7.0 VISUAL RESOURCES

This chapter describes the existing visual characteristics of the project area and evaluates the visual impacts of the proposed project. The visual impact analysis considers existing scenic resources and the potential visibility of the project area from surrounding areas, including both the physical characteristics of trail development and changes in light and glare in the project area. The descriptions of the existing visual setting are accompanied by photographs of representative views, taken during site visits in July 2005 and April 2007. An overview of the photograph locations (Key Observation Points) is provided in Exhibit 7-1.

7.1 ENVIRONMENTAL SETTING

7.1.1 REGIONAL AND LOCAL VISUAL CHARACTER

VISUAL CHARACTER OF THE PROJECT AREA

The project area is located on the southern slope of the North Fork American River canyon in the Sierra Nevada foothills of Placer County (Exhibit 7-2). This area falls within the boundaries of the Auburn State Recreation Area (SRA), which stretches from Auburn to Colfax southeast of Interstate 80 (I-80). Lake Clementine lies immediately to the north of the proposed trail alignment. The project area is virtually undeveloped and consists mostly of woodland and chaparral vegetation. Undeveloped land dominated by natural vegetation also lies to the east, west, and south of the project area. Foresthill Road follows a ridge generally south of the proposed trail alignment. The mountains and ridgelines and the North Fork American River dominate views from the project area. The nearest visually prominent landform is Robbers Roost, a large rock outcropping on the north side of the river, across the river canyon from the proposed trail alignment (Exhibit 7-3).

VISUAL CHARACTER OF THE SURROUNDING AREA

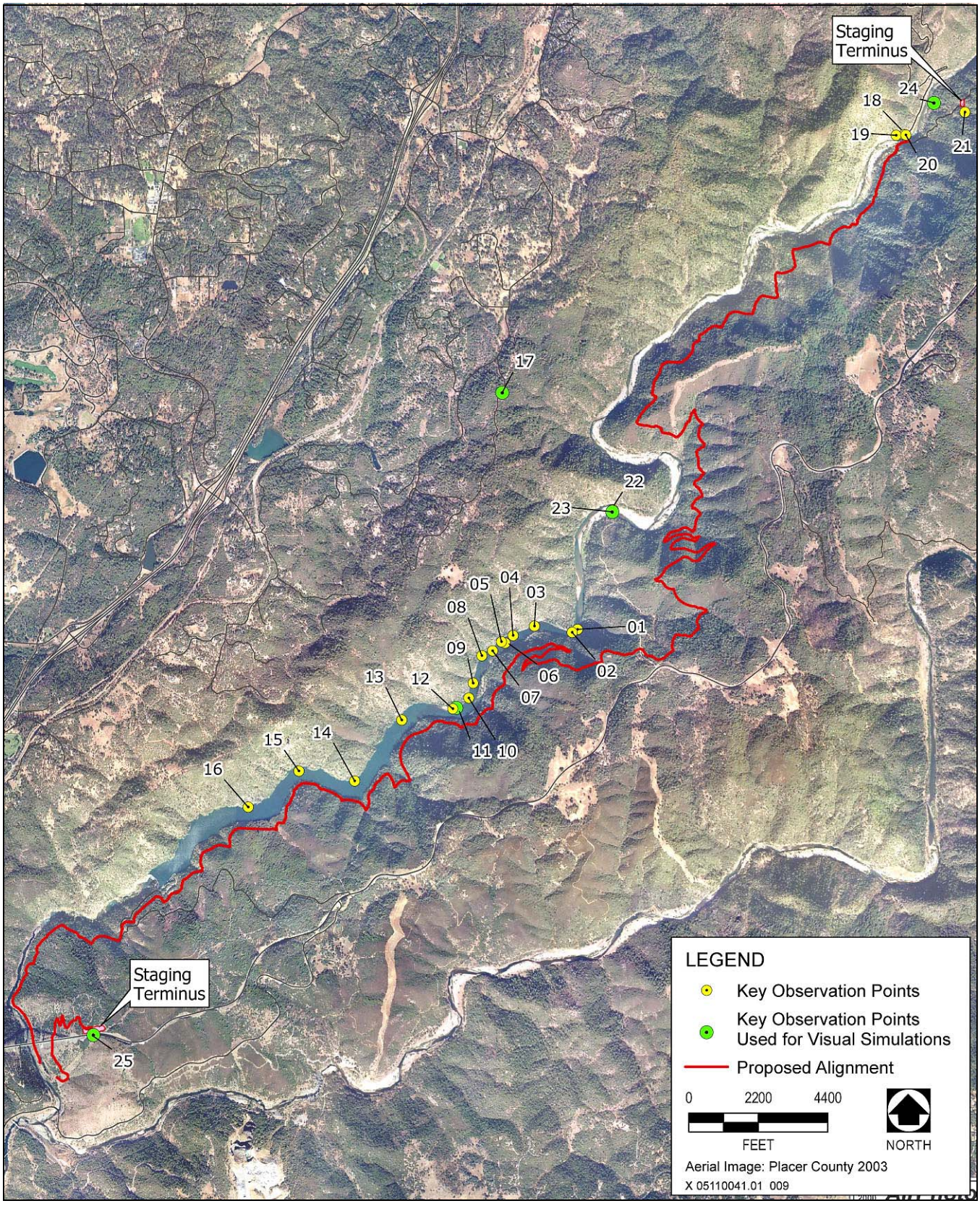
Foresthill Divide

The Foresthill Divide is the mountainous partition of land between the North and Middle Forks of the American River. This mostly secluded area is located approximately 40 miles northeast of Sacramento. The ridge provides a peaceful environment for recreational activities such as hiking, biking, running, and horseback riding. The steep and broken hills on the edge of the Foresthill Divide area break up views from Old Foresthill Road into pockets of chaparral, oak thickets, and grassy clearings with extended views into and around the North Fork and Middle Fork river canyons (Reclamation 1992).

In the early 1960s, this land was purchased from private-property owners by the federal government to accommodate the proposed Auburn Dam and reservoir, which was to be built by the U.S. Bureau of Reclamation (Reclamation). The Foresthill Bridge was also built during this time to accommodate the high-water mark of the proposed Auburn reservoir should the Auburn Dam be constructed. The Auburn Dam has not been built yet because of concerns expressed by environmental groups and for safety reasons (induced seismicity), thus leaving most of the Foresthill Divide unpopulated. This has allowed views of the canyon along the North and Middle Forks of the American River to be undisturbed by development (Grant 1996).

Auburn State Recreation Area

The Auburn SRA is an area of rugged scenic beauty with complex topographic forms and a diversity of natural vegetation. Abundant wildlife populations and the presence of abundant water in the landscape contribute to the scenic resources of the Auburn SRA.



Source: Data provided by EDAW in 2005

Locations of Representative Views (Key Observation Points) Along the Proposed Trail Alignment **Exhibit 7-1**

Source: EDAW 2005

View of the North Fork American River Canyon from the Foresthill Bridge **Exhibit 7-2**

Source: EDAW 2005

Robber's Roost, Located on the North Side of the River **Exhibit 7-3**

The Auburn SRA is characterized primarily by the North and Middle Forks of the American River and surrounding steep hillsides. The river canyons are steep and thickly wooded from the river level to the ridgelines, which loom more than 1,000 feet above the canyon floor. From the canyon ridge are views of the river, the Sierra Nevada crest to the east, and the Central Valley to the west.

Lake Clementine

Lake Clementine is a reservoir in the Auburn SRA that was built by the U.S. Army Corps of Engineers (USACE) to retain debris and sediment from hydraulic mining in the area. The reservoir is approximately 3.5 miles long and has very narrow steep canyon walls (Exhibit 7-4). It provides for many recreational opportunities and is surrounded by lush riparian vegetation (Reclamation 1992). Lake Clementine is also characterized by views of water cascading over the face of Clementine Dam.

7.1.2 REPRESENTATIVE VIEWPOINTS

Key Observation Points (KOPs) are the primary focus of the visual analysis. KOPs are generally selected to represent the most critical locations from which a project site may be seen. KOPs are used to evaluate existing landscapes and potential impacts on visual resources with various levels of sensitivity, in different landscape types and terrain, and from various vantage points. For the analysis of potential visual impacts associated with the proposed trail and staging termini, 25 KOPs along the North Fork American River and in the canyon were selected (Exhibit 7-1). Photographs were taken at each of the KOPs and visual simulations were prepared for five of the KOPs to further analyze the impacts of the proposed trail and staging termini on viewers. It was determined that the project area would be most visible from these five KOPs and, therefore, visual simulations of these KOPs would represent the areas most likely to experience visual impacts. These visual simulations were prepared for views from the boat-in campground on Lake Clementine (KOP 11 in Exhibit 7-1), a private road off Boole Road in Applegate (KOP 17 in Exhibit 7-1), Upper Lake Clementine (KOP 23 in Exhibit 7-1), Ponderosa Road (KOP 24 in Exhibit 7-1), and Foresthill Road (KOP 25 in Exhibit 7-1). Exhibits 7-5 through 7-7 highlight the location of the proposed trail with the placement of a computer generated line for the reader's reference.

7.2 REGULATORY SETTING

7.2.1 FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

WILD AND SCENIC RIVERS ACT

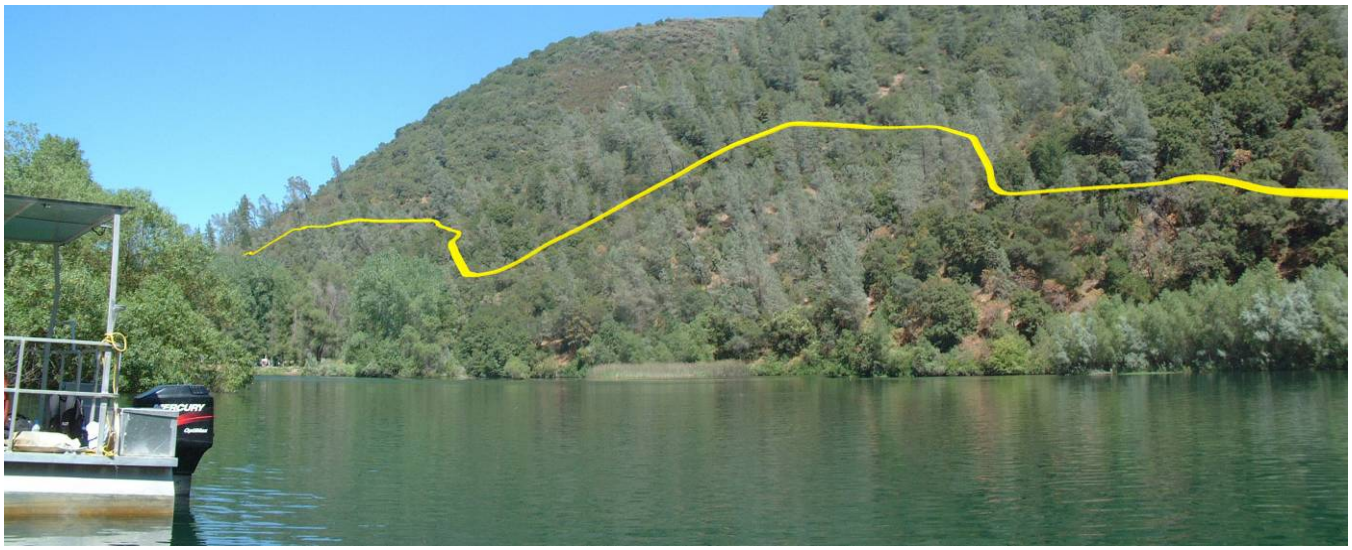
The Wild and Scenic Rivers Act (WSRA) of 1968, as amended (Public Law 90-542; 16 U.S. Code 12371–1287), established the National Wild and Scenic Rivers System (National System), which identifies distinguished rivers of the nation that possess remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. The WSRA preserves the free-flowing condition of rivers that are designated and protects their local environments. Section 5(d)(1) of the WSRA requires that all federal agencies, when planning for the use and development of water and related land resources, consider potential national wild, scenic, and recreational river areas, which are defined as follows:

- **"Wild" river areas—**Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

- **"Scenic" river areas—**Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

Source: EDAW 2005

Lake Clementine, Looking Upstream **Exhibit 7-4**

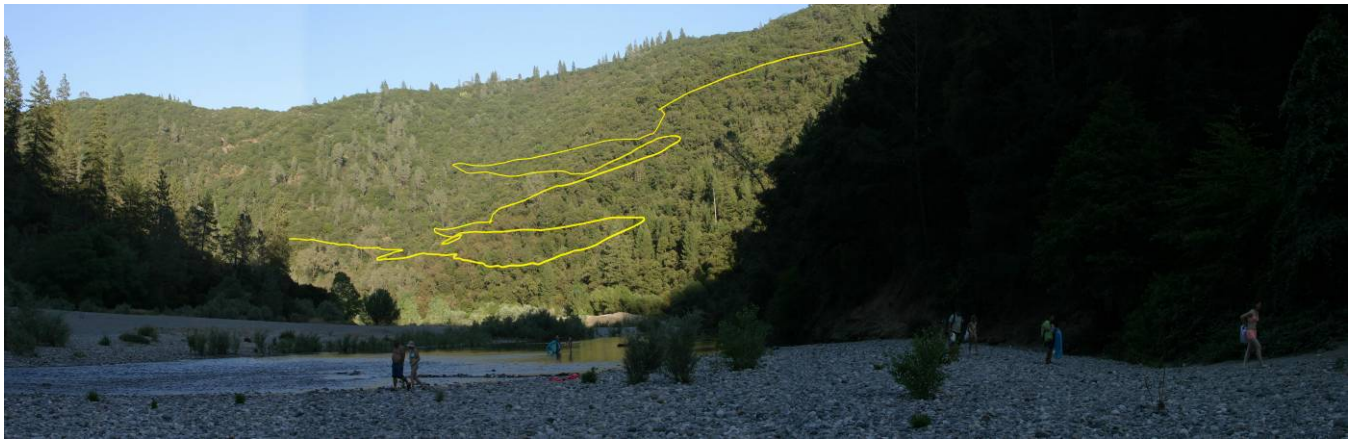


Source: Field of Vision 2005

Proposed Trail Alignment Shown from the Boat-in Campground along Lake Clementine (Key Observation Point 11) **Exhibit 7-5**

Source: Field of Vision 2007

Proposed Trail Alignment Shown from near Boole Road in Applegate (Key Observation Point 17) **Exhibit 7-6**



Source: Field of Vision 2007

Proposed Trail Alignment Shown from Upper Lake Clementine, Looking Upstream (Key Observation Point 23) **Exhibit 7-7**

- **"Recreational" river areas—**Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

The portion of the North Fork American River from Heath Springs to 1,000 feet upstream of the Colfax–Iowa Hill Bridge was designated as a Wild and Scenic River on November 10, 1978. This designation placed 38.3 miles of this 41.1-mile stretch into the "wild" classification in the National System (National Park Service 2004). On January 19, 1981, 23 miles of the lower American River was incorporated into the National System as a recreational river. These segments of the American River are not near the project area.

In 1993, Reclamation, as part of its resource planning, reviewed the eligibility of three additional sections of the American River for inclusion in the WSRA. This eligibility study concluded that the following three segments of the American River were eligible for listing:

- The Middle Fork American River, from Oxbow Dam to the confluence with the North Fork American River. This portion is approximately 23 miles in length.

- The North Fork American River (upper) from the Colfax–Iowa Hill Bridge to Upper Lake Clementine. This portion of the river is approximately 16 miles in length.

- The North Fork American River (lower) from Clementine Dam to the intake of the Auburn Dam diversion tunnel. This portion of the river is approximately 5 miles in length.

The North Fork American River (upper) from the Colfax–Iowa Hill Bridge to Upper Lake Clementine is the only river segment in the vicinity of the project area. A suitability study of the eligible river segments would be the next step in deciding whether these segments are suitable for designation by the National System; however, no suitability studies have been completed for these segments.

AUBURN STATE RECREATION AREA INTERIM RESOURCE MANAGEMENT PLAN

The *Auburn State Recreation Area Interim Resource Management Plan* (Auburn SRA IRMP) (Reclamation 1992) states that the visual resources of the Auburn SRA should be protected to the extent possible and should be considered when various facilities, improvements, and projects are proposed. The Auburn SRA IRMP contains the following design standards for new facilities in the Auburn SRA related to visual resources.

- All park signs and facilities in the Auburn SRA should blend with the natural environment. They should be of a design, color, texture, and scale that minimize adverse visual intrusion into the Auburn SRA.

- Structures should be screened from view with vegetation or other naturally occurring features whenever possible.

The IRMP also contains the following management guidelines for the scenic viewshed of the Auburn SRA.

- The viewshed is to be maintained. Development should be located outside scenic areas, adjacent to existing structures, or along the edges of scenic areas where vistas will be less interrupted. Development should not be allowed on ridgelines.

- Newly proposed roads, parking areas, and other developments should be evaluated to determine their effects on scenic quality. Proposals that would have an adverse impact on the viewshed should be revised or rejected.

- Landscaping, berms, and other buffers should be used to separate the Auburn SRA from adjoining land uses.

7.2.2 STATE PLANS, POLICIES, REGULATIONS, AND LAWS

CALIFORNIA SCENIC HIGHWAY PROGRAM

California's Scenic Highway Program was created by the California Legislature in 1963 and is managed by the California Department of Transportation (Caltrans). The goal of this program is to preserve and protect scenic highway corridors from changes that would affect the aesthetic value of the land adjacent to highways. A highway may be designated "scenic" depending on how much of the natural landscape travelers can see, the scenic quality of the landscape, and the extent to which development intrudes on travelers' enjoyment of the view.

There are no state-designated highways within the viewshed of the project area. The nearest state-designated highway segment is U.S. Highway 50 (U.S. 50) from Placerville to South Lake Tahoe, approximately 25 miles southeast of the project area. The project area is not visible from this segment of U.S. 50 because of the extended distance to the area and the intervening topography. State Route (SR) 49, which is located approximately 0.3 mile from the project area, has been deemed eligible for listing as a scenic highway (Caltrans 2005). Only the westernmost portion of the proposed trail alignment, consisting of the 1.8-mile long segment that is already in place (see Section 3.4.1, "Proposed Trail Alignment"), is visible from SR 49.

7.2.3 LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

PLACER COUNTY GENERAL PLAN

The following are the relevant goal and policies identified by the *Placer County General Plan* (Placer County 1994) for visual resources, including scenic routes.

- **GOAL 1.K:** To protect the visual and scenic resources of Placer County as important quality-of-life amenities for County residents and a principal asset in the promotion of recreation and tourism.

- **Policy 1.K.1.** The County shall require that new development in scenic areas (e.g., river canyons, lake watersheds, scenic highway corridors, ridgelines and steep slopes) is planned and designed in a manner which employs design, construction, and maintenance techniques that:

  - avoids locating structures along ridgelines and steep slopes;
  - incorporates design and screening measures to minimize the visibility of structures and graded areas; and
  - maintains the character and visual quality of the area.

- **Policy 1.K.5.** The County shall require that new roads, parking, and utilities be designed to minimize visual impacts. Unless limited by geological or engineering constraints, utilities should be installed underground and roadways and parking areas should be designed to fit the natural terrain.

- **Policy 1.L.3.** The County shall protect and enhance scenic corridors through such means as design review, sign control, undergrounding utilities, scenic setbacks, density limitations, planned unit developments, grading and tree removal standards, open space easements, and land conservation contracts.

- **Policy 1.L.5.** The County shall encourage the development of trails, picnicking, observation points, parks, and roadside rests along scenic highways.

- **Policy 1.L.7.** The County shall encourage the use of bicycles as an alternative mode of travel for recreational purposes in scenic corridors.

FORESTHILL DIVIDE COMMUNITY PLAN

The *Foresthill Divide Community Plan* (Community Plan), which is currently in draft form, covers the project area. The Community Plan contains the following goals and policies relevant to visual resources in the project area.

- **GOAL 3.C.1:** Promote, preserve and enhance the forested nature of the Foresthill Divide and rural atmosphere of the Foresthill community by requiring high aesthetic quality in all new development.
- **Policy 3.C.1-15.** Wherever possible an all weather trail (e.g., decomposed granite), roughly parallel to but physically separate from Foresthill Road and Foresthill–Soda Springs Road, shall be provided for pedestrians and motorized traffic.
- **Policy 3.C.3-2.** Landscaping shall be used to reduce the visual impact of all structures, including solid fences. Native vegetation should dominate where possible. Where existing vegetation is inadequate, the use of native plant materials is encouraged.
- **Policy 3.C.5-2.** Signage outside of commercial areas shall be discouraged. Signage along designated scenic corridors shall be limited to those necessary for public safety.
- **GOAL 3.C.9:** Protect the visual and scenic resources of the Foresthill Divide as an important quality-of-life amenity for local residents and as a principal asset in the promotion of recreation and tourism.
- **GOAL 4.A.14:** Protect and maintain identified viewsheds and natural areas of special aesthetic quality along Foresthill roadways.
- **Policy 4.A.14-1.** The well-recognized views of surrounding lands, ridges and canyons from public rights-of-way or lands shall be retained.
- **Policy 4.A.14-5.** Although not entirely within the Community Plan area, the following road segments shall be designated as scenic highways:
  - Foresthill Road within the Plan area and to Robinson Flat;
  - Mosquito Ridge Road to Robinson Flat Road; and
  - Robinson Flat Road from Mosquito Ridge Road to Foresthill Road.

7.3 IMPACTS

7.3.1 ANALYSIS METHODOLOGY

This visual impact analysis is based on field surveys, visual simulations, and a review of existing KOPs of the area (Exhibit 7-1) in relation to the surrounding vicinity. The elements of the proposed project were compared to existing views of the area to determine how the project would change foreground, middle ground, and background views where appropriate. The project was reviewed for its overall visual impacts using the standards of quality, consistency, and symmetry typically used for a visual assessment. The following methodology was used in preparation of the visual simulations for the proposed project:

The visual simulation was produced by combining site photography with accurate, rendered computer models to predict what would be seen if the proposed project were built. There are no existing CEQA guidelines for the technical production of visual simulations, although the methodology used is a typical visual simulation process and conforms to standard practices in the industry.

Creation of visual simulations to analyze the potential impacts of the proposed project can be organized into three primary steps:

- Site Reconnaissance/Photographs
- Computer Modeling
- Photo Editing

SITE RECONNAISSANCE/PHOTOGRAPHY

A site reconnaissance was conducted for the study area. An inventory of representative viewpoint photographs was taken using a 35mm digital camera from which representative existing conditions images were selected for use in visual simulations. A panoramic format that increases the horizontal field-of-view of a conventional 35mm photograph was used. This was done to show the broader existing landscape context within which the proposed trail would be constructed. Date, time of day, and geographic location identified using a GPS unit were documented. This information was subsequently integrated into a GIS spatial database in ESRI ArcView and Autodesk Land Desktop and 3DMax release 7.

COMPUTER MODELING

To portray the proposed project from the selected representative viewpoints, a three dimensional (3D) computer model was produced using 3DMax release 7. The model consisted of the following components:

- Base / Context Model
- Virtual Cameras
- Daylighting

Base Model / Context Model

The base model is a scene of the study area measured in real-world units[1]. It is the virtual environment that contains all of the modeled components used to produce the visual simulations (existing roads, existing trails, proposed trail, virtual cameras and daylighting). The base model was generated to provide accurate contextual information for the location and placement of the 3D modeled components in the life-size computer environment. The following data was used to develop the 3D base model:

1. 30m USGS Digital Elevation Model
2. 1-meter resolution USGS Digital Orthographic Quadrangle (DOQs)
3. ESRI ArcView Shapefiles
   A. Existing Roads
   B. Existing Trails
   C. Proposed Trail/Staging Termini
   D. Viewpoint Locations

Existing Roads / Existing Trails / Proposed Trail

The existing roads, existing trails, and proposed trail lines and staging termini locations were extracted from a GIS database provided by Placer County. The lines were treated as centerlines from which 3D roads and trails were derived based on specifications given in the *North Fork American River Trail Plan* and supporting data such as the USGS DOQs. A consistent trail width of 8’0” and 15’0” was assumed for construction of the proposed trail, which conforms to the suggested range of initial clearing dimensions for the trail corridor. Although it is understood that the proposed trail will vary in width and be much narrower with re-vegetation over time, the 8’0”

[1] Use of scale within the computer modeling environment is not necessary. The computer model is life size.

and 15’0” standards were simulated to test the tolerance of the trail’s visibility at its most visible condition (i.e., immediately after construction).

Viewpoint Locations

Viewpoint locations were sampled as points in 3D space using a GPS unit in the field and integrated into the 3D base model represented as virtual cameras. All components were combined into a cohesive base layer in Autodesk Land Desktop and translated to three-dimensions in 3DMax 7, a computer modeling application.

Virtual Cameras

Representative viewpoint locations were photographed with a digital camera for which the x,y,z coordinate position of the camera, focal length of the camera lens, and eye-level height of the photographer were identified. This data was integrated into the 3D computer model to create virtual camera viewpoints that match the positions in the life-size computer modeled environment to the lens of the original camera. This means that the 3D model of the proposed trail and staging termini in the scene accurately portrayed the proposed project in scale and distance from the representative viewpoint.

Daylighting

To accurately portray and render the 3D computer model under daylight conditions relative to each viewpoint, the date, time of day, and geographic location for each view were parametrically programmed into 3DMax release 7 to generate appropriate and accurate sun angles.

PHOTO-EDITING

Once the model was constructed and virtual cameras matched to the photographs, the rendering of the computer model from each viewpoint was composited over the existing conditions viewpoints using image editing software such as Photoshop or QFX. It was in this step that details from the computer model were blended seamlessly into the base photograph to produce the final visual simulation.

7.3.2 THRESHOLDS OF SIGNIFICANCE

CEQA THRESHOLDS

Based on the Placer County California Environmental Quality Act (CEQA) Checklist and the State CEQA Guidelines, the proposed project would result in a potentially significant impact on visual resources if it would:

- have a substantial adverse effect on a scenic vista;
- substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway;
- substantially degrade the existing visual character or quality of the site and its surroundings; or
- create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

The proposed project does not include any lights or sources of glare, and there would be no changes to and/or impacts related to light and glare in the project area; therefore, changes in light and glare will not be discussed further in the impact discussion below.

CRITERIA USED IN VISUAL ASSESSMENT

The aesthetic quality of an area is determined through the variety and contrasts of the area's visual features, the character of those features, and the scope and scale of the scene. The aesthetic quality of an area depends on the relationships between its features and their importance in the overall view. Visual images dominate observers' impressions of the aesthetic qualities of an area. Therefore, evaluating scenic resources requires a method that objectively characterizes visual features, assesses their quality in relation to the visual character of the surrounding area, and identifies their importance to the individuals viewing them. This process is derived from established federal procedures for visual assessment and is commonly used for a variety of project types.

Both natural and created features in a landscape contribute to the perceived visual quality of that landscape. Landscape characteristics influencing visual quality include geologic, hydrologic, botanical, wildlife, recreation, and urban features. A commonly used set of criteria for defining and evaluating visual quality includes the concepts of vividness, intactness, and unity. None of these is itself equivalent to visual quality; all three must be high to indicate high quality. These terms are defined as follows (FHWA 1983).

- "Vividness" is the visual power or memorability of landscape components as they combine in striking and distinctive visual patterns.

- "Intactness" is the visual integrity of the natural and human-built landscape and its freedom from encroaching elements.

- "Unity" is the visual coherence and compositional harmony of the landscape considered as a whole.

The quality of views of areas that could be affected by the proposed project is evaluated based on the relative degree of vividness, intactness, and unity apparent in the views, and also on viewer sensitivity. Viewer sensitivity is a function of several factors:

- visibility of the landscape,
- proximity of viewers to the visual resources,
- frequency and duration of views,
- number of viewers,
- types of individuals and groups of viewers, and
- viewers' expectations.

The sensitivity of a view of the landscape is also determined by the extent of the public's concern for a particular view. Areas of high visual sensitivity are highly visible to the general public. Scenic highways, tourist routes, and recreation areas are considered more visually sensitive than more urbanized locations. A determination finding that a potential visual impact has significance would be based on a change in visual character as determined by the obstruction of a public view, creation of an aesthetically offensive public view, or adverse changes to objects having aesthetic significance. The distance of a view from landscape elements plays an important role in the determination of an area's visual quality. Landscape elements are considered higher or lower in visual importance based on their position relative to the viewer. Generally, the closer a resource is to the viewer, the more dominant, and therefore visually important, it is to the viewer.

7.3.3 IMPACT ANALYSIS

IMPACT 7-1	Visual Resources – Temporary Changes in Visual Resources Associated with Trail Construction. *Construction activity, construction equipment, and small areas of vegetation removal would be temporarily visible during and immediately following construction of the proposed trail. However, these changes in views would be minimal. All views of trail construction would be temporary.*
Significance	*Less Than Significant*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less Than Significant*

Construction of the proposed trail would result in some changes to the visual character of the project area as a result of vegetation removal and other construction activities. During the construction phase of the proposed project, construction crew members and their vehicles would be present on-site along with a Sweco trail dozer, a mini excavator, and/or other machinery capable of conforming to the dimensional requirements of the trail. Some vegetation would be cleared during this phase of the project. The proposed trail alignment would bypass as many trees as possible, particularly native trees greater than 6 inches in diameter at breast height (dbh). The project area is thickly vegetated, making it less visible to the surrounding areas. All cut vegetation would be chipped and broadcast to the area surrounding the proposed trail alignment.

Construction activities at both staging termini would also be visible. Some vegetation would be removed at both of the staging termini. Trees greater than 6 inches dbh would also be avoided to the extent possible at these sites. Construction crews and equipment, such as graders, would be present at these sites during construction. Although these construction activities would be visible from surrounding areas, they would be temporary; therefore, they would have a less-than-significant impact on visual resources.

The proposed trail alignment would also be more visible immediately following construction until the surrounding vegetation is able to grow back. Exhibits 7-8 through 7-17 show existing conditions compared to the worst-case scenario of what the trail and staging termini could look like immediately following construction. These exhibits show what the proposed trail would look like with the maximum amount of vegetation removed and with a 15-foot-wide vegetation removal corridor in which all vegetation has been removed. No re-vegetation of any kind has been simulated to fill the corridor up to the specified 6 foot width trail, and a stone wall was modeled on the outside edge of the trail. Because visibility of trail construction would be minimal even under this "most visible" scenario, and these changes in views would be temporary, this impact is considered less than significant.

Source: EDAW 2005

Existing Views from the Boat-in Campground along Lake Clementine **Exhibit 7-8**

Source: Field of Vision 2005

Visual Simulation of the Proposed Trail Alignment from the Boat-in Campground along Lake Clementine Immediately following Construction **Exhibit 7-9**

Source: EDAW 2005

Existing Views of the North Fork American River Canyon from near Boole Road in Applegate **Exhibit 7-10**

Source: Field of Vision 2007

Visual Simulation of the Proposed Trail Alignment from near Boole Road in Applegate Immediately following Construction **Exhibit 7-11**

Source: EDAW 2005

Existing Views from Upper Lake Clementine, Looking Upstream **Exhibit 7-12**

Source: Field of Vision 2007

Visual Simulation of the Proposed Trail Alignment from Upper Lake Clementine, Looking Upstream Immediately after Construction **Exhibit 7-13**

Source: Field of Vision 2007

Existing Views from Ponderosa Bridge, Looking Southeast **Exhibit 7-14**

Source: Field of Vision 2007

Visual Simulation of the Proposed Ponderosa Way Staging Terminus, Looking Southeast **Exhibit 7-15**

Source: Field of Vision 2007

Existing Views from Foresthill Road, Looking Northeast **Exhibit 7-16**

Source: Field of Vision 2007

Visual Simulation of the Proposed Foresthill Bridge Staging Terminus, Looking Northeast **Exhibit 7-17**

IMPACT 7-2	Visual Resources – Long-term Changes in Visual Resources Associated with the Proposed Trail. *The proposed project would introduce new physical elements into the landscape; however, the proposed trail is designed to avoid visually obtrusive effects and would be revegetated after construction. After 1 year of vegetation growth, the proposed trail alignment would not be visible from the KOPs.*
Significance	*Less Than Significant*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less Than Significant*

The narrow trail width (6 feet) would minimize visibility of the proposed trail alignment from above or from the other side of the river. In addition, trail construction would avoid to the extent feasible the removal of trees greater than 6 inches dbh, which would minimize visible reduction of the tree canopy and maintain the picturesque views along the proposed trail alignment. The proposed project would not substantially damage any scenic rock outcrops, such as Robber's Roost, and it would not damage any historic buildings in the project area. Proposed project features such as stream crossings, off-road-vehicle barriers, and bridges would incorporate natural colors and materials such as stone, rock, and wood found in the area, to further reduce their visibility.

Because of the low profile of the proposed trail alignment and the steep topography of the canyon, the proposed project would not affect long-range views from the surrounding area. After one or two growing seasons, vegetation regrowth would also help the trail blend into the landscape. The KOPs chosen for this project were identified as the critical observation points that could be affected by the proposed project. As shown by the visual simulations (Exhibits 7-18 and 7-20), the proposed trail alignment would not be visible from the KOPs 1 year after construction.

Source: Field of Vision 2005

Views of the Proposed Trail Alignment from the Boat-in Campground along Lake Clementine One Year after Trail Construction **Exhibit 7-18**

Source: Field of Vision 2005

Views of the Proposed Trail Alignment from near Boole Road in Applegate One Year after Trail Construction **Exhibit 7-19**

Source: Field of Vision 2007

Views of Proposed Trail Alignment from Upper Lake Clementine Looking Upstream, One Year after Trail Construction **Exhibit 7-20**

The presence of staging termini would change the views of the areas from surrounding roadways (Exhibits 7-15 and 7-17). The Foresthill Bridge Staging Terminus would be enclosed by a 6-foot cyclone fence with either black or green vinyl coating, and a new gate would be installed. State Park Trail Standards require either a gravel or dirt surface for equestrian facilities. This location was previously used as a construction staging area during the construction of the Foresthill Bridge; therefore, the area has been previously disturbed and does not currently have thick vegetation. Construction of a staging terminus at this location would result in some visual changes;

however, these changes would be consistent with the existing roadway and character of the area. The proposed Ponderosa Way Staging Terminus would also be visible from the surrounding area. This staging terminus would also have a gravel or dirt surface. This staging terminus would be consistent with the character of the surrounding area. Neither of the staging termini would affect long-range views. All structural facilities at these locations would use colors that would blend with the natural environment. Therefore, the presence of the staging termini would have a less-than-significant impact on long-range views.

Views of the American River canyon for recreational users on and around the North Fork American River would be unobstructed. Because the proposed trail alignment would not be readily visible after vegetation regrowth from the any of the vantage points in the area, including the KOPs, and would blend with the surrounding area, this impact is considered less than significant.

IMPACT 7-3	Visual Resources – Changes in Views from Scenic Vistas. *SR 49, Foresthill Road, and the North Fork American River have been identified as scenic vistas in the project area. The proposed trail alignment would not be visible from Foresthill Road or the American River, and only the existing portion of the trail is visible from SR 49. The Foresthill Bridge Staging Terminus would be visible from Foresthill Road; however, this staging terminus would be consistent with the character of the surrounding area.*
Significance	*Less Than Significant*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less Than Significant*

A scenic vista is generally a view of an area that has remarkable scenery or a resource that is indigenous to the area. SR 49, Foresthill Road, and the North Fork American River are considered scenic vistas. As discussed in Impact 7-2, "Long-term Changes in Visual Resources Associated with the Proposed Trail," the proposed trail alignment would not be visible from Foresthill Road or the North Fork American River. The westernmost portion of the proposed trail alignment, which is already in place, is visible from SR 49; however, because this portion of the trail already exists, there would be no change to the views as a result of the proposed project. The Ponderosa Way Staging Terminus would not be visible from any of these scenic vistas.

Although the proposed trail alignment would not be visible from Foresthill Road, the Foresthill Bridge Staging Terminus would be visible from Foresthill Road. The location of the staging terminus has been previously disturbed; therefore, construction of the staging terminus would not require extensive vegetation removal, and facilities associated with both staging termini would use colors that would blend with the natural environment. Therefore, the presence of the staging termini would have a less-than-significant impact on scenic vistas.

Because the proposed trail and its staging termini would be consistent with the surrounding area, this impact is considered less than significant.

IMPACT 7-4	Visual Resources – Potential Conflict with Wild and Scenic Eligibility of the North Fork American River. *The section of the American River between Clementine Dam and the intake of the Auburn Dam diversion tunnel has been deemed eligible for listing as a recreational river under the Wild and Scenic River Act. The proposed project would be consistent with a recreational classification and would not have a significant impact on any of the outstandingly remarkable values of the river.*
Significance	*Less Than Significant*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less Than Significant*

In 1993, the stretch of the North Fork American River between Clementine Dam and the intake of the Auburn Dam diversion tunnel, which is visible from the project area, was deemed as eligible for designation as a recreational river under Wild and Scenic River Act. This river segment was recommended for a recreational classification, because of the recreational trails and roads that exist along this segment of river. After river segments have been deemed eligible for designation, a suitability study is typically conducted for each eligible river segment to determine whether it is suitable for designation under the Wild and Scenic River Act. When a river becomes eligible for listing, state and federal agencies seek to protect the outstandingly remarkable values (ORVs) of the river until it can be determined whether the river segment is suitable for listing. ORVs for this stretch of the North Fork American River are the Western States Trail; the No Hands Bridge; endangered and threatened species in the area; and landforms, waterforms, and wildlife habitat in the project area (Reclamation 1993). A suitability study for this stretch of the river has never been conducted. If this stretch of the North Fork American River were to be deemed suitable for listing at some time in the future, it would be classified as recreational.

The ORVs that may be affected by the proposed project are foothill yellow-legged frog, Brandegee's clarkia, landforms in the project area, and wildlife habitat in the area. The proposed project would not result in significant impacts to any of these resources after mitigation. The proposed project would not have a significant impact on foothill yellow-legged frog or Brandegee's clarkia, and would minimize impacts on wildlife habitat to the extent possible (see Chapter 5.0, "Biological Resources"). Impacts on landforms would also be minimized by designing the proposed trail alignment to follow the contour of the canyon and blend with the surrounding environment to the extent possible (Exhibits 7-18 and 7-20). The trail would also be consistent with the recreational designation. The proposed project would not have an impact on any other ORVs on this stretch of river.

Depending on a river's Wild and Scenic classification, new roads, trails, bridges, and recreational facilities may be allowed (Marsh 1999). Because there are numerous existing recreational trails and roads along this portion of the North Fork American River, and because new trails would be consistent with the proposed recreational classification, the proposed project would be consistent with the current facilities along the river and the recommended classification of the river. Therefore, this impact is considered less than significant.

7.4 MITIGATION MEASURES

No mitigation measures are necessary.

8.0 TRANSPORTATION AND CIRCULATION

This chapter describes existing transportation facilities in the project area and the vicinity. It describes the existing roadway network and transportation facilities, as well as current circulation elements (bikeways, bridges, and parking conditions), and discusses the transportation impacts of the proposed project. There are no transit, light rail, or airport facilities in the project vicinity; therefore, these types of facilities will not be discussed further in this chapter.

8.1 ENVIRONMENTAL SETTING

8.1.1 ROADWAYS

Interstate 80 (I-80) is the primary transportation facility in the project vicinity. It runs east-west, and is located northwest of the proposed trail alignment. Other roadways in the project area include Foresthill Road, Old Foresthill Road, Lake Clementine Road, Upper Lake Clementine Road, and Ponderosa Way (Exhibit 3-2). Old Foresthill Road at the North Fork/Middle Fork American River confluence (confluence), Lake Clementine Road, and Upper Lake Clementine Road would serve as access points to the proposed trail.

Foresthill Road lies generally to the south of the proposed trail alignment. It begins near I-80 just outside of Auburn, crosses the North Fork American River via the Foresthill Bridge, and continues eastward along the top of the Foresthill Divide to the town of Foresthill. Foresthill Road is a two-lane rural roadway. This roadway provides the principal link between Auburn and Foresthill and serves as the main route along the divide; it then continues easterly to Soda Springs. A traffic analysis conducted in 2003 for the *Foresthill Community Plan Draft Environmental Impact Report* found that Foresthill Road carries 6,650 average daily trips (ADT) east of the two-lane Foresthill Bridge. These data indicate that Foresthill Road is operating at level of service (LOS) C (kdANDERSON Transportation Engineers 2003). LOS definitions are provided in Section 8.2.1, "Level of Service," below.

Foresthill Road is used for tourist travel between the Auburn area, the Tahoe National Forest, and the Auburn State Recreation Area (SRA). Approximately 900,000 tourists visit the Foresthill area of the Tahoe National Forest annually. Based on information provided by U.S. Forest Service (USFS) staff for recent traffic analysis, and accounting for such factors as carpooling and weekend vs. weekday traffic, tourist traffic accounts for an estimated 570+ weekday trips on Foresthill Road between Auburn and Foresthill (kdANDERSON Transportation Engineers 2003).

Ponderosa Way is a USFS road that extends southeasterly from the town of Weimar into the North Fork of the American River canyon, where it crosses the river at the Ponderosa Bridge. Ponderosa Way just north of Foresthill Road carries 1,495 ADT. This roadway is operating at LOS B (kdANDERSON Transportation Engineers 2003).

8.1.2 BIKEWAYS

Three existing multiple-use trails within the Auburn SRA would link to the proposed trail: the Clementine Loop Trail, the Lake Clementine Access Trail, and the Long Point Fuel Break Trail. The Clementine Loop Trail is approximately 11 miles long and connects five shorter trails, including the Lake Clementine Trail. The Lake Clementine Access Trail begins at Lake Clementine Road just off Foresthill Road, and the Long Point Fuel Break Trail begins at Foresthill Road. Both trails end at the North Fork American River.

8.1.3 BRIDGES

There are two bridges in the project area: the Foresthill Bridge and the Ponderosa Bridge. The Foresthill Bridge, which is the tallest bridge in California, was initially built in 1875 and has been rebuilt several times since its first construction. The latest reconstruction of the bridge was completed in 1973. The Foresthill Bridge lies near the west end of the proposed trail alignment. The Ponderosa Bridge is a one-lane truss-type bridge located at the east end of the proposed trail. This bridge serves as the crossing point for Ponderosa Way over the North Fork American River.

8.1.4 PARKING

There is existing parking for hikers and mountain bikers along Old Foresthill Road and at the Ponderosa Bridge. There is additional parking on Lake Clementine Road, near the intersection of Foresthill Road. No equestrian parking areas currently exist in the project area.

8.2 REGULATORY SETTING

8.2.1 LEVEL OF SERVICE

LOS describes the operating conditions of a roadway based on such factors as speed, travel time, maneuverability, delay, and safety. The LOS for a given facility is designated with a letter, between A and F, with A representing the best operating conditions and F representing the worst. These letter designations are described in more detail in Table 8-1.

8.2.2 FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No federal plans, policies, regulations, or laws related to transportation and circulation are applicable to the proposed project.

Table 8-1
Level of Service Definitions

LOS	Description
A	Free Flow: Almost no platoons of three or more cars. Driver delayed no more than 30% by slow-moving vehicles.
B	Free Flow: Some platoons form. Driver delayed no more than 45% by slow-moving vehicles.
C	Stable Flow: Noticeable increase in platoon formation and size. Drivers delayed no more than 60% by slow-moving vehicles.
D	Approaching Unstable Flow: Heavy platooning. Passing becomes more difficult. Drivers delayed no more than 75% by slow-moving vehicles.
E	Unstable Flow: Intense platooning. Passing is virtually impossible. Drivers delayed more than 75% by slow-moving vehicles.
F	Forced Flow: Queues form behind breakdown points.

Source: Transportation Research Board 2000

8.2.3 STATE PLANS, POLICIES, REGULATIONS, AND LAWS

The California Department of Transportation (Caltrans) is responsible for planning, designing, constructing, operating, and maintaining all state-owned roadways in Placer County.

8.2.4 LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

PLACER COUNTY GENERAL PLAN

The following are the relevant policies identified by the *Placer County General Plan* (Placer County 1994) for transportation and circulation.

- **Policy 3.A.7.** [Placer] County shall develop and manage its roadway system to maintain the following minimum levels of service (LOS).
  - LOS "C" on rural roadways, except within one-half mile of state highways where the standard shall be LOS "D."
  - LOS "C" on urban/suburban roadways except within one-half mile of state highways where the standard shall be LOS "D."
- **Policy 3.A.10.** The County shall strive to meet the level of service standards through a balanced transportation system that provides alternatives to the automobile.
- **Policy 3.D.1.** The County shall promote the development of a comprehensive and safe system of recreational and commuter bicycle routes that provides connections between the County's major employment and housing areas and between its existing and planned bikeways.
- **Policy 3.D.2.** The County shall work with neighboring jurisdictions to coordinate planning and development of the County's bikeways and multi-purpose trails with those of neighboring jurisdictions.
- **Policy 3.D.3.** The County shall pursue all available sources of funding for the development and improvement of trails for non-motorized transportation (bikeways, pedestrian, and equestrian).
- **Policy 3.D.4.** The County shall promote non-motorized travel (bikeways, pedestrian, and equestrian) through appropriate facilities, programs, and information.
- **Policy 3.D.6.** The County shall support the development of parking areas near access to hiking and equestrian trails.

WEIMAR-APPLEGATE-CLIPPER GAP GENERAL PLAN

The *Weimar-Applegate-Clipper Gap General Plan* contains the following policy relevant to transportation and circulation in the project area.

- Existing roads should be maintained at a level that ensures that the network is safe, economical, and efficient.

FORESTHILL DIVIDE COMMUNITY PLAN

The *Foresthill Divide Community Plan* (Community Plan), which is currently in draft form, includes the project area. The Community Plan contains the following goals and policies relevant to transportation and circulation in the project area.

- **GOAL 5.1:** Provide for the safe and efficient movement of people and goods on the primary roadway serving the Foresthill Divide, i.e., Foresthill Road.

- **Policy 5.1-1.** Establish and maintain a Level of Service (LOS) of "C" or better on Foresthill Road between Auburn and the Idle Wheels Mobile Home Park and "D" or better between the Idle Wheels Mobile Home Park and east of the Foresthill Elementary School.

- **GOAL 5.2:** Provide for safe emergency access and alternative routes onto the Foresthill Divide and to provide river and canyon access for recreational purposes.

- **GOAL 5.7:** Provide emergency and public access to public lands.

8.3 IMPACTS

8.3.1 ANALYSIS METHODOLOGY

Impacts on transportation and circulation that would result from the proposed project were identified by comparing existing service capacity and facilities against anticipated future demand associated with implementation of the proposed project.

8.3.2 THRESHOLDS OF SIGNIFICANCE

Based on the Placer County California Environmental Quality Act (CEQA) Checklist and the State CEQA Guidelines, the proposed project would result in a potentially significant impact on traffic or circulation if it would result in:

- increased vehicle trips or traffic congestion, hazards to safety from design features (e.g., sharp curves or dangerous intersections), or incompatible uses (e.g., farm equipment);

- inadequate emergency access or access to nearby uses;

- insufficient parking capacity on-site or off-site;

- hazards or barriers for pedestrians or bicyclists;

- conflicts with adopted policies supporting alternative transportation (e.g., bus turnouts, bicycle racks); or

- rail, waterborne, or air traffic impacts.

As mentioned above, there are no transit, light rail, or airport facilities in the project vicinity; therefore, the proposed trail would not have an impact on any of these facilities. The proposed trail would not conflict with any policies supporting alternative transportation. Because the proposed project would have no impact on these thresholds, they are not discussed further in this chapter.

8.3.3 IMPACT ANALYSIS

IMPACT 8-1	Transportation and Circulation – Temporary Increase in Traffic during Construction. *During construction of the proposed trail, local roadways would experience an increase in traffic from daily commutes by construction workers. However, this increase in traffic would be temporary and is not expected to be substantial in relation to the existing traffic load and capacity.*
Significance	*Less Than Significant*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less Than Significant*

During trail construction, there would be a temporary increase in construction-related traffic from equipment and construction workers traveling to and from the project area. Based on the assumption that a 12-person crew (see Chapter 3.0, "Project Description") would be required for trail construction, it is expected that the maximum number of vehicle trips generated in any one day would be 12 round trips (10 construction worker commute trips and two material delivery trips). Carpooling among construction workers would be encouraged by the County, further reducing this number. The increase in traffic would be spread out over approximately 3 years. Because Foresthill Road is currently operating at LOS C with approximately 6,650 ADT, this increase in traffic would constitute a very small increase in traffic and would not be substantial in relation to existing traffic load and capacity of Foresthill Road. In addition, this increase in traffic would be only temporary. Therefore, this impact is considered less than significant.

IMPACT 8-2	Transportation and Circulation – Increase in Traffic with Use of the North Fork Trail. *The proposed trail would not be sufficiently different from other multiple-use trails in the Auburn SRA to create its own demand. However, the proposed trail may redirect trail users from other trails in the area to the immediate project area. Visitors traveling to the Auburn SRA would use the surrounding roadways regardless of which recreational facility they will be using.*
Significance	*Less Than Significant*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less Than Significant*

The proposed trail would be constructed to accommodate the existing demand for recreational facilities caused by population increases in the project vicinity. Other multiple-use trails exist in the project area, and the proposed trail would not be sufficiently different to create its own demand. The proposed trail may redirect trail users from other trails in the area to the immediate project area, which would result in some additional traffic in the immediate project area. The roadways in the immediate vicinity of the proposed trail alignment are currently operating at a LOS C or better, and visitors traveling to the Auburn SRA would use these roadways regardless of which recreational facility they will be using. Because the proposed trail would not create its own demand and would not significantly increase traffic in the project area, this impact is considered less than significant.

IMPACT 8-3	Transportation and Circulation – Increase in Traffic Hazards Associated with Construction Vehicles. *Construction vehicles entering the road could cause an increase in traffic hazards in the project area. Site plans would include measures for safety that would reduce these hazards.*
Significance	*Less Than Significant*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less Than Significant*

Slow-moving construction vehicles entering the roadways could increase traffic hazards in the project area by turning into and out of the staging termini. Site plans for the staging termini would include ingress and egress specifications for safety and driver awareness. Cones would also be placed at the entrance points, and appropriate signage would be placed in construction areas to warn drivers of construction activities. Because these measures would be taken to ensure the safety of truck drivers and passing vehicles, this impact is considered less than significant.

IMPACT 8-4	Transportation and Circulation – Increase in Traffic Hazards Associated with Use of Staging Termini. *Trucks and trailers entering and exiting Foresthill Road and Ponderosa Way from the proposed staging termini could cause an increase in traffic hazards in the project area. The staging termini would be designed to include measures for safe ingress and egress of trucks and trailers.*
Significance	*Less Than Significant*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less Than Significant*

Trucks and trailers entering Foresthill Road and Ponderosa Way from the respective staging termini could increase hazards in the project area for the same reasons as described above for Impact 8-3. However, the staging termini would be designed for safe ingress and egress of these vehicles. In addition, the proposed staging terminus would provide additional off-street parking which could reduce traffic hazards along Foresthill Road. State Route 49 and Foresthill Road are suitable for horse trailers; however, construction of the Foresthill Bridge Staging Terminus may require shortening of an existing passing lane on Foresthill Road to provide room for a left-turn lane. The Foresthill Bridge Staging Terminus would be enclosed with a 6-foot cyclone fence, and a new gate would be installed to prevent horses from running into traffic. The County would coordinate with Caltrans to ensure that all roadway standards are met and that the proposed project would not adversely affect the safety of vehicles traveling on Foresthill Road.

Ponderosa Way, at the east end of the proposed trail alignment, is a dirt road with little traffic. The staging area would be designed for safe ingress and egress of vehicles. Therefore, traffic entering and exiting the roadway would not pose a significant hazard. The California Department of Parks and Recreation (State Parks) grades the road each spring; however, by early summer it is in poor condition (Fisher, pers. comm., 2004). The condition of Ponderosa Way could pose a hazard to horse trailers and other vehicles using the Ponderosa Way Staging Terminus; however, State Parks would increase maintenance of Ponderosa Way to ensure the safety of vehicles using the roadway.

Because the staging termini would be designed to include measures for safe ingress and egress of trucks and trailers and would provide additional off-street parking, this impact is considered less than significant.

IMPACT 8-5	Transportation and Circulation – Adequacy of Parking for Trail Users. *Although there would be increased demand for parking at trail access points, adequate parking would be provided to accommodate this increase in demand.*
Significance	*Less Than Significant*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less Than Significant*

Adequate parking would be provided at the existing confluence parking lot for visitors who are hiking or biking, and at the proposed Foresthill Bridge Staging Terminus for horse trailers. Approximately seven parking spaces for trucks and horse trailers and approximately 21 parking spaces for cars would be created at the Foresthill Bridge Staging Terminus. Approximately 18 spaces would be created for trucks and trailers at the Ponderosa Way Staging Terminus. There is also existing parking at the Upper Lake Clementine parking lot. It is expected that peak trail use, and corresponding peak parking demand, would occur during the spring and fall when parking demands from other recreational activities (e.g., whitewater rafting) are lower (Fisher, pers. comm. 2006). Therefore, the proposed project is not expected to cause an increase in demand for parking during the peak season for other recreational activities in the area. Because existing parking and additional parking spaces created by the proposed project are expected to be adequate for trail users, this impact is considered less than significant.

IMPACT 8-6	Transportation and Circulation – Potential Interference with Emergency Response Routes. *The proposed trail would have several access points that would provide adequate access for emergency response vehicles and personnel.*
Significance	*Less Than Significant*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less Than Significant*

Four existing trails—the Clementine Loop Trail, Lake Clementine Access Trail, Foresthill Divide Loop, and the Long Point Fuel Break Trail—would provide emergency access points to the proposed trail. Three existing roads could provide emergency access to the proposed trail: Old Foresthill Road at the confluence, Lake Clementine Road, and Upper Lake Clementine Road (Placer County 2003a). In addition, three multiple-use trails within the Auburn SRA would link to the proposed trail: the Clementine Loop Trail, the Lake Clementine Access Trail, and the Long Point Fuel Break Trail. The trail section below the Foresthill Bridge may also be widened to 10 feet to allow emergency vehicles to have better access to the Clark's Hole recreation area as well as the proposed trail. Because these six access points are expected to provide adequate emergency access, and widening of the westernmost portion of the trail would improve emergency access to the area, this impact is considered less than significant.

8.4 MITIGATION MEASURES

No mitigation measures are necessary.

9.0 AIR QUALITY

This chapter includes a discussion of existing air quality conditions, a summary of applicable regulations, and an analysis of potential short-term and long-term air quality impacts of the proposed project. The method of analysis for short-term construction, long-term regional (operational), local mobile-source, odor, and toxic air emissions is consistent with the recommendations of the Placer County Air Pollution Control District (PCAPCD).

9.1 ENVIRONMENTAL SETTING

The project area is located in the central portion of Placer County, California, which is within the Mountain Counties Air Basin (MCAB). The MCAB also comprises all of Amador, Calaveras, Mariposa, Nevada, Plumas, Sierra, and Tuolumne Counties and the majority of El Dorado County. The ambient concentrations of air pollutant emissions are determined by the amount of emissions released by pollutant sources and the ability of the atmosphere to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and the presence of sunlight. Therefore, existing air quality conditions in the project area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources, as discussed separately below.

9.1.1 TOPOGRAPHY, CLIMATE, AND METEOROLOGY

Elevations within the MCAB vary from less than 1,000 feet above sea level in the west to more than approximately 6,000 feet above sea level in the east. The general climate in the MCAB varies considerably with elevation and proximity to the Sierra Nevada crest. The terrain features of the MCAB make it possible for various climates to exist in relatively close proximity. The pattern of mountains and hills causes a wide variation in rainfall, temperature, and localized winds throughout the MCAB.

The local topographical and meteorological conditions in the MCAB largely determine the effect of air pollutant emissions in the basin. Regional airflows are affected by the mountains and hills, which direct surface airflows, cause shallow vertical mixing, and hinder dispersion, thereby creating areas of high pollutant concentrations. Inversion layers, where warm air overlies cooler air, frequently occur and trap pollutants close to the ground. In the winter, these conditions can lead to carbon monoxide (CO) "hot spots" along heavily traveled roads and at busy intersections. During the summer, with its longer daylight hours, stagnant air, and high temperatures, plentiful sunshine provides the energy needed to fuel photochemical reactions between reactive organic gases (ROG) and oxides of nitrogen (NO_X), which in turn result in ozone formation.

Local meteorology of the project area is represented by measurements recorded at the Auburn station. Relative humidity is generally in the moderate to low range. Precipitation is moderate to occasionally heavy in the winter; the normal annual precipitation, which occurs primarily from November through March, is approximately 35 inches. January temperatures range from a normal minimum of 36 degrees Fahrenheit (°F) to a normal maximum of 54°F. July temperatures range from a normal minimum of 62°F to a normal maximum of 93°F (NOAA 1992). The predominant wind direction and speed is from the south-southwest at less than 9 mph, although winds can reach high speeds during storms (ARB 1994).

9.1.2 EXISTING AIR QUALITY—CRITERIA AIR POLLUTANTS

Concentrations of criteria air pollutants are used as indicators of ambient air quality conditions. Source types, health effects, and future trends for each criteria air pollutant are briefly described below, along with the most current attainment area designations and monitoring data for the project area.

OZONE

Ozone is the primary component of smog. Ozone is not directly emitted into the air, but is formed through complex chemical reactions between precursor emissions of ROG and NO_X in the presence of sunlight. ROG are volatile organic compounds that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO_X are a group of gaseous compounds of nitrogen and oxygen that result from high-temperature combustion processes, such as those occurring in automobiles and power plants, and from natural sources, such as lightning, biological and abiological processes in soil, and stratospheric intrusion. While natural background emissions of NO_X compounds are known to exist, research has shown the levels to be many times lower than those found around metropolitan and industrialized areas.

Ozone located in the upper atmosphere (stratosphere) acts in a beneficial manner by shielding the earth from harmful ultraviolet radiation that is emitted by the sun. However, ozone located in the lower atmosphere (troposphere) is a major health and environmental concern. Meteorology and terrain play a major role in ozone formation. Generally, low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for formation. As a result, summer is generally the peak ozone season. Because of the reaction time involved, peak ozone concentrations often occur far downwind of the precursor emissions. Therefore, ozone is a regional pollutant that often affects large areas. In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry (Godish 1991).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone affect not only sensitive receptors, such as asthmatics and children, but healthy adults as well. Exposure to ambient levels of ozone ranging from 0.10 to 0.40 part per million (ppm) for 1–2 hours has been found to significantly alter lung functions by increasing respiratory rates and pulmonary resistance, decreasing the amount of air breathed in and out, and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to such adverse health effects as throat dryness, chest tightness, headache, and nausea. Evidence also exists that ozone exposure can interfere with or inhibit the immune system's ability to defend against infection of the respiratory system (Godish 1991).

Emissions of ozone precursors ROG and NO_X in the MCAB have decreased over the past several years because of more stringent motor vehicle standards and cleaner burning fuels (ARB 2005a).

CARBON MONOXIDE

CO is a colorless, odorless, and poisonous gas produced by incomplete burning of carbon in fuels, primarily from mobile (transportation) sources. In fact, 77% of the CO emitted nationwide comes from mobile sources. The other 23% consists of CO emissions from wood-burning stoves, incinerators, industrial sources, and natural sources, such as wildfires (EPA 2006).

Adverse health effects associated with exposure to CO concentrations include such symptoms as dizziness, headaches, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (EPA 2006a). The highest concentrations are generally associated with cold, stagnant weather conditions that occur during the winter. In contrast to ozone, which tends to be a regional pollutant, CO tends to cause problems in localized areas.

NITROGEN DIOXIDE

Nitrogen dioxide (NO_2) is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts

through oxidation in the atmosphere to form NO_2 (EPA 2006a). The combined emissions of NO and NO_2 are referred to as NO_X and reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local NO_X emission sources.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms during or shortly after exposure, including coughing, difficulty with breathing, vomiting, headache, and eye irritation. After a period of approximately 4–12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has occasionally been linked to prolonged respiratory impairment, with such symptoms as chronic bronchitis and decreased lung functions.

SULFUR DIOXIDE

Sulfur dioxide (SO_2) is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills and naturally by sea spray and volcanoes. The major adverse health effects associated with SO_2 exposure pertain to the upper respiratory tract. SO_2 is a respiratory irritant; the bronchioles constrict when 5 ppm or more of SO_2 is inhaled. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. The concentration of SO_2 to which a person is exposed is a more important determinant of respiratory effects than duration of exposure. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis.

PARTICULATE MATTER

Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires and natural windblown dust, and particulate matter formed in the atmosphere by condensation and/or transformation of SO_2 and ROG (EPA 2006a). Fine particulate matter ($PM_{2.5}$) includes a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less (ARB 2006).

The adverse health effects associated with PM_{10} depend on the specific composition of the particulate matter. For example, health effects may be associated with metals, polycyclic aromatic hydrocarbons (PAHs), and other toxic substances adsorbed onto fine particulate matter (the piggybacking effect), or with fine dust particles of silica or asbestos. Generally, adverse health effects associated with PM_{10} may result from both short-term and long-term exposure to elevated concentrations. These health effects may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations to the immune system, carcinogenesis, and premature death (EPA 2006a). $PM_{2.5}$ poses an increased health risk because the particles can deposit deep in the lungs and may contain substances that are particularly harmful to human health.

Direct emissions of both PM_{10} and $PM_{2.5}$ have increased in the MCAB between 1975 and 2000 and are projected to increase through 2020 (ARB 2005a).

LEAD

Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline (discussed in detail below), metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, the U.S. Environmental Protection Agency (EPA) set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. EPA banned the use of leaded gasoline in highway vehicles in December 1995 (EPA 2006a).

All areas of the state are currently designated as attainment for the state lead standard (EPA does not designate areas for the national lead standard). (Air quality attainment status designations are described below.) Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose "hot spot" problems in some areas.

MONITORING STATION DATA AND ATTAINMENT AREA DESIGNATIONS

Criteria air pollutant concentrations are measured at several monitoring stations in the MCAB. The Auburn and Roseville stations are the closest in proximity to the project area with recent data for ozone, NO_2, CO, PM_{10}, and $PM_{2.5}$. In general, the ambient air quality measurements from these stations are representative of the air quality in the vicinity of the project area. Table 9-1 summarizes the air quality data from the most recent 3 years.

Both the California Air Resources Board (ARB) and EPA use this type of monitoring data to designate areas according to attainment status for criteria air pollutants established by the agencies. The purpose of these designations is to identify those areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are "nonattainment," "attainment," and "unclassified." The "unclassified" designation is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, the California designations include a subcategory of the nonattainment designation, called "nonattainment-transitional." The nonattainment-transitional designation is given to nonattainment areas that are progressing and nearing attainment. Attainment designations for the year 2005 with respect to the Placer County portion of the MCAB are shown in Table 9-2 for each criteria air pollutant.

Table 9-1
Summary of Annual Ambient Air Quality Data (2004–2006)

	2004	2005	2006
OZONE			
Auburn—108 C Avenue Monitoring Station			
Maximum concentration (1-hour/8-hour average, ppm)	0.118/0.101	0.120/0.107	0.129/ 0.114
Number of days state standard exceeded (1-hour)	14	11	25
Number of days national 1-hour/8-hour standard exceeded	0/12	0/10	1/29
CARBON MONOXIDE (CO)			
Roseville—North Sunrise Avenue Monitoring Station			
Maximum concentration (1-hour/8-hour average, ppm)	2.6/1.93	2.0/1.27	-
Number of days state standard exceeded (8-hour)	0	0	-
Number of days national standard exceeded (1-hour/8-hour)	0/0	0/0	-
NITROGEN DIOXIDE (NO_2)			
Roseville—North Sunrise Avenue Monitoring Station			
Maximum concentration (1-hour average, ppm)	0.067	0.079	0.063
Number of days state standard exceeded	0	0	0
Annual average (ppm)	0.013	0.013	0.013

Table 9-1
Summary of Annual Ambient Air Quality Data (2004–2006)

	2004	2005	2006
FINE PARTICULATE MATTER ($PM_{2.5}$)			
Roseville—North Sunrise Avenue Monitoring Station			
Maximum concentration (μg/m^3)	47.8	59.2	45.0
Number of days national standard exceeded (measured[1])	0	0	0
RESPIRABLE PARTICULATE MATTER (PM_{10})			
Roseville—North Sunrise Avenue Monitoring Station			
Maximum concentration (μg/m^3)	43.0	40.0	55.0
Number of days state standard exceeded (measured/calculated[a])	0/0	0/0	1
Number of days national standard exceeded (measured/calculated[a])	0/0	0/0	0

Notes: μg/m^3 = micrograms per cubic meter; ppm = parts per million

[a] Measured days are those days that an actual measurement was greater than the level of the state daily standard or the national daily standard. Measurements are typically collected every 6 days. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.

Source: ARB 2007, EPA 2007a

9.1.3 EXISTING AIR QUALITY—TOXIC AIR CONTAMINANTS

Concentrations of toxic air contaminants (TACs) (in federal parlance, "hazardous air pollutants" [HAPs]) are also used as indicators of ambient air quality conditions. TACs are defined as air pollutants that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations. In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts may not be expected to occur. This contrasts with the criteria air pollutants, for which acceptable levels of exposure can be determined and for which the ambient standards have been established (Table 9-2).

According to the *California Almanac of Emissions and Air Quality* (ARB 2005a), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being PM from diesel-fueled engines (diesel PM). Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, and lubricating oil, and whether an emission control system is present. Unlike the other TACs, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, ARB has made preliminary concentration estimates based on a PM exposure method. This method uses the ARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to diesel PM, benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene are the TACs for which data are available that pose the greatest existing ambient risk in California.

According to ARB, there are no facilities in the vicinity of the project that emit TACs (ARB 2005b).

Table 9-2
Ambient Air Quality Standards and Designations

Pollutant	Averaging Time	California		National Standards [a]		
		Standards [b,c]	Attainment Status (Placer County portion of MCAB) [f]	Primary [c,e]	Secondary [c,f]	Attainment Status (Placer County portion of MCAB) [g]
Ozone	1-hour	0.09 ppm (180 µg/m^3)	N	- [i]	Same as primary standard	N [i]
	8-hour	0.070 ppm [h] (137 µg/m^3)	–	0.08 ppm (157 µg/m^3)		N (Serious)
Carbon monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	U	35 ppm (40 mg/m^3)	–	U/A
	8-hour	9 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)		
Nitrogen dioxide (NO_2)	Annual arithmetic mean	0.030 ppm (56 µg/m^3)	–	0.053 ppm (100 µg/m^3)	Same as primary standard	U/A
	1-hour	0.18 ppm (338 µg/m^3)	A	–		–
Sulfur dioxide (SO_2)	Annual arithmetic mean	–	–	0.030 ppm (80 µg/m^3)	–	
	24-hour	0.04 ppm (105 µg/m^3)	A	0.14 ppm (365 µg/m^3)	–	U
	3-hour	–	–	–	0.5 ppm (1300 µg/m^3)	
	1-hour	0.25 ppm (655 µg/m^3)	A	–	–	–
Respirable particulate matter (PM_{10})	Annual arithmetic mean	20 µg/m^3	N	- [f]	Same as primary standard	U/A
	24-hour	50 µg/m^3		150 µg/m^3 [f]		
Fine particulate matter ($PM_{2.5}$)	Annual arithmetic mean	12 µg/m^3	U	15 µg/m^3	Same as primary standard	U/A
	24-hour	–	–	35 µg/m^3		
Lead [j]	30-day average	1.5 µg/m^3	A	–	–	–
	Calendar quarter	–	–	1.5 µg/m^3	Same as primary standard	A
Sulfates	24-hour	25 µg/m^3	A	**No national standards**		
Hydrogen sulfide	1-hour	0.03 ppm (42 µg/m^3)	U			
Vinyl chloride [j]	24-hour	0.01 ppm (26 µg/m^3)	U/A			

Table 9-2
Ambient Air Quality Standards and Designations

Pollutant	Averaging Time	California		National Standards [a]		
		Standards [b,c]	Attainment Status (Placer County portion of MCAB) [f]	Primary [c,e]	Secondary [c,f]	Attainment Status (Placer County portion of MCAB) [g]
Visibility-reducing particulate matter	8-hour	Extinction coefficient of 0.23 per kilometer—visibility of 10 miles or more (0.07—30 miles or more for Lake Tahoe) because of particles when the relative humidity is less than 70%.	U			

Notes: MCAB = Mountain Counties Air Basin; $\mu g/m^3$ = micrograms per cubic meter; ppm = parts per million

[a] National standards (other than ozone, particulate matter (PM), and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when 99% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The $PM_{2.5}$ 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the U.S. Environmental Protection Agency (EPA) for further clarification and current federal policies.

[b] California standards for ozone, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, PM, and visibility-reducing particulate matter are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[c] Concentration expressed first in units in which it was promulgated [i.e., parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$)]. Equivalent units given in parentheses are based upon a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] Unclassified (U): A pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.
Attainment (A): A pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a 3-year period.
Nonattainment (N): A pollutant is designated nonattainment if there was a least one violation of a state standard for that pollutant in the area.
Nonattainment/Transitional (NT): A subcategory of the nonattainment designation. An area is designated nonattainment/transitional to signify that the area is close to attaining the standard for that pollutant.

[e] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[f] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[g] Nonattainment (N): Any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.
Attainment (A): Any area that meets the national primary or secondary ambient air quality standard for the pollutant.
Unclassifiable (U): Any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

[h] This concentration was approved by the California Air Resources Board (ARB) on April 28, 2005, and is expected to become effective in early 2006.

[i] The 1-hour ozone national ambient air quality standard was revoked on June 15, 2005. The annual PM10 NAAQS was revoked in 2006.

[j] ARB has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Sources: ARB 2007, EPA 2007a

EXISTING AIR QUALITY – GREENHOUSE GASES AND GLOBAL CLIMATE CHANGE

Various gases in the earth's atmosphere, classified as atmospheric greenhouse gases (GHGs), play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface, and a smaller portion of this radiation is reflected back toward space. The earth emits this radiation, which was initially absorbed, back to space, but the properties of the radiation have changed from high-frequency solar radiation to lower frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the Greenhouse Effect, is responsible for maintaining a habitable climate on Earth. Without the Greenhouse Effect, Earth would not be able to support life as we know it.

Prominent GHGs contributing to the Greenhouse Effect are carbon dioxide (CO_2), methane (CH_4), ozone, nitrous oxide, water vapor, hydrofluorocarbons, chlorofluorocarbons, and sulfur hexafluoride. Human-caused emissions of these GHGs (with the exception of water vapor) in excess of natural ambient concentrations are responsible for intensifying the Greenhouse Effect and have led to a trend of warming of the earth's climate, known as global climate change or global warming (Ahrens 2003). Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors (California Energy Commission [CEC] 2006a). In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (CEC 2006a). Emissions of CO_2 are byproducts of fossil fuel combustion and are the largest portion of human-caused GHG emissions by mass. Methane, a highly potent GHG, results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) associated with agricultural practices and landfills. CO_2 sinks, or reservoirs, include sequestration by vegetation or dissolution into the ocean, among other processes.

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and TACs, which are pollutants of regional and local concern, respectively. California is the 12th to 16th largest emitter of CO_2 in the world (CEC 2006a). California produced 492 million gross metric tons of carbon dioxide equivalent in 2004 (CEC 2006a). Carbon dioxide equivalent is a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the Greenhouse Effect. This potential, known as the global warming potential of a GHG, is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. For example, as described in Appendix C, "Calculation References," of the General Reporting Protocol of the California Climate Action Registry (2006), 1 ton of CH_4 has the same contribution to the Greenhouse Effect as approximately 21 tons of CO_2. Therefore, CH_4 is a much more potent GHG than CO_2. Expressing emissions in carbon dioxide equivalent takes the contributions of all GHG emissions to the Greenhouse Effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted.

Combustion of fossil fuel in the transportation sector was the single largest source of California's GHG emissions in 2004, accounting for 40.7% of total GHG emissions in the state (CEC 2006a). This sector was followed by the electric power sector (including both in-state and out-of-state sources) (22.2%) and the industrial sector (20.5%)(CEC 2006a).

According to the Intergovernmental Panel on Climate Change (IPCC), which was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme, global average temperature is expected to increase by 3–7°F by the end of the century, depending on future GHG emission scenarios (IPCC 2007). Resource areas other than air quality and atmospheric temperature could be indirectly affected by the accumulation of GHG emissions. For example, an increase in the global average temperature is expected to result in a decreased volume of precipitation falling as snow in California and an overall reduction in snowpack in the Sierra Nevada, which is a major source of supply for the state. According to the CEC (2006b), the snowpack

portion of the water supply could potentially decline by 30–90% by the end of the 21st century. A study cited in a report by the California Department of Water Resources (DWR) projects that approximately 50% of the statewide snowpack will be lost by the end of the century (Knowles and Cayan 2002). Although current forecasts are uncertain, it is evident that this phenomenon could lead to significant challenges in securing an adequate water supply for a growing population. An increase in precipitation falling as rain rather than snow could also lead to increased potential for floods because water that would normally be held in the Sierra Nevada snowpack until spring could flow into the Central Valley concurrently with winter storm events. This scenario would place more pressure on California's levee/flood control system (DWR 2006).

Another outcome of global climate change is sea level rise. Sea level rose approximately 7 inches during the last century (CEC 2006b), and it is predicted to rise an additional 7–22 inches by 2100, depending on the future levels of GHG emissions (IPCC 2007). If this occurs, resultant effects could include increased coastal flooding, saltwater intrusion (especially a concern in the low-lying Sacramento–San Joaquin River Delta, where pumps delivering potable water could be threatened), and disruption of wetlands (CEC 2006b). As the existing climate throughout California changes over time, the ranges of various plant and wildlife species could shift or be reduced, depending on the favored temperature and moisture regimes of each species. In the worst cases, some species would become extinct or be extirpated from the state if suitable conditions are no longer available.

ASBESTOS

Naturally occurring asbestos may be found in at least 44 of California's 58 counties. Asbestos is the name for a group of naturally occurring silicate minerals. Exposure to asbestos may result in inhalation or ingestion of asbestos fibers, which over time and may result in damage to the lungs or membranes that cover the lungs, leading to illness or even death.

Naturally occurring asbestos, often found in serpentine rock formations, is present in several foothill areas of Placer County. When material that contains naturally occurring asbestos is disturbed, asbestos fibers may be released and become airborne, thereby creating a potential health hazard.

The California Geological Survey (formerly the California Division of Mines and Geology) has recently developed an enhanced 1:1,000,000 scale map that has improved the overall identification of locations in Placer County. The map denotes areas of Placer County that are more or less likely to contain naturally occurring asbestos, based on available soil and geologic studies and some field verification. Where an area is characterized as having a lower overall probability of presence of naturally occurring asbestos, the likelihood of presence is slight, but in some instances naturally occurring asbestos might be found within such an area. Similarly, a location in the area identified as being most likely to have naturally occurring asbestos may not contain it.

The California Geological Survey's map shows areas of higher probability for asbestos-containing rock within the broad zone of faults that follow the low foothills and lie in a southeast-to-northwest band. The Placer County communities of Auburn, Colfax, Meadow Vista, and Foresthill are among those that are within this fault band. Generally, there are no areas of high probability of occurrence of naturally occurring asbestos in areas of Placer County west of Folsom Lake or south of Wise Road. That is, Roseville (and Granite Bay), Rocklin, Lincoln, Loomis, Penryn, and Newcastle lie within geologic areas that have a lower probability for the presence of naturally occurring asbestos. There are some isolated areas of higher probability of presence of naturally occurring asbestos within the Tahoe National Forest.

Deposits of naturally occurring asbestos have been found in rock other than ultramafic and serpentine rock; for example, deposits have been found in metavolcanic rocks such as the Copper Hill Volcanics in the Folsom vicinity. Metavolcanic rock formations are prevalent to the northeast, north, and west of Auburn. Finally, in areas of sedimentary or alluvial rock deposits like those in western Placer County, it is possible that analytically detectible naturally occurring asbestos may be found.

According to *Relative Likelihood for the Presence of Naturally Occurring Asbestos in Placer County, California* (Higgins and Clinkenbeard 2006) and *A General Location Guide for Ultramafic Rocks in California—Areas More Likely to Contain Naturally Occurring Asbestos* (Churchill and Hill 2000), the project area is not located in an area that is likely to contain naturally occurring asbestos.

9.2 REGULATORY SETTING

Air quality in Placer County is regulated by EPA, ARB, and PCAPCD. Each of these agencies develops rules, regulations, policies, and/or goals to comply with applicable legislation. Although EPA regulations may not be superseded, both state and local regulations may be more stringent.

9.2.1 CRITERIA AIR POLLUTANTS

Air quality regulations focus on the following air pollutants: ozone, CO, NO_2, SO_2, PM_{10} and $PM_{2.5}$, and lead. Because these are the most prevalent air pollutants known to be deleterious to human health, and because extensive health-effects criteria documents are available, these pollutants are commonly referred to as "criteria air pollutants."

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

At the federal level, EPA has been charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments made by Congress were in 1990.

The CAA required EPA to establish national ambient air quality standards (NAAQS). As shown in Table 9-2, EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. The primary standards protect the public health and the secondary standards protect public welfare. The CAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA is responsible for reviewing all state SIPs to determine whether they conform to the mandates of the CAA and its amendments, and for determining whether implementation will achieve air quality goals. If EPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) that imposes additional control measures may be prepared for the nonattainment area. If the state fails to submit an approvable SIP or to implement the plan within the mandated time frame, EPA may apply sanctions to transportation funding and stationary air pollution sources in the air basin.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required ARB to establish California ambient air quality standards (CAAQS) (Table 9-2). ARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the

emissions from transportation and areawide emission sources, and provides districts with the authority to regulate indirect sources.

Other ARB responsibilities include overseeing local air districts' compliance with California and federal laws; approving local air quality plans; submitting SIPs to EPA; monitoring air quality; determining and updating area designations and maps; and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

Placer County Air Pollution Control District Rules and Regulations

PCAPCD attains and maintains air quality conditions in Placer County through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean-air strategy of PCAPCD includes the preparation of plans for the attainment of ambient air-quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. PCAPCD also inspects stationary sources of air pollution and responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations required by the CAA, CAAA, and the CCAA. Air quality plans applicable to the proposed project are discussed below.

All projects are subject to PCAPCD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of the proposed project may include the following:

- **Rule 202—Visible Emissions.** A person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than 3 minutes in any one hour which is as dark or darker in shade as that designated as number 1 on the Ringelmann Chart, as published by the United States Bureau of Mines.

- **Rule 217—Cutback and Emulsified Asphalt Paving Materials.** A person shall not manufacture for sale nor use for paving, road construction, or road maintenance any: rapid cure cutback asphalt; slow cure cutback asphalt containing organic compounds which evaporate at 500°F or lower as determined by current American Society for Testing and Materials (ASTM) Method D402; medium cure cutback asphalt except as provided in Section 1.2.; or emulsified asphalt containing organic compounds which evaporate at 500°F or lower as determined by current ASTM Method D244, in excess of 3% by volume.

- **Rule 218—Application of Architectural Coatings.** No person shall: (i) manufacture, blend, or repackage for sale within PCAPCD; (ii) supply, sell, or offer for sale within PCAPCD; or (iii) solicit for application or apply within PCAPCD, any architectural coating with a volatile organic carbon (VOC) content in excess of the corresponding specified manufacturer's maximum recommendation. "Manufacturer's maximum recommendation" means the maximum recommendation for thinning that is indicated on the label or lid of the coating container.

- **Rule 228—Fugitive Dust.**

    - *Visible Emissions Not Allowed Beyond the Boundary Line*: A person shall not cause or allow the emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area (including disturbance as a result of the raising and/or keeping of animals or by vehicle use), such that the presence of such dust remains visible in the atmosphere beyond the boundary line of the emission source.

    - *Visible Emissions from Active Operations*: In addition to the requirements of Rule 202, Visible Emissions, a person shall not cause or allow fugitive dust generated by active operations, an open storage pile, or a disturbed surface area, such that the fugitive dust is of such opacity as to obscure an observer's

view to a degree equal to or greater than does smoke as dark or darker in shade as that designated as number 2 on the Ringelmann Chart, as published by the United States Bureau of Mines.

- *Concentration Limit*: A person shall not cause or allow PM_{10} levels to exceed 50 micrograms per cubic meter ($\mu g/m^3$) (24-hour average) when determined, by simultaneous sampling, as the difference between upwind and downwind samples collected on high-volume particulate matter samplers or other EPA-approved equivalent method for PM_{10} monitoring.

- *Track-Out onto Paved Public Roadways*: Visible roadway dust as a result of active operations, spillage from transport trucks, and the track-out of bulk material onto public paved roadways shall be minimized and removed.

  The track-out of bulk material onto public paved roadways as a result of operations, or erosion, shall be minimized by the use of track-out and erosion control, minimization, and preventative measures, and removed within 1 hour from adjacent streets any time track-out extends for a cumulative distance of greater than 50 feet onto any paved public road during active operations.

  All visible roadway dust tracked-out upon public paved roadways as a result of active operations shall be removed at the conclusion of each work day when active operations cease, or every 24 hours for continuous operations. Wet sweeping or a High Efficiency Particulate Air (HEPA) filter equipped vacuum device shall be used for roadway dust removal.

  Any material tracked-out, or carried by erosion, and clean-up water, shall be prevented from entering waterways or storm water inlets as required to comply water quality control requirements.

- *Minimum Dust Control Requirements*: The following dust mitigation measures are to be initiated at the start and maintained throughout the duration of the construction or grading activity, including any construction or grading for road construction or maintenance.

  - Unpaved areas subject to vehicle traffic must be stabilized by being kept wet, treated with a chemical dust suppressant, or covered.

  - The speed of any vehicles and equipment traveling across unpaved areas must be no more than 15 miles per hour unless the road surface and surrounding area is sufficiently stabilized to prevent vehicles and equipment traveling more than 15 miles per hour from emitting dust exceeding Ringelmann 2 or visible emissions from crossing the project boundary line.

  - Storage piles and disturbed areas not subject to vehicular traffic must be stabilized by being kept wet, treated with a chemical dust suppressant, or covered when material is not being added to or removed from the pile.

  - Prior to any ground disturbance, including grading, excavating, and land clearing, sufficient water must be applied to the area to be disturbed to prevent emitting dust exceeding Ringelmann 2 and to minimize visible emissions from crossing the boundary line.

  - Construction vehicles leaving the site shall be cleaned to prevent dust, silt, mud, and dirt, from being released or tracked off-site.

  - When wind speeds are high enough to result in dust emissions crossing the boundary line, despite the application of dust mitigation measures, grading and earthmoving operations shall be suspended.

- No trucks are allowed to transport excavated material off-site unless the trucks are maintained such that no spillage can occur from holes or other openings in cargo compartments, and loads are either covered with tarps; or wetted and loaded such that the material does not touch the front, back, or sides of the cargo compartment at any point less than 6 inches from the top and that no point of the load extends above the top of the cargo compartment.

- *Wind-Driven Fugitive Dust Control*: A person shall take action(s), such as surface stabilization, establishment of a vegetative cover, or paving, to minimize wind-driven dust from inactive disturbed surface areas.

- **Rule 501—General Permit Requirements.** Any person operating an article, machine, equipment, or other contrivance, the use of which may cause, eliminate, reduce, or control the issuance of air contaminants, shall first obtain a written permit from the Air Pollution Control Officer (APCO). Stationary sources subject to the requirements of Rule 507, Federal Operating Permit Program, must also obtain a Title V permit pursuant to the requirements and procedures of that rule.

Air Quality Plans

PCAPCD, in coordination with the air quality management districts and air pollution control districts of El Dorado, Sacramento, Solano, Sutter, and Yolo Counties, prepared and submitted the 1991 *Air Quality Attainment Plan* (AQAP) in compliance with the requirements set forth in the CCAA, which specifically addressed the nonattainment status for ozone and, to a lesser extent, CO and PM_{10}. The CCAA also requires a triennial assessment of the extent of air quality improvements and emission reductions achieved through the use of control measures. As part of the assessment, the AQAP must be reviewed and, if necessary, revised to correct for deficiencies in progress and to incorporate new data or projections. The requirement of the CCAA for a first triennial progress report and revision of the 1991 AQAP was fulfilled with the preparation and adoption of the 1994 *Ozone Attainment Plan* (OAP). The OAP stresses attainment of ozone standards and focuses on strategies for reducing emissions of the ozone precursors ROG and NO_X. It promotes active public involvement, enforcement of compliance with PCAPCD rules and regulations, public education in both the public and private sectors, development and promotion of transportation and land use programs designed to reduce vehicle miles traveled (VMT) within the region, and implementation of stationary- and mobile-source control measures. The OAP became part of the SIP in accordance with the requirements of the CAAA and amended the 1991 AQAP. However, at that time the region could not show that the national ozone (1-hour) standard would be met by 1999. In exchange for moving the deadline to 2005, the region accepted a designation of "severe nonattainment" coupled with additional emission requirements on stationary sources. Additional triennial reports that acted as incremental updates were also prepared in 1997, 2000, and 2003 in compliance with the CCAA.

As a nonattainment area, the region is also required to submit rate-of-progress milestone evaluations in accordance with the CAAA. Milestone reports were prepared for 1996, 1999, and 2002, and one is being prepared for 2005. These milestone reports include demonstrations that the requirements for compliance have been met for the Sacramento nonattainment area. The air quality attainment plans and reports present comprehensive strategies to reduce ROG, NO_X, and PM_{10} emissions from stationary, area, mobile, and indirect sources. Such strategies include the adoption of rules and regulations; enhancement of California Environmental Quality Act (CEQA) participation; implementation of a new and modified indirect-source-review program; adoption of local air quality plans; and stationary-, mobile-, and indirect-source control measures.

In July 1997, EPA promulgated a new 8-hour ozone standard. This change lowered the standard for ambient ozone from 0.12 ppm averaged over 1 hour to 0.08 ppm averaged over 8 hours. In general, the 8-hour standard is more protective of public health and more stringent than the 1-hour standard. The promulgation of this standard prompted new designations and nonattainment classifications in June 2004, and resulted in the revocation of the 1-hour standard in June 2005. The region has been designated as a nonattainment (serious) area for the national (8-hour) ozone standard with an attainment deadline of June 2013.

Although the region has made significant progress in reducing ozone, a problem has arisen with regard to another issue. The region's transportation plan must conform and show that implementation will not harm the region's chances of attaining the ozone standard. The SIP is tied to a "motor vehicle emissions budget"; thus, transportation planners must ensure that emissions anticipated from plans and improvement programs remain within this budget. The region is not required to update the SIP before the ozone (8-hour) plans are due in 2006. However, since a conformity lapse began October 4, 2004, an expedited process to prepare a plan is under way (SMAQMD 2006).

9.2.2 TOXIC AIR CONTAMINANTS

Air quality regulations also focus on TACs ("HAPs" in federal parlance). As mentioned in Section 9.1.3, "Existing Air Quality—Toxic Air Contaminants," above, a TAC is an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts may not be expected to occur. This contrasts with the criteria air pollutants, for which acceptable levels of exposure can be determined and for which the ambient standards have been established (Table 9-2). Instead, EPA and ARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology for toxics (MACT and BACT) to limit emissions. These in conjunction with additional rules set forth by PCAPCD establish the regulatory framework for TACs.

FEDERAL HAZARDOUS AIR POLLUTANT PROGRAMS

At the federal level, EPA has programs for identifying and regulating HAPs. Title III of the CAAA directed EPA to promulgate national emissions standards for HAPs (NESHAP). The NESHAP may differ for major sources than for area sources of HAPs. (Major sources are defined as stationary sources with potential to emit more than 10 tons per year [TPY] of any HAP or more than 25 TPY of any combination of HAPs; all other sources are considered area sources.) The emissions standards are to be promulgated in two phases. In the first phase (1992–2000), EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. These standards are generally referred to as requiring MACT. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001–2008), EPA is required to promulgate health risk–based emissions standards where deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards.

The CAAA also required EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions, at a minimum, emissions of benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.

STATE AND LOCAL TOXIC AIR CONTAMINANT PROGRAMS

The State of California regulates TACs in California primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807 [1983]) and the Air Toxics Hot Spots Information and Assessment Act (AB 2588 [1987]). The Tanner Act sets forth a formal procedure for ARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before ARB can designate a substance as a TAC. To date, ARB has identified more than 21 TACs and has adopted EPA's list of HAPs as TACs. Most recently, diesel PM was added to the ARB list of TACs.

Once a TAC is identified, ARB adopts an Airborne Toxics Control Measure (ACTM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure

must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate BACT to minimize emissions.

The Hot Spots Act requires that existing facilities that emit toxic substances above a specified level prepare a toxic-emission inventory, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

ARB has adopted diesel exhaust control measures and more stringent emission standards for various on-road mobile sources of emissions, including transit buses and off-road diesel equipment (e.g., tractors, generators). In February 2000, ARB adopted a new public transit bus fleet rule and emission standards for new urban buses. These new rules and standards provide for:

- more stringent emission standards for some new urban bus engines, beginning with 2002 model year engines;
- zero-emission bus demonstration and purchase requirements applicable to transit agencies; and
- reporting requirements under which transit agencies must demonstrate compliance with the urban-transit bus-fleet rule.

Upcoming milestones include the low-sulfur diesel-fuel requirement, and tighter emission standards for heavy-duty diesel trucks (2007) and off-road diesel equipment (2011) nationwide.

In addition, ARB recently published the *Air Quality and Land Use Handbook: A Community Health Perspective*, which provides guidance concerning land use compatibility with TAC sources (ARB 2005). While not regulatory, the handbook offers advisory recommendations for the siting of sensitive receptors near uses associated with TACs (e.g., freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries, dry cleaners, gasoline stations, and industrial facilities) to help keep children and other sensitive populations out of harm's way.

At the local level, air pollution control or management districts may adopt and enforce ARB's control measures. Under PCAPCD Rule 501 ("General Permit Requirements"), Rule 502 ("New Source Review"), and Rule 507 ("Federal Operating Permit"), all sources that possess the potential to emit TACs are required to obtain permits from the district. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new-source review standards and air-toxics control measures. PCAPCD limits emissions and public exposure to TACs through a number of programs. PCAPCD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors.

Sources that require a permit are analyzed by PCAPCD (e.g., health risk assessment) based on their potential to emit toxics. If it is determined that the project will emit toxics in excess of PCAPCD's threshold of significance for TACs (identified below), sources have to implement the BACT for TACs to reduce emissions. If a source cannot reduce the risk below the threshold of significance even after the BACT has been implemented, PCAPCD will deny the permit required by the source. This helps to prevent new problems and reduces emissions from existing older sources by requiring them to apply new technology when retrofitting with respect to TACs.

9.2.3 Regulatory Framework – Greenhouse Gas Emissions

Assembly Bill 32, the California Climate Solutions Act of 2006

In September 2006, Governor Arnold Schwarzenegger signed Assembly Bill (AB) 32, the California Climate Solutions Act of 2006. AB 32 requires that statewide greenhouse gas (GHG) emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will

be phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves the reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

There are no federal or local laws, regulations, or policies pertaining to GHG emissions.

9.3 IMPACTS

9.3.1 ANALYSIS METHODOLOGY

Short-term construction-generated emissions of criteria air pollutants (e.g., PM_{10}) and ozone precursors (ROG and NO_X) were assessed in accordance with methodologies recommended by PCAPCD. Where quantification was required, emissions were modeled using air pollutant emission factors recommended by PCAPCD, ARB, and EPA. Modeling was based on project-specific data (e.g., estimated duration of construction, number and type of construction equipment) and default parameters. Modeled short-term construction-generated emissions were compared with applicable PCAPCD thresholds for determination of significance.

Long-term mobile-, stationary-, and area-source emissions were qualitatively assessed in accordance with methodologies recommended by PCAPCD. Predicted long-term operational emissions were compared with applicable PCAPCD thresholds for determination of significance.

All other air quality impacts (i.e., local mobile-source, odor, and TAC emissions) were assessed in accordance with methodologies recommended by ARB and PCAPCD and based on existing reference documentation.

9.3.2 THRESHOLDS OF SIGNIFICANCE

Based on the Placer County CEQA Checklist and the State CEQA Guidelines, the proposed project would result in a potentially significant impact on air quality if it would:

- conflict with or obstruct implementation of the applicable air quality plan,
- violate any air quality standard or contribute substantially to an existing or projected air quality violation,
- result in a cumulatively considerable net increase of any criteria air pollutant for which the project region is nonattainment under any applicable national or state ambient air quality standards (PCAPCD has adopted an operational cumulative threshold of 10 lb/day of ROG or NO_X, to apply during summer months only),
- expose sensitive receptors to substantial pollutant concentrations, or
- create objectionable odors affecting a substantial number or people.

As stated in Appendix G of the State CEQA Guidelines, the significance of criteria established by the applicable air quality management or air pollution control district may be relied upon to make the above determinations.

Thus, based on recommendations by PCAPCD, the proposed project would result in a potentially significant impact on air quality if:

- construction-generated criteria air pollutant or precursor emissions would exceed the PCAPCD-recommended threshold of 82 pounds per day (lb/day) for ROG, NO_X, or PM_{10},
- long-term operational (regional) criteria air pollutant or precursor emissions would exceed the PCAPCD-recommended threshold of 82 lb/day for ROG, NO_X, or PM_{10}, or
- long-term operational local mobile-source CO emissions would violate or contribute substantially to concentrations that exceed the California 1-hour ambient air-quality standard of 20 ppm or the 8-hour standard of 9 ppm.

Neither the ARB nor any air district in California, including the PCAPCD, has identified a significance threshold for analyzing GHG emissions generated by a proposed project or a methodology for analyzing air quality impacts related to global warming. Though, by adoption of AB 32, the State of California has identified GHG reduction goals, the effect of increased GHG emissions as they relate to global climate change is inherently an adverse environmental impact. While the emissions of one single project will not cause global climate change, GHG emissions from multiple projects throughout the world could result in an impact with respect to global climate change.

To meet AB 32 goals, California would need to generate less GHG than current levels. It is recognized, however, that for most projects there is no simple metric available to determine if a single project would substantially increase or decrease overall GHG emission levels.

While AB 32 focuses on stationary sources of GHG emissions, the primary objective of AB 32 is to reduce California's contribution to global climate change by reducing California's total annual production of GHG emissions. The impact that GHG emissions have on global climate change is not dependent on whether they were generated by stationary, mobile, or area sources; or whether they were generated in one region or another. Thus, the net change in total GHG levels generated by a project or activity is the best metric for determining whether the proposed project would contribute to climate change. The impacts of the proposed project on global climate change are addressed in the cumulative section of Chapter 16.0, "Other CEQA-Required Sections," because the project by itself would not cause a noticeable change in global climate change.

9.3.3 IMPACT ANALYSIS

IMPACT 9-1	Air Quality – Short-Term Construction-Generated Emissions of ROG, NO_X, and PM_{10}. *Site preparation and other trail construction activities would result in the temporary generation of ROG, NO_X, and PM_{10} emissions. However, daily unmitigated emissions of ROG, NO_X, and PM_{10} would not exceed PCAPCD's significance thresholds.*
Significance	*Less Than Significant*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less Than Significant*

Construction emissions are described as "short term" or temporary in duration and have the potential to represent a significant impact with respect to air quality, especially emissions of fugitive dust (PM_{10}). Fugitive dust emissions are associated primarily with site preparation and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of the disturbance area, and miles traveled by construction vehicles

on-site and off-site. ROG and NO_X emissions are associated primarily with gas and diesel equipment exhaust and the application of architectural coatings.

Construction of the proposed trail would result in the temporary generation of ROG, NO_X, and PM_{10} emissions from site preparation, compaction, motor vehicle exhaust associated with construction equipment, employee commute trips, material transport (especially on unpaved surfaces), and other trail construction activities. The trail would be constructed by both hand and mechanical construction techniques. The proposed project would include various construction activities, including removal of surface vegetation, grading and filling activities, vehicle travel on paved and unpaved roads, and material hauling. The proposed Foresthill Bridge Staging Terminus would require minimal improvements, including light grading and fence installation. The proposed Ponderosa Way Staging Terminus would require cutting and filling, compaction, and grading. A bulldozer, vibrating compactor, backhoe, and motor grader would be required for construction of the staging termini. Trail construction would likely involve use of a Sweco trail dozer, mini excavator, and other machinery capable of conforming to dimensional requirements of the trail.

Construction of all trail segments would require approximately 3 years, assuming a 12-person crew working 7 hours per day. Short-term construction-generated emissions of ROG, NO_X, and PM_{10} were modeled using air pollutant emission factors recommended by PCAPCD, ARB, and EPA (ARB 2003, EPA 1995); default parameters and project-specific information (e.g., number and type of construction equipment) were used where available. Based on the modeling conducted, in the worst-case scenario construction of the proposed trail would result in maximum unmitigated daily emissions of approximately 11.28 lb/day of ROG, 77.90 lb/day of NO_X, and 34.25 lb/day of PM_{10} (refer to Appendix D for detailed modeling assumptions, input, and results). Daily unmitigated emissions of ROG, NO_X, and PM_{10} would not exceed PCAPCD's significance threshold of 82 lb/day. Thus, construction-generated emissions would not be anticipated to violate an air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations. As a result, this impact is considered less than significant.

IMPACT 9-2	Air Quality – Long-Term Operational (Regional) Emissions of ROG, NO_X, and PM_{10}. *Implementation of the proposed project may result in area-source emissions from trail landscape maintenance activities and could result in additional vehicle trips on local roadways from an increase in visitors to the trail. However, long-term operational emissions would not violate an air quality standard, contribute substantially to an existing or projected air quality violation, expose sensitive receptors to substantial pollutant concentrations, or conflict with PCAPCD's air quality planning efforts.*
Significance	*Less Than Significant*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less Than Significant*

Long-term operation of the proposed project (i.e., use and maintenance of the proposed trail) would not result in the use of any new stationary sources of emissions in the project area. Implementation of the proposed project may result in area-source emissions from trail landscape maintenance activities. In addition, the proposed project could result in additional vehicle trips on local roadways from an increase in visitors to the Auburn State Recreation Area (SRA). However, trail maintenance activities would be minimal, in most instances not requiring mobilized or mechanical equipment, and a majority of vehicle trips are anticipated to be generated by current visitors of the Auburn SRA (see Impact 8-2, "Increase in Traffic with Use of the North Fork Trail," in Chapter 8.0, "Transportation and Circulation"). Daily unmitigated emissions of ROG, NO_X, and PM_{10} would not be anticipated to exceed the PCAPCD significance threshold of 82 lb/day. Thus, long-term operational emissions would not be anticipated to violate an air quality standard, contribute substantially to an existing or projected air

quality violation, expose sensitive receptors to substantial pollutant concentrations, or conflict with PCAPCD's air quality planning efforts. As a result, this impact is considered less than significant.

IMPACT 9-3	Air Quality – Exposure of Sensitive Receptors to Toxic Air Contaminant Emissions or Asbestos. *Construction of the proposed trail would result in short-term emissions of diesel exhaust from on-site heavy-duty equipment. However, the use of mobilized equipment would be temporary (approximately 2% of the exposure period) and would combine with the highly dispersive properties of diesel PM; furthermore, no sensitive receptors are located within 2 miles of the site. Therefore, short-term construction activities and long-term use and maintenance would not expose sensitive receptors to substantial pollutant concentrations. In addition, the project area is not located in an area that is likely to contain naturally occurring asbestos.*
Significance	*Less Than Significant*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less Than Significant*

Construction of the proposed trail would result in short-term emissions of diesel exhaust from on-site heavy-duty equipment. Particulate exhaust emitted from diesel-fueled engines (diesel PM) was identified as a TAC by ARB in 1998. Diesel PM emissions would be generated during trail construction from the use of off-road diesel equipment for site grading and excavation, and from other construction activities. The dose to which receptors are exposed (a function of concentration and duration of exposure) is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the maximally exposed individual. Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer period of time. According to the state Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project (Salinas, pers. comm., 2004). In addition, since diesel PM is known to be highly dispersive, emissions would diffuse rapidly from the source, thus resulting in lower concentrations to which receptors could be exposed (Zhu et al. 2002). Thus, because the use of mobilized equipment would be temporary (approximately 2% of the exposure period) and would combine with the dispersive properties of diesel PM, and because no sensitive receptors are located within 2 miles of the site, short-term construction activities would not expose sensitive receptors to substantial pollutant concentrations. In addition, the long-term operation of the proposed project (i.e., use and maintenance of the proposed trail) would not require the use of any major stationary sources of TAC emissions (e.g., emergency backup generators), and there are no existing stationary sources of TACs in the vicinity of the project area (ARB 2005b).

In addition, naturally occurring asbestos, often found in serpentine rock formations, is present in several foothill areas of Placer County. When material containing naturally occurring asbestos is disturbed, asbestos fibers may be released and become airborne, thereby creating a potential health hazard. According to *Relative Likelihood for the Presence of Naturally Occurring Asbestos in Placer County, California* (Higgins and Clinkenbeard 2006) and *A General Location Guide for Ultramafic Rocks in California—Areas More Likely to Contain Naturally Occurring Asbestos* (Churchill and Hill 2000), the project area is not located in an area that is likely to contain naturally occurring asbestos. As a result, this impact is considered less than significant.

IMPACT 9-4	Air Quality – Long-Term Operational (Local) Mobile-Source Emissions of Carbon Monoxide. *The proposed project could result in additional vehicle trips on local roadways from an increase in visitors to the trail. However, a majority of such vehicle trips would be anticipated to be generated by current visitors of the Auburn SRA. Long-term operational emissions of CO would not be anticipated to violate or contribute substantially to an air quality violation.*
Significance	*Less Than Significant*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less Than Significant*

As stated in Chapter 3.0, "Project Description," the proposed project could result in additional vehicle trips on local roadways from an increase in visitors to the trail; however, a majority of such vehicle trips are anticipated to be generated by current visitors of the Auburn SRA. Thus, long-term operational (local) mobile-source emissions of CO would not be anticipated to violate or contribute substantially to concentrations that exceed the California 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm. As a result, this impact is considered less than significant.

IMPACT 9-5	Air Quality – Exposure of Sensitive Receptors to Odor Emissions. *Construction of the proposed trail would result in emissions of diesel exhaust from on-site construction equipment. However, these emissions would be intermittent and temporary and would dissipate rapidly from the source with an increase in distance.*
Significance	*Less Than Significant*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less Than Significant*

The occurrence and severity of odor impacts depend on numerous factors: the nature, frequency, and intensity of the source; wind speed and direction; and the presence of sensitive receptors. Although offensive odors rarely cause any physical harm, they can still be very unpleasant, leading to considerable distress and often generating citizen complaints to local governments and regulatory agencies.

Construction of the proposed trail would result in emissions of diesel exhaust from on-site construction equipment. These emissions would be intermittent and temporary and would dissipate rapidly from the source with an increase in distance. In addition, no existing sources of odors are located in the vicinity of the project area, and the proposed project would not include the long-term operation of any new sources of odor. Thus, the operation of the proposed project (i.e., use and maintenance of the proposed trail) would not create objectionable odors affecting a substantial number of people. As a result, this impact is considered less than significant.

9.4 MITIGATION MEASURES

No mitigation measures are necessary.

10.0 NOISE

This chapter includes a summary of applicable regulations related to noise and vibration and a description of ambient-noise conditions. It provides an analysis of potential short-term construction and long-term operational-source noise impacts of the proposed project.

10.1 ENVIRONMENTAL SETTING

10.1.1 SOUND FUNDAMENTALS

Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound, as described in detail below, is an audible vibration of an elastic medium.

SOUND PROPERTIES

A sound wave is introduced into a medium (e.g., air) by a vibrating object. The vibrating object (e.g., vocal cords, the string and sound board of a guitar, or the diaphragm of a radio speaker) is the source of the disturbance that sets the medium to vibrate and then propagates through the medium. Regardless of the type of source creating the sound wave, the particles of the medium through which the sound moves are vibrating in a back-and-forth motion at a given frequency, tone, or pitch. The frequency of a wave refers to how often the particles vibrate when a wave passes through the medium. The frequency of a wave is measured as the number of complete back-and-forth vibrations of a particle per unit of time. If a particle of air undergoes 1,000 longitudinal vibrations in 2 seconds, then the frequency of the wave would be 500 vibrations per second. A commonly used unit for frequency is Hertz (Hz).

Each particle vibrates as a result of the motion of its nearest neighbor. The first particle of the medium begins vibrating at, for example, 500 Hz, and sets the second particle of the medium into motion at the same frequency (500 Hz). The second particle begins vibrating at 500 Hz and thus sets the third particle into motion at 500 Hz. The process continues throughout the medium; hence each particle vibrates at the same frequency, which is the frequency of the original source. Subsequently, a guitar string vibrating at 500 Hz will set the air particles in the room vibrating at the same frequency (500 Hz), which carries a sound signal to the ear of a listener that is detected as a 500-Hz sound wave.

The back-and-forth vibration motion of the particles of the medium would not be the only observable phenomenon occurring at a given frequency. Because a sound wave is a pressure wave, a detector could be used to detect oscillations in pressure from high to low and back to high pressure. As the compression (high-pressure) and rarefaction (low-pressure) disturbances move through the medium, they would reach the detector at a given frequency. For example, a compression would reach the detector 500 times per second if the frequency of the wave were 500 Hz. Similarly, a rarefaction would reach the detector 500 times per second if the frequency of the wave were 500 Hz. Thus, the frequency of a sound wave refers not only to the number of back-and-forth vibrations of the particles per unit of time but also to the number of compression or rarefaction disturbances that pass a given point per unit of time. A detector could be used to detect the frequency of these pressure oscillations over a given period of time. The period of the sound wave can be found by measuring the time between successive high-pressure points (corresponding to the compressions) or the time between successive low-pressure points (corresponding to the rarefactions). The frequency is simply the reciprocal of the period; thus an inverse relationship exists so that as frequency increases, the period decreases, and vice versa.

A wave is an energy-transport phenomenon that transports energy along a medium. The amount of energy carried by a wave is related to the amplitude (loudness) of the wave. A high-energy wave is characterized by high amplitude; a low-energy wave is characterized by low amplitude. The amplitude of a wave refers to the maximum amount of displacement of a particle from its rest position. The energy transported by a wave is directly

proportional to the square of the amplitude of the wave. This means that a doubling of the amplitude of a wave is indicative of a quadrupling of the energy transported by the wave.

SOUND AND THE HUMAN EAR

Because of the ability of the human ear to detect a wide range of sound-pressure fluctuations, sound-pressure levels are expressed in logarithmic units called decibels (dB). The sound-pressure level in decibels is calculated by taking the log of the ratio between the actual sound pressure and the reference sound pressure squared. The reference sound pressure is considered the absolute hearing threshold (Caltrans 1998). Use of this logarithmic scale reveals that the total sound from two individual sources measured at 65 A-weighted decibels (dBA) (see discussion of the A-weighting scale below) is 68 dBA, not 130 dBA (i.e., doubling the source strength increases the sound pressure by 3 dBA).

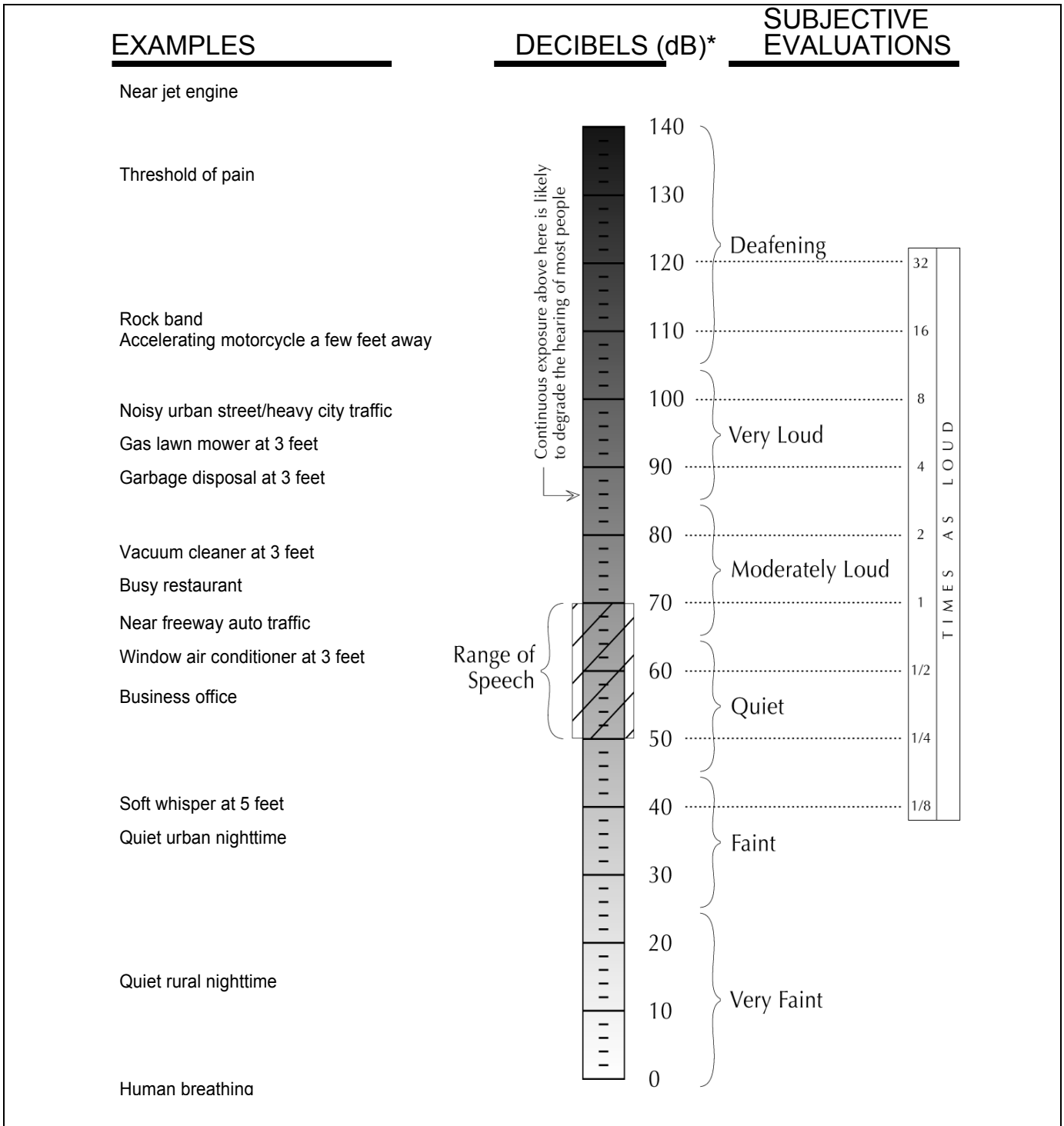
The human ear is sensitive to frequencies from 20 Hz to 20,000 Hz (the audible range) and can detect the vibration amplitudes that are comparable in size to a hydrogen atom (EPA 1974). When damaged by noise, the ear is typically affected at the 4,000-Hz frequency first; therefore, this can be considered the most noise-sensitive frequency. The averaged frequencies of 500 Hz, 1,000 Hz, and 2,000 Hz have traditionally been employed in hearing conservation criteria because of their importance to the hearing of speech sounds (ASA 1997).

Because the human ear is not equally sensitive to all sound frequencies, depending on the amplitude of the sound, a specific frequency-dependent rating scale was devised to relate noise to human sensitivity. This is called the weighting scale or function. The A-weighting scale is the most commonly used and is noted as A-weighted dB, dB(A), or dBA. The dBA scale discriminates against frequencies in a manner approximating the sensitivity of the human ear when a source is at 50 dB. The basis for compensation is a comparison of the "loudness" of tones played one at a time with a reference tone producing 50 dB. This dBA scale has been chosen by most authorities for the purpose of regulating environmental noise. Typical indoor and outdoor noise levels are presented in Exhibit 10-1.

With respect to how humans perceive increases in noise levels, for pure tones or some broadband tones, a 1-dBA increase is imperceptible, a 3-dBA increase is barely perceptible, a 6-dBA increase is clearly perceptible, and a 10-dBA increase is subjectively perceived as approximately twice as loud (Egan 1988). For this reason, an increase of 3 dBA or more is generally considered a degradation of the existing noise environment for this type of source. For more complex sources, that is, where the tones differ substantially between sources such as for the sound of a heavy truck versus a new car or a kitchen blender, the ear perceives differences much more quickly.

SOUND PROPAGATION

As sound (noise) propagates from the source to the receptor, the attenuation, or manner of noise reduction in relation to distance, is dependent on surface characteristics, atmospheric conditions, and the presence of physical barriers. The inverse-square law describes the attenuation when sound travels from a point source such as an air-conditioning unit to the receptor. Sound travels uniformly outward from a point source in a spherical pattern with an attenuation rate of 6 dBA per doubling of distance. However, from a line source, such as a long line of traffic on a freeway, sound travels uniformly outward in a cylindrical pattern with an attenuation rate of 3 dBA per doubling of distance. The surface characteristics between the source and the receptor may result in additional sound absorption and/or reflection. Atmospheric conditions such as wind speed, temperature, and humidity may affect noise levels. Furthermore, the presence of a barrier between the source and the receptor may also attenuate noise levels. The actual amount of attenuation is dependent upon the size of the barrier and the frequency of the noise. A noise barrier may be any natural or human-made feature such as a hill, building, wall, or berm (Caltrans 1998).



* dB are "average" values as measured on the A-scale of a sound-level meter.
From *Concepts in Architectural Acoustics* (M. David Egan, McGraw Hill, 1988) and *The Noise Guidebook* (U.S. Department of Housing and Urban Development, Office of Community Planning and Development, undated).

Source: Data provided by EDAW in 2006

Typical Noise Levels **Exhibit 10-1**

NOISE DESCRIPTORS

The selection of a proper noise descriptor for a specific source is dependent upon the spatial and temporal distribution, duration, and fluctuation of the noise. The noise descriptors most often encountered when dealing with traffic, community, and environmental noise are defined below (Caltrans 1998, Lipscomb and Taylor 1978).

- *L_{max} (maximum noise level):* The maximum noise level during a specific period of time. The L_{max} may also be referred to as the "highest (noise) level."
- *L_{min} (minimum noise level):* The minimum noise level during a specific period of time.
- *L_X (statistical descriptor):* The noise level exceeded X% of a specific period of time.
- *L_{eq} (equivalent noise level):* The energy mean (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value is calculated, which is then converted back to dBA to determine the L_{eq}.
- *L_{dn} (day-night noise level):* The 24-hour L_{eq} with a 10-dBA "penalty" for the noise-sensitive hours between 10 p.m. and 7 a.m. The L_{dn} attempts to account for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.
- *CNEL (community noise equivalent level):* A noise level similar to the L_{dn} described above, but with an additional 5-dBA "penalty" for the noise-sensitive hours between 7 p.m. and 10 p.m., which are typically reserved for relaxation, conversation, reading, and television. If the same 24-hour noise data are used, the CNEL is typically approximately 0.5 dBA higher than the L_{dn}.
- *SEL (single-event [impulsive] noise level):* A receiver's cumulative noise exposure from a single impulsive-noise event, which is defined as an acoustical event of short duration and which involves a change in sound pressure above some reference value.

NEGATIVE EFFECTS OF NOISE ON HUMANS

Negative effects of noise exposure include physical damage to the human auditory system, speech interference, sleep interference, activity interference, and disease. Exposure to noise may result in physical damage to the auditory system, which may lead to gradual or traumatic hearing loss. Gradual hearing loss is caused by sustained exposure to moderately high noise levels over a period of time; traumatic hearing loss is caused by sudden exposure to extremely high noise levels over a short period. However, gradual and traumatic hearing loss both may result in permanent hearing damage. In addition, noise may interfere with or interrupt sleep, relaxation, recreation, and communication. Although most interference may be classified as annoying, the inability to hear a warning signal may be considered dangerous. Noise may also be a contributor to diseases associated with stress, such as hypertension, anxiety, and heart disease. The degree to which noise contributes to such diseases depends on the frequency, bandwidth, and level of the noise, and the exposure time (Caltrans 1998).

VIBRATION

Vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structureborne noise. Sources of groundborne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, groundborne vibrations may be described by amplitude and frequency.

Vibration amplitudes are usually expressed in peak particle velocity (PPV) or root mean squared (RMS), as in RMS vibration velocity. The PPV and RMS velocity are normally described in inches per second (in/sec). PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is often used in monitoring of blasting vibration because it is related to the stresses that are experienced by buildings (FHWA 1995, Caltrans 2002).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. It takes some time for the human body to respond to vibration signals. In a sense, the human body responds to average vibration amplitude. The RMS of a signal is the average of the squared amplitude of the signal, typically calculated over a 1-second period. As with airborne sound, the RMS velocity is often expressed in decibel notation as vibration decibels (VdB), which serves to compress the range of numbers required to describe vibration (FHWA 1995). This is based on a reference value of 1 microinch per second (µin/sec).

The background vibration-velocity level in residential areas is usually approximately 50 VdB. Groundborne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels (FHWA 1995).

Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the groundborne vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Construction activities can generate groundborne vibrations, which can pose a risk to nearby structures. Constant or transient vibrations can weaken structures, crack facades, and disturb occupants (FHWA 1995).

Construction vibrations can be transient, random, or continuous. Transient construction vibrations are generated by blasting, impact pile driving, and wrecking balls. Continuous vibrations result from vibratory pile drivers, large pumps, and compressors. Random vibration can result from jackhammers, pavement breakers, and heavy construction equipment. Table 10-1 describes the general human response to different levels of groundborne vibration-velocity levels.

Table 10-1
Human Response to Different Levels of Groundborne Noise and Vibration

Vibration-Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

Note: VdB = vibration decibels referenced to 1 microinch per second (µin/sec) and based on the root mean square (RMS) velocity amplitude.
Source: FHWA 1995

10.1.2 EXISTING SENSITIVE RECEPTORS

Noise- and vibration-sensitive land uses generally include those uses where exposure would result in adverse effects (e.g., annoyance and structural damage), as well as uses where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Other sensitive land uses include

hospitals, convalescent facilities, parks, hotels, churches, libraries, and other uses where low interior noise levels are essential, including any uses where people sleep at night. With respect to the project area, there is no residential zoning in the vicinity and the nearest sensitive receptor is more than 2 miles away.

10.1.3 EXISTING NOISE SOURCES

The project area is located in the undeveloped North Fork American River canyon in Placer County, approximately 3 miles northeast of the city of Auburn. The area surrounding the project area is open space and zoned as Water Influence, Water Influence with a Mineral Reserve combining district, and Farm with Building Site (20 acre minimum) and Mineral Reserve combining districts. Existing noise sources are occasional traffic from Foresthill Road, water falling over Clementine Dam, and recreational users on Lake Clementine and throughout the Auburn State Recreation Area (SRA).

10.2 REGULATORY SETTING

10.2.1 FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No federal plans, policies, regulations, or laws related to noise are applicable to the proposed project. However, the Federal Transit Administration (FTA) has set forth guidelines for maximum-acceptable vibration criteria for different types of land uses to address the human response to groundborne vibration (Federal Transit Administration 1995):

- 65 VdB (referenced to 1 μin/sec and based on the RMS velocity amplitude) for land uses where low ambient vibration is essential for interior operations (e.g., hospitals, high-tech manufacturing, laboratory facilities);
- 80 VdB for residential uses and buildings where people normally sleep; and
- 83 VdB for institutional land uses with primarily daytime operations (e.g., schools, churches, clinics, offices).

Standards have also been established to address the potential for groundborne vibration to cause structural damage to buildings. These standards were developed by the Committee of Hearing, Bio Acoustics, and Bio Mechanics (CHABA) at the request of the U.S. Environmental Protection Agency (EPA) (Federal Transit Administration 1995). For fragile structures, CHABA recommends a maximum limit of 0.25 in/sec PPV (Federal Transit Administration 1995).

10.2.2 STATE PLANS, POLICIES, REGULATIONS, AND LAWS

The *State of California General Plan Guidelines*, published by the Governor's Office of Planning and Research (2003), provides guidance for the acceptability of projects within specific CNEL/L_{dn} contours. Table 10-2 presents acceptable and unacceptable community-noise-exposure limits for various land-use categories. Generally, residential uses are considered to be acceptable in areas where exterior noise levels do not exceed 60 dBA CNEL/L_{dn}. Residential uses are normally unacceptable in areas exceeding 70 dBA CNEL/L_{dn} and conditionally acceptable within 55–70 dBA CNEL/L_{dn}. Schools are normally acceptable in areas up to 70 dBA CNEL/L_{dn} and normally unacceptable in areas exceeding 70 dBA CNEL/L_{dn}. Recreation uses are normally acceptable in areas up to 75 dBA CNEL/L_{dn}. The guidelines also present adjustment factors that may be used to arrive at noise-acceptability standards that reflect the noise-control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise issues.

With respect to vibration, the California Department of Transportation (Caltrans) recommends a more conservative threshold of 0.2 in/sec PPV for normal residential buildings and 0.08 in/sec PPV for old or historically significant structures (Caltrans 2002) to protect fragile, historic, and residential structures. These standards are more stringent than the federal standard established by CHABA, presented above.

Table 10-2
State of California Noise Compatibility Guidelines by Land Use Category

Land Use Category	Community Noise Exposure (CNEL/L_{dn}, dBA)			
	Normally Acceptable[1]	Conditionally Acceptable[2]	Normally Unacceptable[3]	Clearly Unacceptable[4]
Residential—Low-Density Single-Family, Duplex, Mobile Home	<60	55–70	70–75	75+
Residential—Multiple-Family	<65	60–70	70–75	75+
Transient Lodging, Motel, Hotel	<65	60–70	70–80	80+
School, Library, Church, Hospital, Nursing Home	<70	60–70	70–80	80+
Auditorium, Concert Hall, Amphitheater		<70	65+	
Sports Arenas, Outdoor Spectator Sports		<75	70+	
Playground, Neighborhood Park	<70		67.5–75	72.5+
Golf Courses, Stable, Water Recreation, Cemetery	<75		70–80	80+
Office Building, Business Commercial and Professional	<70	67.5–77.5	75+	
Industrial, Manufacturing, Utilities, Agriculture	<75	70-80	75+	

[1] Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

[2] New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

[3] New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Outdoor areas must be shielded.

[4] New construction or development should generally not be undertaken.

Source: Governor's Office of Planning and Research 2003

10.2.3 LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

PLACER COUNTY GENERAL PLAN

The following are the relevant policies identified by the *Placer County General Plan* (Placer County 1994) for noise.

- **Policy 9.A.2.** The County shall require that noise created by new non-transportation noise sources be mitigated so as not to exceed the noise level standards of [Table 10-3] as measured immediately within the property line of lands designated for noise-sensitive uses.

- **Policy 9.A.9.** Noise created by new transportation noise sources, including roadway improvement projects, shall be mitigated so as not to exceed the levels specified in [Table 10-3] at outdoor activity areas or interior spaces of existing noise-sensitive land uses.

- **Policy 9.A.12.** Where noise mitigation measures are required to achieve the standards of [Tables 10-3 and 10-4], the emphasis of such measures shall be placed upon site planning and project design. The use of noise barriers shall be considered as a means of achieving the noise standards only after all other practical design-related noise mitigation measures have been integrated into the project.

Table 10-3
Allowable CNEL/L_{dn} Noise Levels Within Specified Zone Districts[1]
Applicable to New Projects Affected by or Including Nontransportation Noise Sources

Zone District of Receptor	CNEL/L_{dn} (dBA) at Property Line of Receiving Use	Interior Spaces (dBA)[2]
Residential Adjacent to Industrial[3]	60	45
Other Residential[4]	50	45
Office/Professional	70	45
Transient Lodging	65	45
Neighborhood Commercial	70	45
General Commercial	70	45
Heavy Commercial	75	45
Limited Industrial	75	45
Highway Service	75	45
Shopping Center	70	45
Industrial	---	45
Industrial Park	75	45
Industrial Reserve	---	---
Airport	---	45
Unclassified	---	---
Farm	(see footnote 6)	---
Agriculture Exclusive	(see footnote 6)	---
Forestry	---	---
Timberland Preserve	---	---
Recreation & Forestry	70	---
Open Space	---	---
Mineral Reserve	---	---

Notes:

- Except where noted otherwise, noise exposures will be those which occur at the property line of the receiving use.
- Where existing transportation noise levels exceed the standards of this table, the allowable CNEL/L_{dn} shall be raised to the same level as that of the ambient level.
- If the noise source generated by, or affecting, the uses shown above consists primarily of speech or music, or if the noise source is impulsive in nature, the noise standards shown above shall be decreased by 5 dB.
- Where a use permit has established noise level standards for an existing use, those standards shall supersede the levels specified in Table [10-3] and Table [10-4]. Similarly, where an existing use which is not subject to a use permit causes noise in excess of the allowable levels in Tables [10-3] and [10-4], said excess noise shall be considered the allowable level. If a new development is proposed which will be affected by noise from such an existing use, it will ordinarily be assumed that the noise levels already existing or those levels allowed by the existing use permit, whichever are greater, are those levels actually produced by the existing use.
- Existing industry located in industrial zones will be given the benefit of the doubt in being allowed to emit increased noise consistent with the state of the art[5] at the time of expansion. In no case will expansion of an existing industrial operation be cause to decrease allowable noise emission limits. Increased emissions above those normally allowable should be limited to a one-time 5 dB increase at the discretion of the decision-making body.
- The noise level standards applicable to land uses containing incidental residential uses, such as caretaker dwellings at industrial facilities

Table 10-3
Allowable CNEL/L_{dn} Noise Levels Within Specified Zone Districts[1]
Applicable to New Projects Affected by or Including Nontransportation Noise Sources

Zone District of Receptor	CNEL/L_{dn} (dBA) at Property Line of Receiving Use	Interior Spaces (dBA)[2]

and homes on agriculturally zoned land, shall be the standards applicable to the zone district, not those applicable to residential uses.

- Where no noise level standards have been provided for a specific zone district, it is assumed that the interior and/or exterior spaces of these uses are effectively insensitive to noise.

[1] Overriding policy on interpretation of allowable noise levels: Industrial-zoned properties are confined to unique areas of the County, and are irreplaceable. Industries which provide primary wage-earner jobs in the County, if forced to relocate, will likely be forced to leave the County. For this reason, industries operating upon industrial zoned properties must be afforded reasonable opportunity to exercise the rights/privileges conferred upon them be their zoning. Whenever the allowable noise levels herein fall subject to interpretation relative to industrial activities, the benefit of the doubt shall be afforded to the industrial use. Where an industrial use is subject to infrequent and unplanned upset or breakdown of operations resulting in increased noise emissions, where such upsets and breakdowns are reasonable considering the type of industry, and where the industrial use exercises due diligence in preventing as well as correcting such upsets and breakdowns, noise generated during such upsets and breakdowns shall not be included in calculations to determine conformance with allowable noise levels.

[2] Interior spaces are defined as any locations where some degree of noise-sensitivity exists. Examples include all habitable rooms of residences, and areas where communication and speech intelligibility are essential, such as classrooms and offices.

[3] Noise from industrial operations may be difficult to mitigate in a cost-effective manner. In recognition of this fact, the exterior noise standards for residential zone districts immediately adjacent to industrial, limited industrial, industrial park, and industrial reserve zone districts have been increased by 10 dB as compared to residential districts adjacent to other land uses. For purposes of the Noise Element, residential zone districts are defined to include the following zoning classifications: AR, R-1, R-2, R-3, FR, RP, TR-1, TR-2, TR-3, and TR-4.

[4] Where a residential zone district is located within an -SP combining district, the exterior noise level standards are applied at the outer boundary of the -SP district. If an existing industrial operation within an -SP district is expanded or modified, the noise level standards at the outer boundary of the -SP district may be increased as described above in these standards. Where a new residential use is proposed in an -SP zone, an Administrative Review Permit is required, which may require mitigation measures at the residence for noise levels existing and/or allowed by use permit as described under "NOTES," above, in these standards.

[5] State of the art should include the use of modern equipment with lower noise emissions, site design, and plant orientation to mitigate offsite noise impacts, and similar methodology.

[6] Normally, agricultural uses are noise insensitive and will be treated in this way. However, conflicts with agricultural noise emissions can occur where single-family residences exist within agricultural zone districts. Therefore, where effects of agricultural noise upon residences located in these agricultural zones is a concern, an CNEL/L_{dn} of 70 dBA will be considered acceptable outdoor exposure at a residence.

Source: Placer County 1994

PLACER COUNTY NOISE ORDINANCE

The Placer County Noise Ordinance (Article 9.36 of the Placer County Code), which was approved in December 2003 and became effective March 2004, defines sound level performance standards for sensitive receptors. The ordinance states that it is unlawful for any person at any location to create any sound, or to allow the creation of any sound, on property owned, leased, occupied, or otherwise controlled by such a person that causes the exterior sound level, when measured at the property line of any affected sensitive receptor, to exceed the ambient sound level by 5 dBA or exceed the sound level standards listed in the table reproduced here as Table 10-5, whichever is greater.

Table 10-4
Maximum Allowable Noise Exposure
Transportation Noise Sources

Land Use	Outdoor Activity Areas[a]	Interior Spaces (dBA)	
	CNEL/L_{dn} (dBA)	CNEL/L_{dn}	L_{eq}[b]
Residential	60[c]	45	---
Transient Lodging	60[c]	45	---
Hospitals, Nursing Homes	60[c]	45	---
Theaters, Auditoriums, Music Halls	---	---	35
Churches, Meeting Halls	60[c]	---	40
Office Buildings	---	---	45
Schools, Libraries, Museums	---	---	45
Playgrounds, Neighborhood Parks	70	---	---

[a] Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use.

[b] As determined for a typical worst-case hour during periods of use.

[c] Where it is not possible to reduce noise in outdoor activity areas to 60 dB CNEL/L_{dn} or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB CNEL/L_{dn} may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.

Source: Placer County 1994

Table 10-5
Sound Level Standards (On-site)

Sound Level Descriptor (dBA)	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
L_{eq} (1-hour)	55	45
L_{max}	70	65

Source: Placer County 2004

Each of the sound level standards specified in Table 10-5 shall be reduced by 5 dBA for simple tone noises, consisting of speech and music. However, in no case shall the sound level standard be lower than the ambient sound level plus 5 dBA. If the intruding sound source is continuous and cannot be reasonably discontinued or stopped for a time period whereby ambient sound level can be measured, the sound level measured while the source is in operation shall be compared directly to the sound level standards of Table 10-5.

Section 9.36.030, "Exemptions," of the noise ordinance states that sound or noise emanating from the following sources and activities is exempt from the provisions of Title 9.36:

- Construction between 6 a.m. and 8 p.m., Monday through Friday, and between 8 a.m. and 8 p.m. Saturday and Sunday, provided that all construction equipment is fitted with factory-installed muffler devices and maintained in good working order.

10.3 IMPACTS

10.3.1 ANALYSIS METHODOLOGY

Land use types and major noise sources in the vicinity of the project area were identified based on existing documentation (e.g., Placer County Zoning Code) and site reconnaissance data. To assess potential short-term construction noise impacts, sensitive receptors and their relative exposure (considering topographic barriers and distance) were identified. Noise levels of specific construction equipment were determined and resultant noise levels at those receptors were calculated.

Potential long-term (operational) traffic, area-, and stationary- source noise impacts were qualitatively assessed based on the number of vehicle trips and other potential operational noise sources introduced to the project area.

Groundborne vibration impacts were qualitatively assessed based on existing documentation (e.g., vibration levels produced by specific construction equipment) and the distance of sensitive receptors from the given source.

Predicted noise levels were compared with applicable standards for determination of significance. Mitigation measures were developed for significant and potentially significant noise impacts.

10.3.2 THRESHOLDS OF SIGNIFICANCE

Based on applicable Placer County (County) noise regulations, the Placer County California Environmental Quality Act Guidelines (CEQA) Checklist, and the State CEQA Guidelines, the proposed project would result in a potentially significant noise impact if it would:

- result in short-term construction-generated noise levels that exceed the applicable County noise standards (Table 10-3 and Table 10-4), or substantially increase ambient noise at nearby existing noise-sensitive receptors during the more noise-sensitive hours of the day (8 p.m.–6 a.m. Monday through Friday and 8 p.m.–8 a.m. Saturday and Sunday);

- result in short- or long-term (operational) traffic-generated noise levels that exceed the applicable County noise standards (Table 10-4), or substantially increase ambient noise at nearby existing noise-sensitive receptors;

- result in long-term (operational) stationary- or area- source noise levels that exceed applicable County noise standards (Table 10-3 and Table 10-4), or substantially increase ambient noise at nearby existing noise-sensitive receptors; or

- expose persons to or generation of excessive groundborne vibration or noise levels that exceed Caltrans's recommended standards with respect to the prevention of structural building damage (0.2 in/sec PPV and 0.08 in/sec PPV, respectively, for normal and historical buildings) or FTA's maximum-acceptable vibration standard with respect to human response (80 VdB for residential uses) at nearby existing or proposed vibration-sensitive land uses.

10.3.2 IMPACT ANALYSIS

IMPACT 10-1	Noise – Short-Term Construction-Generated Noise Levels. *Short-term exterior noise levels at the closest existing noise-sensitive receptor could exceed 47 dBA without feasible noise controls, which would exceed the applicable County nighttime standard of 45 dBA. However, construction activities would occur only during daytime hours. Resulting exterior noise levels at the closest noise-sensitive receptor would not exceed the County daytime noise standard of 55 dBA, nor would they reflect a substantial increase in ambient noise.*
Significance	*Less Than Significant*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less Than Significant*

Activities associated with construction of 14.2 miles of trail would include site preparation (e.g., excavation, grading, and clearing), staging, and other miscellaneous activities. The trail would be constructed by hand and/or with a small Sweco trail dozer or equivalent. Hand construction of the trail would require one or more crews (approximately 12 members) of the California Conservation Corps or others, and the use of hand tools and chain saws. The use of a trail dozer would significantly reduce the amount of manual labor needed for the exaction of soil and large rocks. The trail dozer would not be used in any areas where it would be incapable of excavating to the dimensional requirements of the *North Fork American River Trail, Trail Plan* (Placer County 2003a). The trail dozer would have a narrow track and blade width, minimizing impacts on natural resources, but its diesel-powered engine would generate noise. Other equipment used for trail construction would include a mini excavator, haul trucks, and other types of machinery (e.g., graders) that would fit the size constraints of the trail corridor. Larger equipment such as grader, excavators, and dozers would be used for construction of the proposed staging areas.

According to EPA, and as indicated in Table 10-5, noise levels from individual equipment can range from 80 to 91 dBA at 50 feet. The simultaneous operation of on-site construction equipment associated with the project, as identified above, could result in combined intermittent noise levels up to approximately 93 dBA at 50 feet from the site (Appendix E). Based on these equipment noise levels and a typical noise-attenuation rate of 6 dBA per doubling of distance, exterior noise levels at the closest existing noise-sensitive receptor (located approximately 2 miles from the project site) could exceed 47 dBA without feasible noise controls. Thus, if construction activities were to occur during the more noise-sensitive hours or if construction equipment were not properly equipped with noise control devices, construction-generated noise levels could exceed the applicable County nighttime standard of 45 dBA and substantially increase ambient noise at existing nearby sensitive receptors. However, as stated in Chapter 3.0, "Project Description," construction activities would only occur 7 hours per day. Construction activities would be restricted to the daytime hours of 6 a.m. and 8 p.m. Monday through Friday, and between 8 a.m. and 8 p.m. Saturday and Sunday. During such hours of the day, noise emanating from construction activities is exempt from the provisions of the Placer County Noise Ordinance. In addition, short-term construction-generated exterior noise levels at the closest noise-sensitive receptor would not be anticipated to exceed the applicable County daytime noise standard of 55 dBA. Thus, short-term construction-generated noise levels would not exceed the applicable County noise standards or substantially increase ambient noise at nearby existing noise-sensitive receptors during the more noise-sensitive hours of the day. As a result, this impact is considered less than significant.

Table 10-5
Typical Construction Equipment Noise Levels

Type of Equipment	Noise Level in dBA at 50 feet[1]	
	Without Feasible Noise Control	With Feasible Noise Control[2]
Dozer or Tractor	85	75
Excavator	88	80
Truck	91	75

Note: dBA = A-weighted decibels

[1] Estimates correspond to a distance of 50 feet from the noisiest piece of equipment and 200 feet from the other equipment.

[2] Feasible noise control includes the use of intake mufflers, exhaust mufflers and engine shrouds in accordance with manufacturers specifications.

Source: U.S. Environmental Protection Agency 1971

IMPACT 10-2 Noise – Increases in Long-Term (Operational) Stationary- and Area-Source Noise Levels. *Area-source noise may result from trail landscape maintenance activities. However, exterior noise levels at the closest existing noise-sensitive receptor (2 miles away) would not exceed 20 dBA. Such noise levels would not exceed any of the applicable County daytime or nighttime noise standards, nor would ambient noise levels substantially increase at nearby existing noise-sensitive receptors.*

Significance *Less Than Significant*

Mitigation Proposed *None Warranted*

Residual Significance *Less Than Significant*

Use of the proposed trail would not result in the use of any new stationary sources of noise in the project area. However, area-source noise may result from trail landscape maintenance activities. According to EPA, such activities could result in noise levels reaching approximately 90 dBA at 3 feet from the source, depending on the exact equipment type and size (U.S. Environmental Protection Agency 1971). Based on these equipment noise levels and a typical noise-attenuation rate of 6 dBA per doubling of distance, exterior noise levels at the closest existing noise-sensitive receptor (2 miles) would not exceed 20 dBA, which would not exceed any of the applicable County daytime or nighttime noise standards. Thus, long-term stationary- and area-source noise levels would not exceed applicable County noise standards or substantially increase ambient noise at nearby existing noise-sensitive receptors. As a result, this impact is considered less than significant.

IMPACT 10-3 Noise – Increases in Short- and Long-Term Traffic-Generated Noise Levels. *Construction, use, and maintenance of the proposed trail would not result in a noticeable change in the traffic noise contours of area roadways. In addition, noise increases associated with construction traffic would be temporary and would occur during the less noise-sensitive daytime hours. Thus, short- and long-term traffic-generated noise levels would not exceed applicable Placer County noise standards or substantially increase ambient noise at nearby existing noise-sensitive receptors.*

Significance *Less Than Significant*

Mitigation Proposed *None Warranted*

Residual Significance *Less Than Significant*

As described in Chapter 3.0, "Project Description," construction of the proposed trail would require approximately 12 on-site employees at any given time. Assuming two total trips per day per employee, project construction would only result in a maximum of approximately 24 one-way daily trips. In the long term, the proposed trail could result in additional vehicle trips on local roadways because the trail could result in an increase in visitors to the Auburn SRA; however, a majority of such vehicle trips would be anticipated to be generated by current visitors (see Chapter 8.0, "Transportation and Circulation," for more detail). Typically, roadway traffic volumes have to double before the associated increase in noise levels (3 dBA [CNEL/L_{dn}]) is noticeable. Therefore, the addition of these daily trips on the local roadway system to existing volumes (e.g., approximately 6,650 average daily trips on Foresthill Road) would be minor. Consequently, construction, use, and maintenance of the proposed trail would not result in a noticeable change in the traffic noise contours of area roadways. In addition, such increases associated with construction traffic would be temporary and would occur during the less noise-sensitive daytime hours. Thus, short- and long-term traffic-generated noise levels would not exceed applicable County noise standards, nor would ambient noise levels substantially increase at nearby existing noise-sensitive receptors. As a result, this impact is considered less than significant.

IMPACT 10-4	Noise – Exposure of Persons to or Generation of Excessive Groundborne Vibration or Noise Levels. *Vibration levels associated with on-site construction equipment would not exceed Caltrans's recommended standard for the prevention of structural damage and FTA's maximum-acceptable vibration standard with respect to human annoyance for residential uses. In addition, long-term use and maintenance of the proposed trail would not include any vibration sources. Thus, the proposed project would not result in the exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.*
Significance	*Less Than Significant*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less Than Significant*

Construction activities have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and operations involved. Vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. Table 10-6 displays vibration levels for typical construction equipment.

As discussed above, on-site construction equipment would include a Sweco trail dozer, trucks, excavators, and graders. According to FTA and as shown in Table 10-6, vibration levels associated with the use of trucks are 0.076 in/sec PPV and 86 VdB (referenced to 1 µin/sec and based on the RMS velocity amplitude) at 25 feet. Using FTA's recommended procedure for applying a propagation adjustment to these reference levels, predicted worst-case vibration levels of approximately 0.000009 in/sec PPV and 33.5 VdB at the closest existing noise-sensitive receptor (2 miles away) could occur from use of trucks. These vibration levels would not exceed Caltrans's recommended standard of 0.2 in/sec PPV (Caltrans 2002) with respect to the prevention of structural damage for normal buildings and FTA's maximum-acceptable vibration standard of 80 VdB (Federal Transit Administration 1995) with respect to human annoyance for residential uses. In addition, the long-term operation of the proposed project (i.e., use and maintenance of the proposed trail) would not include any vibration sources. Thus, short-term construction and long-term operation would not result in the exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels. As a result, this impact is considered less than significant.

Table 10-6 Typical Construction-Equipment Vibration Levels			
Equipment		PPV at 25 feet (in/sec)[1]	Approximate Lv at 25 feet[2]
Pile Driver (impact)	Upper range	1.518	112
	Typical	0.644	104
Pile Driver (sonic)	Upper range	0.734	105
	Typical	0.170	93
Large Bulldozer		0.089	87
Caisson Drilling		0.089	87
Trucks		0.076	86
Jackhammer		0.035	79
Small Bulldozer		0.003	58
Notes: in/sec = inches per second; Lv = velocity level in decibels (VdB) referenced to 1 microinch per second (µin/sec) and based on the root mean square (RMS) velocity amplitude; PPV = peak particle velocity Source: Federal Transit Administration 1995			

10.4 MITIGATION MEASURES

No mitigation measures are required.