10 SOILS, GEOLOGY, AND SEISMICITY

The Soils, Geology, and Seismicity chapter of the EIR describes the geologic and soil characteristics of the Timberline at Auburn (proposed project) project site and evaluates the extent to which implementation of the project could be affected by seismic hazards such as ground shaking, liquefaction, and expansive soil characteristics. The analysis also addresses the proposed project's potential effects related to erosion. Information sources for this evaluation include the *Geotechnical Engineering Report for Timberline at Auburn* prepared by Holdrege & Kull (See Appendix W),[1] the *Geotechnical Feasibility Study* prepared by Earth Systems Consultants (See Appendix X),[2] the *Placer County General Plan* (PCGP),[3] the *PCGP EIR*,[4] and the *Auburn/Bowman Community Plan* (ABCP).[5]

All impacts related to soils, geology, and seismicity in the Timberline at Auburn Initial Study were identified as *potentially significant* and are therefore addressed within this chapter (See Appendix C).

10.1 Environmental Setting

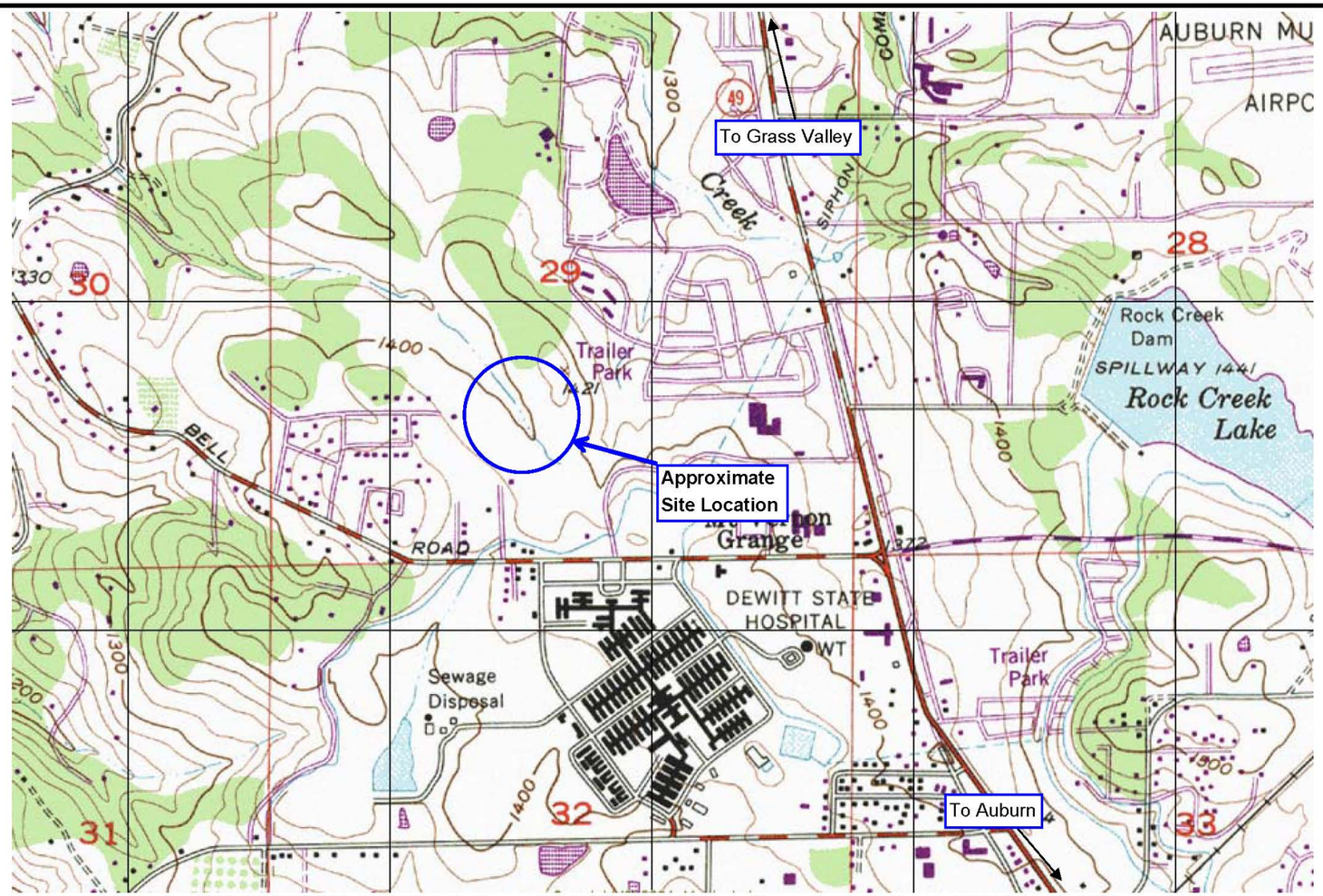
The proposed project is situated at the foot of the Sierra Foothills region of the Sierra Nevada Mountain Range in the Sacramento Valley. The Sacramento Valley is part of the Great Valley Geomorphic Province (Central Valley of California) (See Figure 10-1).

Regional Geology and Seismicity

The proposed project site is located in the eastern foothills of the Sierra Nevada Range within the Western Sierra Nevada Metamorphic Belt of California. These rocks are part of a north-to-northwest-trending belt of material characterized by stratified metamorphic rocks of sedimentary and volcanic origin into which basic and ultramafic (rock that crystallizes from silicate minerals at the highest temperatures) bodies have intruded. According to the *Geotechnical Engineering Report*, the area containing the project site is generally underlain by Jurassic-age metavolcanic rock. The Jurassic period is described as the period of time between 206 and 144 million years before the present.

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 commonly are 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.

Figure 10-1
Topographic Vicinity Map



SOURCE: MAPTECH, Terrain Navigator Pro, ver. 7.0 - USGS 7.5 minute topographic map, Auburn Quadrangle, 1953, Photorevised 1981.

HK HOLDREGE & KULL CONSULTING ENGINEERS • GEOLOGISTS 792 Searls Avenue • Nevada City, CA 95959 (530) 478-1305 • FAX (530) 478-1019	**TOPOGRAPHIC VICINITY MAP** Timberline at Auburn Placer County, California	PROJECT NO. 3573-02 FIGURE 1 August 2008

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 locally may not exist.

The California Geological Survey Open File Report 96-08, Probabilistic Seismic Hazard Assessment for the State of California, and the 2002 update entitled California Fault Parameters, indicate that the project site is located within the Foothills Fault System. The Foothills Fault System is designated as a Type C fault zone, with low seismicity and a low rate of recurrence. The 1997 edition of California Geological Survey Special Publication 43, Fault Rupture Hazard Zones in California, describes active faults and fault zones (activity within 11,000 years), as part of the Alquist-Priolo Earthquake Fault Zoning Act. The map and document indicate that the project site is not located within an Alquist-Priolo active fault zone.

Project Site Characteristics

The site consists of undeveloped land located on the north end of Richardson Drive, north of Bell Road, in Placer County, California. The site is surrounded by the following uses: residential property and an Auburn Recreation District park to the north; residential property, an assisted living facility, and undeveloped land to the east; an assisted living facility to the south; and residential development to the west. Topographically, the site is characterized by low, gently sloping northwest-southeast trending ridgelines, separated by two major northwest flowing drainages. Gradients in the southerly leg and north central portion of the property (near the larger drainage) are very gentle, typically on the order of two to four percent. Gradients along the flanks of the ridgelines at the west side and northeast corner typically range from six to 12 percent, with the ridgetop areas being nearly level. Elevations across the site range from approximately 1,440 feet above sea level at the southwest corner to approximately 1,348 feet above sea level at the northwest corner.

The largest drainage channel on the site is an ephemeral creek system trending from the southeast corner of the site to a juncture with the other main drainage at the northwest corner of the site. This drainage is very erratic and weakly developed in the upper meadowlands comprising the southern leg of the property, becoming somewhat more incised through the northwest portion. The other primary drainage is in the westernmost section and is more strongly incised. A third minor drainage channel trends along the westerly flank of the ridge in the northeast portion of the site. This channel is a narrow, shallow man-made feature.

The site is vegetated with mixed oak-grey pine woodlands in the ridgeland areas in the west and the northeast corner. The rest of the site is primarily vegetated with grasses and low shrubs, as

well as scattered growths of trees. The site is undeveloped and does not contain any existing structures. A small remnant slab-on-grade is located in the southwest corner of the site. Numerous dirt paths traverse the site, with several being strongly rutted from vehicular use.

Slope Stability

According to the *Geotechnical Feasibility Study*, the natural slopes on and near the site are relatively gentle and show generally good slope stability. Slope failures were not observed on the site. The near-surface soils on the majority of the site are generally cohesive and are moderately resistant to erosion.

Soil Survey

According to the *Geotechnical Engineering Report*, the U.S. Department of Agriculture Soil Conservation Service *Soil Survey of Placer County, California, Western Part* (1980) was consulted to determine the soil types found on project site. The soil survey indicated that the site is located in an area containing three distinct soil types. The majority of the property contains Auburn Silt Loam, a small area along the northeastern corner contains soil of the Auburn-Argonaut Complex, and a portion of the northeastern and the southwestern areas of the property contain soil of the Auburn Rock Outcrop Complex.

The soil survey describes the Auburn Silt Loam as a 20-inch layer of silt loam with a moderate permeability and a slight to moderate erosion hazard underlain by basic schist. The Auburn-Argonaut Complex is described as a 20-inch layer of silt loam or loam with moderate permeability and a slight to moderate erosion hazard underlain by basic schist. The Auburn Rock Outcrop Complex is described as a 20-inch layer of silt loam or loam with moderate permeability and a slight to high erosion hazard underlain by basic schist.

Surface Conditions

At the time of Holdrege and Kull's site investigation, the site appeared to be unimproved, except for a few dirt roads, an abandoned foundation, a Placer County sewer line, and an NID ditch, which flows across the eastern portion of the site. Site topography is gently sloping, with estimated slopes ranging from five to 10 percent on the majority of the site, to approximately 20 percent in the northeastern portion of the property.

According to the base topographic map, site elevations range from 1,435 feet above mean sea level (msl) west of the southern site entrance to 1,345 feet msl near the northwestern corner of the property.

Vegetation on the site is typical of the Sierra Nevada Foothills, with areas of dense oak and a few scattered pine trees, Manzanita, and poison oak, as well as open fields of grasses and forbs. Seasonal drainage courses traverse the site, generally trending north and west. The seasonal drainages are lined with blackberry thickets and riparian grasses.

Subsurface Soil Conditions

According to the *Geotechnical Engineering Report*, data obtained from the site reconnaissance and exploratory trenches (See Figure 10-2) indicates that the site's surface layer ranged from one foot below ground surface (bgs) to three feet bgs and consists of light reddish brown, dry, medium dense to dense, sandy silt with clay. In exploratory trench location T-4, the surface layer consisted of strong brown, moist, medium stiff clay. Variably weathered metavolcanic rock was encountered at depths ranging from one to four feet bgs. The exploratory trenches were terminated at depths ranging from four to 9.5 feet bgs.

Groundwater Conditions

During Holdrege and Kull's site investigation, groundwater seepage was not encountered in the exploratory trenches, nor were on-site springs or seeps emanating from the ground surface observed. The *Geotechnical Engineering Report* indicates that a drainage channel that indicated seasonal flow of surface water was located on-site. Holdrege and Kull's observations of groundwater conditions were made in June 2008 following a period of dry weather. Although groundwater was not observed in the exploratory trenches, it should be noted that seepage may be encountered in excavations which reveal the soil/weathered rock transition, particularly during or after the rainy season and in drainage swales.

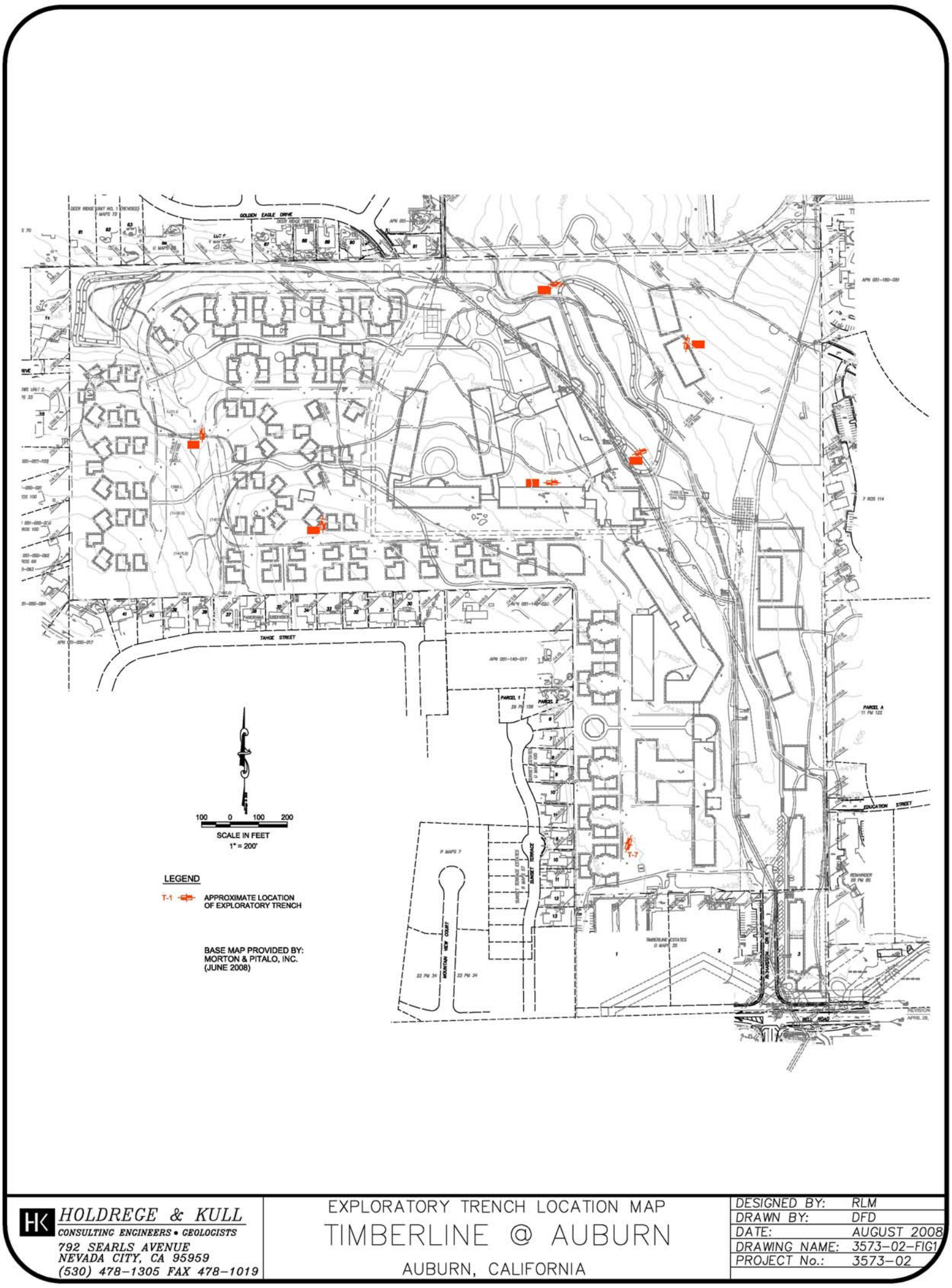
Liquefaction

Liquefaction is a phenomenon in which saturated cohesionless soils are subject to a temporary, but essentially total loss of shear strength (any compression stress with support on one side) because of pore pressure build-up, which is the interstitial pressure of water within a mass of soil, rock, or concrete under the reversing cyclic shear stresses associated with earthquakes. The primary factors determining liquefaction potential of a soil deposit are: (1) the level and duration of seismic ground motions; (2) the type and consistency of the soil; and (3) the depth to groundwater.

Expansive Soils

Expansive soils are those that greatly increase in volume when they absorb water and shrink when they dry out. These soils are typically characterized by large amounts of finer grained materials such as silts and clays within the soil matrix. Expansion is measured by shrink-swell potential, which is the relative volume change in a soil with a gain in moisture. .

Figure 10-2
Exploratory Trench Location Map



Construction

According to the *Geotechnical Feasibility Study*, data analyzed from the site reconnaissance and the test pits suggest that the anticipated minor grading that would be associated with the project could be performed using conventional grading and construction equipment. Ripping of the harder shallow rock areas would probably require a D-10 size dozer, and the possibility exists that relatively localized blasting of hard outcrops could be required. The possible need for localized blasting is considered moderately high for utility trench excavations, especially those deeper than five feet or those through outcrop areas. (For further detail, see Impact 13-3, Impacts related to exposure of project residents or the surrounding population to chemical hazards or construction hazards, in Chapter 13, Hazardous Materials and Hazards, of this EIR.)

Previous Investigations

Three geotechnical studies were previously prepared for the proposed project site and vicinity. The first study was prepared in 1987 by Earthtec, Ltd. for the previously proposed Timberline Senior Center at the intersection of Richardson Drive and Education Streets. Nine borings, drilled to depths of four to 10 feet, were placed for the investigation. The report indicated that soil profiles consisted of shallow depths of clayey silt soil overlying highly weathered meta-volcanic schist and siltstone.

The second study was prepared in 1992 for the Oakwood Care Facility located at the northwest corner of the intersection of Bell Road and Richardson Drive, adjacent to the proposed project site. Three borings, drilled to depths of three to 12 feet, were placed for the study. The soil profile reportedly consisted of a shallow depth of gravelly silt soil over weathered bedrock (meta-sedimentary rock).

The third study was prepared in 1993 by Earth Systems Consultants for the proposed Timberline Village project. The study indicated that the principal geotechnical factors affecting the proposed project site are shallow depth to rock, moderately high potential for erosion on unprotected graded areas, and the potential for rapid saturation of the upper soils. The study indicated that the site would be geotechnically suitable for a mixed-use development.

All of the studies indicated generally non-problematic conditions, and major geotechnical problems were not noted in any of the studies.

10.2 Regulatory Setting

The following section includes a brief summary of the regulatory context under which soils and geologic 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 CUBC 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 soils and geology.

Soils

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.

10.3 Impacts and Mitigation Measures

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 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 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 environmental setting section and the impact discussions below are based primarily on the *Geotechnical Engineering Report for Timberline at Auburn* prepared by Holdrege & Kull in 2008. In addition, the *Geotechnical Feasibility Study*, the PCGP, the PCGP EIR, and the ABCP were reviewed.

To prepare the *Geotechnical Engineering Report,* Holdrege and Kull performed a surface reconnaissance and subsurface geotechnical investigation at the site, soil samples were collected for laboratory testing, and engineering calculations were performed to provide grading and drainage recommendations, foundation and retaining wall design criteria, slab-on-grade recommendations, and pavement design for the proposed improvements.

<u>Surface Reconnaissance and Subsurface Geotechnical Investigation</u>

A site investigation was performed to characterize the existing surface conditions and shallow subsurface soil/rock conditions. The site investigation included a field investigation and a limited review of geologic literature pertaining to the project site.

Field Investigation

The field investigation was performed on June 27, 2008. During the field investigation, the local topography and surface conditions were observed and a limited subsurface investigation was performed. The subsurface investigation included the excavation of seven exploratory trenches across the project site (See Figure 10-2). Depths ranging between four and 9.5 feet bgs were excavated using a Kubota KX-121 excavator equipped with an 18-inch bucket. The soil conditions revealed in the exploratory trenches were logged and bulk soil samples were collected for laboratory testing. Dry soil conditions and the presence of rock at shallow depths limited the ability to collect undisturbed soil samples.

Laboratory Tests

Laboratory tests were performed on selected soil samples collected from the subsurface exploratory trenches to determine the soil's engineering material properties.

The engineering material properties were then used to develop geotechnical engineering design recommendations for earthwork and structural improvements. The following laboratory tests were performed:

- Expansion Index (ASTM D4829);
- Atterberg Limits (ASTM D4318);
- Particle Size (ASTM D422); and
- Resistance Value (ASTM D2844).

Significant rock content and dry soil prevented the collection of undisturbed soil samples. Appendix D of the *Geotechnical Engineering Report* (See Appendix W) presents expansion index, Atterberg limits, particle size and R-value test results.

The recommendations in the *Geotechnical Engineering Report* are based on the understanding that project construction would include asphalt concrete paved roads and parking areas, as well as underground utilities, and that grading would include cut and fill for roadways, culvert crossings, spillway, retaining structures, and water retention ponds, as well as excavation for underground utilities. The maximum anticipated wall and column loads are expected to be approximately 4 kips per lineal foot and 80 kips per lineal foot, respectively.

Project-Specific Impacts and Mitigation Measures

10-1 Risks to people and structures associated with seismic activity, including surface rupture, slope instability, and/or landslides.

According to the *Geotechnical Feasibility Study*, the site is situated in an area that has experienced only minor earthquake activity since 1808. During the earthquake of April 18, 1906 (estimated Richter magnitude 8.3) on the San Andreas Fault, the site reportedly experienced some groundshaking estimated to be V-VI on the Rossi-Forel Intensity

Scale. This intensity is described as being a shock of moderate intensity resulting in disturbance of some furniture and ringing of some bells, but without significant damage. Intensities from possible earthquakes on active, smaller faults closer to the site would most likely be less than that produced by the 1906 event. The lack of active faults in the site vicinity and the distance of the site from known active faults create a low potential for seismic hazards to occur at this site. The trace of the Bear Mountain Fault mapped through the site is considered inactive and is therefore not a project design consideration.

The *Geotechnical Engineering Report* indicates that construction of the project would result in permanent cut slopes up to 15 feet in height, as well as fill slopes up to 10 feet in height. However, the *Geotechnical Engineering Report* notes that the risk of seismically-induced hazards, such as slope instability or surface rupture, is remote at the project site. In addition, the report notes that, based on review of soil survey information, the native soil conditions on-site possess a moderate to high corrosion potential for uncoated steel and concrete. However, it should be noted that the report includes recommendations that will be required to be implemented per the mitigation measure below to reduce the likelihood of corrosion problems, as well as recommendations regarding cut slope and fill slope grading that will be required to be implemented. Furthermore, the ABCP requires that all construction comply with the California Building Code (CBC) and the Uniform Building Code (UBC).

Although the risk of seismically-induced hazards, such as slope instability or surface rupture, is remote at the project site, implementation of the proposed project could result in instability of on-site soils; therefore, the impact would be ***potentially significant***.

<u>Mitigation Measure(s)</u>
Implementation of the following mitigation measure would reduce the above impact to a *less-than-significant* level.

10-1 *The project applicant shall 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. If the soils report indicates the presence of critically expansive or other soils problems which, if not corrected, could lead to structural defects, a certification of completion of the requirements of the soils report will be required for subdivisions, prior to issuance of Building Permits. This certification may be completed on a Lot by Lot basis or on a Tract basis. This shall be so noted in the CC&Rs and on the Informational Sheet filed with the Final Map(s). 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.

10-2 Risks associated with erosion (loss of topsoil) and/or sedimentation.

Construction activities typically result in disturbance of site soils, in turn leading to increased soil erosion due to loss of soil cohesiveness. Surface grading and earth-moving activities associated with construction projects would create temporary exposed earth surfaces. Once the protective vegetative cover is removed and the soil is broken into easily transported particles, exposed earth surfaces are susceptible to wind and water erosion. During dry months wind can move dry soil particles into the air creating fugitive dust emissions. Water may erode the topsoil by moving across the ground and picking up soil particles. Precipitation causes additional erosion by loosening soil particles for transport and the transport of soil particles could lead to the sedimentation of off-site waterways. Potential project-related air quality and water quality impacts associated with erosion and dust control are addressed in Chapters 8 and 11, respectively, within this Draft EIR.

As discussed above, the on-site soils (Auburn Silt Loam, Auburn-Argonaut Complex, and Auburn Rock Outcrop Complex) have a moderate to high potential for erosion. 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)
Implementation of the following mitigation measures would reduce the above impact to a *less-than-significant* level.

10-2(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 and Placer County Fire Department Improvement Plan review 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.

10-2(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 Development 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.

10-2(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), Straw Bale Barriers (SE-9), Storm Drain Inlet Protection (SE-10), Silt Fence (SE-1), revegetation techniques, dust control measures, and concrete washout areas.*

10-2(d) *Projects with ground disturbance exceeding one acre that are subject to construction stormwater quality permit requirements of the National Pollutant Discharge Elimination System (NPDES) program 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.*

10-2(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.*

10-3 Loss of structural support due to liquefaction.

According to the Placer County General Plan, soils that are prone to liquefaction are located throughout Placer County. The Placer County General Plan Background Report indicates that, in the County, the zone of liquefaction opportunity for magnitude 6.5 earthquakes is approximately 30 miles. The 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 30 miles of at least one of the faults;

therefore, all of Placer County has an opportunity for liquefaction damage. Sites in Placer County having liquefaction potential are those on alluvial deposits having groundwater and sand or silt layers of uniform grain size within approximately 30 feet from the surface. According to the Background Report, geologic and soil maps do not provide sufficient information to map substrates having liquefaction potential, and only borings approximately 30 feet deep can reveal whether or not the soils on-site are prone to liquefaction. In addition, the *Geotechnical Engineering Report* (page 7) indicates that the liquefaction potential on the proposed project site is remote. However, because soils throughout the County have the potential to experience liquefaction, a ***potentially significant*** impact would result.

Mitigation Measure(s)
Implementation of the following mitigation measure would reduce the above impact to a *less-than-significant* level.

10-3 *Implement Mitigation Measure 10-1.*

10-4 Impacts related to damage from expansive soils on-site.

Construction of the proposed roadways and future construction of residential and commercial development would require solid building surfaces. Expansive soils shrink and swell as a result of moisture changes, causing heaving and cracking of slabs-on-grade, pavements, and structures founded on shallow foundations.

According to the *Geotechnical Engineering Report*, moderately expansive soil was detected in the upper portion of exploratory trench T-4. Because expansive soils are present on-site, a ***potentially significant*** impact would result.

Mitigation Measure(s)
Implementation of the following mitigation measures would reduce the above impact to a *less-than-significant* level.

10-4(a) *Implement Mitigation Measure 10-1.*

10-4(b) *The preliminary geotechnical engineering report performed by Holdrege & Kull, dated August 14, 2008, indicated the presence of critically expansive soils or other soil problems which, if not corrected, would lead to structural defects.*

For non-pad graded lots, prior to 1mprovement Plan approval the applicant shall submit to the Engineering and Surveying Department (ESD) for review and approval, a soil investigation of each lot in the subdivision produced by a California Registered Civil or Geotechnical Engineer (Section 17953-17955 California Health and Safety Code).

For pad graded lots, prior to Final Acceptance of project improvements or consideration of early Building Permits and after the completion of the pad grading for all lots, the applicant shall submit to the Engineering and Surveying Department (ESD) for review and approval, a soil investigation of each lot produced by a California Registered Civil or Geotechnical Engineer (Section 17953-17955 California Health and Safety Code).

The soil investigations shall include recommended corrective action that is likely to prevent structural damage to each proposed dwelling. In addition, the applicant shall include in the Development Notebook or modify the Development Notebook to include the soil problems encountered on each specific lot as well as the recommended corrective actions. A note shall be included on the 1mprovement Plans, CC&Rs, and the Informational Sheet filed with the Final Map(s), which indicates the requirements of this condition. Once approved by the ESD, two copies of the final soil investigations for each lot shall be provided to the ESD and one copy to the Building Department for their use.

Endnotes

[1] Holdrege & Kull. *Geotechnical Engineering Report for Timberline at Auburn*. August 14, 2008.
[2] Earth Systems Consultants. *Geotechnical Feasibility Study*. June 1993.
[3] Placer County. *Placer County General Plan*. August 1994.
[4] Placer County. *Placer County General Plan EIR*. October 1993.
[5] Placer County. *Auburn/Bowman Community Plan*. June 1994.