture content.[33] If such expansion or shrinking did occur it would not be substantial enough to cause damage to structures. In addition, with the incorporation of all previously mentioned project design features impacts would be less than significant.

Project Design Features: None are required.

Level of Significance Before Mitigation: Less than significant.

Mitigation Measure: None are required.

Level of Significance After Mitigation: Less than significant.

Regulatory Consistency

The proposed Glendale Town Center will comply with all requirements contained in the City's Municipal and Building and Safety Codes. In addition, as described above, the proposed project will comply with all provisions contained in the UBC. Consistency with goals and policies contained in the City of Glendale General Plan is analyzed in **Section 4.1, Land Use and Planning**. As discussed in **Section 4.1**, the project conflict with applicable goals and policies pertaining to geology and soils listed in the Safety Element.

Cumulative Impacts

***Thresholds*:** **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. (Refer to Division of Mines and Geology Special Publication 42.).

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33 Ibid., pg. 2.

ii. Strong seismic ground shaking.

iii. Seismic-related ground failure, including liquefaction.

iv. Landslides.

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.

Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life and property.

Impact Analysis: The geographic context of the analysis of rupture of a fault, strong seismic ground shaking, liquefaction, landslide, lateral spreading, subsidence, collapse, and expansive soils are generally site specific, rather than cumulative in nature. This is because each development site has unique geologic considerations that would be subject to uniform site development and construction standards. In this way, potential cumulative impacts resulting from geological, seismic, and soil conditions would be reduced to less than significant on a site-by-site basis by modern construction methods and code requirements. Thus, cumulative impacts associated with Related Projects are considered to be less than significant. In addition, development of the Glendale Town Center would comply with the most stringent safety standards, consistent with all applicable local, state, and federal regulations, such as the Uniform Building Code. Consequently, the contribution of the project would not be cumulatively considerable and, thus, is less than significant.

Project Design Features None are required.

Level of Significance Before Mitigation: Less than significant.

Mitigation Measure: None are required.

Level of Significance After Mitigation: Less than significant.

***Threshold*:** **Result in substantial soil erosion or the loss of topsoil.**

Impact Analysis: Impacts from erosion and loss of topsoil from site development and operation can be cumulative in effect within a watershed. The Los Angeles River Watershed forms the geographic context of cumulative erosion impacts. Development throughout the City of Glendale is subject to state and local runoff and erosion prevention requirements, including the applicable provisions of the National Pollutant Discharge Elimination System, as well as implementation of fugitive dust control measures of the SCAQMD Rule 403. These measures are implemented as conditions of approval and subject to continuing enforcement. As a result, it is anticipated that the cumulative impact on the Los Angeles River watershed from cumulative development would be less than significant. The contribution of the

Glendale Town Center project would not be cumulatively considerable and, thus, is less than significant due to the extremely limited extent of ground disturbance on the project site and the implementation of measures to reduce erosion and safeguard water quality. The project's contribution is considered to be less than significant.

Project Design Features None are required.

Level of Significance Before Mitigation: Less than significant.

Mitigation Measure: None are required.

Level of Significance After Mitigation: Less than significant.