

The Soils, Geology, and Seismicity chapter of the Environmental Impact Report (EIR) describes the geologic and soil characteristics of the project site and evaluates the extent to which implementation of the proposed project could be affected by seismic hazards such as ground shaking, liquefaction, and expansive soil characteristics. The analysis also addresses potential effects of the Bohemia Retail Project (proposed project) on erosion. The project site has undergone two separate environmental reviews conducted for previous projects, which have since been withdrawn (Refer to the Project Background subsection in Chapter 3). In addition, an Initial Study was prepared by Placer County on April 24, 2008 for the proposed project and is included as Appendix C of this Draft EIR. Informational sources for this evaluation include the *Revised Geotechnical Engineering Report* (Revised Geotechnical Report) conducted by Wallace Kuhl & Associates (See Appendix N),<sup>1</sup> the *Geotechnical Investigation Report for the Proposed Bohemia Residential Development* conducted by España Geotechnical Consulting (See Appendix O),<sup>2</sup> the *Phase I Environmental Site Assessment* conducted by Charles Lockwood Consulting Engineer, Inc. (See Appendix P),<sup>3</sup> the *Phase II Soil Investigation* conducted by GHH Engineering, Inc. (See Appendix Q),<sup>4</sup> the *Placer County General Plan (PCGP)*,<sup>5</sup> the *PCGP EIR*,<sup>6</sup> the *Auburn/Bowman Community Plan (ABCP)*,<sup>7</sup> and the Natural Resources Conservation Service's (NRCS's) *Soil Survey for Placer County* (Soil Survey).<sup>8</sup>

All impacts in the Bohemia Retail Initial Study were identified as *potentially significant* and are therefore addressed within this chapter (See Appendix C).

## 11.1 ENVIRONMENTAL SETTING

### Regional Setting

The proposed project is situated at the base of the Sierra Nevada Foothills region in Placer County, California within the Sierra Nevada Mountain Range (geomorphic province). Placer County covers approximately 1,500 square miles between Sacramento and the Nevada State border. Placer County has three general areas, each with distinct geological and topographical features including the Western Region, Central Region, and Eastern Region. The proposed project is located in the Foothill region of the Central Region, which includes the City of Auburn and surrounding areas. The Central and Eastern Regions are located within the Sierra Nevada Geomorphic Province. Areas to the west include the Sacramento Valley with the foothills and mountain ranges of the Sierra Mountains extending eastward.

### Regional Geology

The Sierra Nevada geomorphic province is predominantly composed of granite rock derived approximately 200 million years ago. Placer County is situated in a seismically active area of the State. However, when compared to the Eastern Region of the Placer County and coastal areas of

the State, the Western and Central Regions of the Placer County are generally characterized with a low seismicity. According to the PCGP Background Report, historical records indicate that several moderate earthquakes have occurred within the Placer County, although none have exhibited any evidence of surface rupture.<sup>9</sup> Other regional geological conditions of the Placer County include the potential for fault surface rupture, groundshaking and liquefaction (during earthquakes), landslides (during earthquakes), expansive soils, soil erosion, and avalanches.<sup>10</sup>

### **Regional Seismicity**

A fault is defined as a fracture or zone of closely associated fractures along which rocks on one side have been displaced with respect to those on the other side. A fault zone is a zone of related faults that is commonly braided and subparallel, but may be branching or divergent. Movement within a fault causes an earthquake. When movement occurs along a fault, the energy generated is released as waves that cause ground shaking. Ground shaking intensity varies with the magnitude of the earthquake, the distance from the epicenter, and the type of rock or sediment the seismic waves move through.

The Alquist-Priolo Special Studies Zone Act of December 1972 (AP Zone Act) regulates development near active faults so as to mitigate the hazard of surface fault rupture. The AP Zone Act requires that the State Geologist (Chief of the California Department of Mines and Geology [CDMG]) delineate “special study zones” along known active faults in California. Cities and counties affected by these zones must regulate certain development projects within these zones. The AP Zone Act prohibits the development of structures for human occupancy across the traces of active faults. According to the AP Zone Act, “active faults” have experienced surface displacement during the last 11,000 years. “Potentially” active faults are those that show evidence of surface displacement during the last 1.6 million years. A fault may be presumed to be inactive based on satisfactory geologic evidence; however, the evidence necessary to prove inactivity sometimes is difficult to obtain and may not exist locally. The Central Region of the Sierra Nevada province is generally considered to be less-seismically active than other areas of California, such as the Eastern Region of Placer County and coastal areas of the State.

### **Local Seismicity**

The project site is not located within an Alquist-Priolo Special Study Zone (AP Zone) nor located near any active faults.<sup>11</sup> According to the previous geotechnical reports, four recognized fault systems traverse through the Placer County. The nearest known fault system is the Foothills Fault system, which is located west of the project site. Activity of this system is not well understood. The Foothill Fault system is aligned in a general northwest to southeast direction from Oroville to Fresno, California and is associated with the Sierra Nevada uplift. The Foothill Fault system is not identified within an AP Zone. Recent seismicity from this system included an event during the 1940’s and more recently in 1975 near Oroville, California.

The State requires that structures be designed to resist seismic activity and wind stresses. Minimum requirements for seismic safety and structural design standards are set forth in Chapter 16 or the Uniform Building Code (UBC) and California Building Code (CBC). The State is

divided into two “seismic zones”, Zone 3 and Zone 4, each with respective design standards. The project site is located in Zone 3.

Surface Rupture

A surface rupture is the outcome from two or more faults that produce enough deep underground energy that generates a surface fracture. The AP Zone Act limits development of lands located within a fault rupture zone. As described above, the project site is not located within an AP Zone, nor is the site located near any active faults.

Seismic Shaking Intensity

The Modified Mercalli Intensity (MMI) Scale measures an earthquake’s intensity based upon the effects from ground shaking. The range of MMI values for intensity range from I (event not felt by most people) to XII (nearly total damage). Moderate to significant structural damage is generally restricted to MMI values between IV to XI.

The Richter Scale measures the magnitude of an earthquake’s seismic energy release. Higher Richter Scale numerical values represent stronger earthquakes that generally correspond to higher MMI values. The relationship between an earthquake’s intensity and magnitude is shown in Table 11-1.

Max Intensity (MMI) Scale	Richter Scale Magnitude	Approximately Distance Effects are Felt (miles)
I – III	3.0 – 3.9	15
IV – V	4.0 – 4.9	30
VI – VII	5.0 -5.9	70
VII – VIII	6.0 – 6.9	125
IX – XII	7.0 – 7.9	250
<i>Source: California Office of Emergency Services. Approximate Relationship Between Earthquake Intensity and Magnitude. 2005.</i>		

The California Geological Survey (CGS) records information about seismicity and area fault systems. According to the CGS, the project site is identified as having a Peak Gravitational Acceleration (PGA) of approximately 0.102 g-force in firm rock, 0.111 in soft rock, and a 0.148 in alluvium.<sup>12</sup> Such PGA values are considered to be low levels of seismic ground shaking and may be associated with a maximum seismic event with a MMI value of VII. An earthquake with this MMI rating could cause negligible damage in buildings of good design and construction.

**Project Site Characteristics**

The project site is located approximately 2.3 miles north of downtown Auburn within the ABCP area. The topography of the four parcels comprising the project site is generally flat, ranging in elevations between 1,428 feet to 1,480 feet above mean sea level. The site had been previously

developed for lumber mill operations and evidence of the former building foundations and paved/gravel areas are still apparent, although no remaining structures are onsite. Over the years, grasses and shrubs have been established throughout the vacant parcels.

### Site Geology

The project site and surrounding area is underlain by Paleozoic to Mesozoic metavolcanic rocks (greenstone) and ultramafic rocks (serpentine). Weathered greenstone will commonly exhibit reddish clay, clayey, and silty sand. Contrastingly, serpentine soils usually weather to a light to moderate dark green silty and/or sandy clay. The geological attributes of the project site have been well documented.

Between the years 1992 and 2008, the project site has undergone three geotechnical investigations. The first report was completed on September 16, 1992 by Wallace Kuhl & Associates, Inc. for a previous project that has since then been withdrawn. A 2008 Revised Geotechnical Report was prepared by Wallace Kuhl & Associates, Inc., which updated and corroborated the findings from the original 1992 investigation for the project site. The original field exploration consisted of drilling 11 borings (between 6 and 15 feet in depth), excavating 12 test pits (between 2 and 7 feet below ground surface), and performing two seismic refraction surveys. The revised report included another four exploratory borings that confirmed the findings from the original report.

In addition to these two reports, a third geotechnical report was conducted in December 2004 by Espana Geotechnical Consulting for a former project that has since been withdrawn. The 2004 investigation included 16 test pits, laboratory testing of soil samples, and analysis to determine the presence of Naturally Occurring Asbestos, which is analyzed further in Chapters 9 (Air Quality) and 14 (Hazardous Materials and Hazards).

### Soil Conditions

Soils are commonly identified by similar or dissimilar characteristics, such as the erosion potential, shrink-swell properties, permeability, available water capacity, and runoff potentials. In their exploratory borings and test pits, Wallace Kuhl & Associates, Inc. encountered surface materials consisting of silty sand overlying highly weathered, metavolcanic rock. In addition, the USDA NRCS's Soil Survey was consulted to determine the specific soil types found onsite. The NRCS's Soil Survey for Placer County identified two soil types within the boundaries of the proposed project: Xerorthents (cut and fill areas) and Auburn silt loam.

The Xerorthents material is characterized by well-drained mine spoils (stony, cobbly, and gravelly materials) or earthy fill materials at depths of 0 to 60 inches. The available water capacity for Xerorthents is very low (0.0 inches), with slopes generally between 2 and 50 percent. The permeability, runoff, erosion hazard, and drainage are variable. Approximately 85-90 percent of the project site is composed of this type of material.

Auburn silt loam is characterized by well-drained silt loams derived from residuum and weathered from metamorphic rock. The available water capacity for Auburn silt loam is low

(approximately 3.2 inches), with slopes between 2 and 15 percent. Approximately 10 to 15 percent of the project site is composed of this type of material.

### Liquefaction

Liquefaction is a phenomenon in which certain soils, when saturated with water and subjected to considerable seismic events, temporarily lose their solid structure and effectively move as a liquid and generate ground failure. Soil types located in areas with high groundwater tables or high rainfall and comprised of sands and sandy loams are subject to liquefaction during seismic events. Based upon the geological investigations conducted by Wallace Kuhl & Associates Inc., the project site is not considered to be susceptible to liquefaction.

### Expansive Soils

Expansive soils are those that greatly increase in volume when they absorb water and shrink when they dry out. Expansive soils are typically characterized by large amounts of finer grained materials such as silts and clays within the soil matrix. Expansion is measured by a shrink-swell potential, which is the relative volume change in a soil from a net gain or loss of moisture. Based upon the conclusions of the geotechnical investigations, the soils found onsite have a low soil expansion potential.

### Groundwater

During the investigative borings conducted for the geotechnical reports, groundwater was not encountered in the test pits during or immediately after the drilling operations. It should be noted that the maximum depth for any test pit or borings conducted was no greater than 20 feet in depth.

### Subsidence

Subsidence refers to the gradual compaction of ground surface soil, loss of soil materials, the oxidation of organic solids, or triggered by seismic events. Groundwater withdrawal is the most common cause of land subsidence within California. The project site is not located in area identified with a moderate or high potential for subsidence.

### Landslides

Landslides are generally defined as the downslope movement of rock and soil material under the force of gravity. The results of the geotechnical reports prepared for the project site indicates that the underlying soils (greenstone and serpentine) are relatively stable and of "high strength." The project site and vicinity did not display any previous evidence of landsliding. Based upon the dense nature of the underlying material and low topographic relief of the project site, the potential for landsliding or slope instability is considered to be low for the project site.

## **11.2 REGULATORY SETTING**

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The following chapter is a brief summary of the regulatory context under which soils, geology, and seismic hazards are managed at the federal, state, and local levels.

## **Federal**

### Federal Earthquake Hazards Reduction Act

Passed by Congress in 1977, the Federal Earthquake Hazards Reduction Act is intended to reduce the risks to life and property from future earthquakes. The Act established the National Earthquake Hazards Reduction Program (NEHRP). The goals of NEHRP are to educate and improve the knowledge base for predicting seismic hazards, improve land use practices and building codes, and to reduce earthquake hazards through improved design and construction techniques.

## **State**

### Alquist-Priolo Earthquake Fault Zoning Act

The 1972 AP Zone Act was passed to prevent the new development of buildings and structures for human occupancy on the surface of active faults. The Act is directed at the hazards of surface fault rupture and does not address other forms of earthquake hazards. The locations of active faults are established into fault zones by the AP Zone Act. Local agencies regulate any new developments within the appropriate zones in their jurisdiction.

### Seismic Hazards Mapping Act

Passed in 1990, the Seismic Hazards Mapping Act addresses non-surface rupture earthquake hazards, which may include liquefaction and subsidence. A mapping program is also established by this Act, which identifies areas within California that have the potential to be affected by such non-surface rupture hazards.

### National Pollutant Discharge Elimination System (NPDES)

As required under the federal Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources, which discharge pollutants into waters of the United States. In California, the NPDES permit issues are overseen by the nine individual Regional Water Quality Control Boards. Placer County and the ABCP area would be overseen by the Central Valley Regional Water Quality Control Board. Issues pertaining to erosion processes (wind and water) are addressed within this chapter; however water quality-related issues are addressed and analyzed in Chapter 12 (Hydrology and Water Quality) of this Draft EIR.

## California Building Standards Code / Uniform Building Code

The State of California provides minimum standards for building design through the California Building Standards Code (California Code of Regulations (CCR), Title 24). The California Uniform Building Code (CUBC) is based on the federal Uniform Building Code (UBC) used widely throughout the United States. The CBC includes specific safety and design standards for new structures to resist the forces of strong winds and seismic activity.

### **Local**

#### Auburn/Bowman Community Plan

The ABCP establishes the following goals and policies applicable to geology issues.

#### Soils

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| Goal 1   | Conservation of soils as a valuable natural resource.   |
| Goal 2   | Minimize soil loss due to accelerated erosion.  |
| Goal 3   | Minimize the conversion of soils suitable for agricultural purposes to non-agricultural uses.   |
| Policy 1 | Utilize the existing inventory of important soil types to serve as a means of identifying unique and important resources prior to project development. In the absence of more detailed site-specific studies, determination of soil suitability for particular land uses shall be made according to the Soil Conservation Service's Soil Survey of Placer County. |
| Policy 2 | Coordinate with local, State, and federal agencies with a trustee responsibility for the management of natural resources when land development activities affect soil resource conservation and management efforts.   |
| Policy 3 | Require slope analysis maps during the environmental review process or at the first available opportunity of project review, as needed, to assess future grading activity, building location impacts, and road construction impacts.  |
| Policy 4 | Ensure implementation of the Placer County Grading Ordinance to protect against sedimentation and soil erosion.   |
| Policy 5 | Support and encourage existing special district, State, and federal soil conservation and restoration programs.   |

- Policy 6 Developers shall provide adequate drainage and erosion control during construction as described in the Placer County Land Development Manual.
- Policy 7 Discourage the use of off-road motor vehicles in areas where topsoil destruction or reduction of valuable habitat could result.
- Policy 8 Discourage the conversion of land designated for agricultural uses to non-agricultural uses by encouraging Williamson Act Preserves, by maintaining large minimum parcel sizes in agricultural areas in order to prevent fragmentation of land ownership patterns that lead to the loss of open space and economic agricultural units, and by supporting an agricultural buffer zone which would result in directing “urban and suburban” uses into areas appropriately zoned for such uses.
- Policy 9 Consider recreation facilities and activities, such as fishing, camping, equestrian activities, and parks as appropriate uses in areas of agricultural operations.

#### Geology

- Goal 1 Minimize loss of life, injury, and damage to property, and impacts to human health resulting from geologic hazards.
- Goal 2 Identify and protect important geologic and mineral resources in the Plan area.
- Policy 1 Require a detailed geological report during the environmental review process (could be deferred until the improvement plan process) for public and private development projects in high hazard areas (15% to 30% or more slopes). Such reports shall be completed by a registered geologist, or other qualified specialist, and shall conform to standards adopted by the County of Placer.
- Policy 2 Require a soils report on all building permits and grading permits within areas of known slope instability or where significant potential hazard has been identified.
- Policy 3 Discourage, through precise zoning for large parcel sizes, new development on serpentine formations which require individual wells, septic systems, or water recharge areas.
- Policy 4 During project review, consider the development limitations of geologic formations.

Policy 5      The goals and policies of Placer County Mineral Resource Conservation Element are included by reference as part of the ABCP.

### 11.3 IMPACTS AND MITIGATION MEASURES

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#### Standards of Significance

The following thresholds of significance related to soils, geology, and seismicity are derived from the criteria listed in Appendix G of the State CEQA Guidelines.

Impacts resulting from the project would be considered significant if the project would:

- Expose people or structures to 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;
  - Strong seismic ground shaking;
  - Seismic-related ground failure, including liquefaction; and/or
  - Landslides.
- Result in substantial soil erosion or the loss of top soil;
- 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 landslides, lateral spreading, subsidence, liquefaction or collapse; or
- Be located on expansive soil, as defined in Table 118-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.

#### Method of Analysis

The Soils, Geology, and Seismicity chapter identifies any impacts to and from geological, seismic, or soils-related impacts that could occur during the construction and/or operation of the proposed project. Evaluation of potential geological and soil impacts were based on a review of the abovementioned reference documents, including the original and revised geotechnical reports.

As stated earlier, all impacts in the Bohemia Retail Initial Study were identified as *potentially significant* and are therefore addressed within this chapter.

#### Project-Specific Impacts and Mitigation Measures

If significant impacts are identified for the construction and operational phases of the proposed project, recommended mitigation measures have been included to reduce the identified impacts to less-than-significant levels.

**11-1 Risks to people and structures associated with seismic activity, including surface rupture, seismic shaking, subsidence, and/or landslides.**

As previously described, the project site and vicinity is not located in a region of Placer County known for high seismic activity. The site is not located within or near an AP Zone and would not be subjected to significant seismic hazards from fault ruptures. According to the CGS, seismic activity in the area, although rare, could produce an earthquake intensity scale rating (MMI) of VII. The associated PGA values for a seismic event with an MMI rating of VII would be 0.102 g-force in firm rock, 0.111 in soft rock, and a 0.148 in alluvium. Such PGA values are considered to be low levels of seismic ground shaking.<sup>13</sup> Potential damage from such a seismic event could cause negligible damage in buildings of good design and construction. As presented in the Revised Geotechnical Report, the project site is not located in an area with moderate to high potential for subsidence. The report also states that the project site has a low topographic relief and is located on top of relatively dense underlying materials, which would result in a very low potential for landslide activity.

The PCGP requires that all new developments adhere to the UBC/CBC standards. The project area is located within a CBC Zone 3 designation area, which has specific guidelines and specifications for new construction/development projects. Adherence to these structural design guidelines would reduce any construction or operational seismic impacts to *less-than-significant* levels.

Mitigation Measure(s)

*None required.*

**11-2 Risks associated with erosion (loss of topsoil) and/or sedimentation.**

The topography of the project site is considered to be generally flat, with a slight west-southwest downslope (towards SR 49). The relatively flat area of the site, along with the soils information presented in the Revised Geotechnical Report conducted by Wallace Kuhl & Associates, Inc. indicate that the on-site soils are not subject to excessive erosion.

Construction activities related to project implementation may include, but not be limited to, grading, excavation, and the removal of vegetation and/or trees, which could temporarily disturb soils and make them more prone to sedimentation, soil compaction, and/or erosion processes (rain and wind). Grades vary on the project site from a low elevation of approximately 1,428 feet above sea level (asl) at the southeasterly corner to a high elevation of 1,483 feet asl along the north boundary. The building pad is determined by grades at the access points in Canal Street and at the proposed new bridge across Wise Canal. The proposed parking lots are expected to be graded to a maximum slope of approximately three percent, which would result in grading in the building area varying from a cut of 19 feet to minimal grading at the southwesterly corner. Some areas of the project site along the boundaries would require fill slopes of 10 feet or more. The resulting grading would require an export of approximately 70,000 cubic yards of soil off-site. Such disturbances could negatively affect the re-vegetation potential of onsite

and nearby soils as well as potentially increase erosion processes. The site would also require significant cut slopes along the northern and eastern property lines. Slope gradients could exceed a 2:1 horizontal to vertical ratio, as approved by a geotechnical engineer and permitted by Placer County. Some minor retaining walls would also be required in these areas.

Erosion processes transport soil particles from one area to another and increase the potential for sedimentation. During dry months, wind could move dry soil particles into the air creating fugitive dust emissions, while water (rain) may erode the topsoil across the ground into nearby waterways, thus affecting water quality. Furthermore, the exportation of fill materials from the project site could potentially increase wind and water erosion processes during transportation. Potential project-related air quality and water quality impacts associated with erosion and dust control are addressed in Chapters 9 and 12 respectively, within this Draft EIR.

Construction activities would result in the disturbance of on-site soils, as well as potentially increase soil erosion processes. Therefore, risks associated with erosion are considered to be *potentially significant*.

Mitigation Measure(s)

The following mitigation measure would reduce potential sedimentation- and erosion-related impacts from construction to a *less-than-significant* level.

- 11-2(a) *The applicant shall prepare and submit Improvement Plans, specifications and cost estimates (per the requirements of Section II of the Land Development Manual [LDM] that are in effect at the time of submittal) to the Engineering and Surveying Division (ESD) for review and approval. The plans shall show all conditions for the project as well as pertinent topographical features both on- and off-site. All existing and proposed utilities and easements, on-site and adjacent to the project, which may be affected by planned construction, shall be shown on the plans. All landscaping and irrigation facilities within the public right-of-way (or public easements), or landscaping within sight distance areas at intersections, shall be included in the Improvement Plans. The applicant shall pay plan check and inspection fees. (NOTE: Prior to plan approval, all applicable recording and reproduction cost shall be paid). The cost of the above-noted landscape and irrigation facilities shall be included in the estimates used to determine these fees. It is the applicant's responsibility to obtain all required agency signatures on the plans and to secure department approvals. If the Design/Site Review process and/or DRC review is required as a condition of approval for the project, said review process shall be completed prior to submittal of Improvement Plans. Record drawings shall be prepared and signed by a California Registered Civil Engineer at the applicant's expense and shall be submitted to the ESD prior to acceptance by the County of site improvements.*

11-2(b) *All proposed grading, drainage improvements, vegetation and tree removal shall be shown on the Improvement Plans and all work shall conform to provisions of the County Grading Ordinance (Ref. Article 15.48, Placer County Code) that are in effect at the time of submittal. No grading, clearing, or tree disturbance shall occur until the Improvement Plans are approved and all temporary construction fencing has been installed and inspected by a member of the Design Review Committee (DRC). All cut/fill slopes shall be at 2:1 (horizontal:vertical) unless a soils report supports a steeper slope and the Engineering and Surveying Department (ESD) concurs with said recommendation.*

*The applicant shall revegetate all disturbed areas. Revegetation undertaken from April 1 to October 1 shall include regular watering to ensure adequate growth. A winterization plan shall be provided with project Improvement Plans. It is the applicant's responsibility to assure proper installation and maintenance of erosion control/winterization during project construction. Where soil stockpiling or borrow areas are to remain for more than one construction season, proper erosion control measures shall be applied as specified in the Improvement Plans/Grading Plans. Provide for erosion control where roadside drainage is off of the pavement, to the satisfaction of the ESD.*

*The applicant shall submit to the ESD a letter of credit or cash deposit in the amount of 110 percent of an approved engineer's estimate for winterization and permanent erosion control work prior to Improvement Plan approval to guarantee protection against erosion and improper grading practices. Upon the County's acceptance of improvements, and satisfactory completion of a one-year maintenance period, unused portions of said deposit shall be refunded to the project applicant or authorized agent.*

*If, at any time during construction, a field review by County personnel indicates a significant deviation from the proposed grading shown on the Improvement Plans, specifically with regard to slope heights, slope ratios, erosion control, winterization, tree disturbance, and/or pad elevations and configurations, the plans shall be reviewed by the DRC/ESD for a determination of substantial conformance to the project approvals prior to any further work proceeding. Failure of the DRC/ESD to make a determination of substantial conformance may serve as grounds for the revocation/modification of the project approval by the appropriate hearing body.*

11-2(c) *Water quality Best Management Practices (BMPs) shall be designed according to the California Stormwater Quality Association Stormwater Best Management Practice Handbooks for Construction, for New Development / Redevelopment, and/or for Industrial and Commercial,*

*(and/or other similar source as approved by the Engineering and Surveying Department (ESD)). Construction (temporary) BMPs for the project could include, but are not limited to, the following: Fiber Rolls (SE-5), Hydroseeding (EC-4), Stabilized Construction Entrance (LDM Plate C-4), Storm Drain Inlet Protection (SE-10), Silt Fence (SE-1), revegetation techniques, dust control measures, and concrete washout areas.*

11-2(d) *This project's ground disturbance exceeds one acre and is subject to the construction stormwater quality permit requirements of the National Pollutant Discharge Elimination System (NPDES) program. The applicant shall obtain such permit from the State Water Resources Control Board and shall provide to the Engineering and Surveying Department evidence of a state-issued WDID number or filing of a Notice of Intent and fees prior to start of construction.*

11-2(e) *Stockpiling and/or vehicle staging areas shall be identified on the Improvement Plans and located as far as practical from existing dwellings and protected resources in the area.*

### **11-3 Loss of structural support due to liquefaction.**

According to the PCGP, soils that are predisposed to liquefaction are located throughout the Placer County. The PCGP Background Report indicates that in the Placer County, the zone of liquefaction opportunity for an earthquake with a 6.5 magnitude is approximately 30 miles from the point of epicenter. The PCGP Background Report goes on to note that the maximum credible magnitudes for all four Placer County faults is 6.5 and map evaluation shows that all parts of Placer County are within a 30 mile radius of at least one of the fault systems. Therefore, all of Placer County has an opportunity for liquefaction damage.

Sites in Placer County that have a liquefaction potential are those areas on alluvial deposits having groundwater and sand/silt layers of uniform grain size within approximately 30 feet below the surface. According to the PCGP Background Report, geologic and soil maps do not provide sufficient information to map substrates having liquefaction potential, and only borings approximately 30 feet deep could reveal whether or not the soils on-site are prone to liquefaction. Although the Revised Geotechnical Report prepared for the proposed site concluded that there was a low probability for liquefaction to occur onsite, the boring samples conducted during the geotechnical site survey did not go to a depth of 30 feet. Therefore, a possibility exists for liquefaction to occur onsite, which could result in a *potentially significant* impact.

#### Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the construction and operational impacts of liquefaction to a *less-than-significant* level.

11-3 *Submit to the Engineering and Surveying Department (ESD), for review and approval, a geotechnical engineering report produced by a California Registered Civil Engineer or Geotechnical Engineer. The report shall address and make recommendations on the following:*

- *Road, pavement, and parking area design;*
- *Structural foundations, including retaining wall design (if applicable);*
- *Grading practices;*
- *Erosion/winterization;*
- *Special problems discovered on-site, (i.e., groundwater, expansive/unstable soils, etc.); and*
- *Slope stability.*

*Once approved by the ESD, two copies of the final report shall be provided to the ESD and one copy to the Building Department for their use. It is the responsibility of the developer to provide for engineering inspection and certification that earthwork has been performed in conformity with recommendations contained in the report.*

#### **11-4 Risks associated with structural damage from expansive soils.**

Construction of the proposed retail development would require solid building surfaces and foundations. Expansive soils shrink and swell as a result of soil moisture content and may result with heaving and cracking of concrete slabs, pavements, and other on-site structures built upon shallow foundations.

As previously discussed, the project site is generally underlain by serpentine and greenstone materials. The NRCS Soil Survey determined that the project site included Auburn silt loam and Xerorthents. Such soil types are considered to be well drained and do not contain high concentrations of silt or clay particles, which largely influence the shrink-swell potential of soils. The geotechnical reports for the project site have indicated that the soils onsite have a low expansion potential. However, the geotechnical report also notes that laboratory testing was not performed in order to characterize the shrink-swell potential of the sampled soils collected during the geotechnical investigations and further exploration and tests should be performed to study the possibility of a localized on-site presence of expansive soils. Therefore, development of the proposed project could be exposed to underlying expansive soils, which is a ***potentially significant*** impact.

##### Mitigation Measure(s)

Implementation of the following mitigation measures would reduce the construction and operational impacts of expansive soils to a *less-than-significant* level.

11-4 *Implement Mitigation Measure 11-3.*

## Endnotes

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- <sup>1</sup> Wallace Kuhl & Associates, Inc. *Revised Geotechnical Engineering Study for Bohemia Retail Project*. October 20, 2008.
- <sup>2</sup> España Geotechnical Consulting. *Geotechnical Investigation Report for the Proposed Bohemia Residential Development*. December 2, 2004.
- <sup>3</sup> Charles Lockwood Consulting Engineer, Inc. *Phase I Environmental Site Assessment for Bohemia Parcels APN 052-102-012, -013, -017*. June 8, 2004.
- <sup>4</sup> GHH Engineering, Inc. *Revised Soil Sampling & Assessment Report (Phase II Soil Investigation)*. June 6, 2006.
- <sup>5</sup> Placer County. *Countywide General Plan Policy Document*. August 16, 1994.
- <sup>6</sup> Placer County. *Countywide General Plan EIR*. October 1993.
- <sup>7</sup> Placer County. *Auburn/Bowman Community Plan*. 1994 (updated 1999).
- <sup>8</sup> Natural Resources Conservation Service Web. *Soil Survey for Placer County*. <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>. Accessed March 11, 2009.
- <sup>9</sup> Placer County. *Placer County General Plan Background Report*. August 1994.
- <sup>10</sup> Placer County. *Countywide General Plan EIR*. October 1993.
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