3. ENVIRONMENTAL ANALYSIS

A. BIOLOGICAL RESOURCES

The principal intent of the biological survey was to document the presence or potential presence of sensitive biological resources onsite that could pose constraints to the proposed landfill expansion. No detailed quantitative plant transects or animal trapping studies were conducted as part of these studies.

Survey periods were optimal for detection and accurate identification of all sensitive plant and animal species likely to occur in the area. Biological resources were mapped using a 1"=100' topographic map, 1:8400 scale aerial photograph, and the soil survey map for El Dorado County (Soil Conservation Service 1974).


1. Existing Conditions

Vegetation Communities

Vegetation communities occurring within the study area include transitional interior/canyon live oak woodland, three phases of northern mixed chaparral, white alder riparian forest, freshwater seep, aquatic habitat, nonnative grassland, and disturbed area. Vegetation communities are delineated in Figure 3A-1 and discussed in general terms below. Habitat types conform to Holland (1986). All native and nonnative plant species found within the property boundaries are listed in the Biological Resources Technical Report, Appendix C.

Interior/Canyon Live Oak Woodland. Interior live oak woodland is typically dominated by broad-leaved trees to 45 feet in height (Holland 1986). The tree canopy is generally closed and the herbaceous and shrub layers tend to be poorly developed. This habitat type occurs on north-facing slopes extensively through the
North Coast Ranges and foothills of the Sierra Nevada, and in scattered locations in the South Coast, Transverse, and Peninsular ranges.

Typical interior live oak woodland is dominated by interior live oak (*Quercus wislizenii*) and occurs throughout the site on north- and south-facing slopes. Oak woodland habitat dominated by a dense cover of mature canyon live oak (*Quercus chrysolepis*) occurs on a north-facing slope to the south of the existing landfill site, within the proposed expansion area. This stand exhibits transitional characteristics of interior live oak forest and canyon live oak forest.

Plant species characteristic of interior live oak woodland and detected onsite include California buckeye (*Aesculus californica*), ponderosa pine (*Pinus ponderosa*), digger pine (*Pinus sabiniana*), blue elderberry (*Sambucus caerulea*), blue oak (*Quercus douglasii*), and poison oak (*Toxicodendron diversilobum*).

Interior live oak woodland habitat onsite is relatively undisturbed and of high quality in terms of species diversity and value to wildlife.

**Northern Mixed Chaparral.** Northern mixed chaparral consists of broad-leaved sclerophyllous shrubs 6-15 feet high. This fire-adapted plant community is typically very dense, forming impenetrable stands with little or no understory. Northern mixed chaparral occurs on dry, steep rocky slopes and shallow soils and is distributed from the eastern slopes of the Klamath Mountains and North Coast Ranges, over the South Coast Ranges and western Sierran foothills, to the Transverse and Peninsular Ranges of southern California (Holland 1986).

Typical northern mixed chaparral is dominated by scrub oak (*Quercus dumosa*), chamise (*Adenostoma fasciculatum*), and various species of manzanita (*Arctostaphylos* spp.) and buckbrush (*Ceanothus* spp.). Three phases of this community type occur onsite: chamise-dominated, white-leaf manzanita (*Arctostaphylos viscida*) dominated, and mixed stands supporting chamise, white-leaf manzanita, and interior live oak. Chamise-dominated stands of northern mixed chaparral occur principally on south-facing slopes. White-leaf manzanita-dominated stands onsite are found at or near ridge tops and mixed stands are found on west-facing slopes.
Additional species detected onsite and characteristic of northern mixed chaparral include California buckeye, buckbrush (Ceanothus cuneatus), woolly-leaved ceanothus (Ceanothus tomentosus var. tomentosus), toyon (Heteromeles arbutifolia), yerba santa (Eriodictyon californicum), and poison oak.

**White Alder Riparian Forest.** White alder riparian forest is a broad-leafed deciduous forest of medium height which occurs along streams. It typically forms a dense shrubby understory of deciduous species. This plant community is most often found in steep sided canyons on coarse sandy soils with underlying bedrock (Holland 1986). White alder riparian forest is distributed at lower elevations of the Sierra Nevada, Coast, Transverse, and Peninsular ranges.

Habitat onsite is best characterized as early successional, having developed relatively recently in stream channels disturbed by placer mining. The most typical example of this community occurs along Martinez Creek on the alternate site. Poorly developed white alder riparian forest occurs in patches along the stream course at the canyon bottom immediately to the south of the landfill site, within the proposed expansion area.

Characteristic species detected onsite include white alder (Alnus rhombifolia), snowberry (Symphoricarpos sp.), California rose (Rosa californica), dogwood (Cornus stolonifera), big-leaf maple (Acer macrophyllum), arroyo willow (Salix lasiolepis), and black willow (Salix gooddingii).

**Freshwater Seep.** Freshwater seep habitat occurs throughout most of the state and is particularly common on permanently moist soils in grasslands and meadows (Holland 1986). It is usually dominated by perennial herbs such as sedges and grasses forming complete vegetative cover.

Numerous isolated and connected freshwater seeps occur within the study area. Some occur as typical mesic sites in meadows on the slopes of hills. Others occur as early successional habitat in open, wet depressions in placer diggings along stream courses. Typical species detected onsite include rushes (Juncus spp.), curly dock (Rumex crispus), Douglas' mugwort (Artemisia douglasiana), sedges (Carex spp.), soft flag cattail (Typha latifolia), water cress (Rorippa nasturtium-aquaticum), and duckweed (Lemma sp.).
Aquatic Habitat. Aquatic habitat in the project area is associated with the permanent water present in Martinez Creek. Plant species characteristic of this habitat include watercress, spearmint (Mentha spicata), and common horsetail (Equisetum arvense). This habitat occurs in close association with white alder riparian forest, and the roots and dead branches of the riparian trees contribute to the physical structure of the aquatic habitat.

Nonnative Grassland. This plant community is generally found in open areas interspersed among oak woodland and northern mixed chaparral and typically occurs on fine-textured loam or clay soils that are somewhat poorly-drained (Holland 1986). Nonnative grassland also frequently develops on grazed or otherwise disturbed sites.

This vegetation type is typically dominated by nonnative annual grasses and weedy annual and perennial forbs, with scattered native wildflower species. Characteristic nonnative plant species detected include brome grass (Bromus spp.), farmer's foxtail (Hordeum leporinum), red-stemmed filaree (Erodium cicutarium), cut-leaved geranium (Geranium dissectum), yellow star thistle (Centaurea solstitialis), and mouse-ear chickweed (Cerasium viscosum). Typical native species detected include Douglas' lupine (Lupinus nanus), California poppy (Eschscholzia californica), and henbit (Lamium amplexicaule).

Disturbed Area. Disturbed area is characterized as land on which the native vegetation has been significantly altered by agriculture, construction, or other surface disturbances. Such area typically occurs on vacant lots, roadsides, construction staging areas, or graded sites. Numerous locations onsite are highly disturbed. Recent surface disturbances have occurred at the landfill site and the immediate vicinity, and at the two shooting ranges. Historic disturbances resulting from mining operations occurred primarily along stream courses and at the bottoms of slopes.

Typical species found in disturbed areas include yellow star thistle, pineapple weed (Matricaria matricarioides), turkey mullein (Verbascum thapsus), red-stemmed filaree, horehound (Marrubium vulgare), and common vetch (Vicia angustifolia).
Wildlife Habitat

The value of a site to wildlife is influenced by a combination of the physical and biological features of the immediate environment. Species diversity is a function of diversity of abiotic and biotic conditions and is greatly affected by human use/abuse of the land. The habitat quality of an area for use by wildlife, therefore, is ultimately determined by the type, size, and diversity of vegetation communities present and their degree of disturbance. As a plant community is degraded by loss of understory, creation of openings, and a reduction in area, a loss of structural diversity generally results. Degradation of structural diversity of a habitat typically diminishes habitat quality and usually results in a reduced ability to support a diversity of animal species.

Wildlife habitats are typically distinguished by vegetation type. Varying combinations of plant species provide different resources for utilization by wildlife. The following is a discussion of existing habitats on the project site and the wildlife species detected onsite that they support. All animal species detected during field surveys are listed in the Biological Resources Technical Report, Appendix C.

Nonnative Grassland. Nonnative grasslands are of value primarily for the foraging opportunities they offer granivorous birds such as lesser goldfinch (Carduelis psaltria) and predators such as red-tailed hawk (Buteo jamaicensis). Grasslands are capable of supporting colonies of rodent species such as California vole (Microtus californicus). Rodents may then serve as prey for predators such as the gray fox (Urocyon cinereoargenteus). Nonnative grasslands are typically considered to be of low habitat quality to wildlife species.

Interior/Canyon Live Oak Woodland. Interior/canyon live oak woodland typically has high habitat value for wildlife species. Oak woodlands provide cover and forage for avian and mammalian species, as well as perching and nesting sites for resident birds. Characteristic avian species detected in oak woodland habitat onsite include acorn woodpecker (Melanerpes formicivorus), Nuttall's woodpecker (Dendrocoptes nuttali), scrub jay (Aphelocoma coerulescens), Steller's jay (Cyanocitta stelleri), and northern pygmy-owl (Glaucidium gnoma). Mammalian species utilizing this habitat type include mule deer (Odocoileus hemionus), California vole, western gray squirrel (Sciurus griseus) and gray fox. A variety of
reptile and amphibian species are also likely to occur within oak woodland onsite. Detected residents include Gilbert's skink (*Eumeces gilberti*) and Pacific treefrog (*Hyla regilla*).

The oak woodland habitat within the proposed expansion area is considered to be of very high quality. This woodland is mature, is composed of a variety of oak and pine species, has a well developed understory, and has an abundance of leaf litter and dead wood. These features tend to make this particular habitat very attractive to wildlife species.

**Riparian, Wetland, and Aquatic Habitats.** Riparian habitat, such as white alder riparian forest, is of high habitat value to a wide variety of wildlife species. Riparian systems associated with perennial sources of water tend to support plant communities with great structural diversity and provide abundant cover, forage, and water for a wide array of resident and migratory animal species. In addition, riparian systems often act as movement corridors for wildlife. Intermittent streams, while providing similar resources for wildlife, may support fewer and less diverse animal species.

Avian species detected in riparian habitats onsite include song sparrow (*Melospiza melodia*), yellow warbler (*Dendroica petechia*), yellow-breasted chat (*Icteria virens*), and common yellowthroat (*Geothlypis trichas*). Mammalian species detected in riparian habitat onsite include gray fox, and dusky-footed woodrat (*Neotoma fuscipes*). Amphibians such as Pacific treefrog and California newt (*Taricha torosa*) were also detected in these habitats. Fishes observed in the aquatic habitat of Martinez Creek include mountain sucker (*Catostomus platyrhynchos*), sunfish (*Lepomis* sp.), and an unidentified trout species, possibly brown trout (*Salmo trutta*).

Freshwater seeps provide little in the way of cover for vertebrate species. However, due to the presence of water, seeps may support invertebrate populations providing food for insectivorous birds. Bird species detected include black phoebe (*Sayornis nigricans*) and American robin (*Turdus migratorius*). Pacific treefrog was detected in the freshwater seeps onsite as well.
Northern Mixed Chaparral. Northern mixed chaparral similarly provides abundant cover and forage opportunities but generally for fewer and smaller bird and mammal species than found in woodlands. Bird species detected in this habitat include dusky flycatcher (*Empidonax oberholseri*), Bewick's wren (*Thryomanes bewickii*), Nashville warbler (*Vermivora ruficapilla*), mountain quail (*Oreortyx pictus*), and Anna's hummingbird (*Calypte anna*).

Disturbed Areas. Disturbed sites such as old fields and abandoned mine tailings may provide suitable habitat for rodents. These sites may also provide forage for granivorous, insectivorous and predatory bird species. More highly impacted areas such as roads, roadsides, and graded pads may have virtually no habitat value for wildlife, depending on the length of time since disturbance. The only animal species detected in disturbed areas was western fence lizard (*Sceloporus occidentalis*).

Sensitive Species

Plant and animals species are designated as sensitive due to their overall rarity, restricted distribution, and/or unique habitat requirements. In general, it is a combination of these factors that leads to the designation of a species as sensitive. The Endangered Species Act (ESA), enacted by Congress in 1973, outlines the procedures whereby species are listed as endangered or threatened and established a program for the conservation of such species as well as the habitat in which they occur.

Many individual states have enacted their own listing procedure to provide for the protection of additional locally sensitive biological resources. The California Endangered Species Act of 1984 amends the California Fish and Game Code to protect species deemed to be locally endangered and essentially expands the number of species protected under the ESA (CDFG 1991).

The California Department of Fish and Game (CDFG) has also compiled lists of species of "special concern" (Remsen 1978; Williams 1986; CDFG 1990b,c). Although such species are afforded no official legal status, they may receive special consideration during the planning stages of certain development projects. The CDFG further classifies some species under the following categories: "fully
protected," "protected furbearer," "protected amphibian," and "protected reptile." The designation "protected" indicates that a species may not be taken or possessed except under special permit from the CDFG; "fully protected" indicates that a species can be taken for scientific purposes by permit only.

The Audubon Society's Blue List (Tate 1986) is a periodically updated list of bird species considered to be declining in the United States. The list does not include species already federally listed. Local populations may and often do differ in status from the general Blue List status for the entire United States.

**Plants.** High interest plants include those listed by the U.S. Fish and Wildlife Service (USFWS) (USFWS 1989), CDFG (CDFG 1988; 1990a,c), and the California Native Plant Society (CNPS) (Smith and Berg 1988). The CNPS listing is sanctioned by the CDFG and serves essentially as their list of "candidate" plant species (see the Biological Resources Technical Report, Appendix C, for a summary of potentially occurring sensitive species and an explanation of USFWS, CDFG, and CNPS listing codes). In addition, the County of El Dorado General Plan (County of El Dorado 1990) lists plant species considered sensitive.

Twelve plant species listed as sensitive by the CNPS are known to occur in the general vicinity of the project area in habitat types represented onsite. None of these are federal-listed endangered and, thus, have no formal status under the ESA. Three species are state-listed rare and are candidates for federal listing; three additional species are candidates for federal listing; and the remainder are considered sensitive by the CNPS. A general discussion of sensitive plant species known from the project vicinity and their potential for occurrence onsite is given below.

Nissenan manzanita (*Arctostaphylos nissenana*) is a low growing perennial shrub in the heath family. It is on the CNPS list 1B:3-2-3, but has been rejected for federal listing (C3c). The species occurs on barren, acidic mineral soils on slopes where competition from larger shrubs and trees is minimal. Nissenan manzanita was not detected during the present survey. There is no potential for its occurrence onsite due to a lack of suitable habitat and the fact that it would have been easily recognizable during the survey.
Pleasant Valley mariposa lily (Calochortus clavatus var. avius) is on the CNPS list 1B:3-2-3 and qualifies for federal listing (C1). The species produces erect, yellow lily-like flowers on stems up to 3 feet high. The flowering period is from April to June. Pleasant Valley mariposa lily occurs on dry, often rocky slopes in chaparral and foothill woodland below 4000 feet in elevation. Although suitable habitat occurs onsite and a non-flowering (and therefore unidentifiable) species of Calochortus was detected during the survey, potential for the target species to occur onsite is low. Due to the growth habit and habitat of these non-flowering individuals, it is believed that the species occurring onsite is the same as flowering individuals of the widespread fairy lantern (Calochortus albus) found offsite.

Sierra clarkia (Clarkia virgata), a member of the evening-primrose family, is on the CNPS list 4:1-1-3 but has no state or federal status. The species produces purple to dark lavender flowers from May through July and occurs in foothill woodland and lower yellow pine forest in the western Sierra Nevada. Because habitat onsite is not typical for the species and because the species would have been recognizable during the survey, it is not expected to occur within the project area.

Pine Hill flannelbush (Fremontodendron decumbens) is a shrub 3 feet in height and 6 to 12 feet across. It is on the CNPS list 1B:3-2-3, is state-listed rare (CR), and is a candidate for federal listing (C2). It produces large orange to red-brown flowers May-June and occurs in chaparral and foothill woodland. The potential for occurrence of the species is low due the fact that it would have been readily identifiable during the survey.

El Dorado bedstraw (Galium californicum ssp. sierra) is also on the CNPS list 1B:3-2-3, is state-listed rare (CR), and is a candidate for federal listing (C2). The species is a low herb to 1 foot high and produces diminutive yellowish flowers March-July. Although suitable habitat and other members of the genus occur onsite, the potential for the occurrence of El Dorado bedstraw onsite is low; the species would have been detectable during the survey.

Bisbee Peak rush-rose (Helianthemum suffrutescens) is on the CNPS list 1B:2-2-3 and is a candidate for federal listing (C2). It is a low multi-branched shrub 2 feet high and produces yellow flowers April-May. It occurs in open chaparral, often on disturbed soils. Although a similar species, California rush-rose (H. scoparium),
occurs onsite, the target species was not detected and is not believed to be present because it would have been identifiable during the survey.

Parry's horkelia (\textit{Horkelia parryi}) is on the CNPS list 1B:3-1-3 but has no state or federal status. This species is a low spreading herb developing from a horizontal rootstock. It occurs on dry hills below 1000 feet in open chaparral and foothill woodland. Although suitable habitat is present onsite, the species would have been detectable during the survey and is therefore not expected to occur within the project boundaries.

Hoary navarretia (\textit{Navarretia eriocephala}) is on the CNPS list 4: 1-1-3 but has no state or federal status. This annual herb produces cream-yellow flowers on stems 2 to 8 inches high from May through June. It occurs in dry, open grasslands and foothill woodland below 1000 feet. There is a low potential for occurrence of hoary navarretia. Although suitable habitat occurs onsite, the plant would have been detectable during the survey and is therefore not expected to occur in the project area.

Yellow bur navarretia (\textit{Navarretia prolifer} ssp. \textit{lutea}) is on the CNPS list 4:1-1-3 and was rejected for federal listing (C3c). The subspecies is also an annual herb producing bright yellow flowers on stems 2 to 6 inches high from May through June. It occurs above 2700 feet in elevation in yellow pine forest. There is no potential for the occurrence of this subspecies due to the facts that the site lacks suitable habitat and that the taxon would have been identifiable during the survey.

Mariposa phacelia (\textit{Phacelia vallicola}) is on the CNPS list 4:1-1-3 and has no state or federal status. This small annual herb produces purple flowers May through June and occurs in rocky places in chaparral, and foothill woodland above 1800 feet. Although a few individuals of one unidentified species of \textit{Phacelia} were detected onsite, it is not believed to be the target species due to differences in the plant's habit and because the elevation of the site is below 1400 feet.

Layne's butterweed (\textit{Senecio layneae}) is on the CNPS list 1B:2-2-3, is listed as rare (CR) by the CDFG, and is a candidate (C2) for federal listing. It is a perennial herb growing 8-20 inches high and producing yellow flowers in May. The species occurs in chaparral and foothill woodland, often on ultramafic soils. Layne's
butterweed is not expected onsite due to the fact that it would have been readily recognizable during the present survey.

El Dorado County mule ears (*Wyethia reticulata*) is on the CNPS list 1B:2-2-3 and is a candidate (C2) for federal listing. The species is a low, leafy perennial reaching two feet in height. It produces yellow flowers in sunflower-like heads 1 inch across from May through July and occurs on stony clay soils in open chaparral and foothill woodland between 1200 and 1500 feet in elevation. The potential for the occurrence of the species onsite is low because it would have been readily detectable during the spring survey.

**Animals.** High interest animals include those listed by the USFWS (1989), the CDFG (1990b; 1991); Remsen (1978), Williams (1986), and Tate (1986), as well as those considered sensitive by the County of El Dorado General Plan (County of El Dorado 1990). The El Dorado National Forest Land and Resource Management Plan FEIR lists additional species as sensitive (U.S. Forest Service 1988).

The USFWS officially lists sensitive species as either threatened or endangered, and unofficially recognizes additional species as candidates for listing. Additional species (i.e., bald eagle, golden eagle) receive federal protection under the Bald Eagle Protection Act.

No federally- or state-listed endangered or threatened animal species are known to occur in the vicinity of the project site (CDFG 1990b). However, four animal species recognized as being of special concern by the CDFG or as sensitive by the County of El Dorado either occur or have the potential of occurring on the site. A general discussion of sensitive animal species known from the project vicinity and their potential for occurrence onsite is given below.

Several breeding bird species of concern (Remsen 1978) or declining species (Everett 1979) are associated specifically with riparian woodland habitat. These sensitive bird species include warbling vireo (*Vireo gilvus*), yellow warbler, and yellow-breasted chat. Brownheaded cowbird (*Molothrus ater*) parasitism in combination with habitat loss are suspected as the major reasons for the decline of these species.
Warbling vireo may potentially occur as a summer visitor in El Dorado County. Warbling vireos formerly nested in oak and riparian woodlands but have been essentially extirpated from this habitat, apparently because of brood parasitism by brown-headed cowbirds. This species was not detected during the surveys.

Yellow warbler is a summer visitor that in California nests only in mature riparian woodland. It is a frequent victim of the brown-headed cowbird. The yellow warbler is considered a second-priority species of special concern by the CDFG. This species was detected in the riparian habitat of Martinez Creek and may potentially breed there.

Yellow-breasted chat is another species restricted to riparian woodland, where it frequents dense undergrowth. It is a second-priority species of special concern (Remsen 1978). The yellow-breasted chat is a summer visitor to California, arriving in early April. This species was detected in the riparian habitat of Martinez Creek and may potentially breed there.

A sensitive amphibian that potentially may be in the vicinity of the project is the California red-legged frog (*Rana aurora draytonii*), which is protected by the CDFG (1982) and is a candidate (Category 2) for federal listing as threatened or endangered. This species frequents marshes, slow parts of streams, lakes, reservoirs, ponds, and other usually permanent water sources. It occurs primarily in wooded areas in lowlands and foothills, although it can also be found in grassland. It is considered a pond frog (Stebbins 1966) and is typically associated with deep water pools (at least 0.5 meter in depth) fringed by thick vegetation (Zweifel 1955; Hayes, pers. comm.), especially arroyo willow or native cattails. During the breeding season the males call from the water while floating, producing weak vocalizations (Hayes and Krempels 1986). The adults are strictly nocturnal and extremely wary; any attempt to census this species must be conducted at night.

The decline of the California red-legged frog, as well as other western ranids, is probably the result of numerous confounding factors such as competition and predation with and by introduced species (bullfrogs and fish), acid rain, pathogens and parasites, catastrophic events (severe drought and scouring floods), and habitat alteration (Hayes and Jennings 1986). These frogs often exist in small populations (Storm 1960; Hayes, pers. comm.) and as such are sensitive and subject to local
extinctions. The tadpoles of this frog require cool water (>21°C is lethal); therefore habitat alterations that increase water temperature, such as removal of riparian vegetation or reduction in stream flow, could lead to local extinctions. This species was not detected during the survey and has a low potential for occurrence onsite due to the lack of appropriate habitat and the presence of exotic species such as the bullfrog (*Rana catesbiana*).

**Sensitive Habitats**

Sensitive habitats are those which are considered rare in the region, support sensitive plant or animal species, receive regulatory protection such as wetlands under the U.S. Army Corps of Engineers (ACOE) 404 permit process and/or the CDFG 1600-1606 (Streambed Alteration Agreement), or are those considered important by the County of El Dorado General Plan (County of El Dorado 1990). In addition, the CNDDDB has designated a number of communities as rare; these communities are given the highest inventory priority (Holland 1986).

Sensitive habitats within the Union Mine Landfill expansion area include the two wetland plant communities, white alder riparian forest and freshwater seep, and interior/canyon live oak woodland. Locations of sensitive habitats and jurisdictional wetlands are identified in Figure 3A-1.

Wetland habitat is considered a sensitive and declining resource by several regulatory agencies including the CDFG and the USFWS. Wetlands are specifically addressed by the CDFG Code sections 1600-1606 (Streambed Alteration Agreement), and Section 404 of the Clean Water Act (Reinen 1978). Section 404 permit provisions regulating the dredging and filling of wetlands are enforced by the ACOE and U.S. Environmental Protection Agency (EPA), with technical input from the USFWS. The ACOE exerts jurisdiction over "waters of the U.S." which include territorial seas, tidal waters, and non-tidal waters in addition to wetlands and drainages that support wetland vegetation, exhibit ponding or scouring, show obvious signs of channeling, or have discernible banks and high water marks.

Wetland communities identified within the project area include white alder riparian forest and freshwater seep. A majority of the white alder riparian forest habitat
occurs along Martinez Creek at the alternate site with additional patches onsite along an unnamed tributary in the canyon just south of the existing landfill. Freshwater seep habitat is abundant along Martinez Creek and the same unnamed tributary mentioned above as well as other unnamed tributaries onsite and in disturbed grassland at the east end of the expansion area. Jurisdictional drainages ("waters of the U.S.") are present within the two main unnamed tributaries and Martinez Creek.

Oak woodland in general is considered a sensitive plant community by the CNPS and the CDFG due to the decline of this habitat type in California as a result of land conversion, fragmentation, and lack of regeneration (CNPS 1989). Approximately 7.2 million acres of oak woodland presently occur in the state; 1 million acres have been lost since 1945 (McCready, personal communication). Although no local or state ordinances govern impacts to interior/canyon live oak woodland in El Dorado County, per se, Sections 1913-1933 of the State Fish and Game Code, governing the protection of biodiversity, outlines requirements for preserving significant natural areas, including significant examples of plant community types, which apply to areas of this habitat onsite.

2. Impacts

Impacts to biological resources have been assessed for the entire study area. A "worst-case scenario" has been assumed when details of the project description are lacking. The potential direct impacts associated with this project can be attributed to five project components (Figure 2-13):

1. Impacts associated with the expansion of the landfill to the south.
2. Impacts associated with the proposed leachate/septage treatment site.
3. Impacts associated with the potential future leachate/septage treatment site or borrow area.
4. Impacts associated with the retention basin.
5. Impacts associated with leachate/septage pipelines and pump stations.

A 20-foot wide construction zone has been assumed for the leachate/septage pipelines. Impacts have been calculated for the retention basin assuming grading as shown on Figure 3B-4.
Sensitive Species

Two sensitive animal species were detected in the project area (yellow warbler, yellow-breasted chat). No impacts to these sensitive species are anticipated from implementation of the proposed project.

Sensitive Habitats

Project implementation would result in an overall loss of 21.0 acres of native and nonnative habitat. However, the quality of the habitat varies between the various portions of the project area due to variations in maturity, structural diversity, and levels of disturbance. Table 3A-1 provides impact acreages for all habitat types broken down by the five project components. Total acres of habitats occurring within the project area are presented below and include the alternate site (i.e., total project area = 237 acres).

Interior/canyon live oak woodland habitat covers approximately 82.9 acres within the project area, of which, a total of 12.2 acres would be impacted as a result of the proposed project. However, of this 12.2 acres of oak woodland, approximately 2.3 acres located at the southwest corner of the landfill site (Figure 3A-1), are fragmented and generally disturbed with little understory; this area is not considered high quality habitat.

Oak woodlands are generally considered a sensitive resource by the CNPS and the CDFG. Oak woodland onsite represents a valuable biological resource due to its extensive cover, low degree of disturbance, and the high diversity of animal and plant species associated with it. The impacts to 9.9 acres of oak woodlands onsite (exclusive of the 2.3 acres at the southwest corner of the existing landfill disturbance area) are considered a significant impact. Impacts to the 2.3 acres of habitat at the southwest corner of the existing landfill are not considered significant because of its highly disturbed and fragmented nature.

Direct impacts would result from the clearing of land supporting oak woodland by construction and grading activities. Indirect impacts may result from fugitive dust and disturbance of the soil surface within the root protection zone of trees adjacent to graded areas, effectively increasing the total acreage of actual impacts. Because
**Table 3A-1**

**IMPACT ACREAGES FOR HABITAT TYPES IN THE PROJECT AREA BY PROJECT COMPONENT**

<table>
<thead>
<tr>
<th>Habitat Type</th>
<th>Total Project Area</th>
<th>Expansion Area</th>
<th>Proposed Leachate/Septage Treatment Site</th>
<th>Future Leachate/Septage Treatment Site</th>
<th>Retention Basins</th>
<th>Leachate/Septage Pipelines</th>
<th>Total Impacts</th>
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</thead>
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<tr>
<td>Interior Live Oak Woodland</td>
<td>82.9</td>
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<td>1.4</td>
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<td>White Alder Riparian Forest</td>
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<td></td>
<td>0.02</td>
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<td>81.6</td>
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<td></td>
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<td>Nonnative Grassland</td>
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<td></td>
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*Total impact acreage represents impacts to habitat types only.*
the potential area of indirect impact is small and this indirect impact may be reduced by contractor education, indirect impacts to oaks are not considered significant. Cumulative impacts would result from a net overall reduction of this habitat type within El Dorado County and are considered adverse but not significant.

Approximately 4.7 acres of white alder riparian forest and 0.7 acre of freshwater seep occur within the project area. Approximately 0.9 acre of wetland habitat (0.6 acre white alder riparian forest and 0.3 acre of freshwater seep) would be directly impacted as a result of project implementation. Impacts would include 0.02 acre of ACOE jurisdictional wetlands, 0.16 acre of ACOE jurisdictional "waters," and 0.9 acre jurisdictional, CDFG wetlands. Direct and indirect impacts to wetlands are considered significant due to their high biological value and protected status at the state and federal levels.

Impacts to ACOE jurisdictional wetlands are less than 1 acre and therefore qualify for a Nationwide 26 permit, thereby avoiding the need for an Individual 404 permit requiring mitigation to offset wetland habitat loss. The CDFG warden for this area, who is familiar with the project area, has indicated that he would not require a Streambed Alteration Agreement (CDFG Section 1601) for impacts to the drainage in the proposed expansion area (personal communication, Ken Ball, CDFG to Mike White, ERCE, May 9, 1991). The CDMG prepared a "Stream or Lake Alteration Agreement" form for the project documenting that no formal stream alteration agreement is necessary for impacts to the expansion drainage area. This Stream Alteration Agreement form is included in the FEIR as Attachment D to the Biological Resources Technical Report (Appendix C).

Potential indirect impacts to wetlands or waters of the U.S. could result from sedimentation, erosion, or spillage of toxic materials, and could affect habitat within the project area or downstream. These impacts are considered significant but avoidable through sensitive construction practices, as outlined in the general mitigation measures section below.

Approximately 81.6 acres of northern mixed chaparral occur onsite. The proposed project would result in impacts to approximately 7.7 acres of northern mixed chaparral. These impacts are not considered significant.
Nonnative grassland covers approximately 7.7 acres of the project area. The proposed project would impact approximately 0.2 acres of nonnative grassland. This impact is not considered significant.

The remaining area onsite is disturbed by existing landfill operations, the gun club areas and roadways. Any impacts to disturbed areas are not considered significant.

3. Mitigation Measures

To mitigate potential direct, indirect, and cumulative impacts to below a level of significance, the following mitigation measures are recommended and should be incorporated as project design features.

Mitigation for Direct Impacts

Sensitive Species

No sensitive plant or animal species will be impacted as a result of project implementation, and therefore no mitigation measures are required.

Sensitive Habitats

Oak Woodlands. Project implementation will result in significant impacts to 9.9 acres of oak woodland. Although El Dorado County has no formal mitigation policy for oak trees, the CNPS, CDFG, and the California Oak Foundation recommend that direct impacts to oak woodland should be minimized as much as possible. As mitigation for the loss of interior/canyon live oak woodlands resulting from project implementation, the County of El Dorado has proposed that the alternate site along Martinez Creek be acquired and set aside as a native habitat preserve; the alternate site currently supports approximately 13.6 acres of similar oak woodland (Figure 3A-2). This parcel is currently being acquired by the County of El Dorado and the acquisition of the parcel for preservation as biological open space will preclude future development on this land. The purpose of designating this land as biological open space is to prevent the degradation of existing habitat values. Therefore, not only would development be precluded on this parcel, land uses that involve any habitat modification would also be precluded.
Designating approximately 13.6 acres of oak woodland as biological open space will mitigate the project related impacts to oak woodlands to below a level of significance.

**Wetlands.** As mitigation for significant impacts to 0.9 acre of wetlands, the County of El Dorado proposes to acquire the alternate site described above to be set aside as a native habitat preserve. The site presently supports approximately 4.0 acres of high quality white alder riparian forest and freshwater marsh habitats with even greater value to wildlife than those wetland habitats found onsite (Figure 3A-2). Mitigation of this sort will require creation of a mitigation agreement with the CDFG guaranteeing the preservation of the site and ensuring its protection as biological open space in perpetuity. The purpose of designating this land as biological open space is to prevent the degradation of existing habitat values. Therefore, not only would development be precluded on this parcel, land uses that involve any habitat modification would also be precluded.

Designating 4.0 acres of white alder riparian forest as biological open space will mitigate the project related impacts to wetlands to below a level of significance.

**Mitigation for Indirect Impacts**

In general, indirect impacts may result from increased runoff and erosion, toxic spills into drainages, and fugitive dust. These potential significant impacts are mitigable to below a level of significance, as described below.

**Erosion/Sedimentation**

The primary concerns to biological resources from erosion and sedimentation are 1) increased erosion due to clearing of existing vegetation and the resultant bare soil surface and 2) degradation of offsite (i.e., downstream) riparian/wetland habitat by excessive sedimentation. Effects of erosion can be decreased by collecting surface runoff in desilting ponds before releasing the water into natural drainages. Erosion and sedimentation impacts can also be mitigated by employing standard erosion control procedures such as sandbagging, diversion ditches, and stream bank stabilization procedures.
standard erosion control procedures such as sandbagging, diversion ditches, and stream bank stabilization procedures.

**Toxic Spills**

Contamination of drainages from fuel spills or other toxic substances has been identified as a potentially significant impact. Toxic spills can result in degradation of habitat and water quality. In order to prevent these impacts, a "no fueling" zone will be designated wherein fueling of vehicles or equipment is prohibited within 50 feet of all drainages. In addition, all equipment used in or near drainages will be clean and free of leaks and/or grease. Emergency provisions (e.g., straw bales) will be in place at all drainage crossings prior to the onset of construction to deal with unintentional spills.

**Dust**

Little information exists on the effects of dust on oak trees. However, there is some potential that a continual cover of dust may reduce the overall vigor of individual trees by reducing their photosynthetic capabilities and increasing their susceptibility to pests or disease. These effects would likely require long-term exposure to dust. Nonetheless, any potential indirect impacts to oak trees as a result of fugitive dust emissions created by construction and operation activities can be mitigated by employing standard air quality control procedures such as watering areas of bare ground.

**General Mitigation Measures**

Many of the potential direct and indirect impacts identified above can be minimized or avoided altogether by adherence to the following general project design mitigation measures.

1. The County will retain a project biologist to oversee aspects of construction monitoring that pertain to biological resource protection, and to ensure compliance with the mitigation measures described below. The project biologist will be responsible for the contractor education program (no. 2 & 3, below) and will monitor all construction activities in areas supporting
sensitive biological resources. The project biologist will act as the liaison between the County of El Dorado and the contractor(s), and will act in the County's interest in resolving conflicts between resource protection and project implementation.

2. Provisions will be made to inform the construction contractor(s) about the biological constraints of this project. All sensitive habitat areas to be avoided shall be clearly marked on project maps provided to the contractor. These areas will be designated as "no construction" or "limited construction" zones. These areas will be flagged by the project biologist prior to the onset of construction activities. In some cases, resources may need to be fenced or otherwise protected from direct or indirect impacts.

3. A contractor education program will be implemented to ensure that contractors and all construction personnel are fully informed of the biological resources associated with this project. This program will focus on a) the purpose for resource protection, b) contractor identification of sensitive resource areas in the field (e.g., areas delineated on maps and by flags or fencing), c) sensitive construction practices (see nos. 4-7, below), d) protocol to resolve conflicts that may arise during the construction process, and e) ramifications of noncompliance. This program will be conducted by a qualified biologist (preferably, the project biologist/construction monitor), and will be a requirement for all construction personnel.

4. Vehicles will use existing access roads to the degree feasible. Where new access is required, all vehicles will use the same route, even if this requires heavy equipment to back out of such areas. All access routes outside of existing roads or the construction easement will be clearly marked (i.e., flagged and/or staked) prior to the onset of construction. All access roads outside of existing roads or the construction easement will be delineated on the grading plans and reviewed by a qualified biologist.

5. Topsoil will be stockpiled in disturbed areas, to the degree feasible, presently lacking native vegetation. Stockpile areas will be delineated on the grading plans and reviewed by a qualified biologist.
6. Staging areas will be located in disturbed habitat, to the degree feasible. Staging areas are prohibited within sensitive habitat areas. Staging areas will be delineated on the grading plans and reviewed by a qualified biologist.

7. Fueling of equipment will not occur adjacent to drainages. "No-fueling zones" will be designated on construction maps and will be situated a minimum distance of 50 feet from all drainages.
B. WATER RESOURCES

1. Existing Conditions

Regional Hydrogeology

The hydrogeology of the Union Mine area is relatively complicated since the primary aquifer in this region is a fractured rock system in which the host rock includes jointed and fractured meta-sediments, meta-volcanics, and granitic rocks (refer to Section 3C). Within these types of fractured rock systems, groundwater is transported primarily through the fractures and joints in the bedrock. The occurrence and quantity of groundwater is dependent upon the nature, distribution, and interconnection of the fractures.

Groundwater recharge generally occurs in the areas of higher elevation during precipitation events. A percentage of the rainwater infiltrates into the soil and percolates down to the local or regional water table. Infiltration of surface water from ephemeral streams is another potential source of groundwater recharge in this region (EMCON 1987).

Groundwater flow directions in this type of terrain typically reflect surface topography and are generally directed from the areas of higher elevation to the ephemeral and perennial stream valleys. The general groundwater flow direction in the Union Mine area is east towards Martinez Creek (EMCON 1987).

Site Hydrogeology

Groundwater Monitoring System. The County of El Dorado is conducting a monitoring program in accordance with the Regional Water Quality Control Board Monitoring and Reporting Program Number 88-149. The current monitoring program consists of ten wells and seven surface water locations (CH2M HILL 1991c). This combination of wells and surface water sample locations has been utilized to monitor water levels within and surrounding the landfill as well as evaluate impacts of landfill leachate on surface and groundwaters.
The ten monitor wells and seven surface water sample locations are depicted in Figure 3B-1. According to CH2M HILL (1991c), background ground-water quality is being monitored by wells UM-1 and UM-2. Well UM-1 is located west and directly upgradient of the site while UM-2 is located south and approximately crossgradient of the landfill.

The evaluation of the impact of leachate on the water-bearing zones beneath and downgradient of the existing landfill has been conducted utilizing six wells. According to CH2M HILL, monitor wells MW-1 through MW-4 are completed in the shallow weathered bedrock along and downgradient of the toe of the existing landfill and have been utilized to assess impacts to the shallow aquifer. Monitor wells UM-3 and UM-4 are completed within the deeper unweathered fractured meta-sediments. Wells UM-3 and UM-4 are located along the southern half of the downgradient edge of the landfill and directly downgradient, respectively.

The relationship between landfilled materials and the groundwater underlying the landfill is being evaluated utilizing well LM-2. This well is completed across the contact between the base of the landfill and the weathered bedrock and is located in the south-central portion of the landfill (CH2M HILL 1991c). Well LW-1 was installed in an attempt to identify a potential perched water table within the landfill and is located in the east-central portion of the landfill.

Seven surface water sampling stations are located both upgradient and downgradient of the existing landfill. Most of the stations are located along the unnamed tributary to Martinez Creek located south of the landfill, and along Martinez Creek. Station S-4 is located near the opening of the Minerva Tunnel for the purpose of sampling the discharge from this tunnel which underlies the existing landfill (CH2M HILL 1991c).

**Description of Water-bearing Zones.** The groundwater system beneath the site appears to consist of two aquifer systems that are gradational with one another. These include a shallow weathered bedrock and alluvial aquifer and a deeper unweathered bedrock aquifer. Artificial voids resulting from mining activities previously conducted at the site also serve to locally increase the groundwater storage capacity of both aquifers as well as potentially act as conduits for groundwater movement.
The shallow, weathered bedrock aquifer generally comprises the upper 20 to 30 feet of the Mariposa Formation. At the surface, the Mariposa Formation is weathered to a light-brown to yellow-red color and is very friable and fissile. A seismic refraction study of the site indicated that a zone of weathered bedrock extends to depths of approximately 19 to 25 feet below the surface (EMCON 1987). Lithologic data from borings drilled onsite correlate with the seismic data and indicate that the upper 20 to 30 feet of Mariposa Formation consists of very friable, intensely fractured, and thoroughly discolored meta-sediments (EMCON 1987). A thin veneer of alluvial sediments is generally present only along the surface water drainages. In the southern and eastern portions of the project site, these sediments are saturated and are part of the shallow aquifer system.

The deep, unweathered bedrock aquifer consists of fractured and jointed, finely foliated gray slate to phyllite (EMCON 1987). Groundwater within this aquifer exists primarily within, and is transported through, the fractures and joints present in the bedrock. Fracture spacing and aperture width in the dense bedrock range from 1 inch to 1 foot and very tight to 1/8 inch (EMCON 1987), respectively.

Groundwater also exists within the mine shafts, adits, and workings left over from earlier mining activities. The vertically oriented shafts were filled via bulldozer utilizing the weathered bedrock as fill material (CH2M HILL pers.comm. 1991). The approximate locations and lateral extent of the mine workings is depicted in Figure 3B-2. The existing landfill and the proposed expansion are underlain by mine workings. The Springfield Shaft was sunk to a total depth of 2,000 feet and had an undetermined number of horizontal drifts up to 1,000 feet in length (CH2M HILL 1991c). These shafts and horizontal workings may be permeability avenues which could potentially connect previously unconnected fracture zones within the fractured meta-sediment aquifer. However, permeability data obtained from the unweathered fractured rock aquifer suggest that the hydraulic conductivity of this aquifer is low, indicating little interconnection of fractures within the unit.

**Groundwater Flow Directions.** Groundwater flow directions have been assessed by evaluating the water table elevation data collected from the nine wells that penetrate the top of the aquifer. Two of these monitor wells are screened below the water table. Monitor well UM-2 was screened from 29 to 54 feet below ground
Approximate Locations of Mine Workings

SOURCE: CH²M Hill 1991
surface (bgs) with a filter pack that extends up to 24 feet bgs (EMCON 1987). Monitor Well UM-3 was screened from 60 to 90 feet bgs and had a filter pack emplaced up to 50 feet bgs. The water levels in wells UM-2 and UM-3 utilized to construct the latest water table contour map are 11.7 feet bgs and 2.03 feet bgs, respectively. The remainder of the wells are screened across the water table surface. No piezometer nests or well clusters have been constructed to date.

Figure 3B-3 depicts the latest available water table elevations and the potentiometric surface interpreted from these data (CH₂M HILL 1991c). The data indicate that the horizontal component of groundwater flow is generally from the northwest to the southeast across the site. Given the completion of monitor wells UM-2 and UM-3 below the water table and the observation that their respective water table elevations correlate well with the data from the shallower completions, these data suggest that the magnitude of the vertical component of groundwater flow is small along the southern margin of the site. Additionally, the shallow nature of the water table within the drainages along the southern and eastern boundaries of the site, along with the presence of phreatophytes at the east end of the site, strongly suggest that the southeast end of the site is in an area of groundwater discharge (CH₂M HILL pers.comm. 1991). CH₂M HILL and EMCON interprets these data as an indication that an upward groundwater gradient exists in this area.

**Evaluation of Aquifer Hydraulic Parameters**

Aquifer hydraulic parameters were evaluated by conducting aquifer testing in six monitor wells. Two general types of aquifer testing methodologies were utilized: short term constant discharge tests and slug testing. The slug test results were conducted by EMCON (EMCON 1987). CH₂M HILL conducted the short term constant discharge tests (CH₂M HILL 1991c).

Slug tests were performed in monitor wells UM-1, UM-3, and MW-1. Rising- and falling-head aquifer testing was conducted on wells UM-1 and MW-3. Due to the shallow depth to water in UM-3, only rising-head testing was conducted on this well. The aquifer test data collected from these three wells was analyzed utilizing the methods of Bouwer and Rice (EMCON 1987).
Constant discharge drawdown and recovery data were collected from monitor wells MW-3, MW-4, and LW-2. Wells MW-3 and MW-4 were tested by airlifting for 109 minutes and 71 minutes, respectively. Well LM-2 was pumped at a constant rate for 60 minutes utilizing a submersible pump. The data from these tests were analyzed using the straight-line methods of Cooper and Jacob (CH2M HILL 1991c). The results of both types of testing are presented in Table 3B-1.

These data indicate that the shallow materials at the site typically have hydraulic conductivities on the order of $1 \times 10^{-3}$ to $1 \times 10^{-2}$ centimeters per second (cm/sec). The deeper bedrock aquifer appears to have hydraulic conductivities on the order of $1 \times 10^{-6}$ to $1 \times 10^{-4}$ cm/sec (CH2M HILL 1991c). The degree of interconnection between the shallow and deep aquifers was not evaluated during aquifer testing.

**Surface Water**

Two site conditions will be evaluated for surface: 1) the existing landfill surface water conditions; and 2) the expansion area surface water conditions.

The existing landfill area consists of 33 acres of upland that slope to the southeast. The elevation range of the existing landfill site varies from 1400 feet above mean sea level (MSL) to 1200 feet MSL (EMCON 1987). Upslope of the 33-acre landfill is naturally vegetated area located to the west along Logtown Ridge. All surface water from the existing landfill site eventually drains to the perennial Martinez Creek which flows to the south. The closure plans for the existing landfill characterize all surface water from the existing landfill as noncontact water (CH2M HILL 1991a,b).

The proposed expansion of the landfill involves in-filling 14 acres of the canyon south of the present landfill. The unnamed tributary that flows through the canyon drains adjacent upland areas to the west and south and discharges into Martinez Creek to the east. Martinez Creek is perennial while the unnamed tributary is ephemeral. The drainage area of the unnamed tributary is approximately 234 acres in size. The average stream gradient is 0.16 ft/ft and elevation along the unnamed tributary ranges from 1840 feet MSL to 1120 feet above MSL. A spring has been mapped along the unnamed tributary west of the proposed expansion area at the contact between the Logtown Ridge and Mariposa Formations. However, the
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unnamed tributary is primarily ephemeral and loses flow along the streambed as recharge to the underlying aquifer (EMCON 1987).

The specific proposed landfill expansion area, which is the lower portion of the unnamed creek canyon, ranges in elevation from 1275 feet above MSL to 1150 feet above MSL.

Existing California state regulations concerning surface water drainage systems surrounding Class III landfills require that drainage systems be sized to prevent inundation or washout during a 100-year, 24-hour storm (Title 23 CCR Chapter 15). Title 23 states that Class II surface impoundments must have the capacity to control 1,000-year, 24-hour precipitation events. Waste management units and containment structures must also be designed and constructed to limit, as much as possible, ponding, infiltration, inundation, erosion, slope failure, washout, and overtopping under specified precipitation events.

**Leachate Control**

No leachate collection or removal system is currently in place at the Union Mine Disposal Site. However, preliminary designs have been developed for the collection of leachate from the existing landfill and expansion areas as depicted in Figure 3B-4 (CH₂M HILL 1991a,b).

The leachate collection system will consist of a perforated pipe placed within a gravel-filled trench that will have a depth equal to the top of the bedrock. The drainage system will extend along the southeastern toe of the existing landfill and is intended to capture ground water in the shallow aquifer downgradient of the existing landfill. The ground water and leachate derived from the collection system will be diverted to a surface holding pond (Figure 3B-4) and then will be pumped to the wastewater treatment plant for treatment. The leachate collection system will also be used to monitor shallow ground-water quality.

**Groundwater Quality**

**Inorganic Constituents.** The comprehensive sampling of six monitor wells (UM-1 through UM-4, MW-1, and MW-2) was completed by EMCON in May of 1987
and presented in the 1987 Solid Waste Assessment Test (SWAT) report. Additional water samples were collected by CH2M HILL (1991) from the leachate pond (sample L-1), and from wells MW-3, MW-4, and LW-2. The results of the inorganic chemistry analyses are presented in a trilinear diagram (Figure 3B-5) and Tables 3B-2 and 3B-3.

EMCON concluded that there are two types of background groundwater chemistry at the site based on the data collected during 1987 (Figure 3B-6). Located directly upgradient of the existing landfill, well UM-1 indicated a calcium bicarbonate type of water (EMCON 1987). Well UM-2, located crossgradient from the landfill, was determined to have a calcium sulfate type of groundwater. As can be observed in Figures 3B-5 and 3B-6, these two data points plot in distinctly different fields on a trilinear diagram.

The water sample collected from the former mine drainage pond (WMU-4) on the south side of the landfill was assumed to represent the leachate chemistry. The plots of the major ion concentrations for the water quality sampling points on a trilinear diagram (Figure 3B-5) suggest that much of the groundwater at the site is a mixture of the background groundwater chemistry and the leachate chemistry (CH2M HILL 1991c). It also appears from the chemistry data and Figure 3B-4 that the leachate pond sample is a mixture of the groundwater chemistry immediately underlying the landfill (the sample from LW-2) and the background groundwater chemistry. Samples L-1 and LW-2 plot as sodium chloride type waters.

The sampling events conducted in 1987 and 1990 provide data for the evaluation of potential impacts to the groundwater underlying site. CH2M HILL (1991c) has determined that the following analytes may be elevated relative to background wells UM-1 and UM-2:

- Aluminum
- Arsenic
- Barium
- Calcium
- Cadmium
- Chloride
- Electrical Conductivity
- Potassium
- Magnesium
- Manganese
- Nickel
- Sodium

3.B-12
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| TSS | mg/l | <1 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| BOD5d | mg/l | 36 | 13 | 6.2 | 0.2 | 0.1 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 |

| COD | mg/l | 465 | 531 | 345 | 205 | 150 | 100 | 50 | 30 | 20 | 10 | 5 | 2 | 1 | 0.5 | 0.2 |
| Na | mg/l | 65000 | 62000 | 22000 | 13000 | 24000 | 12000 | 10000 | 14000 | 62000 | 76000 | 42000 | 28400 | 28000 | 405000 | 410000 |
| K | mg/l | 11000 | 61000 | 28000 | 35000 | 30000 | 15000 | 12000 | 14000 | 20000 | 25000 | 6830 | 4210 | 3000 | 10300 | 107000 |
| Ca | mg/l | 98500 | 105000 | 83500 | 38200 | 75000 | 84000 | 75000 | 159000 | 11000 | 67000 | 88500 | 83800 | 80000 | 85000 | 837000 |
| Mg | mg/l | 40000 | 42000 | 27000 | 30000 | 40000 | 27000 | 44000 | 70000 | 40000 | 34000 | 22000 | 25400 | 28000 | 66000 | 65000 |
| CI | mg/l | 1400 | 1400 | 39 | 27 | 45 | 42 | 22 | 20 | 200 | 150 | 150 | 60.2 | 41.7 | 40.5 | 705 | 746 |
| etCaCO3 | mg/l | 510 | 300 | 240 | 150 | 230 | 150 | 200 | 520 | 320 | 240 | 245 | 262 | 285 | 678 | 705 | 746 |
| SO4 | mg/l | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 |
| pH | 7.2 | 7.0 | 6.8 | 6.7 | 6.6 | 6.5 | 6.4 | 6.3 | 6.2 | 6.1 | 6.0 | 5.9 | 5.8 | 5.7 | 5.6 | 5.5 | 5.4 |
| EC (umhos/cm) | 940 | 960 | 610 | 520 | 530 | 280 | 1600 | 950 | 790 | 550 | 620 | 300 | 1600 | 950 | 790 | 550 |
| Redox (mV) | 2.4 | 3.7 | 4.7 | 5.7 | 6.7 | 7.7 | 8.7 | 9.7 | 10.7 | 11.7 | 12.7 | 13.7 | 14.7 | 15.7 | 16.7 | 17.7 |
| Temp. (°C) | 22.4 | 17.3 | 17.6 | 22.5 | 23.3 | 23.6 | 23.9 | 23.2 | 23.5 | 23.8 | 24.1 | 24.4 | 24.7 | 25.0 | 25.3 | 25.6 | 25.9 |

**Source:** CHM Hill, Feb. 1991

**Table 3B-2:** Results of Water Sample Analyses

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<th>Cadmium</th>
<th>Chemical Oxygen Demand</th>
<th>Chloride</th>
<th>Hardness</th>
<th>Iron</th>
<th>Magnesium</th>
<th>Manganese</th>
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<th>Summation of Cations</th>
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SOURCE: CH^2M Hill, Feb. 1991
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**Source:** CHemM Hill, Feb. 1991
### Table 3B-3 (Continued)

**RESULTS OF WATER SAMPLE ANALYSES**

By El Dorado County

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<td>72.0</td>
<td>1034.0</td>
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TDS values:

- L-1: 1500
- UM-1: 430
- UM-2: 540
- UM-3: 310
- UM-4: 1300
- SW-2: 740
- SW-3: 790
- SW-4: 520
- SW-5: 340
- MW-1: 870
- MW-2: 580
- MW-3: 609
- MW-4: 560
- LW-2: 2000

Based on May 1987 data except MW-3, MW-4, and MW-5 which are based on July 1990 data.

Source: EMCON, 1987
CHM Hill, Feb. 1991

Erce Trilinear Diagram Plot of Water Analyses from Union Mine Disposal Site
- Chromium
- Cobalt
- Copper
- Total Dissolved Solids
- Zinc

One of the best indicators of leachate migration is the conservative chloride ion. The highest concentrations of chloride are found in LW-2, which has a level of approximately 800 mg/l. Chloride concentrations steadily decrease downgradient of the landfill, as evidenced by the chloride levels in the leachate pond and wells UM-4, MW-1, MW-2, and MW-3. A similar pattern exists for total dissolved solids.

The concentrations of a number of inorganic compounds presented in Table 3B-2 and Table 3B-3 exceeded the State of California drinking water quality criteria (CH2M HILL 1991c). Criteria for aluminum, arsenic, barium, chromium, iron, and manganese were exceeded in the leachate pond sample. Leachate well sample LW-2 exceeded criteria for iron, total dissolved solids, and chloride (CH2M HILL 1991c). Also, the criterion for zinc was exceeded in well MW-4.

**Organic Constituents.** Water sampling completed by EMCON (1987) and the County of El Dorado (CH2M HILL 1991c) indicated the presence of organic compounds within the groundwater underlying the site and the mine drainage pond. The sampling of monitor well LW-2, located within the landfill, indicated the presence of 6 μg/l ethylbenzene and 3 μg/l 2-butanone in this well (CH2M HILL 1991c). The sampling of well UM-3, completed within the unweathered bedrock, has indicated the presence of chloroform and acetone in the respective concentrations of 4 μg/l and 22μg/l. However, these compounds may either be attributed to laboratory error or to the fact that the well has been vandalized in the past and the casing broken. A water sample collected from the mine drainage pond indicated the presence of 6 μg/l phenol and 15 μg/l 4-methylphenol.

With the exception of the Proposition 65 chloroform criterion and the state taste and odor criterion, water quality criteria for the detected organic compounds have not been exceeded. However, the data may indicate that leachate from the landfill may have impacted the groundwater underlying and immediately downgradient of the landfill.
Surface-water Quality

Inorganic Constituents. The surface water quality data show chemical patterns similar to the groundwater data. The chemistry of surface water sampling locations SW-2 through SW-6 and S-7 have been documented by EMCON (1987) and CH2M HILL (1991c). The pertinent data are presented in Figure 3B-5, Table 3B-2, and Table 3B-3.

The back groundwater quality can be best characterized by the chemical data obtained from SW-5, which is located near the southwest corner of the site and upgradient of the landfill. The water from this locale can be characterized as a calcium bicarbonate type of water much like the sample collected from UM-1. Surface water quality generally decreases towards the east as characterized by increasing total dissolved solids and chloride ion content (Tables 3B-2 and 3B-3).

Unsaturated Pore-water Quality

At this time, it appears that no data have been obtained to chemically characterize the soil-pore moisture from the vadose zone within and underlying the existing landfill as well as the proposed expansion (EMCON 1987). As previously discussed, much of the landfill is directly underlain by fractured meta-sedimentary rocks instead of soil. The extraction of pore fluids from fractured rock is generally not feasible using available field and laboratory fluid extraction techniques. Additionally, where soil and other granular materials exist, the water table tends to be very shallow and it is generally more efficient to utilize monitor wells to collect water quality samples under these circumstances.

2. Impacts

The preliminary evaluation of the hydrogeological data and issues associated with the regulatory requirements of a Class III waste management unit has identified potentially adverse and significant impacts related to surface and ground-water quality. The following presents an evaluation of these potential effects.
Leachate Control

Significant impacts to water quality could be anticipated in the expansion area due to the proximity of the bottom of the expansion area to groundwater. However, the County of El Dorado has proposed to install a leachate collection system to prevent impacts to groundwater quality. Additional concerns about depth of groundwater below the proposed and fill expansion will be addressed by the installation of a groundwater underdrain.

Leachate will be collected at the bottom of the landfilled waste by a gravel blanket covering an engineered soil liner (CH2M HILL 1991a). Perforated collection pipes will be set in the gravel layer that will utilize gravity to transport the leachate to the toe of the landfill. Mine shafts and tunnels will be plugged and drainage pipes will be installed within the tunnel plugs for the collection of leachate.

Collection of leachate from the existing landfill will be problematic since there is no liner or leachate collection system in place. The leachate collection system under consideration is a system that will collect seepage in areas of observed and potential landfill seeps and areas of groundwater discharge within the expansion area canyon (CH2M HILL 1991a). Additionally, water discharging from the Minerva Tunnel will be controlled by plugging the tunnel entrance and installing a drainage pipe within the plug to collect the discharge and transfer it to the leachate treatment system. It must be noted that the collection of all of the leachate from the existing landfill may not be possible given the systems under consideration (CH2M HILL 1991a). Since potential degradation of groundwater quality due to leachate migration of the existing landfill exists, this is considered to be a potentially significant impact.

Groundwater

Potentially adverse impacts are posed by the potential off-site migration of leachate-impacted groundwater. A number of inorganic constituents are present in the shallow groundwater underlying and immediately downgradient of the landfill at concentrations above the State of California drinking water standards. The problem is further compounded by the numerous shafts and mine workings present underlying the site, which may serve as potential conduits for groundwater
movement. The potential for degrading groundwater quality is considered to be a potentially adverse and significant impact.

However, CH₂M HILL (1991) has indicated that their evaluations indicate that high permeability avenues within deeper bedrock aquifer do not exist based on the available field evidence. No large fractures were ever observed at depth during boring installation, nor were fractures larger than 1/8 of an inch observed at the surface. Permeability data obtained from two wells completed within the deep bedrock appear to confirm this (CH₂M HILL 1991c). CH₂M HILL has interpreted the data to indicate that the shallow ground-water system dominates the site in terms of groundwater flow. Therefore, according to CH₂M HILL, the potential impacts to groundwater quality will be confined to the uppermost water-bearing zone. The tunnels and shafts are interpreted as being large, dead end void spaces.

**Surface Water**

Potential surface water impacts were identified on the basis of the standards identified in Title 23 Chapter 15 (see previous section, existing conditions). The potential surface water impacts include:

- Surface water quality degradation due to possible contact with the landfill.
- Erosion, slope failure, and washout which could cause stability problems within the landfill structure.
- Ponding, infiltration, inundation, and overtopping by surface water which could cause increased leachate production and increased landfill erosion.
- Downstream erosion due to increased surface water velocities.

None of the above listed potential impacts are significant due to the facility's proposed surface water drainage plans. The applicant has designed and will implement drainage systems that comply with Title 23, Chapter 15. The designs also include energy dissipation mechanisms and siltation basins.
Surface water from the closed, existing landfill has been characterized as noncontact water. This water will be routed in ditches/pipes designed for the 100 year, 24 hour storm. An energy dissipater will be installed at the end of the ditches/pipes and the water will then be conveyed to a sedimentation basin. After passing through the sedimentation basin, the water will be discharged directly to Martinez Creek (CH2M HILL 1991a).

Surface water from the expansion area will be classified as noncontact and contact water. Noncontact water from the upslope area to west and south of the expansion area will be collected in a perimeter ditch. The ditches will be designed for a 100-year, 24-hour storm. An energy dissipater will be constructed at the ditch outlets and water flow will be discharged into a sedimentation basin and released to Martinez Creek. Temporary ditches will be constructed to contain the contact water from the expansion area. This contact water will be discharged to the leachate lift pump station. The drainage system will be designed to transmit the 1,000-year, 24-hour storm.

3. Mitigation Measures

Leachate Control

As part of final design, documentation for the design of the groundwater monitoring program will be prepared by a qualified professional and implemented for both the existing landfill and the expansion area. The design rationale will account for the anisotropic nature of the aquifer, the potential for vertical hydraulic gradients, and the existing extent of groundwater degradation. The monitoring program will be capable of evaluating leachate migration over time and will be designed to ensure that groundwater users in the area are not impacted. In addition, existing monitor wells that are required to be abandoned as part of the expansion area construction will be replaced with a series of groundwater/leachate collection trenches which will be monitored to allow an equivalent level of protection. The implementation of this groundwater monitoring program will mitigate potential impacts caused by leachate migration to below a level of significance.
Groundwater Quality

As part of the final design, documentation for the design of the groundwater monitoring program will be prepared by a qualified professional and implemented to ensure that significant, additional groundwater degradation due to leachate migration from the landfill does not occur. The design will account for the anisotropic nature of the aquifer, the potential for vertical hydraulic gradients, and the existing extent of groundwater degradation. The system will be capable of evaluating the migration of contaminants in groundwater over time and will be designed to ensure that groundwater users in the area are not impacted.

Additionally, a contingency mitigation plan will also be developed that will be implemented if groundwater monitoring indicates that significant contaminant migration is occurring. The plan will be developed by a qualified professional and will specify the types of studies, mitigation measures, and time schedules that will be implemented in the event significant migration is identified. The plan will further identify notification procedures for the pertinent regulatory agencies. The implementation of a groundwater monitoring program and the development of a contingency plan will mitigate the impacts to water quality to below a level of significance.

Surface Water

The erosion and surface water quality impacts would be mitigated to a level below significance by the measures delineated in the project design.
C. **GEOLOGY/SOILS**

1. **Existing Conditions**

**Topography**

The existing and proposed expansion of the El Dorado Union Mine Disposal Site is situated in the Sierra Nevada physiographic province and located in the western foothill slopes of the Sierra Nevada Mountain range. Relief within El Dorado County ranges from a low of approximately 200 feet at the border with Sacramento County to a high of 10,881 feet atop Freel Peak in the Lake Tahoe Basin. The local topography is mountainous in nature and characterized by north-south trending uplands separated by incised stream valleys. Locally, elevations range from approximately 1,200 feet in the valley bottom to 2,012 on Logtown Ridge (Figure 3C-1).

The project site is located in the small valley formed by Martinez Creek, a tributary of the Cosumnes River. The landfill is situated in a small, southeast facing canyon that is a tributary to Martinez Creek. The eastern edge of the existing landfill is located about 500 feet west of the Martinez Creek channel.

**Stratigraphy**

**Regional Stratigraphy.** Several geologic formations are exposed within a 10-mile radius of the Union Mine Disposal Site. The following discussion is a brief description of the lithologic units of the region and is a modification of the work presented by Wagner et al. (1981).

The site is underlain by Late Jurassic metasedimentary rocks of the Mariposa Formation. This formation contains foliated slate and phyllite with metamorphosed graywacke and conglomerate interbeds.

Several different formations of metasedimentary and volcanic rocks exist west of the site. These include the Mariposa and the Logtown Ridge Formations, and comprise the Jurassic-age Mother Lode Belt in this area which has been intruded by more recent Plutonic rocks. The metasedimentary rocks of the Mariposa Formation
most generally occupy a melange terrain which consists of slate, graywacke, conglomerate, pebbly mudstone, some pyroclastic rocks, quartzite, and chert. The volcanic rocks are Jurassic in age and include the Copper Hill Volcanics, the Logtown Ridge Formation and some metavolcanics. These formations can be summarized as consisting of metamorphosed mafic pyroclastic rocks, breccias, and flow rocks.

Regional geology is much different in the area east of the Union Mine Landfill. A dramatic change in lithology occurs at the eastern most trace of the Melones Fault Zone, a large north-northwest trending feature. The predominant formation east of the fault is the Calaveras Complex, which contains chert, argillite and slate, and is Paleozoic in age. In addition to these units, there are large intrusions of Mesozoic granitic rocks which are predominantly granite and granodiorite with local outcrops of both gabbroic and ultramatic rocks.

Both the metamorphic rocks and the intrusives are covered in some areas by Tertiary sediments including: the Mehrten Formation, composed of andesitic conglomerate, sandstone, and breccia; and the Valley Springs Formation, which consists of rhyolitic tuff and sedimentary rocks.

Site Stratigraphy. The following lithologic descriptions of site stratigraphy are based on field work performed by EMCON Associates (1987). The Union Mine Disposal Site is underlain by the Mariposa Formation (Figure 3C-2). The Mariposa Formation consists of dark-gray, foliated slate and phyllite with interbeds of metagraywacke and metaconglomerate. The bedding of unweathered bedrock ranges from less than an inch to several inches in thickness. A seismic refraction geophysical study performed by EMCON Associates (1985) showed that bedrock weathering occurs to a depth ranging from 19 to 25 feet below ground surface. Lithologic descriptions of boreholes drilled at the site during the Solid Waste Assessment Test (SWAT) investigation (EMCON Associates 1987) confirm that a weathered zone exists between 20 to 30 feet below ground surface. Rocks in this weathered zone are characterized as being very friable and intensely fractured.

Unweathered bedrock is also intensely fractured; fractures of both weathered and unweathered bedrock are commonly filled with quartz and clay, but may also be open. The ground surface at the margins of the site is characterized by large areas
of exposed weathered bedrock; when soil is present, it is generally thin and poorly
developed.

Regional Geologic Structure

The structural geology of the region is strongly influenced by a series of large
sub-parallel, generally north-south trending faults. The principle faults zones in the
region include the Bear Mountains Fault Zone and the Melones Fault Zone. The
Bear Mountains and Melones Fault Zones are approximately 100 miles long and
220 miles long, respectively, and each zone contains several main fault traces.
Map interpretation indicates that fault movement postdates Late Jurassic deposition;
however, there is no evidence which indicates large scale Holocene faulting.

Numerous smaller faults and associated folding occur locally throughout the region.
Mesozoic sedimentary, metasedimentary, and volcanic formations of the Mother
Lode Belt generally have a north to north-northwest strike. Localized orientation of
bedding of the Mariposa Formation at the Union Mine Landfill has a north-
northeast strike and steep western dip.

Local Geologic Structure

The local geologic structure has been highly influenced by the Melones Fault Zone.
A major trace of the Melones Fault Zone exists less than 3,000 feet east of the
present landfill. Fracture patterns at the site are evidence of a previous tectonic
history. Orientation data on jointed surfaces of the Mariposa Formation collected
by EMCON Associates (1987) indicate several fracture patterns. The most
dominant fracture set has an east-west strike and dips steeply (70-90°) north or
south. Another joint set strikes east-west with a shallow to intermediate southern
dip. Additional jointed surfaces have northeast-southwest and northwest-southeast
strikes with dips ranging from 25 to 70°.

Preliminary data indicate that the distance between fractures ranges from 1 inch to
1 foot. The apertures of fractures generally range from 0-1/8 inch (EMCON
Associates 1987). Several larger fractures are filled with quartz veins which occur
along shear zones most likely attributed to the Melones Fault. Major joint systems
and hydrothermal veins are also commonly filled with quartz. Well developed
foliation is parallel to sub-parallel to bedding; both bedding and foliation strike about N10E and dip steeply (85°) to the west (McLaren 1982). The shear zones commonly parallel the strike of bedding and dip steeply (70-85°) to the east (McLaren 1982).

**Hydrogeology**

**Regional Hydrogeology.** The regional hydrogeology is dominated by a large fractured rock aquifer system. This system is contained within the metamorphic and plutonic units present in the area south of the City of El Dorado. The Calaveras Complex, Logtown Ridge Formation, Mariposa Formation, and Mesozoic-age granitic rocks all comprise the local metamorphic and plutonic fractured rock system.

Ground-water recharge in this region occurs primarily from direct infiltration of precipitation, artificial recharge from localized sources of leachate, and losses from streams. For more details concerning regional hydrogeology, the reader is directed to Section 3B, Water Resources, of this EIR.

**Site Hydrogeology.** Groundwater underlying the project site occurs primarily within the fractured and/or weathered portions of the metamorphosed Mariposa Formation. Additionally, groundwater occurs within the shafts, stopes, and tunnels locally present in the Mariposa Formation that are associated with previous mining activities. Minor amounts of groundwater occur within the alluvial and artificial fill located in the southern portion of the site as evidenced by the springs identified in this area. Groundwater flow directions in the vicinity of the project site are generally towards the east or east-southeast with an apparent horizontal gradient of approximately 0.07 ft/ft. For more details concerning the site hydrogeology, the reader is directed to Section 3B, Water Resources, of this EIR.

**Soils**

Soils underlying the Union Mine Landfill and the area of the proposed expansion consist of three principal units as shown in Figure 3C-3. These are Metamorphic Rock Land (MmF), Whiterock gravelly silt loam (WhE), and Placer Diggings (PrD). Soil properties are summarized in Table 3.C-1.
Table 3C-1

PROPERTIES OF SOILS UNDERLYING UNION MINE LANDFILL

<table>
<thead>
<tr>
<th>Soil Name</th>
<th>Drainage</th>
<th>Slopes</th>
<th>Permeability</th>
<th>Surface Runoff</th>
<th>Erosion Hazard</th>
<th>Shrink-swell Potential</th>
<th>Corrosivity</th>
<th>USCS</th>
<th>SCS Hydrologic Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metamorphic Rock Land</td>
<td>excessively drained</td>
<td>steep to very steep</td>
<td>ND</td>
<td>very rapid</td>
<td>slight to moderate</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Whiterock Gravelly Silt Loam</td>
<td>excessively drained</td>
<td>3 to 50%</td>
<td>moderately rapid to very rapid</td>
<td>medium to high</td>
<td>low</td>
<td>low</td>
<td>SM</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Placer Diggins drained</td>
<td>well to excessively drained</td>
<td>3 to 70%</td>
<td>moderately rapid to very rapid</td>
<td>slow to rapid</td>
<td>slight to very high</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
</tr>
</tbody>
</table>

ND = Parameter too variable, Not Determined.
Metamorphic Rock Land is the most widespread soil/land type within the landfill site, and is present in the northeast portion of the existing facility and the southern portion of the proposed expansion area. This unit consists of areas of highly resistant schist and slate formations, in which 50 to 90 percent of the ground surface is comprised of rock outcrop and stones. The remaining surface is characterized by a thin mantle of soil material. This land type is mainly steep to very steep and is excessively drained. Surface runoff is very rapid and the erosion hazard is slight to moderate. Shrink-swell and corrosive properties, as well as physical characteristics (grain size, plasticity, soil moisture, etc.) are too variable in these soils to be estimated.

Whiterock Gravelly Silt Loam is present in the western portion of the existing facility and proposed expansion area. This unit is comprised of excessively drained soils which are underlain by hard slate, with as much as 2 percent of the surface area consisting of slate outcrops. Soils have been classified according to the USCS as SM, and by the SCS as Hydrologic Soil Group D. Slopes range from 3 to 50 percent and permeability is moderate. Surface runoff is medium to rapid and the erosion hazard is slight to high. Shrink-swell potential and the risk of corrosion to uncoated steel are both low.

Placer Diggings are present along the southwest-northeast trending tributary to Martinez Creek in the proposed expansion area, and within an adjacent northwest-southeast drainage feature in the western portion of the proposed expansion area. This unit consists of stony, cobbly, and gravelly material which commonly occurs in beds of creeks and streams, or in areas which have undergone placer mining. These soils are generally well drained to excessively drained, although areas in stream beds tend to be flooded in the rainy season. Slopes range from 3 to 70 percent and permeability is moderately rapid to very slow. Runoff is slow to rapid, and the erosion hazard is slight to very high. Shrink-swell and corrosive properties, as well as physical properties are too variable in these soils to be estimated.

Soils located around the perimeter of the existing landfill generally consist of a patchy, very thin veneer, and metamorphic bedrock is exposed in a large part of the area.
Geologic Hazards

Seismicity. The Provisional Fault Map of California does not indicate any faults within El Dorado County with recognized Quaternary (within the last 3 million years) movement (El Dorado County Seismic Safety and Safety Elements (SSSE) 1979). In addition, El Dorado County does not contain any Alquist-Priolo special studies zones. These zones delineate areas of active fault traces and are established by the California Division of Mines and Geology (CDMG) (pursuant to Public Resources Code 2621 et seq.) to prohibit the location of certain facilities (e.g. structures for human occupancy) across such faults (CDMG 1985a).

The project site is located approximately 1/2 mile west of the Melones Fault. No recorded earthquakes have occurred along this fault within El Dorado County (CDMG 1985b). However the SSSE (1979) cites concern regarding the potential for activity and refers to an ongoing study by the U.S. Army Corps of Engineers and the U.S. Department of the Interior, Bureau of Reclamation. This study is described as an in-depth investigation of all significant faults on the western slope of El Dorado County. At the time of this report, information regarding this study was not available through either the Army Corps or Bureau of Reclamation libraries. Therefore, the potential for seismic activity along this fault has not been definitively established at this time.

Surface Rupture. No evidence of fault movement within the project site has been identified in existing studies (EMCON 1987). In addition, due to the lack of demonstrated seismic activity in the vicinity, the potential for surface fault movement within the landfill expansion area appears to be low.

Ground Acceleration. Since no potential for movement along the Melones Fault has been indicated by existing studies, ground acceleration stemming from activity on this fault cannot be estimated. Moreover, the Maximum Credible Rock Acceleration Map (Figure 3C-4) (Greensfelder 1974) does not indicate rock acceleration values for western slope faults because of their lack of demonstrated Quaternary movement.
Liquefaction. No significant potential effects related to liquefaction are anticipated for project facilities due to the low probability of significant ground acceleration in the area of the project site.

Slope Stability. Slope stability may be influenced by a number of factors including topography, bedrock and soil types, bedrock orientation, precipitation, vegetation, seismic shaking, and human-induced topographic alteration. The SSSE (1979) identifies the vicinity of the project site as having a moderate potential for landslides. However, according to CH2M HILL, no evidence of slope instability or slope failure were observed in the area of the landfill during site reconnaissance or examination of aerial photos (CH2M HILL letter report, Appendix G).

Mine Workings. Numerous mine shafts remain from previous mining operations beneath the project site. According to CH2M HILL, there is no evidence of subsidence or cracked ground on the hillsides in which tunnels have been excavated. Moreover, prior to construction of the landfill, concrete plugs will be placed at the openings of all tunnels located in the expansion area as described in the "Closure and Postclosure Maintenance Plan". These openings constitute the weakest portion of the tunnels, since the thickness of the overlying strata increases with distance into the tunnels. Therefore, CH2M HILL considers the potential for cave-in of any tunnels affected by landfill expansion to be extremely low (CH2M HILL letter report, Appendix G).

2. Impacts

Topography

No potential impacts due to topography are anticipated.

Stratigraphy

No significant impacts are anticipated.

Potential groundwater problems could develop by leachate migration via both primary and secondary permeability. Stratigraphy at the site is restricted to the Mariposa Formation, well-indurated metasedimentary rocks, and primary
permeability is expected to be relatively low. However, this formation is intensely fractured in some areas; therefore, secondary permeability is expected to be relatively high, which could result in an adverse impact on groundwater sources in the event of leachate migration. This issue is specifically addressed in the Water Resources Section of this EIR.

**Geologic Structure**

Fracture sets and shear zones associated with the Melones Fault Zone and other local structural features pose the greatest potential for migration of contamination from the landfill area. Unfilled fractures or fractures containing easily erodible materials could provide a pathway for migration of contaminated groundwater. Furthermore, the intensely fractured weathered zone of the Mariposa Formation combined with the underlying network of mine shafts and tunnels could accelerate leachate migration. Fluid migration could also occur along bedding planes of the metasedimentary rocks.

**Hydrogeology**

Impacts related to hydrogeology are discussed in the Water Resources Section of this EIR.

**Soils**

**Erosion.** Erosion hazard within the most widespread soil/land type, Metamorphic Rock Land, is slight to moderate, while that for Whiterock Gravelly Silt Loam and Placer Diggings ranges from slight to very high. Therefore, the potential exists for significant, adverse impacts due to increased erosion during construction or operation of the landfill in these areas, especially on steeper slopes or near stream channels.

**Shrink-swell.** Shrink-swell potential is low within the Whiterock Gravelly Silt Loam. However, soil properties are too variable to estimate this parameter within the Metamorphic Rock Land and Placer Diggings soil types. Therefore, the potential may exist in these deposits for impacts due to shrink-swell effects on

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landfill facilities. Significant expansive behavior can adversely affect the integrity of foundations, fill slopes, and underground facilities.

Reactive Soils. The potential for reactive soils within Metamorphic Rock Land and Placer Diggings is too variable to estimate. Therefore, the potential exists for significant adverse impacts to landfill facilities such as subsurface pipelines, foundations, or leachate collection systems.

Geologic Hazards

Seismicity. Existing studies do not indicate the potential for seismic impacts to the proposed landfill expansion. Seismic impacts are, therefore, considered to be below a level of significance at this time.

Surface Rupture. No evidence of surface rupture is cited in existing studies. Therefore, the potential for significant impacts to the proposed landfill facility are considered negligible at this time.

Liquefaction. Due to the low potential for seismic activity and proximity of bedrock to ground surface, impacts caused by liquefaction are considered to be below a level of significance.

Slope Stability. Impacts due to slope stability are considered to be below a level of significance.

Mine Workings. Impacts due to mine workings are considered to be below a level of significance

3. Mitigation Measures

Stratigraphy

No mitigation measures are required.
Soils

_Erosion_. The potential for erosion in the area of the proposed landfill will be investigated by a qualified geologic consultant. All recommendations included in the consultant's report shall be incorporated into final project design. Potential mitigation measures may include establishing maximum slope grades and/or the use of stabilizing materials or buttresses. During the construction phase, interim measures such as temporary buffer zones (e.g., sandbagging) may be used. During the operational phase, measures including maintenance of vegetative cover and vegetated buffer zones should be employed. Use of these measures will reduce the impacts to below a level of significance.

_Shrink-swell_. During final design, site specific soil engineering tests will be performed by a qualified geologic consultant on soils of Metamorphic Rock Land and Placer Diggings to determine the degree of expansivity and the appropriate uses of these soils in the proposed project design. Unsuitable base materials shall be overexcavated and replaced with approved and properly compacted structural fill. Implementation of these measures will reduce impacts to below a level of significance.

_Reactive Soils_. During final design, the potential for reactive soils shall be investigated by a qualified geologic consultant. If reactive soils are present, the use of non-steel or coated (usually polyethylene encased) steel conduits, sulfate-resistant cement, or other protective materials will reduce impacts to below a level of significance.

_Geologic Hazards_

_Surface Faulting_. No mitigation measures are required, since impacts are considered to be below a level of significance.

_Seismicity_. No mitigation measures are required, since impacts are considered to be below a level of significance.

_Liquefaction_. No mitigation measures are required, since impacts are considered to be below a level of significance.

3.C-16
Slope Stability. No mitigation measures are required, since impacts are considered to be below a level of significance.

Mine Workings. Measures proposed by El Dorado County in the "Closure and Postclosure Maintenance Plan", including installation of concrete plugs at mine tunnel openings, are considered adequate to mitigate impacts to below a level of significance.
D. Air Quality

1. Existing Conditions

Climate and Meteorology

El Dorado County extends from the border of the Sacramento Valley (500 feet above MSL) eastward to the summit of the Sierra Nevada Range near Lake Tahoe (9,000 feet above MSL). The elevation between these two points increases at a gradual and nearly uniform rate; these elevation differences directly affect the county's climate.

The Union Mine Disposal Site is located approximately 7 miles south of the community of Placerville (1,890 feet above MSL), near the county’s center. Placerville is situated within a sheltered valley that experiences a cool winter climate. It is prone to cold air drainage and thus exhibits the coolest temperatures in the county. The mean annual temperature at Placerville is approximately 57°F. Average daily temperatures range from a low of 36°F in January to a high of 94°F in July (Kazama 1980).

While precipitation amounts and frequencies in El Dorado County generally increase with elevation, they are also influenced by the orientation of the Sierra Nevada terrain relative to the directional movement of incoming storms. Snow is a fairly common winter occurrence at Placerville, where the average annual snowfall is 10 inches. Total precipitation averages 34–35 inches annually.

Regional wind direction varies seasonally. The prevailing wind direction at the existing Union Mine Disposal Site is from the south to southwest during the summer, and from the south to southeast in winter. Wind speed generally increases with elevation, and terrain effects can be substantial. Wind speed at Placerville averages 5 to 7 miles per hour (Kazama 1980).

Regulatory Framework

Federal and state regulatory agencies have established the maximum levels of air pollution allowed to avoid adverse human health and welfare effects. The
Federal 5 Clean Air Act established National Ambient Air Quality Standards (NAAQS), and the California Air Resources Board developed more stringent California State ambient air quality standards. The federal and state standards are presented in Table 3D-1. California standards, other than carbon monoxide (CO), sulfur dioxide (SO₂, 1 hour), nitrogen dioxide (NO₂) and particulate matter (PM₁₀), are values that may not be either equaled or exceeded. The CO, SO₂ (1 hour), NO₂, and PM₁₀ standards are not to be exceeded. National standards other than ozone (O₃), are not to be exceeded more than once per year. Compliance with the federal average O₃ standard is achieved when the number of days in a year with maximum hourly average concentrations above the standard is zero or one.

Congress amended the Clean Air Act in 1977 to require the identification of areas that did not meet the NAAQS. A non-attainment plan, showing how the standards would be met by 1982, was required for each area failing to meet the standard. Because some areas in California were not able to attain the standards by 1982, the State was granted an extension to 1987. This deadline has also been extended. The California Clean Air Act, effective January 1989, imposes additional air quality control requirements as well, including annual reductions in ozone precursor emissions of 5 percent. As part of the Act, local air pollution control districts in violation of air quality standards are to prepare plans to improve air quality within two years. The California Air Resources Board will review and approve the plans and will coordinate the statewide pollution reduction effort.

The Lake Tahoe Air Basin has specific local standards for CO and visibility-reducing particles which differ from the California standard concentrations. Instead of applying the state eight-hour CO concentration of 9.0 ppm, the Lake Tahoe Air Basin allows only 6.0 ppm. The Lake Tahoe standard for visibility-reducing particles is "in sufficient amount to reduce the prevailing visibility to less than 30 miles when the relative humidity is less than 70 percent."

El Dorado County lies within the Mountain Counties Air Basin. Three Air Pollution Control Districts within the Mountain Counties Air Basin are working jointly to develop the plan that will affect El Dorado County. These are the Placer County, Northern Sierra and El Dorado County Air Pollution Control Districts. A Draft Mountain Counties Air Basin California Clean Air Act Work Plan was submitted in November 1989 to the California Air Resources Board for review.
<table>
<thead>
<tr>
<th>POLLUTANT</th>
<th>AVERAGING TIME</th>
<th>CALIFORNIA STANDARDS (1)</th>
<th>NATIONAL STANDARDS (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Concentration</td>
<td>Method</td>
<td>Primary</td>
</tr>
<tr>
<td>Ozone</td>
<td>1 Hour</td>
<td>0.09 ppm (180 µg/m³)</td>
<td>Ultraviolet Photometry</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>8 Hour 9.0 ppm (10 mg/m³)</td>
<td>Nondispersive Infrared Spectroscopy</td>
<td>9.0 ppm (10 mg/m³)</td>
</tr>
<tr>
<td></td>
<td>1 Hour 20 ppm (23 mg/m³)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Nitrogen Dioxide</td>
<td>Annual Average</td>
<td>-</td>
<td>Gas Phase Chemiluminescence</td>
</tr>
<tr>
<td></td>
<td>1 Hour 0.25 ppm (470 µg/m³)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sulfur Dioxide</td>
<td>Annual Average</td>
<td>0.05 ppm (131 µg/m³)</td>
<td>Ultraviolet Fluorescence</td>
</tr>
<tr>
<td></td>
<td>24 Hour 0.25 ppm (655 µg/m³)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Suspended Particulate</td>
<td>Annual Geometric Mean PM-10 30 µg/m³</td>
<td>Size Selective High Volume Sampler and Gravimetric Analysis</td>
<td>PM-10 (3) 50 µg/m³</td>
</tr>
<tr>
<td>Matter</td>
<td>24 Hour PM-10 50 µg/m³</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sulfates</td>
<td>24 Hour 25 µg/m³</td>
<td>-</td>
<td>Turbidimetric Barium Sulfate</td>
</tr>
<tr>
<td>Lead</td>
<td>30 Day Average 1.5 µg/m³</td>
<td>-</td>
<td>Atomic Absorption</td>
</tr>
<tr>
<td></td>
<td>Calendar Quarter</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hydrogen Sulfide</td>
<td>1 Hour 0.03 ppm (42 µg/m³)</td>
<td>Cadmium Hydroxide Stractan</td>
<td>-</td>
</tr>
<tr>
<td>Vinyl Chloride (chloroethene)</td>
<td>24 Hour 0.010 ppm (26 µg/m³)</td>
<td>Tedlar Bag Collection, Gas Chromatography</td>
<td>-</td>
</tr>
<tr>
<td>Visibility Reducing</td>
<td>1 Observation</td>
<td>In sufficient amount to reduce the prevailing visibility to less than 10 miles when the relative humidity is less than 70%</td>
<td>-</td>
</tr>
</tbody>
</table>

ppm - parts per million
µg/m³ - micrograms per cubic meter
mg/m³ - milligrams per cubic meter

(1) CO, SO₂ (1 Hour), NO₂, O₃ and PM-10 Standards are not to be exceeded. All other Standards are not to be equaled or exceeded.
(2) Not to be exceeded more than once a year.
(3) Annual arithmetic mean
The draft work plan defines the schedule by which the three districts will obtain, review and present air quality data and measures for improvement for a final document targeted for completion in June 1991 (Sedway Cooke Associates 1990). This final plan will include chapters on budgetary requirements, air quality monitoring, emissions inventory, growth projections, estimates of transport contributions, emissions reductions, control strategy, and development and attainment projections.

**Ambient Air Quality**

Very limited ambient air quality data are available for El Dorado County. The El Dorado Air Pollution Control District (EDAPCD) maintains a monitoring station in Placerville that only monitors for PM$_{10}$. Data from a station (on loan from the state) in Shingle Springs that monitors for O$_3$ and CO has been made available to the EDAPCD. According to EDAPCD (Thompson 1991), El Dorado County is designated by the EPA as non-attainment for O$_3$, and the South Lake Tahoe area is designated non-attainment for O$_3$ and CO. For all other criteria pollutants, El Dorado is classified either attainment or unclassified. The Baseline Conditions report prepared for the El Dorado County 2010 General Plan (Sedway Cook Associates 1990) states that El Dorado County is unclassified for CO, primarily because it is heavily impacted by the transport of pollution produced in the Sacramento and San Francisco metropolitan areas.

**Landfill Gas**

An air quality evaluation test was conducted at the existing El Dorado County Landfill in 1987 (Air Resources Board 1987). The primary purpose of this test was to determine ambient air concentrations of specific toxic air contaminants at and near the existing landfill site. Using 24-hour ambient air sampling, the study determined that detectable amounts of vinyl chloride, methylene chloride, chloroform, methylchloroform, carbon tetrachloride, trichlorethylene, ethylene dibromide (EDB), ethylene dichloride (EDC), perchloroethylene, and benzene were present locally in the ambient air.

Higher concentrations of these pollutants were recorded in the landfill gas (LFG). The vinyl chloride in the LFG ranged from 850 ppb to 4,500 ppb, in individual
samples; these levels are substantially higher than the corresponding ambient air concentration. Concentrations of methylene chloride ranged from 190 ppb to 35,000 ppb. The concentrations of carbon tetrachloride, EDB and EDC were below detection limits. Benzene was determined to be below the required minimum detection limit (500 ppb), except for one well that had a concentration of 920 ppb on the first day of sampling. The remaining compounds were several orders of magnitude above minimum detection limits (Air Resources Board 1987). Table 3D-2 lists average values obtained from the onsite measurements.

2. Impacts

The major air quality concern during both the construction and operational phases of a landfill is dust generation. In addition, potential atmospheric impacts from landfill facilities include odors, litter, and gaseous emissions from organic matter decay processes.

According to the site closure and expansion project time line (refer to Figure 2-3), it appears that the most significant air quality impacts will occur between 1994 and 1995. During this period, the site clearing activities for the expansion area will overlap the closure activities for the southern 16 acres while operational activities continue.

Construciton Impacts

The proposed expansion will entail installation of an additional operation area of 14 acres south of the existing fill area and the construction of a leachate/septage treatment plant. The service life of the existing landfill plus the expansion area is expected to provide disposal capacity for approximately 22.6 years. Construction activities will include: 1) grubbing and grading the expansion area; 2) constructing expansion area groundwater under drain; 3) placing of a composite liner; 4) installing a leachate collection system; 5) constructing leachate trenches, water retention basins, and the treatment plant; 6) rerouting Union Mine Road; and 7) closure activities.

During the construction and earth moving activities associated with the expansion, short-term emissions of several criteria pollutants will occur. Emissions of NO₅,
Table 3D-2

AVERAGE CONCENTRATION (ppb) OF COMPOUNDS IN AMBIENT AIR AND LANDFILL AT THE EL DORADO LANDFILL

<table>
<thead>
<tr>
<th>Compound</th>
<th>Ambient Air(^1)</th>
<th>Landfill Gas(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vinyl chloride</td>
<td>&lt;1</td>
<td>2,235</td>
</tr>
<tr>
<td>Methylene chloride</td>
<td>22</td>
<td>12,882(^3)</td>
</tr>
<tr>
<td>Ethylene dichloride</td>
<td>1</td>
<td>&lt;950(^4)</td>
</tr>
<tr>
<td>Chloroform</td>
<td>NA(^5)</td>
<td>38</td>
</tr>
<tr>
<td>Methyl Chloroform</td>
<td>3.7</td>
<td>2,809</td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>0.15</td>
<td>&lt;4</td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>0.040</td>
<td>900</td>
</tr>
<tr>
<td>Ethylene dibromide</td>
<td>0.05</td>
<td>&lt;27</td>
</tr>
<tr>
<td>Perchloroethylene</td>
<td>0.33</td>
<td>233</td>
</tr>
<tr>
<td>Benzene</td>
<td>2.3</td>
<td>328(^6)</td>
</tr>
</tbody>
</table>

SOURCE: Air Resources Board (1987)

1 Average of 9 samples collected over 3 days (ppb)
2 Average of 14 samples collected over 3 days and analyzed by two different laboratories (ppb)
3 Five-sample average on May 11, 1987
4 10-sample average between May 11 and 12, 1987
5 Not included because of coelution with Freon
6 12-sample average
CO, SO₂, particulate matter (TSP and PM₁₀) and total hydrocarbons will be generated from combustion of fuels by construction equipment. Besides combustion pollutants, fugitive dust will be generated by soil excavation, heavy-vehicle movement on unpaved surfaces, and exposure of unstabilized dry soil to the wind.

U.S. EPA Document AP-42 (1985), Section 11.2.4, provides an approximate emission factor for heavy construction operations of 1.2 tons of particulate matter less than 30 micrometers in diameter per acre of construction per month of activity. Although the EPA’s dust emission factor was not developed for the specific types of construction operations associated with the proposed project, it does provide a rough order of magnitude estimate of the dust generation that may occur. Because of the approximate nature of the emissions estimate, the following assessment of probable fugitive dust impacts should be viewed as a broad estimate rather than a precise prediction.

During excavation operations, water trucks will spray adequate water on soil-covered work areas, excavation areas and stockpile areas to control fugitive dust. The EPA estimates that an effective watering program (e.g., twice daily with complete coverage) can reduce fugitive dust emissions by up to 50 percent. Based on the construction schedule provided by the applicant, worst-case fugitive dust emissions can be estimated as follows: 14 acres x 1.2 tons/acre/month x 12 months/year x 0.5 control factor = 101 tons/year fugitive dust. Average daily emissions are predicted to be 0.28 tons/day or 562 lb/day of TSP. Assuming 80 percent of the total dust generated by construction activities will occur in the form of PM₁₀, an estimate of 450 lb of PM₁₀ per day was calculated. This calculation conservatively assumes that all 14 acres are excavated simultaneously, and that an effective watering program is in place. There are currently no onsite wind or particulate data that can be used to quantify the frequency of dust-raising events nor the amount of dust generated by the present facility that will reach inhabited areas. Although dusty conditions will occur onsite for the proposed expansion during high wind conditions, the potential impact on regional air quality is not considered significant. In addition, the elevated terrain surrounding the landfill will help confine the fugitive dust to the immediate project area.
Operational Impacts

Potential air quality degradation resulting from the operational phase of the proposed project will result from both stationary and mobile sources. Stationary source pollutant emissions include volatile gases from the landfill and the septage treatment facility, which will be used for disposal of trucked septic tank contents and the landfill leachate. The treatment plant will contain three aerated lagoons (uncovered) measuring 110 feet by 250 feet by 8 feet and four settling ponds (50 feet by 50 feet by 8 feet). The primary emissions from the lagoons and settling ponds will be hydrogen sulfide, ammonia, and volatile and semi-volatile organic compounds (VOC). Some of these compounds are considered to be toxic to humans. After design of the treatment plant has been completed, it will be subject to subsequent environmental review, including an analysis of the effect of the treatment plant’s operation on ambient air quality. The EPA Publication, Compiling Air Toxics Emissions Inventories, lists ammonia, arsenic, cadmium, chromium, copper, hydrogen chloride, lead, mercury, nickel and zinc as potential constituents in sewage systems. Corbitt (1990) lists typical landfill leachate composition. Metals comprise the dominant category of toxic substances found in leachate.

No information is currently available on the quantities or compositions of the landfill leachate and sewage material that will be routed to the proposed septage treatment facility. Most of the metallic and organic materials in this waste will be removed in settling ponds, and will not enter the atmosphere through evaporation. Because of the low odor detection thresholds of the organic compounds found in both sewage and landfill leachate, localized odor impacts can be expected to occur on the project property and, occasionally, to within a distance of one-half mile or so. This is considered an adverse but not significant impact.

The expansion of the landfill will result in no net increase in combustion emissions or fugitive dust emissions from operational vehicles. The same vehicles and equipment presently operating at the El Dorado landfill will operate at the expansion area; no additional operating equipment is anticipated. Mobile sources include waste hauling trucks, heavy-duty landfill equipment (e.g., scrapers, compactors, and bulldozers), water trucks, and other light-duty trucks. There will also be an increase in vehicular traffic (5–7 trucks/day hauling septage) around the proposed project. This very small addition to current project-related traffic will not produce a
<table>
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</table>

<sup>a</sup> P=Propane, D=Diesel, G=Gasoline, NA=Not Available
<sup>b</sup> Emissions from bulldozers were calculated from emission factors specified in AP-42 Table II-7.1 (1985) for track type loaders. Each bulldozer was assumed to operate 10 hours per day.
<sup>c</sup> Emissions from the compactors were calculated from emission factors specified in AP-42 Table 3.3-1 (1985). Each compactor was assumed to operate 10 hours per day.
<sup>d</sup> Emissions from the scrapers were calculated from the emission factors specified in AP-42 Table II-7.1 (1985) for scrapers. Each scraper was assumed to operate 10 hours per day.
<sup>e</sup> Emissions from the water trucks were calculated from emission factors specified in AP-42 Table II-7.1 (1985) for off-highway vehicles. Each water truck was assumed to be operating 10 hours per day.
<sup>f</sup> Emissions from the grader were calculated from emission factors specified in AP-42 Table II-7.1 for motor graders. Each grader was assumed to operate 10 hours per day.
<sup>g</sup> Emissions from the pickup trucks were estimated based on emission factors specified in AP-42 Table 1.2.1B (1985) for low altitude, light duty, gasoline powered trucks. The pickup was assumed to be 1987+ model having an average mileage of 100,000. Each pickup was assumed to travel 10 miles during a working day.
<sup>h</sup> Emissions from the waste hauling truck were calculated from emission factors specified in AP-42 Table II-7.1 (1985) for off-highway trucks. Each truck was assumed to operate approximately 0.5 hours per visit. During peak hours, approximately 14 trucks per hour would be present at the site with a total of 60 per day.
<sup>i</sup> Emissions from the septage truck were calculated from emission factors specified in AP-42 Table II-7.1 (1985) for off-highway trucks. Each truck was assumed to operate approximately 0.5 hours per visit. During peak hours, approximately 1 trucks per hour would be present at the site for a total of 5 per day.
<sup>j</sup> Additional emissions of the contaminants listed in this table will likely occur at the aerators, lagoons and holding ponds. These emissions will be small but cannot be quantified based on available data.
significant air quality impact. Table 3D-3 lists the operational equipment that is presently used at the landfill and proposed for continued use after the expansion. The emission estimates are derived from EPA AP-42 (1985) emission factors and assumed operations 10 hr/day and 359 day/yr for all equipment.

In addition to the combustion pollutants, fugitive dust will be generated by vehicle movement, material transfer activities, and wind erosion of the working face and stockpile. Because the presently active landfill areas will be closed (i.e., capped with four feet of clean cover and revegetated), no incremental increase in fugitive dust will be generated over the long term. Another potential source of fugitive dust emission is the stockpiling of soils for use in the daily cover material over the working face. Expansion of the landfill is not expected to increase the area of the stockpiled material above present levels. It is assumed that the same operating equipment will also be used for the existing landfill closure activities, so that the associated emissions would be included in the maximum hourly and maximum daily emissions shown in Table 3D-3.

In addition to the emissions described above, LFG (mostly methane gas) is produced in landfills by the decomposition of organic refuse. Over time, this gas can migrate to the surface of the landfill and be released to the atmosphere, if not collected. Landfill gas emissions can be controlled in two ways. Operational practices, including use of sufficient cover and repairing cracks, fissures, and settling, can minimize surface emissions. Gas emissions also can be controlled by the installation of a landfill gas extraction system. The collected gas is a renewable resource. When recovered by a gas extraction system, it can either be sold for energy use, or flared to the atmosphere for disposal.

There is presently no LFG extraction system at the El Dorado Landfill. However, a LFG monitoring and control system may be developed at the Union Mine Disposal Site following the closure of the existing area and may eventually include the expansion area. Previous work indicates that very little LFG is currently being generated at the site. According to the Air Resource Board's "Suggested Control Measures for Landfill Gas Emissions and Landfill Gas Guidelines," landfills with less than 0.5 million tons of refuse in-place, or landfills that do not emit concentrations of LFG-generated methane in concentrations greater than 500 ppm, are exempt from the requirement for an extraction system.
Mitigation Measures

Although construction and operational emissions from the proposed project will create only very minor incremental impacts immediately downwind of the facility, such emissions nevertheless will contribute incrementally to the existing regional ozone and particulate problem. The following paragraphs discuss recommended mitigation measures.

Any increase in NO\textsubscript{X} or hydrocarbon emissions will contribute to ozone formation, and El Dorado County is presently classified as non-attainment for this pollutant. To minimize the impacts from the mobile sources, the following mitigation measures should be applied:

- Use of catalytic reduction for all gasoline-powered vehicles;
- Use of fuel injection timing retard for diesel powered equipment; and,
- Minimize concurrent construction/closure/operation activities.

According to the Baseline Conditions Report prepared for the El Dorado County 2010 General Plan, (Sedway and Cooke Associates 1990), El Dorado was non-attainment for PM\textsubscript{10} in 1990. Therefore, the EDAPCD may require the facility to implement additional mitigation measures to control fugitive dust emissions from the proposed project. For example, to further reduce fugitive dust emissions from the mobile sources during the operation of the landfill, the access roads should be kept in good repair with adequate drainage to prevent soil from washing onto the road during storms. In addition, a gravel surface should be added to the internal roads, and all vehicles using these internal roads should be required to travel at speeds less than 15 miles per hour. Concurrent operation of earth moving equipment should be minimized.
E. TRAFFIC AND CIRCULATION

The following traffic and circulation analysis is summarized from the technical traffic report prepared for the project by TJKM Transportation Consultants (1991). The report, in its entirety, is contained in Appendix D of this report.

Existing Conditions

Circulation Network. The circulation system in the vicinity of the Union Mine Disposal Site is comprised of four main roadways as shown in Figure 3E-1. The primary regional roadway servicing the project area is State Route 49 (SR-49), a two-lane generally north-south undivided highway. Based on Caltrans traffic volumes for this road (1989), SR-49 currently carries approximately 4,900 to 6,800 average daily trips (ADT) north and south of Union Mine Road and up to 11,300 ADT just west of Missouri Flat Road (Figure 3E-2). A number of the roadways in the project area form intersections with SR-49.

The primary access to the Union Mine Disposal Site is along Union Mine Road, which is presently a two-lane paved roadway that generally parallels SR-49. The ADT along Union Mine Road ranges from 1,100 trips at its northern intersection with SR-49 to 109 ADT at its southern intersection with SR-49. Landfill trucks and traffic access the site from the northern segment of the roadway. The SR-49/Union Mine Road intersection is stop sign-controlled for the westbound approach from Union Mine Road to Highway 49, where both the right and left-turning movements share a single lane. The single lane for the northbound approach on SR-49 supports right-turn movements onto Union Mine Road and through movements on the highway. The southbound lane supports both left-turn and through movements at the intersection. In other words, no separate lane is designated for turns in any direction.

Pleasant Valley Road is an east-west trending, two-lane major collector road just north of Union Mine Road which shares an alignment with Highway 49 for approximately 2 miles as it traverses through the town of El Dorado. Based on El Dorado County traffic counts (1990), the roadway currently carries an average of 8,473 vehicles each day between El Dorado Road and SR-49. The Pleasant Valley/SR-49 intersection is stop-sign controlled in all three directions. The
Existing Roadways in the Vicinity of the Union Mine Disposal Site
KEY:
--- = Future Road

Existing Average Daily Traffic and P.M. Peak Hour Volumes

PROJECT SITE
The westbound approach from SR-49 to Pleasant Valley Road features one exclusive left-turn lane on to southbound SR-49 and an exclusive through lane to Pleasant Valley Road. The eastbound approach features one shared through and right lane. The northbound direction from SR-49 to Pleasant Valley Road features one lane which shares the left and right-turn movements onto Pleasant Valley Road.

Forni Road is a generally north-south trending, two-lane local roadway located north of Union Mine Road. Forni Road currently carries 1,698 ADT north of its intersection with SR-49. The Forni Road/SR-49 intersection is stop sign-controlled and has one lane that shares the left- and right-turn movements onto SR-49 from Forni Road. From eastbound SR-49 a single lane provides both through and left-turn movements, while from westbound SR-49 a single lane shares both through and right-turn movements onto Forni Road.

Waterbury Drive is a future two-lane road planned for installation upon construction of a large development approved in east El Dorado.

Intersections. Six intersections were originally identified by the El Dorado County and Caltrans staff as key study intersections that would be most affected by the landfill expansion. Figure 3E-3 illustrates the locations of these intersections relative to the project site. In addition to the three existing intersections described above, the southern SR-49/Union Mine Road intersection and two future intersections with Waterbury Drive along Union Mine Road were evaluated. Upon preliminary evaluation of all six intersections, the traffic analysis was further focused on the Pleasant Valley Road/SR-49 intersection because it serves as the primary circulation feature affected by landfill traffic.

Intersection capacity analyses were performed to determine the existing traffic conditions during typical weekday p.m. peak hours. Capacity is expressed in terms of the volume-to-capacity ratio and the level of service rating of the intersection. Volume-to-capacity (V/C) ratio is a classification system which ranks street and highway operations according to the amount of traffic and the geometrics of the intersection. For example, a volume to capacity ratio value of 0.50 means that the volume of traffic utilizing the road is one-half of the available capacity, and a 0.75 value translates to a roadway that has three-quarters of the available capacity utilized. A volume/capacity ratio greater than 1.0 means that the volume of traffic
utilizing the roadway is greater than its capacity. Such a condition results in gridlock and significant traffic problems.

Level of service (LOS) is a ranking (from A to F) of operations based on the amount of traffic utilizing the intersection. An LOS A is perceived as free flow conditions, where intersections have no limiting factors affecting vehicular speed or movement. Likewise, a LOS F intersection is considered a grid-lock condition, where vehicles have no control of the speed or movements that can be executed at the intersection. LOS C is considered an acceptable LOS in El Dorado County; any intersection LOS less than C is considered unacceptable and must be mitigated.

Currently, the intersection capacity calculations for the Pleasant Valley/SR-49 intersection indicate operations are at LOS D during the p.m. peak hour with a V/C ratio of 0.85, or unstable traffic flows. However, the actual operations are likely better than LOS D because the eastbound to southbound right-turns and the northbound to eastbound right-turns utilize informal exclusive right-turn lanes for a distance of two or three car lengths (TJKM 1991). In other words, vehicles currently make right-turns from the right-hand shoulder of the road.

Based on the Caltrans method of traffic signal warrants analysis which was conducted for the Pleasant Valley/SR-49 intersection, the existing intersection should be signalized to provide safe traffic operations to the area provide improved traffic flow.

Landfill Traffic. Based on actual traffic counts conducted by TJKM (1991) and daily sales receipts at the landfill, the Union Mine Landfill currently generates an average of 290 weekday daily trips or 145 vehicles per day. Of the 290 daily trips during the week, 13 inbound and outbound trips occur during the a.m. peak hour and 14 inbound and outbound trips occur during the p.m. peak hour. Therefore, 236 trips occur during non-peak hours of the day. Approximately 120 ADT of the 290 total each day are truck trips.

Pavement Conditions. Existing pavement conditions were evaluated using traffic index (TI) measurements. The TI determines the required structural thickness for asphalt concrete (AC) pavement, and is a measure of the total weight expected through tires on the roadway surface during the design lifetime of the pavement.
The County and Caltrans use the TI to calculate an adequate asphalt concrete thickness necessary to bear the weight of vehicles traveling a given roadway. Due to the larger number and weight of trucks in the area, the effects of passenger cars, pick-up trucks, vans and two-axle trucks with single rear tires were considered negligible. Based on the existing traffic volumes and truck counts by number of axles conducted by El Dorado County (March 1991), the AC pavement conditions in the project area are capable of handling the current structural load from the landfill operations.

Impact Analysis

Upon expansion of the Union Mine Disposal Site, the traffic volumes in the area would remain essentially the same, with the exception of the five to seven additional truck trips associated with the proposed septage/leachate treatment facility. The landfill expansion will provide the County with disposal capacity well into the future – the landfill’s volumes are not expected to increase as a result of the expansion (except due to the 4 percent annual population growth rate). Three traffic impact scenarios are presented in this analysis, as requested by El Dorado County: existing plus project, cumulative without the project, and cumulative plus project conditions. Both cumulative scenarios evaluate impacts in the year 2010.

Existing Plus Project Scenario. Under these conditions, the landfill traffic is added to the traffic associated with the recently approved project that will install Waterbury Drive. The truck increase associated with the landfill expansion is considered insignificant because no increase in the volume of refuse is expected (TJKM 1991). As with the existing intersection capacity analysis, the "existing plus project" scenario results in a LOS D in the p.m. peak hour for the Pleasant Valley/SR-49 intersection with a V/C ratio of 0.85. According to the signal warrant analysis of the intersection, signalization is required. The TI calculations for the current pavement conditions indicate the existing roadways would be capable of supporting traffic operations under this scenario (Table 3E-1). No impacts on the existing traffic conditions are apparent under this scenario.

Cumulative Without the Project Scenario. Based on a 4 percent annual growth rate, future year 2010 traffic and peak hour turning movements would increase as shown in Figure 3E-3. Both Pleasant Valley Road and SR-49 would exceed LOS C for
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* Equivalent Single-Axle Loadings (ESAL) is a calculation which assigns a weight value per axle for any truck type (i.e. 2, 3, 4, and 5 axles.) The total ESAL is utilized by traffic engineers to arrive at a TI.

SOURCE: TJKM Transportation Consultants
two laned roadways. Both roadways should be widened to four lanes. The
intersection of Pleasant Valley/SR-49 would be significantly affected, and would
operate at a degraded LOS F and V/C ratio of 1.68 during the p.m. peak hour. As
in the existing conditions, the traffic signal warrants indicate that a signal should be
installed. According to the TI calculations for the future AC pavement conditions of
critical roadways, pavement upgrades are necessary for SR-49 between China Hill
and Union Mine roads, SR-49 between Pleasant Valley and Missouri Flat roads and
the entire length of Union Mine Road in the project area (Table 3E-1). In addition,
there is the potential that landfill traffic may utilize Waterbury Drive as a shortcut
through the area, which would adversely affect roadway conditions for that
segment (TJKM 1991). Without the proposed expansion the landfill will reach its
currently permitted capacity within 5 years and would be closed thereafter. No
refuse hauling trips would then be made to the site, and the approximately 290
vehicle trips currently made to the site would no longer travel the roadways. Only
an insignificant number of trips would need to be made to the site by County
employees to perform periodic maintenance and site monitoring.

Cumulative Plus Project Scenario. Since the Union Mine Disposal Site is currently
contributing trips to the roadway network and future weekday traffic generated by
the project will increase at the same growth rate (i.e., 4 percent) as in the cumulative
traffic scenario presented above, the same traffic volumes and intersection
operations as would occur before the closure activity are anticipated under this
"cumulative plus project" condition. Therefore, the Pleasant Valley/SR-49
intersection will operate at unacceptable conditions and the pavement conditions will
be insufficient in the future. In addition, the potential for shortcut traffic along
Waterbury Drive will remain. No additional impacts would occur.

Mitigation

The following measures are proposed to eliminate significant traffic intersection
operations at Pleasant Valley Road/SR-49 and to prevent pavement degradation
identified in the analysis. The intent of the proposed intersection improvements is
to improve intersection conditions to LOS C or better at all study intersections.
These measures are required to mitigate the effects of existing traffic, as well as
traffic in the year 2010. However, it is noted that the actual impacts attributable to
the expansion are insignificant. The County, as owners of the project, will
contribute a proportionate share of the listed improvements based on the proportionate shares of traffic volumes using that improvement.

Existing Conditions

- Add one exclusive right-turn lane for the eastbound approach to Pleasant Valley/SR-49.

- Signalize the Pleasant Valley/SR-49 intersection.

Existing Plus Project Conditions

- Implement the same measures as required under the existing conditions scenario.

Cumulative Conditions

- Implement the measures required under the existing conditions scenario.

- Add an exclusive left-turn lane and one exclusive right-turn lane for the northbound approach to Pleasant Valley Road/SR-49; add two exclusive left-turn lanes and one exclusive throughlane for the westbound approach; and add two exclusive throughlanes and one exclusive right-turn lane for the eastbound approach.

- Widen both SR-49 and Pleasant Valley Road to four travel lanes.

- When routine maintenance is conducted, increase the roadway structural base of SR-49 between China Hill and Union Mine Road to a TI rating of 8.5.

- When routine maintenance is conducted, increase the roadway structural base of SR-49 between Pleasant Valley Road and Missouri Flat Road to a TI rating of 9.5.
• When routine maintenance is conducted, increase the roadway structural base of Union Mine Road to a TI rating of 8.0 north of the landfill entrance and 5.5 south of the landfill entrance.

In addition to the above required measures, the following measures are recommended to prevent adverse traffic impacts in the future:

• Install a three-way stop control at the intersection of SR-49/Waterbury Drive.

• Install "No Trucks" signs along Waterbury Drive to prevent through travel and access to the landfill.

**Cumulative Plus Project Conditions**

• Implement the same measures as required under the cumulative conditions scenario.
F. HAZARDOUS MATERIAL/INFECTIOUS WASTE

1. Existing Conditions

Hazardous Materials

The El Dorado County Union Mine Disposal Site is a Class III sanitary landfill. This classification allows for the disposal of residential and commercial nonhazardous solid wastes. The site is open to the public for disposal of household waste and organic debris. The landfill receives approximately 60 percent residential wastes, 35 percent commercial wastes, and five percent inert wastes. Asbestos, grease trap, and sewage sludge wastes are not currently accepted at the facility, but are planned to be accepted at the proposed expansion. These wastes are known to have been accepted at the site in the past (El Dorado County 1988; Morgan 1991).

Under California law, friable asbestos is considered a hazardous waste. Grease trap waste and sewage sludge are classified as "special wastes." A "hazardous waste" is a waste, or combination of wastes, which because of its quantity, concentration, physical, chemical, or infectious characteristics, may either: (1) cause or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of, or otherwise managed (El Dorado County 1988). A "special waste" is any hazardous waste listed in Section 66740 of Title 22 of the California Code of Regulations, or any waste which has been classified as a special waste pursuant to Section 66744 of Title 22 of the California Code of Regulations, or which has been granted a variance for the purpose of storage, transportation, treatment, or disposal by the Department of Health Services pursuant to Section 66310 of Title 22 of the California Code of Regulations. Special waste also includes any solid waste which, because of its source of generation, physical chemical or biological characteristics or unique disposal practices, is specifically conditioned in a solid waste facilities permit for handling and/or disposal (California Integrated Waste Management Board 1990).

Although hazardous wastes are not formally accepted at the landfill, solid waste streams that originate from households can be expected to contain small quantities
of materials legally classified as hazardous. Sources of household hazardous waste include: pesticides, cleaning products, paints and paint products, hobby products, and other toxic, flammable, corrosive, or reactive substances commonly found in households. According to findings of a waste characterization study conducted at the Union Mine landfill by CH2M HILL in May 1990, 1.4 percent (by weight) of the wastes accepted at the landfill were household hazardous wastes (El Dorado County 1991a). It should be noted that the majority of this percentage is the weight of empty containers (Morgan 1991). Table 3F-1 illustrates a profile of waste types entering the landfill based on waste categories assigned by the California Integrated Waste Management Board (CIWMB). In El Dorado County, 40,810 households generated an estimated 287 tons of hazardous wastes in 1986, or eight percent of the total waste stream. This amounts to 15.5 pounds per household or 5.8 pounds per person. The discrepancy in figures for household wastes accepted at the landfill and household wastes generated is mainly due to improper disposal methods on the part of householders. Improper methods include pouring wastes into sinks, toilets or storm sewers, or dumping them on the ground. Also, many households store hazardous materials for months or years before disposing of them (El Dorado County 1988).

It is projected that by the year 2000 over 160,000 residents of El Dorado County in over 65,000 households will generate 488 tons of hazardous wastes, or a per household generation of approximately 17.9 lbs/year and per capita generation of 6.7 pounds per year. (According to the County, these figures are estimated based on EPA study methodology and should be considered only as estimates.) This projection for household hazardous waste generation represents approximately 5 percent of total projected hazardous waste generation (9,427 tons). The increase reflects the current trend of increased household generation and does not take into account source reduction and recycling efforts (El Dorado County 1988).

As previously mentioned in Section 2, Project Description, a monitoring program is in place at the landfill, pursuant to RWQCB waste discharge requirements. The program includes solid waste, leachate, groundwater, surface water, and landfill gas environmental systems which monitor for the presence of a variety of hazardous materials.
<table>
<thead>
<tr>
<th>CIWMB Waste Types</th>
<th>Percent of Total</th>
<th>Category Subtotals</th>
<th>Weight (lbs)</th>
<th>Weight (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Corrugated Containers</td>
<td>12.0%</td>
<td>385,200</td>
<td>192.6</td>
<td></td>
</tr>
<tr>
<td>b. Mixed Paper</td>
<td>4.8%</td>
<td>154,300</td>
<td>77.2</td>
<td></td>
</tr>
<tr>
<td>c. Newspaper</td>
<td>4.0%</td>
<td>127,700</td>
<td>63.9</td>
<td></td>
</tr>
<tr>
<td>d. High Grade Ledger Paper</td>
<td>0.1%</td>
<td>3,800</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>e. Other Paper</td>
<td>10.4%</td>
<td>335,300</td>
<td>167.7</td>
<td></td>
</tr>
<tr>
<td>Plastics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. High Density Polyethylene (HDPE)</td>
<td>0.1%</td>
<td>4,400</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>b. Polyethylene Terephthalate (PET)</td>
<td>0.0%</td>
<td>600</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>c. Film Plastics</td>
<td>2.5%</td>
<td>79,900</td>
<td>40.0</td>
<td></td>
</tr>
<tr>
<td>d. Other Plastics</td>
<td>3.6%</td>
<td>114,500</td>
<td>57.3</td>
<td></td>
</tr>
<tr>
<td>Glass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Refillable Glass Beverage Containers</td>
<td>0.0%</td>
<td>200</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>b. California Redemption Value Glass</td>
<td>0.3%</td>
<td>9,900</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>c. Other Recyclable Glass</td>
<td>1.1%</td>
<td>34,100</td>
<td>17.1</td>
<td></td>
</tr>
<tr>
<td>d. Other Non-Recyclable Glass</td>
<td>0.2%</td>
<td>5,500</td>
<td>2.8</td>
<td></td>
</tr>
<tr>
<td>Metals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Aluminum Cans</td>
<td>0.2%</td>
<td>6,300</td>
<td>3.2</td>
<td></td>
</tr>
<tr>
<td>b. Bi-Metal Containers</td>
<td>0.0%</td>
<td>1,400</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>c. Ferrous Metals and Tin Cans</td>
<td>4.9%</td>
<td>157,100</td>
<td>78.6</td>
<td></td>
</tr>
<tr>
<td>d. Non-Ferrous Metals Including Aluminum Scrap</td>
<td>0.6%</td>
<td>18,400</td>
<td>9.2</td>
<td></td>
</tr>
<tr>
<td>e. White Goods</td>
<td>0.0%</td>
<td>1,600</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>Yard Waste, Incl. Leaves, Grass and Prunings</td>
<td>4.6%</td>
<td>147,300</td>
<td>73.7</td>
<td></td>
</tr>
<tr>
<td>Other Organics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Food Waste</td>
<td>5.6%</td>
<td>179,200</td>
<td>89.6</td>
<td></td>
</tr>
<tr>
<td>b. Tires and Rubber Products</td>
<td>7.7%</td>
<td>248,200</td>
<td>124.1</td>
<td></td>
</tr>
<tr>
<td>c. Wood Wastes</td>
<td>25.2%</td>
<td>809,800</td>
<td>404.9</td>
<td></td>
</tr>
<tr>
<td>d. Agricultural Crop Residues</td>
<td>0.0%</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>e. Manure</td>
<td>0.0%</td>
<td>0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>f. Textiles and Leather</td>
<td>2.0%</td>
<td>63,800</td>
<td>31.9</td>
<td></td>
</tr>
<tr>
<td>Other Wastes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Inert Solids, Including Rock, Concrete</td>
<td>5.1%</td>
<td>165,100</td>
<td>82.6</td>
<td></td>
</tr>
<tr>
<td>b. Household Wastes</td>
<td>1.4%</td>
<td>44,400</td>
<td>22.2</td>
<td></td>
</tr>
<tr>
<td>Special Wastes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Ash</td>
<td>0.0%</td>
<td>0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>b. Sewage Sludge</td>
<td>0.0%</td>
<td>0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>c. Industrial Sludge</td>
<td>0.0%</td>
<td>0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>d. Asbestos</td>
<td>0.0%</td>
<td>0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>e. Auto Shredder Waste</td>
<td>0.0%</td>
<td>0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>f. Auto Bodies</td>
<td>0.0%</td>
<td>0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>g. Other Special Wastes</td>
<td>0.1%</td>
<td>1,900</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Sheetrock</td>
<td>2.8%</td>
<td>89,300</td>
<td>44.7</td>
<td></td>
</tr>
<tr>
<td>Disposable Diapers</td>
<td>0.8%</td>
<td>24,800</td>
<td>12.4</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>3,214,000</td>
<td>1,607</td>
<td></td>
</tr>
</tbody>
</table>

Source: El Dorado County 1990a
Past waste management practices at the landfill to control the discharge of mine drainage resulted in contamination of sediments in WMU-4 and 4A with hazardous levels of arsenic. As mentioned in Section 2, Project Description, these sediments were excavated and disposed of at a Class I (hazardous waste) landfill.

**Regulatory Framework.** The management of hazardous materials at the Union Mine Landfill is subject to a complex network of federal, state, and local environmental regulations. The primary pieces of federal legislation are:

- Resource Conservation and Recovery Act (RCRA) of 1976;
- Hazardous and Solid Waste Amendments (HSWA) of 1984;
- Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980; and
- Superfund (CERCLA) Amendments and Reauthorization Act (SARA) of 1986.

RCRA and HSWA regulate hazardous waste generators, transporters, and Treatment Storage and Disposal (TSD) facilities, providing a type of "cradle to grave" set of regulations regarding waste disposal. CERCLA and SARA specify provisions for the location, assessment, and cleanup of contaminated waste sites.

Primary direction in California comes from the following state laws:

- California Hazardous Waste Control Act of 1972;
- Safe Drinking Water and Toxic Enforcement Act of 1986 or "Proposition 65;"
- Hazardous Substance Act (HSA) of 1981; and
- California Environmental Quality Act (CEQA) of 1981.

The State Hazardous Waste Control Act is coordinated with the federal RCRA program to provide regulations for hazardous wastes generators, transporters, and TSDs. The Safe Drinking Water and Toxic Enforcement Act (Proposition 65) provides for public warning of chemical hazards and prohibits "knowing discharge" to drinking water sources on the part of industrial dischargers. The HSA regulates site cleanup activities, and CEQA provides requirements for environmental evaluation. The key state agencies with jurisdiction over hazardous materials and waste at the landfill are the State Water Resources Control Board and the Department of Health Services.
In addition to these regulations are several key state regulations that apply more specifically to landfill operations, and thus to the El Dorado County Union Mine Disposal Site. Chapter 15, Title 23 of the California Code of Regulations includes regulations pertaining to water quality aspects of waste discharge to land; these regulations establish waste and site classifications and waste management requirements for waste treatment, storage or disposal in landfills, surface impoundments, waste piles, and land treatment facilities. Requirements are minimum standards for proper management of each waste category. The Calderon Amendments to the Porter-Cologne Water Quality Act establish requirements for air and leachate testing from all existing/former solid waste sites. Under the California Water Code, Section 13273 (AB 3525/3374) the State Water Resources Control Board is required to rank all solid waste disposal sites based upon the threat which they pose to water quality. Due to the fact that the El Dorado County Union Mine Disposal Site is the only operating disposal facility in the County, the facility ranked number 1 on the El Dorado County listing and was therefore required to submit a Solid Waste Assessment Test (SWAT) report to the Regional Water Quality Board, Central Valley Region in 1987.

The local framework for hazardous materials management is largely the responsibility of El Dorado County. The California Solid Waste Management and Resource Recovery Act of 1972 created the California Waste Management Board and required all counties to prepare a Solid Waste Management Plan for all wastes disposed of within the county and all wastes originating in the county and disposed of outside the county. El Dorado County submitted an original County Solid Waste Management Plan (CoSWMP) in August 1977; the plan has undergone several revisions pursuant to triannual review requirements specified in Government Code Section 66780.5 and 14 California Code of Regulations, Section 17141. Under Tanner legislation (AB 2948), adopted as part of the California Health and Safety Code in 1988, the County was required to prepare a County Hazardous Waste Management Plan (CoHWMP). The CoHWMP outlines procedures for appropriate management of hazardous wastes, and also identifies potential areas for the siting of needed future hazardous waste facilities. The El Dorado CoHWMP was completed in 1988. Specifically, the goals of this plan are to:
• Protect the health, safety, and property of the residents and visitors of El Dorado County and minimize damage to the environment from the adverse effects of hazardous wastes while maintaining the economic viability of the County and the State.

• Manage hazardous wastes in a way that is consistent with sound management approaches in this order of priority: source reduction, recycling and reuse, treatment (onsite and offsite), and residuals disposal.

• Develop a plan that will fulfill the criteria established by the Department of Health Services to meet state-legislated local hazardous waste management plans (AB 2498, Tanner) and acquire the funding sources to implement the plan.

• Assess and accommodate the current and future needs for hazardous waste management practices and facilities for proper recycling, transfer, treatment, storage of hazardous wastes and disposal of treated residuals.

In 1990, Assembly Bill 939 (the Sher Bill) was passed and its regulations incorporated as Title 14, Chapter 9, Article 6.1, Section 18722 of the California Code of Regulations. This legislation and subsequent amendments including AB 2702 and AB 2092 essentially updates and replaces the requirements for preparation of a CoSWMP. The legislation mandates that each local jurisdiction in the state prepare a Countywide Integrated Waste Management Plan (CIWMP). The CIWMP must include three elements: (1) a Siting Element (for locating facilities to handle future waste disposal); (2) a Source Reduction and Recycling Element (SRRE); and (3) a Household Hazardous Waste Element (HHWE). El Dorado County has initiated preparation of the County Integrated Waste Management Plan (CIWMP) by conducting a waste characterization study which provides baseline data for the SRRE (El Dorado County 1991a). The legislative deadline for submittal of the SRRE and HHWE was originally July 1, 1991, but this deadline is likely to be extended to January 1, 1992. Siting Element regulations are currently in draft form (Smith 1991). The components of El Dorado County's SRRE are scheduled for completion by September 1991 (Morgan 1991). The Household Hazardous Waste Element and Siting Elements are also currently being prepared. Objectives and goals of the three elements are discussed below.
Siting Element objectives are to identify new locations for solid waste disposal to assure that disposal facilities will be able to accommodate future waste disposal needs. The main goal of the SRRE is to provide the groundwork for achieving a 25 percent reduction in solid waste disposal by 1995 and 50 percent reduction by the year 2000. The SRRE is required to contain four major components: (1) the Source Reduction Component; (2) the Recycling Component; (3) the Composting Component; and (4) the Special Waste Component. The key objective of the Household Hazardous Waste Element is to reduce or eliminate the disposal of household hazardous waste at solid waste disposal facilities.

Infectious waste

Currently, Union Mine Landfill does not accept untreated infectious waste, although it has accepted untreated infectious wastes in the past. Landfill policy for accepting infectious wastes has changed because of recent state legislation, which has made requirements for infectious waste disposal more stringent (see Regulatory Framework section). Infectious waste, which is also commonly called contaminated, biohazardous, biological, biomedical, pathogenic, and red bag waste, is loosely defined as any waste material that is a potential health hazard because of infectious characteristics.

In California, infectious waste is defined by statute (Health and Safety Code 25117.5). The statute considers the prime factor in determining whether a waste is infectious to be the presence of an etiological or disease causing agent. This includes tissues, bloods, cultures, equipment, and utensils contaminated with etiological agents. Broad categories of waste include isolation waste, cultures, blood products, pathological wastes, contaminated animals, and contaminated materials and equipment.

Infectious waste will typically comprise from five to 35 percent of the total waste generated by a hospital or medical facility. Infectious waste generation rates have been increasing steadily throughout the country over the past few years. This trend is likely to continue for at least the next several years. The concern over the HIV virus, also known as AIDS (Auto Immune Deficiency Syndrome), and the increased reliance on disposable items has increased the amount of solid, often
infectious, waste that is generated by medical facilities. In addition, increasing quantities of these wastes are being generated among large and small quantity generators, as more invasive medical procedures are being performed in medical offices, clinics, and centers.

The actual volume of infectious waste entering the landfill in the past is unknown. The main problem with identifying the actual volume is that infectious waste accepted by the landfill (in quantities formerly exempt from regulations) did not have to be separated from other refuse, and no special packaging, shipping, or labeling was required. Although volumes of infectious waste accepted at the landfill in the past are not known, a conservative estimate can be made, based on a profile of wastes categorized by Standard Industrial Waste Classifications that was compiled for El Dorado County in 1986 (El Dorado County 1986). The category identified as "Health Services" generated a total of 16 tons of hazardous wastes, or 0.05 percent of the total estimated wastestream for 1986. The Union Mine Landfill currently does not accept infectious waste and will not accept infectious waste after the proposed expansion.

**Regulatory Framework.** At the federal level, infectious waste is regulated as a non-hazardous solid waste under Subtitle D of the Resource Conservation and Recovery Act. However, more stringent state regulations pertaining to infectious waste management govern in California.

Infectious wastes are currently governed in California under the Hazardous Waste Control Law. The Hazardous Waste Control Law requires the California Department of Health Services (DHS) to adopt regulations for the safe management of infectious wastes, and defined infectious waste as a hazardous waste, which makes these wastes subject to the jurisdiction of the Toxic Substances Control Division. Requirements for the storage, containment, handling, treatment, and disposal of infectious wastes are divided into two categories: Category 1 Requirements, for small quantity generators; and Category 2 Requirements, for large quantity generators. These regulations are contained in Article 13, California Code of Regulations (CCR), Title 22. Article 13 extends authority to enforce provisions of the regulations to local jurisdictions.
Legislation passed by the State Assembly (Assembly Bills 109 and 1641) in 1990 has altered the current regulations governing infectious waste in California. The two assembly bills refer to these wastes as **medical wastes**. Assembly Bill 109 revises the definition of hazardous waste to exclude infectious waste and deletes infectious waste from regulation under the Hazardous Waste Control Law. Below is a discussion of the provisions of the two bills.

Assembly Bill 109 (AB 109) enacts provisions governing the handling, storage, treatment, disposal, and transportation of medical wastes. The bill applies to all producers of medical waste. AB 109 limits the "small quantity" exemption to the following:

- generators that treat their own medical waste onsite in quantities of 100 kg/mo or less are not required to obtain a medical waste treatment facility permit; and

- generators that have onsite treatment facilities may accept medical waste from other generators so long as the total amount of medical waste treated is less than 100 kg/mo (0.2 lbs./mo).

AB 1641 enacts the Medical Waste Management Act. This legislation requires large quantity medical waste generators and certain small quantity medical waste generators to register with the enforcement agency and imposes recordkeeping, treatment, and storage requirements on all medical waste generators; requires generators to file a medical waste management plan with specified information; and subjects specified generators to prescribed inspection schedules. The bill requires all medical waste to be hauled by either a registered hazardous waste hauler or by a person with an approved limited-quantity exemption, as specified. The bill also establishes treatment facility permit requirements, containerization procedures, and generator responsibility for ensuring that the waste is treated by a specified method to render it solid waste, prior to disposal. In summary, AB 109 and AB 1641 essentially eliminate the small quantity generator exemption from requirements of handling these wastes according to established procedures. In accordance with AB 109 and AB 1641, untreated medical wastes, regardless of quantity, are not allowed for disposal at a Class III landfill, and will not be allowed at the El Dorado County Union Mine facility.
Landfill Procedures

Established procedures are in place at the existing landfill to minimize health risks posed by hazardous wastes. Procedures include screening wastes upon entry, providing adequate cover, implementing the environmental monitoring program required by the RWQCB, conducting regular inspections (performed on a daily basis by the County), and implementing an emergency response plan. Key procedures adopted to minimize health risks are contained in the facility's waste acceptance control program and the emergency response plan, described in the following sections.

Waste Acceptance Control Program

The current waste acceptance control program, which will be continued for the proposed expansion, is intended to prevent, to the extent possible, the acceptance of prohibited wastes at the landfill. The basis of the waste acceptance control program is the load screening program, which was developed by the County pursuant to requirements of Title 23, Chapter 3, Subchapter 15 of the California Code of Regulations. Due to a lack of specific guidelines for implementation of a load screening program, the County's program is based on existing programs of other California counties. Union Mine Landfill's load checking program was instituted in October 1990, and is intended for use after the proposed expansion (Morgan 1991). The load screening program only addresses actions that are to be taken by the landfill operator at the landfill. Other public educational programs are part of the CoHWMP. The load screening program implemented by the landfill consists of the following components:

- Signs posted and leaflets distributed identifying what wastes are considered hazardous and stating that those wastes cannot be disposed of at the landfill;

- Verbal entrance check with drivers to determine if their loads contain any hazardous wastes; and

- Random load checks.
The following provides a summary of the components of the load screening program, and proposed additions to the program.

**Signs and Leaflets.** Signs are posted at the entrance to the landfill and near the working face to educate the users of the landfill about what types of materials are considered hazardous waste and cannot be disposed of at the landfill. Leaflets are also distributed which contain the same information as the sign. The content of the sign and leaflet is shown in Figure 3F-1.

**Entrance Check.** As disposal fees are collected from each driver of a waste load, the driver is questioned concerning the content of the load by a gate attendant. The following question is asked by the gate attendant:

"Do you have any hazardous wastes in your load such as paint, waste oils, solvents, pesticides, or other wastes identified on the sign in front of you?"

If the response is negative, the driver will be allowed to proceed. If the response is affirmative, the driver will be asked to separate those items from the load and remove them from the landfill.

**Random Load Checking.** Four uncompacted loads are randomly checked each month. This equals approximately one load for every 3,000 tons of waste disposed of at the landfill. As the driver of the randomly selected load enters the landfill, the driver is directed toward a designated area near the working face. An observer, trained to recognize hazardous waste, sorts through the waste. If heavy items are included in the waste load, a bulldozer is used to distribute the load for inspection. If hazardous wastes are identified during the load screening, they are segregated from the load prior to landfilling. The driver is questioned as to the possible source(s) of the waste(s). If the source of the hazardous waste is identified, then the source is contacted and requested to remove the wastes from the landfill. If the driver is the source of the waste, then the driver is asked to remove the hazardous wastes from the landfill. If no source can be identified, the County stores the hazardous waste in a secure area for disposal at a later time. Wastes are not stored for more than 90 days.
NOTICE TO RESIDENTS OF WESTERN EL DORADO COUNTY

Currently, most of the refuse generated in Western El Dorado is disposed of in the Union Mine Landfill, located near the town of El Dorado. The Union Mine Landfill is allowed to accept only non-hazardous wastes. The following wastes cannot be disposed of in this landfill:

1. Household Cleaners
   • Drain Openers
   • Oven Cleaners
   • Wood and Metal Cleaners and Polishes

2. Automotive Products
   • Used Motor Oil and Fuel
   • Oil and Fuel Additives
   • Grease and Rust Solvents
   • Carburetor and Fuel Injection Cleaners
   • Air Conditioning Refrigerants
   • Starter Fluids

3. Home Maintenance and Improvement Products
   • Paints - Latex and Oil Based
   • Paint Thinners
   • Paint Strippers and Removers
   • Adhesives

4. Lawn and Garden Products
   • Herbicides
   • Pesticides
   • Fungicides/Wood Preservatives

5. Other hazardous Materials not specifically listed are also prohibited. A more complete list of prohibited hazardous materials is available at the landfill or at the Environmental Management Department, 7563 Green Valley Road, Placerville.

Random load checks will be conducted at the landfill to help prevent illegal disposal of hazardous materials.

Residents of El Dorado County should call the Environmental Management Department at 916/621-5308 for information on how to dispose of household hazardous materials.

IT IS ILLEGAL TO DISPOSE OF HAZARDOUS MATERIALS OTHER THAN AT APPROVED FACILITIES.
Additions to the Program. In recognition of the fact that the public needs to be provided options for the disposal of hazardous waste, the County has included the following measures as part of the Waste Acceptance Control Program:

- Establish an information phone number where the public can obtain general information on hazardous wastes and where to dispose of hazardous wastes;
- Identify pickup days for hazardous waste and proper disposal of these wastes; and
- Establish transfer stations for the collection of hazardous waste.

Emergency Response Plan

The Union Mine Landfill's emergency response plan (included as Appendix B) was developed to: 1) identify specific occurrences that may exceed the design capacities of the facility's waste management units and endanger public health and the environment; and 2) identify the steps that will be taken by the landfill operator to minimize these hazards. The responsibility for implementing the plan lies with the designated emergency coordinator. Local emergency responders with designated response roles include the El Dorado County Local Enforcement Agency, the Fire Department/Emergency Squad, the Police, and the El Dorado County Hazardous Materials Emergency Response Team.

Specific catastrophic occurrences that have been identified that could result in exceedance of the facility's design capacity and endanger public health and the environment include:

- Fire and/or explosion;
- Spill or release of hazardous waste;
- Failure or vandalism of leachate collection and removal system; and
- Failure or vandalism of gas collection and control system.

Responsibilities of the onsite emergency coordinator in the event of an incident include the following:
• Identify the character, source, amount, and extent of released materials;

• Assess possible hazards (both direct and indirect) resulting from the release, fire or explosion;

• Determine whether immediate evacuation of any injured personnel is possible;

• Notify the applicable state or local agencies;

• Arrange for proper storage of recovered waste; and

• Submit "after-incident" reports, if required.

The plan specifies general response procedures for dealing with the various incident types. Also included is a list of equipment to be maintained onsite for use in an emergency.

The plan will be revised and amended whenever:

• Applicable regulations are revised;

• The plan fails in an emergency;

• The facility changes in design, construction, operation, maintenance, or other circumstances in a way that substantially increases the potential for fires, explosions, or release of hazardous waste or hazardous waste constituents, or changes in the response necessary in an emergency; and

• The emergency coordinator changes.

2. Impacts

Hazardous Materials

Asbestos. As previously stated, the Union Mine Disposal Site does not formally accept hazardous wastes and hazardous wastes would not routinely be accepted at
the proposed expansion. However, asbestos wastes are planned to be accepted at the proposed expansion under a variance from the County. Because asbestos is designated as a hazardous waste, the asbestos must be contained in labeled containers comprised of, as a minimum, double six-millimeter plastic bags.

Asbestos in soil is relatively immobile. It is unlikely that asbestos could be leached and/or enter the groundwater system. Therefore, due to the relative immobility of asbestos, and the requirements for containment that will be imposed, impacts due to asbestos disposal (as part of closure and expansion activities) are considered to be adverse, but not significant.

**Household Hazardous Wastes.** Based on the County’s projections for future waste generation, household hazardous waste generation will increase from a per capita figure of 5.8 pounds per year, based on 1986 data, to 6.7 pounds per year, predicted for the year 2000 (El Dorado County 1988). However, this increase reflects current trends and does not account for source reduction efforts that are currently being implemented as part of the CoHWMP, and efforts planned as part of the Source Reduction and Recycling Element (SRRE) and Household Hazardous Waste Element (HWWE) of the CIWMP (currently under preparation). The waste generation projections also do not take into account the potential decreases in hazardous waste acceptance to the landfill that are expected to result from the load screening program that went into effect at the disposal site in October 1990. In addition, household hazardous wastes currently represent a small percentage (1.4 percent) of the wastestream entering the landfill. Therefore, hazardous waste impacts due to the proposed expansion are expected to be adverse, but not significant.

Landfill closure activities will be conducted in accordance with closure plans intended to minimize any potential migration of hazardous constituents from areas scheduled for closure. Closure activities will be monitored through the environmental monitoring system. As mentioned in Section C, Geology/Soils, the subsurface geology has not been fully characterized due to a lack of knowledge regarding the locations of abandoned mine shafts. However, based on the small percentage of wastes accepted at the landfill that are classified as hazardous wastes, and the low permeability of subsurface soils, potential hazardous waste impacts
from the closure/expansion of the landfill are considered adverse, but not significant.

Special Waste. Facility expansion plans include acceptance of sewage wastes. Approximately 1,000 tanker trucks of septage per year are expected to be accepted. Tankers will have capacities of between 1,500 and 5,000 gallons each. (The plant will also accept leachate generated by the landfill.) Sewage wastes will be treated at a new treatment plant, to be constructed onsite. The treatment plant will contain 4 settling ponds, outside of the treatment plant building. Because sewage wastes will be treated onsite, special waste impacts from the closure/expansion are not expected to be significant.

Infectious Waste

The recent passage of state legislation essentially eliminated regulatory exemptions for the disposal of infectious waste. Therefore, untreated medical wastes, regardless of quantity, are not allowed to be disposed of at the Union Mine Landfill, and will not be disposed of at the proposed expansion. Therefore, no impact to existing levels of infectious waste at the landfill would occur as a result of the proposed expansion.

As indicated in the previous section addressing hazardous waste impacts due to closure activities, adherence to closure plans will be followed to minimize any potential migration of hazardous constituents (including infectious constituents). Since the landfill no longer accepts infectious wastes, potential infectious waste impacts from the closure/expansion of the landfill are not expected to be significant.

Leachate/Septage Treatment Plant

The operation of the leachate/septage treatment plant may necessitate the use and storage onsite of potentially hazardous materials, such as chlorine or acids. These chemicals are typically used in the treatment process for disinfection and coagulation of solids. The specific chemicals needed to treat the leachate/septage will be determined at the time the treatment plant is designed.
The use of potentially hazardous chemicals in the effluent treatment process is not expected to result in any significant environmental impacts. However, the potential effects of the use and storage of potentially hazardous materials of the treatment plant will be evaluated in subsequent environmental review under CROA to be completed after design of the treatment plant.

3. Mitigation Measures

Hazardous Materials

Mitigation measures identified to mitigate hazardous materials effects found to be adverse, but not significant consist of County/applicant proposed modifications to the load screening program, to reduce the amount of household hazardous materials entering the landfill. These additions to the program consist of the following:

- Establish an information phone number where the public can obtain general information on hazardous wastes and where to dispose of hazardous wastes;

- Identify pickup days for hazardous waste and proper disposal of these wastes; and

- Establish transfer stations for the collection of hazardous waste.

The following measure is recommended to mitigate potential adverse effects due to asbestos disposal:

- All asbestos wastes would be containerized as as condition of their acceptance to the landfill. The minimum requirements for containerization will consist of double bagging the waste in 6-mil plastic bags.

The following measure is recommended to mitigate potential adverse effects resulting from contaminant migration through potentially unidentified subsurface routes (mine shafts).

- The adequacy of the current environmental monitoring system should be reevaluated as part of closure plan development. The reevaluation should focus
on the adequacy of the system to monitor subsurface contaminant migration routes. An attempt should be made to identify locations of abandoned mine shafts to ensure that all potential subsurface routes have been addressed.

Infectious Waste

No significant impacts related to infectious wastes are expected to occur as a result of the proposed expansion; therefore, no mitigation measures are recommended.

With respect to closure activities, the following mitigation measure is proposed to mitigate infectious materials effects found to be adverse, but not significant. This measure is identical to the mitigation measure proposed to mitigate hazardous materials effects:

- The adequacy of the current environmental monitoring system should be reevaluated as part of closure plan development. The reevaluation should focus on the adequacy of the system to monitor subsurface contaminant migration routes. An attempt should be made to identify locations of old mine shafts to ensure that all potential subsurface routes have been addressed.

4. Cumulative Impacts

The analysis of cumulative impacts resulting from hazardous materials/infectious waste includes impacts associated with past operations, closure activities, and the proposed expansion.

Based on waste generation projections made in the CoHWMP, the generation of hazardous waste typically parallels the economic climate of the County. El Dorado County is expected to experience a growth rate of 3.4 percent into the year 2000. Hazardous waste generation quantities therefore could be expected to increase by the same amount; however, growth projections do not take into account source reduction or the possibility of technological changes, resulting in waste reduction. The goals of the Source Reduction and Recycling Element (SRRE) of the CIWMP are to reduce the amount of waste generation and disposal in the County, and thereby reduce the amount of hazardous wastes accepted at the El Dorado Union
Mine Disposal Site. Through implementation of the CIWMP, El Dorado County will be able to accommodate future hazardous waste disposal needs.

Areas of the landfill planned for closure and areas proposed for expansion will be monitored through environmental monitoring programs to detect releases of contaminants to the air and ground/surface water. Implementing the monitoring programs, and taking corrective actions when monitoring indicates that releases of contaminants in excess of acceptable levels has occurred, will mitigate the potential adverse effects resulting from past waste disposal practices. However, it appears that the current monitoring program may not be adequate with respect to monitoring the groundwater pathway. Further information regarding the locations of abandoned mine shafts should be obtained before the adequacy of current monitoring programs and monitoring programs proposed as part of closure and expansion activities can be assessed.
G. HUMAN HEALTH AND SAFETY

Several of the other EIR technical sections discuss potential environmental impacts and mitigation measures that are relevant to an evaluation of human health and safety issues associated with the proposed landfill expansion. The purpose of this section is to assemble this diverse information in a manner suitable for developing qualitative conclusions regarding the potential of the proposed project to affect health and safety in the surrounding area. The types of potential impacts that are discussed include the following:

- Potential for accidental spills on the roadways servicing the Union Mine Landfill;

- Potential for fires or explosions due to buildup of landfill gas;

- Potential for disease vectors and pests at the site to impact the surrounding area;

- Potential for health hazards due to acceptance of household and infectious wastes; and

- Potential for offsite contamination of surface water and groundwater due to landfill leachate.

The potential for human health and safety effects associated with the operation of the leachate/septage treatment plant will be evaluated in supplemental environmental review after design of the treatment plant has been completed.

1. Existing Conditions

Accidental Spills of Waste-hauling Vehicles

The traffic study conducted for the proposed landfill expansion project is described in Section 3E. The study provides information on the current and expected trips of waste-hauling trucks on the roads serving the Union Mine Disposal Site. According to the traffic study, 290 vehicle round trips per day are directly associated with the existing landfill operation. The traffic engineering study
prepared by TJKM found no significant safety problems concerning the existing traffic volumes vis a vis roadway segments and intersections studies in their analysis.

**Potential for Landfill Gas Fires or Explosions**

Decomposition of organic materials in landfills produces methane gas. Over time, the concentration of gas can build up and, in rare circumstances, could reach combustible levels. Explosive levels of methane gas have been reached in some instances where landfill gas has migrated offsite and become trapped below or within buildings.

Testing by the California Air Resources Board indicates that the rate of gas generation at the Union Mine Disposal Site is very low (see Section 3D of this EIR) and there are no buildings adjacent to the landfill where gas buildup could occur. Thus, the risk of landfill related fires or explosions is considered negligible.

**Potential for Offsite Health Effects due to Disease Vectors and Pests**

According to El Dorado County (Morgan 1991), there have been no complaints by the general public regarding the activities of disease vectors such as rodents, birds or other pests from the existing landfill, nor has landfill refuse been transported by vectors to neighboring residences. The refuse placed in the existing landfill is covered with compacted soil at the end of each working day, which greatly reduces the potential for disease vector and pest problems. Unlike many similar facilities, the Union Mine Landfill does not attract large bird populations which could carry unhealthful materials to neighboring areas inhabited by humans.

**Potential for Public Exposure to Hazardous Household and Infectious Wastes**

As discussed in Section 3F, the current landfill does not accept hazardous wastes or untreated infectious waste, although such wastes have been accepted in the past in amounts that were formerly exempted from regulations. Although the quantity of infectious wastes previously placed in the Union Mine Landfill is unknown, it has been conservatively estimated at 0.05 percent of the total waste stream, based on a 1986 waste classification study for El Dorado County. Total hazardous wastes in

3.G-2
the form of pesticides, paints, cleaning products and other toxic, flammable, corrosive or reactive substances commonly found in households are estimated to comprise 1.4 percent of all wastes accepted. To ensure that exposure to infectious and hazardous wastes will not occur in the future, the landfill has implemented a waste acceptance control program, which includes load screening, random load checks, and signs and literature identifying and prohibiting hazardous materials. The present waste acceptance policy will continue for the proposed expansion.

Potential for Offsite Surface Water and Groundwater Contamination

As discussed in Section 3B, analyses of water quality on the existing Union Mine Disposal Site indicate that contamination of landfill leachate may have occurred in the groundwater underlying and immediately downgradient from the site. In addition, increased surface water concentrations of total dissolved solids and chloride ion were detected on the eastern side of the landfill. The existing landfill is not equipped with a liner for leachate controls. However, CH2M HILL personnel working on the site have interpreted the available monitoring data to indicate that impacts to groundwater will be limited to the uppermost water-bearing zone and will affect only the Martinez Creek watershed. A leachate collection system is currently being designed for both the existing landfill and the proposed expansion area (Refer to the Project Description, Section 2). This is expected to reduce the discharge of leachate to Martinez Creek to acceptable levels, and eliminate any potential health effects that may presently occur due to exposure of individuals to contaminated waters in the creek.

2. Impacts

Accidental Spills of Waste-hauling Vehicles

The proposed project will result in an average increase of only five to seven additional truck trips per day. These trips will contain septic tank cleanings, and will be added to the current level of 290 vehicle round trips per day, generated by the existing landfill. The traffic study for the proposed project (see Section 3D) has determined that the expected 4 percent population growth will cause traffic at certain intersections on State Highway 49 to increase the lifetime of the proposed project to
levels that will require signalization with the addition of new turning lanes to avoid unacceptable traffic volumes.

Trucks hauling wastes to the Union Mine Landfill will normally pose no health threat to residences or other populated areas. A possible upset scenario that would result in health impacts would be an accident involving a septage truck and resulting in a spill of the waste into surface water bodies along the haul route. Such an accident would have the potential to expose individuals using these waters to untreated wastes. However, the probability of such an accident occurring is considered insignificant, given the extremely low volume of trucks hauling to the Union Mine Disposal Site.

**Potential for Landfill Gas Fires or Explosions**

As with the existing landfill, the buildup of landfill gas after the proposed expansion, either onsite or due to offsite migration, is considered extremely unlikely. The proposed project will include installation of gas monitoring probes to detect any potential offsite migration of landfill gases. These probes will be placed around the landfill perimeter at intervals of 1,000 feet or less. The measurements of landfill gas concentrations will be compared with the known combustion concentrations for methane and other landfill gases. Based on the operating experience of many landfills in California, including the existing Union Mine Disposal Site, the probability of a health-threatening occurrence due to gas buildup is extremely low and the risk insignificant. The mitigation measures referenced below and discussed in Section 3D will ensure that health impacts from this source remain below a level of significance.

**Potential for Offsite Health Effects Due to Disease Vectors and Pests**

As discussed above, the current Union Mine Disposal Site landfill operation has encountered no problems associated with birds, insects or rodents at the site or transport of wastes offsite by these agents. The proposed landfill expansion will continue the current operating practices, including daily soil coverage of wastes, and is not expected to experience disease vector problems. Therefore, no significant impact from vectors and pests is anticipated.
Potential for Public Exposure to Hazardous Household and Infectious Wastes

The policy of the proposed expanded landfill will be to reject all hazardous and infectious wastes delivered to the Union Mine Disposal Site. Small quantities of materials classified as hazardous will inevitably continue to enter the facility with other household and commercial wastes. However, the present waste acceptance control program will be continued to minimize the amounts of such materials landfilled. In addition, the various environmental monitoring programs and leachate collection system will identify and contain hazardous materials and prevent their introduction to the environment. Thus, no significant impact to health and safety is expected to occur due to hazardous and/or infectious wastes.

Potential for Offsite Surface Water and Groundwater Contamination

Section 3B shows that surface and groundwater contamination due to the existing landfill are believed to be confined to the Martinez Creek watershed. The proposed project would involve establishment of leachate collection systems for both the existing site and the landfill expansion area. In addition, the existing landfill will be capped to minimize the amount of water coming into contact with landfilled wastes. These steps should ensure that unhealthful concentrations of toxic or otherwise unhealthful substances will not reach water resources to which the public will have access. Impacts to health and safety due to contaminated water are considered to be below a level of significance with these measures in place.

3. Mitigation Measures

As described in the previous discussion on project impacts, the mitigation measures proposed in the EIR sections on Air Quality, Water Resources, Hazardous Materials/Infectious Waste, and Traffic and Circulation are adequate to reduce potential health and safety impacts to levels below significance.

However, one additional measure that should be implemented to prevent potential gas fires or explosions is as follows:

- Any vents that will allow landfill gas to reach the ambient air will be sited away from landfill traffic areas to minimize the potential for ignition.
H. NOISE

1. Existing Conditions

Background

Noise is most simply defined as unwanted sound. Airborne sound is a small scale fluctuation of instantaneous air pressure above and below the local barometric pressure. Sound levels are usually measured and expressed in decibels (dB). Most of the sounds which we hear in the environment do not consist of a single frequency, but rather a mixture of frequencies, with each frequency differing in sound level. The intensities of each frequency add together to generate sound.

The method commonly used to quantify environmental sounds consists of evaluating all of the frequencies of a sound in accordance with a weighting system that reflects the decreased sensitivity of human hearing at low frequencies and at extremely high frequencies relative to the mid-range frequencies. This is called "A" weighting, and the decibel level measured is called the A-weighted sound level (dBA). In practice, the level of a sound source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

Although the A-weighted sound level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of noises from distant sources which create a relatively steady background noise in which no particular source is identifiable. To describe the time-varying character of environmental noise, the statistical noise descriptors L_{10}, L_{50}, and L_{90}, are commonly used. They are the noise levels equaled or exceeded during 10 percent, 50 percent, and 90 percent of a stated period of time. A single descriptor called the L_{eq} (equivalent sound level) is also used. L_{eq} is the energy mean A-weighted sound level during a stated measured time interval. Appendix E defines additional acoustical terminology and includes a table of familiar noise sources and their measured noise levels in decibels.
County Noise Standards

The Noise Element of the County of El Dorado General Plan specifies maximum allowable property line noise levels that may be generated by various land use categories. The Noise Element also specifies maximum allowable noise exposure levels for residential land uses. The county noise standards are summarized in Table 3H-1 and Table 3H-2.

Ambient Noise Levels

The primary noise sources contributing to the ambient noise level at the existing Union Mine Disposal Site are the waste collection trucks along the access routes to the landfill and the heavy equipment operating in the landfill area. The equipment used onsite includes one Caterpillar D8 (bull dozer), two compactors, two 14-yard TEREX scrapers, two water trucks, and one road grader. Wastes are generally deposited at the base of the working face and spread up the face and compacted into two foot thick layers. The active working face is then covered daily with a minimum of 6 inches of cover material. The intensity of activity on the landfill face is sporadic throughout the day and depends on the frequency of waste deliveries and volume of waste material. The most active period of an average work day occurs near closing time when one or two compactors compress the waste material while the bulldozer spreads the daily cover material over the active fill site, (Russert 1991).

The landfill is open to the public and operates 359 days a year, from 8:00 a.m. to 3:00 p.m. during Pacific Standard Time and until 6:00 p.m. during Daylight Savings Time. The noise generated by the landfill operations is typical of heavy construction equipment.

An onsite buy back center operates concurrently with the landfill operations. The buy back center operations consist of manual sorting and collecting of aluminum, glass, and plastics into 5 portable storage bins. The center does not utilize any powered machinery and therefore produces very little noise outside of the occasional dumping or tossing of glass and aluminum into the bins.
Table 3H-1

EL DORADO COUNTY NOISE STANDARDS

<table>
<thead>
<tr>
<th>Land Use Classification</th>
<th>Maximum Sound Level dBA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L_{eq} (1 hour)*</td>
</tr>
<tr>
<td>Residential, rural-suburban:</td>
<td></td>
</tr>
<tr>
<td>10:00 p.m. to 7:00 a.m.</td>
<td>40</td>
</tr>
<tr>
<td>7:00 a.m. to 10:00 p.m.</td>
<td>45 - 50</td>
</tr>
<tr>
<td>Residential, suburban:</td>
<td></td>
</tr>
<tr>
<td>10:00 p.m. to 7:00 a.m.</td>
<td>40</td>
</tr>
<tr>
<td>7:00 a.m. to 10:00 p.m.</td>
<td>50 - 55</td>
</tr>
<tr>
<td>Residential, low-density urban:</td>
<td></td>
</tr>
<tr>
<td>10:00 p.m. to 7:00 a.m.</td>
<td>50</td>
</tr>
<tr>
<td>7:00 a.m. to 10:00 p.m.</td>
<td>55 - 60</td>
</tr>
<tr>
<td>Residential, medium, high-density:</td>
<td></td>
</tr>
<tr>
<td>10:00 p.m. to 7:00 a.m.</td>
<td>55</td>
</tr>
<tr>
<td>7:00 a.m. to 10:00 p.m.</td>
<td>60</td>
</tr>
<tr>
<td>Commercial zones, districts:</td>
<td></td>
</tr>
<tr>
<td>10:00 p.m. to 7:00 a.m.</td>
<td>60</td>
</tr>
<tr>
<td>7:00 a.m. to 10:00 p.m.</td>
<td>65</td>
</tr>
<tr>
<td>Industrial zones, districts:</td>
<td></td>
</tr>
<tr>
<td>24 hours</td>
<td>70 - 75</td>
</tr>
</tbody>
</table>

* This analysis assumes that the standards reflect a one-hour equivalent sound level (L_{eq}). Noise levels may not exceed these standards at the property boundary of two differing land use designations.
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Table 3H-2</strong></td>
<td></td>
</tr>
<tr>
<td><strong>EL DORADO COUNTY STANDARDS FOR ACCEPTABLE EXTERIOR NOISE EXPOSURE LEVELS FOR RESIDENTIAL LAND USES</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1. Unacceptable:</strong></td>
<td></td>
</tr>
<tr>
<td>a. 80 dBA during any 1 hour per 24 hours.</td>
<td></td>
</tr>
<tr>
<td>b. 75 dBA during 8 hours per 24 hours.</td>
<td></td>
</tr>
<tr>
<td><strong>2. Discretionary and Normally Unacceptable:</strong></td>
<td></td>
</tr>
<tr>
<td>a. 65 dBA 8 hours per 24 hours.</td>
<td></td>
</tr>
<tr>
<td>b. Any loud or repetitive sounds onsite.</td>
<td></td>
</tr>
<tr>
<td><strong>3. Discretionary and Normally Acceptable:</strong></td>
<td></td>
</tr>
<tr>
<td>a. Does not exceed 65 dBA for more than 8 hours per 24 hours.</td>
<td></td>
</tr>
<tr>
<td><strong>4. Acceptable:</strong></td>
<td></td>
</tr>
<tr>
<td>a. Does not exceed 45 dBA for more than 30 minutes per 24 hours.</td>
<td></td>
</tr>
</tbody>
</table>

* An $L_{eq}$ (1 hour) is not specified in the Noise Element but is assumed for the purposes of this analysis.
A salvaging operation also operates at the landfill site. The equipment used in this operation include two 3/4 ton pickup trucks and one Case 580 tractor. This is a low-intensity operation which consists of occasional sorting through waste material to extract reusable metals such as aluminum, copper, brass, and iron. The reusable materials are collected and stored on an inactive portion of the landfill. This operation typically generates relatively little noise.

Access to the Union Mine Disposal Site is via the Union Mine Road, a two-lane road maintained by the county. The current average daily traffic (ADT) volume on this road is 1,100 vehicles (TJKM 1991). There are a number of residences adjacent to Union Mine Road within 1/2 mile of the intersection with State Route 49 in the town of El Dorado, although residential density decreases as the road progresses toward the landfill with only a few rural residences along the Union Mine Road within 1 mile of the landfill. There are between 10 and 15 residences on Maric Road, a small gravel drive that runs along the ridge 3,000 feet west of the landfill at an elevation of 1,800 feet MSL (500 feet above the active landfill site).

Noise measurements were conducted on Tuesday April 9, 1991 to characterize the existing daytime noise levels generated by landfill operations onsite and along Union Mine Road. The sound levels were measured using calibrated Larson-Davis Model 800B and Model 700 sound level meters which meet the American National Standards Institute for type 1 and type 2 sound level meters respectively. Sound level measurements were taken along Union Mine Road, at various points at the landfill site, and at many of the nearby residences on Maric Road. The results of the on and off site monitoring are summarized in Table 3H-3 below. Figure 3H-1 depicts the monitoring locations.

Although the Union Mine Landfill is on property that is zoned agricultural, the landfill operation is considered an industrial land use and therefore must comply with the county noise standards for industrial land uses (Rivas 1991). According to this standard, noise from the landfill operation must not exceed 75 dBA $L_{eq}$ during any one hour of a 24-hour period at the boundary between the landfill property and any other land use. The measured "worst case" noise levels produced by the most intense period of daily landfill activity was 71.9 dBA $L_{eq}$ at 100 feet from the active working face. Although some noise emanates from the various operations throughout the site, by far the majority of the noise produced by landfill
Table 3H-3
MEASURED AMBIENT NOISE LEVELS (dBA)

<table>
<thead>
<tr>
<th>Monitoring Location</th>
<th>$L_{eq}$</th>
<th>$L_{90}$</th>
<th>$L_{50}$</th>
<th>$L_{10}$</th>
<th>Time of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Union Mine Road</td>
<td>55.5</td>
<td>57.0</td>
<td>44.0</td>
<td>36.0</td>
<td>8:00 - 9:00 a.m.</td>
</tr>
<tr>
<td>B. Landfill 1</td>
<td>46.6</td>
<td>37.0</td>
<td>41.5</td>
<td>49.0</td>
<td>1:20 - 2:20 p.m.</td>
</tr>
<tr>
<td>C. Landfill 2</td>
<td>50.5</td>
<td>49.0</td>
<td>50.0</td>
<td>51.0</td>
<td>1:30 - 2:30 p.m.</td>
</tr>
<tr>
<td>D. Landfill 3</td>
<td>71.9</td>
<td>63.0</td>
<td>70.5</td>
<td>75.0</td>
<td>4:10 - 5:10 p.m.</td>
</tr>
<tr>
<td>E. Residence 1</td>
<td>44.0</td>
<td>38.5</td>
<td>42.0</td>
<td>46.5</td>
<td>11:00 - 12:00 p.m.</td>
</tr>
<tr>
<td>F. Residence 2</td>
<td>49.4</td>
<td>38.0</td>
<td>44.0</td>
<td>52.0</td>
<td>11:45 - 12:45 p.m.</td>
</tr>
<tr>
<td>G. Residence 3</td>
<td>47.6</td>
<td>40.0</td>
<td>45.0</td>
<td>49.5</td>
<td>12:00 - 1:00 p.m.</td>
</tr>
</tbody>
</table>

Location "A" was taken 50 feet from the centerline of Union Mine Road in the residential neighborhood 1/4 mile southeast of the intersection of Union Mine Road and SR 49.

Location "B" was taken approximately 700 feet from the active landfill site on the northeast County property boundary.

Location "C" was taken adjacent to the landfill expansion area and the proposed leachate collection sump and pump station in the new property to be acquired by the County.

Location "D" was taken 100 feet from the active landfill site during the period of highest activity.

Location "E" at the residence of 5824 Maric Road, approximately 2000 feet west of the active landfill.

Location "F" at the residence of 5995 Maric Road, approximately 2000 feet west of the active landfill.

Location "G" at the residence of 5941 Maric Road, approximately 2000 feet west of the active landfill.

* Each monitoring period was 60 minutes.
+ Measurement locations are depicted on Figure 3H-1.
operations is focused on the active working face. Based on the sound level measurements, the maximum hourly sound levels at the nearest property line to the active working face (600 feet) is far below the county standard of 75 dBA $L_{eq}$.

The noise generated at the landfill site and by waste collection trucks on Union Mine Road is audible at the residences adjacent to Union Mine Road and at the residences west of the landfill on Maric Road. The maximum exposure level for residential land uses that is considered "normally acceptable" by the county noise standards is any noise that does not exceed 65 dBA $L_{eq}$ for more than 8 one-hour periods during one 24-hour day. Some residences are as close as 50 feet to the centerline of Union Mine Road and are exposed to hourly average noise levels as high as 55.5 dBA $L_{eq}$ during peak traffic hours. The traffic volume during the 1-hour measurement period on Union Mine Road was 88 vehicles, 24 percent of which were waste collection vehicles. The peak hour is considered the "worst case" daily operating period; therefore, the landfill's associated traffic generations produce maximum noise levels below the county standard.

Ten to fifteen residences are located on the ridge roughly 2,000 feet west of the landfill site. Existing noise levels range from 44.0 to 49.4 dBA $L_{eq}$ and reflect the noise of the occasional residential traffic, the wind through the trees, and the sounds of the chickens, dogs, and cows on the properties. The maximum noise exposure at the residential property lines adjacent to the landfill may be as high as 50 dBA $L_{eq}$ during the most active operation period, but these noise levels are also far below the standard and are currently compliant with this county noise standard.

2. Impacts

The proposed landfill expansion would require the same equipment and operations as the existing landfill operation. The onsite buy back center and the salvaging operation are not expected to change the intensity of their operation. The expansion site will be located in the canyon from the southern edge of the current site to a line approximately 500 feet to the south. The east-west width of the expansion area is approximately 1,300 feet which is consistent with the width of the current landfill site; therefore, the landfill expansion site will not be any closer than the existing landfill site to the residences on Maric Road, and in most cases will be further from these residences. The noise from the active working face is considered a point
source noise generator which follows the inverse square rule and is therefore expected to result in a propagation loss of 6 dBA per doubling of distance. The estimated maximum "worst case" project-related noise exposure level at the residential property line may be as high as 54 dBA $L_{eq}$ when the active face is located at the far western end of the expansion area. This would correspond to an estimated maximum project-related noise exposure level of 50 dBA $L_{eq}$ near the actual residences. As the active working face moves further east and away from the residences, the sound levels will decrease accordingly. These estimated maximum project-related noise exposure levels are far below the county standard and, therefore, no significant impacts are expected.

The expansion of the landfill is not expected to increase the onsite activity nor is it expected to increase the number of vehicle trips to the landfill site. Therefore, the average daily traffic volume (ADT) is expected to remain as it is now at 1,100 vehicles (TJKM 1991). The estimated maximum project-related noise exposure levels to the residences along Union Mine Road are, therefore, expected to remain roughly the same as the current noise exposure level measured as 55.5 dBA $L_{eq}$ at 50 feet from the roadway centerline. These estimated maximum project-related noise exposure levels are far below the county standard and, therefore, no significant impacts are expected.

The future (2010) predicted traffic volumes, however, are significantly higher for Union Mine Road than they are today. By the year 2010 it is estimated that the ADT along Union Mine Road will be 2,400 vehicles (TJKM 1991). With the expanding population in the region will come an obvious increased need for waste disposal and consequently an increased daily rate of disposal and number of waste collection vehicles along Union Mine Road. The expansion of the Union Mine Landfill is expected to provide waste disposal space for El Dorado County through the year 2010 (CH2M HILL, 1991a). The expansion of the landfill in association with regional buildout creates the potential for the increase in waste collection vehicles along Union Mine Road. Therefore, to evaluate the potential noise impacts associated with the increased volume of waste collection vehicles using Union Mine Road throughout the lifetime of the expansion area, the Federal Highway Administration's Stamina 2.0 noise prediction model was utilized.
The model input included future traffic volumes, vehicle mix, and average vehicle speeds. The analysis assumes that Union Mine Road will remain a two lane roadway, that the future peak hour traffic volume ratio of waste collection vehicles is consistent with the existing observed traffic volumes, and that Union Mine Road will have an average vehicle speed of 35 mph. The mitigating effects of intervening topography and barriers such as buildings, walls and berms were not considered. These assumptions represent "worst case" conditions for traffic volumes along Union Mine Road. The model output indicates that the estimated maximum future noise exposure level may be as high as 62 dBA $L_{eq}$ at 50 feet from the roadway centerline. Therefore, the future increased waste collection vehicular traffic along Union Mine Road associated with the expansion of the landfill will comply with county noise standards and does not represent a significant impact.

The proposed leachate collection and treatment system includes a pump station with ancillary pump sites at the eastern end of the expansion area and a leachate and septage treatment facility in the immediate areas of the current "gun club" site. As proposed by the county, all pumps in the leachate collection and treatment system will conform to the El Dorado County Irrigation District noise policy of 55 dBA at 50 feet for all periods of operation (Morgan 1991). The leachate and septage treatment facility will operate 3 uncovered aerated lagoons, each with eight 30 horsepower aerators. Data from previous measurements conducted by ERCE at various water treatment facilities indicate that aeration lagoons generate a noise level of approximately 65 dBA at 50 feet. If the project is designed and constructed as proposed, the estimated maximum noise exposure levels at the residential property lines adjacent to the pump sites and the leachate treatment facility are expected to be well below the county standard. Failure to design and install the pumps as proposed and in compliance with the county and the Irrigation Districts noise policy may result in a potentially significant impact. Noise impacts associated with the operation of the treatment plant will be analyzed in supplemental environmental review after completion of the design of the plant.

3. Mitigation Measures

There are no anticipated impacts associated with the Union Mine Landfill expansion provided that the leachate pumps are installed and operated in compliance with the noise standards and policies of El Dorado County and of the El Dorado County
Irrigation District. Adherence to the following mitigation measures should ensure compliance with the county noise standards:

- All pumps shall be designed and installed to comply with the El Dorado County Irrigation District noise policy of 55 dBA at 50 feet for all periods of operation.

- The pumps shall be field tested subsequent to final installation to ensure compliance with the El Dorado County noise standards and the El Dorado County Irrigation District noise standard.

No additional mitigation is required.
I. PUBLIC SERVICES

1. Existing Conditions

Electricity

Electric power is supplied to the Union Mine Disposal Site by Pacific Gas and Electric. A distribution line from the overhead utility line along Union Mine Road connects to the landfill's gatehouse at the entrance. Only the gatehouse is supplied with electric power. No outdoor lighting or other electrical equipment is used on the landfill. Electricity is used in the gatehouse to operate lights, air conditioners/fans, office machines, telephones and the like.

Water

The landfill uses approximately 8,000 gallons of water per day for daily operations, such as dust control and compaction. An 8-inch pipeline is currently under construction which would connect the landfill to the area’s potable water supply. The pipeline will extend from a potable water line in Maric Road (located on the hillside just to the west of the site) to the site. A fire hydrant will be installed near the entrance to the site, and will be supplied by the potable water pipeline. The water supplied by the pipeline would be used for operations (dust control and compaction) and for fire prevention/suppression. Bottled drinking water is currently provided for the landfill employees.

Sewer

The existing landfill is not connected to a sewage collection system. Sanitary facilities for site workers are provided by portable toilets which are serviced regularly. The operators of the landfill do not provide or maintain sanitary facilities for the general public.

Fire and Emergency Medical Services

The Union Mine Disposal Site is located in a rugged, sparsely developed area covered with dense combustible natural vegetation. The vegetation can constitute a
heavy fuel-load fire hazard when mature. The dry summer and fall months are the critical periods of concern for brush fires.

The landfill is provided fire and emergency medical protection by the Diamond Spring-El Dorado Fire Protection District. The nearest fire station to the site is the Diamond Springs Station located on Pleasant Valley Road, approximately 3 miles northeast of the landfill site. The Diamond Springs Station has a minimum of two personnel on duty 24 hours per day (Wylie 1991). All of the paid staff at the station are either Emergency Medical Technicians (EMTs) or paramedics. All of the station's personnel (paid and volunteer) also have basic levels of training in hazardous materials management.

The response time to the site from the Diamond Springs Station is estimated to be approximately 5 to 7 minutes (Wylie 1991). The station has one 1,000-gallon per minute pumper truck and a 250-gallon per minute squad truck. Additional equipment can be obtained from other stations within the district and from the California Department of Forestry and Fire Protection in the event of a large fire. Response times of back up stations is approximately 8 to 20 minutes depending on how many engines are needed and the response of volunteer firefighters.

Fires have broken out at the site on several occasions. Many of the small fires can and have been controlled by landfill personnel. The landfill maintains two 4,000-gallon water trucks and 2 bulldozers which can be used for the suppression of very small fires. Over the last two years a successful fire prevention program has been instituted at the landfill which has significantly reduced the threat of fires at the site (Wylie 1991). For moderate or larger fires the fire district would be called. All of the Diamond Springs Station personnel have fought fires at the site at one time or another (Wylie 1991). The fire district currently has the capability and equipment to suppress most moderate fires at the site. Larger fires have broken out and additional personnel and equipment from the Department of Forestry have been utilized, especially for air drops of fire retardant materials and bulldozers for moving unwanted debris.

The installation of the 8-inch water pipeline and fire hydrant that is currently under construction and discussed above under "water" will also enhance the fire suppression capability at the landfill site.
Land Use Designations of Landfill and Surrounding Area
Police Protection

Police protection is provided by the El Dorado County Sheriff's Department. The Sheriff's Department headquarters is located on Fair Lane in Placerville. The Sheriff's Department currently has 141 sworn officers. A minimum of 6 officers (patrols) are on duty during the day and swing shifts, and 5 officers (patrols) are on duty during the graveyard shift (Wilson 1991). The Sheriff's Department has an average response time for priority A calls (highest priority) of 14 minutes throughout the entire County (Wilson 1991). Response times for priority B and C calls (moderate and low priority) average 20 and 50 minutes, respectively. El Dorado County has an officer to resident ratio of 1.0-1.2/1,000, which is less than the state average of 1.8/1,000 (Sedway Cook 1990).

2. Impacts

Electricity

As part of the proposed expansion project, a leachate/septage treatment plant and pump station are proposed to be constructed on the county property. The treatment plant facilities and the pump station pump would be run on electric power and would be backed up by propane generators. Existing overhead electric utility lines are located in the nearby roadways (Union Mine Road and Church Mine Road), and would be extended to the treatment plant and pump station sites to supply them with power. While electric power would be utilized by these facilities around the clock, the amount of power necessary to run them is not expected to significantly affect the power utility. The treatment plant’s electrical usage will be evaluated in a supplemental CEQA environmental review after completion of the design of the treatment plant.

The proposed project does not entail nighttime operations, and no other new uses of electricity are expected to be developed. Therefore, no significant increases in the use of electricity are expected with the project as proposed.
Water

The amount of water expected to be used for the landfill is not expected to significantly increase with the proposed expansion. The expansion is needed only to extend the life of the site and the volume of waste accepted is not expected to increase significantly from current conditions. Therefore, no impacts associated with the supply of water or the water supply system is expected with the proposed expansion.

Sewer

The expansion of the landfill will not require hookups to the sewerage system. Sanitary facilities will continue to be provided by portable toilets.

Some or all of the effluent produced from the proposed leachate/septage treatment plant would potentially be piped to the Deer Creek Waste Water Treatment Plant via the EID forcemain in Union Mine Road right-of-way for final treatment. The volume of effluent to be transported to the Deer Creek WWTP is unknown at this time. However, the volume of effluent is not expected to significantly affect the Deer Creek WWTP. This is because it can be stored temporarily at the landfill treatment plant site during periods of high flow and discharged to the WWTP during low flow periods.

Fire and Emergency Services

The proposed expansion activities are not expected to increase the risk of fires at the site, nor are they expected to affect the level of service of fire and emergency medical services. The recent fire prevention measures have reduced the fire threat significantly. The fire district feels that the fire protection and emergency medical service provided to the site by their agency is adequate to protect the site (Wylie 1991). The completion of the fire hydrant at the site will provide the site with enhanced capability to respond to fire hazards.
Police Protection

The proposed landfill expansion is not expected to affect the level of police protection currently provided to the site. The level of police protection is considered to be adequate to service the site.

3. Mitigation Measures

The proposed landfill expansion and construction of ancillary facilities is not expected to have a significant impact on the area's public services; therefore, no mitigation measures are required. However, the following measures should be implemented to ensure public and worker safety.

- The fire prevention measures currently in practice at the site should be maintained.
- The installation of the fire hydrant connected to the public water supply should be completed.
- Site workers should receive training in first aid and CPR.
J. AESTHETICS/VISUAL QUALITY

The criteria for analyzing visual resource impacts fall into two general categories: compatibility with the existing visual setting and viewer sensitivity. Compatibility with the existing visual setting is assessed by evaluating the potential for alteration of existing views or physical characteristics which would occur if the proposed project were implemented. Analysis of viewer sensitivity involves the proximity of viewers and the duration of views to the site.

1. Existing Conditions

Site Characteristics (Topography)

The existing Union Mine Disposal Site and expansion area is located in the western foothills of the Sierra Nevada Mountains approximately 6 miles south of the town of Placerville, in El Dorado County. The existing disposal site occupies approximately 33 acres of the 217-acre county-owned property (refer to Figure 1-3).

The site is located in a topographically varied area. The area surrounding the site to the north, east, and west rises steeply in elevation and features a variety of ridges, canyons, and hillsides while to the south the land generally decreases in elevation, but also features a variety of ridges, canyons, and hillsides (Figure 3J-1). The present average elevation of the active surface of the Union Mine Disposal Site is approximately 1,345 feet above mean sea level (MSL), and the bottom of the landfill is located at approximately 1,200 feet MSL. The active surface of the landfill is approximately at the same elevation as the access road entering the site; therefore, persons entering the site from the front gate enter and only see the top (active) portion of the landfill (Figure 3J-2). The surface of the landfill is relatively flat with some limited areas of higher topography in the northern portion of the site. The side slopes of the landfill have an approximate 3:1 (horizontal to vertical) slope ratio.

The proposed expansion area is a drainage located immediately south and adjacent to the existing side slopes of the fill. A small unnamed ephemeral tributary to Martinez Creek flows in a general east-west direction in the bottom of this drainage.
The proposed leachate/septage treatment plant site would be located on top of a ridgeline to the south. The treatment plant site overlooks the existing landfill and expansion area, and is located near the southern boundary of the county’s property.

Site Characteristics (Facilities)

The approximately 217-acre county-owned property currently supports the 33-acre existing landfill and accessory structures, several abandoned gold mine shafts and waste tailings, several dirt roads and trails, and a shooting range (El Dorado Rod and Gun Club). All of the landfill support facilities, with the exception of monitoring wells located near the toes of the landfill, are located on the top active surface of the landfill. The landfill support facilities include a gatehouse, a recycling center located in a portable trailer, numerous metal bins for recycled, salvaged and separated materials, equipment storage, and portable sanitary facilities (Figure 3J-3). Several small aboveground tanks (fuel storage, etc.) are located on a graded pad on the side of the hill just to the north of the entrance.

The proposed expansion would occupy approximately 14 acres in the drainage immediately south of the landfill (Figure 3J-4). The leachate/septage treatment plant would be constructed on the gun club site, which currently consists of several trap shooting ranges and small buildings on a ridge top (Figure 3J-5a). Additional treatment facilities may be located in a hollow downslope from the main gun club site which is currently occupied by a rifle range (Figure 3J-5b).

Vicinity Characteristics

To the immediate north and east of the site the topography rises steeply in elevation. Tombstone Mountain, located immediately north of the site, is a prominent landform in the area and rises to an elevation of 1,785 feet MSL (Figure 3J-1). Logtown Ridge, immediately west of the site, rises steeply from 1,400 MSL to approximately 1,800 feet MSL, and then rises more gradually to a final elevation of close to 2,000 feet MSL.
a) Proposed Treatment Plant Site as viewed from Rattler Ridge Road

b) Proposed Location for Treatment Plant Facilities as viewed from Rattler Ridge Road
Martinez Creek, a perennial stream, flows in a north-south trending canyon drainage just to the east (less than 500 feet) of the property boundary. The surface of the creek is at an approximate elevation of 1,120 feet MSL. Two generally north-south trending ridgelines are prominent landforms east of the creek. The closest ridge (located less than 1,000 feet to the east) rises to approximately 1,500 feet MSL, and the larger and more distant ridgeline (approximately 1 mile to the east) rises to over 2,000 feet MSL. Several homes are located off Oak Hill Road which traverses the top of the distant ridge to the east. South of the project site, the topography is quite variable, but generally slopes down to the south and is cut by numerous canyons and drainages.

The hillsides and canyons surrounding the landfill site are densely vegetated with shrubs and trees, giving the area a lush and natural character. The vicinity surrounding the landfill is generally undeveloped with only a few scattered residences on the hillsides. Some of these residences are located on the ridgeline to the west (Logtown Ridge) and a few others are located on the far ridge to the east. The landfill is prominently visible from approximately 6 houses on the ridge immediately west of the landfill. The site is also visible from a few residences on the distant ridgeline to the east of the site, although views from these residences are attenuated by distance, vegetation, and topography.

**Sensitive Viewsheds**

Long range views from the landfill site are generally limited to the surrounding ridges and hillsides. Long range views from the expansion area are limited to the drainage itself and the adjacent side of the landfill. Long range views from the gun club/treatment plant site afford unobstructed views of the landfill (Figure 3J-1). Views from the gun club site are also more distant to the north and south with views of distant hillsides, but limited to the nearby ridges to the east and west.

Long range views of the landfill site and the county property are limited because of the steep intervening topography and dense vegetation. The primary viewers of the landfill are nearby residents whose houses are located on the ridges to the east and west and overlook the site (Figure 3J-6a). Most of the views from the homes on the ridge to the east are blocked by intervening topography, vegetation and
a) View from Property Adjacent to 3995 Marle Road Looking East

b) View from Union Mine Road Looking Southeast

Views of the Union Mine Disposal Site
distance. Brief views of the site are afforded to motorists traveling on Union Mine Road, Church Mine Road, Maric Road (which accesses the houses on the ridge just to the west of the site), and Rattler Ridge Road (the road behind the gun club site). (Figure 3J-6b). The landfill is not visible from the town of El Dorado, nor from Highway 49, a proposed scenic highway.

Applicable Plans and Policies

Development in El Dorado County is guided by a variety of regulatory documents, including the Diamond Springs/El Dorado Area Plan (1979), the El Dorado County Long Range Land Use Plan (1981), and the Open Space and Conservation Element (1973 and 1984) of the General Plan. However, none of these plans provide specific policies or guidelines for the protection of visual resources.

Dust and Litter

The landfill has an ongoing litter collection program to minimize litter in the surrounding area. The active face (the area of uncovered refuse) of the landfill is kept very small (less than 1 acre), which helps to limit the amount of fugitive litter that can be generated (Figure 3J-7). During site visits in February and April 1991, no significant quantities of stray litter were observed in the area surrounding the landfill and none was observed on Union Mine Road. Fugitive litter has, however, been a nuisance in the past, and complaints had been made to the county. The litter collection program was initiated and seems to be effective in eliminating stray litter.

The landfill also has a fugitive dust prevention program. The program consists of watering internal areas travelled by disposal vehicles. Due to the shaley nature of onsite soils, the soil particles are heavier and not as susceptible to air suspension. Rainfall in this area, especially during the winter and spring months, also minimizes the frequency of conditions under which dust becomes a management problem. During both the February and April 1991 site visits, the ground was damp from recent rains so that dust was not produced during fill activities. The watering program is implemented on an as-needed basis, primarily during the dry months. Fugitive dust is discussed in more detail in Section 3.D, Air Quality.
In addition, during the wet months, mud from the site may be carried out onto the roadway by trucks and cars creating slippery conditions. Currently no program exists to prevent mud from being tracked onto the roadway.

Lighting

The Union Mine Disposal Site restricts operations to between the hours of 8:00 a.m. to 5:00 p.m. (6:00 p.m. during daylight savings time). No landfill operations take place at night. There are currently no lights on the landfill site, and none are planned to be installed as part of the proposed expansion activities.

2. Impacts

The proposed landfill expansion would increase the permitted fill area from 33 acres to 47 acres and would necessitate the construction of several ancillary facilities (contact water basin, leachate pump station and leachate pipelines) on the county-owned site. Also, as part of the expansion project, a small leachate/septage treatment plant would be constructed on the gun club site south of the landfill. **This treatment plant will be subject to supplemental environmental review under CEQA upon completion of design.** Upon reaching final capacity, the landfill would be closed and the site revegetated for use as non-irrigated open space. The potential visual quality impacts associated with the proposed project include landform alteration caused by grading, excavation, and fill activities; vegetation removal; and soil disturbance.

The overall sensitivity of the project site views are considered moderate. While the surrounding area is sparsely populated, clear unobstructed views of the site exist from residences to the west, and along Union Mine Road. Long range visibility of the site is limited by intervening topography. The existing landfill is a permanent and contrasting feature of the viewscape. The proposed expansion would increase the physical dimension of this feature and thereby its visual effect on the surrounding area.
Expansion

The proposed 14-acre expansion would extend the landfill into a natural drainage way just south of the existing fill area. During the initial stages of the expansion activities (expected to occur in 1994-1995) the vegetation would be cleared from the expansion area, exposing native soils. The area would then be graded and a groundwater underdrain, liner and leachate collection system installed. Once this is complete, commencement of fill activities would occur, starting in the westernmost portion of the expansion area, gradually extending east. The grading, vegetation removal, and subsequent refuse fill would represent a significant change in the existing landform and visual character of the expansion site. The elevation of the expansion area is currently approximately 1,150 feet MSL. The landfilling activities will raise the elevation in this area to over 1,460 feet MSL as shown on the final closure contours (Figure 2-5). Therefore, the expansion would result in significant visual impacts due to the extent and permanent nature of the landform alteration. The landform alterations are permanent and unmitigable.

The expansion activity would also create a larger disturbed area visible from the surrounding environs and would increase the amount of landform alteration (33 acres of fill area increasing to 47 acres). The expansion would also extend the life of the landfill, increasing the duration of landfilling activities, and extending the period where disturbed, unvegetated soils are exposed. While the expansion would not significantly increase the visibility of the landfill from the surrounding area (i.e., additional areas would not be afforded views of the site), it would effect the severity and character of the existing view to the receptors currently afforded views of the site. The impact to the residences immediately west of the landfill would be the most affected, while the effect on viewers to the east and along Union Mine Road would not be as severe. The impact associated with the view of the expansion is considered unmitigable until closure, when revegetation measures would partially mitigate the effects.

The construction of the ancillary facilities, including contact water basin, pump station, and pipelines as part of the proposed expansion activities, would not severely affect views to the site or the visual quality of the views, due to their small size, intervening topography and vegetative screening. The location of the ancillary facilities is shown on Figure 2-13.
Treatment Plant

The proposed leachate/septage treatment plant would most likely be constructed on an 0.8-acre site on the ridgetop currently occupied by the main facilities of the gun club. The treatment plant would be approximately 1,000 square feet in size, of which 400 square feet would be used for storage and a two car garage for maintenance vehicles. Additional treatment facilities may be constructed in a hollow below the ridgetop where a rifle range currently exists. The hollow below the ridgetop is not visible from the surrounding area, except from the access road leading to the main gun club site and from Rattler Ridge Road. The ridgetop itself, however, is a prominent visual feature and is highly visible from the surrounding area. The construction of a 1,000 square foot building at the top of the ridge would not significantly alter the existing character of the site, due to the presence of the existing gun club buildings (refer to Figure 3J-4). The small size of the building and mitigative vegetative screening would reduce impacts associated with the visibility of the structure to levels that are adverse but not significant. The construction of ponds or lagoons in the hollow would not cause any visual impacts or significantly alter the character of the site. After design of the treatment plant has been completed, a supplemental visual analysis will be completed. This analysis will include an evaluation of the visual character of the treatment plant, its effect on the aesthetics of the area and possible measures to be incorporated into the design to reduce any identified visual effects.

Closure

Upon reaching capacity of the existing landfill and expansion area, the entire site would be prepared for final closure. Closure involves placing a final cover of compacted soil, or soil and synthetic material, above the refuse to cover the refuse and act as a moisture barrier. The top of the final cover would be a 1-foot minimum soil layer that is capable of supporting vegetation. The highest final elevation of the landfill would be slightly greater than 1,460 feet MSL (in 1991 the landfill surface was at an elevation of 1,345 MSL). The final contours of the closed landfill are shown on Figure 2-5. The landfill would have the appearance of a series of small terraces. The top surface would be generally flat with a slight slope out from the center for drainage. The side slopes would be stepped (terraced), with 3:1
(horizontal to vertical) slopes. The site would be revegetated with native non-irrigated grass species. The vegetation would be maintained by the county throughout the post-closure period. The post-closure revegetation plan would partially mitigate significant visual impacts associated with the landfill operations by eliminating the view of disturbed soil conditions and returning the site to a vegetated state. However, the vegetation would differ from the surrounding area in that typical tree and shrub species would likely be replaced with more shallow rooted grasses, scrub, and wildflower species. The residual visual impact associated with topographic alteration is considered significant and unmitigable.

3. Mitigation Measures

Required

- The project site will be revegetated pursuant to state regulations and county policy. The revegetation plan will be prepared by a qualified biologist, horticulturist or landscape architect (see Section 3A, Biological Resources).

Recommended

- The site plan for the treatment plant structure should include vegetative screening to limit visibility from sensitive receptors.

- Revegetation will be initiated concurrently with placement of final cover.

- A vehicle wash-down program should be initiated during wet periods to prevent mud from being tracked onto the roadway.
K. LAND USE

1. Existing Conditions

The 217-acre landfill property is located in the west slope area of El Dorado County, approximately 3 miles south of the town of El Dorado, and 7 miles southwest of the City of Placerville. The 14-acre expansion area is proposed directly south of the existing 33-acre active fill area within the boundaries of the landfill property owned by the county (Figure 1-3). Closure plans are proposed for the entire expanded landfill. Local access to the site is gained from Union Mine Road, a two-lane paved roadway maintained by the county. The facility entrance is located off Union Mine Road in the northwestern corner of the property. Currently, 60 disposal vehicles (on average) access the site each day to deliver municipal solid waste.

Existing Land Uses. The landfill site and expansion area were formerly the site of mine workings, where gold ore extraction was practiced extensively from 1850 until the 1940s. Since 1969, the facility has been referred to as the Union Mine Disposal Site and operates as a solid waste sanitary landfill, accepting Class III municipal (non-hazardous) waste from the western portion of El Dorado County. The sole remaining evidence of the former gold mining activities are a series of abandoned mine tailings, shafts, and tunnels in and around the expansion area. The only other development on the property is the Rod and Gun Club, located atop a peak in the southern portion of site. The club currently operates a firing range for the general public. Access to the gun club is gained from an unnamed unpaved road via Union Mine Road, farther south of the landfill entrance. Naturally vegetated setbacks from the property boundary provide a buffer around the fill and landfill activities.

The expansion area is located in an unnamed drainage which slopes gently east to Martinez Creek. The northern boundary of the expansion area is the southern extent of the existing landfill and features a steep earthen slope. The undisturbed portions of the expansion area are heavily vegetated with manzanita, shrubs, and scattered trees. Surrounding onsite topography and setbacks isolate the area from nearby properties.
Beside the few scattered rural residences located along nearby ridgelines, the surrounding area is predominantly characterized by rugged topography and undeveloped, forested land. The closest homes to the landfill property are: located approximately 1,000 feet to the east, separated from the landfill by a small hill; approximately 2,000 feet to the northwest on a ridge approximately 200 feet above the existing landfill area; and 2,000 feet to the south of the proposed treatment plant site. Only one home has an unobstructed view of the active fill area of the existing landfill, the rest are shielded by vegetation. In addition, the abandoned Church Mine and two residences are located approximately 500 feet north of the northeast property boundary. These two residences are also separated from the landfill by topography. Other homes in the vicinity are located to the west, on Oak Hill Road approximately 1-1/2 miles from the site and on southeast facing ridges south and southeast of the landfill property. Much of the adjacent land is currently owned by the Bureau of Land Management (BLM) and the U.S. Forest Service (USFS), with the exception of a 20-acre privately-owned parcel east of the facility and the several smaller residential lots to the northwest and south. The 20-acre parcel is to be purchased by the county for the expansion.

Applicable Plans and Policies. Local land use policies governing development in the project area are contained within the El Dorado County Long Range Land Use Plan of the General Plan (1981) and the Diamond Springs-El Dorado Area Plan (1979). Policies of the Long Range Land Use Plan provide general land use patterns for the county and are intended to regulate Area Plan amendments. Each of the 24 Area Plans guide land use decisions which are unique to the geographic area of the county for which they were established. The project site is situated in the southeast portion of the Diamond Springs-El Dorado Area Plan.

The El Dorado County General Plan is currently undergoing an update, which is scheduled for completion this year in March 1993 (Rivas 1991). The new County General Plan is intended to be a county-wide plan with goals, objectives, and policies that apply to the county as a whole, rather than particular communities or geographic subareas (thus dissolving the Area Plan policy framework in the future) (Sedway Cooke Associates 1990). However, policies discussed in this document are those of the adopted plans and the recently updated zoning and land use maps.
The Area Plan Land Use Map (Figure 3K-1) designates the landfill site and expansion area as "L" for landfill, while the surrounding properties are specified as "J", or Rural Residential-Agriculture at a density of 1 du/10-160 acres (El Dorado County 1990c). Policies from the Diamond Springs-El Dorado Area Plan pertaining to the project are as follows:

Annexation to a county fire district is a prerequisite for all new zoning applications except those within the Rural Agricultural and Agricultural Exclusive designations.

Agricultural lands are to be protected from conflicting land uses. In sections 9,16,20,21,28,29 and 32 of T9n, R10E, MDBM, land surrounding agricultural preserves will be zoned 10-acre minimum in order to reduce the impacts of any future developments in that area on agriculture.

Zoning for the Union Mine Disposal Site is "A", Agriculture, while a majority of the surrounding lands are zoned "RA-20", Rural Agriculture, with a minimum lot size of 20 acres (Figure 3K-2). The exceptions are properties adjacent to the northeast corner of the project site, which are zoned "RE-10" for estate residential with a 10-acre minimum lot area (El Dorado County 1990b). The Agricultural zone permits a number of uses that are compatible with horticultural and agricultural pursuits, including detached residences, livestock raising and grazing, and crop planting and sales. Under a special use permit, agricultural product processing, animal slaughtering, mining, refuse disposal and recreational uses, among other uses, are allowed. Operation of the landfill facility within this zone is authorized under an existing special use permit. Despite the agricultural designations, the project site is not within an Agricultural Preserve nor is there a Timber Preserve on the property (El Dorado County 1981b).

Open space in El Dorado County, such as the property surrounding the landfill, is managed for the preservation of natural resources, for the production of resources, for outdoor recreation, and for public health and safety. Because of the site's historic gold mining activity and the open character of the local area, the Conservation and Open Space Element of the General Plan (El Dorado County 1984b) contains land use policies which are applicable to the project.
Open Space for Outdoor Recreation

Policy 3 – To preserve, maintain, and develop public access to recreational resources.

Open Space for Managed Production of Resources

Policy 4 – To promote the reclamation for useful purposes of existing and future extraction sites.

Open Space for Health and Safety

Policy 3 – To promote compatibility between adjacent land uses.

Policy 4 – The county will protect lives and property from unacceptable risks resulting from natural and man-made hazards.

It should be noted that there are no formal recreational facilities in the Diamond Springs-El Dorado Area Plan, and the closest hiking trail is west of Highway 49 (Rivas 1991).

Impact Analysis

The potential land use effects of expanding, then closing, a landfill facility could involve land use interface issues with local residences (such as any increase or change in site activities), redistribution of open space areas, increases in noise levels and degradation of views, and could present land use policy conflicts.

Expansion Characteristics. Proposed expansion of the Union Mine Disposal Site would entail extending the current operations onto the 14-acre area south of the existing active fill area. In general, the landfill activities would still be contained within the central portion of the county-owned site. The active (working) face of the landfill will be confined to a small portion of the expansion area, although the entire expansion area would be graded as part of construction in order to install the liner and leachate collection system.

The expansion plans include a proposal to construct a combined leachate/septage treatment facility on an 0.8-acre site where the gun club is located. The facility would treat leachate from the landfill and septage from western El Dorado County,
which is currently exported to Sacramento County for treatment. The treatment system would feature a 1,000 square-foot building containing plant control equipment, storage space, and a garage; three aeration lagoons; four settling ponds; and the installation of underground pipelines to convey the pre-treated waste to the Deer Creek Wastewater Treatment Plant. In addition, 3 to 5 trucks per day would transport septage from offsite to the treatment plant. The construction and operation of the treatment plant is not expected to result in any significant land use impacts. The treatment plant will be subject to a supplemental environmental review after the plant design has been completed.

The county proposes to acquire a 20-acre, privately-owned parcel of land and approximately 92.2 acres of BLM land contiguous to the Union Mine site to serve as additional buffer area around the expanded landfill facility (Figure 3K-1). A small leachate pump station would be sited on the 20-acre parcel near the western edge of the site boundary to convey leachate uphill to the treatment plant (Figure 2-13). The minimum distance from the eastern property boundary to the expansion area would be from the proposed site limits expanded landfill is approximately 500 feet.

A resolution of intention to rezone the buffer zone property has been recently adopted by the county (El Dorado County 1991e). An initial study was prepared in July 1991 by the County Community Development Department under CEQA for the potential rezone. No significant environmental impacts were identified by the County for the proposed rezone. It was later determined by the County Board of Supervisors that the proposed rezone must be reviewed as part of the landfill expansion/closure project EIR.

The 20-acre private parcel and 200+ acres of BLM land (which includes the 93+ acres to be acquired by the county) of public property would be designated rezoned from "RA-20" to "A", refer to Figures 1-3, C and D. The 93+ acres of the 200+ acre total area to be rezoned would be utilized as buffer around the existing Union Mine Landfill and no residential development would be allowed in the 93-acre landfill buffer area. The County has prepared a separate CEQA-driven negative declaration for this rezone.
The existing land use designation of the land to be rezoned will remain "T" (Rural Residential-Agriculture) as shown on Figure 3K-1. No general plan amendment is proposed subsequent to the rezone. As mentioned previously in Section 2, Project Description, no waste disposal activities will occur in the buffer zone area. The buffer zone will be used for preservation (i.e., 13.6 acres: all oak woodland within 20-acre parcel, and 4.0 acres of riparian habitat within 20-acre parcel) and for ground water monitoring wells, landfill gas monitoring wells, a water detention basin, and for a possible surface water conveyance system. The restricted uses of the biological preservation areas are described in Biological Resources, Section 3-A of this EIR.

The proposed rezone is consistent with the goals and policies of the Long Range Land Use Plan and the Diamond Springs/El Dorado Area Plan. No landfilling of waste or waste disposal activities will occur in the buffer area as part of this project.

The rezone will not adversely affect the environment, and will not permit waste disposal activities to occur in the buffer area. If in the future waste disposal activities are proposed for the buffer areas, detailed environmental review would be required, along with permits and authorization from several state and local regulatory agencies. Therefore, no significant adverse environmental impacts are expected associated with the rezone.

As discussed above, no residential development will be allowed on either the newly acquired county property (20+ acres) or the remaining BLM land total in the immediate project area. Nonetheless, a question was raised during the original rezone initial study regarding the typical differences between RA-20 and A. Thus, the following table is provided for informational purposes only.

<table>
<thead>
<tr>
<th>&quot;RA-20&quot; Zone</th>
<th>&quot;A&quot; Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 acre minimum lot size</td>
<td>10 acre minimum lot size</td>
</tr>
<tr>
<td>Sanitary landfill not an allowable use</td>
<td>Sanitary landfill is an allowable use with a special use permit</td>
</tr>
<tr>
<td>Raising and grazing of livestock and other animals</td>
<td>Raising and grazing of livestock and other animals</td>
</tr>
<tr>
<td>Growing of trees, fruit, vegetables, flowers, grain and other crops</td>
<td>Growing of trees, fruit, vegetables, flowers, grain and other crops</td>
</tr>
</tbody>
</table>
11 residences would be allowed on 220 acres

21 residences would be allowed on 220 acres

**Closure Characteristics.** Closure of the existing landfill would occur in phases, with the northern 16 acres being the first area subject to closure. Ultimately, the entire landfill, including the expansion area, would be closed in stages as described in the Project Description (Section 2). Excluding the access and small areas dedicated to post-closure environmental monitoring equipment, the site would be revegetated in accordance with state law and returned to unirrigated open space. No plans for future use of the landfill site (e.g., recreation) are proposed at this time. The leachate/septage treatment facility would be a permanent facility after closure of the landfill area.

**Potential Land Use Interface Issues.** In general, expansion of the Union Mine Disposal Site would have limited land use interface effects on surrounding residential uses. This is because the landfill expansion and new treatment plant and ancillary facilities would be confined to the county-owned property. The intervening setback area would also continue to provide a vegetated buffer between adjacent uses. The project would not significantly change the character of the site, since a landfill facility already exists on the property, nor would the expansion represent a significant increase in the landfill surface area (i.e., less than 1/2 the acreage of the existing fill). The 14-acre expansion area would be situated to the south of the existing landfill, away from the closest residences to the northwest. Operation of the leachate/septage treatment facility would, however, introduce a new industrial use, which is compatible with the landfill activities and buffered by distance (approximately 4,900 2,000 feet) and vegetation from the local residences.

The most obvious effect on those residences would be the extended lifespan of landfill activities and, thus, the longer time frame before closure and revegetation. Because the facility entrance would remain as it is now and no increases in daily traffic volumes are anticipated over the lifetime of the expansion (refer to the traffic analysis in Section 3E), no change in the magnitude of site operations would be perceived by local residents. Therefore, no significant land use interface impacts would occur upon expansion of the Union Mine Disposal Site.
Adoption and implementation of the closure plan would first cover the northernmost portion of the landfill closest to the homes. This would augment the intervening buffer area between the residents and the active landfill activities. Final closure of the remainder of the existing landfill and expansion area would be completed in approximately 22 years. At that time, the site would be revegetated and left as unirrigated open space. The exception would be the area dedicated to the permanent operation of the treatment plant and monitoring equipment. No adverse land use effects would occur upon closure of the landfill.

Potential Policy Conflicts. The proposed rezone on the private 20-acre parcel and 200+ acre BLM parcel would be compatible with the existing landfill and surrounding RA-20 zone. The rezone is consistent with the goals and policies of the Long Range Land Use Plan, the Diamond Springs - El Dorado Area Plan of the County's General Plan, and the County's Solid Waste Management Plan (CoSWMP). No general plan amendment will be necessary as result of the rezone. Amendment of the special use permit would eliminate any potential policy conflicts associated with increasing the landfill capacity and site acreage. Leaving the closed landfill as unirrigated open space would be compatible with other permitted uses allowable under the agricultural zone. The continued setback from the proposed buffer area would provide continued adequate distance between the landfill and area residences. would result in project compatibility. This is consistent with open space policies of the Conservation and Open Space Element. Therefore, no policy conflicts would occur upon expansion and closure of the Union Mine Disposal Site.

Mitigation Measures

No land use impacts were identified, therefore, no measures are required. Refer to mitigation recommendations listed under the noise and visual resources sections of this EIR to reduce potential land use impacts related to those topics.
L. CULTURAL RESOURCES

1. Environmental Setting

Archaeological Resources

Almost 700 prehistoric and historic archaeological sites have been assigned state
trinomial designations in El Dorado County to date. In addition, an estimated
300 sites are in the process of being recorded and logged, which will total an
approximate 1,000 sites recorded in El Dorado County (Russo, personal
communication). Prior to Euro-American contact, the project area was occupied by
Southern Maidu (Nisenan) and Sierran Miwok groups for over 10,000 years. The
project site contains no recorded prehistoric sites listed with the California
Archaeological Inventory North Central Information Center. The closest prehistoric
site, a bedrock milling station, lies approximately 3/4 mile from the Union Mine
Landfill (Cook, personal communication).

Historic Resources

The project area lies within the El Dorado Mining District and includes a stretch of
Martinez Creek. This mining district was the location of extensive 19th century
mining activities. During the reconnaissance survey conducted by ERCE, the
remains of the historic Union Gold Mine were noted within the project boundary.
The Union Mine is significant because it contains remnants representing historic
mining activities in this area from the early 1850s to 1940s. The mill was
characteristic of the type used throughout the Mother Lode District of California.
They became obsolete early in this century and, therefore, are rare.

Within the project area, five mine openings and three groups of stamp batteries will
be subject to demolition. The openings include the Springfield Shaft, the Golden
Gate, Minerva and Pendar adits, a stope, and an unnamed vertical shaft located on
the western project boundary. The stamp batteries were probably associated with
the Springfield Shaft and the Pendar and Golden Gate adits, perhaps all sharing one
mill. A series of three mill terraces with five associated apple trees were located on
a hill approximately 100 feet (30 meters) south of the Golden Gate stamp batteries.
These terraces were probably associated with the ore bins, stamp batteries, and tables of the original mill.

Because each of these features will experience direct effects due to the proposed project, an evaluation of the features as potential historic resources is included in this section of the EIR.

The Church-Union Mine site includes the following features:

1. Unnamed Adit;
2. Big Cut Stope;
3. Footings for stamp mill;
4. Series of three mill terraces with five apple trees;
5. Golden Gate Adit;
6. Footings for stamp mill;
7. Pendar Adit; and
8. Minerva Adit.

Detailed descriptions of these features are provided in Appendix F, Cultural Resources Technical Report. The following is a brief summary of the mine's history.

The history of the Union Mine dates from 1850. By 1853, a mixed anglo and hispanic community of 2,000 to 3,000 residents worked the stream placers at the Union Mine (Gudde 1975). In c.1852, the mines were improved by the addition of a ten-stamp mill which was steam-powered until 1857. Between 1853 and 1854, the mining claims were worked using arrastras by Hoover, Crow and Company. In 1855 through 1856, the mines were owned by a partnership called Dr. Frost and Brother. Subsurface mining began when the first shafts were dug in the early 1850s (Sioli 1883). In 1865, Professor Benjamin Silliman published a glowing report of the mine, then controlled by the Church-Union Gold Company of New York. The Church-Union Mine reportedly recovered gold valued at $600,000 between 1851 and 1868 (Logan 1934). Poor management led to the abandonment of the entire venture in about 1868.
After a period of inactivity, the Church-Union Mine was owned and operated from 1871 to 1886 by a partnership called Hayward and Hobart (Logan 1934). The partnership, who called the mine the Springfield District, used fifteen 600-pound stamps to work the ore (Logan 1934). Sources report the Hayward and Hobart period lasted between 1871 and 1886. With four others, a man named L.R. Poundstone registered a claim "to be known as the Church Union Placer Mining Claim," on February 10, 1877. The date of this claim registration appears to contradict other available information concerning the extent of the Hayward and Hobart ownership period (El Dorado Recorder's Office 1877).

After an idle period of about ten years, the mine was controlled by another firm called the Union Gold Mining Company, which reported a production valued at $36,000 in 1897 (Logan 1934). From 1896 to 1909, the Union Mine and the Schoolgirl Mine to the west were under joint ownership. By 1915, the mine was owned by the John A. Finch Estate and was managed by a Washington state firm (Hamilton 1916). In 1934, a company called the Gold Fields American Development Company "dewatered" the Union shaft to permit additional underground mining (Logan 1934). Between 1936 and 1937, the Montezuma-Apex Mining Company extracted ore from the Union Mine and trucked it to their mill in Nashville, about 4.5 miles to the south. Onsite mining became sporadic after 1937 and by 1940 the mining activity ceased.

El Dorado County purchased the land in 1962 and the facility was operated as an open burn dump until 1969. The site was operated by the El Dorado County Department of Public Works until 1978, when El Dorado Landfill, Inc. was contracted to conduct landfill operations.

Applicable Laws and Regulations

The Union Mine Landfill Expansion/Closure is subject to CEQA criteria for determining the effects anticipated with the implementation of the proposed project. According to State of California law, an historic resource is defined as a building, structure, or object that is listed or is eligible for listing in the National Register of Historic Places, the State Historic Resource Inventory, or the State Historical Landmarks List. The National Park Service maintains the National Register of Historic Places. Properties are considered for inclusion on the National Register
according to criteria for evaluation published in 36 CFR 60.4 of the NHPA. These criteria state that:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in ...[resources] that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

a) that are associated with events that have made a significant contribution to the broad patterns of our history; or

b) that are associated with the lives of persons significant in our past; or

c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

d) that have yielded, or may be likely to yield, information important in prehistory or history.

State Public Resource Code Section 5024 requires that all state agencies keep an up-to-date inventory of resources over 45 years old on file with the State Historic Preservation Officer (SHPO), so that the SHPO may determine which resources may be eligible for the National Register. In addition, public agencies must obtain comments from the SHPO when considering destruction or alteration of resources eligible for the National Register. The SHPO generally must approve a mitigation plan if it identifies a significant impact to them. The State of California maintains the State Historic Resources Inventory listing that includes both archaeological and historic resources.

El Dorado County does not have an ordinance, a stated policy, or a committee dedicated to historic and prehistoric cultural resources (Alcott 1991). However, several efforts undertaken by the County in recent years demonstrate local recognition of the area's cultural resources. A booklet published in the 1980s, entitled "Historic Design Guide, El Dorado County" contains guidelines pertaining to the care and conservation of historic architectural resources. Several publications represent efforts to inventory historic resources on a county-wide level, i.e., the Open Space and Conservation Element (El Dorado County 1984b) and the El Dorado County Recreation Plan (El Dorado County n.d.).
Protection measures for archaeological resources were initiated in 1989 when the El Dorado County Community Development Department began requesting archaeological record searches as a requirement for the approval of parcel splits. These record searches are conducted by regional information centers in cooperation with the State Office of Historic Preservation to help preserve and catalog the state's prehistoric and protohistoric resources. Archaeologists at the North Central Information Center, the resource center that serves El Dorado County, have the opportunity to advise and comment on the potential for the presence of cultural resources (Russo 1990).

2. Impacts

Direct impacts are those involving the demolition or removal of historic features, earthmoving, and related activities associated with the proposed landfill expansion/closure that could adversely affect cultural resources. Indirect impacts include those caused by the increased access to an area where cultural resources exist, including the staging of equipment. Both long-term and temporary indirect effects can erode the integrity of the resource and can diminish a resource's qualifications for official historic recognition.

No prehistoric cultural resources were found within the project site during the current field survey, and none are known to have been recorded previously for the property. As with other parcels in the Sierran foothills that have been disturbed by mining activities, however, there is a potential that significant prehistoric subsurface materials may exist at this site. In the event that potentially significant cultural materials are discovered during project development, further investigation shall be made to reevaluate these mitigation measures.

Direct impacts are anticipated for historic resources that are associated with the Union Mine including the Springfield and Unnamed shafts, the Minerva, Golden Gate and Pendar adits, associated stamp battery footings, a stope, and a series of three mill terraces. Regulations regarding the estimation of adverse impacts are essentially the same whether the impacts are considered to be direct or indirect. Section 800.9 (a, b) of Section 106 of the National Historic Preservation Act (NHPA) states that:
An undertaking has an effect on an historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the National Register. An undertaking is considered to have an adverse effect when the effect on an historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling or association.

Appendix G(j) of the California Environmental Quality Act (CEQA) establishes the state's criteria for measuring the significance of effects on cultural resources. A project would have a significant effect on the environment if it would:

Disrupt or adversely affect a prehistoric or historic archaeological site or property of historic or cultural significance to a community or ethnic or social group, except as part of a scientific study.

3. Mitigation Measures

Onsite Resources. Based upon survey reports, no prehistoric sites have been discovered on the project site, according to the California Archaeological Inventory Northwest Information Center. While the possibility exists that prehistorically significant sites could be found during the earthmoving activities of the landfill expansion/closure, the discovery of such a site is not anticipated.

Major elements of the Union Mine site located within the landfill expansion/closure area include three adits, two shafts, one stope, associated stamp battery footings, mill terraces, and tailings with associated waste rock heaps. These features would be impacted by the earthmoving activities of the proposed landfill expansion/closure.

The portals of the Big Cut Stope and Springfield shaft, the Golden Gate, Minerva, Pendar, and unnamed adits, must and will be sealed as part of the proposed project and cultural resource mitigation. The Springfield Shaft is 2,000 feet (610 meters) deep, and associated features may be comparable to, or even exceed this depth. The seals must be designed to support the overburden pressure of the proposed landfill/closure project.

If prehistoric or historic resources are encountered during construction, personnel should avoid collecting or altering the materials and their context until a qualified cultural resource consultant has evaluated the significance of the materials. These
resources include chert or obsidian flakes; projectile points, mortars, and pestles; dark friable soils containing shell and bone dietary debris; heat-affected rock; or human burials. Historic resources include stone or adobe foundations or walls, structures and remains with cut nails, and refuse deposits, often in old wells and privies.

Because the archaeological recording and historical research provided in the cultural resources technical report for this project have documented the Union Mine Disposal Site, no other investigations are recommended. If, however, unrecorded cultural material is unearthed during the groundmoving activity for the landfill expansion/closure, all work should be stopped and a qualified archaeologist should be retained to assess the potential archaeological value.

**Offsite Resources.** The region surrounding the proposed Union Mine Landfill Expansion/Closure has numerous historic mines, including the Union, Church, Look-out, and Crusader. Martinez Creek, a portion of which traverses the project area, and nearby Deadman and Squaw Hollow creeks were also locations of extensive 19th century mining activities. Another historic feature in the surrounding region is a branch of the Carson Emigrant Road, an important transportation route between Placerville and Jackson during the Gold Rush era. Future development in this area would have the potential to disturb these features. In accordance with CEQA, any major development proposals would require assessment of the cultural significance of the site prior to the undertaking.