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## IV. ENVIRONMENTAL IMPACT ANALYSIS

### F. GEOLOGY AND SOILS

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#### REGULATORY SETTING

##### *State*

##### *California Alquist-Priolo Earthquake Fault Zoning Act*

The Alquist-Priolo Earthquake Fault Zoning Act (the “Act”) was signed into state law in 1972, as amended, with its primary purpose to mitigate the hazard of fault rupture by prohibiting the location of structures for human occupancy across the trace of an active fault. The Act requires the State Geologist to delineate “Earthquake Fault Zones” along faults that are “sufficiently active” and “well defined.” The Act also requires that cities and counties withhold development permits for sites within an Earthquake Fault Zone until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting. Pursuant to this Act, structures for human occupancy are not allowed within 50 feet of the trace of an active fault.

##### *Seismic Hazard Mapping Act*

The Seismic Hazard Mapping Act (the “SHMA”) was adopted by the state in 1990 for the purpose of protecting the public from the effects of non-surface fault rupture earthquake hazards, including strong ground shaking, liquefaction, seismically induced landslides, or other ground failure caused by earthquakes. The goal of the Act is to minimize loss of life and property by identifying and mitigating seismic hazards. The California Geological Survey (the “CGS”) prepares and provides local governments with seismic hazard zones maps that identify areas susceptible to amplified shaking, liquefaction, earthquake-induced landslides, and other ground failures.

##### *California Building Code*

Current law states that every local agency enforcing building regulations, such as cities and counties, must adopt the provisions of the California Building Code (the “CBC”) within 180 days of its publication. The California Building Standards Commission establishes the publication date of the CBC, and the code is also known as Title 24 of the California Code of Regulations. The most recent building standard adopted by the legislature and used throughout the state is the 2016 version of the CBC, often with local, more restrictive amendments that are based upon local geographic, topographic, or climatic conditions. These codes provide minimum standards to protect property and the public welfare by regulating the design and construction of excavations, foundations, building frames, retaining walls, and other building elements to mitigate the effects of seismic shaking and adverse soil conditions. The procedures and limitations for the design of structures are based on site characteristics, occupancy type, configuration, structural system height, and seismic zoning for Seismic Zone 4. Seismic ratings are derived from the

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Uniform Building Code (the “UBC”) specifications, which divide the U.S. into five geographical zones (0 through 4), of which Seismic Zone 4 - comprising most of central, coastal and southern California - is the most prone to earthquake activity. According to Section 1613A of the California Building Code, “Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with ASCE 7.”<sup>1</sup>

#### *Natural Hazards Disclosure Act*

The Natural Hazards Disclosure Act requires that sellers of real property and their agents provide prospective buyers with a “Natural Hazard Disclosure Statement” when the property being sold lies within one or more state-mapped hazard areas. If a property is located in a Seismic Hazard Zone, as shown on a map issued by the State Geologist, the seller or the seller’s agent must disclose this fact to potential buyers. California law also requires that when houses built before 1960 are sold, the seller must give the buyer a completed earthquake hazards disclosure report and a booklet titled “The Homeowners Guide to Earthquake Safety.” This publication was written and adopted by the California Seismic Safety Commission.

#### **Local**

The City of La Cañada Flintridge (LCF) has adopted, by reference, the County of Los Angeles Building Code, which incorporates the CBC.

## **ENVIRONMENTAL SETTING**

### **Seismic Hazards**

LCF is located in a seismically active region. Large earthquakes have occurred in region and will occur again in the future. Estimates by the Southern California Earthquake Center indicate an 82 percent probability exists for a 7.0-magnitude event to occur in Southern California in the next 30 years; smaller but still potentially damaging earthquakes can be expected to occur more frequently.<sup>2</sup>

The State of California recognizes two broad categories of hazards associated with earthquake events: 1) *primary seismic hazards*, which include surface fault rupture and ground shaking, and 2) *secondary*

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<sup>1</sup> ASCE 7 is a document published by the American Society of Civil Engineers that specifies minimum design loads for buildings and other structures.

<sup>2</sup> USGS, *Forecasting California’s Earthquakes – What Can We Expect?*, 2008.

*seismic hazards*, which include corollary results of ground shaking, such as seismically induced landslides and various types of ground failure, including liquefaction and ridgetop shattering. (Ridgetop shattering refers to earthquake-related shattering of bedrock materials along a ridgeline or other topographic high point.) Based on current knowledge of the City’s geology, earthquake ground shaking, liquefaction, and seismically induced landslides are the most serious geologic hazards.

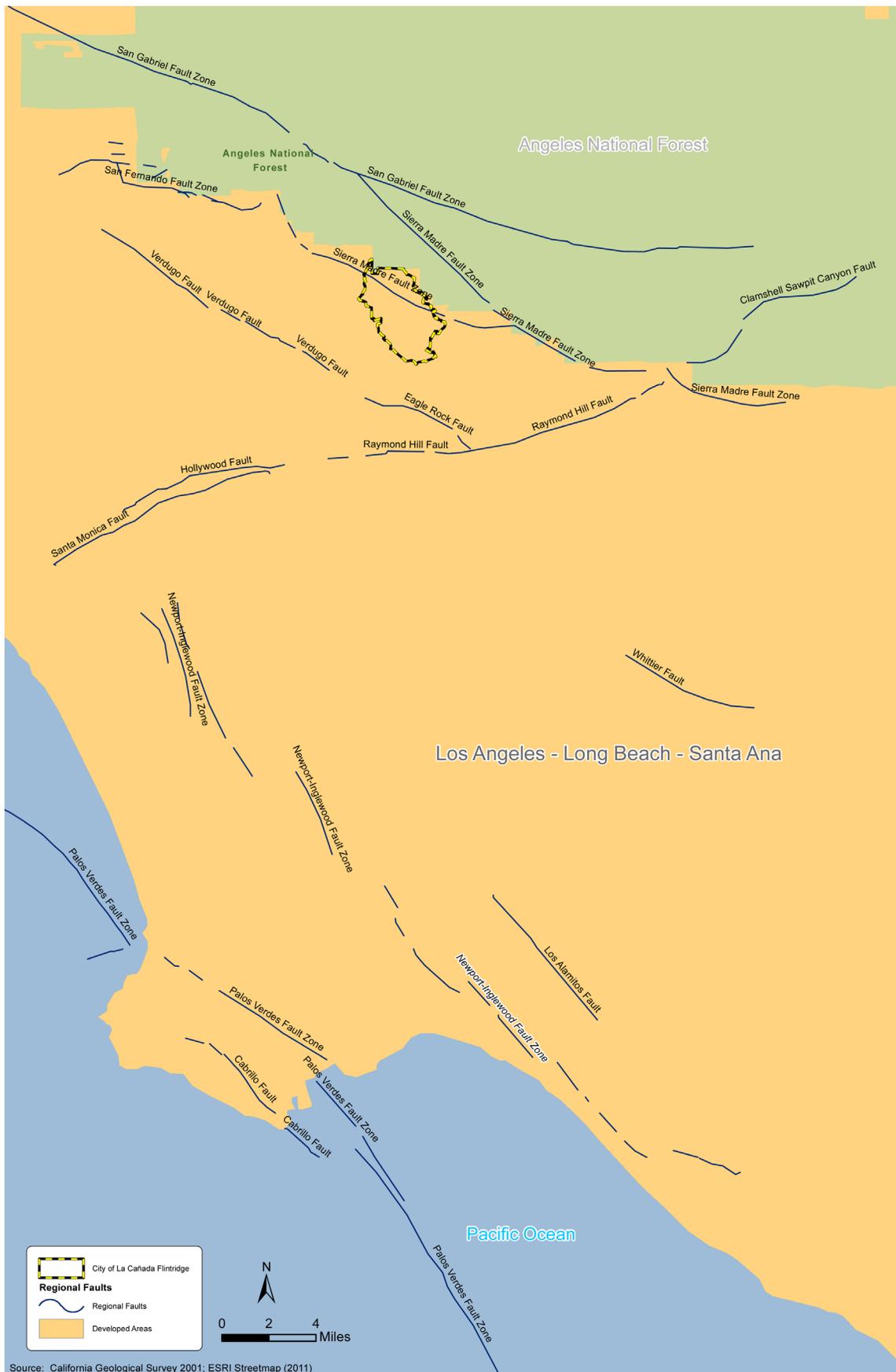
The City has one fault within its boundaries (the Sierra Madre fault) and is within five miles of several other faults (refer to Table IV.F-1 and Figure IV.F-1). In 2014, CGS released the Earthquake Zones of Required Investigation for the Azusa Quadrangle that mapped a section of the Sierra Madre fault within an Alquist-Priolo Earthquake Fault Zone and Seismic Hazard Zone. However, the section of the Sierra Madre fault that falls in the boundaries of the City is not mapped within an Alquist-Priolo Earthquake Fault Zone and Seismic Hazard Zone. Additionally, none of the other faults shown on Table IV.F-1 is within an Alquist-Priolo Earthquake Fault Zone and Seismic Hazard Zone.

**Table IV.F-1**  
**Active Faults Near the Project Site**

<b>Fault</b>	<b>Fault Type</b>	<b>Distance from Project Site (in miles)</b>	<b>Location Relative to Project Site</b>
Eagle Rock	Thrust	2.06	South
Sierra Madre	Reverse	2.14	North
Verdugo	Reverse	3.87	East
Raymond Hills	Left-lateral	3.87	South

*Source: City of La Cañada Flintridge General Plan, Safety Element.*

Studies by the Southern California Earthquake Data Center suggest that a large earthquake on the San Andreas fault, to the north, could trigger corollary ruptures on reverse faults along the southern margin of the San Gabriel Mountains. Whether all segments of the Sierra Madre fault zone would or could rupture in such an event is unknown. However, this and other reverse faults of the Transverse Ranges continue to be the subject of ongoing studies. A number of other faults that have been recognized as active by the State of California and/or the CBC are present in the surrounding region, and a moderate to major event on any of these faults could result in potentially damaging ground shaking in LCF.



Source: California Geological Survey 2001; ESRI Streetmap (2011)

Source: ICF International, 2014.

## Slopes and Soil Stability

The Project site is located on the crest of the San Rafael Hills, at an elevation of approximately 1,650 feet above sea level. According to the U.S. Department of Agriculture, Natural Resource Conservation Center, the soil association on and in the area surrounding the Project site is the Vista-Amargosa association.<sup>3</sup> This association is characterized by Vista and Amargosa soils. Vista soils, which are thinner sandy loam soils, are well drained and exhibit moderately rapid subsoil permeability. Amargosa soils are excessively drained, with rapid runoff and moderately rapid subsoil permeability that makes them prone to sheet and rill erosion and gullyng. However, hazards due to shrink-swell are minimal and therefore, these soils are not considered expansive soils. The potential for erosion with the Vista-Amargosa association is high. Given the hilltop location of the Project site, slopes in the area can range from 30 to 50 percent

Although the soil type present in the vicinity of the Project site has the potential to experience erosion, the Project site is not located in or near an area identified by the CGS as being susceptible to landslides.<sup>4</sup> In addition, the Project site is not located in area that is susceptible to liquefaction or subsidence.<sup>5</sup>

## ENVIRONMENTAL IMPACTS

### Threshold of Significance

#### *Appendix G of the CEQA Guidelines*

In accordance with Appendix G of the CEQA Guidelines, a project could have a significant environmental impact if a project would do the following:

- 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;

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<sup>3</sup> *A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil; the soil association is named for the major soils. The soils in one association may occur in another but in a different pattern.*

<sup>4</sup> *City of La Cañada Flintridge General Plan, Safety Element.*

<sup>5</sup> *Ibid.*

- 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;
- 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 wastewater disposal systems where sewers are not available for the disposal of wastewater.

As discussed in Section IV.A (Impacts Found to be Less Than Significant), the Project would not result in any impacts related to issues “a.i.” and “e.” Thus, no further analysis of these issues is required.

## **Project Impacts**

### ***Flintridge Sacred Heart Academy Campus***

#### *Seismic Ground Shaking*

As discussed previously, the Project site is in a seismically active region and is susceptible to ground motion as a result of potential movement along faults in the region. Seismic activity in the region is an existing condition. CEQA does not require that lead agencies study the impact of the existing environment upon the proposed project or its future occupants.<sup>6</sup> Nevertheless, CEQA does require study of the potential impacts of grading, excavation, and structures proposed as part of a project, including the potential impacts of these activities during seismic events. All new development associated with the Project would be required by LCF to be designed and constructed in conformance to the most recently adopted City Building Code design parameters. Additionally, LCF would require the Project Applicant to have prepared a Geotechnical Report that would address the specific building standards and recommendations that shall apply to building on the Project site (refer to Mitigation Measure F-1).

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<sup>6</sup> [\*California Building Industry Association v. Bay Area Air Quality Management District\* \(2015\) \\_\\_ Cal.4th \\_\\_ \(Case No. S213478\).](#)

Through compliance with LCF's building code and recommendations of a Geotechnical Report, impacts related to seismic ground shaking would be less than significant.

#### *Ground Failure/Liquefaction/Instability*

As discussed previously, no known faults exist on or near the Project site and as such, the potential for surface ground rupture at the Project site is considered low. Also, according to the CGS, the Project site is not in an area susceptible to liquefaction or subsidence. All development associated with the Project would be required by LCF to be designed and constructed in conformance to the most recently adopted City Building Code design parameters. Additionally, LCF would require the Project Applicant to prepare a Geotechnical Report that would address the specific building standards and recommendations that shall apply to building on the Project site. Through compliance with LCF's building code and recommendations of a Geotechnical Report, impacts related to ground failure/instability would be less than significant.

#### *Landslides*

As discussed previously, the Project site is not located in or near an area identified by the CGS as being susceptible to landslides. All development associated with the Project would be required by LCF to be designed and constructed in conformance to the most recently adopted City Building Code design parameters. Additionally, LCF would require the Project Applicant to have prepared a Geotechnical Report that would address the specific building standards and recommendations that shall apply to building on the Project site. Through compliance with LCF's building code and recommendations of a Geotechnical Report, impacts related to landslides would be less than significant.

#### *Erosion/Loss of Topsoil*

During the Project's construction phase, activities such as excavation, grading, and site preparation could leave soils at the Project site susceptible to soil erosion. However, the Project developer would be required to implement South Coast Air Quality Management District's (SCAQMD) Rule 403 – Fugitive Dust to minimize wind and water-borne erosion at the site. Also, the Project developer would be required to prepare and implement a Stormwater Pollution Prevention Plan (SWPPP), in accordance with the National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Associated with Construction Activity and Land Disturbance Activities. The site-specific SWPPP would be prepared prior to earthwork activities and would be implemented during Project construction. The SWPPP would include best management practices (BMPs) and erosion control measures to prevent pollution in storm water discharge. Typical BMPs that could be used during construction include good-housekeeping practices (e.g., street sweeping, proper waste disposal, vehicle and equipment maintenance, concrete washout area, materials storage, minimization of hazardous materials, proper handling and storage of hazardous materials, etc.) and erosion/sediment control measures (e.g., silt fences, fiber rolls,

gravel bags, storm water inlet protection, and soil stabilization measures, etc.). The SWPPP would be subject to review and approval by LCF. Additionally, all Project construction activities would comply with LCF's grading permit regulations, which require the implementation of grading and dust control measures, including a wet weather erosion control plan if construction occurs during rainy season, as well as inspections to ensure that sedimentation and erosion is minimized. Through compliance with these existing regulations, the Project would not result in any significant impacts related to soil erosion during the construction phase.

Additionally, for the Project's operation phase, in accordance with LCF's Low Impact Development (LID) Standards, the Project Applicant would be required to prepare and submit for review and approval an LID plan along with grading and drainage plans, which would be required to incorporate appropriate stormwater pollution control measures into the design of the Project. In accordance with LCF's LID Standards the Project Applicant would be required to implement the following measures that are set out as part of the LID Standards:

- Conduct site assessment and identify design considerations, including determining the feasibility of on-site infiltration;
- Apply site-specific source control measures;
- Calculate the Stormwater Quality Design Volume;
- Implement stormwater quality control measures, including retaining controlling discharge rates and volumes on the Project site to not exceed pre-Project conditions;
- Implement alternative compliance measures, if necessary;
- Implement hydromodification requirements, if necessary; and
- Develop a Maintenance Plan, if necessary.

Thus, no significant impacts related to erosion would occur as a result of Project operation.

#### *Expansive Soils*

As discussed previously, the Project site is located on the crest of the San Rafael Hills, at an elevation of approximately 1,650 feet above sea level. According to the U.S. Department of Agriculture, Natural Resource Conservation Center, the soil association on and in the area surrounding the Project site is the Vista-Amargosa association. This association is characterized by Vista and Amargosa soils. Vista soils, which are thinner sandy loam soils, are well drained and exhibit moderately rapid subsoil permeability. Amargosa soils are excessively drained, with rapid runoff and moderately rapid subsoil permeability that makes them prone to sheet and rill erosion and gulying. However, hazards due to shrink-swell are minimal and therefore, these soils are not considered expansive soils. All development associated with the Project would be required by LCF to be designed and constructed in conformance to the most recently adopted City Building Code design parameters. Additionally, LCF would require the Project Applicant to have prepare) a Geotechnical Report that would address the specific building standards and

recommendations that shall apply to building on the Project site, including the types of soils that would be encountered during construction. Compliance with LCF's building code and recommendations of a Geotechnical Report would ensure that impacts related to expansive soils would be less than significant.

### ***Southern California Edison Sub-Transmission Pole/Line Replacement***

Prior to implementation of the Specific Plan development projects, approximately eight existing 66-kV sub-transmission poles would be replaced, and approximately five new 66-kV sub-transmission poles would be installed. One existing H-Frame Structure located approximately 100 feet southeast of Highland Drive and approximately three existing 4-kV distribution poles located to the east of the FSHA Campus could be removed. Approximately four new 16-kV distribution poles would be installed – one at the intersection of Inverness Drive and St Katherine Drive and three north of the FSHA Campus. These sub-transmission pole/line replacement activities would be undertaken by SCE in accordance with the requirements of the California Public Utilities Commission (CPUC). Additionally, all construction activities associated with the pole/line replacement would be required to occur in accordance with NPDES storm water requirements to ensure that no significant erosion impacts would occur at the locations of the replaced/new poles. Through compliance with existing state and local regulations, impacts related to geology and soils would be less than significant.

## **CUMULATIVE IMPACTS**

Geotechnical impacts related to future development in LCF involve hazards related to site-specific soil conditions, erosion, and ground-shaking during earthquakes. The impacts on each site are specific to that site and its users and would not be in common or contribute to (or shared with, in an additive sense) the impacts on other sites. In addition, development on each site is subject to uniform site development and construction standards that are designed to protect public safety. Therefore, cumulative geotechnical impacts related would be less than significant.

## **MITIGATION MEASURES**

The following mitigation measure is required by LCF to ensure that no significant impacts related to geology and soils would be less than significant:

- F-1: Prior to issuance of any construction-related permit, FSHA shall have prepared a Geotechnical Report by a qualified engineer that addresses the specific building standards and recommendations that shall apply to building on the Project site.

## **LEVEL OF SIGNIFICANCE AFTER MITIGATION**

With implementation of Mitigation Measure F-1, impacts related to geology and soils would be less than significant.