mentioned, the project site is not located within or adjacent to an Earthquake Fault Zone regulated under the Alquist-Priolo Earthquake Fault Zoning Act. Since no known active or potentially active faults cross or project toward the site, the potential for fault-related surface rupture at the site is very low (PSI, 2008; Kleinfelder, 2010).

**Liquefaction**

Liquefaction is the phenomenon in which saturated granular sediments temporarily lose their shear strength during periods of earthquake-induced strong groundshaking. Liquefaction can produce excessive settlement, ground rupture, lateral spreading, or failure of shallow bearing foundations. To determine the liquefaction susceptibility of a region, factors to analyze include: (1) the density and textural characteristics of the alluvial sediments, (2) the intensity and duration of groundshaking, and (3) the depth to groundwater.

On the North Sky site, depth to groundwater is greater than 50 feet; in accordance with Special Publication 117 (SP 117), published by the California Department of Conservation, Division of Mines and Geology (CGS, 2008), standard geotechnical engineering analyses in California are not required to assess liquefaction where the depth to groundwater is greater than 50 feet. The potential for seismically induced liquefaction to occur on the North Sky site is minimal (PSI, 2008).

On the Jawbone site, the proposed tower sites are located where surface or near surface bedrock is present (Kleinfelder, 2010) and bedrock is a lithified formational material which is not considered liquefiable. Liquefaction potential on the rest of the Jawbone site is considered comparable to that described above for the North Sky site. Therefore, the potential for seismically induced liquefaction to occur on the Jawbone site is minimal.

**Lateral Spreading**

Lateral spreading is a potential hazard commonly associated with liquefaction where extensional ground cracking and settlement occur as a response to lateral migration of subsurface liquefiable material. These phenomena typically occur adjacent to free faces such as slopes and creek channels. With little to no potential for liquefaction, and bedrock sites for the wind towers, lateral spreading would be highly unlikely.

### 4.6.3 Regulatory Setting

Geologic resources and geotechnical hazards are governed primarily by local jurisdictions. The conservation elements and seismic safety elements of city and county general plans contain policies for the protection of geologic features and avoidance of hazards.

The California Environmental Quality Act (CEQA) is the major environmental statute that guides the design and construction of projects on non-federal lands in California. This statute sets forth a specific process of environmental impact analysis and public review. In addition, the project proponent must comply with other applicable State and local applicable statutes, regulations and policies. Relevant and potentially relevant statutes, regulations and policies are discussed below.
Federal

Clean Water Act (CWA)

The CWA (33 U.S.C. Section 1251 et seq.), formerly the Federal Water Pollution Control Act of 1972, was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the United States. The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non-point source discharges to surface water. Those discharges are regulated by the National Pollutant Discharge Elimination System (NPDES) permit process (CWA Section 402). Projects that disturb one or more acres of land are required to obtain NPDES coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction Activity (General Permit), Order No. 99-08-DWQ. The General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP), which includes Best Management Practices (BMPs) to protect stormwater runoff.

Requirements of the federal CWA and associated SWPPP requirements are described in further detail in Section 4.9 (Hydrology and Water Quality).

State

Alquist-Priolo Earthquake Fault Zoning Act of 1972

Formerly the Special Studies Zoning Act, the Alquist-Priolo Earthquake Fault Zoning Act of 1972 regulates development and construction of buildings intended for human occupancy to avoid the hazard of surface fault rupture. In accordance with this law, the California Geological Survey maps active faults and designates Earthquake Fault Zones along mapped faults. This Act groups faults into categories of active, potentially active, and inactive. Historic and Holocene age faults are considered active, Late Quaternary and Quaternary age faults are considered potentially active, and pre-Quaternary age faults are considered inactive. These classifications are qualified by the conditions that a fault must be shown to be “sufficiently active” and “well defined” by detailed site-specific geologic explorations in order to determine whether building setbacks should be established. Any project that involves the construction of buildings or structures for human occupancy, such as an operation and maintenance building, is subject to review under the Alquist-Priolo Earthquake Fault Zoning Act, and any structures for human occupancy must be located at least 50 feet from any active fault.

Seismic Hazards Mapping Act (the Act) of 1990

In accordance with Public Resources Code, Chapter 7.8, Division 2, the California Department of Conservation, Division of Mines and Geology [now the California Geological Survey (CGS)] is directed to delineate Seismic Hazard Zones through the Seismic Hazards Zonation Program. The purpose of the Act is to reduce the threat to public health and safety and to minimize the loss of life and property by identifying and mitigating seismic hazards, such as those associated with strong ground shaking, liquefaction, landslides, other ground failures, or other hazards caused by earthquakes. Cities, counties, and State agencies are directed to use seismic hazard zone maps developed by CGS in their land-use planning and permitting processes. In accordance with the Act, site-specific geotechnical investigations must be performed prior to permitting most urban development projects within seismic hazard zones.
**California Building Code (CBC, 2008)**

The State of California provides minimum standards for building design through the CBC. The CBC is based on the Uniform Building Code (UBC), which is used widely throughout the United States (generally adopted on a state-by-state or district-by-district basis), and has been modified for conditions within California. In 2008, a revised version of the CBC took effect. In accordance with the CBC, a grading permit is required if more than 50 cubic yards of soil is moved during implementation of a proposed project. Chapter 16 of the CBC contains definitions of seismic sources and the procedure used to calculate seismic forces on structures.

**Local**

Construction and operation of the proposed project is subject to policies and regulations contained within General and Specific Plans including the Kern County General Plan (KCGP), the Kern County Zoning Ordinance, and the Kern County Code of Building Regulations, which include policies for the avoidance of geologic hazards and/or the protection of unique geologic features, as well as for the preservation of paleontologic resources (please see Section 4.5 (Cultural Resources) for discussion of paleontologic resources relevant to the proposed project). The policies, goals, and implementation measures in the KCGP for geology and soils applicable to the project are provided below. The KCGP contains additional policies, goals, and implementation measures that are more general in nature and are not specific to development such as the proposed project. These measures are not listed below, but, as stated in Chapter 2, (Introduction), all policies, goals, and implementation measures in the KCGP are incorporated by reference.

**Kern County General Plan**

**Chapter 1. Land Use, Open Space, and Conservation Element**

**1.3 Physical and Environmental Constraints**

- **Policy 1.** Kern County will ensure that new developments will not be sited on land that is physically or environmentally constrained (Map Code 2.1 [Seismic Hazard], Map Code 2.2 [Landslide], Map Code 2.3 [Shallow Groundwater], Map Code 2.5 [Flood Hazard], Map Codes from 2.6 – 2.9, Map Code 2.10 [Nearby Waste Facility], and Map Code 2.11 [Burn Dump Hazard]) to support such development unless appropriate studies establish that such development will not result in unmitigated significant impact.

- **Policy 6.** Regardless of percentage of slope, development on hillsides will be sited in the least obtrusive fashion, thereby, minimizing the extent of topographic alteration required and reducing soil erosion while maintaining soil stability.

- **Policy 7.** Ensure effective slope stability, wastewater drainage, and sewage treatments in areas with steep slopes are adequate for development.

**1.9 Resource (Land Use, Open Space, and Conservation Element)**

- **Policy 17.** Lands classified as MRZ-2, as designated by the State of California, should be protected from encroachment of incompatible land uses.
4.3 Seismically Induced Surface Rupture, Ground Shaking, and Ground Failure (Safety Element)

- **Policy 1.** The County shall require development for human occupancy to be placed in a location away from an active earthquake fault in order to minimize safety concerns.

4.5 Landslides, Subsidence, Seiche, and Liquefaction (Safety Element)

- **Policy 1.** Determine the liquefaction potential at sites in areas of shallow groundwater (Map Code 2.3) prior to discretionary development and determine specific mitigation to be incorporated into the foundation design, as necessary, to prevent or reduce damage from liquefaction in an earthquake.
- **Policy 2.** Route major lifeline installations around potential areas of liquefaction or otherwise protect them against significant damage from liquefaction in an earthquake.
- **Policy 3.** Reduce potential for exposure of residential, commercial, and industrial development to hazards of landslide, land subsidence, liquefaction, and erosion.

5 Energy Element

**Policy 2.** All wind energy development shall be subject to the development standards of Kern County Zoning Ordinance.

**Kern County Zoning Ordinance (Title 19 of the Ordinance Code)**

The Wind Energy (WE) Combining District (Chapter 19.64) contains development standards and conditions (Section 19.64.140) that would be applicable to the siting and operation of WTGs. The following provisions apply to geology and soils issues related to the proposed project.

**Chapter 19.64 WE Combining District**

- **Section 19.64.140(A):** All necessary building and grading permits shall be obtained from the Kern County Planning and Community Development Department. For construction and permit purposes, all WTG towers shall conform to the regulations of the applicable seismic zone of the UBC and the applicable ground shaking zone.
- **Section 19.64.140(K):** Prior to issuance of any grading permit, a plan for the mitigation of potential soil erosion and sedimentation shall be prepared by a California registered civil engineer or other professional and submitted for the approval by the Director of the Engineering, Surveying, and Permit Services Department.
- **Section 19.64.140(L):** A minimum of on-site roadways shall be constructed. Temporary access roads utilized for initial machine installation shall be revegetated to a natural condition after completion of machine installation. The project proponent shall submit a plan of all proposed roads, temporary and permanent, for approval by the Planning Director prior to the issuance of any building permits.
- **Section 19.64.140(M):** Construction of any slopes steeper than four to one (4:1) shall be prohibited unless specifically authorized by the Kern County Planning and Community Development Department and mitigation is provided.
- **Section 19.64.130(N):** Soil erosion and sedimentation control plan, including revegetation plan, as provided in Section 19.64.140 (grading permits only).

**Kern County Code of Building Regulations (Title 17 of the Ordinance Code)**

All construction in Kern County is required to conform to the Kern County Building Code (Chapter 17.08, Building Code, of the Kern County Code of Regulations). Kern County has adopted the
UBC, 2007 Edition, with some modifications and amendments. The entire County is in Seismic Zone 4, a designation previously used in the UBC to denote the areas of highest risk to earthquake ground motion. California has an Unreinforced Masonry program that details seismic safety requirements for Zone 4. Seismic provisions associated with Seismic Zone 4 have been adopted.

Chapter 17.28 Kern County Grading Code.

The purpose of the Kern County Grading Code is to safeguard life, limb, property and the public welfare by regulating grading on private property. All requirements of the Kern County Grading Code will be applied during implementation of the proposed project. All required grading permit(s) shall be obtained prior to commencement of construction activities. Sections of the Grading Code that are particularly relevant to geology and soils are provided below.

Section 17.28.140 Erosion control.

A. Slopes. The faces of cut and fill slopes shall be prepared and maintained to control against erosion. This control may consist of effective planting. The protection for the slopes shall be installed as soon as practicable and prior to calling for final approval. Where cut slopes are not subject to erosion due to the erosion-resistant character of the materials, such protection may be omitted.

B. Other Devices. Where necessary, check dams, cribbing, riprap or other devices or methods shall be employed to control erosion and provide safety.

C. Temporary Devices. Temporary drainage and erosion control shall be provided as needed at the end of each work day during grading operations, such that existing drainage channels would not be blocked. Dust control shall be applied to all graded areas and materials and shall consist of applying water or another approved dust palliative for the alleviation or prevention of dust nuisance. Deposition of rocks, earth materials or debris onto adjacent property, public roads or drainage channels shall not be allowed.

Section 17.28.170 Grading inspection.

A. General. All grading operations for which a permit is required shall be subject to inspection by the building official. Professional inspection of grading operations and testing shall be provided by the civil engineer, soils engineer and the engineering geologist retained to provide such services in accordance with Subsection 17.28.170(E) for engineered grading and as required by the building official for regular grading.

B. Civil Engineer. The civil engineer shall provide professional inspection within such engineer’s area of technical specialty, which shall consist of observation and review as to the establishment of line, grade and surface drainage of the development area. If revised plans are required during the course of the work they shall be prepared by the civil engineer.

C. Soils Engineer. The soils engineer shall provide professional inspection within such engineer’s area of technical specialty, which shall include observation during grading and testing for required compaction. The soils engineer shall provide sufficient observation during the preparation of the natural ground and placement and compaction of the fill to verify that such work is being performed in accordance with the conditions of the approved plan and the appropriate requirements of this chapter. Revised recommendations relating to conditions differing from the approved soils engineering and engineering geology reports shall be submitted to the permittee, the building official and the civil engineer.
4.6.4 Impacts and Mitigation Measures

This section describes the methodology used in conducting the CEQA impact analysis for geology and soils, the thresholds of significance used in assessing impacts to geology and soils, and the assessment of impacts to geology and soils, including relevant mitigation measures.

Methodology

This section describes the potential geology and soils impacts associated with development of the proposed project. This analysis first established baseline conditions for the affected environment relevant to geology and soils, as presented above in Section 4.6.2 (Environmental Setting). These baseline conditions were evaluated based on their potential to be affected by construction activities as well as operation and maintenance activities for the proposed project. As described in Sections 3.7 (Construction), 3.8 (Operation and Maintenance Activities), and 3.9 (Decommissioning and Repowering), activities that are reasonably expected to occur throughout the life of the proposed project, including construction and installation of WTGs, operation and maintenance, and decommissioning, may extend over a period of 30 years. The predicted interactions between the