RED STRIKE TEXT = CHANGES FROM FINAL EIR
BLUE STRIKE TEXT = CHANGES FROM MMRP

CHAPTER 3

ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

3.1 GEOLOGY, SOILS, AND SEISMICITY

3.1.1 SETTING

REGIONAL SETTING

Geology, Soils, and Groundwater

The South Bay Aqueduct (SBA) project corridor extends across the Altamont Hills, a series of northeast trending uplands that divide the Livermore Valley from the San Joaquin Valley. Elevation in the Altamont Hills ranges from 200 feet above mean sea level (msl) in the marginal foothills and drainages to about 1,600 feet at some of the higher interior peaks. Hillside slopes vary with location but range from gentle gradients (less than 15 percent) in the foothills to moderately steep (15 to 50 percent) in the higher elevations east of the SBA project corridor.

The Altamont Hills are underlain by bedrock that originated from clay, sand, and gravel sediments that eroded from upland areas and were deposited in ancient marine and non-marine environments. During the millions of years after the sediments were laid down, they were consolidated into bedrock. Tectonic forces within the earth crust uplifted and deformed the bedrock forming a series of folds referred to as anticlines (concave downward fold) and synclines (concave upward fold). The uplifted, folded bedrock is present throughout the Altamont Hills and this bedrock structure influences the regional topography.

Primary bedrock units underlying the Altamont Hills are referred to as the Panoche Formation (Dibblee, 1980a,b) the younger Neroly Formation (Dibblee 1980a,b; Graymer, et al., 1996), and Cierbo Sandstone (Graymer, et al., 1996) similar in age to the Neroly. The Panoche Formation outcrops at the surface and directly underlies the SBA project corridor north of Interstate 580 (I-580), while the Panoche Formation, the Neroly Formation and the Cierbo Sandstone underlie the SBA project corridor south of I-580. In many areas, the Panoche Formation contains shale with thin interbedded sandstone, while in other locations, the Panoche Formation is a massive (homogeneous in nature), moderately fractured sandstone with siltstone layers. The considerably younger Neroly Formation is a pebbly sandstone formed in an ancient non-marine setting. The Cierbo Sandstone of similar age to the Neroly is pebbly, fossil-bearing sandstone formed under

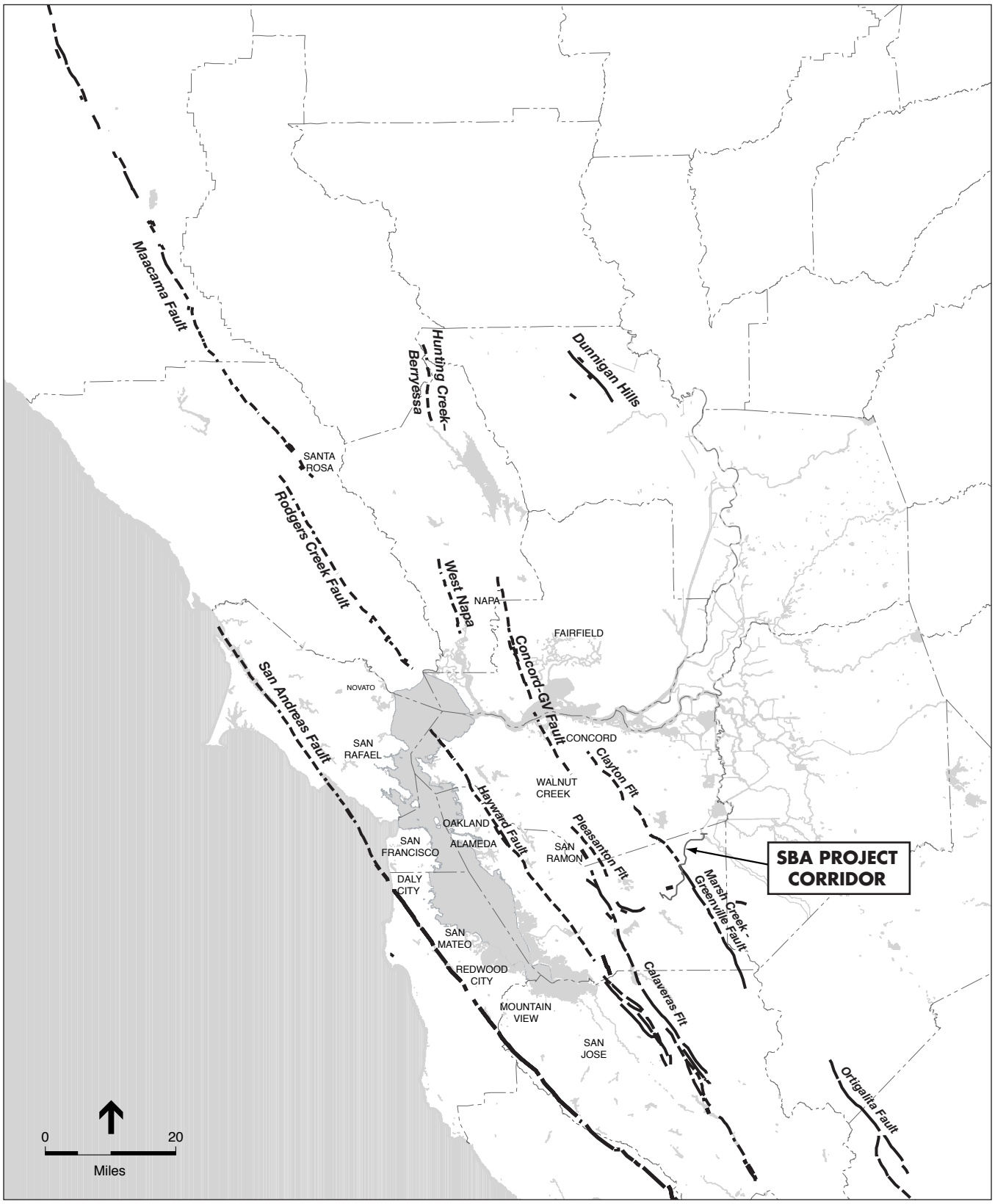
marine conditions. Along the west edge of the Altamont Hills, adjacent to the Livermore Valley, a cobble and pebble-sized gravel deposit, known as the Livermore Gravel, overlies the bedrock. A unit of semi-consolidated alluvium, referred to by Dibblee (1980b) as "older alluvium" is present between the Livermore Gravel and the geologically youngest surficial deposits. The surficial deposits consist of alluvium, landslide debris, and stream gravel that overlie the bedrock in small valleys, canyons and drainages. The youngest deposits vary in thickness and composition and are generally unconsolidated and erodable.

Soils in the SBA project corridor are comprised of upland soils and soils typically found on terraces, alluvial fans, and floodplains (USDA, 1966). In general, the areas underlain by bedrock units, including the Panoche, and the Livermore Gravel, are blanketed with the upland soil type. The low-lying Livermore Valley floor is blanketed by the terrace, alluvial fan, and floodplain soil type. The upland soil is identified in agricultural literature as the Altamont – Diablo association (USDA, 1966). It is found on the moderately sloping to very steep hills north and east of Livermore Valley and typically supports annual grasses and scattered oaks. These soils formed in material that has weathered from interbedded shale and fine-grained sandstone and are up to 5-feet deep. In general, these soils can be expansive, and subject to high post-construction settlement (USDA, 1966).

Groundwater is present beneath the Livermore Valley in unconfined and confined water-bearing zones within the many layers of deep valley alluvium. These conditions change abruptly eastward of the valley as the subsurface materials change from alluvium to bedrock underlying the Altamont Hills. Within the Altamont Hills, unconfined groundwater can: 1) be present as the water table in the young alluvium that fills drainages and small valleys; 2) can flow within the interface soils between overlying alluvial materials and the bedrock, or; 3) can flow within bedrock fractures. Under these conditions, the water table levels fluctuate seasonally and would approach the surface after a storm event, with water table levels decreasing rapidly following the rainfall event. Groundwater in the larger drainages would occupy water-bearing sediments at lower depths that, in some places, can provide a reliable groundwater source for extraction. Groundwater in the upper reaches of the drainages eventually flows down gradient to exit as springs that supply creeks.

Seismicity

The San Francisco Bay Area is a region of high seismic activity. The San Andreas Fault System, forming the boundary between the North American and Pacific crustal plates, is expressed as a series of northwest-trending faults (Jennings, 1994). These major active fault zones include the Greenville, Hayward-Rodgers Creek, San Andreas, Concord-Green Valley, Calaveras, and Maacama (**Figure 3.1-1**). Many individual faults of the San Andreas Fault System have produced strong earthquakes in the past and are expected to do so in the future. The U.S. Geological Survey (USGS) Working Group on Northern California Earthquake Probabilities has evaluated the probability of one or more earthquakes of Richter magnitude 6.7 or higher occurring in the San Francisco Bay Area within the next 30 years. The result of the evaluation indicated a 62 percent likelihood that such an earthquake event would occur in the Bay Area between 2003 and 2032 (USGS, 2003).



SOURCE: Jennings, 1994

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Figure 3.1-1
Regional Fault Map

The location and other information, including activity status and maximum expected moment magnitude (Mw), of regionally significant active faults in the SBA project corridor, is provided in **Table 3.1-1**. The Mw, similar to the Richter magnitude, is a comparative measure of the size of an earthquake, how much energy is released, and the level of ground shaking. Mw is preferred by the scientific community because it is related to the physical size of a fault rupture and movement across a fault and provides a physically meaningful measure of the size of a faulting event (CGS, 1997b). The *maximum* Mw is the largest earthquake that appears capable of occurring on a fault, based on empirical relationships between fault length, fault rupture length, and historic earthquake magnitudes.

Local Earthquake Faults

The active Greenville Fault Zone[1] traverses in a northwest direction through the Altamont Hills and is the closest fault to the SBA project corridor. The Greenville fault is a strike slip fault; the relative motion is parallel to the direction of the fault and during an earthquake, the ground on either side of the fault would be displaced laterally. The fault is recognized as a major structural feature that has demonstrated recent activity and is therefore zoned as an active fault under the Alquist-Priolo Earthquake Fault Zoning Act (discussed in Regulatory Framework section below).[2] In 1980, a pair of earthquakes of magnitude 5.6 and 5.9, on the Greenville fault, produced a small amount of surface rupture on the fault near Vasco Road north of Livermore. The Greenville Fault Zone intersects the SBA Livermore Canal at several locations between I-580 and Patterson Road in Livermore. The Department of Water Resources (DWR) is currently performing a Reliability Study of the canal reaches intersected by Greenville Fault Zone to address potential offsets associated with a maximum magnitude earthquake (DWR, 2004).

The Las Positas fault, located southeast of the Lawrence Livermore Laboratory, intersects the SBA Alameda Canal near the intersection of Greenville Road and Grant Road. The State of California considers the Las Positas fault an active Fault Rupture Hazard Zone (FRHZ) under the Alquist-Priolo Earthquake Fault Zoning Act. The two small earthquakes in Livermore in 1980, which were attributed to the Greenville fault, caused a small displacement on the Las Positas fault. The Las Positas fault may not be capable of generating surface offset. However, some researchers contend that features in curbs and roads, that indicate slow fault creep or surface rupture, appeared following the 1980 and 1981 events on the Greenville Fault Zone. The Las Positas fault intersects the Alameda Canal in two locations south of Lawrence Livermore National Laboratories, between East Avenue and Tesla Road.

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1 Earlier works have referred to the Greenville Fault Zone as the Marsh Creek-Greenville Fault Zone.

2 An "active" fault is defined by the State of California as a fault that has had surface displacement within Holocene time (approximately the last 10,000 years). A "potentially active" fault is defined as a fault that has shown evidence of surface displacement during the Quaternary (last 1.6 million years), unless direct geologic evidence demonstrates inactivity for all of the Holocene or longer. This definition does not define faults lacking evidence of surface displacement as necessarily inactive. "Sufficiently active" is also used to describe a fault if there is some evidence that Holocene displacement occurred on one or more of its segments or branches (Hart, 1997).

TABLE 3.1-1
ACTIVE FAULTS IN THE PROJECT SITE VICINITY

Fault	Location and Direction[a]	History of Recent Movement	Fault Classification[b]	Historical Seismicity[c]	Maximum Moment Magnitude[d]
Greenville	Intersects SBA south of I-580	Historic (1980 rupture) Holocene	Active	M5.9, M5.3, 1980 (Bolt, 1981)	6.9
Las Positas	Intersect SBA southeast of Lawrence Livermore Laboratory	Historic (1980 and 1981 rupture) Holocene	Active	Unknown	Estimated at 6.2
Calaveras (northern segment)	Approximately 12 miles south east of the SBA project corridor	Historic (1861 rupture) Holocene	Active	M5.6-M6.4, 1861 M4 to M4.5 swarms 1970, 1990	6.8
Hayward-Rodgers Creek	18 miles east of the SBA project corridor	Pre-Historic (possible 1836; 1868 ruptures) Holocene	Active	M6.8, 1868 Many <M4.5	7.1
San Andreas	36 miles west of the SBA project corridor	Historic (1906; 1989 ruptures)	Active	M7.1, 1989 M8.25, 1906 M7.0, 1838 Many <M6	7.9

[a] Project alignment is shown on the alignment maps (Appendix A).
[b] An "Active Fault" is defined by the State Mining and Geology Board as one which has displayed surface displacement within Holocene time (about the last 10,000 years).
[c] Richter magnitude (M) and year for recent and/or large events.
[d] Mw is related to the physical size of a fault rupture and movement across a fault. Mw provides a physically meaningful measure of the size of a faulting event [(CGS, 1997b) (CGS, 1997b)]. The Maximum Moment Magnitude Earthquake, derived from the joint CDMG/USGS Probabilistic Seismic Hazard Assessment for the State of California, 1996. (Peterson, et al., 1996).

SOURCES: Jennings, 1994; Hart, 1997

The Livermore fault is a northwest-trending structural feature that was first mapped in the western Livermore area on the basis of differential groundwater levels. Other evidence for the fault has included surface observations and geomorphic expression observed on aerial photographs. The Livermore fault was identified as a potentially active fault by Merrill & Seeley (1980) and is considered potentially active in the City of Livermore Seismic Safety Element; however, the fault is not considered to be capable of surface rupture (City of Livermore, 2004). The California Geological Survey has not found evidence of a well-defined fault trace.

Ground Motion

While moment and Richter magnitudes are a measure of the energy released in an earthquake, intensity is a measure of the earthquake ground shaking effects at a particular location. Intensity would vary depending on the overall magnitude, distance to the fault, focus of earthquake energy, and type of geologic material underlying an area. The Modified Mercalli Intensity (MMI) scale (**Table 3.1-2**) is commonly used to express earthquake effects due to ground shaking because it expresses ground shaking relative to actual physical effects observed by people, and therefore can be used to describe earthquake damage potential to a wide audience. MMI values range from I (earthquake not felt) to XII (damage nearly total). Earthquakes on the various active and potentially active San Francisco Bay Area and Central Valley fault systems can produce a wide range of ground shaking intensities within the SBA project corridor. The Association of Bay Area Governments (ABAG) provides earthquake maps for San Francisco Bay Area cities, which express ground motion in the MMI scale. According to the ABAG Earthquake maps, a magnitude 6.9 earthquake on the Greenville Fault Zone could produce ground shaking intensity in the proposed SBA project corridor ranging from Very Strong (MMI-VIII) to Violent closer to the fault (MMI-IX). As a comparison, a 6.5 magnitude earthquake on the North Hayward Fault Zone could be expected to generate light (MMI-V) to moderate (MMI-VI) ground shaking in the proposed SBA project corridor.

Strong ground motion is described as motion of sufficient strength to affect people and their environment or any ground movement recorded on a strong motion instrument or seismograph. The common way to describe ground motion during an earthquake is with the motion parameter of acceleration measured as peak ground acceleration (PGA), which is the largest value of horizontal acceleration obtained from a seismograph. PGA is expressed as the percentage of the acceleration due to gravity (g), which is approximately 980 centimeters per second squared. To illustrate this, one “g” of acceleration is a rate of increase in speed equivalent to a car traveling 328 feet from rest in 4.5 seconds. The maximum peak acceleration value recorded during the recent Loma Prieta earthquake was at epicenter, near Santa Cruz, at 0.64 g while the highest value measured in the East Bay was 0.29 g over Bay Mud, about 65 miles away from the epicenter. The San Francisco Bay area has not experienced an earthquake with location and magnitude similar to the Great San Francisco Earthquake since 1906. The 1906 earthquake caused intense ground shaking over a widespread area that caused considerable damage. Some of the highest ground accelerations occurred in Alameda, Contra Costa and Marin counties, which were essentially uninhabited at that time.

TABLE 3.1-2
MODIFIED MERCALLI INTENSITY SCALE (Abridged)

Intensity Value	Intensity Description	Average Peak Acceleration[a]
I	Not felt except by very few persons under especially favorable circumstances.	< 0.0017 g
II	Felt only by a few persons at rest, especially on upper floors on buildings. Delicately suspended objects may swing.	< 0.014 g
III	Felt quite noticeably indoors; especially on upper floors of buildings, but many people do not recognize it as an earthquake.	< 0.014 g
IV	During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound.	0.014–0.039 g
V	Felt by nearly everyone, many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned.	0.039–0.092 g
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; minor fallen plaster or damaged chimneys. Damage slight.	0.092–0.18 g
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken.	0.18–0.34 g
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, and walls.	0.34–0.65 g
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse.	0.65–1.24 g
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.	> 1.24 g
XI	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.	> 1.24 g
XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.	> 1.24 g

[a] g is gravity = 980 centimeters per second squared. Acceleration is scaled against acceleration due to gravity or the acceleration with which a ball falls if released at rest in a vacuum (1.0 g). Acceleration of 1.0 g is equivalent to a car traveling 100 meters (328 feet) from rest in 4.5 seconds.

SOURCE: Bolt (1988)

Geologists and engineers attempt to predict earthquake ground acceleration at sites to improve the structural design of buildings so that the building can withstand the earthquake motion and not collapse. A probabilistic seismic hazard assessment describes seismic hazard from earthquakes that geologists and seismologists agree could occur.[3] It is "probabilistic" in that the analysis takes into consideration the uncertainties in the size and location of earthquakes and the resulting ground motions that can affect a particular site. The results of probabilistic analyses are typically more realistic because it accounts for the full range of possible earthquakes, their location, frequency of occurrence, size, and the propagation of the earthquake motion from the rupture zone to the site of interest; the results take into account certainty in the vulnerability of structures. The fundamental difference between deterministic and probabilistic analyses is that deterministic analyses do not consider the probability associated with the earthquake hazard.

Non-engineered artificial fill along the SBA project corridor could intensify ground shaking effects in the event of an earthquake on one of the aforementioned faults. Areas directly underlain by bedrock would likely experience less-severe ground shaking due to the ability of the bedrock to attenuate seismic waves. The California Geological Survey (CGS) probabilistic seismic hazard assessment for California determined that the Livermore region could experience ground motion between 0.5 g to 0.6 g (1 chance in 475 of being exceeded each year). Refer to **Table 3.1-2** for a general comparison between this probabilistic ground motion and the MMI scale.

EXISTING ENVIRONMENT

This section describes the existing topographic, geologic, and seismic conditions specific to the individual elements of the proposed SBA Improvement and Enlargement Project.

South Bay Pumping Plant

The South Bay Pumping Plant (SBPP) is sited at an elevation of approximately 240 feet above msl in the low hills near the northwest end of the Bethany Reservoir. The SBPP was constructed on a level area adjacent to a natural hill slope approximately 100 feet in height. The plant and associated facilities are underlain by Panoche Formation sandstone and shale bedrock that dips (tilts) eastward at about 23 degrees. Given the location and elevation of the SBPP, soils are typically thin, if present, but past development and construction in this area have disturbed natural soil conditions. The presence of bedrock in this location would serve to attenuate seismic ground shaking compared to a facility sited on alluvium. No active faults traverse the SBPP site.

[3] Probabilistic expressed in terms of probability of exceeding a certain ground motion. For example, the 10 percent probability of exceedance in 50 years maps depict an annual probability of 1 in 475 of being exceeded each year. This level of ground shaking has been used for designing buildings in high seismic areas. The maps for 10 percent probability of exceedance in 50 years show ground motions that geologists and seismologists do not think would be exceeded in the next 50 years. In fact, there is a 90 percent chance that these ground motions would not be exceeded. This probability level allows engineers to design buildings for larger ground motions that geologists and seismologists think would occur during a 50-year interval, which makes buildings safer than if there were only designed for the ground motions that are expected to occur in the next 50 years. Seismic shaking maps are prepared using consensus information on historical earthquakes and faults. These levels of ground shaking are used primarily for formulating building codes and for designing buildings. The maps can also be used for estimating potential economic losses and preparing for emergency response (Peterson et al., 1999).

Other than small seeps that may be present in the adjacent bedrock slopes, groundwater is deep, and if present, is confined within the deep fractures of the bedrock.

Stage 3 Brushy Creek Pipeline

The proposed Brushy Creek pipeline would traverse the Altamont Hills through an area with moderate slopes (15 percent to 50 percent) at elevations ranging from 240 feet above msl at the SBPP and up to 800 feet above msl on the hilltops. The proposed pipeline alignment is underlain by Panoche Formation shale, and to a lesser extent, the Panoche sandstone (Dibblee, 1980a). Given the underlying Panoche bedrock, native soils along the pipeline consist of gravelly clay consistent with the Altamont-Diablo Association, however, these soils may have been disturbed during the installation of the existing pipelines. Geologic mapping of the Byron Hot Springs Quadrangle (Dibblee, 1980a) did not identify landslides or landslide deposits along the existing route of the Brushy Creek pipelines. Geologic mapping by Nilsen identified and mapped the approximate location of three small landslides and one larger landslide complex in proximity to the existing Brushy Creek pipeline (Nilsen et al, 1976). Landslide complexes are present in the Panoche Formation, but are less frequent than in areas of the Altamont Hills that are underlain by younger sedimentary bedrock. Ground shaking would be strong along the pipeline route, but the underlying bedrock likely attenuates some ground motion. The pipeline crosses an inferred trace of an unnamed inactive fault mapped by Dibblee (1980a), but does not cross an active fault zone capable of surface rupture. The unnamed fault does not appear to be active.

Groundwater is present at the soil/bedrock interface and in fractures within the bedrock, and can become a slope stability issue when the soils or alluvium overlying the bedrock become saturated and initiate slope failure.

Stage 3 Surge Tank

The Stage 3 Surge Tank would be located on a hill at an elevation of approximately 740 feet above msl. The Stage 3 Surge Tank site is underlain by Panoche Formation shale, which dips to the east about 22 degrees. Native soils have been disturbed from previous surge tank construction, but if there are undisturbed native soils, they are Altamont-Diablo Association and consist of clays and silts. The slopes flanking the project site are moderate (15 percent to 50 percent) and available mapping does not indicate the presence of landslide deposits. Ground shaking would be strong along the pipeline route and at the surge tank locations, with some attenuation due to the presence of bedrock.

Dyer Reservoir

The proposed Dyer Reservoir is sited in a drainage unit that slopes gently to the west. Dibblee (1980a) mapped the geologic materials underlying the proposed dam site as surficial deposits consisting of alluvium over Panoche Formation shale and sandstone. Geologic reconnaissance conducted by DWR, which included subsurface drilling and trenching, encountered unconsolidated to semi-consolidated alluvium and colluvium overlying Panoche Formation shale (approximately 80 percent) with occasional sandstone (DWR, 2004). The structure of the

Panoche Formation shale in this location is anticlinal and underlying the proposed dam site, and the beds dip towards the southwest at between 11 and 25 degrees (Dibblee, 1980a). Depths of loose material over the bedrock range from 2 to 22 feet. Faults capable of causing surface rupture are not located beneath or adjacent to the proposed Dyer Reservoir site. Ground motion at this site could reach 0.6g during an earthquake on the Greenville Fault Zone.

Dibblee (1980a), Nilsen et al. (1976) and recent DWR geologic reconnaissance did not identify active landslides or landslide deposits on or adjacent to the proposed Dyer Reservoir site. Groundwater varies in depth on this site from a few feet below the surface after rain storms to about 20 feet below during dry periods. Groundwater flows under unconfined conditions along the alluvium/bedrock interface and after a rain storm would saturate the alluvium overlying bedrock. Shallow groundwater can sometimes lead to liquefaction during an earthquake, provided the unconsolidated materials could liquefy. The alluvial materials at the dam site contain fine grained clay material and is therefore less susceptible to liquefaction than coarser-grained gravels and sand. Regardless, DWR would evaluate the proposed dam site for liquefaction potential.

Canal Improvements

Canal Embankment and Lining, Patterson Reservoir

These improvements are located on the Alameda, Dyer and Livermore Canals. The Dyer Canal extends along Dyer Road to I-580, while Alameda and Livermore Canals traverse south from I-580, along the edge of the Altamont Hills. The canals remain at approximately 700 feet above msl and are underlain by Panoche Formation, Neroly Formation, young, non-marine sedimentary rocks, and the Livermore Gravel. The canal and reservoir improvements would be conducted within the footprint of the existing canal facilities inside the DWR right-of-way with the exception of the siphon crossings, which require additional right-of-way. Therefore, geologic conditions (consisting of young, sometimes weak, marine sedimentary bedrock and alluvium) and soils underlying the canal are not considered directly pertinent to the analysis in this Environmental Impact Report (EIR). As the Alameda and Livermore Canals traverse the Greenville Fault Zone from the Altamont tunnel south past Patterson Reservoir, they cross and parallel individual fault traces. Within the fault zone, the existing canal structure could be subjected to greater intensity ground shaking and damage related to fault rupture. There is no direct evidence of fault offset in the canal (DWR, 2004). However, a minor panel crack (repaired in 2001) may suggest offset of the Greenville fault either due to creep or offset associated with the earthquake in 1980 (DWR, 2004). Groundwater occurs at depths of at least several feet below these facilities.

Canal Check Structures and Siphons

The proposed Arroyo Seco Check 5 siphon is underlain by young, unconsolidated to semi-consolidated valley alluvium consisting of gravel, sand, and clay. The proposed siphon is located within the Alquist-Priolo earthquake fault hazard zone established for the Las Positas fault by the State of California. DWR has not identified geotechnical-related problems related to the underlying geology at the existing siphon, which is currently operating at this location (DWR, 2004). The Telsa Road siphon is underlain by similar geology as the Arroyo Seco Check 5

siphon, but is not within the fault hazard zone for the Las Positas fault. The Arroyo Mocho Check 6 siphon is underlain by geologically recent alluvium consisting of stream gravel associated with Arroyo Mocho, which can contain saturated gravels and sand. ABAG maps the stream channel as having high liquefaction susceptibility. The underlying saturated sediments within stream channel corridors have the tendency to amplify ground shaking. Groundwater occurs a varying shallow depths below these facilities.

SEISMIC AND GEOLOGIC HAZARDS

Based on existing geologic and seismic conditions discussed above, this section describes and lists in order of relevance the potential geologic and seismic hazards that are present in the SBA project corridor.

Seismic Ground Shaking

Strong ground movement from a major earthquake could affect the SBA project corridor. Earthquakes on the region's active faults are expected to produce a range of ground-shaking intensities in the Livermore area and along the SBA. Ground shaking may affect areas hundreds of miles from the earthquake's epicenter. Historic earthquakes have caused strong ground shaking and damage in the San Francisco Bay Area, the most recent being the magnitude 6.9 Loma Prieta earthquake in October 1989. The epicenter of the Loma Prieta event was approximately 50 miles southeast of the project site, but this earthquake nevertheless caused strong ground shaking for about 20 seconds and resulted in varying degrees of structural damage throughout the Bay Area. Seismic ground shaking could be the most damaging seismic or geologic hazard affecting the Proposed Project and is discussed further in **Section 3.1.2, Impacts and Mitigation Measures**.

Surface Fault Rupture

Seismically induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. The magnitude, sense, and nature of fault rupture can vary for different faults or even along different strands of the same fault. Surface rupture can damage or collapse buildings, cause severe damage to roads and pavement structures, and cause failure of overhead as well as underground utilities. Utility service can be disrupted for an undeterminable length of time. Elements of the Proposed Project are in proximity to the active Greenville Fault Zone and Las Positas fault Zone. Therefore, surface fault rupture potential is discussed further in **Section 3.1.2, Impacts and Mitigation Measures**.

Slope Failure

Ground failure is dependent on the slope and geology, as well as the amount of rainfall, excavation, and seismic activities. Secondary earthquake hazards along the SBA project corridor include earthquake-induced landsliding. A slope failure is a mass of rock, soil, and debris displaced downslope by sliding, flowing, or falling. Steep slopes and downslope creep of surface materials characterize landslide-susceptible areas. In those areas, exposed rock slopes break away from a weakened portion of the slope, causing the rock mass to fall. Weathered rock

dislodged from steep slopes, either through static or seismic forces, can result in occasional rockfalls that propel individual rocks or rock masses down cliffs at varying velocities. Debris flows consist of a loose mass of rocks and other granular material that, if present on a steep slope and saturated, can move downslope. Some proposed SBA expansion elements traverse landslide-prone areas, especially the Stage 3 Brushy Creek Pipeline. Therefore, potential slope failure is discussed further in **Section 3.1.2, Impacts and Mitigation Measures**.

Settlement

Settlement of the ground surface can be accelerated and accentuated by earthquakes. During an earthquake, settlement can occur as a result of the relatively rapid rearrangement, compaction, and settling of subsurface materials (particularly loose, non-compacted, and variable sandy sediments). Settlement can occur both uniformly and differentially (i.e., where adjoining areas settle at different rates). Areas are susceptible to differential settlement if underlain by compressible sediments, such as poorly engineered artificial fill. Given that some SBA project components may be placed on pre-existing engineered and possibly non-engineered fills, both non-seismic and seismic settlement are discussed in **Section 3.1.2, Impacts and Mitigation Measures**.

Liquefaction

Soil liquefaction is a phenomenon primarily associated with saturated, cohesionless soil layers located close to the ground surface. During liquefaction, soils lose strength and ground failure may occur. Soils that are most susceptible to liquefaction are clean, loose, uniformly graded, saturated, fine-grained sand that occur close to the ground surface, usually at depths of less than 50 feet. In general, upland areas have a low liquefaction potential except where significant alluvium occurs in creek bottoms or swales, such as the Arroyo Mocho, discussed above. In these areas, liquefiable materials would be localized within the saturated creek bed. According to the ABAG Liquefaction Susceptibility Maps, liquefaction susceptibility level is very low in the uplands of the Altamont Hills and considered low in the valley portion of the SBA project corridor. Because of this low probability for seismic-induced ground failure, liquefaction is not discussed further in this chapter.

Groundwater

Groundwater can be attributed to potential seismic or geologic hazards if the groundwater levels are shallow and saturate shallow soil materials that can liquefy during an earthquake. Shallow groundwater can form failure surfaces on an unstable slope causing soil creep or catastrophic slope failure. Groundwater is discussed further in **Section 3.1.2, Impacts and Mitigation Measures**, regarding potential slope stability hazards and down gradient groundwater conditions.

Soil-Related Hazards

Expansive soils possess a “shrink-swell” characteristic. Shrink-swell is the cyclic change in volume (expansion and contraction) that occurs in fine-grained clay sediments from the process of wetting and drying. Structural damage may occur over a long period of time, usually the result

of inadequate soil and foundation engineering or the placement of structures directly on expansive soils. Expansive soils may be present in some proposed facility sites. However, given that all proposed facilities would involve standard grading and soil engineering to prepare the ground prior to construction, or the proposed facilities would be below grade, long term soil expansivity is not considered a potential geologic hazard in the SBA project corridor and is not discussed further in this chapter.

Soil erosion is a process whereby soil materials are worn away and transported to another area, either by wind or water. Rates of erosion can vary depending on soil material and structure, placement, and human activity. The erosion potential for soils is variable throughout the SBA project corridor; soil containing high amounts of sand and silt can be easily eroded, while clayey soils are less susceptible to erosion. Erosion can also lead to loss of topsoil and can be considered significant if the topsoil loss adversely impacts a valuable or protected soil resource. In some cases, especially during construction, minor soil erosion is merely a nuisance, however, excessive soil erosion can eventually damage building foundations and roadways. Erosion is most likely to occur on sloped areas with exposed soil, especially where unnatural slopes are created by cut-and-fill activities. Soil erosion rates can be higher during the construction phase. Typically, the soil erosion potential is reduced once the soil is graded and compacted or covered with concrete, structures, or asphalt. Long term or construction phase soil erosion could occur in some areas disturbed during project construction and is discussed further in **Section 3.1.2, Impacts and Mitigation Measures**. Loss of topsoil, however, is not considered a potential concern for the SBA project corridor, and is not discussed further in this chapter because the upland soils underlying the site are not valuable farmland soils.

REGULATORY FRAMEWORK

Resource-Specific Regulations

Reservoir and Dam Regulations

Since 1929, the State of California has supervised the construction and operation of dams to prevent failure, safeguard life and protect property. The California Department of Water Resources, Division of Safety of Dams (DSOD) oversees the construction, enlargement, alteration, repair, maintenance, operation, and removal of dams and reservoirs. The DSOD has jurisdiction over all non-Federal dams in the State that are 25 feet or higher (regardless of storage capacity) and dams with a storage capacity of 50 acre-feet (af) of water or greater (regardless of height). Dams 6 feet or less in height (regardless of storage capacity) or dams with a storage capacity of 15 af or less (regardless of height) are not under DSOD jurisdiction.

The DSOD reviews permit applications to evaluate the safety of dams and reservoirs. DSOD staff provide independent review of facilities design and safety calculations. The DSOD requires the collection of data concerning subsoils, foundation conditions, availability of construction materials, and geologic hazards to assess the potential for seepage, earth movement, and other conditions that may occur in the vicinity of a dam or reservoir. Investigations usually include exploratory pits, trenches, drilling, coring, geophysical survey, tests to determine leakage rates,

and physical tests to measure properties of foundation materials. During construction or repair of a dam or reservoir, the DSOD makes continuous or periodic inspections to verify that construction is proceeding in accordance with approved plans.

Alquist-Priolo Earthquake Hazards Zone Act

The Alquist-Priolo Earthquake Hazard Zone Act (originally the Alquist-Priolo Special Studies Zone Act of 1972) requires that zones along sufficiently active and well-defined faults be established. Development is limited in areas defined as Earthquake Hazard Zones, and structures for human occupancy are generally not permitted. The construction of pipelines, canals, or structures not designed for regular occupancy (less than 2,000 person-hours per year) are not regulated by the act.

California Office of Emergency Services

The California Office of Emergency Services (OES) requires the preparation of inundation maps to show areas susceptible to flooding following a partial or complete collapse of a dam structure. These maps are used to develop procedures for assistance and evacuation by local emergency services departments for the impacted areas. The OES would review the procedures to determine whether adequate public safety measures are developed for evacuation and control of the populated areas impacted by dam failures. Some of the public safety measures include identifying evacuation areas, evacuation routes, traffic control measures, and emergency care for evacuees.

California Building Code (CBC)

The California Building Code (CBC) is another name for the body of regulations known as the California Code of Regulations, Title 24, Part 2. Title 24 is assigned to the California Building Standards Commission which, by law, is responsible for administering, adopting, approving, publishing, and implementing all building standards in the state of California. Under state law, all building standards must be centralized in Title 24 or they are not enforceable (Bolt, 1988).

The Uniform Building Code (UBC) is a widely adopted model building code in the United States, and was most recently published in 1997 by the International Conference of Building Officials (ICBO). The CBC incorporates the 1997 UBC by reference and includes necessary California amendments. These amendments include criteria for seismic design, and approximately one-third of the text within the CBC has been tailored to California earthquake conditions. The 1997 UBC provides engineering design criteria for grading, foundations, retaining walls, and structures within zones of seismic activity. The SBA project corridor is located within Seismic Zone 4, which is the seismic zone expected to experience the greatest effects from earthquake ground shaking. Thus, this seismic zone has the most rigorous requirements for seismic design.

In January 2003, the ICBO merged with the Building Officials and Code Administrators International, Inc. and the Southern Building Code Congress International, Inc., and all three organizations have become collectively known as the International Code Council (ICC). Revisions to the 1997 UBC by the ICC are expected by 2005 or later.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act was developed to protect the public from the effects of strong ground shaking, liquefaction, landslides, or other ground failure, and from other hazards caused by earthquakes. This act requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones. Before a development permit is granted for a site within a seismic hazard zone, a geotechnical investigation of the site is required and appropriate mitigation measures incorporated into the project design. The CGS has not, at this time, completed Seismic Hazard mapping within the USGS 7.5-Minute Altamont, Livermore, or Byron Hot Springs topographic quadrangles that contain the SBA project corridor. The CGS is currently zoning higher priority areas first and would eventually zone the area quadrangles related to the Proposed Project.

3.1.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The California Environmental Quality Act (CEQA) defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions within the area affected by the project. The following significance criteria was adapted from CEQA *Guidelines.* Based on the location of the project and existing geologic and seismic characteristics, hazardous geologic conditions, adverse soils-related conditions, potential seismic hazards, or impacts to groundwater resources would be considered a significant impact to the Proposed Project if any of the following occurred:

- The Proposed Project is subjected to strong seismic ground shaking capable of causing injury, structural collapse, non-repairable facility or utility damage, or severe service disruption;
- The Proposed Project is affected by surface rupture along a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, that causes injury, non-repairable structural damage or collapse, or severe service disruption;
- The Proposed Project is placed near or causes slope failure resulting in debris flows or landslides capable of worker injury, structural damage, severe service disruption, or compromised water quality resulting in service disruption;
- The Proposed Project is placed near or results in seismic or static (gravity) induced settlement capable of compromising structural integrity resulting in injury, non-repairable damage, or severe service disruption;
- The Proposed Project involves construction on an existing geologic unit, unstable soil, or engineered fill that would become unstable as a result of the Proposed Project, resulting in on- or off-site soil failure, settlement, ground collapse, or landslide, lateral spreading, subsidence, liquefaction, or collapse;
- The Proposed Project results in substantial soil erosion that under temporary construction conditions or over the long term causes non-repairable foundation damage, compromised structural integrity, structural damage, structural collapse, or piping (removal of fine

sediment from an engineered fill by water flowing through the fill thus resulting in collapse and settlement of the fill);

- The Proposed Project causes the existing natural flow of groundwater to change such that an unstable, subsurface soil condition forms or other conditions occur that would restrict, redirect, or concentrate groundwater to change original water level or flow direction.

As discussed in the Seismic and Geologic Hazards section above, certain potential hazards are not discussed further in this chapter because they do not represent a potentially adverse seismic or geologic hazard within the SBA project corridor. In consideration of the CEQA Guidelines Checklist (Appendix G) for geologic and seismic impacts, three items are not considered in this EIR: liquefaction, expansive soils, and soil capability for supporting septic systems. The SBA project corridor and proposed locations of the expansion components and improvements are not located in an area considered susceptible to liquefaction. Hazardous expansive soil conditions would be remedied during site preparation, grading, and construction through standard engineering practices for the reduction of potentially weak soil conditions. No septic systems are proposed for this project.

IMPACTS AND MITIGATION MEASURES

Impact 3.1-1: In the event of a major earthquake in the Bay Area Region, proposed facilities could be subject to ground shaking capable of causing localized collapse or damage of engineered fills, structural damage, pipeline rupture, or equipment topple. Damage to project facilities could result in service interruptions. Less than Significant with Mitigation.

The SBA project corridor would likely experience at least one major earthquake (greater than Mw 7) sometime within the operational life of the project. Earthquake ground shaking could damage structures, including buildings, access roads, bridges, water conveyance and pumping equipment, engineered slopes, buried pipelines and canal embankments. Ground shaking is an unavoidable hazard for facilities in the San Francisco Bay and San Joaquin/Sacramento Valley regions. For the Proposed Project, the degree of hazard depends on the ground motion generated during an earthquake on any of the major San Francisco Bay Region faults, although the Greenville Fault Zone would generate the greatest ground motion due to its proximity to the SBA. As discussed in the significance criteria above, ground shaking would be a significant impact if it was capable of causing injury, structural collapse, non-repairable facility or utility damage, or severe service disruption.

South Bay Pumping Plant

Ground shaking at the SBPP could cause structural damage to the facility equipment, structures, and unsecured objects, and expose workers to injury from building structure damage, toppling machinery, and equipment, or fall hazards. Damage to essential equipment and electrical supply could result in temporary cessation of facility operations. Although earthquakes are unavoidable, the hazards associated with manmade structures can be avoided through appropriate design and engineering. Equipment, structural foundations, and buildings at the SBPP would be designed to accommodate anticipated ground motion for the site and comply with the CBC. Implementation

of **Measure 3.1-1** would reduce impacts associated with effects of earthquake ground shaking to less-than-significant levels. The purpose of the mitigation is to reduce the potential for injury and the length of service interruptions during and after a seismic event.

Stage 3 Brushy Creek Pipeline

A major earthquake would subject the proposed Stage 3 Brushy Creek Pipeline to ground motion and under extreme conditions, could cause material failure or piping connection failure leading to rupture and release of water. However, the pipeline and associated structures would be designed to accommodate site-specific ground motions greater than those anticipated for this region. Standard geotechnical and structural design criteria to reduce excessive earthquake response and potential damage or collapse would ensure that earthquake ground shaking impacts remain less than significant. The post-earthquake inspection discussed in **Measure 3.1-1** would reduce the temporary impacts associated with earthquake-related pipeline rupture to less-than-significant levels.

Stage 3 Surge Tank

Earthquake ground shaking could cause significant damage to the surge tank, possibly causing the 100-foot tank to partially fail or under the worst case, topple. Design of this structure would undergo geotechnical investigation and appropriate structural design to ensure that the tower could accommodate anticipated ground motions without collapse or debilitating structural damage. Additionally, improvements to the existing Stage 1 and Stage 2 Surge Tanks would be implemented to improve seismic reliability, including reinforcement of tank sidewalls. Surge tank seismic design criteria would comply with the CBC or more stringent building design criteria applied to this type of structure. Standard design and construction for structures using the seismic criteria for Seismic Zone 4 would provide a conservative design criteria to reduce the potential for damage associated with ground motion to less-than-significant levels.

Dyer Reservoir

Unless the water retention embankments are properly engineered, constructed, and periodically inspected, ground shaking from a significant earthquake could either cause an immediate embankment failure during an earthquake, or cause a leak that could eventually lead to embankment failure. Failure of the embankments and the subsequent dewatering of a storage reservoir could expose people and property to the hazards of downstream flooding.

As previously discussed in the Regulatory Framework Section, the DSOD oversees and approves the construction, enlargement, alteration, repair, maintenance, operation, and removal of dams and reservoirs. Designs for proposed dams that meet DSOD jurisdictional size and criteria capacity must be approved by the DSOD prior to construction to ensure compliance with their standards. Under DSOD standards, jurisdictional water retention structures are designed to withstand the effects of expected seismic events and the secondary ground failures associated with ground shaking. The DSOD would require a dam design that would withstand a seismic event with an earthquake magnitude considerably higher than the maximum magnitude of the

active regional fault closest to the dam site. This results in a conservative design criteria for ground shaking. During the design phase, DSOD determines appropriate soil exploration methods and protocols, reviews results of soil and bedrock investigations, requires fault investigations when deemed necessary, and oversees each phase of dam construction.

DWR is responsible for designing the proposed Dyer Reservoir under review and consultation of the DSOD. The current design of the reservoir structure involves the construction of a compacted earthen structure. The geotechnical investigation to support the proposed design includes subsurface exploration to characterize the underlying geology and determine suitability of site geology to support the reservoir. The DSOD also specifies design ground motions to ensure that the reservoir structure remains intact during a characteristic earthquake on the Greenville Fault Zone or from ground shaking generated from one of the other major Bay Area faults. The DSOD has provided technical review of the investigation throughout the design process to ensure compliance with regulations governing seismically sound reservoir design and construction in California. Although a regional earthquake would subject the Dyer Reservoir site to moderately to strong ground shaking, compliance with DSOD seismic design criteria would ensure that impacts associated with localized or catastrophic dam failure would remain less than significant.

Canal Improvements

Canal Embankment and Lining

Extension of the concrete canal lining would occur within the existing canal embankments. These improvements would require placement of shallow, compacted, engineered fills that would tolerate earthquake ground motion with little or no deformation. Deformation of the new fills from ground shaking would be minor and would likely result in small localized failures in the fill mass or distortions in the road base or overlying asphalt roadway, where present. The performance of raised canal embankments and linings would not represent a potential significant impact during and following an earthquake.

Patterson Reservoir

Improvements at Patterson Reservoir would be designed under review and consultation of the DSOD and would include raising the downstream embankment 1.5 feet (vertical) by placement of 10-feet (horizontal) of engineered fill material on the existing downstream embankment. The fill would be placed in accordance with standard geotechnical engineering practice and compacted up to 98-percent relative compaction. Engineering fills, such as those proposed, could tolerate earthquake ground motion with little or no deformation. DWR does not propose sliver fills (fill placed on the slope), which have the tendency to fail more readily than compacted fill on a level surface. Deformation of the new fills from ground shaking would be minor and would likely result in small localized surficial failures or slight deformations in the fill mass. Therefore, potential impacts are considered less than significant.

Canal Overcrossings

Seismic ground shaking during a major regional earthquake could cause repairable structural damage to some engineered concrete structures and engineered fills. However, ground shaking is unlikely to cause structural collapse because these facilities would be designed to withstand ground motion in excess of what is expected to occur during the life of the project. Typical structural damage following a major earthquake could include offsets in localized slump failures in engineered fills, offset drainage pipelines, repairable concrete cracking, offset joints, and distorted road base and asphalt. DWR would employ seismic design criteria established through the CBC or a more stringent criteria, if applicable. Earthquake damage to proposed construction for canal overcrossings would not constitute a significant impact.

Canal Check Structures and Siphons

Improvements to the check structures would be within the engineered canal embankment. Installation of siphons would involve construction of inlet and outlet structures, which would be backfilled with engineered and compacted fill. Subsurface siphon pipelines would be subjected to surface waves during an earthquake, and although they may flex in response, the construction would tolerate the ground motion and not rupture catastrophically during an earthquake. Because of the check structure and siphon design, impacts associated with ground shaking would not constitute a significant impact.

Mitigation Measures

Measure 3.1-1: DWR shall update their Earthquake Preparedness and Response Plan to prescribe actions to identify and remedy potential hazards related to earthquake-related equipment topple, employee injury, fire, and equipment failure for the new facilities. The Plan shall include a detailed post-earthquake inspection procedure and schedule to identify conditions that compromise workers safety or could result in extensive service interruptions. In updating the plan, DWR will solicit input from local regulatory agencies and with the Office of Emergency Services (OES). The plan will include public safety measures identified by OES relating to earthquake preparedness.

Impact Significance After Mitigation: Less than significant.

Impact 3.1-2: Surface fault rupture during an earthquake on the Greenville Fault Zone or along the Las Positas fault could cause structural damage or collapse at proposed facilities. Less than Significant.

South Bay Pumping Plant

The closest named fault (Jennings, 1994) to the SBPP is the potentially active Midway fault located approximately 2 miles south, and the active Greenville Fault Zone located 6 miles to

west.[4] There are no known active fault traces capable of generating a surface expression of displacement on or near the proposed SBPP expansion project site. Therefore, there is a very low potential for surface fault rupture at this site.

Stage 3 Brushy Creek Pipeline and Stage 3 Surge Tank

The Brushy Creek Pipeline crosses one inferred thrust fault mapped, but not named, within the Panoche Formation (Dibblee, 1980a), approximately 1.7 miles west of the SBPP. There is no information presented in the geologic literature that suggests this fault is active and capable of generating surface displacement. There are no faults classified as active and capable of surface fault rupture across or in proximity to the Brushy Creek Pipeline or the Stage 3 Surge Tank. Therefore, there are no potential surface fault rupture impacts at these locations.

Dyer Reservoir

The Dyer Reservoir is sited in an area devoid of known or mapped faults. The active Greenville Fault Zone is located approximately 3 miles west of the Dyer Reservoir site. There is no potential for surface fault rupture at the Dyer Reservoir site.

Canal Improvements

Dyer Canal

Dyer Canal is sited in an area devoid of known or mapped faults. The active Greenville Fault Zone is located approximately two miles west of Dyer Canal. There is no potential for surface fault rupture along Dyer Canal.

Livermore Canal and Patterson Reservoir

The Livermore Canal traverses a section of the Alquist-Priolo Fault Rupture Hazard Zone (FRHZ) between 3,500 and 4,000 feet wide that includes up to 10 mapped traces of the active Greenville Fault Zone (CGS, 1982). The canal crosses four traces that are either inferred or are shown as approximate locations. Inferred traces (those with approximate, unverified locations) indicate that, at the time the CGS published the Alquist-Priolo Earthquake Fault Zone map, these fault traces were not accurately located. Typically, accurate fault trace locations are determined or verified through a fault trenching field study. The Alquist-Priolo Earthquake Fault Zone Map, shows the Livermore Canal crossing only inferred fault traces. However, this does not suggest that surface fault rupture would not occur on these inferred traces sometime in the future.

If the Greenville fault generated a major earthquake in the Proposed Project study area, it is possible that one or more of the fault traces would undergo displacement. This is an existing condition and surface fault rupture is a potential impact that would not be lessened or avoided by the Proposed Project components. As discussed above, DWR indicates that a characteristic

[4] The northern portion of the potentially active Midway fault is believed to be buried under young undisturbed alluvial deposits according to work performed by William Lettis and Associates (DWR, 2004). The DWR does not consider this fault active.

earthquake on the Greenville Fault Zone could generate up to 4 feet of lateral offset. If this were to occur, locations at which the canal crosses the traces could be damaged. Damage could include localized slump failures, settlement of engineered fill, and cracks in the earthen levee and concrete channel. However, because the canal improvements proposed as part of this project are not intended to strengthen, retrofit, or stabilize the canal against seismic forces, if fault rupture was to occur, canal facilities would likely respond as they would under existing conditions.

Some degree of surface fault rupture is unavoidable and would cause significant but repairable damage to the canal improvement elements proposed as part of this project. According to the significance criteria discussed above, surface fault rupture is significant if it causes injury, non-repairable structural damage or collapse, or severe service disruption. Although surface fault rupture could cause damage to the aqueduct, as it would under existing conditions, damage to the proposed canal improvements would not compromise the structural integrity of the canal or its capability to convey water. However, a shutdown of a few hours to a few days may be necessary to inspect and temporarily repair local damage to the canal. Therefore, impacts relating to surface fault rupture are considered less than significant.

Alameda Canal

The Alameda Canal extends through two designated fault zones established as Alquist-Priolo FRHZ for the Las Positas fault, south of Livermore. A portion of the canal parallels an accurately located trace of the Las Positas fault and then traverses south to cross an inferred trace of the second FRHZ. Arroyo Seco Check 5 is located within the southern FRHZ for the Las Positas fault. In the event of an earthquake on the Las Positas fault, rupture could damage the proposed siphon at Arroyo Seco Check 5 if surface fault displacement were to occur. However, considering the short length of the Las Positas fault, the extent of surface fault rupture would likely be minor and cause structural damage rather than collapse of the check structure. Minor damage could include settlement of placed, engineered fills, offset of conveyance structures, or cracks in concrete. This damage is repairable and would be completed following the earthquake. Because the canal improvements proposed as part of this project are not intended to strengthen, retrofit, or stabilize the canal against seismic forces, if fault rupture was to occur, canal facilities, including the siphon at Arroyo Seco Check 5, would likely respond as it would under existing conditions. Although surface fault rupture could cause damage to the aqueduct, as it would under existing conditions, damage to the proposed canal improvements would not compromise the structural integrity of the canal or its capability to convey water. However, a shutdown of a few hours to a few days may be necessary to inspect and temporarily repair local damage to the canal. Therefore, impacts relating to surface fault rupture are considered less than significant.

Mitigation Measures

No mitigation measures are required.

Impact 3.1-3: Proposed facilities could be subjected to ground failure due to non-seismic conditions or in the event of an earthquake. Ground failure, including slope failure, differential settlement, or loss of bearing strength, could occur beneath the proposed components resulting in structural or mechanical damage and temporary disruption in service. Less than Significant.

South Bay Pumping Plant

The SBPP is underlain by Panoche Formation sandstone and shale and is founded on competent materials with a low potential for non-seismic or earthquake-induced ground failure. The SBPP is not in an area susceptible to liquefaction during an earthquake. The slope stabilization work on the SBPP site proposed as part of this project, is intended to provide required expansion area and improve overall slope stability. The project proposes to reconfigure the slope to a 1(H):1(V). Slope conditions at the SBPP are favorable for the proposed slope stabilization work because the Panoche Sandstone in this area is competent and dips to the east, into the hillside, at about 22 degrees (Dibblee, 1980a). In addition to the structure and attitude of the bedrock, the slope reconfiguration work would require removal of the material down to the bedrock. Exposed bedrock at a 2:1 slope would provide adequate slope stability given the existing bedrock structure. Because of the underlying bedrock and the proposed slope work, the potential for non-seismic and earthquake-induced ground failure impacts at the SBPP are less than significant.

Stage 3 Brushy Creek Pipeline and Stage 3 Surge Tank

Landslides, both deep-seated and shallow, as well as debris flows, can occur in alluvium overlying the Panoche Formation bedrock or in heavily fractured, micaceous shale exposed on steep slopes. Landslide maps of this area indicate that through the existing Brushy Creek pipeline corridor, large landslides and landslide complexes are relatively infrequent if compared to areas south of I-580, which are underlain by younger and weaker, non-marine sedimentary rocks (Nilsen et al., 1972a,b). Regional landslide mapping for Alameda County show four scattered areas of landslide deposits in proximity to the proposed Brushy Creek Pipeline alignment (Nilsen et al., 1976). Three of these landslide deposits are small and are described as a landslide deposit area between 200 and 500 feet at the longest length. The fourth area is larger, extending greater than 500 feet and appears to have occurred in the steep slopes near Brushy Creek. The landslide map shows the existing Stage 1 Brushy Creek Pipeline intersecting the lower portion of the larger slide area. The ABAG has prepared recent landslide susceptibility maps for the San Francisco Bay Region that locate principal debris flow areas. These areas are similar to, and consistent with, landslide mapping provided by the USGS.

Although there are scattered areas of landslide deposits bordering the proposed pipeline alignment, it does not necessarily suggest that the pipeline is at risk in the event that a landslide or pipeline construction activity could trigger debris flows or landslides. Given the relative number of slope failures within the local Panoche Formation and observed stability of slopes along the existing corridor, there is little evidence to support the possibility that a large slope failure could compromise the proposed pipeline. Furthermore, DWR engineers and geologists carefully evaluate geologic and seismic conditions prior to construction of linear pipeline projects.

Through standard and accepted engineering practices, DWR would perform an appropriate evaluation of slope stability if steep slopes, with evidence of potential failure, exist within the alignment. There is a potential that excavations associated with pipeline construction could trigger a landslide during installation activities. Slope failure from non-seismic forces and earthquake forces would not be an impact to the pipeline after installation, because the pipeline would be placed outside of landslide areas where practical. If it is necessary to construct the pipeline within a landslide area, the pipe would be installed below the failure plane. The pipeline would not be exposed to damage by debris if a landslide were to occur from an adjacent hillside slope, because it would be placed below the ground surface. Seismic and non-seismic ground failure associated with the Stage 3 Brushy Creek Pipeline and Stage 3 Surge Tank are less than significant.

Dyer Reservoir

The Dyer Reservoir site is underlain by alluvial material and Panoche Formation Shale and Sandstone. Recent work by DWR indicates that the alluvium overlying the shale ranges in thickness between 2 and 23 feet. Liquefaction hazard is low and landslide potential is low due to topography and underlying material. Dyer Reservoir construction would require extensive excavation and grading and the majority of the reservoir would be below the existing ground surface. Site investigations to date indicate that the Dyer Reservoir site is not underlain by materials subject to failure from either seismic or non-seismic forces. Extensive site investigations included geologic surface mapping, literature research, drilling 20 borings, excavating 24 test pits, and running four seismic refraction survey lines. The geologic reconnaissance and site investigation of the proposed Dyer Reservoir site has undergone rigorous study by DWR geologists and dam engineers with oversight by the DSOD. The information obtained would be analyzed in further detail by DWR during final design. Further review would be provided by DSOD and by a consulting board that has been hired to review information and make recommendations regarding design and safety issues. Site investigation to date has determined that the proposed Dyer Reservoir site is geologically suitable and therefore, impacts associated with unstable geological conditions are less than significant.

Canal Embankment and Lining, Canal Over Crossings

Extension of canal lining, including placement of fill, would occur within the engineered canal embankment structure. The design of the embankment fills and linings, and the overcrossing structures incorporate potential site-specific earthquake parameters for ground motion, and are constructed with approved imported fill materials engineered, compacted and constructed under inspection of the field engineer. Although there is a potential that earthquake ground shaking could cause localized damage to the canal expansion improvements proposed as part of this project, it is unlikely that the damage could cause non-repairable foundation damage; compromise structural integrity; cause structural damage, collapse, or piping failure. Based on the significance criteria, the potential impacts associated with ground failure are less than significant.

Canal Check Structures and Siphons

Check structures and siphons may be underlain by loose alluvium, especially those in close proximity to creeks and areas underlain by recent alluvium. The potential for collapse of the underlying materials under seismic conditions or gradual settlement under non-seismic conditions is possible, given the potential for shallow groundwater and varying distribution of alluvial material. However, canal check structures and siphons are relatively simple structures that would be designed, engineered, and constructed in conformance with standard engineering practices and the recommendations provided in the preliminary geotechnical report. As with all DWR construction projects, appropriate geologic and engineering site characterization would be conducted by DWR geologists and engineers prior to and during design to identify adverse geologic conditions that may result in ground failure. If DWR identifies adverse geologic conditions, appropriate, standard measures to correct the condition would be recommended and made part of the project. Potential seismic and non-seismic ground failure impacts associated with canal check structures and siphons are less than significant.

Mitigation Measures

No mitigation measures are required.

Impact 3.1-4: Proposed facilities could interfere with and alter shallow groundwater conditions such that existing downstream groundwater conditions change. Less than Significant.

South Bay Pumping Plant

Proposed slope stability work and expansion of the existing SBPP facility would not intersect groundwater except for potential groundwater seeps and small springs that exit through fractures in the bedrock. Seeps and springs would be identified during slope stabilization work. Groundwater from seeps and springs, if encountered would be managed using standard construction practices. Groundwater issues associated with Proposed Project work at the SBPP can be overcome using standard engineering practices and impacts are less than significant. Please refer to **Section 3.2, Water Resources and Water Quality**, for further discussion of Best Management Practices for groundwater control and protection of water quality during construction activities.

Stage 3 Brushy Creek Pipeline

Trench excavation and installation of the proposed Stage 3 Brushy Creek Pipeline would require standard trench dewatering if seeps and springs are encountered during construction. The quantity of groundwater entering the trench, if any, is likely to be minor and would be managed using standard construction practices. The installation of the Brushy Creek Pipeline would not, as the significance criteria states, alter natural flow of groundwater such that an unstable surface soil condition occurred or other conditions occur that would restrict, redirect, or concentrate

groundwater flow away from original flow direction. Groundwater impacts associated with the Brushy Creek pipeline are less than significant.

Stage 3 Surge Tank

The proposed surge tank would be installed on a topographic high point underlain by bedrock. Groundwater would likely not be encountered and if it is encountered, it would be a minor quantity. Groundwater issues associated with the proposed Stage 3 Surge Tank are less than significant.

Dyer Reservoir

According to the significance criteria, discussed above, the proposed Dyer Reservoir project would result in a significant impact if it causes the existing natural flow of groundwater to change such that an unstable, subsurface soil condition forms or other conditions occur that would restrict, redirect, or concentrate groundwater to change the original water level or flow direction. The placement of the proposed Dyer Reservoir would have the potential to alter or restrict shallow groundwater flow to Dyer Road drainage. Placement of the reservoir could reduce infiltration to the shallow water bearing zones, or could cause groundwater to "back up" behind the reservoir on the up gradient side. As discussed below, these three potential impacts are less than significant.

Seven onsite groundwater wells provide DWR with data regarding the condition and fluctuation of groundwater beneath the proposed Dyer Road reservoir site. DWR field exploration of the reservoir site revealed unconfined groundwater at a depth of 4 to 20 feet below ground surface. According to DWR subsurface logging, depths to bedrock under the site range from 2 to 22 feet. Less consolidated materials including heavily weathered shale and alluvium overlie the bedrock. This condition suggests that groundwater migrates laterally above the bedrock interface through the less consolidated alluvial and weathered bedrock materials. Groundwater monitoring indicated that following rainy periods, groundwater levels rose to depths just below the surface and then days later, groundwater levels dropped to 18 to 20 feet below the surface. The fluctuation between observed water levels further suggest that the saturated thickness varies and the saturated zone does not provide consistent underflow or significant surface water discharge down gradient. Observation of groundwater conditions suggests that the water table is directly influenced by surface infiltration and is "perched" above the semi-impermeable to impermeable bedrock/alluvial interface.

The reservoir site is located just south of the topographic divide between the Altamont Creek sub-watershed to the south, and the Brushy Creek sub-watershed to the north. The proposed reservoir site slopes gently to the west towards Dyer Road, which is constructed along the axis of a sub-watershed to Altamont Creek. This sub-watershed that slopes to the south towards Altamont Creek and is a historical stream valley that contained a creek that fed Altamont Creek prior to the development and construction of Dyer Road. The sub-watershed is filled with varying depths of accumulated, recent alluvium consisting of sand, silt, and gravel (Dibblee, 1980a). The depth of

the alluvium within the sub-watershed is deeper than the alluvium underlying the proposed Dyer Reservoir site.

The Dyer Reservoir may be founded on bedrock, which could hinder down gradient flow of groundwater causing high seasonal flows to back-up behind the east side of the reservoir. Hindered groundwater flow could cause a structural stability issue if the materials behind the reservoir become saturated and were not properly compacted. Reservoir embankments would be conservatively designed with drainage systems to accommodate water losses from the reservoir and anticipated groundwater conditions, where required. The drainage systems would be designed in accordance with accepted dam design practices with independent review conducted by DSOD. Therefore, no further mitigation is required. Please refer to **Section 3.2, Water Resources and Water Quality**, for further discussion regarding groundwater production within the sub-watershed.

Canal Embankment and Lining

This Proposed Project component would not intersect naturally occurring groundwater. No impact.

Canal Overcrossings

This Proposed Project component would not intersect naturally occurring groundwater. No impact is anticipated.

Canal Check Structures and Siphons

Trench excavation and installation of the proposed canal check structures and siphons may require standard dewatering if shallow groundwater is encountered during excavation and construction. The quantity of groundwater entering the trench, if any, is likely to be minor and standard construction dewatering practices would be implemented. The installation of the siphons and checks would not, as the significance criteria states, alter natural flow of groundwater such that an unstable surface soil condition occurs or other conditions occur that would restrict, redirect, or concentrate groundwater flow away from original flow direction would occur. Groundwater impacts associated with the these Proposed Project components are less than significant.

Mitigation Measures

No mitigation measures are required.

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3.2 WATER RESOURCES AND WATER QUALITY

3.2.1 SETTING

HYDROLOGIC RESOURCES

The South Bay Aqueduct (SBA) corridor extends across the Altamont Hills from the Old River watershed into the Alameda Creek Watershed **(Figure 3.2-1)**. From the South Bay Pumping Plant (SBPP) at Bethany Reservoir, the project corridor is located within the Brushy Creek Watershed, which drains the eastern slope of the Altamont Hill east and north to Italian Slough, which is tributary to Old River. At Dyer Canal, the facility extends into the upper reaches of the Alameda Creek Watershed, which drains west to San Francisco Bay. The remainder of the SBA project corridor is located within this watershed. The general Altamont Hills area is considered semi-arid with highly seasonal precipitation averaging 12 to 14 inches.

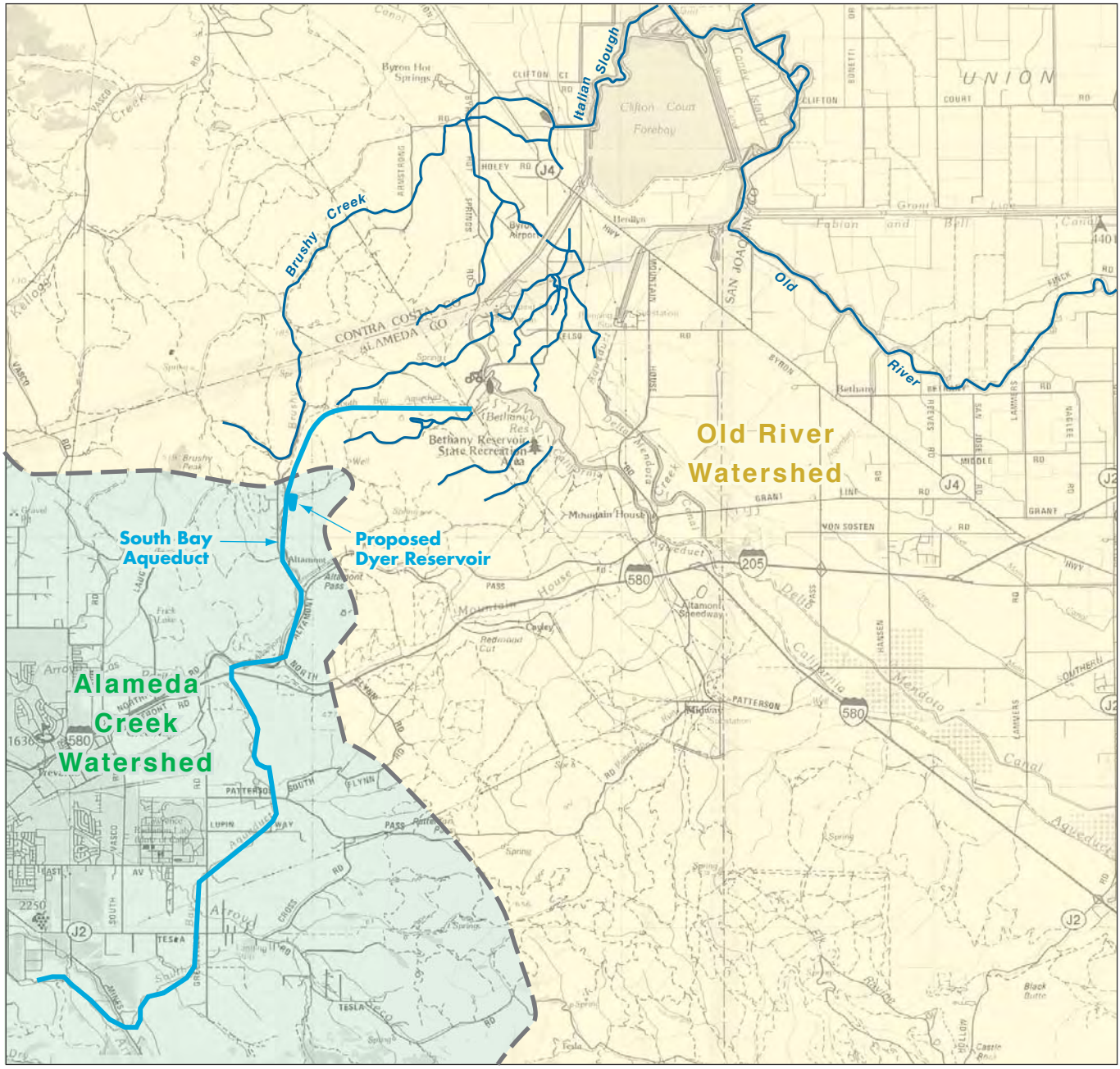
The project site and vicinity consist of the hills of the Panoche Formation, and valleys containing minor amounts of alluvium. There are regionally extensive aquifer systems underlying the area's southeast perimeter in the San Joaquin Valley. Groundwater recharge occurs primarily through direct infiltration of precipitation into bedrock fractures and alluvial deposits. Discharge occurs as springs, and seasonally, as flow in intermittent drainages. Water level variations occur seasonally in response to precipitation patterns. Due to the elevation of the pipeline routes, significant groundwater should not be encountered along any of the pipeline routes, with the exception of stream alluvial crossings.

SURFACE WATERSHEDS

Surface water potentially affected by the Proposed Project includes sub-watersheds within the San Joaquin-Delta and San Francisco Bay Watersheds. These include the Italian Slough and Brushy Creek Drainage Units within the San Joaquin-Delta Watershed, and the Altamont Creek Drainage Unit within the San Francisco Bay Watershed.

San Joaquin – South Delta Watershed

The San Joaquin- South Delta Watershed drainage unit encompasses approximately 595 square miles and includes areas in Alameda, Contra Costa, Sacramento, and San Joaquin counties. The San Joaquin Watershed basin is divided into two basins. The northern San Joaquin Sub-basin drains into the Delta from the north and is the area addressed by this report. The major rivers in this watershed sub-basin are the San Joaquin and Merced. Their tributaries are mainly the Old and Middle rivers and Indian Slough. Old River drains into Clifton Court Forebay from the north and is bound by Byron-Tracy Tract to the west and by Victoria Island to the east. Middle River drains from the north before turning west to converge with Old River on the eastern side of Clifton Court Forebay. Middle River is bound on the west by Woodward and Victoria Islands, on the east by Upper Jones Tract, and on the south by Union Island Tract. Indian Slough ties into Old River from the west above Clifton Court Forebay.



SOURCE: DeLorme Atlas & Gazetteer; Environmental Science Associates

DWR SBA Improvement and Enlargement Project / 202456 ■

Figure 3.2-1
Project Corridor Watersheds–
South Bay Aqueduct

Brushy Creek Watershed

Brushy Creek Watershed encompasses approximately 54 square miles and includes areas in both Contra Costa and Alameda Counties. The watershed drains the eastern slope of the Altamont Hills, and is generally bound by Clifton Court Forebay and Bethany Reservoir on the east, Byron Hot Springs on the north, Brushy Peak on the west, and Altamont Pass on the south. Approximately 60 percent of the watershed is within Contra Costa County boundaries with the remaining 40 percent within Alameda County boundaries.

The major drainage within the watershed is Brushy Creek, which receives runoff from small tributaries draining the northern and eastern flank of the Altamont Hills. Flows within these tributaries and the majority of Brushy Creek are perennial. Along the SBA corridor, facilities located within this watershed include the SBPP, Brushy Creek Pipeline, and approximately 2,000 feet of Dyer Canal. The watershed boundary crosses Dyer Canal and Dyer Road, with the headwaters of Altamont Creek and the larger Alameda Creek Watershed located to the east of this topographical divide (**Figure 3.2-1**).

Flood control within this portion of the SBA project corridor is primarily under the jurisdiction of the California State Department of Water Resources (DWR) and the Bureau of Reclamation.

Alameda Creek Watershed

The Alameda Creek Watershed encompasses approximately 630 square miles and includes areas of both Alameda and Santa Clara Counties (**Figure 3.2-1**). The watershed extends from Altamont Pass, Livermore on the east, Mount Diablo, Dublin on the north, Mount Hamilton on the south, and to its outlet to San Francisco Bay in Union City on the west. The upper basin of the watershed covers portions of three counties: approximately 55 percent lies within Alameda County, 10 percent lies within Contra Costa County, and 35 percent lies within Santa Clara County. Five incorporated cities are completely or partially located in the watershed: Livermore, Pleasanton, Dublin, and the southeastern portions of San Ramon and Danville (Alameda County Water District, 1990). The 630-square-mile upper basin is divided into the Livermore and Sunol drainage units.

The Livermore drainage unit occupies the northern and eastern portion of the watershed and includes the Orinda, Dublin, Altamont, and Livermore uplands; the Livermore Valley; and the Livermore Highland. The major streams in the drainage unit are Arroyo del Valle, Arroyo Las Positas, Arroyo Mocho, Alamo Canal, and San Ramon and Tassajara Creeks. Arroyo del Valle and Arroyo Mocho have the largest drainage areas. These streams converge on the floor of the Livermore-Amador Valley, forming Arroyo de la Laguna, and join Alameda Creek from the Sunol drainage unit at the exit from the upper watershed. The total drainage area of the Livermore unit is about 388 square miles (ACWD, 1990). No natural lakes and few natural ponds exist in the watershed. Small stock ponds are found in the foothill regions.

Flood control within this portion of the SBA project corridor is primarily under the jurisdiction of the Zone 7 Water Agency (Zone 7). Zone 7 maintains improved flood control channels and installs new drainage channels as needed. In the past, flooding has occurred within the

Livermore-Amador Valley at the confluence of Arroyo Las Positas and Arroyo Mocho. Additional areas have been impacted by flooding or channel damage, and include Alamo Canal in the City of Dublin, and the reach of Arroyo de la Laguna from above its confluence with Arroyo Mocho to the San Francisco Water Department's Bernal Property. These impacts have been limited primarily to channel damage and repair; residential structures have not been affected.

STREAMS BY FACILITY

South Bay Pumping Plant

The SBPP is located on the shoreline of a man-made inlet on the western shoreline of Bethany Reservoir (see **Figure 2-2, Chapter 2, Project Description**). Drainage of the site is to the adjacent reservoir, and the SBPP receives surface drainage from the surrounding topography, which is conveyed as sheet flow across the property and via storm drains to the reservoir. A small intermittent drainage tributary to the reservoir is located adjacent and south of the concrete pad of the SBPP, and conveys drainage from a small watershed within the Altamont Hills east of the site to Bethany Reservoir.

Stage 3 Brushy Creek Pipeline

The new Stage 3 Brushy Creek Pipeline would extend from the SBPP to the proposed Dyer Reservoir and would be located approximately 100 feet north of the existing dual pipeline system. Between the SBPP and the proposed surge tank, the pipeline extends up slopes that are tributary to Bethany Reservoir. Between the surge tank and the proposed Dyer Reservoir, the pipeline would run along the northern flank of the Altamont Hills, and would intersect four ephemeral drainages of small tributaries to Brushy Creek. At the western end of the pipeline, the main stem of Brushy Creek runs northward along an existing access road. At the western end of the corridor, at approximately Sta 140+00, the pipeline route turns south along Brushy Creek towards Dyer Canal, and the pipeline would be located along the creek channel between Sta 140+00 and 170+00. Top of trench would be located less than 50 feet from top of bank for approximately 1,700 feet along this reach. At two locations where the creek channel meanders to the east, shoring would be installed to reduce trench width and maintain separation of at least 10 feet between the top of trench and top of bank. Maintaining setbacks to minimize impacts to Brushy Creek, the pipeline route would extend southward to Sta 166+50, where the pipeline would be routed to the east side of Dyer Canal, under the existing Stage 2 and Stage 1 pipelines. The top of trench would intersect ephemeral channel tributary to Brushy Creek at Sta 169+50. The pipeline would then extend within DWR right of way along the eastern side of Dyer Canal to its terminus within the proposed Dyer Reservoir, crossing a another ephemeral drainage tributary to Brushy Creek at Sta 179+00.

Dyer Reservoir

The proposed Dyer Reservoir site is located near the watershed divide between Brushy Creek and Altamont Creek watershed. Located just south of this divide, the reservoir site is on the eastern flank of north-south trending ridgeline, and drains toward the headwaters of Altamont Creek The site consists of a broad alluvial area with two poorly defined drainage swales that run west along

topographic gradients (**Figure 3.2-2**). Drainage from the site is to the west via these drainage swales and sheet flow along topographic gradients, with drainage from two of the swales running along the existing dirt road toward the existing Check 1 crossing of Dyer Canal. A second drainage swale is located south of the proposed reservoir site, and drains a parallel subwatershed in a similar pattern towards Dyer Canal. Drainage from this southern drainage area is intercepted by the existing Dyer Canal and routed northward along the canal to the Check 1 crossing of Dyer Canal. Drainage from both swale areas is conveyed through five culverts to the canal crossing adjacent to the existing access road. This flow then follows topographic gradients south across pasture lands to a small agricultural stock pond, and is eventually discharged to drainage swales along the east and west sides of Dyer Road.

With respect to the proposed reservoir siting, the watershed area east of Dyer Canal can be divided into two watersheds: the main watershed area to the east and south of the reservoir, encompassing 560 acres, and a minor watershed to the north and west of the proposed access road around the reservoir encompassing 40 acres. Runoff estimates for these watersheds are shown in **Table 3.2-1**, below.

TABLE 3.2-1
DYER RESERVOIR WATERSHED AREA EAST OF DYER CANAL

Watershed Area	Acres	Calculated Flow 100 Year Event
Main Watershed (East/South)	560 acres	240 cfs
Minor Watershed (North)	40 acres	16 cfs
Total Watershed Area	600 acres	256 cfs

SOURCE: Compiled by Environmental Science Associates

Canal Improvements

Dyer Canal

Dyer Canal extends along the western flank of a north-south trending ridgeline following a specific topographic elevation to maintain conveyance flows. From its backsurge pool connection with the existing Brushy Creek Pipelines to approximately 2,000 feet downstream, Dyer Canal is located within the Brushy Creek Watershed, which drains to the north. The remaining canal length is located with the Altamont Creek sub-watershed, which drains southward along Dyer Road. The canal intersects a number of small ephemeral swales that are routed either under or across the canal, including the two swales noted in the discussion for Dyer Reservoir above. One swale is tributary to the Brushy Creek Watershed; the remaining swales are tributary to the Altamont

SOURCE: Department of Water Resources, 2004

Figure 3.2-2
Existing Drainage Gradients, Dyer Reservoir

Creek watershed. In addition to the two swales noted at the Dyer Reservoir site, four ephemeral swales are intersected by the canal and are conveyed either under the canal or over the canal in an overchute. These facilities discharge to downstream areas, and flow is by topography to drainage swales along Dyer Road. These swales then discharge to Altamont Creek south of the railroad bridge near the intersection of Dyer Road and Altamont Pass Road.

Livermore Canal

Livermore Canal extends from just south of Interstate 580 along the western flank of a north-south trending ridgeline following a specific topographic elevation, and terminating at Patterson Reservoir. The canal intersects ephemeral drainages that are conveyed under the canal. These drainages discharge to downslope alluvial areas.

Patterson Reservoir

Patterson Reservoir is located north of Zone 7's Patterson Pass WTP, off of Patterson Pass Road. The reservoir is fed by an overflow weir from Livermore Canal, and marks the dividing point between Livermore Canal and Alameda Canal. The reservoir has a surface area of 4 acres, with a maximum depth of approximately 30 feet. Patterson Reservoir does not intercept any drainages. However, a drainage is conveyed across Alameda Canal just downstream of Patterson Reservoir. This drainage swale is located along the toe of the southern embankment, and continues west along the northern fenceline of the Zone 7 Patterson Pass WTP.

Raising of Patterson Reservoir's embankment would provide an additional 5 acre-feet of storage. Modifications to Patterson Reservoir would not alter drainage or conveyance patterns in or surrounding the reservoir. Therefore, no impacts would occur.

Embankment Borrow Area

Approximately 50,000 cubic yards of soil may be borrowed from an undeveloped parcel adjacent to and east of the Zone 7 Patterson Pass WTP. This 17-acre parcel of land is currently used for periodic drainage of Patterson Reservoir and spoils storage by DWR O&M. The site slopes gently to the north and east, and drainage is via sheet flow to drainage ditches along the SBA and Patterson Reservoir.

Alameda Canal

Alameda Canal extends from Patterson Reservoir to its intersection with Del Valle Pipeline at Check 7, approximately 3 miles east of Arroyo Mocho. Alameda Canal extends through primarily agricultural lands, and intersects a number of drainages. There are 19 potentially jurisdictional features along the Alameda Canal, including three freshwater marsh areas, two seasonal wetlands, and 14 drainage swales. The canal includes siphon crossings at major roadways and streams, including Arroyo Seco and at Arroyo Mocho. A concrete access apron crosses the channel at these locations and conveys flows over the siphon structure, providing scour protection and maintenance access along the canal. Arroyo Seco is an intermittent stream, and riparian vegetation here is disturbed riparian scrub, with a few oaks and eucalyptus. Channel width at ordinary high water is 15 feet downstream from the low water crossing and 10 feet

upstream. The channel and floodplain are vegetated with riparian scrub. At Arroyo Mocho, flow upstream of the crossing the stream is intermittent. Downstream of the crossing the flow is perennial as water is discharged here from the SBA pipeline into Arroyo Mocho for the purposes of groundwater recharge.

REGULATORY BACKGROUND

Construction Activity Permitting

The Regional Water Quality Control Board (RWQCB) administers the National Pollution Discharge Elimination System (NPDES) storm water permitting program in the Bay Area. Construction activities of 1 acre or more are subject to the permitting requirements of the NPDES General Permit for Discharges of Storm Water Runoff Associated With Construction Activity (General Construction Permit). The project applicant must submit a Notice of Intent to the RWQCB to be covered by the General Permit prior to the beginning of construction. The General Construction Permit requires the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must be prepared and approved before construction begins. The plan would include specifications for Best Management Practices (BMPs) that would be implemented during project construction to control contamination of surface flows through the potential discharge of pollutants from the construction area. Additionally, the plan would describe measures to prevent or control pollutants in runoff after construction is complete and identify a plan to inspect and maintain these facilities or project elements. Implementation of the plan starts with the commencement of construction and continues though the completion of the project. Upon completion of the project, the applicant must submit a Notice of Termination to the RWQCB to indicate that construction is completed.

In accordance with State policy for water quality control, the San Francisco Bay RWQCB employs a range of beneficial use definitions for surface waters, ground waters, marshes, and mudflats that serve as the basis for establishing water quality objectives and discharges conditions and prohibitions. The RWQCB has identified the existing and potential beneficial uses supported by the key surface water drainages throughout the bay area in the *San Francisco Bay Basin Water Quality Control Plan* (1995 Basin Plan) (RWQCB, 1995). The beneficial uses designated in the Basin Plan for Alameda Creek and its tributaries are presented in **Table 3.2-2**.

REGULATORY SETTING – CALIFORNIA DEPARTMENT OF WATER RESOURCES, DIVISION OF SAFETY OF DAMS

The California Department of Water Resources, Division of Safety of Dams (DSOD) oversees the construction of dams that are over 25 feet high and impound over 15 acre-feet (af) (4.9 mg) of water, or over 6 feet high and impound over 50 af (16.3 mg) of water. A dam failure can cause loss of life, damage to property, and displacement of people who reside within the dam's inundation zone. Dam failure can occur from internal erosion caused by embankment and foundation leakage, and from inadequate spillway capacity that can lead to overtopping and erosion.

TABLE 3.2-2
DEFINITIONS OF BENEFICIAL USES OF SURFACE WATERS

Beneficial Use	Description
Agricultural Supply	Uses of water for farming, horticulture, or ranching.
Areas of Special Biological Significance	Preservation and enhancement of areas (i.e., marine life refuges, ecological reserves) designated by the State Water Resources Control Board.
Cold Freshwater Habitat	Uses of water that support cold water ecosystems, including the preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife.
Ocean, Commercial, and Sport Fishing	Uses of water for commercial or recreational collection of fish, shellfish, or other organisms for human consumption or bait purposes.
Estuarine Habitat	Uses of water that support estuarine ecosystems, including the preservation or enhancement of habitat and biota.
Freshwater Replenishment	Uses of water for natural or artificial maintenance of surface water quantity or quality.
Groundwater Recharge	Uses of water for natural or artificial recharge of groundwater for purposes of future extraction, maintenance of water quality, or halting saltwater intrusion into freshwater aquifers.
Industrial Service Supply	Uses of water for industrial purposes that do not depend on water quality, including cooling water supply, fire protection, mining, gravel washing, etc.
Marine Habitat	Uses of water that support marine ecosystems, including preservation or enhancement of habitats and biota.
Fish Migration	Uses of water that support habitat for aquatic organisms that are temporary inhabitants, including anadromous fish. Maintenance of zones of passage free from physical or chemical barriers is important to this use.
Municipal and Domestic Supply	Uses of water for community, military, or individual water supply systems, including drinking water supply.
Navigation	Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.
Preservation of Rare and Endangered Species	Uses of waters that support habitat for rare or endangered plant and animal species.

TABLE 3.2-2 (Continued)
DEFINITIONS OF BENEFICIAL USES OF SURFACE WATERS

Beneficial Use	Description
Water Contact Recreation	Uses involving body contact with water, where ingestion of water is reasonably possible, including swimming, wading, water skiing, windsurfing, and diving.
Noncontact Water Recreation	Uses involving proximity to water, not normally including water contact, such as picnicking, sunbathing, hiking, beachcombing, camping, boating, sightseeing, and nature studies.
Shellfish Harvesting	Uses of water that support habitats suitable for collection of crustaceans and filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption. Water quality (levels of bacteriological pathogens, trace elements, natural toxins) of overlying waters is a significant concern.
Fish Spawning	Uses of water that support high-quality aquatic habitats suitable for reproduction and early development of fish.
Warm Freshwater Habitat	Uses of water that support warm water ecosystems, including the preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife.
Wildlife Habitat	Uses of waters that support wildlife habitats, including preservation of vegetation, prey species, and water quality.

SOURCE: RWQCB, 1995

California has the most stringent dam safety design and construction review standards in the nation. The requirements for siting, engineering, construction, and monitoring of dams are continually improved as knowledge increases as to how and why dams fail. Damage to earthen dams in California is often associated with poor operation and maintenance of dam facilities, or with strong earthquake-induced ground shaking that affects older dams that have not been designed to modern standards. The risk of dam failure is highest in older dams constructed to lower design standards that have not been upgraded for seismic safety, or when dams are poorly designed, constructed, operated, or maintained.

It is important to note that the potential for the catastrophic failure of a properly designed and constructed dam, whether caused by a seismic event, flood event, unstable slope conditions, or damage from corrosive or expansive soils, is extremely remote.

Consistency with County and Local Regulations, Goals, and Policies

Alameda County

The East County Area plan, part of the Alameda County General Plan includes the following policies that affect water quality in the vicinity of surface water bodies:

> Policy 282. The County shall protect surface and groundwater resources by:
>
> - Minimizing sedimentation and erosion through control of grading, quarrying, cutting trees, removal of vegetation, placement of roads and bridges, use of off-road vehicles, and animal-related disturbance of the soil.

The County's Watercourse Protection Ordinance (ACWD, 1990) was enacted to restrict discharge of polluted materials to watercourses and encroachment of new development into watercourses within the unincorporated County. Implementation of the ordinance protects surface water and groundwater recharge areas from erosion, sedimentation and other sources of pollution.

The County implements all federal, state, and locally imposed statutes, regulations, and orders that apply to storm water quality including NDPES stormwater permits issued by the RWQCB to the Alameda County Urban Runoff Clean Water Program, NPDES General Permit for Storm Water Discharges (General Construction Permit), Water Quality Control Plan, and letters issued by the RWQCB under the Porter-Cologne Water Quality Act.

In addition to the Watercourse Protection Ordinance, the County has a grading erosion and sediment control ordinance requiring that trenching and grading incidental to the construction or installation of approved underground pipelines shall be backfilled and the surface restored to its original condition, including reseeding or otherwise restoring vegetation on all disturbed earth surfaces if slopes exceed 2 percent, as soon as possible after such grading work is completed.

Non-Point Source Discharges

Overview

The Basin Plan also identifies non-point source control programs to aid in achieving the Basin Plan water quality objectives. The intent of non-point source control management involves three basic elements:

1. Changes in existing operating practices to minimize the potential for untreated wastes to reach aquatic systems.

2. Collection and treatment of wastes.

3. Prohibition of waste-generating practices.

The Regional Board's urban runoff management program focuses on reducing pollutant transport through stormwater drain systems into surface waters. The strategy for managing the pollutant and sediments from stormwater includes two levels of control programs: the Baseline Control Program and the Comprehensive Control Program. The Baseline Control Program includes

voluntary participation of all local agencies in the cities and counties of the region that own or have maintenance responsibility for storm drain systems. The Comprehensive Control program includes select cities and counties (according to the amount of pollutants being discharged from their storm drain systems, impact of those discharges on receiving waters, or population) that are required to develop pollution prevention programs and take steps to reduce runoff into drain systems.

3.2.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Impacts to surface water hydrology or water quality resulting from the Proposed Project would be significant if the project:

Water Quality

- Causes violations of effluent water quality limits.
- Causes or contributes to violations of ambient water quality objectives.
- Causes significant increases in mass loadings.

Flooding

- Exacerbates flooding problems.

Surface Water Drainages

- Alters substantially the direction, rate, or amount of surface water flow; alters the course of a stream; or substantially degrades water quality/violates water quality standards for construction activities.

IMPACT ANALYSIS

Impact 3.2-1: Construction of proposed facilities could result in increased erosion and subsequent sedimentation, with impacts to water quality and/or storm drain capacity. Additionally, discharge of groundwater, release of fuels, or release of other hazardous materials associated with construction activities could degrade water quality. Less than Significant with Mitigation.

Construction of proposed facilities would involve earthmoving activities such as excavation, grading, and soil stockpiling. The Proposed Project occurs within upland areas tributary to Brushy Creek and Altamont Creek. Project construction could result in soil erosion and subsequent discharge of suspended sediments to adjacent surface water or drainages. Sedimentation to the waterways could degrade water quality for beneficial uses by increasing channel sedimentation and suspended sediment levels (turbidity) reducing the flood-carrying capacity, and adversely affecting associated aquatic and riparian habitats. Additionally, sedimentation to local drainage facilities could result in reduced storm flow capacities, resulting in localized ponding or flooding during storm events. Finally, dewatering of excavations would have the potential to affect surface waters if discharge without appropriate sediment control measures.

Hazardous materials associated with construction equipment, such as fuels, oils, antifreeze, coolants, and other substances could adversely affect water quality if released to surface waters. Without mitigation, these impacts would be considered potentially significant.

The acreage of land disturbed by the Proposed Project would exceed 1 acre, the minimum acreage that would initiate the preparation of a SWPPP in accordance with the NPDES Construction Activity Storm Water Permit requirements. This General Permit mandates the development and implementation of a SWPPP identifying BMPs to reduce erosion of disturbed soils and release of hazardous materials into water courses. As such, DWR or its contractor would prepare a SWPPP requiring implementation of BMPs for erosion and sediment control. These include the use of straw waddles, silt fencing, water detention structures, baker tanks, and other control measures that would limit construction-related storm runoff. Because these measures would reduce the erosion of soils and release of hazardous materials into water courses, the Proposed Project would not violate water quality standards for construction activities. Preparation of the SWPPP and compliance with the measures identified in the SWPPP would ensure compliance with state regulatory policies to minimize the potential for water quality impacts from construction activities (**Measure 3.2-1a**). Specific impacts related to each facility are identified below.

South Bay Pumping Plant

Project construction would expand the existing footprint of the SBPP to the north, and would involve re-contouring existing slopes adjacent and north of the pumping plant. Approximately 120,000 cubic yards (cy) of material would be generated at the site. Materials generated during grading would be deposited at spoil locations adjacent to the SBPP facility. During construction, SBPP graded areas, stockpile areas, and drying basin would have the potential to contribute sediment loads during storm events, with subsequent downstream effects. Grading activities adjacent to SBPP would have the potential to affect water quality within the Bethany Forebay Inlet Channel, as the majority of the site drains to the south via sheetflow. Similarly, dewatering activities, if required, would have the potential to affect water quality through the release of sediment. Preparation of the SWPPP and compliance with the measures identified in the SWPPP would ensure compliance with state regulatory policies to minimize the potential for water quality impacts from construction activities (**Measure 3.2-1a**). Specific BMPs that could be applicable to this site include compaction of all graded slopes and stockpile areas, use of silt fence, jute netting, and revegetation to reduce erosion potential on constructed slopes, and application of sediment control measures along the intake shoreline. Application of these or similar measure under the SWPPP would reduce potential impacts to a less than significant level.

Shoreline excavation and dredging activities to establish water surface elevations at intake structures and to re-establish Bethany Forebay Inlet Channel bathymetry would have the potential to affect water quality within Bethany Reservoir through suspension of sediments within the water column. Dredging activities would be conducted using a dragline, clamshell, or hydraulic vacuum dredge as appropriate based on sediment type. The saturated sediments would be transferred into a constructed drying basin located along the northern shoreline of the Bethany Forebay Inlet Channel. Once in the impoundment, the water would either evaporate or percolate, drying out the sediments over time.

These small scale dredging operations would have the potential to affect water quality by increasing turbidity and disturbing sediments that could be contaminated with pollutants or pesticides. Increased turbidity and disturbance of sediments is considered a temporary effect. The United States Army Corps of Engineers issues federal permits for dredging projects pursuant to Section 404 of the Clean Water Act. The RWQCB oversees the dredging to ensure compliance with the Porter Cologne Water Quality Control Act. Dredging operations would comply with all applicable state and federal requirements (**Measure 3.2-1b**).

If dredge spoils are reused as a beneficial reuse, including habitat development, levee maintenance and rehabilitation, construction fill, and daily cover at existing sanitary landfills, then screening values and guidelines outlined in the *Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines, Draft Staff Report* (RWQCB, 2000) would be followed and implemented to characterize sediments (**Measure 3.2-1c**).

Brushy Creek Pipeline

Construction of the Brushy Creek Pipeline would use conventional cut and cover techniques, with excavated materials side cast and re-compacted in the pipeline trench. The pipeline would be installed within the Brushy Creek Watershed, with the exception of the final connection to Dyer Reservoir. Construction materials would be staged along the pipeline route within the construction easement. Erosion and discharge of stockpiled materials to watercourses during construction would have the potential to affect downstream water quality. Additionally, trench crossings of ephemeral drainages could result in downstream sedimentation.

Approximately 3,000 feet of pipeline would be installed within close proximity and upgradient of Brushy Creek, Construction activities along this reach would have the potential to affect downstream water quality associated with erosion of trench excavation materials. It is anticipated that trench spoils would be hauled to a temporary stockpile location along this reach to reduce potential for downgradient migration of materials. Preparation of the SWPPP and compliance with the measures identified in the SWPPP would ensure compliance with state regulatory policies to minimize the potential for water quality impacts from construction activities (**Measure 3.2-1a**). Specific BMPs that may be applicable at this location include catch basins and swales, silt fencing established along the eastern edge of Brushy Creek, jute netting, straw waddles, or other appropriate measures to control sediment from leaving the construction area. Application of BMPs would reduce potential impacts to a less than significant level.

During construction of the Stage 3 Surge Tank, construction activities would include sandblasting of the Stage 1 and Stage 2 Surge Tanks, and placement of steel plates to thicken the surge tank shells. Equipment and materials would be established at the existing graded pad for the two surge tanks, and water or other materials used for paint removal would be controlled using an excavation or other appropriate BMPs, and would not be allowed to runoff to surrounding areas. Residual paint removed during the sandblasting process would be removed from the site and appropriately disposed.

Dyer Reservoir

Dyer Reservoir would be constructed within an approximately 72-acre construction area east of Dyer Canal (includes staging, stockpile, and spoil areas). Grading and excavation of approximately 790,000 cy would be implemented at the site. The facility would be constructed in accordance with DSOD *Statutes and Regulations Pertaining to Supervision of Dams and Reservoirs*. The exact construction scenario would vary, depending on the contractor selected. However, the main tasks would be as follows: clearing and grubbing of the construction area, which involves the removal of vegetation or other materials; excavation of the embankment site and reservoir impoundment area; scarification of the reservoir impoundment area, followed by refill and compaction of the area to ensure low-permeability of the impoundment area.

As previously noted, the Dyer Reservoir site is within the Alameda Creek watershed, and the reservoir site itself drains westward to a single conveyance point across Dyer Canal. During construction, release of sedimentation from the construction site to wetland areas west of Dyer Canal could degrade water quality, with secondary effects to biological resources. Preparation of the SWPPP and compliance with the measures identified in the SWPPP would ensure compliance with state regulatory policies to minimize the potential for water quality impacts from construction activities (**Measure 3.2-1a**). Specific BMPs that may be applicable at this location include establishment of a sediment basin and erosion control perimeter around active construction and contractor layout areas, silt fencing, jute netting, straw waddles, or other appropriate measures to control sediment from leaving the construction area. Application of BMPs would reduce potential impacts to a less than significant level.

Canal Improvements

Raising of canal linings would require placement of fill and concrete within the interior sidewalls of the Dyer, Livermore, and Alameda Canals. Additionally, modification to check structures within the canals would be implemented. Due to the contained nature of this work within the canal structure, the potential for erosion and subsequent sedimentation to affect surface water are considered low.

At certain locations along the canals, embankment improvements would include placement and compaction of fill along the exterior embankment wall. Erosion and subsequent sedimentation from exterior embankment improvements would have the potential to affect water quality. Similarly, construction or alteration of drainage overchutes may involve limited excavation and re-grading areas. Cross drainage is currently conveyed under the canal in 29 culverts, over the canal in 8 pipes or box overchutes, or into the canal by numerous drainage pipes, depending on the existing topographic conditions. Application of appropriate BMPs, including silt fencing, straw waddles or other appropriate measures would reduce potential impacts to less than significant.

The trench installation of siphons across active creek channels would have the potential for release of sediment or other construction related materials, with the potential for release directly to waters at Arroyo Seco and Arroyo Mocho. Preparation of the SWPPP and compliance with the measures identified in the SWPPP would ensure compliance with state regulatory policies to

minimize the potential for water quality impacts from construction activities (**Measure 3.2-1a**). Specific BMPs that may be applicable at these locations include scheduling construction during the dry season, establishment of a sediment basin and erosion control perimeter around active construction and contractor layout areas, silt fencing, jute netting, straw waddles, or other appropriate measures to control sediment from leaving the construction area. Additionally, provisions for control and desilting of groundwater prior to release would also be appropriate. Application of BMPs would reduce potential impacts to a less than significant level.

Mitigation Measures

Measure 3.2-1a: For all project construction components, a SWPPP will be developed for construction activities as required by the State Water Resources Control Board for construction of projects exceeding 5 acres. The objectives of the SWPPP are to identify pollutant sources that may affect the quality of stormwater discharge and to implement control practices to reduce pollutants in stormwater discharges. The SWPPP for this project will include implementation of a minimum of the following elements:

- Source identification
- Preparation of a site map
- Description of construction materials, practices, and equipment storage and maintenance
- List of pollutants likely to contact stormwater
- Estimate of the construction site area
- Erosion and sedimentation control practices including: soils stabilization, re-vegetation, and runoff control to limit increases in sediment in stormwater runoff: such as detention basins straw bales, silt fences, drainage swales, and sand bag dikes
- List of provisions to eliminate or reduce discharge of materials to storm waters
- Description of waste management practices
- Maintenance and training practices

Measure 3.2-1b: Dredging Activities. DWR shall acquire appropriate permits for excavation and dredging of Bethany Forebay Inlet Channel, including permits from USACOE, RWQCB, and CDFG, as applicable. DWR shall abide by permit requirements, which may require use of BMPs, such as sediment barriers to isolate work areas from the larger reservoir.

Measure 3.2-1c: Dredge Material Disposal. Dredged materials shall be disposed of in accordance with *Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines, Draft Staff Report* (RWQCB, 2000).

Impact Significance After Mitigation: Less than significant.

Impact 3.2-2: Installation of the proposed facilities would have the potential to alter drainage patterns, runoff rates, and flow volumes. Less than Significant with Mitigation.

Project implementation would alter local drainage patterns and runoff rates in the vicinity of project facilities. Installation of impermeable surfaces can result in an increase in the rate and volume of surface runoff, potentially contributing to downstream flood impacts. Individual facilities would be designed with appropriate drainage infrastructure to reduce the potential for downstream impacts related to alteration in drainage patterns or increased generation of surface flows. Each project component is analyzed below.

South Bay Pumping Plant

Project implementation would result in the establishment of compacted slopes north of the SBPP, and would expand the impervious surface area onsite by approximately 0.10 acres. Facility design would include drainage infrastructure sized to convey surface flows generated onsite to Bethany Reservoir, and establishment of appropriate drainage gradients to convey flows. Constructed slopes would be compacted, revegetated, and designed with appropriate drainage infrastructure to convey flows around the SBPP. Due to its proximity to Bethany Reservoir, no drainage impacts related to increased surface flow rates or volumes are anticipated. The spoil areas and drying basin would be contoured consistent with existing topography, compacted, and revegetated, and would not substantially alter existing drainage patterns. Therefore, impacts are considered less than significant.

Brushy Creek Pipeline

Due to its below-grade design, the Brushy Creek Pipeline would not affect surface flows or drainage patterns. Following installation, trench fill would be compacted and graded to be consistent with existing topography. Remaining spoils material generated by the volume of the pipeline would be graded across the pipeline corridor, and the pipeline corridor would be reseeded to reduce the potential for erosion. Impervious surface areas would be limited to the graded (non-paved) Stage 3 Surge Tank pad, the 21 concrete vault structures installed along the pipeline route, and construction of approximately 0.5 mile of graded (non-paved) access road to access 8 of the new vault structures. This incremental increase in impervious surface of 0.07 acre over the entire 3.73-mile pipeline route would not affect surface runoff flows or volumes. Therefore, impacts associated with alteration of drainage patterns and surface flow rates are considered less than significant.

Approximately 3,000 linear feet of Brushy Creek Pipeline (Sta 140+00 to 170+00) would be encased in concrete in order to provide a more stable pipeline installation within high slope areas. Following encasement, fill would be compacted and graded to restore existing topography. Depth to concrete along this reach would be approximately 1 foot below grade, and would not be anticipated to present an erosion hazard. Top of trench for would be located less than 50 feet from top of bank for approximately 1,700 feet along this reach. At two locations where the creek channel meanders to the east, shoring would be installed to reduce trench width and maintain separation of at least 10 feet between the top of trench and top of bank. The pipeline structure

would maintain a setback of greater than 10 feet from the Brushy Creek channel top of bank. Due to this setback, and considering the small area of watershed upstream of this location, the potential for substantial stream channel migration to affect or expose the pipeline is considered low. Therefore, potential impacts are considered less than significant.

Dyer Reservoir

Dyer Reservoir would be designed to allow for the storage of untreated water pumped from the SBPP, together with adequate freeboard to allow the storage of precipitation falling directly on the reservoir. The reservoir features, and other civil features (inlets, outlets, cross drainage, etc.) would be designed to accommodate a 100-year event (240 cubic feet per second [cfs]). Natural storm water runoff from the main watershed east and south of the reservoir would be routed around the reservoir primarily to the south, and conveyed across Dyer Canal via a new overchute (see **Figure 2-9, Chapter 2, Project Description**). This drainage channel would be constructed to convey a 1,000 year event (450 cfs) to ensure that drainage flows are conveyed past the reservoir structure. Flows generated from areas north of the reservoir would be routed along the proposed access road, and routed across Dyer Canal at the Dyer Check 1 crossing, similar to the existing drainage pattern. These facilities would be designed to typical access road standards of 10- and 100-year events. This drainage routing would maintain the existing drainage patterns to the agricultural field adjacent to Dyer Canal, although the majority of drainage would be conveyed approximately 700 feet south of its current conveyance point at Dyer Check 1.

Dyer Reservoir would be designed and constructed in accordance with DWR's DSOD regulations. These include a minimum of 4 feet of freeboard to accommodate precipitation. Additionally, all reservoirs are required to include a spillway in the unlikely event of an overflow scenario. The spillway design would accommodate the design capacity of the Stage 3 Brushy Creek Pipeline (180 cfs), the primary input to the reservoir. Use of the spillway would only occur in the event of operator error in coordinating SBPP pumping. The spillway would discharge flow south into drainage infrastructure designed to accommodate 100-year flows of 240 cfs.

The reservoir would have an internally draining surface area of approximately 27 acres, or approximately 4 percent of the drainage area east of Dyer Canal. Due to the reduction in contributing drainage area, the overall flow volumes from the drainage area east of Dyer Canal would be incrementally reduced. As such, reservoir construction would not adversely affect runoff volumes or peak flows from the reservoir site. Therefore, no impacts to downstream drainage facilities or their capacity would occur.

Drainage patterns on the agricultural field west of Dyer Canal would be altered by the routing of drainage from the main watershed south around the reservoir, and conveyance across Dyer Canal in a new overchute approximately 700 feet south of the current drainage conveyance point at Dyer Canal Check 1. Drainage from the minor watershed north of the reservoir would still be conveyed across Dyer Canal at this point. From conveyance points, flows would follow topographic gradients to drainage swales along Dyer Road, similar to existing conditions. Therefore, hydrologic conditions at this agricultural field, and within the stock pond at its southern point, are not anticipated to be affected by project implementation. Project related

alterations in drainage patterns are not considered significant within the context of either the Altamont Creek Watershed or the Alameda Creek Watershed. Please refer to **Section 3.3, Biological Resources**, for further discussion regarding the potential secondary effects to wetland and sensitive species habitat associated with this drainage alteration.

Patterson Reservoir

Raising of Patterson Reservoir's embankment would provide an additional 5 acre-feet of storage. Modifications to Patterson Reservoir would include relocation of the existing drainage channel along the toe of the southern embankment to maintain drainage from the eastern side of Dyer Reservoir. Relocation of this drainage channel along the new toe of slope would not alter drainage or conveyance patterns in or surrounding the reservoir. Therefore, no impacts would occur.

Embankment Borrow Area

Approximately 50,000 cubic yards of soil may be borrowed from an undeveloped parcel adjacent to and east of the Zone 7 Patterson Pass WTP. This 17-acre parcel of land is currently used for periodic drainage of Patterson Reservoir and spoils storage by DWR O&M. The site slopes gently to the north and east, and drainage is via sheet flow to drainage ditches along the SBA and Patterson Reservoir. Areas that are utilized as borrow areas would be contoured to continue to drain to existing drainage facilities. Additionally, if appropriate, the borrow area site may be used as a mitigation wetland area following completion of the project. In the event mitigation is implemented at the site, contouring would provide for retention of rainfall, with appropriate freeboard; therefore, surrounding areas would not be affected. Therefore, although drainage patterns would be altered, use of this site would not impact downstream areas. Therefore, potential impacts are considered less than significant.

Canal Improvements

Raising of canal linings would provide adequate freeboard along the Dyer, Livermore, and Alameda Canals to convey project design flows. This would include maintenance of 3 to 4 feet of freeboard, per DWR criteria. Modification to check structures within the canals would be implemented to accommodate new water elevations. These modifications would improve current freeboard conditions, which are below DWR criteria along certain reaches of the canal, particularly during high demand periods. Improvements would not alter drainage or conveyance patterns within the canal itself. Therefore, no impacts would occur.

Cross drainage is currently conveyed under the canal in 29 culverts, over the canal in eight pipes or box overchutes, or into the canal by numerous drainage pipes, depending on the existing topographic conditions. Project implementation would alter the configuration of drainage structures along the three canals. In general, improvements consist of the following: raising headwalls; extending existing culverts; raising overchutes; and removing existing drain inlets. (Specific improvements by milepost are included in **Appendix 2.0**.) These structures would be redesigned to convey cross drainage at the canal structure to downstream areas. Sizing of

proposed facilities would be adequate to accommodate flows, and would result in minor alteration of drainage patterns on the upstream side of the canals to maintain cross drainage hydrologic profile at the new canal elevations. These modifications would also correct current drainage into the canal.

Installation of new overchutes where upgradient flows currently discharge into the canal would be modified to convey drainage across the canal. All proposed facilities would be appropriately sized to accommodate upstream drainage, and would not be anticipated to affect downstream drainages or properties. Energy dissipation would be installed to ensure that the downstream effects are minimized. Therefore, potential drainage impacts related to canal improvements are considered less than significant. Please refer to **Section 3.3, Biological Resources**, for further discussion regarding the potential impacts to wetland and sensitive species habitat associated with this drainage alteration.

Mitigation Measures

Measure 3.2-2a: All proposed facilities shall be designed to include appropriate drainage infrastructure to convey flows generated onsite and from upstream areas. Drainage designs shall be integrated with existing drainage systems, and shall be designed to avoid or minimize effects to downstream areas and infrastructure.

Impact Significance After Mitigation: Less than significant.

Impact 3.2-3: Installation of the proposed facilities would have the potential to alter groundwater flow patterns, with secondary effects to private well operations. Less than Significant with Mitigation.

As previously discussed in **Impact 3.1-4**, the Dyer Reservoir site is located just south of the topographic divide between the Altamont Creek sub-watershed to the south, and the Brushy Creek sub-watershed to the north. The proposed reservoir site slopes gently to the west towards Dyer Road, which is constructed along the axis of a subwatershed to Altamont Creek. This subwatershed that slopes to the south towards Altamont Creek and is likely a historical stream valley that contained a creek and fed Altamont Creek prior to the development and construction of Dyer Road. The subwatershed is filled with varying depths of accumulated, recent alluvium consisting of sand, silt, and gravel (Dibblee, 1980). The depth of the alluvium within the subwatershed is deeper than the alluvium underlying the proposed Dyer Reservoir site.

The Dyer Reservoir may be founded on bedrock which could hinder down gradient flow of groundwater causing high seasonal flows to back-up behind the east side of the reservoir. However, design of underdrain systems would be anticipated to maintain groundwater flow patterns downstream of the reservoir.

Residences along Dyer Road use private groundwater wells located across the valley from the proposed Dyer Reservoir site to pump groundwater for domestic use. Based on the geology, it

appears that the private domestic wells used by the residences tap deeper water-bearing sediments that have filled in the Dyer Road drainage. The private domestic wells may also tap groundwater held in fractures of the underlying Panoche Shale. The groundwater recharge area for the water-bearing sediments underlying the Dyer Road drainage is the surrounding uplands that comprise the watershed to the north, east and west. Based on the geology and observed topography, the private, domestic groundwater wells receive the majority of groundwater recharge from the small, upland watershed directly to the north and northwest. Seasonal groundwater that flows beneath the proposed Dyer Reservoir site tends to enter the larger subwatershed in a southwest direction, south and down gradient of the residences and does not contribute to recharge of the private, domestic groundwater wells directly across the valley. Shallow groundwater flowing beneath the Dyer Reservoir site, however, may contribute a fraction of the groundwater water that supply the few private groundwater wells directly downgradient of the reservoir site. This contribution would be seasonal and is only minor compared to the groundwater provided to the subwatershed from the entire surrounding watershed.

Although the reservoir placement could reduce the overall watershed infiltration area that provides recharge to the shallow groundwater, the amount of infiltration area replaced by the impervious reservoir surface would be 27 acres, or less than 4 percent of the drainage area east of Dyer Canal. When the entire drainage area upgradient of the residential units along Dyer Road is considered (approximately 800 acres) this loss of infiltration area would be less than 1 percent of the watershed area, and would result in a unmeasurable change to groundwater levels in down-gradient wells. Additionally, reservoirs typically contribute seepage to groundwater, similar to existing leakage present along the SBA project corridor, including Dyer Canal. As such, potential impacts to down gradient production wells associated with the incremental change in groundwater gradients, and the installation of impervious surface area within the watershed, would be less than significant.

DWR installed seven observation wells to assess groundwater elevations at the proposed Dyer Reservoir site. Four wells monitor groundwater flow and elevations down gradient of the proposed reservoir while three monitor flows beneath the proposed footprint. These wells would provide DWR permanent groundwater observation points to assess changes in levels prior to and after the construction of the reservoir. In connection with preliminary reservoir planning and engineering, DWR has collected regular groundwater elevation data to evaluate local groundwater flow characteristics and seasonal changes. These data establish a pre-construction baseline and provide subsurface information regarding the groundwater interactions beneath the proposed reservoir. During reservoir construction, the three wells placed within the footprint would be properly destroyed in accordance with the California Well Standards. The four down gradient wells would remain as permanent groundwater observation points and DWR would conduct level monitoring during the operational life of the reservoir. Down gradient monitoring of groundwater is standard practice for many reservoir facilities and serves as a mechanism for early identification of excessive seepage. The post-construction monitoring would establish a record of seasonal groundwater fluctuation as well as develop a means to observe long term-trends in groundwater levels and flow. Through the post monitoring data set, DWR would be able to compare pre- and post-construction seasonal groundwater characteristics and determine

long-term effects of the reservoir to the local groundwater. These long-term data would identify gradual, incremental groundwater elevation decreases due to reduced infiltration or increased groundwater elevation increases due to excessive seepage.

Mitigation Measures

Measure 3.2-3: DWR shall monitor groundwater conditions at the Dyer Reservoir site to ensure that substantial decreases in groundwater levels onsite are not observed following installation of the reservoir structure and sub-drain systems.

Impact Significance After Mitigation: Less than significant.

Impact 3.2-4: Catastrophic failure of Dyer Reservoir as a result of improper design, construction, or operation, would result in potential flooding hazards. Less than Significant.

The design and construction of dams is required to adhere to standards set by the DSOD; adherence to these design and construction standards greatly reduces the probability of dam failure, and therefore adequately protects public safety. During operation, Dyer Reservoir would be visually inspected daily to ensure that the embankments, control structures, access roads, and monitoring instrumentation are maintained. All impediments would be removed from the spillway and other control structures as soon as they are observed. Application of design standards, as well as DWR's daily maintenance of the facility, would ensure that the potential for embankment failure is reduce to the degree feasible.

Although the probability of dam failure is extremely remote, the California Office of Emergency Services (OES) requires the preparation of an inundation map and the development of a downstream evacuation plan for areas within the potential inundation area (California Water Code Section 6002, and California Government Code Section 8589.5). This inundation map would be prepared and submitted as part of the design review for Dyer Reservoir. The reservoir capacity would be 500 af (425 af active storage; 75 af inactive storage), with a water surface elevation of 805 feet above mean sea level (msl). Due to the small storage capacity of the reservoir, the inundation area is anticipated to be confined to areas along Dyer Road, and is not anticipated to affect existing residential units, which are located at elevations of 810 msl or higher. Compliance with DSOD and OES regulations regarding reservoir design and maintenance would reduce the potential for embankment failure, and subsequent release of stored water to acceptable levels. Therefore, no additional measures beyond these design requirements are necessary.

Mitigation Measures

No mitigation measures are required.

REFERENCES – Water Resources and Water Quality

Alameda County, *East County Area Plan*, Adopted: May, 1994, Corrected: March, 1996, Amended: September, 1996, July, 1998, and November, 2000, Adopted: May 2002.

Alameda County Water District (ACWD), *Ordinance Code, Chapter 10 Watercourse Protection*, June 1990.

Department of Water Resources, *CAD Drawing*, 2004.

Dibblee, Thomas, W. Jr., *Preliminary Geologic Map of the Altamont Quadrangle, Alameda, California*, 1980.

San Francisco Bay Regional Water Quality Control Board, *San Francisco Bay Basin Water Quality Control Plan*, June 1995.

Regional Water Quality Control Board – San Francisco Bay Region (RWQCB), *Draft Staff Report, Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines*, May 2000.

RED STRIKE TEXT = CHANGES FROM FINAL EIR
BLUE STRIKE TEXT = CHANGES FROM MMRP

3.3 BIOLOGICAL RESOURCES

3.3.1 SETTING

This section describes existing biological resources along the proposed pipeline alignments and facility sites, as well as project-related impacts to those resources. References used in the preparation of this section include information from field surveys, records from the California Natural Diversity Database (CNDDB; CNDDB, 2003), biological literature (Skinner and Pavlik, 2001; Holland, 1986; Hickman, 1993; Stebbins, 1985; Mayer and Laudenslayer, 1988; USFWS, 1997b), previous and on-going biological reports of the site and vicinity, technical reports from commercial database searches, and various aerial photographs of the SBA project corridor.

Vegetation types and wildlife habitats are characterized on the basis of both record and field observations. Environmental Science Associates (ESA) conducted a reconnaissance and focused on biological and botanical surveys of the South Bay Aqueduct (SBA) project corridor to gather information on vegetative communities, wildlife habitats, and habitat use on and surrounding the project site. In addition, results of previously produced biological reports were verified. ESA's wildlife and plant ecologists conducted a combination of reconnaissance-level and site-specific surveys along the entire project corridor for special-status wildlife species and wetlands on November 24, 2003, January 2004, and February 5, 2004. Surveys for the presence or absence for San Joaquin kit fox, western burrowing owl, California tiger salamander, California red-legged frog and vernal pool fairy shrimp and longhorn fairy shrimp were conducted throughout the survey period.

REGIONAL SETTING

The Proposed Project is located in southern Alameda County within the California Floristic Province. Alameda County has a Mediterranean climate and, within the Tri-Valley area and adjacent hills, the vegetation is a mosaic of oak woodland, annual grasslands, upland scrubs, wetland communities, and riparian scrubs and forests. Valley floor portions of the SBA project corridor are characterized by annual grasslands, intermittent streams, and seasonal wetlands. At higher elevations, foothill oak woodland, annual grasslands, and riparian vegetation dominate the landscape. In the past, principal land use of the interior region was cattle grazing and dry-land farming (wheat, oats, barley). Increased development has fragmented portions of the landscape, restricting once widespread plant and wildlife habitats. Current principal land uses within the SBA project corridor include agriculture and pasture lands, residential, commercial and industrial development, and cattle grazing. Residential, commercial, and industrial land uses are rapidly replacing agricultural land uses.

Livermore Valley

The Livermore Valley is characterized by grasslands with rolling hills and steep narrow valleys. Agriculture remains one of the main land uses in the Livermore Valley. Depending on the type

and intensity of agriculture, lands in the Livermore Valley vary in the degree to which they support native plant and animal species. In the vicinity of the SBA project corridor, most of the native grasslands have been extensively grazed.

EXISTING ENVIRONMENT

Vegetation Communities and Wildlife Habitats in the Study Corridor

Vegetation communities are assemblages of plant species that occur together in the same area, which are defined by species composition and relative abundance. *A Manual of California Flora* (Sawyer and Keeler-Wolfe, 1995) was used to classify the vegetation communities or "series" in the SBA project corridor. Vegetation series generally correlate with wildlife habitat types and were classified and evaluated using the California Department of Fish and Game's (CDFG) *Guide to Wildlife Habitats of California* (Mayer and Laudenslayer, 1988).

Lands within the SBA project corridor have been disturbed from current and past land uses including wind farms, cattle grazing, and vineyard agriculture.

California Annual Grassland

California annual grassland is the most common vegetation community in the Livermore Valley. It is found on the valley floor as well as in the surrounding hillsides along with oak woodlands. California annual grasslands are often found in areas that have been grazed or otherwise converted to crop agriculture. This community occurs throughout the SBA project corridor, varying from disturbed ruderal vegetation to relatively intact communities. The most common species found in this community include wild oats (*Avena fatua*), ripgut brome (*Bromus diandrus*), yellow star thistle (*Centaurea solstitialis*), fescue (*Vulpia myuros*), filaree (*Erodium* sp.), and mustards (*Brassica* and *Hirschfeldia* sp.). Native wildflowers may also occur within the annual grassland community and may include fiddleneck (*Amsinckia* ssp.), lupine (*Lupinus* ssp.), popcorn flower (*Plagiobothrys* ssp.), and California poppy (*Eschscholzia californica*). The grasslands observed within the SBA project corridor support a significant number of non-native invasive plant species including yellow star thistle and sweet fennel (*Foeniculum vulgare*).

Many wildlife species use both native and non-native grasslands for refugia, nesting, and foraging materials. Reptiles commonly found in grasslands include western fence lizard (*Sceloporus occidentalis*), common garter snake (*Thamnophis sirtalis*), and western rattlesnake (*Crotalus viridis*). Bird species that breed in grasslands include northern harrier (*Circus cyaneus*), burrowing owl (*Athene cunicularia*), western meadowlark (*Sturnella neglecta*), and horned lark (*Eremophila alpestris*). Birds that commonly forage in grasslands include turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and white-tailed kite (*Elanus leucurus*). Several mammal species use grasslands including western harvest mouse (*Reithrodontomys megalotis*), California ground squirrel (*Spermophila beechyii*), black-tailed jackrabbit (*Lepus californicus*), black-tailed deer (*Odocoileus hemionus columbianus*), and San Joaquin kit fox (*Vulpes macrotis mutica*).

Alkali Meadow

Alkali meadows can be found within some grasslands in the Livermore Valley and favor a unique set of characteristics. Alkali meadows form in shallow basins where soils are particularly alkaline relative to surrounding grasslands and where soil types are seasonally indundated and slow to drain. This community commonly contains hare barely (*Hordeum marinum*), saltgrass (*Distichlis spicata*), alkali heath (*Frankenia salina*), and toad rush (*Juncus bufonius*). Vegetation found in alkali meadows are typically those species adapted to soil conditions and seasonal ponding, many of which are special-status species such as alkali milkvetch (*Astragalus tener var. tener*), heartscale (*Atriplex cordulata*), and San Joaquin saltbrush (*Atriplex joaquiniana*). Common or ruderal species that may occur within the alkali meadow community include curly dock (*Rumex crispus*) and Italian ryegrass (*Lolium multiflorum*).

Alkali meadows support wildlife species that are adapted to seasonal ponding and may include California tiger salamander (*Ambystoma californiense*) and vernal pool tadpole shrimp (*Lepidurus packardi*).

Within the SBA project corridor, alkali meadow is found at the proposed Dyer Reservoir site and on Altamont Creek, downstream of Dyer Road along the Altamont Pipeline where the channel is poorly defined and a pasture exhibits alkali meadow characteristics.

Coast Live Oak Series / Oak Savannah

Coast live oak habitat is typically found on higher slopes and ridgetops where soils are well-drained. The dominant tree species is coast live oak (*Quercus agrifolia*). Other tree species typically found within this community include blue oak (*Quercus douglasii*), California bay laurel (*Umbellularia californica*), and California buckeye (*Aesculus californica*). This habitat community occurs in patches throughout the project site in areas that have not be cleared for wind turbines.

Oaks provide food, cover, and nesting sites for many wildlife species. Bird species typically found in oak woodlands include acorn woodpecker (*Melanerpes formicivorus*), bushtit (*Psaltriparus minumus*), oak titmouse (*Baeolophus inornatus*), and hermit thrush (*Catharus guttatus*). Cavity nesting birds, as well as many raptor species, rely on oaks and oak woodlands for nesting sites.

Bulrush-Cattail Series

Bulrush (*Scirpus* ssp.) and cattails (*Typha latifolia* and *T. angustifolia*) are found in areas that are wet year-round such as ponds (natural or human made); shallow edges of lakes, pools, and stockponds; and in seasonal drainages and riparian areas. In the SBA project corridor, this community is found within larger in-stream pools in Brushy Creek and in wet drainages along the access road on Livermore Canal. It also occurs in patches along canal alignments where overchutes or inlet drainages have become incised and have allowed ponding or long-term pooling of water to occur and wetland vegetation to develop.

Wildlife species that typically use this community include pacific tree frog (*Hyla regilla*), California red-legged frog (*Rana aurora draytonii*), and western pond turtle (*Clemmys marmorata*). Common bird species using this community include marsh wren (*Cistothorus palustris*), common yellowthroat (*Geothlypis trichas*), and red-winged blackbird (*Agelaius phoeniceus*). Mammals may use these aquatic features for water or forage.

Arroyo Willow Series

Arroyo willow habitat occurs in Brushy Creek, Arroyo Mocho and Arroyo Seco. This vegetation community is characterized by riparian scrub dominated by arroyo willow (*Salix lasiolepis*) and red willow (*Salix laevigata*). Associated species found within this habitat include California black walnut (*Juglans californica*), California buckeye, elderberry (*Sambucus mexicana*), and Himalyan blackberry (*Rubus discolor*). This vegetation community occurs in dense stands along the banks of Arroyo Seco and Arroyo Mocho.

Riparian areas provide important breeding and foraging habitat for many amphibians, reptiles, birds and mammals including special-status species such as California red-legged frog. These areas also provide movement and dispersal corridors, allowing animals to move from upland and other aquatic habitats within the watershed.

Riparian Forest / Riparian Scrub

The riparian forest/riparian scrub vegetation community occurs within the banks of Arroyo Mocho and Arroyo Seco. This vegetation community is characterized by riparian vegetation dominated by sycamore (*Plantanus racemosa*), mulefat, and willow. This vegetation type often transitions into the Willow Series where gravel bars develop and willows are able to establish.

Vernal Pool

Vernal pools are seasonal wetlands that occur in grasslands. These wetlands are typically located in slight depressions that form over bedrock or hardpan soils that allow water to pool during winter and spring rains. Northern claypan vernal pools are found in the Livermore Valley and typically have an impervious layer of silicate-based hardpan underlying them that prevents water from percolating into the soil. Although vernal pools occur naturally in grassland and woodland settings, they may also occupy disturbed locations where the underlying soil conditions remain intact. Vernal pools are considered unique habitat and often support species that are endemic to vernal pools or other shallow pools in that particular geographic region. Vernal pool communities have been greatly reduced due to conversion of grasslands to agriculture or urban development. Vernal pools are listed as a Significant Natural Community by the CDFG and many vernal pool dependent plants and animal species are special-status species protected by the state or federal government. Plant species common to vernal pools include Contra Costa goldfields (*Lasthenia conjugens*), coyote thistle (*Eryngium* spp.), dwarf blennosperma (*Blennosperma nanum*), spike rush (*Eleocharis spicata*), and California hairgrass (*Deschampsia danthonioides*). Vernal pool conditions occur in two depressions adjacent to the western access road along Dyer Canal.

Vernal pool communities provide habitat for those species adapted to seasonal ponding and drying including California tiger salamander, vernal pool fairy shrimp (*Branchinecta lynchi*), and longhorn fairy shrimp (*Branchinecta longiantenna*).

Aquatic Habitats

The quality of the aquatic habitat in the SBA project corridor varies considerably, depending on the degree of disturbance from current and past land use. Bethany Reservoir is a man-made component of the California Aqueduct. The immediate lakeshore can be classified as aquatic habitat with isolated patches and strands of narrow leaved cattail and rushes at the water's edge. Aquatic habitat quality for fish is low to moderate due to the poorly developed cover vegetation along the shoreline. Bethany Reservoir is currently stocked with rainbow trout and also contains, among others, largemouth bass, smallmouth bass, striped bass, bluegill and crappies.

Brushy Creek is the dominate natural aquatic feature within the project boundary. Brushy Creek is a perennial, low gradient stream with incised banks and pockets of instream wetland vegetation. Dense riparian vegetation is non-existent within the project corridor. However, Brushy Creek does provide aquatic habitat to common and special-status species including California red-legged frog and California tiger salamander. Common species typically found in this habitat include pacific treefrog, western toad, garter snake, and bird species adapted to riparian environments such as snowy egret, great blue heron, and black phoebe.

Special-Status Species

Species known to occur on or in the vicinity of the project site are considered "special-status" because of their recognized rarity or vulnerability to various causes of habitat loss or population decline. Some of these species receive specific protection from federal or state endangered species legislation. Other species have been designated as "sensitive" on the basis of the following: adopted policies and expertise of state resource agencies; organizations with acknowledged expertise; or policies adopted by local governmental agencies such as counties, cities, and special districts to meet local conservation objectives. These species are referred to collectively as "special-status species" in this Environmental Impact Report (EIR), following a convention that has developed in practice but has no official sanction. Special- status species are discussed further in the Regulatory Framework section of this chapter.

Special-Status Species in the SBA Project Corridor

A list of special-status plant and animal species occurring within the vicinity of the project site was compiled on the basis of data in the California Natural Diversity Database (CNDDB, 2003), consultation with the CDFG, California Native Plant Society (CNPS) literature (Skinner and Pavlik, 2001), consultation with the U.S. Fish and Wildlife Service (USFWS), and biological literature for the region. The "Potential for Occurrence" designations (**Table 3.3-1**) apply to species and their habitats in close proximity to the Proposed Project's boundary and facilities, but not necessarily impacted by the project. Special-status species with the potential for occurrence within the SBA project corridor are described below.

TABLE 3.3-1
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SBA ENLARGEMENT PROJECT
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SOUTH BAY AQUEDUCT PROJECT

Common Name *Scientific Name*	**Listing Status USFWS/ CDFG/CNPS**	**General Habitat**	**Potential for Species Occurrence in the SBA project corridor**	**Period of Identification**	**Location/Facility**
ANIMALS					
Invertebrates					
Longhorn fairy shrimp *Branchinecta longiantenna*	FE/--	Vernal pools or other areas capable of ponding water seasonally	**Moderate potential.** Potential habitat found along seasonal ponds and pools along Dyer Canal	Year-round (eggs in dry season, adult shrimp in Winter)	Dyer Canal
Vernal pool fairy shrimp *Branchinecta lynchi*	FT/--	Vernal pools or other areas capable of ponding water seasonally	**Moderate potential.** Potential habitat found along seasonal ponds and pools along Dyer Canal	Year-round (eggs in dry season, adult shrimp in Winter)	Dyer Canal
Monarch butterfly *Danaus plexippus*	--/* (wintering sites)	Protected tree groves of eucalyptus, Monterey pine, and cypress with nearby nectar and water sources	**Low potential.** No potential habitat within SBA project corridor.	December-March	--
Curved-foot hygrotus diving beetle *Hygrotus curvipes*	FSC/--	Drainages, seeps, and wet areas; standing water in ponds or ephemeral pools	**Present.** Observed in Brushy Creek	February-March	Brushy Creek
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT/--	Riparian habitat, levee and rip rap lined stream banks containing its host plant, the elderberry (*Sambucus* sp.)	**Low Potential.** No suitable habitat exists within project area	Year round, breeding March-June	--
Bridges Coast Range shoulderband snail *Helminthoglypta nickliniana*	FE/--	Open hillsides of Alameda and contra Costa counties. Found in tall grass and weeds and/or rock piles.	**Low potential.** Project is out of species' described range.	Year-round	--
Vernal Pool Tadpole Shrimp *Lepidurus packardi*	FE/–	Vernal pools or other areas capable of ponding water seasonally	**Moderate potential.** Potential habitat found along seasonal ponds and pools along Dyer Canal	Year-round (eggs in dry season, adult shrimp in Winter)	Dyer Canal
Callippe silverspot butterfly *Speyeria callippe callippe*	FE/--	Coastal areas in dunes, prairie, scrub, and grasslands supporting its host plant, johnny jump-up (*Violet pedunculata*)	**Low potential.** Grassland in the Dyer Canal area my provide marginal habitat but host plant has not been identified in this area.	March-June	--

TABLE 3.3-1 (Continued)
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SBA ENLARGEMENT PROJECT
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SOUTH BAY AQUEDUCT PROJECT

Common Name *Scientific Name*	**Listing Status USFWS/ CDFG/CNPS**	**General Habitat**	**Potential for Species Occurrence in the SBA project corridor**	**Period of Identification**	**Location/Facility**
Amphibians					
California tiger salamander *Ambystoma californiense*	FT/CSC	Wintering sites occur in grasslands occupied by burrowing mammals; breed in ponds and vernal pools	**Present.** Brushy Creek and Dyer Canal segments pass through documented habitat; other segments pass near documented locations.	Winter rains and March-April	Brushy Creek, Dyer Canal.
California red-legged frog *Rana aurora draytonii*	FT/CSC	Breed in stock ponds, pools, and slow moving streams	**Present.** Brushy Creek corridor provides suitable breeding and aestivation habitat. One individual observed on February 2004 in Brushy Creek	May-August	Brushy Creek
Foothill yellow-legged frog *Rana boylii*	--/CSC	Breeds and overwinters in and near cobbled streams with permanent water.	**Low potential.** No suitable habitat exists within SBA project corridor.	December-May	--
Western spadefoot *Speeas hammondii*	FSC/CSC	Freshwater seasonal marsh (primarily vernal pools for breeding), grasslands, and oak savanna	**Low potential.** Potential habitat for this species	February-May	--
Fish					
Steelhead- Central California Coast ESU *Oncorhynchus mykiss irideus*	FT/--	Drainages of San Francisco and San Pablo Bays, central Calif. Coastal drainages	**Low potential.** No suitable aquatic habitat occurs in the SBA project corridor	year-round, migrating October-June	--
Reptiles					
Northwestern pond turtle *Clemmys marmorata marmorata*	FSC/CSC	Lakes, ponds, reservoirs, and slow-moving streams and rivers, primarily in foothills and lowlands	**High potential.** Brushy Creek provides marginal habitat. Stock ponds throughout SBA project corridor provide excellent habitat for this species.	year-round	Brushy Creek, stock ponds throughout SBA project corridor.
San Joaquin whipsnake *Masticophis flagellum ruddocki*	FSC/CSC	Open grassland, pasture and alkali scrub	**Moderate potential.** Grassland and pasture throughout the project alignment is potential habitat.	March-October	Brushy Creek, Dyer Canal.
Alameda whipsnake *Masticophis lateralis euryxanthus*	FT/CT	Coastal ranges, in chaparral and riparian habitat and adjacent grasslands.	**Low potential.** Potential habitat in riparian and adjacent grasslands of southern portion of project alignment; no AWS habitat located near work locations.	March-November	Dyer Canal

TABLE 3.3-1 (Continued)
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SBA ENLARGEMENT PROJECT
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SOUTH BAY AQUEDUCT PROJECT

Common Name *Scientific Name*	**Listing Status USFWS/ CDFG/CNPS**	**General Habitat**	**Potential for Species Occurrence in the SBA project corridor**	**Period of Identification**	**Location/Facility**
California horned lizard *Phrynosoma coronatum frontale*	--/CSC	Valley woodland, coniferous forest, riparian, and grassland habitats; most commonly in sandy washes with scattered shrubs	**Low potential.** One CNDDB record in SBA project corridor vicinity, about 5 miles north of Brushy Creek segment.		Brushy Creek
Birds					
Cooper's hawk *Accipiter cooperii*	--/CSC (nesting)	Nests in dense oak and riparian woodland	**Low Potential.** Riparian areas in Brushy Creek provide marginal nesting habitat.	year-round	Brushy Creek
Sharp-shinned hawk *Accipiter striatus*	--/CSC (nesting)	Nests in dense stands of conifers and riparian habitats	**Low Potential.** Riparian areas in Brushy Creek provide marginal habitat.	year-round	Brushy Creek
Tricolored blackbird *Agelaius tricolor*	FSC/CSC	Nests in freshwater marshes with dense stands of cattails or bulrushes, occasionally in willows, thistles, mustard, blackberry brambles, and dense shrubs and grains	**Present (nesting).** Riparian areas in Brushy Creek and along freshwater marsh areas adjacent to Dyer Canal and Livermore Canal provide suitable habitat for this species. A breeding colony was observed nesting adjacent to Livermore Canal, east of Patterson Reservoir	year-round	Brushy Creek, Livermore Canal
Golden eagle *Aquila chrysaetos*	--/CSC	Nests in canyons and large trees in open habitats	**Present.** Nesting pair observed on several occasions in small grove of eucalyptus trees east of Patterson Reservoir.	year-round	Livermore Canal
Burrowing owl *Athene cunicularia*	--/CSC (burrowing sites)	Nests and forages in low-growing grasslands with burrowing mammals	**Present.** Several pairs observed in grassland area adjacent to Dyer Canal in the area proposed for Dyer Reservoir.	year-round	Dyer Canal
Northern harrier *Circus cyaneus*	--/CSC	Ground nester found in grasslands and in adjacent wetlands or upland/wetland areas	**Present.** One female observed foraging over field adjacent to Dyer Canal. One male observed foraging in wetland area adjacent to Alameda Canal	Year-round	Dyer Canal, Alameda Canal
Great blue heron *Ardea herodias*	--/* (nesting)	Colonial nester in tall trees near wetland foraging areas	**Low Potential.** Suitable nesting habitat does not exist in SBA project corridor	year-round	--
Swainson's hawk *Buteo swainsoni*	--/CT (nesting)	Nests in large trees, often near water, open grasslands or agricultural lands.	**Low potential.** No nesting records for this species in SBA project corridor.	March-July	--

TABLE 3.3-1 (Continued)
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SBA ENLARGEMENT PROJECT
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SOUTH BAY AQUEDUCT PROJECT

Common Name *Scientific Name*	**Listing Status USFWS/ CDFG/CNPS**	**General Habitat**	**Potential for Species Occurrence in the SBA project corridor**	**Period of Identification**	**Location/Facility**
White-tailed kite *Elanus leucurus*	--/*	Nests in shrubs and trees adjacent to grasslands, forages over grasslands and agricultural lands	**Present.** Several individuals and at least one nesting pair observed within the Dyer Canal area of the SBA project corridor.	year-round	Dyer Canal, Patterson Reservoir
California horned lark *Eremophila alpestris actia*	--/CSC	Nests and forages in short-grass prairie, mountain meadow, coastal plain, fallow fields, and alkali flats	**Present.** Individuals observed within the grassland adjacent to the Dyer Canal. Suitable habitat exists throughout the SBA project corridor.	March-July	All segments.
American peregrine falcon *Falco peregrinus anatum*	FD/CE	Forages in marshes and grasslands. Nesting habitat includes high, protected cliffs and ledges near water	**Low potential.** The SBA project corridor does not provide suitable nesting habitat and only limited foraging habitat is available for this species.	May-August	--
Bald eagle *Haliaeetus leucocephalus*	FT[1]/CE	Winter foraging at lakes and along major rivers	**Low potential.** No suitable nesting or foraging habitat occur for this species.	August-January	--
Loggerhead shrike *Lanius ludovicianus*	FSC/CSC	Scrub, open woodlands, and grasslands	**Present.** Numerous individuals observed adjacent to the Dyer Canal and Livermore Canal areas of the SBA project corridor. Suitable habitat exists throughout the SBA project corridor.	year-round	All project segments
Mammals					
Townsend's western big-eared bat *Corynorhinus townsendii townsendii*	FSC/CSC	Oak and coniferous woodland and arid grasslands. Roosts in caves, buildings, etc.	**Low potential.** Potential roosting sites limited along project alignment.	April-October	--
Berkeley kangaroo rat *Dipodomys heermanni berkeleyenis*	--/--	Grassy openings and hilltops in chaparral and blue oak/gray pine woodland.	**Low potential.** Chaparral and blue oak/gray pine woodland do not occur along project alignment.	year-round	--
San Joaquin pocket mouse *Perognathus inornatus inornatus*	FSC/--	Grassland or scrub areas in loose soils from 1,000 to 2,000 ft.	**Moderate potential.** Suitable habitat along much of project alignment but only recorded sighting in vicinity well north of project northern terminus.	year-round	--

1 Currently pending delisting by the federal government.

TABLE 3.3-1 (Continued)
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SBA ENLARGEMENT PROJECT
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SOUTH BAY AQUEDUCT PROJECT

Common Name *Scientific Name*	**Listing Status USFWS/ CDFG/CNPS**	**General Habitat**	**Potential for Species Occurrence in the SBA project corridor**	**Period of Identification**	**Location/Facility**
Greater western mastiff bat *Eumops perotis californicus*	FSC/CSC	Breeds in rugged, rocky canyons and forages in a variety of habitats	**Low potential.** SBA project corridor does not provide habitat for this species. No CNDDB records in SBA project corridor.	February-August	--
Small-footed myotis bat *Myotis* [*ciliolabrum*] *leibii*	FSC/--	Forages over grasslands and roosts in caves and rock crevices	**Low potential.** SBA project corridor does not provide roosting habitat for this species. No CNDDB records in SBA project corridor.	February-August	--
Long-eared myotis bat *Myotis evotis*	FSC/--	Inhabits woodlands and forests up to approximately 8,200 feet in elevation; generally not in Central Valley.	**Low potential.** Roosting habitat available in large diameter oaks and sycamores. No CNDDB records in SBA project corridor.	February-August	--
Fringed myotis bat *Myotis thysanodes*	FSC/--	Inhabits a variety of habitats including pinyon-juniper woodland, valley-foothill hardwood, hardwood-conifer forests, and desert scrub; generally not in Central Valley.	**Low potential.** Roosting habitat available in large diameter oaks and sycamores. No CNDDB records in SBA project corridor.	February-August	--
Long-legged myotis bat *Myotis volans*	FSC/--	Inhabits forests and woodland habitats, primarily oak and juniper woodlands	**Low potential.** Roosting habitat available in large diameter oaks and sycamores. No CNDDB records in SBA project corridor.	February-August	--
Yuma myotis bat *Myotis yumanensis*	FSC/--	Open forests and woodlands below 8,000 feet in close association with water bodies	**Low potential.** SBA project corridor is considered outside this species' range.	February-August	--
San Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	FSC/CSC	Forests with moderate canopy cover and brushy understory	**Low potential.** Suitable habitat does not occur in the SBA project corridor.	year-round	--
San Joaquin kit fox *Vulpes macrotis mutica*	FE/CT	Annual grasslands or grassy open areas with shrubs, loose-textured soils for burrows and prey base	**Moderate potential.** SBA project corridor provides suitable grazed grasslands habitat for this species. SBA project corridor is within the range of this species (CNDDB, 2001).	year-round	Brushy Creek, Dyer Canal, Livermore Canal.

TABLE 3.3-1 (Continued)
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SBA ENLARGEMENT PROJECT
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SOUTH BAY AQUEDUCT PROJECT

Common Name *Scientific Name*	Listing Status USFWS/ CDFG/CNPS	General Habitat	Potential for Species Occurrence in the SBA project corridor	Period of Identification	Location/Facility
PLANTS					
Bent-flowered fiddleneck *Amsinckia lunaris*	--/--/1B	Coastal bluff scrub, woodland, grassland	**Low potential.** Occurrence noted in Altamont quad and potential habitat occurs within SBA project corridor but not noted in floristic surveys.	March-June	Dyer Canal, Livermore Canal.
Large-flowered fiddleneck *Amsinckia grandiflora*	FE/CE/1B	Grasslands; only native population is at LLNL.	**Low potential.** Potential marginal habitat exists in SBA project corridor but current known distribution extremely limited. Not noted in floristic surveys.	March-June	Grasslands with remaining native elements throughout SBA project corridor
Ferris's milk vetch *Astragalus tener* var. *ferrisiae*	FSC/--/1B	Meadows, grasslands; subalkali flats, usually in dry adobe soil	**Low potential.** Potential habitat exists within SBA project corridor but not noted in floristic surveys.	April-May	Proposed Dyer reservoir site
Alkali milk vetch *Astragalus tener* var. *tener*	--/--/1B	In poor draining low ground of alkali playa, grasslands and vernal pools; usually in dry adobe soil	**Low potential.** Potential habitat exists within SBA project corridor. Closest known occurrence is from 1938 at the end of Livermore Valley.	March-June	Proposed Dyer reservoir site
Heartscale *Atriplex cordulata*	FSC/--/1B	Chenopod scrub and sandy, alkaline grasslands	**Low potential.** No suitable habitat occurs within SBA project corridor.	April-October	--
Brittlescale *Atriplex depressa*	--/--/1B	Alkaline or clay grasslands, chenopod scrub, and playas; occasionally in riparian areas, marshes or vernal pools	**Low potential.** Marginal suitable habitat occurs within SBA project corridor. Closest known occurrence is north of I-580 in the Springtown Reserve. Not noted in floristic surveys.	May-October	--
San Joaquin saltbush *Atriplex joaquiniana*	FSC/--/1B	Alkaline seasonal wetlands and sinks in grasslands, chenopod scrub and alkali meadows	**Low potential.** Marginal suitable habitat occurs within SBA project corridor. CNDDB reports nearest known occurrence east of Vasco Rd. and north of Frick Lake. Not noted in floristic surveys.	April-October	--
Big-scale balsamroot *Balsamorhiza macrolepis* var. *macrolepis*	--/--/1B	Woodland and grasslands, sometimes on serpentine soils	**Low potential.** Potential habitat occurs within SBA project corridor. CNDDB reports nearest known occurrence 1.5 miles southeast of Tesla Rd. southeast of Livermore. Not noted in floristic surveys.	March-June	--

TABLE 3.3-1 (Continued)
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SBA ENLARGEMENT PROJECT
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SOUTH BAY AQUEDUCT PROJECT

Common Name *Scientific Name*	**Listing Status USFWS/ CDFG/CNPS**	**General Habitat**	**Potential for Species Occurrence in the SBA project corridor**	**Period of Identification**	**Location/Facility**
Big tarplant *Blepharizonia plumosa* ssp. *plumosa*	--/--/1B	In annual grasslands of dry hills and plains; soils are clay to clay-loam; often found in burned areas and usually on slopes	**Low potential.** Potential habitat occurs within SBA project corridor.	July-October	Less disturbed grasslands throughout SBA project corridor
Congdon's tarplant *Centromadia parryi* ssp. *congdonii*	FSC/--/1B	Alkaline soils in grasslands	**Low potential.** Potential habitat occurs within SBA project corridor.	June-November	--
Hispid bird's-beak *Cordylanthus mollis* ssp. *hispidus*	FSC/--/1B	Seasonal wetlands in alkali sinks with valley sink scrub, alkali meadows, and alkali marsh communities	**Low potential.** Known occurrences near the project alignment are a few miles west in the Springtown Reserve. Not noted during floristic surveys.	June-September	--
Palmate-bracted bird's beak *Cordylanthus palmatus*	FE/CE/1B	Usually on silty, alkaline clays in chenopod scrub and grasslands; tends toward wetter areas (meadows, seeps, seasonal wetlands)	**Low potential.** Known occurrence near the project alignment is a few miles west in the Springtown Reserve. Not noted in floristic surveys.	May-October	--
Livermore tarplant *Deinandra bacigalupii*	--/--/1B	Alkali meadows	**Low potential.** CNPS note of occurrence in Altamont quad. Potential habitat in segments in this quad.	June-October	--
Recurved larkspur *Delphinium recurvatum*	FSC/--/1B	On alkaline soils mostly in saltbush scrub and chenopod scrub but also grasslands and woodland.	**Low potential.** Known occurrences are north of project alignment. The northern segments mostly have non- or sub-alkaline soils. Not noted in floristic surveys.	March-May	Brushy Creek
Mt. Diablo buckwheat *Eriogonum truncatum*	--/--/1A	Dry slopes of coastal scrub, chaparral, grasslands habitats; on exposed clay to sandy soils	**Low potential.** Only one historical occurrence near project alignment (Altamont quad). Plant thought to be extinct (Skinner and Pavlik, 2001)	April-November	--
Round-leaved filaree *Erodium macrophyllum*	--/--/2	On clay soils in woodland and grasslands	**Low potential.** Not identified during appropriately timed surveys.	March-May	--
Hoover's button-celery *Eryngium aristulatum* var. *hooveri*	FSC/--/1B	Vernal pools	**Low potential.** Occurrence noted in Milpitas quad (Skinner and Pavlik, 2001). Marginal suitable habitat present but not noted in floristic surveys.	July	Proposed Dyer Reservoir site
Diamond-petaled poppy *Eschscholzia rhombipetala*	FSC/--/1B	On grassland slopes and flats; substrate clay and alkaline	**Low potential.** Not identified during appropriately timed surveys.	March-April	--

TABLE 3.3-1 (Continued)
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SBA ENLARGEMENT PROJECT
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SOUTH BAY AQUEDUCT PROJECT

Common Name *Scientific Name*	**Listing Status USFWS/ CDFG/CNPS**	**General Habitat**	**Potential for Species Occurrence in the SBA project corridor**	**Period of Identification**	**Location/Facility**
Fragrant fritillary *Fritillaria liliacea*	FSC/--/1B	Coastal prairie and scrub, grasslands, often on serpentine soils	**Present.** One population of this plant is located on Brushy Creek pipeline alignment.	February-April	Brushy Creek Pipeline
Diablo helianthella *Helianthella castanea*	FSC/--/1B	Forest, woodland, chaparral, coastal scrub, riparian woodland, and grassland; usually in chaparral/oak woodland ecotone.	**Low potential.** Only location referenced near project is in Byron Hot Springs quad. Project alignment does not contain preferred habitat for this species.	April-June	Brushy Creek
Contra Costa goldfields *Lasthenia conjugens*	FE/--/1B	Vernal pools and seasonal wetlands in grassland and woodland	**Low potential.** Extirpated from Byron Hot Springs quad (CNDDB, 2001); extant population about 2 miles west of project alignment in Milpitas quad. Marginal suitable habitat present but not noted in floristic surveys.	March-June	--
Wooly-headed lessingia *Lessingia hololeuca*	--/--/3	On clay, serpentinite soils in broadleaf forest, coastal scrub, coniferous forest and grassland	**Low potential.** CNPS (Skinner and Pavlik, 2001) notes occurrences in Calaveras Reservoir quad. No suitable habitat found along project segment in this area.	June-October	--
Little mousetail *Myosurus minimus* ssp. *apus*	FSC/--/3	In alkaline vernal pools in grassland	**Low potential.** CNPS (Skinner and Pavlik, 2001) notes occurrences in Clifton Court and Altamont quads. Potential habitat along project alignment in this area in the Altamont pipeline segment. Not noted in floristic surveys.	March-June	--
Prostrate navarretia *Navarretia prostrata*	--/--/1B	In mesic, alkali areas of coastal scrub and grassland, particularly vernal pools	**Low potential.** Only occurrence in vicinity in Milpitas quad, from which it has been extirpated (Skinner and Pavlik, 2001). Marginal suitable habitat present but not noted during floristic surveys.	April-July	--
Hairless popcornflower *Plagiobothrys glaber*	--/--/1A	Alkaline wetlands in valleys; salt marshes	**Low potential.** Historic location just south of Livermore. Believed to be extirpated from Alameda and Santa Clara counties (Skinner and Pavlik, 2001). Suitable wetland alkali habitat restricted to Altamont pipeline segment. Not noted during floristic surveys.	March-May	--

TABLE 3.3-1 (Continued)
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SBA ENLARGEMENT PROJECT
SPECIAL-STATUS SPECIES CONSIDERED IN THE EVALUATION OF THE SOUTH BAY AQUEDUCT PROJECT

Common Name *Scientific Name*	**Listing Status USFWS/ CDFG/CNPS**	**General Habitat**	**Potential for Species Occurrence in the SBA project corridor**	**Period of Identification**	**Location/Facility**
Rayless ragwort *Senecio aphanactis*	--/--/2	Alkaline flats in woodland and coastal scrub	**Low potential.** One historic location about 4 miles north of project northern terminus. Suitable habitat not found along proposed alignment.	January-April	--
Most beautiful jewel-flower *Streptanthus albidus* ssp. *peramoenus*	FSC/--/1B	Ridges and slopes with chaparral, grassland and woodland; on serpentine outcrops	**Low potential.** Extant populations found in Sunol Regional Park and near Mission Peak. Proposed alignment contains no suitable habitat.	April-June	--
Saline clover *Trifolium depauperatum* var. *hydrophilum*	--/--/1B	Vernal pools and seasonal wetlands in grassland; also in freshwater marsh	**Low potential.** CNPS (Skinner and Pavlik, 2001) notes occurrences in Livermore and Altamont quads. Marginal suitable habitat present but not noted during floristic surveys.	April-June	Proposed Dyer reservoir site and along Altamont Creek
Caper-fruited *tropidocarpum* *Tropidocarpum capparideum*	FSC/--/1A	Grasslands in alkaline hills.	**Low potential.** Numerous historic locations near northern half of project route. Last seen in area in 1957. Species is believed to be extinct (Skinner and Pavlik, 2001).	March-April	Brushy Creek

STATUS CODES:

FEDERAL: (U.S. Fish and Wildlife Service)
FE = Listed as Endangered (in danger of extinction) by the Federal Government.
FT = Listed as Threatened (likely to become endangered within the foreseeable future) by the Federal Government.
FP = Proposed for Listing as Endangered or Threatened.
FC = Candidate to become a *proposed* species.
FSC = Federal Species of Concern. May be endangered or threatened, but not enough biological information has been gathered to support listing at this time.
FD = Delisted by the Federal Government

STATE: (California Department of Fish and Game)
CE = Listed as Endangered by the State of California
CT = Listed as Threatened by the State of California
CR = Listed as Rare by the State of California (plants only)
CSC = California Species of Special Concern
* = Special Animals
3503.5=Protection for nesting species of Falconiformes (hawks) and Strigiformes (owls)

California Native Plant Society
List 1A=Plants presumed extinct in California
List 1B=Plants rare, threatened, or endangered in California and elsewhere
List 2= Plants rare, threatened, or endangered in California but more common elsewhere
List 3= Plants about which more information is needed
List 4= Plants of limited distribution

SOURCE: CNDDB, 2003; USFWS, 2003; Skinner and Pavlik (CNPS), 2001.

Special-status organisms are evaluated for this EIR based on a plausible likelihood of habitat loss or construction-related disturbance. Of the special-status plants and animals in **Table 3.3-1**, only the following species are considered in the impact analysis: Fragrant fritillary, longhorn fairy shrimp, vernal pool fairy shrimp, curve-footed hygrotis diving beetle, California tiger salamander California red-legged frog, western pond turtle, burrowing owl, San Joaquin kit fox, and nesting and breeding birds and raptors that include golden eagle, loggerhead shrike, tricolored blackbirds, California horned lark, northern harrier, and short-eared owls.

Special-Status Species

Special-status Plant

Fragrant fritillary (*Fritillaria liliacea*). Fragrant fritillary is included on the CNPS List 1B and is designated a species of concern by the USFWS. This member of the lily family (Liliaceae) is known to occur in the Bay Are and other coastal counties such as Monterey and San Benito. The species is a slender, herbaceous perennial lily developing from a bulb and typically found on soils derived from serpentine. The lower leaves are opposite and the upper, more slender leaves are oppositely arranged on the 6 to 35 inch tall stem. The flowers, which appear from February to April are nodding and white, sometimes turning dull pink or red.

Grazing, agriculture, urbanization, and non-native plants threaten the fragrant fritillary. Grassland habitat in the SBA project corridor is limited for this species due to disturbance from intensive grazing.

Special-status Wildlife

Longhorn Fairy Shrimp (*Branchinecta longiantenna*). Longhorn fairy shrimp generally inhabit moderately deep, medium to large-sized grass-bottomed and clay-bottomed alkaline pools and moderately deep, small to medium-sized rock outcrop pools (Eng et al., 1990), however, individuals have been observed in pools less than 1 square meter (0.0002 acre) in area to pools as large as 0.3 hectares (0.7 acre). The depth of known, occupied habitats ranges from 20 cm (8 inches) to 51 cm (20 inches).

All known populations of longhorn fairy shrimp inhabit sites in California. The geographic range of this species encompasses the western San Joaquin Valley and the eastern flank of the central and southern coastal range (USFWS, 1994). Based on the geographic range of this species, the USFWS considers appropriate habitats in the following counties to potentially support longhorn fairy shrimp: Alameda, Contra Costa, western Fresno, western Kern, Kings, western Madera, Merced, eastern Monterey, San Benito, San Joaquin, eastern San Luis Obispo, Santa Clara, and Stanislaus.

Vernal Pool Fairy Shrimp (*Branchinecta lynchi*). The vernal pool fairy shrimp inhabits vernal pools with tea-colored water, most commonly in grass or mud bottomed swales, or basalt flow depression pools in unplowed grasslands. This fairy shrimp has been collected from early December to late May. Thirty-two populations of the vernal pool fairy shrimp are known to exist: (1) extending from Stillwater Plain in Shasta County through most of the length of the

Central Valley to Pixley in Tulare County, and, (2) along the central Coast Range from northern Solano County to Pinnacles National Monument in San Benito County.

Curve-footed Hygrotus Diving Beetle (*Hygrotus curvipes*). The curve-footed hygrotus diving beetle, while not currently listed as endangered or threatened by the federal or state governments, is listed as a species of special concern by the USFWS. Currently, it has no official status with the State of California.

This beetle is known to occur in both fresh and brackish waters of small mineralized ponds, alkali vernal pools, and intermittent creek channels. Both larval and adult stages are strictly aquatic. Adult beetles, which are most readily observed from March to September, maintain flight capability and are very mobile. This species has been collected from the Delta region of Contra Costa County and near the Kellogg Creek watershed in Contra Costa and Alameda counties but little is known about the overall distribution and ecology of this species. It is thought the preferred habitat for this species is small, drying, mineralized pools formed by winter rains, plus small ponds and pools in intermittent streams.

Central California Coast Steelhead (*Onchorynchus mykiss*). The Steelhead (Central California Coast Evolutionary Significant Unit (ESU)) is a federally listed threatened species. Critical habitat was designated for this species by National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries)[2] on February 16, 2000 and included the Alameda Creek watershed. However, on September 29, 2003, NOAA Fisheries formally withdrew critical habitat designation for the Central California Coast Evolutionary Significant Unit (ESU), as well as 18 other ESUs (Federal Register 68: No. 188) due to court order.

Steelhead trout (*Onchorynchus mykiss*) exhibit one of the most complex life histories of any salmonid species. The resident rainbow trout form spends its entire life in freshwater environments while the anadromous steelhead form migrates between their natal streams and the ocean. Steelhead typically migrate to marine waters after spending one or more years in freshwater. They typically reside in marine waters 2-3 years prior to returning to their natal stream to spawn as 4- or 5- year olds. Unlike salmon, steelhead are iteroparous, meaning they can spawn more than once before they die.

Arroyo Mocho and Arroyo Seco are part of the larger Alameda Creek watershed that lies geographically within the Central California Coast ESU as defined by NOAA Fisheries. Historically, the Alameda Creek watershed has supported anadromous steelhead. Steelhead observations have been reported below the Bay Area Rapid Transit (BART) weir in the Lower Alameda Creek channel. The hydrology of Arroyo Seco and Arroyo Mocho and numerous downstream barriers prevent steelhead from migrating into the SBA project corridor.

[2] On or about January 1, 2003, the National Marine Fisheries Service (NMFS) began referring to itself as "NOAA Fisheries" (National Oceanic and Atmospheric Administration Fisheries).

California Tiger Salamander (*Ambystoma californiense*). The California tiger salamander (CTS) is a large (75 to 125 millimeter snout-vent length) terrestrial salamander with several white or pale yellow spots or bars on black skin (Stebbins, 1985). The undersides are highly variable and range from uniformly white or pale yellow to variegated white or pale yellow and black (Jennings and Hayes, 1994).

Tiger salamanders breed and lay eggs following relatively warm rains in winter months. CTS participates in nocturnal breeding migrations that may cover distances of 1,000 meters or more (Jennings and Hayes, 1994) Juveniles emigrate from drying breeding sites to small mammal burrows, and may take two years to mature (Jennings and Hayes, 1994). During years of low rainfall, CTS may not reproduce at all (Jennings and Hayes, 1994), and because they take refuge in burrows during the dry months, they are rarely observed outside of the breeding season.

CTS most commonly breeds in vernal pools, but may utilize the quiet waters of ponds, reservoirs, lakes, vernal pools, and occasionally streams (Stebbins, 1985). Adult CTS spend most of the year in subterranean refugia, especially burrows of California ground squirrels (*Spermophilus beecheyi*) and occasionally man-made structures. The species appears to be restricted to grasslands and low foothill regions of Central and Northern California, which is where the longest-lasting rain pools tend to form (Jennings and Hayes, 1994).

CTS have been separated into several geographically isolated and genetically distinct populations and have been introduced into areas outside of their natural range (Jennings and Hayes, 1994). CTS is restricted to the central part of California. In the past two decades there have been 288 occurrences reported for this species in 87 quadrangles. There are seven separate populations of this species, with a discontinuous distribution from Sonoma County to Santa Barbara County in the coastal valleys, from Colusa and Butte counties to Kern and Tulare counties in the Central Valley. Urban development and conversion of grassland habitat to agricultural uses are the primary threat to this species.

California Red-legged Frog (*Rana aurora draytonii*). The California red-legged frog (CRLF) is the largest native frog in the western United States (Wright and Wright, 1949) ranging from 4 to 13 centimeters (cm) (1.5 to 5.1 inches) in length (Stebbins, 1985). The abdomen and hind legs of adults are largely red; the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background color.

The largest populations of CRLF currently are associated with deep pools with stands of overhanging willows and an intermixed fringe of cattails (*Typha latifolia*) (Jennings, 1988). However, CRLF also have been found in ephemeral creeks and drainages and in ponds that may or may not have riparian vegetation. The CRLF disperse upstream and downstream of their breeding habitat to forage and seek sheltering habitat. Sheltering habitat for CRLF potentially includes all aquatic, riparian, and upland areas within the range of the species and any landscape features that provide cover, such as existing animal burrows, boulders or rocks, organic debris (e.g., downed trees or logs), and industrial debris. Incised stream channels with portions narrower than 18 inches and depths greater than 18 inches also may provide important summer sheltering habitat. Accessibility to sheltering habitat is essential for the survival of CRLF within

a watershed and can be a factor limiting frog population numbers and survival. During winter rain events, juvenile and adult CRLF are known to disperse up to 1 to 2 kilometers (Rathbun and Holland, unpublished data, cited in Rathbun et al., 1991).

CRLF generally breed from January to May, attaching eggs to vegetation or other available sites in shallow water. Tadpoles grow to 3 inches before metamorphosing. CRLF are adapted to a highly variable climate that can alternate yearly between very wet and extreme drought conditions. In response to this variability, in wet years frog reproduction is high, and more sites become occupied by dispersing young frogs. In drought years populations may decline, and previously occupied sites are no longer inhabited. Therefore, it is important to preserve areas that may be unoccupied, as they may become so in other years.

CRLF is presently known from only isolated populations in the Sierra Nevada Range and may be extirpated from the southern Transverse and Peninsular Ranges (USFWS, 2001). This species is relatively common in the San Francisco Bay Area and throughout the Inner and Outer Central Coast Ranges. A wide variety of human activities, including urban encroachment, construction of reservoirs and water diversions, introduction of exotic predators and competitors, livestock grazing, and habitat fragmentation have resulted in the extirpation of this species in these areas and reduction of populations in other areas within its range.

Western Pond Turtle (*Clemmys marmorata*). The western pond turtle, including the northwestern (ssp. *marmorata*) and the southwestern (ssp. *pallida*) subspecies, is a federal species of concern and a state species of special concern. This species occurs in a variety of permanent and intermittent aquatic habitats such as ponds, marshes, rivers, streams, and ephemeral pools. Pond turtles require suitable basking habitat and haul-out sites, such as emergent rocks or floating logs which they use to thermoregulate their temperature throughout the day (Stebbins, 1985). Pond turtles also require an upland oviposition site near appropriate aquatic habitat, typically within 200 (650 feet) meters away.

Western pond turtles generally measure 9 to 18 cm in length when fully grown and appear in a olive, dark brown, or blackish color, with dashes of brown or black that radiate outwards from their shell. These turtles are typically alert and secretive and retreat to the cover of water when disturbed, diving beneath the surface and hiding in vegetation or beneath submerged rocks and debris. Western pond turtles are omnivorous scavengers. This species hibernates during the winter, emerging in March to feed and reproduce. Reproduction generally takes place between May and August followed by the deposition of five to eleven eggs which are buried in nests in sunny areas near the water. Nests are typically dug in grassy, open fields with soils that are high in clay or silt faction.

Suitable aquatic habitat does not occur within the project boundaries but does occur directly adjacent to the Department of Water Resources (DWR) right-of-way in stock ponds and wetland pools. No focused surveys have been conducted for this species but due to suitable adjacent to the project boundary, it has moderate potential to occur in drainage areas such as Brushy Creek and Patterson Reservoir.

Northern Harrier (*Circus cyaneus*). The northern harrier is a CDFG species of special concern, but is not listed under the federal or state endangered species acts (FESA and CESA). This species is present throughout the central valley and surrounding areas and is a resident in the Bay Area in open grasslands and near wetland areas. Female harriers are a large raptor, typically dark brown throughout and a obvious white patch at the base of its tail. Male harriers are slightly smaller than females and mostly gray or mottled grays and an obvious white patch at the base of its tail.

Harriers breed from April to September with peak breeding activity occurring during June through July (Zeiner et al., 1988). Harriers are ground nesters and nests are a mound of sticks and leaves on moist ground, hidden by shrubby vegetation, tall grasses, and forbs in wetlands, and in wetland/upland borders in tidal marshes, freshwater marshes, and annual grasslands habitats. The nestling period is approximately 53 days and harriers typically brood 2-3 young. All fledglings are brown with the white tail patch until males begin to mature and display sexual dimorphism. Breeding pairs and juveniles may roost annually in late fall and winter. Forage areas consist of open ground and grasslands, where harriers hunt for prey items including small mammals, birds, reptiles and amphibians.

Suitable habitat exists throughout the SBA project corridor in grasslands adjacent to wetland areas such as Dyer Canal, Livermore Canal, Alameda Canal, and in the proposed Dyer Reservoir location. One female harrier has been observed foraging in the grassland areas adjacent to Dyer Canal. One male harrier has been observed foraging in the freshwater marsh area adjacent to Alameda Canal.

White-tailed kite (Nesting) **(*Elanus leucurus*).** The white-tailed kite is a federal species of concern and a CDFG fully-protected species. The species is a year-long resident in coastal and low-land valleys. It is rarely found away from agricultural areas. The kite nests and roosts in large groves of dense, broad-leafed deciduous trees and forages in open grasslands, meadows, farmlands, and emergent wetlands.

White-tailed kites breed from February to October (with peak from May to August) and construct their nests near the top of dense oaks, willow, or dense shrubs such as coyote brush. Female kites incubate eggs for approximately 28 days. Young fledge in 35-40 days. Typically white-tailed kites are single brooded, but will occasionally raise two broods in one season.

White tailed kites, including nesting pairs, have been observed in various locations throughout the SBA project corridor.

Golden Eagle (*Aquila chrysaetos*). The golden eagle is a California species of Special Concern. It is a very large bird with a wingspan of approximately 7 feet. It is typically dark brown but may shows slight signs of white on the wings and on the tail. Juvenile eagles typically show white patches on the wings and tail but the tail patch is often absent. Golden eagles are found throughout California with a range extending from sea level to approximately 11,500 feet.

Golden eagles feed mostly on rodents and rabbits but will take other mammals, birds, reptiles and some carrion. Golden eagles require open woodland or grassland for foraging and tall trees or steep cliffs for breeding. It can also be found in open, rolling country grasslands or savannahs, farms, chaparral, and at the desert edge.

Golden eagles nest on cliffs or tall trees. Large platform nests are constructed from sticks, twigs, and greenery. Breeding season occurs in late January through August but typically between March through July. Golden eagle are single brooded and typically lay 1 or 2 eggs, but rarely 3. Incubation usually performed by female alone, but sometimes by male and female for approximately 43-45 days. Young are semi-altricial and downy and the nestling period is approximately 30 days. The female feeds the young food brought to the nest by the male until young are approximately 40 days old and then both parents feed for the remainder of the fledging period, typically 65-75 days. Fledglings practice pouncing while remaining in the nest and can fly for short periods at 63-70 days but typically remain at or close to the nest for another 21 days.

Preferred habitat for this species occurs throughout the grassland habitat in the SBA project corridor. One nesting pair has been observed foraging and preparing a nest in a small stand of eucalyptus trees along the Livermore Canal at Milepost (MP) 8.60. ESA biologists observed one fledgling in this area in April and May 2004.

Burrowing Owl (*Athene cunicularia*). Burrowing owls are year-long residents of the Central Valley, as well as other areas of open, dry grassland and desert habitats. They are frequently found in open grasslands and shrublands where perches and existing rodent burrows are available. These owls inhabit elevations as high as 5,300 feet in Lassen County (Zeiner et al., 1988).

Breeding takes place from February through August, with a peak in April and May. The young emerge from the burrow at about two weeks of age, and can fly at four weeks (Zeiner et al. 1988). Nesting requires existing burrows (these owls have been reported to make their own burrows but if these reports are accurate the behavior is rare). Ground squirrel colonies provide a potential source of burrows for this owl (Grinnell and Miller, 1944 **).** The burrows are often lined with grass, debris, and feathers.

Burrowing owls hunt for prey during the day and at night. Prey species are primarily insects, but also include small mammals, reptiles, birds, and carrion (Zeiner et al.1988). [recent report eating bats]. Burrowing owls may hunt by hovering, diving from above, or pursuing their prey on the ground. However, they often hunt from a perch, and also use perches to thermoregulate (Zeiner et al. 1988).

The western burrowing owl is found in western North America from Canada to Mexico, and east to Texas and Louisiana. In certain areas of its range, it is migratory. Although the burrowing owls in northern California are thought to migrate, owls within central and southern California are predominantly nonmigratory.

The abundant ground squirrel population throughout the SBA project corridor has provided optimal suitable habitat for burrowing owl in many areas. Numerous owls have been observed in

the area of the proposed Dyer Reservoir (ESA, 2004c). Owls have also been observed in the grazed grasslands surrounding the South Bay Pumping Plant (SBPP) and the Stage 3 Brushy Creek Pipeline. In March 2004, one lone burrowing owl was flushed from its burrow and another dead owl was located nearby (ESA, 2004d).

Short-eared owl (*Asio flammeus*). The short-eared owl is a CDFG species of special concern. Nesting sites are of primary concern for this species. These owls inhabit freshwater and saltwater marshes and grasslands where there is tall vegetation with good cover. The Short-eared Owl is a medium-sized, diurnal and nocturnal owl. It's plumage is buffy brown with dark streaks on the chest, belly, and back. Males tend to be lighter in color and slightly smaller in size than females.

Short-eared owls feed on a variety of prey including small mammals, birds, reptiles, amphibians and arthropods (Zeiner et al., 1988) Breeding occurs along the central and northern California coast, including the Bay Area. The short-eared owl breeds form early March through July and eggs are laid in April and May. Fledgling occurs approximately 52 to 64 days after eggs are laid. Destruction of marsh and grassland habitat and grazing present the greatest threat to this species (Zeiner et al. 1988).

Overall, the vegetation communities provide low-quality habitat for this species within the project boundaries. A small flock (approximately 8 individuals) of short-eared owls was flushed from a large willow tree adjacent to Dyer Canal (ESA, 2004e).

Loggerhead Shrike (*Lanius ludovicianus*). The Loggerhead shrike is categorized by USFWS as a candidate for Category 2 for listing under FESA, currently under review and a California Species of Concern whose breeding populations may face extinction in the near future. This species, like birds in general, falls under California Code 3503, which prohibits the taking or destroying of nest or eggs of any bird.

Loggerhead shrikes are small predatory songbirds measuring 8 to 10 inches in height, with wingspans measuring 12 to 13 inches. Breeding in California typically occurs between March and May. The female lays 4-7 eggs in a well-lined nest in a tree or bush, at an average height of about 6 feet above the ground. Prey consists of various insects, lizards, mice, and other small birds. Except outside of breeding season, loggerhead shrikes are solitary, living in open places where they often perch on fences, trees, or scrubs.

This shrike is common throughout California in the lowlands and the foothills. This species occurs in open habitats, such as grasslands or, occasionally, agricultural fields, using shrubs, trees, posts, fences, and utility lines for perching surfaces. Habitats with little to no human disturbance are preferred, such as open canopied valley, valley foothill hardwood, valley foothill hardwood conifer, valley foothill riparian, pinion juniper, juniper, desert riparian, and Joshua tree habitats. Insecticides and habitat loss are the primary reasons for population decreases of this species.

The scrub and shrub vegetation found within the SBA project corridor including the coyote brush and other shrubs found along the embankments of the canals provides suitable nesting habitat for

loggerhead shrikes. The open and grazed grassland provides suitable foraging habitat also. Numerous shrikes have been observed foraging in areas around Livermore, Alameda, and Dyer Canal, and in the grasslands adjacent to SBPP. One nesting pair was observed in a mature willow adjacent to Livermore Canal, downstream of Patterson Reservoir (ESA, 2004f **).**

California horned lark (*Eremophila alpestris actia*). The California horned lark is a California Species of Special Concern. It is a smallish brown bird with black stripes on its face. It is a yearlong resident of California and can be found in the San Joaquin Valley and east to the Sierra Nevada foothills. Horned larks are also found in coastal regions from Sonoma County to San Diego County. They occur in grasslands, meadows, and open coastal plains.

Horned larks feed primarily on insects, snails, and spiders during the breeding season but will also feed on grasses and forbs. Horned larks are ground nesters and will nest in a variety of open habitats. Nests are formed on the ground in shallow depressions but will also have dry grass, plant stems, and hair. Breeding season begins in late February to mid-June. Female will replace clutch if it is lost and will double brood. Incubation is by female alone and 10-14 days. Nestlings are altricial and downy and are fed and tended to by both parents. Fledglings leave the nest in approximately 9-12 days after hatching.

The grassland areas throughout the project site provide high quality habitat for California horned lark. No focused nesting surveys have been conducted for this species but numerous individuals have been observed within the Stage 3 Brushy Creek Pipeline and in the vicinity of SBPP.

Tricolored blackbird (*Agelaius tricolor*). The tricolored blackbird is a California Species of Special Concern that is nearly endemic to California. It is a small black bird with pointed wings and males exhibiting a patch of red and white on their wings. Tricolored blackbirds are colonial nesters and are found commonly throughout the Central Valley and in coastal districts from Sonoma County south. Colonies breed near fresh water, preferably in emergent wetlands with tall, dense cattails or tules but also in thickets of willow, blackberry, wild rose and tall herbaceous vegetation near water (Goals Project, 2000). This species forages in grasslands and also in cropland habitats. Feeds mostly on insects and spiders but will also eat cultivated grains including rice, and oats. In agricultural region tricolored blackbirds will forage in croplands, grassy fields, flooded lands, and at the edge of ponds and streams.

Tricolored blackbird activity is diurnal and are yearlong residents and are considered non-migratory throughout most of their range. Flocks may become nomadic during winter months seeking food. In winter, flocks become more widespread from Marin to Santa Cruz counties and in the Sacramento Delta.

Tricolored blackbirds typically breed in sloughs, swamps, and marshes where tall plants are present. This species is highly colonial and nesting area is typically large enough to support 50 or more pairs (Grinnell and Miller, 1944). Nest are usually near or over freshwater but foraging sites are typically away from nesting sites. Nests made by the female and are made from mud and plant material and are bound upright to growing plants. Breeding season occurs from late March to mid-June with incubation performed by the female for 10 to 11 days. Nestlings are altricial

and downy and leave the nest in approximately 14 days, but will leave earlier if nest is disturbed. Female tricolored blackbirds may lay one or two broods per year and are itinerant breeders. Individuals may spend the entire breeding season at one location or may move to another location. Clutch size is 1to 5, but typically 3 or 4 nestlings.

Individual tricolored blackbirds have been observed during the non-breeding season around the Stage 3 Brushy Creek Pipeline and SBPP. One nesting flock, with approximately 500 individuals was observed adjacent to Livermore Canal at MP 8.60 (ESA, 2004g). Subsequent surveys indicate nesting and breeding behavior at this location. The site is a formerly wetland area but current vegetation at the site include dense mustard, Italian thistle, and sweet fennel. Subsequent observations of this flock indicate that nesting behavior including females with nesting materials in their beaks making repeated trips to one specific location (ESA, 2004h).

San Joaquin Kit Fox (*Vulpes macrotis mutica*). The San Joaquin kit fox (SJKF) is a small fox with large ears set close together. It has a slim body with long slender legs, narrow nose, and long, bushy tail tapering slightly toward the tip. The tail is usually carried low and straight. The color and texture kit fox fur varies seasonally and geographically. Buff, tan, and yellowish-gray are the most common colors. The undersides vary from light buff to white, with the shoulders, lower sides, flanks, and chest varying from buff to a rust color. The ears are dark on their inner (back) sides, and the tail is black-tipped.

SJKF inhabit grasslands and scrublands, many of which have been extensively modified. Types of modified habitats include those with extraction equipment and wind turbines, agricultural mosaics of row crops, irrigated pastures, orchards, vineyards, and grazed annual grasslands. Oak woodland, alkali sink scrubland, and vernal pool and alkali meadow communities also provide habitat for SJKF.

SJKF are active year-round and primarily nocturnal. Dens are used for housing and protection. One fox may use several dens, particularly during the summer months. They also den in human-made structures, such as culverts, abandoned pipes, and banks in roadbeds. Most dens, especially natal and pupping dens, have at least two entrances. Kit foxes prey primarily upon small mammals and insects and may scavenge in urban interface habitats. Mating usually takes place between late December and March, and the median gestation period is estimated to range from 48 to 52 days. Litters are born between February and late March and consist of two to six pups. Similar to other predators, reproductive success of SJKF is related to the abundance of their prey. Decreases in prey abundance caused by circumstances, such as drought and too much rainfall, result in decreases of reproductive success of SJKF.

The historic range of SJKF includes most of the San Joaquin Valley from southern Kern County north to Contra Costa County and eastern Stanislaus County. Contra Costa, Alameda, and San Joaquin Counties comprise the far northern portion of its range. Since 1967, 53 occurrences of San Joaquin kit foxes have been documented within an area between the Black Diamond Mines area and Lone Tree Valley to the north and Brushy Creek to the south. Kit fox have been observed within the past couple years at Brushy Peak in 2002 (DFG 2003) and Vasco Caves in 2001 and 2002 (DFG 2003).

With respect to the loss or fragmentation of grassland habitat within the San Joaquin kit fox range, the USFWS (1998) issued the Recovery Plan for Upland Species of the San Joaquin Valley, which covers 34 species of plants and animals that occur in the San Joaquin Valley. The recovery plan identifies the protection of existing kit fox habitat in the northern portion of its range and protection of existing connections between habitat in Contra Costa County and habitat farther south as primary recovery actions.

Special-status Bats

Habitat for several special-status bats, including Greater western mastiff bat, small-footed myotis bat, long-eared myotis bat, fringed myotis bat and Yuma myotis bat occurs in the SBA project corridor. These species are all federal Species of Concern. The greater western mastiff bat is also a California Species of Special Concern. Potential roosting habitat for these bats occurs in patches within the Brushy Creek riparian corridor, under bridges, and in patches along Dyer, Alameda and Livermore Canals in larger, mature trees and in farm buildings. Roosting colonies are expected to have a moderate potential of occurrence in mature trees and snags, and large diameter sycamores, oaks, and other trees.

Potential roosting sites would not be removed by project activities, but could be disturbed by incidental intrusion of construction workers or equipment into wooded areas. Tree and vegetation removal would not occur as a result of the Proposed Project; however, construction noise and equipment intrusion into wooded habitats are a project concern. To date, focused bat surveys have not been performed in the SBA project corridor. If special-status bats are present, construction noise and disturbance could cause bats to abandon their roosts and could potentially result in reproductive failure.

Critical Habitat for Listed Wildlife Species

Critical habitat for CRLF was first designated on March 31, 2001 and included portions of the East Bay, North Bay, and San Francisco Bay Peninsula. In November 2002, the critical habitat for CRLF was vacated except for Units 5 and 31 and the USFWS was remanded to designate a new critical habitat for CRLF. Critical habitat for CRLF was re-proposed in April 2004 using the configuration of the previously published final designation of critical habitat for CRLF.

Portions of the Proposed Project are within the proposed critical habitat Unit 15. The proposed critical habitat designation includes the Stage 3 Brushy Creek Pipeline corridor located in the Altamont Pass region of Alameda County north of Interstate Highway 580 and in the foothills region located south of the City of Livermore.

Critical Habitat for the California tiger salamander was proposed by the USFWS on August 10, 2004, and includes portions of the SBA project corridor. The proposed project currently falls within the proposed Unit 17. These are specific areas within the geographic region occupied by a species determined to be critical to its survival in accordance with the Endangered Species Act. Federal entities issuing permits or acting as a lead agency must show that their actions do not negatively impact the Critical Habitat to the extent that it impedes the recovery of the species.

LOCAL SETTING

The following discussion describes the existing vegetation communities and the wildlife habitat by facility. **Table 3.3-2** summarizes the plant community and habitat types and special-status plant and wildlife species that may occur at each project component.

TABLE 3.3-2
HABITAT TYPES AND SPECIAL-STATUS SPECIES PRESENT ALONG SBA PROJECT CORRIDOR BY FACILITY

Project Component	Plant Community/ Habitat Types	Special-status Wildlife	Special-status Plants
SBPP	California annual grassland, open water	SJFK, CTS, BUOW, NBBR	
Stage 3 Brushy Creek Pipeline	Annual grassland, riparian scrub, freshwater emergent	CRLF, CTS, SJKF, BUOW, NBBR	Fragrant Fritillary
Dyer Reservoir	Annual grassland, alkali meadow, seasonal wetland	CRLF, CTS, BUOW, SJKF,	
Dyer Canal	Annual grassland, vernal pool, seasonal wetland, freshwater emergent	NBBR	
Livermore Canal	Annual grassland, seasonal wetland, freshwater emergent	NBBR (Including Golden Eagle and Tricolored Blackbird)	
Patterson Reservoir	Open water, seasonal wetland, freshwater emergent	CRLF, CTS, NBBR	
Alameda Canal	Annual grassland, seasonal wetland, freshwater emergent	NBBR	
Arroyo Seco	Arroyo willow riparian scrub	NBBR	
Arroyo Mocho	Arroyo willow and mulefat riparian scrub, bulrush-cattail, mixed riparian woodland	NBBR	

CRLF = California red-legged frog
CTS = California tiger salamander
SJKF = San Joaquin kit fox
BUOW = Burrowing owl
NBBR = Nesting Breeding Birds and Raptors (includes all birds and raptors including golden eagle, loggerhead shrike, and white-tailed kite)

SOURCE: CDFG, 2003

South Bay Pumping Plant

The SBPP is located on the upper end of Bethany Reservoir and is surrounded by California annual grassland and open water aquatic habitat (Bethany Reservoir). The dominant vegetation in the vicinity of the SBPP includes wild oat, ripgut brome, fennel, and soft chess.

There is marginal habitat for special-status plant species in the vicinity of the SBPP, including big tarplant (*Blepharizonia plumosa* ssp. *plumosa*). Late-season focused plant surveys in the SBA project corridor found no occurrences of this species within the SBPP. Ongoing grazing and maintenance activities within the project footprint have likely eliminated suitable conditions for rare or special-status plants in the vicinity of the SBPP.

Within the immediate vicinity of the SBPP, habitat quality for SJKF and burrowing owl is moderate due to the lack of grazing in and around the SBPP. However, known CNDDB occurrences for kit fox list known burrows within ½ mile of the SBPP and USFWS considers all annual grassland in this area potential habitat for kit fox. East of the SBPP at least one known burrowing owl location was observed by ESA biologists in February 2004. One lone owl was flushed from its burrow and one dead owl was also observed nearby. Bethany Reservoir provides moderate to low quality habitat for CRLF and CTS. There is no emergent vegetation along the banks of Bethany Reservoir and the presence of non-native fish in the reservoir make the presence of CRLF and CTS unlikely. Habitat value for nesting and breeding passerine birds is high for loggerhead shrike and California horned lark. Patches of coyote brush, other shrubby vegetation, and open grassland provide nesting materials and good cover for these species.

Stage 3 Brushy Creek Pipeline

The Stage 3 Brushy Creek Pipeline would extend between Bethany Reservoir and the proposed Dyer Reservoir, through primarily grassland habitats. Between Sta 140+00 and Sta 170+00, the pipeline corridor extends along Brushy Creek, a perennial drainage that receives most of its water from storms, but may receive water from leaks and seeps from the SBA. Brushy Creek has been extensively grazed and shows evidence of erosion, down-cutting, and incision due to past and current land use practices.

Appropriately-timed focused surveys for rare and special-status plants conducted by ESA botanists identified a population of fragrant fritillary (*Fritillaria liliacea*) within the proposed Stage 3 Brushy Creek Pipeline. Approximately 400 plants were observed near Station 115+10, approximately 1,150 feet west of the SBPP.

The Brushy Creek Pipeline construction corridor extends through grasslands that provide associated upland habitat for California red-legged frog and California tiger salamander aestivation. Additionally, stock ponds and other waters located in the vicinity of the pipeline construction corridor, including Brushy Creek, may provide suitable aquatic habitat for CRLF and CTS (see Figure A-1 of Appendix A). CRLF have been observed in several locations along the Brushy Creek corridor (ESA, 2004b) and biological surveys conducted by ESA biologists indicate six known locations of CTS along the proposed Stage 3 Brushy Creek Pipeline.

Brushy Creek provides approximately 154 square feet (0.003 acres) of CRLF breeding habitat in five small pools along the pipeline construction corridor. Instream wetlands have been grazed and trampled, and while there is patchy dense vegetation throughout the creek, the consistent grazing precludes the establishment of dense emergent cover preferred by CRLF.

The grassland habitat along the Brushy Creek Pipeline corridor is considered suitable foraging habitat for San Joaquin kit fox. During reconnaissance surveys of the Stage 3 Pipeline alignment in December 2003, ESA biologists identified several mammal burrows within 200 feet of the proposed work area that could provide refuge to San Joaquin kit fox. Direct San Joaquin kit fox presence has not been identified in the SBA project corridor, though this species has been identified to regularly migrate through and otherwise utilize the project corridor (CNDDB, 2004). In 1998 three kit foxes were identified within 0.3 miles of the Stage 3 Pipeline alignment. Implementation of USFWS 1997 *Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance* is considered sufficient to avoid harm or harassment to individuals.

Dyer Reservoir

The proposed Dyer Reservoir is situated in a wide alluvial valley bisected by a small drainage flowing east to west. The upper reaches of this drainage are perennial while the lower reaches are intermittent to ephemeral. Valley slopes become more steep to the east, south and north and the area supports annual grassland. Surrounding land use includes cattle grazing and wind farms.

Focused plant surveys performed by ESA botanists in 2003 and 2004 did not find special-status plants in the vicinity of the proposed Dyer Reservoir. Continuous over-grazing as well as trampling of wetter areas in the project footprint may have eliminated preferred habitat for special-status plants.

The proposed reservoir site provides associated upland habitat for CRLF and CTS. Potential breeding habitat for CRLF and CTS is present within two stock ponds, located approximately 4,000 feet north of the reservoir site, and 1,000 west of the reservoir site (across Dyer Canal), respectively. Additional CTS breeding locations include seasonal ponds located offsite and west of Dyer Canal, adjacent to the access road. Abundant ground squirrel activity within the reservoir site provides associated upland habitat for these two species.

USFWS considers all annual grasslands in the vicinity of Altamont Pass and Brushy Peak as suitable habitat for San Joaquin kit fox. Surveys for San Joaquin kit fox were conducted by ESA biologists in December 2003. Only one burrow was identified that met den requirements for this species. No direct evidence of kit fox was observed and the vicinity of the proposed reservoir is considered to provide low quality denning habitat for kit fox due to lack of large burrows and hard clay soils. Higher quality kit fox habitat is located approximately 500 feet east of the proposed Dyer Reservoir site.

The proposed Dyer Reservoir site provides habitat for the western burrowing owl. Several potential burrowing owl burrows were observed by ESA biologists in 2003. At least eight

individual owls were observed in the vicinity of the proposed Dyer Reservoir site in January 2004 (J. Barclay, 2004a). Other suitable burrows exist within the project footprint as well as along the steeper canyon slopes and hillsides immediately east of the proposed reservoir site. Burrowing owl monitoring at the reservoir site and vicinity during 2004 indicated at least 14 pairs observed together during the breeding season.

Canal Improvements

Dyer, Livermore, and Alameda Canals extend through agricultural and open space lands east and south of the City of Livermore. Surrounding land uses include cattle grazing, horse boarding, winery operations and residential. Adjacent grasslands provide habitat for common and special-status species.

Vegetation communities along canal embankment includes annual grassland and non-native ruderal (weedy) vegetation. The adjacent annual grasslands along the canal alignments has the potential to provide habitat for special-status species including burrowing owl, San Joaquin kit fox, and California tiger salamander. A discussion of habitat potential for each canal is provided below.

Dyer Canal

Vegetation communities and wildlife habitats along Dyer Canal include annual grassland and non-native ruderal (weedy) vegetation along the canal embankments and along the canal access road. Annual grassland community occurs adjacent to the canal and access road but within the DWR right-of-way. Potentially jurisdictional features occur at nine locations along Dyer Canal in areas where incised drainages cross the canal through culverts or topographic depressions that support wetland vegetation. These features include seasonal wetlands, freshwater marsh, and two vernal pools that lie partially within the canal right of way in the vicinity of the proposed Dyer reservoir site. One known CTS breeding location is located along the western Dyer Canal fenceline. A seasonal wetland is also located adjacent to the Dyer Check 1 access road, on the west side of Dyer Canal.

Focused special-status plant surveys of the Dyer Canal alignment were conducted by ESA botanists in 2003 and 2004. Suitable habitat for Mt. Diablo buckwheat (*Eriogonum trunctatum*) and Hoover's button-celery (*Eryngium aristulatum* var. *hooveri*) occurs along Dyer Canal south of the backsurge pool. Surveys did not find these or any of the special-status species with potential to occur within the area surveyed for Dyer Canal.

Livermore Canal

Vegetation communities and wildlife habitat along Livermore Canal consists of annual grassland and ruderal species along the canal embankment and access road. Annual grassland occurs east of the canal and in patches west of the canal within the DWR right-of-way. Wetland habitat occurs in patches along the western side of the canal in areas that are incised or where topography allows seasonal inundation or ponding to occur.

No focused rare or special-status plant surveys have been conducted for the Livermore Canal SBA project corridor. However, due to the prolonged history of disturbance within the canal corridor, no special-status plants are expected to occur within the DWR right-of-way.

Several potentially jurisdictional features occur immediately outside the DWR right-of-way that provide habitat for special-status species including a nesting colony of tricolored blackbirds, a California species of special concern that was observed nesting along the canal in the vicinity of MP 8.60. In addition, one golden eagle nest was identified in January 2004 in a small grove of eucalyptus trees adjacent to the canal in the vicinity of MP 8.60.

Patterson Reservoir

Patterson Reservoir is connected to the Livermore Canal via a overflow wier, and stores SWP supplies. The open water area of this reservoir provides habitat for numerous common waterfowl species. A drainage channel is located adjacent to the southern embankment of the reservoir; this channel conveys flows from upgradient areas east of Livermore Canal, and continues to the west around Zone 7's Patterson Pass WTP. Known populations of CRLF have been identified within perennially wet areas of this drainage ditch located approximately 1,000 feet upstream to the east and 750 feet downstream to the west, and the drainage channel provides associated upland habitat between these areas. Additional wetland areas are located northwest of the reservoir embankment, and provide associated upland and potential breeding habitat. Annual grassland habitat to the north, east, and west of the existing reservoir site also provides suitable upland habitat for CRLF.

Alameda Canal

Plant communities and wildlife habitats occurring along Alameda Canal include annual grassland and ruderal vegetation along the canal embankments and access roads. Annual grassland dominates the open space areas adjacent to DWR right-of-way. Seasonal wetlands and freshwater marsh occur along several drainages that cross the canal through culverts. Adjacent land uses include vineyards and cattle grazing.

No focused rare or special-status plant surveys have been conducted along Alameda Canal within the project boundary. However, due to the prolonged history of disturbance within the canal corridor, no special-status plants are expected to occur within the DWR right-of-way

Arroyo Seco

Arroyo Seco is an intermittent stream that receives the vast majority of its flow from seasonal storms and is dry for most of the year. At the project location, the stream is approximately 10 feet wide at ordinary high water (OHW) with a well defined bed and bank defining the low flow channel. Patches of riparian scrub including mugwort and coyote bush occur within the active channel indicating long dry periods. Sycamore trees occur in patches within the wider floodplain. Annual grassland occurs along the banks and adjacent to the stream. At the project site, a concrete low flow crossing has been installed and large boulders have been installed to stabilize the banks at the crossing. Vegetative cover at the project location is sparse. Upstream

of the project site, the stream becomes more narrow and begins to meander. Vegetative cover becomes more dense. Downstream from the SBA project corridor the stream widens into a larger floodplain and transitions from riparian forest to riparian and willow scrub vegetation.

Arroyo Seco provides habitat for common species such as western fence lizard and birds such as black phoebe, song sparrow, and California towhee.

Arroyo Mocho

Arroyo Mocho, a tributary to Arroyo Del Valle, is an intermittent stream with flows related to seasonal precipitation during the winter months and dry conditions dominating the majority of the year. The channel composition consists of a well defined bed and bank that defines the low-flow channel. Arroyo Mocho is a managed flood control channel and Zone 7 has historically released water into Arroyo Mocho from the SBA at the Arroyo Mocho turnout located near Mines Road. Vegetation communities and wildlife habitats occurring in Arroyo Mocho consist of riparian scrub and scattered patches of cattails and tules. Vegetation occurring along the banks of Arroyo Mocho consists of mugwort and coyote brush, with larger sycamore trees scattered along the larger floodplain. Scattered vegetation occurs within the stream channel and annual grassland species occur along the upper banks.

There are no CNDDB occurrences for special-status species in the vicinity of Arroyo Mocho. Due to a prolonged history of disturbance and supplemental SBA releases, little intact native habitat remains at the site.

REGULATORY FRAMEWORK

In general, projects approved through the California Environmental Quality Act (CEQA) process should show that new land uses are in compliance with the wetlands provisions of the federal Clean Water Act (CWA) and with CESA and FESA.

A complex array of state and federal regulatory guidelines direct how the jurisdictional boundaries of wetlands are identified, defined, and regulated. The U.S. Army Corps of Engineers (USACOE) is the major regulatory agency involved in wetland regulation under Section 404 of the CWA and Section 10 of the Rivers and Harbors Act. Additional agencies that have jurisdiction over on-site wetlands include the U.S. Environmental Protection Agency (oversight authority on USACOE 404 permits), USFWS, CDFG, and the California State Water Resources Control Board (SWRCB).

CEQA directs each lead agency to consult with the CDFG on any project the agency initiates that is not statutory or categorically exempt from CEQA. CEQA Guidelines (Section 15065a) declare that impacts to rare, threatened, or endangered plants or animals are significant. The Native Plant Protection Act also affords limited protection to special-status plant species. A formal consultation process must be initiated with the CDFG for projects which may have an adverse effect on state-listed species (i.e., listed under CESA).

Similarly, the permitting responsibilities of the USACOE include consultation with the USFWS when federally listed species (i.e., listed under FESA) are at risk. At both the state and federal levels, the process requires that a Biological Assessment (BA) be prepared to determine the effects on listed species. In some cases, the Draft Environmental Impact Report (DEIR) may serve the purposes of the BA. With both USFWS and CDFG policy, "species of special concern" are not subject to the same consultation requirements as listed endangered, rare, or threatened species, but the agencies encourage informal consultation for species of special concern that may become officially listed prior to completion of the CEQA process.

CEQA (Section 15206) specifies that a project shall be deemed to be of statewide, regional, or area-wide significance if it would substantially affect sensitive wildlife habitats including but not limited to riparian lands, wetlands, bays, estuaries, marshes, and habitats for rare and endangered species as defined by Fish and Game Code Section 903.

County Regulations, Goals, and Policies

Objective 1. Tree Preservation

Alameda County East County Area Plan

Policy: Alameda County requires that developments are sited to avoid or, if avoidance is infeasible, to minimize disturbance of large stands of mature, healthy trees and individual trees of notable size and age. Where healthy trees are removed, the County requires a tree replacement program which includes a range of tree sizes, including specimen-sized trees, to achieve immediate visual effect while optimizing the long-term success of the replanting effort (Alameda County, 1993).

Objective 2. Special-status Species Preservation

Alameda County East County Area Plan

Policy: The County encourages preservation of areas known to support special-status species (Alameda County, 1993).

Objective 3. Preserve and Protect Streams, Creeks, and Wetland Habitat

Alameda County East County Area Plan

Policy: The County encourages no net loss of riparian and seasonal wetlands (Alameda County, 1993).

Policy: The County encourages the preservation of East County oak woodland plant communities and riparian woodland habitat present along Arroyo Mocho, Arroyo Las Positas; Alamo Canal; and Tassajara and Alameda Creeks (Alameda County, 1993).

Regulation of Special-Status Species

CEQA Guidelines Section 15380

Although threatened and endangered species are protected by specific federal and state statues, CEQA Guidelines Section 15380(b) provides that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain specific criteria. These criteria have been modeled after the definition of FESA and the Section of CDFG Code discussing rare or endangered plants or animals. This section was included in the guidelines primarily for situations in which a public agency is reviewing a project that may have a significant effect on a candidate species that has not yet been listed by CDFG or USFWS. CEQA provides the ability to protect species from potential project impacts until the respective agencies have the opportunity to designate the species protection.

CEQA also specifies the protection of other locally or regionally significant resources, including natural communities or habitats. Although natural communities do not presently have legal protection, CEQA requires an assessment of such communities and potential project impacts. Natural communities listed by CNDDB as sensitive are considered by CDFG to be significant resources and fall under the CEQA Guidelines for addressing impacts. Local planning documents such as general and area plans often identify natural communities.

Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (16 United States Code § 703 Supp. I, 1989) prohibits the killing, possessing, or trading migratory birds, bird parts, eggs, and nests, except in accordance with regulations prescribed by the Secretary of the Interior. Birds of prey are protected in California under CDFG, Section 3505.5. Under this section it is "unlawful to take possess, or destroy the nests or eggs of any such bird except otherwise provided by this code or any other regulation adopted hereto." Construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment and/or reproductive failure. Disturbance that causes nest abandonment or reproductive failure is considered "taking" by CDFG. Any loss of eggs, nests, or young or any activities resulting in nest abandonment would constitute a significant impact. Project impacts to these species would not be considered significant unless they are known or have high potential to nest in the SBA project corridor or to rely on it for its primary foraging.

Several common and special-status bird and raptor species have the potential to be affected by the project include: burrowing owl, logger-head shrike, golden eagle, horned lark, and the white-tailed kite

Plants

Vascular plants listed as rare or endangered by the CNPS (Skinner and Pavlik, 2001), but which have no designated status or protection under federal or state endangered species legislation are defined as follows:

List 1A: Plants believed extinct

List 1B: Plants rare, threatened, or endangered in California and elsewhere

List 2: Plants rare, threatened, or endangered in California, but more numerous elsewhere

List 3: Plants about which more information is needed

List 4: Plants of limited distribution

In general, plants appearing on CNPS List 1 or 2 are considered to meet CEQA's Section 15380 criteria and impacts to these species are considered significant in this EIR.

Several special-status plants are known to occur or have potential to occur within the SBA project corridor. Plants that have potential to be affected by the Proposed Project include fragrant fritillary a CNPS List 1B species.

SBA Project Corridor Tree Ordinances

Alameda County has adopted a Tree Ordinance.[3] Trees that are located within the County Right-of-Way are protected by the ordinance. Planting, maintaining or removing any tree from the County right-of-way and all associated facilities are subject to the permitting requirements of the ordinance.

3.3.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

To determine the level of significance of an identified impact, the criteria outlined in the CEQA *Guidelines* were used in this analysis. The following is a discussion of the criteria used to determine the significance of impacts to biological resources.

CEQA (Section 15206) specifies that a project shall be deemed to be of statewide, regional, or area-wide significance if it would substantially affect sensitive wildlife habitats including but not limited to riparian lands, wetlands, bays, estuaries, marshes, and habitats for rare and endangered species, as defined by Fish and Game Code Section 903.

Appendix G of the CEQA *Guidelines* indicates that a project would have a significant effect on the environment if it would:

- Interfere substantially with the movement of any resident or migratory fish or wildlife species;
- Substantially diminish habitat for fish, wildlife, or plants; or
- Substantially affect a rare or endangered species of animal or plant or the habitat of the species.

[3] General Ordinance Code of Alameda County, Title 12, Chapter 12.11, *Regulation of Trees in County Right-of-Way*.

CEQA Section 15380 further provides that a plant or animal species may be treated as "rare or endangered" even if not on one of the official lists if, for example, it is likely to become endangered in the foreseeable future.

Based on guidelines established by the USFWS and the CDFG, a project could be considered to have a significant adverse impact on biological resources if it would result in substantial disruption to, or destruction of, any special-status species, its habitat, or breeding grounds. A project would also be considered to have a significant impact if it would result in a substantial loss of important plant or animal species; would cause a change in species composition, abundance, or diversity beyond that of normal variability; would result in the direct or indirect, measurable degradation of sensitive habitats (e.g., wetlands, riparian corridors, vernal pools, oak woodlands); or would result in loss of a significant plant community.

Local Plans and Policies

CEQA Guidelines (Appendix G) specifies that a project would normally have a significant impact on the environment if it would physically impact communities or species protected by adopted environmental plans and goals of the community(ies) where it is located. Generally, local plans encourage the preservation of native plant communities, wetlands, and riparian areas. Any action that would conflict with these policies may be considered a significant impact.

IMPACTS AND MITIGATION MEASURES

The Proposed Project may impact areas where the presence of special-status species is presumed based on: occurrence of suitable habitat; CNDDB occurrence; or results of the ESA biological assessment. Mitigation for impacts to special-status plant and animal species would be implemented to reduce the potential for "take" of listed or otherwise special-status species. In some cases, preconstruction surveys and avoidance would avoid significant impacts to plants and animals.

Special-status animal species that have the potential to occur in the vicinity of the project site include:

- San Joaquin kit fox
- Longhorn fairy shrimp (*Branchinecta longiantenna*)
- Vernal pool fairy shrimp (*Branchinecta lynchi*)
- Western pond turtle (*Clemmys marmorata*)
- California red-legged frog (*Rana aurora draytonii*)
- California tiger salamander (*Ambystoma californiense*)
- Golden eagle (*Haliaeetus leucocephalus*)
- Northern harrier (*Circus cyaneus*)
- White-tailed kite (Nesting) (*Elanus leucurus*)
- Western burrowing owl (*Athene cunicularia*)

- Short-eared owl (*Asio flammeus*)
- Loggerhead shrike (*Lanius ludovicianus*)
- Tricolored blackbird (nesting colony) (*Agelaius tricolor*)

Impact 3.3-1: Construction of the Proposed Project would have the potential to affect grassland along the SBA project corridor, including sensitive plant species that may occur. Sensitive plant surveys conducted for all facilities indicate that the Stage 3 Brushy Creek Pipeline would impact 1.0 acres of fragrant fritillary habitat and approximately 400 individual plants. Less than Significant with Mitigation.

As noted in the setting, the SBA project corridor has the potential to support sensitive plant species. ESA biologists conducted biotic surveys of proposed facility sites in April 2003 and February 2004 to identify the potential for sensitive species identified in **Table 3.3-2** to occur within proposed construction areas. With the exception of the Brushy Creek Pipeline corridor, no sensitive plant species were identified at any of the facility sites.

South Bay Pumping Plant

Improvements at the SBPP would include 6 acres of graded slope area north of the SBPP, and establishment of a 1.5-acre drying basin. Fill generated as part of grading would be spoiled at three locations in the vicinity of the SBPP, totaling approximately 7.5 acres. Following completion of grading, constructed slopes and fill areas would be reseeded with native seed mix, as established in **Measure 3.3-1a**. Reseeding of disturbed areas would reduce potential impacts to a less than significant level.

Stage 3 Brushy Creek Pipeline

Construction of the Brushy Creek Pipeline is anticipated to disturb approximately 63 acres of grassland vegetation along the project corridor. All disturbed areas would be reseeded following construction to restore grassland vegetation (**Measure 3.3.1a**). Reseeding of disturbed areas would reduce potential impacts to a less than significant level.

ESA biologists surveyed the SBA project corridor in April 2003 and February 2004. One special-status plant species was found: fragrant fritillary (*Fritillaria liliacea*), a federal species of concern and a CNPS List 1B plant. A population of this species numbering approximately 400 individuals occurs along the proposed Stage 3 Brushy Creek Pipeline near Station 115+10. Construction of the proposed pipeline would result in disturbance and potential loss of this population. Implementation of **Measure 3.3-1b**, which includes the harvesting, transplanting and long-term maintenance of this population at a suitable mitigation site, would reduce potential impacts to a less-than-significant level.

Mitigation Measures

Measure 3.3-1a: Soil Salvage and Site Restoration. To ensure the re-establishment of California annual grassland disturbed by pipeline installation, the upper 6-12 inches (minimum of 6 inches and maximum of 12 inches based on geology and depth to bedrock) of soil will be salvaged and then placed back onto trenches as the last material added to

restore the original contours as practicable feasible. All disturbed areas will be reseeded with a grassland palette appropriate for the Altamont Foothills and approved by CDFG.

Measure 3.3-1b: Sensitive Plant Mitigation. DWR shall mitigate for population loss through either seed collection and revegetation, or participation in a mitigation bank, as described below:

- Seed Collection. Prior to the start of construction, a qualified biologist, working in association with an expert in native plant horticulture, shall harvest and transplant mature fragrant fritillary bulbs to a suitable mitigation site. The mitigation site shall be protected in perpetuity, through a conservation easement or other similar instrument.

- Mitigation Bank. Land that supports a known population of fragrant fritillary outside the SBA project corridor shall be purchased at a ratio of 1.5:1, or as established in regulatory permits, and protected in perpetuity.

Impact Significance After Mitigation: Less than significant.

Impact 3.3-2: Construction of the Proposed Project could result in impacts to potentially jurisdictional wetlands or waters of the U.S. under the jurisdiction of the USACOE and waters of the state under the jurisdiction of the SWRCB or Regional Water Quality Control Board (RWQCB). The Proposed Project could also result in impacts to the streambed and banks under jurisdiction of CDFG. Potential impacts include sedimentation of channels downstream of the construction areas during trenching and excavating activities, and loss of riparian and instream wetland vegetation. Less than Significant with Mitigation.

Portions of the SBA project corridor support wetlands and other waters of the U.S. under regulatory jurisdiction of the USACOE, RWQCB, and CDFG. Disturbance would occur within drainages and/or wetland areas at points where facility construction requires excavation. This disturbance would affect both areas classified as wetland and channels that are considered "other waters of the U.S."

Wetlands potentially impacted by the project are summarized in **Table 3.3-3**. Wetlands and other waters would be avoided in final project design wherever feasible. Descriptions of wetland conditions at each facility are described below. Wetland feature locations are shown in alignment maps provided in **Appendix A**. The project as a whole would temporarily impact 3.41 acres of wetlands and "other waters," and permanently impact 3.35 acres of wetlands or "other waters."

South Bay Pumping Plant

Construction of SBPP includes the installation of a new intake structure to feed the four additional pumping units. The new intake structure would be constructed north of and adjacent to the existing intake structure. Construction methods include dredging and recontouring the

TABLE 3.3-3
WETLAND IMPACTS BY PROJECT COMPONENT

Project Component	Section 404 Jurisdictional Area (Acres)	Temporary Impacts	Permanent Impacts
South Bay Pumping Plant	2.90	2.85	0.05
Stage 3 Brushy Creek Pipeline	0.540	0.09	0.01
Dyer Reservoir	2.41	0	2.41
Dyer Canal			
MP 3.34	0.002	--	0.002
MP 3.34	0.003	--	0.003
MP 4.14	0.004	--	0.004
MP 4.57	0.002	--	0.002
MP 4.95	0.002	--	0.002
MP 5.12 (approximate)	0.040	--	0.040
Livermore Canal			
MP 8.70	0.060	--	0.060
MP 8.80	0.060	--	0.060
Patterson Reservoir	0.35	--	0.35
Alameda Canal			
Ditch adjacent to canal	0.100	--	0.100
MP 9.70	0.002	--	0.002
MP 10.23	0.007	--	0.007
MP 10.23	0.001	--	0.001
MP 11.48	0.020	--	0.020
MP 11.67	0.003	--	0.003
MP 11.90	0.003	--	0.003
MP 11.90	0.002	--	0.002
MP 12.14	0.002	--	0.002
MP 13.07	0.003	--	--
MP 13.07	0.004	--	--
MP 13.13	0.005	--	--
MP 13.13	0.003	--	--
MP 13.21	0.150	--	0.150
MP 13.53	0.003	--	0.003
MP 13.53	0.005	--	0.005
MP 13.82	0.003	--	--
MP 13.82	0.002	--	--
MP 14.24	0.003	--	--
MP 14.24	0.001	--	--
MP 15.01	0.007	--	--
MP 15.61	0.005	--	--
MP 15.73	0.020	--	--
MP 15.73	0.004	--	--
MP 15.90	0.030	--	--
Arroyo Seco	0.080	0.20	0.0005
Arroyo Mocho	0.160	0.27	0.0005
Vernal Pools	0.110	0	0.040
Totals	**7.13**	**3.41**	**3.35**

shoreline of the Bethany Forebay Inlet Channel. Temporary impacts to approximately 2.85 acres of potentially jurisdictional open water would result from intake excavation and from dredging 750 feet of the Bethany Forebay Inlet Channel. Permanent impacts to approximately 0.05 acres of wetland along the reservoir fringe would also occur. Implementation of **Measure 3.3-2a**, which includes measures to protect water quality, **Measure 3.3-2b,** which includes requirements for regulatory approval, and **Measure 3.3-2c**, which includes mitigation for impacts to jurisdictional features, would reduce the impacts to less than significant.

Stage 3 Brushy Creek Pipeline

There are five potentially jurisdictional drainages located along the Stage 3 Brushy Creek Pipeline alignment. Four of these are small, ephemeral unnamed drainages tributary to Brushy Creek. These unnamed drainages are generally unvegetated (or indistinct from surrounding upland non-native grassland), but are incised. Construction methods for installing the pipeline include open trench construction across these individual drainages, and would result in temporary disturbance of approximately 0.09 acres of potentially jurisdictional wetland. Four of the 21 access vaults would be installed within the 5 ephemeral drainages that occur along the pipeline corridor. Installation of the four vaults would result in the permanent impact of 0.01 acres of jurisdictional wetlands. Implementation of **Measure 3.3-2a**, which includes measures to protect water quality, **Measure 3.3-2b,** which includes requirements for regulatory approval, and **Measure 3.3-2c**, which includes mitigation for impacts to jurisdictional features, would reduce the impacts to less than significant.

Brushy Creek is an intermittent stream that has been highly degraded by cattle grazing. Brushy Creek supports some willow scrub and scattered oaks. Portions of the banks are unvegetated except for non-native annual grasses and ruderal species. The pipeline would be located along Brushy Creek between MP 140+00 and 170+00, a distance of approximately 3,000 linear feet. For the majority of this reach, installation of the pipeline would be setback from the creek channel and would not directly affect Brushy Creek. However, the pipeline would be located within 50 feet of the top of bank for approximately 1,700 feet. At two locations where the creek channel meanders to the east, shoring would be installed to reduce trench width and maintain separation of at least 10 feet between the top of trench and top of bank. Therefore, no direct impacts to jurisdictional features along the main channel of Brushy Creek are anticipated. However, due to the proximity of the pipeline to the creek channel, implementation of **Measure 3.3-2a**, which includes measures to protect water quality, and **Measure 3.3-2b,** which includes requirements for regulatory approval would be implemented.

Dyer Reservoir

ESA conducted a wetland delineation of the Dyer Reservoir site in November 2003 and in January and February, 2004. Data on vegetation, hydrology, and soils were collected at a total of 16 locations within the proposed Dyer Reservoir construction area. Results of the delineation identified approximately 2.41 acres of potentially jurisdictional wetlands and "other waters" occurring onsite. Construction of the reservoir would result in the permanent fill of these wetland

areas. Implementation of **Measures 3.3-2a** through **3.3-2c** would reduce the impacts to less than significant.

Canal Improvements

Raising of the canal linings and embankments, and improvement of cross drainages facilities could result in impacts to wetlands and other waters at stations where jurisdictional features occur within DWR right-of-way. **Table 3.3-3** summarizes these locations and wetland impacts that would result from canal lining and embankment construction. Implementation of **Measures 3.3-2a** through **3.3-2c** would reduce the impacts to less than significant.

Dyer Canal

There are five potentially jurisdictional features along the Dyer Canal. Three of these are small ephemeral drainages that are culverted under the canal, one is a freshwater seep caused by leakage from the canal lining, and one is a freshwater marsh also caused by leakage from the canal lining. Impacts to potentially jurisdictional wetlands within DWR right of way would be associated with alteration of drainage conveyance facilities over or under the canal. This would result in the fill of approximately 0.05 acres of wetlands. Implementation of **Measures 3.3-2a** through **3.3-2c** would reduce the impacts to less than significant.

Livermore Canal

There are five potentially jurisdictional features along the Livermore Canal. Two of these are characterized as freshwater marshes and two are seasonal wetlands. Both freshwater marshes support obligate hydrophytes, including cattail and Baltic rush (*Juncus balticus*). The seasonal wetlands are dominated by non-native facultative hydrophytes, with native species such as saltgrass. Impacts to potentially jurisdictional wetlands within DWR right of way would be associated with alteration of drainage conveyance facilities over or under the canal. This would result in the fill of approximately 0.12 acres of wetlands. Implementation of **Measures 3.3-2a** through **3.3-2c** would reduce the impacts to less than significant.

Patterson Reservoir

The Patterson Reservoir embankment would be expanded an additional 10 feet from its current footprint. Impacts to wetlands would be associated with the fill of wetlands in drainage swales north and south of the facility. This would result in the fill of approximately 0.35 acres of wetlands. Implementation of **Measures 3.3-2a** through **3.3-2c** would reduce the impacts to less than significant.

Alameda Canal

There are 19 potentially jurisdictional features along the Alameda Canal. Three of these are freshwater marshes and two are seasonal wetlands. The remainder are other waters, including two named streams: Arroyo Seco and Arroyo Mocho, as well as numerous unnamed drainages that cross Alameda Canal by way of culverts or, in one case, a concrete flume. Many of these drainages may have been non-jurisdictional swales prior to construction of Alameda Canal, only

becoming incised with the installation of culverts to move flow across the canal. Impacts to potentially jurisdictional wetlands within DWR right of way would be associated with alteration of drainage conveyance facilities over or under the canal. This would result in the permanent fill of 0.30 acres of jurisdictional features. Implementation of **Measures 3.3-2a** through **3.3-2c** would reduce the impacts to less than significant.

Arroyo Seco Siphon

Arroyo Seco is an intermittent stream, with a paved low water crossing above the canal siphon that runs underneath the stream. Riparian vegetation is disturbed riparian scrub, with a few oaks and eucalyptus. Width at OHW is 15 feet downstream from the low water crossing and 10 feet upstream. The channel and floodplain are vegetated with sparse riparian scrub.

The second siphon barrel would extend approximately 440 feet between the two canals, with approximately 175 feet located within potentially jurisdictional wetlands. The proposed siphon would be located west and downstream of the existing siphon, immediately upstream of the existing concrete low water crossing. The siphon would be installed using a trench excavation during dry season conditions, with an anticipated construction area width of 60 feet within the creek area. Excavation would result in the temporary disturbance of approximately 0.20 acres of wetland area. Similar to the existing siphon, a concrete vault and blowoff structure, including blowoff discharge pipe, would be constructed north of the creek's centerline. Consistent with existing blowoff design, the blowoff discharge pipe would be underlain by a mat of stone slope protection to dissipate the energy from raw water discharged into the creek. Installation of the concrete vault would result in the permanent loss of approximately 30 square feet (0.0005 acre). Implementation of **Measures 3.3-2a** through **3.3-2c** would reduce the impacts to less than significant.

Arroyo Mocho Siphon

Arroyo Mocho is an intermittent stream, with a paved low water crossing above the canal siphon that runs underneath the stream. Upstream of the SBA siphon crossing the stream is intermittent, while downstream of the crossing perennial flow is maintained by discharge from a turnout on the SBA pipeline for the purposes of groundwater recharge in the Livermore Valley. This discharge results in a small amount of open water habitat directly downstream of the low water crossing and Arroyo Mocho turnout. Vegetation consists of mulefat and willow scrub, a small amount of freshwater marsh downstream of the low water crossing, and mixed riparian woodland with sycamore found in the floodplain and oaks found along the banks of Arroyo Mocho.

The proposed second siphon barrel would extend approximately 885 feet, with approximately 200 feet located within potentially jurisdictional wetlands. The proposed siphon would be located up to 22 feet south and upstream of the existing siphon. The siphon would be installed using a trench excavation during dry season conditions when flow is absent or minimal, with an anticipated construction area width of 60 feet within the creek area. Excavation would result in the temporary disturbance of approximately 0.27 acres of wetland area. Similar to the existing siphon, a concrete vault and blowoff structure, including blowoff discharge pipe, would be constructed north of the creek's centerline. Consistent with existing blowoff design, the blowoff

discharge pipe would be underlain by a mat of stone slope protection to dissipate the energy from raw water discharged into the creek. Installation of the concrete vault would result in the permanent loss of approximately 30 square feet (0.0005 acre). Implementation of **Measures 3.3-2a** through **3.3-2c** would reduce the impacts to less than significant.

Mitigation Measures

Measure 3.3-2a: Implement Standard BMPs to Maintain Water Quality and Control Erosion and Sedimentation. Standard measures to maintain water quality and control erosion and sedimentation shall be implemented in Brushy Creek and in wetland areas along the canal alignments, as required by compliance with the General National Pollution Discharge Elimination System (NPDES) Permit for Construction Activities and established by **Measure 3.2-1a**.

Measure 3.3-2b: Construction within jurisdictional features will require permit approval from the USACOE for fill in wetlands and other waters of the U.S. pursuant to Section 404 of the Clean Water Act. Water quality certification from the RWQCB will also be required pursuant to Section 401 of the CWA. In addition, the CDFG has jurisdiction pursuant to Sections 1601-1603 of the Fish and Game Code, and the pipeline construction in Brushy Creek will require a Streambed Alteration Agreement from CDFG. Terms and conditions of the permits will include measures to protect and maintain water quality, restore work sites, and mitigate for permanent and temporary wetland impacts.

Measure 3.3-2c: To offset the permanent impacts to wetlands and other waters of the U.S., compensatory mitigation will be provided as required by regulatory permits. Mitigation would be provided through one of the following mechanisms:

- Purchase or dedication of land to provide suitable wetland restoration or creation. If restoration is available and feasible, then a ratio of 2:1 would be proposed. If creation is required, a 3:1 ratio will be implemented to off-set losses. Where practical and feasible, on-site mitigation will be implemented.

- A wetland mitigation and monitoring plan will be developed that will outline mitigation and monitoring obligations for temporary and permanent impacts to wetlands and other waters as a result of construction activities. This Plan will include thresholds of success, monitoring and reporting requirements, and site specific plans to compensate for wetland losses resulting from the project. The mitigation and monitoring plan will be submitted to the appropriate regulatory agencies for approval.

Impact Significance After Mitigation: Less than significant.

Impact 3.3-3: Construction of the Proposed Project would result in temporary and permanent loss of potential habitat for San Joaquin kit fox. Less than Significant with Mitigation.

The USFWS considers all annual grasslands in the vicinity of Brushy Peak and Altamont Pass as suitable habitat for San Joaquin kit fox. Proposed facilities with the potential to impact

San Joaquin fox habitat include the SBPP, Brushy Creek Pipeline, and Dyer Reservoir. Site reconnaissance identified ground squirrel activity, which provides potential denning sites for kit fox. Project implementation would temporarily affect 115 acres of potential kit fox habitat, and would result in the permanent loss of 34 acres of kit fox habitat. Without proper mitigation, construction activities could result in incidental take of individuals. Therefore, a pre-construction survey to identify and close unoccupied burrows within a 200-foot radius of construction areas following the procedure established by the USFWS (1997b,c) would be implemented to reduct potential impacts to a less than significant level (see **Measure 3.3-3a**). A discussion of potential impacts by facility is provided below.

South Bay Pumping Plant

Expansion of SBPP would include grading activities to recontour approximately 6 acres of slope north of the existing SBPP facilities, and the proposed drying basin would cover approximately 1.5 acres, for a total of 7.5 acres that would be permanently impacted. These areas consist of non-native grasslands, and are considered potential SJKF habitat by the USFWS. Additionally, material generated during excavation would be stockpiled at three locations totaling approximately 7.5 acres. Stockpile locations would be graded to be consistent with existing topographic gradients, and would be reseeded to maintain continuity with surrounding grasslands; therefore, impacts at these spoil locations are considered temporary. Implementation of **Measure 3.3-3a,** which includes implementation of pre-construction surveys, and **Measure 3.3-3b,** which includes establishment of mitigation lands for loss of habitat as required by regulatory permits, would reduce potential impacts to less than significant.

Stage 3 Brushy Creek Pipeline

The construction easement for the Stage 3 Brushy Creek Pipeline would range between 80 and 145 feet in width; actual construction easement would vary with topography, to provide the contractor with layout areas in level terrain. The pipeline route extends through grasslands providing potential SJKF habitat. Construction would result in the temporary disturbance of 63 acres of grassland. Permanent habitat loss would be limited, due to the pipeline's below grade nature. However, installation of the surge tank, the 21 access vaults, and 0.67 acres of access road along the pipeline alignment would result in a permanent loss of 0.67 acres of grassland habitat. The permanent loss of 0.67 acres of grassland habitat is not anticipated to affect SJKF movements or population distribution within the area. Implementation of **Measures 3.3-3a** and **3.3-3b** would reduce potential impacts to less than significant.

Dyer Reservoir

Construction of Dyer Reservoir would result in a total disturbance of 72 acres during project construction. Project implementation would result in the temporary disturbance of 45 acres and permanent loss of approximately 27 acres of potential kit fox habitat. This facility would incrementally reduce the current corridor available between Dyer Canal and active areas of Altamont Landfill by approximately 2,500 feet, to an area approximately 1 mile in width. The proposed facility would be sited adjacent to the canal and is not anticipated to restrict or

substantially alter kit fox movement through the area. USFWS considers all annual grasslands in the vicinity of Altamont Pass and Brushy Peak as suitable habitat for SJKF. Surveys for SJKF were conducted in the SBA project corridor by ESA biologists in December 2003. Only one burrow was identified within the proposed reservoir footprint that met den requirements for this species. No direct evidence of SJKF was observed and the reservoir is considered to provide low quality denning habitat for kit fox due to lack of large burrows and to hard clay soils. However, this loss of habitat would be mitigated through provision of compensatory mitigation at a ratio established by regulatory agencies. Implementation of **Measures 3.3-3a** and **3.3-3b** would reduce potential impacts to less than significant.

Canal Improvements

Canal improvements along Dyer Canal, Livermore Canal, Patterson Reservoir, and Alameda Canal would be limited to improvements within or immediately adjacent to existing canal structures. As such, these improvements are not anticipated to affect SJKF habitat. A discussion of potential impacts, by facility, is provided below.

Dyer Canal

Dyer Canal and its associated right of way do not provide suitable breeding habitat for SJKF. The canal embankments and access road are constructed of compacted, engineered fill, have little or no ground squirrel activity, and do not provide suitable denning habitat for SJKF. Although no impacts to SJKF are anticipated as a result of improvements along Dyer Canal, **Measure 3.3-3a** would be implemented to ensure that no impacts to SJKF occur.

Livermore Canal

Livermore Canal and it associated right of way do not provide suitable habitat for SJKF. The canal embankments and access road are constructed of compacted, engineered fill, have little or no ground squirrel activity, and do not provide suitable denning habitat for SJKF. Although no impacts to SJKF are anticipated as a result of improvements along Livermore Canal, **Measure 3.3-3a** would be implemented to ensure that no impacts to SJKF occur.

Patterson Reservoir

Patterson Reservoir and its surrounding habitats, including the Embankment Borrow Area to the south, do not provide suitable habitat for SJKF. Numerous field surveys of the reservoir have not revealed any potential burrows or other indicators (ground squirrel or gopher activity) for kit fox activity in the vicinity of the SBA project corridor. Although no impacts to San Joaquin kit fox are anticipated as a result of improvements at Patterson Reservoir or use of the Embankment Borrow Area, **Measure 3.3-3a** would be implemented to ensure that no impacts to SJKF occur.

Alameda Canal

Alameda Canal and its associated right of way do not provide suitable habitat for San Joaquin kit fox. The canal embankments and access road are constructed of compacted, engineered fill, have little or no ground squirrel activity, and do not provide suitable denning habitat for SJKF.

Although no impacts to kit fox are anticipated as a result to improvements along Alameda Canal, **Measure 3.3-3a** would be implemented to ensure that no impact to SJKF occur.

Mitigation Measures

Measure 3.3-3a: The following measures are derived from the USFWS *Standardized Recommendations for Protection of the San Joaquin kit fox* (USFWS, 1997b). These measures shall be implemented for construction at the SBPP, Brushy Creek Pipeline, and Dyer Reservoir site.

- Preconstruction surveys will be conducted within 200-feet of work areas to identify potential kit fox dens or other refugia in and surrounding work stations. The survey for potential kit fox dens would be performed by a qualified biologist 14-30 days prior to the commencement of construction activities. All identified potential dens would be monitored for evidence of kit fox use by placing tracking material at den entrances and monitoring for at least three consecutive nights. If no activity is detected at these dens, they may be closed (with prior concurrence from the USFWS). Alternatively, fencing may be used to establish construction exclusion zones, with concurrence from USFWS.

- If kit fox occupancy is determined at a given site, closure activities would immediately be halted and the USFWS would be contacted. Depending on the den type, reasonable and prudent measures to avoid effects to kit fox may include seasonal limitations on project construction at the site (i.e., restricting the construction period to avoid spring-summer pupping season), or establishing a construction exclusion zone around the identified site, or resurveying the den following a brief (i.e., 7 days) period to determine species presence or absence.

- During project construction, project-related vehicles would observe a maximum 20-mile-per-hour speed limit on private roads in kit fox habitat to minimize the possibility for inadvertent kit fox mortality. Off-road construction traffic outside the designated construction area would be prohibited in areas that provide kit fox habitat.

- To prevent accidental entrapment of kit fox or other animals during construction, all excavated holes or trenches greater than 2 feet deep would be covered at the end of each work day with suitable materials, or escape routes would be constructed of earthen materials or wooden planks. Before such holes are filled, they shall be thoroughly inspected for trapped animals.

- All food-related trash items such as wrappers, cans, bottles, and food scraps would be disposed of in closed containers and removed from the project site.

- To prevent kit fox harassment, mortality, or destruction of dens, no pets would be allowed with construction personnel on the project site.

- Although not currently proposed, in the event that limited nighttime construction is required, all construction activities will conform to the above measures and will be actively monitored to minimize potential effects to kit fox.

Measure 3.3-3b: To compensate for temporary and permanent losses to San Joaquin kit fox habitat, DWR will provide compensatory mitigation at a ratio of 1.1:1 for temporary and 3:1 for permanent losses. Provision of compensatory mitigation may be provided through one, or a combination of, the following mechanisms:

- Establishment of conservation easement on lands currently owned by DWR adjoining Bethany Reservoir.
- Participation in an approved mitigation bank program;
- Establishment of conservation easement or purchase of private lands to be set aside as managed kit fox habitat.

Impact Significance After Mitigation: Less than significant

Impact 3.3-4: Construction of the Proposed Project would result in the temporary and permanent loss of potential aquatic and breeding habitat for California red-legged frog and California tiger salamander. Less than Significant with Mitigation.

Potential aquatic habitat for CRLF and CTS occurs within the Brushy Creek Pipeline corridor along Brushy Creek, in the vicinity of Dyer Reservoir and Patterson Reservoir, and at siphon crossings for Arroyo Seco and Arroyo Mocho. Potential associated upland habitat used for aestivation is located along the Brushy Creek Pipeline corridor, at Dyer and Patterson Reservoirs, and at specific locations along the Dyer, Livermore, and Alameda Canals. Construction activities have the potential to result in direct and indirect impacts to these special-status species. Indirect impacts include sedimentation, removal of aquatic habitat, removal of riparian vegetation and harassment due to increased human presence and construction equipment. Direct impacts include individual mortality and incidental "take." For CRLF aquatic habitat, construction of the Brushy Creek Pipeline along Brushy Creek (Sta 140+00 to 170+00), Livermore Canal cross drainage modifications, and siphon installation at Arroyo Seco and Arroyo Mocho would have the potential to result in the temporary disturbance of 0.44 acres of CRLF aquatic habitat. Permanent impacts would be limited to 0.001 acres, associated with vault installation at the siphon crossings. For CRLF associated upland habitat, construction would temporarily impact 63 acres and permanently impact 27.5 acres of associated CRLF upland habitat. A discussion of potential impacts by facility is provided below.

South Bay Pumping Plant

Bethany Reservoir provides low quality habitat for California red-legged frog and California tiger salamander. There is no emergent vegetation along the banks of the reservoir in the vicinity of the SBPP construction area, and the presence of non-native fish in the reservoir make the presence of CRLF unlikely. Bethany Reservoir is too deep and contains no emergent vegetation to provide suitable breeding habitat for CTS. Therefore, potential impacts are considered less than significant, and no mitigation measures are required.

Stage 3 Brushy Creek Pipeline

Stock ponds and other waters located in the vicinity of the pipeline construction corridor, including Brushy Creek, may provide suitable aquatic habitat for CRLF and CTS (see Figure A-1 of Appendix A). With the exception of Brushy Creek, no suitable aquatic habitat for CRLF or CTS is located within the proposed construction corridor; therefore, no direct impact to these aquatic habitats would occur. The proposed alignment would affect associated upland habitat for these species during construction, resulting in the temporary disturbance of approximately 63 acres of upland habitat. Permanent aestivation habitat loss would be limited, due to the pipeline's below grade nature. However, installation of the surge tank, approximately 21 access vaults, and 0.6 acres of access road along the pipeline alignment would result in a permanent loss of 0.67 acres of grassland habitat. Impacts to aestivation habitat associated with pipeline installation would not affect CRLF or CTS movements or population distribution within the area. Implementation of **Measure 3.3-4a**, which includes implementation of measures to minimize and avoid CRLF and CTS 'take,' and **Measure 3.3-4b**, which requires consultation with USFWS, and **Measure 3.3-4c**, which includes establishment of mitigation lands for loss of habitat as required by regulatory permits, would reduce potential impacts to less than significant.

Potential CRLF aquatic habitat occurring within the pipeline construction corridor is limited to the reach along Brushy Creek between MP 140+00 and 170+00, a distance of approximately 3,000 linear feet. Brushy Creek provides approximately 154 square feet (0.003 acres) of low quality CRLF and potential CTS breeding habitat in 5 small pools along this reach. For the majority of this reach, installation of the pipeline would be setback from the creek channel and would not directly affect Brushy Creek. However, the pipeline would be located within 50 feet of the top of bank for approximately 1,700 feet. At two locations where the creek channel meanders to the east, shoring would be installed to reduce trench width and maintain separation of at least 10 feet between the top of trench and top of bank. Although no direct impacts to the stream channel are anticipated due to the minimization measures along this reach, implementation of **Measures 3.3-4a** and **3.3-4b**, as well as **Measure 3.3-4d** which includes compensatory mitigation for temporary impacts to potential CRLF and CTS aquatic habitat, would reduce impacts to this species to less than significant.

Dyer Reservoir

Construction of Dyer Reservoir would result in a total disturbance of 72 acres. The project site does not provide suitable breeding habitat for CRLF. However, a stock pond that provides suitable breeding habitat for CRLF is located approximately 1,000 feet southwest of the reservoir

site, across Dyer Canal, near Dyer Road. Implementation of the proposed Dyer Reservoir would result in the permanent loss of approximately 27 acres and temporary loss of 45 acres of associated upland habitat for CRLF.

The intermittent drainages and vernal pools located within the proposed Dyer Reservoir construction area may provide suitable aquatic breeding habitat for CTS, although no occurrences have been documented. Abundant ground squirrel activity in the area provides suitable aestivation habitat for this species. Implementation of the Proposed Project would result in the temporary disturbance of 45 acres and a permanent loss of 27 acres of associated CTS upland habitat. Approximately 0.04 acres of potential aquatic breeding habitat may be permanently impacted. Implementation of **Measures 3.3-4a** through **3.3-4c**, and **Measure 3.3-2a**, which include measures to protect water quality, would reduce the impact to less than significant.

Canal Improvements

Raising of canal lining and modification of check structures along Dyer Canal, Livermore Canal, Patterson Reservoir, and Alameda Canal would be within or immediately adjacent to existing canal structures and drainage structures. Areas within the canal construction envelope consist of an access road and ruderal vegetation and provide no habitat for CRLF and CTS. Impacts to CRLF and/or CTS resulting from project activities are discussed by facility.

Dyer Canal

No suitable breeding habitat occurs within the Dyer Canal construction right-of-way. One known CTS breeding location is located along the western Dyer Canal fenceline. A seasonal wetland is also located adjacent to the Dyer Check 1 access road, on the west side of Dyer Canal. Additionally, a stock pond that provides potential breeding habitat for CRLF is located approximately 100 feet west of the canal, near Dyer Road. No impacts to the pond and its associated upland habitat are expected from the improvements at Dyer Canal. Canal improvements, including raising the canal lining, embankment, and access road are not anticipated to result in any temporary or permanent impacts to these features. Implementation of **Measures 3.3-4a** through **3.3-4c**, and **Measure 3.3-2a**, which include measures to protect water quality, would reduce the impact to less than significant.

Livermore Canal

No suitable CRLF breeding habitat occurs within the Livermore Canal right of way. However, several stock ponds that provide suitable breeding habitat for CRLF occur immediately outside the DWR right-of-way. Grassland and wetland areas along Livermore Canal adjacent to theses ponds could provide associated upland habitat for CRLF and potential breeding habitat for CTS. The raising of Livermore Canal has the potential to permanently impact 0.12 acres of associated upland habitat for CRLF and CTS. Implementation of **Measures 3.3-4a** through **3.3-4c**, and **Measure 3.3-2a**, which include measures to protect water quality, would reduce the impact to less than significant.

Patterson Reservoir

Improvements at Patterson Reservoir would expand the embankment area, resulting in a temporary disturbance to the drainage that runs along the southern embankment (0.02 acres). This feature provides associated upland habitat for CRLF. The drainage would be realigned along the new toe of the embankment, and its conveyance of flows from areas upgradient and east of Livermore Canal would be re-established. Additional wetland areas are located northwest of the reservoir embankment, and provide associated upland habitat for CRLF and CTS. Improvements to Patterson Reservoir would result in the permanent loss of 0.30 acres of associated upland habitat for CRLF and CTS. Implementation of **Measures 3.3-4a** through **3.3-4c**, and **Measure 3.3-2a**, which include measures to protect water quality, would reduce the impact to less than significant.

Embankment Borrow Area

The embankment borrow area provides approximately 17 acres of associated upland area. If soils at this location are identified as appropriate for use, excavation would result in a temporary disturbance of associated CRLF and CTS. Implementation of **Measures 3.3-4a** through **3.3-4c**, would reduce the impact to less than significant. Following use as a borrow site, excavated areas could be restored to provide breeding habitat for CRLF as a project enhancement feature.

Alameda Canal

No suitable breeding habitat for CRLF occurs along the Alameda Canal alignment. However, a stock pond providing suitable breeding habitat occurs just outside the DWR right-of-way at MP 12.14. Approximately 0.002 acres of potential non-breeding habitat for CRLF and CTS would be permanently impacted during improvements at Alameda Canal. Implementation of **Measures 3.3-3a** and **3.3-4b** would reduce potential impacts to less than significant.

Mitigation Measures

Measure 3.3-4a: Measures to minimize and avoid California red-legged frog and California tiger salamander habitat. Measures to minimize and avoid "take" of CRLF would be implemented for the project. These measures shall also provide protection for CTS. These measures are derived from the Programmatic Biological Opinion (PBO) for impacts to CRLF (USFWS 199). This project will not likely be covered under the PBO. However, the PBO summarizes typical project effects that could occur as a result of the proposed action and provides generic preventive measures that will substantially reduce the risk of incidental "take" of CRLF. Prior to and during construction, the following actions will be performed to minimize adverse effects to CRLF and CTS:

- The name and credentials of a biologist qualified to act as construction monitor will be submitted to USFWS for approval at least 15 days prior to commencement of work.

- A USFWS-approved biologist shall survey the work sites two weeks before the onset of construction activities. If California red-legged frog, tadpoles, or eggs are found, the approved biologist shall contact USFWS to determine if moving any of these life-stages is appropriate. If USFWS approves moving the animals, the approved

biologist shall be allowed sufficient time to move frogs from the work sites before work activities begin. If California red-legged frog are not identified, construction may proceed at these sites.

- All work activities within or adjacent to potential CRLF aquatic habitat shall be completed between May 1 and November 1.

- Exclusionary fencing (i.e. silt fences) shall be installed around all construction areas that are within 100 feet of or adjacent to potential California red-legged frog habitat.

- A USFWS–approved biologist shall conduct a training session for all construction personnel. At a minimum, the training shall include a description of the California red-legged frog and its habitat, the importance of the California red-legged frog and its habitat, the general measures that are being implemented to conserve California red-legged frog as they relate to the project, and the boundaries within which the project may be accomplished.

- A USFWS-approved biologist shall be present at active work sites until such time that the removal of California red-legged frog, instruction of workers, and habitat disturbance have been completed. After this time, the contractor or permittee shall designate a person to monitor on-site compliance with all minimization measures. The USFWS-approved biologist shall ensure that this individual receives training outlined in the PBO.

- During work activities, all trash that may attract predators shall be properly contained, removed from the work site and disposed of regularly. Following construction, all trash and construction debris shall be removed from work areas.

- Staging areas shall be situated at least 60 feet from any riparian habitat or water body. All fueling and maintenance of vehicles and other equipment shall occur at least 60 feet from any riparian habitat or water body. The USACOE and permittee shall ensure contamination of habitat does not occur during such operations. Prior to the onset of work, the USACOE shall ensure that the permittee has prepared a plan to allow a prompt and effective response to any accidental spills.

- Project sites shall be revegetated with an appropriate assemblage of native upland vegetation, and if necessary, riparian and wetland vegetation, suitable for the area. A plan describing pre-project conditions, and restoration and monitoring success criteria will be prepared prior to construction.

Measure 3.3-4b: Consultation with USFWS. Facilities that are located within occupied or suspected CRLF and CTS habitat, shall be subject to formal Section 7 consultation under the Endangered Species Act. Consultation with USFWS would likely establish additional reasonable and prudent measures to avoid CRLF and CTS take and require mitigation for temporary and permanent impacts to CRLF habitat. These measures will be in addition to those minimization measures implemented under **Measure 3.3-4a**.

Measure 3.3-4c: DWR shall provide compensation for the temporary disruption (1.1:1 ratio) and permanent loss of CRLF and CTS habitat (3:1 ratio), or similar ratios approved by CDFG and USFWS through one, or a combination of, the following mechanisms:

- Establishment of conservation easement on lands currently owned by DWR adjoining Bethany Reservoir.

- Participation in an approved mitigation bank program;

- Establishment of conservation easement or purchase of private lands to be set aside as managed kit fox habitat.

- Enhancement and revegetation along the SBA project corridor. This may include enhancement Brushy Creek along the construction area (approximately 3,000 linear feet) to provide suitable aquatic breeding habitat for CRLF. Methods of enhancement and restoration may include, but are not limited to: reducing erosion, installing breeding ponds, excluding cattle, and other measures to increase water quality within the reach.

Impact Significance After Mitigation: Less than significant.

Impact 3.3-5: Construction of the Proposed Project would result in the temporary and permanent loss of habitat capable of supporting listed vernal pool invertebrates, including Longhorn fairy shrimp and Vernal pool fairy shrimp. Less than Significant with Mitigation.

Vernal pools capable of supporting listed invertebrate species occur at the Dyer Reservoir site. No other vernal pools have been identified within the construction areas of proposed SBA facilities. Construction of Dyer Reservoir would result in the permanent loss of these vernal pool wetlands (0.04 acres). Surveys for fairy shrimp were conducted by ESA between December 2003 and March 2004. Surveys did not result in observations of listed vernal pool invertebrates. Until completion of 2004 dry season and 2004/05 wet season to complete USFWS survey protocol, these pools are considered potential habitat for vernal pool fairy shrimp and longhorn fairy shrimp. Implementation of **Measures 3.3-5a and 3.3-5b** would reduce impacts to less than significant.

Mitigation Measures

Measure 3.3-5a: Complete Seasonal Surveys. Surveys shall be completed for 2004 dry season and 2004/05 wet season to complete the USFWS survey protocol. If results are negative, no additional mitigation measures are required.

Measure 3.3-5b: Agency Consultation. If vernal pool invertebrates are found within the SBA project corridor, ~~formal or informal~~ consultation with USFWS will ~~would~~ be required. DWR shall provide compensation for the permanent loss of vernal pool habitat at a 3:1 ratio, or similar ratio approved by CDFG and USFWS through one, or a combination of, the following mechanisms:

- Establishment of conservation easement on lands currently owned by DWR adjoining Bethany Reservoir.

- Participation in an approved mitigation bank program;
- Establishment of conservation easement or purchase of private lands to be set aside as managed vernal pool habitat.
- Enhancement and revegetation along the SBA project corridor

Impact Significance After Mitigation: Less than significant.

Impact 3.3-6: Construction of the Proposed Project would result in the temporary and permanent loss of occupied habitat for burrowing owl. Less than Significant with Mitigation.

Burrowing owls are a state species of special concern. Abundant ground squirrel habitat throughout the SBA project corridor provides suitable breeding and non-breeding habitat for the burrowing owl. Proposed facilities with the potential to impact the burrowing owl include the SBPP, Stage 3 Brushy Creek Pipeline, Dyer Reservoir, and Canal improvements. Project implementation is expected to temporarily affect 115 acres of burrowing owl habitat and result in the permanent loss of 34.5 acres of burrowing owl habitat. Without proper mitigation, including preconstruction surveys and protection measures, construction activities could result in a "take" of individual burrowing owls. Implementation of **Measure 3.3-6a**, which would implement protection measures including breeding season avoidance and preconstruction surveys, and **Measures 3.3-6b** and **3.3-6c** which includes compensatory mitigation for the permanent loss of habitat, as required by regulatory permits, would reduce potential impacts less than significant. Discussion of the potential impacts by project component is provided below.

South Bay Pumping Plant

Expansion of SBPP would include grading activities to recontour approximately 6 acres of slope north of the existing SBPP facilities, and the proposed drying basin would cover approximately 1.5 acres, for a total of 7.5 acres that would be permanently impacted. These areas consist of non-native grasslands, and are considered potential burrowing owl habitat by the USFWS. Additionally, material generated during excavation would be stockpiled at three locations totaling approximately 7.5 acres. Stockpile locations would be graded to be consistent with existing topographic gradients, and would be reseeded to maintain continuity with surrounding grasslands; therefore, impacts at these spoil locations are considered temporary. Implementation of **Measure 3.3-6a**, which would implement protection measures including breeding season avoidance and preconstruction surveys, and **Measures 3.3-6b** and **3.3-6c** which includes compensatory mitigation for the permanent loss of habitat, as required by regulatory permits, would reduce potential impacts less than significant.

Stage 3 Brushy Creek Pipeline

The pipeline would extend along annual grassland habitat with abundant ground squirrel activity that provides habitat for burrowing owl. Construction would result in a temporary disturbance of 63 acres of burrowing owl habitat. Permanent habitat loss would be limited, due to the pipeline's below grade nature. However, installation of the surge tank, 21 access vaults, and access road along the pipeline alignment would result in a permanent loss of 0.67 acres of grassland habitat. Installation of the vaults would remain consistent with the existing conditions within the area and would not restrict burrowing owl movement or population distribution in the area. Implementation of **Measures 3.3-6a** through **3.3-6c** would reduce potential impacts to less than significant.

Dyer Reservoir

Construction of the proposed Dyer Reservoir would require grading and excavation of 72 acres. The proposed footprint of the reservoir is in or adjacent to known burrowing owl breeding and non-breeding habitat. Four burrowing owls (*Athene cunicularia*) were observed on and adjacent to the proposed Dyer Reservoir site during October and November 2003 site visits. In 2004, ESA conducted a more exhaustive survey, visiting the site twice weekly from February 5 until April 18, and found up to 14 pairs of burrowing owls. Most of the burrowing owls were located on the steeper canyon slopes and hillsides immediately east of the reservoir footprint, and could be directly or indirectly impacted by the Proposed Project.

The burrowing owl is a federal Species of Concern and California Species of Special Concern. While there are relatively few ground squirrel burrow associations in the reservoir footprint (and only one occupied owl burrow identified during the 2004 monitoring), due to the high water table, a colony of 12-14 nesting pairs of burrowing owls is a significant biological resource in the context of Bay Area burrowing owl populations, where the species has been declining over the past 15 years (DeSante et al.,1997). During two years of local burrowing owl monitoring for another project approximately 5 miles east of Dyer Reservoir, J. Barclay (2004b) recorded up to seven pairs of owls around the perimeter of a 140-acre site. There are no records in the CNDDB of any burrowing owl colonies or aggregations this large in the surrounding four USGS topographic triangles.

Implementation of the proposed Dyer Reservoir would result in a temporary disturbance of 45 acres of burrowing owl habitat and a permanent loss of approximately 27 acres of burrowing owl habitat. Construction of Dyer Reservoir would indirectly affect burrowing owls through the loss of habitat (burrows and grassland foraging habitat). Construction and earthmoving could affect burrowing owls through direct mortality of adults or nestlings should nest burrows occur in areas where the soil is disturbed. Reservoir construction could also affect nesting burrowing owls by disrupting adult reproductive behavior if owl pairs were nesting near (within 500 feet) of construction during the nesting season (March-June at this site). Implementation of **Measures 3.3-6a** through **3.3-6c** would reduce potential impacts to less than significant.

Canal Improvements

Dyer Canal

The grassland habitat adjacent to Dyer Canal and within the construction easement provide habitat for burrowing owl. Potential temporary impacts may result during the construction and raising of the canal linings. Implementation of **Measures 3.3-6a** and **3.3-6c** would reduce potential impacts to less than significant.

Livermore Canal

The grassland habitat adjacent to Livermore Canal and the construction easement provides habitat for burrowing owl. Potential temporary impacts would result during the construction and raising of the canal linings. Implementation of **Measures 3.3-6a** and **3.3-6c** would reduce potential impacts to less than significant.

Patterson Reservoir

The grazed grassland areas northeast and southwest of the Patterson Reservoir site provide suitable habitat for burrowing owl. Impacts to this area would result in temporary construction impacts associated with expanding the reservoir. No permanent habitat loss is expected at Patterson Reservoir. Implementation of **Measures 3.3-6a** and **3.3-6c** would reduce potential impacts to less than significant.

Alameda Canal

The grassland habitat adjacent to Alameda Canal and the construction easement provides habitat for burrowing owl. Potential temporary impacts would result during the construction and raising of the canal linings. Implementation of **Measures 3.3-6a** and **3.3-6c** would reduce potential impacts to less than significant.

Mitigation Measures

Measure 3.3-6a: Preconstruction surveys for burrowing owls shall be conducted by a qualified biologist 14-30 days prior to the start of construction according to current CDFG protocol. Surveys shall cover grassland areas within 250 feet of individual facility construction areas (SBPP, Brushy Creek Pipeline, and Dyer Reservoir). Surveys along canals will be limited to DWR right-of-way, due to the limited nature of construction and availability of access. If owls are detected during surveys, occupied burrows will not be disturbed.

The proposed Dyer Reservoir site is a significant breeding location for burrowing owl. The following measures to avoid, minimize, or mitigate impacts to burrowing owls would be incorporated into the project. If other areas of the SBA project corridor are occupied by burrowing owls, the following measures would apply as well:

- Construction exclusion areas would be established around the occupied burrows in which no disturbance would be allowed to occur. During the non-breeding season (September 1 through January 31), the exclusion zone would extend 160 feet around

occupied burrows. During the breeding season (February 1 through August 31), exclusion areas would extend 250 feet around occupied burrows.

- If the above requirements cannot be met, passive relocation of on-site owls may be implemented as an alternative, but only during the non-breeding season and only with CDFG approval. Passive relocation would be accomplished by installing one-way doors on the entrances of burrows located within 160 feet of the project site. The one-way doors would be left in place for 48-hours to ensure the owls have left the burrow. The burrows would then be excavated with a qualified biologist present.

- Burrows within the construction area would be excavated using hand tools, and then refilled to prevent reoccupation. If any burrowing owls are discovered during excavation, excavation would cease and the owl would be allowed to escape. Excavation may be completed when the biological monitor confirms the burrow is empty.

- For each burrow excavated by project construction, two alternative unoccupied natural or artificial burrows would be provided outside the 160-foot buffer zone (CDFG, 1995). The alternate burrows would be monitored daily for seven days to confirm that the owls have moved and acclimated.

Measure 3.3-6b: To compensate for permanent loss of burrowing owl habitat from the Proposed Project (SBPP – 7.5 acres; Brushy Creek Pipeline – 0.67 acres; Dyer Reservoir – 27 acres), DWR will compensate this loss at a minimum ratio of 3:1 or similar ratio deemed appropriate by CDFG.

Measure 3.3-6c: Temporary losses of burrowing owl habitat will be mitigated by site restoration, and where required, by installation of artificial burrows (see **Measure 3.3-6a**). Given the regional importance of the burrowing owl colony at Dyer Reservoir, artificial burrows will be established at a ratio of 3:1 for all burrows occupied at the time of construction disturbance or as recorded in the 2004 survey, whichever is higher. Artificial burrows will be established through one of the following mechanisms:

- Once construction of Dyer Reservoir is completed, artificial burrows will be established on the spoil site east of the proposed reservoir.

- Installation of a similar number of artificial burrows at the conservation easement established to mitigate for San Joaquin kit fox habitat (see **Measure 3.3-3b**).

- Participation in a USFWS-approved mitigation bank providing offset mitigation credits for loss of burrowing owl habitat.

Impact Significance After Mitigation: Less than significant.

Impact 3.3-7: Construction of the Proposed Project would result in temporary construction disturbance to pond turtle habitat. Less than Significant with Mitigation.

Western pond turtles have the potential to occur in all freshwater drainages throughout the project site, specifically in Brushy Creek, and in stock ponds adjacent to Livermore and Alameda Canals outside the construction right-of-way. Temporary impacts to pond turtles would occur during dewatering and other construction activities in or around habitat supporting pond turtle. Permanent impacts such as individual mortality could result from heavy equipment or other construction activities within or adjacent to pond turtle habitat.

South Bay Pumping Plant

Habitat adjacent to the SBPP provides low quality habitat for western pond turtle. There are no known CNDDB occurrences of pond turtles in Bethany Reservoir and there is little suitable habitat including basking sites and haul-out areas. Therefore, potential impacts associated with improvements to the SBPP would be less than significant, and no mitigation measures are required.

Stage 3 Brushy Creek Pipeline

Suitable habitat for western pond turtle occurs within Brushy Creek in ponded areas with suitable basking sites and haul-out areas. Potential impacts to this species would result from dewatering activities and general construction disturbance resulting from the installation of the pipeline along Brushy Creek. Implementation of **Measure 3.3-7a** which includes preconstruction surveys, would reduce impacts to less than significant.

Dyer Reservoir

There is no suitable aquatic habitat for western pond turtle within the vicinity of the proposed Dyer Reservoir. Therefore, potential impacts are less than significant, and no mitigation measures are required.

Canal Improvements

No suitable habitat for western pond turtle occurs within the construction areas for the Dyer, Livermore, and Alameda Canals. No impacts are anticipated and no specific measures are required.

Potential western pond turtle habitat occurs adjacent to the construction area at Patterson Reservoir. Implementation of **Measure 3.3-7a** would reduce impacts to less than significant.

Mitigation Measures

Measure 3.3-7a: Prior to the start of construction activities, a qualified biologist shall perform pond turtle surveys within Brushy Creek and in other ponded areas affected by the Proposed Project. Surveys may include a search for nests as well as individual turtles. The qualified biologist will be responsible for the survey and for the relocation of adult turtles.

Construction will not proceed until the SBA project corridor can be deemed free of turtles and nests. If nests are observed, a biologist with the appropriate permits from CDFG, may move the eggs to a suitable facility for incubation, and release hatchlings into the creek system in the following fall.

Impact Significance After Mitigation: Less than significant.

Impact 3.3-8: Construction of the Proposed Project would result in disturbance to nesting habitat for breeding raptors and passerine birds. Less than Significant with Mitigation.

Raptors and passerine birds (song birds) nest in trees, dense riparian vegetation, shrubs, and within the annual grassland areas throughout the SBA project corridor. Known nesting areas for golden eagles are located along the Livermore Canal in the vicinity of MP 8.60. Known nesting for loggerhead shrike areas occur in numerous shrubs and trees along the Livermore and Alameda Canal alignments. One known nesting colony for tricolored blackbirds is located along Livermore Canal in the vicinity of MP 8.60. CDFG Code Sections 3503 and 3503.5, and the Migratory Bird Treaty Act, protect raptors and passerines and their eggs and nests from incidental "take." Disturbance from construction could result in reproductive failure for raptors and birds within the SBA project corridor. A discussion of potential impacts by facility is provided below.

South Bay Pumping Plant

Construction activities at the SBPP have the potential to impact nesting and breeding birds and raptors. Implementation of **Measure 3.3-8a** would reduce the impact to a less-than-significant level.

Stage 3 Brushy Creek Pipeline

Installation of the Stage 3 Brushy Creek Pipeline, including installation of 21 access vaults and the Stage 3 Surge Tank have the potential to temporarily impact nesting and breeding birds and raptors. Implementation of **Measure 3.3-8a** would reduce the impacts to a less-than-significant level.

Dyer Reservoir

Construction activities at the proposed Dyer Reservoir site have the potential to impact nesting and breeding birds and raptors. Implementation of **Measure 3.3-8a** would reduce the impacts to a less-than-significant level.

Canal Improvements

Construction activities at Dyer, Livermore, and Alameda Canals, and at Patterson Reservoir have the potential to impact nesting and breeding birds and raptors. Known nesting areas for golden eagles and one known nesting colony for tricolored blackbirds are located along the Livermore

Canal in the vicinity of MP 8.60. Implementation of **Measure 3.3-8a** would reduce the impacts to a less-than-significant level.

Mitigation Measures

Measure 3.3-8a: Protection to nesting and breeding birds and raptors. The following mitigation measures will be implemented to address potential impacts to nesting and breeding birds and raptors in the vicinity of the construction sites:

- To the extent feasible, construction activities shall avoid the nesting season between March 15 and August 15. If construction must occur during this period, all sites shall be surveyed prior to construction by a qualified biologist to verify the presence or absence of nesting birds or raptors. If the survey indicates the potential presence of nesting birds or raptors, the results would be coordinated with CDFG and suitable avoidance measures would be developed and implemented. Construction shall observe the CDFG avoidance guidelines which require a minimum 500-foot buffer zone surrounding active raptor nests and a 250-foot buffer zone surrounding nests of other birds. Buffer zones shall remain until young have fledged.

Measure 3.3-8b: Construction activities within 500 feet of MP 8.60 along Livermore Canal in the vicinity of the known golden eagle nest and tricolored blackbird nesting colony, will be avoided during these species nesting and breeding periods. The nesting period for golden eagle is between February and April. The nesting period for tricolored blackbirds is between April and July. Nest activity will be confirmed by site monitoring prior to construction.

Impact Significance After Mitigation: Less than significant.

Impact 3.3-9: Construction of the Proposed Project could result in impacts to heritage or other significant trees within the SBA project corridor. Less than Significant with Mitigation.

Trees considered significant by local municipalities may be damaged or removed by project construction. Protected trees, which include heritage trees, street trees, and ancestral trees, may occur within the SBA project corridor. Alameda County protects all vegetation planted within the public right-of-way of City streets, as well as ancestral trees. The majority of the SBA project corridor is maintained, and trees are not present within the DWR right of way. However, trees are present at siphon crossings. Portions of the SBA project corridor may extend within the driplines of protected trees or require complete removal of protected trees during pipeline installation. Implementation of **Measures 3.3-9a** and **3.3.9-b** would reduce impacts to less than significant level.

Mitigation Measures

Measure 3.3-9a: DWR shall conduct a tree survey along the SBA project corridor and avoid removal or damage to protected trees. If complete avoidance is infeasible, implement

Measures 3.3-8a and 3.3-8b. This measure applies to those project components that occur within the County of Alameda right-of-way.

Measure 3.3-9b: If tree removal is required, a permit from the County of Alameda Public Works Department shall be obtained, and mitigation developed in coordination with the County. Mitigation may be required and could include replacing disturbed or removed trees or compensating the County for the appraised valued of the impacted trees. Trees will be replanted at the same location following construction with appropriate setback from pipeline. Maintenance of the replanted trees until established may be required by the County to ensure survival.

Impact Significance After Mitigation: Less than significant.

Impact 3.3-10: Construction of the Proposed Project could result in impacts to common plant and animal species. Less than Significant With Mitigation.

Construction of each facility could result in disturbance to, or direct mortality of, common plant and wildlife species. Direct impacts to wildlife species include both mortality of resident species and habitat loss and degradation. Mortality would include road kills, destruction of burrows of species such as ground squirrels and gophers, and destruction of nests of species such as western meadowlarks. Temporary construction-related disturbances may include displacement of animals due to construction noise and loss of habitat. Such habitat losses may be permanent for certain fossorial mammals, whose populations could be eliminated due to habitat modification. Implementation of **Measure 3.3-10a** would reduce impacts to less than significant level.

Mitigation Measures

Measure 3.3-10a: For construction at all facilities, one of the following shall be implemented: cover all open trench areas at the end of work days; provide escape ramps; or have the biological monitor check trenches daily.

Impact Significance After Mitigation: Less than significant.

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RED STRIKE TEXT = CHANGES FROM FINAL EIR
BLUE STRIKE TEXT = CHANGES FROM MMRP

3.4 LAND USE, PLANNING AND RECREATION

3.4.1 SETTING

REGIONAL LAND USE AND PLANNING SETTING

The South Bay Aqueduct (SBA) project corridor extends along the existing SBA facilities between Bethany Reservoir in Eastern Alameda County to the vicinity of Arroyo Mocho in the Livermore Valley. Existing and proposed facilities are located within unincorporated areas of Alameda County and are under the jurisdiction of the East County Area Plan (ECAP) element of the Alameda County General Plan. Starting in the vicinity of the intersection of Vasco Road and Northfront Road and Altamont Pass Road, the SBA Corridor is located within the City of Livermore's Planning Areas as identified in the Draft 2003 Livermore General Plan. Additionally, Livermore Canal, Patterson Reservoir, and Alameda Canal are located within the City of Livermore's Sphere of Influence (SOI) as identified in the City of Livermore General Plan 2003-2025, and the South Livermore Valley Specific Plan. All facilities are generally located within open space or agricultural areas east of the City of Livermore.

Until the 1950s, the East County area was primarily agricultural, with the Cities of Pleasanton and Livermore providing services for the local economy. The establishment of Lawrence Livermore Laboratory and other major research facilities in the 1950s began to change the character of the area. The completion of the Interstate 580 (I-580)/680 freeway system in the 1960s and 1970s opened the area to extensive single-family suburban development in unincorporated areas and near the Cities of Pleasanton and Livermore. In the early 1980s, the three other cities within the region, Danville and San Ramon in Contra Costa County and Dublin in Alameda County incorporated, and included within their borders urbanized lands that had been developed under jurisdiction of the two counties.

During the 1980s, the East County area[1] became a major center of employment for the region, with the development of the Bishop Ranch office park in San Ramon and the Hacienda Business Park in Pleasanton. In addition to this urban growth, an abundance of natural resources exist within eastern Alameda County, including open space, agricultural areas, and aggregate mineral deposits. Resources include the surrounding ridgelines of the Diablo and Sunol ranges, the Livermore Valley vineyards, and the gravel quarries between Pleasanton and Livermore. Under increasing pressure from urbanization, efforts to preserve and enhance these resources, particularly development of the Livermore Valley as a major wine-producing region, have increased in recent years.

[1] The East County area encompasses 418 square miles of eastern Alameda County and includes the cities of Dublin, Livermore, Pleasanton, and a portion of Hayward as well as surrounding unincorporated areas.

EXISTING LAND USE ENVIRONMENT

The Proposed Project is situated in a corridor generally reaching from the Bethany Reservoir in the north, to Check 7, Del Valle Pipeline, about a mile northwest of Arroyo Mocho in the south (see **Figure 2-1** in **Chapter 2, Project Description**). Existing land uses in the project corridor are summarized in **Table 3.4-1** according to the locations of the individual project components.

TABLE 3.4-1
GENERAL LAND USES ALONG PROPOSED PROJECT ROUTE

Segment	From/To	Land Use Planning Jurisdiction	Land Use/Special Features[1]
SBPP		Alameda County	Open Space-Wind Resource Area; Open Space-Large Parcel Agriculture
Brushy Creek Pipeline	SBPP to Dyer Canal	Alameda County	Open Space-Wind Resource Area; Open Space-Large Parcel Agriculture
Dyer Reservoir	Dyer Canal	Alameda County	Open Space-Wind Resource Area; Open Space-Large Parcel Agriculture; Rural Density Residential
Dyer Canal	Brushy Creek Pipeline to Altamont Pipeline	Alameda County	Open Space-Wind Resource Area; Open Space-Large Parcel Agriculture; Rural Density Residential
Livermore Canal	Altamont Pipeline to Patterson Reservoir	Alameda County/ City of Livermore SOI	Open Space-Wind Resource Area; Open Space-Large Parcel Agriculture; Rural Density Residential
Patterson Reservoir	Patterson Reservoir	Alameda County/ City of Livermore SOI	Open Space-Wind Resource Area; Open Space-Large Parcel Agriculture; Rural Density Residential
Alameda Canal	Patterson Reservoir to Check 6	Alameda County/ City of Livermore SOI	Open Space-Wind Resource Area; Open Space-Large Parcel Agriculture; Rural Density Residential

SOURCE: Alameda County 2002; City of Livermore 2003

South Bay Pumping Plant

The South Bay Pumping Plant (SBPP) is located on the western bank of Bethany Reservoir in unincorporated Alameda County. The site is occupied by the existing pumping plant facility and an electrical switchyard. Land uses in the vicinity of the SBPP are limited to open space areas

surrounding the western side of the reservoir. Wind turbines are located west of the facility along the ridgelines; however, the immediate area around the SBPP is undeveloped open space. The ECAP designates the SBPP and the surrounding land use as Open Space-Wind Resource Area.

The lands surrounding Bethany Reservoir are owned by the Department of Water Resources (DWR). These lands also comprise the Bethany Reservoir State Recreational Areas through an agreement between DWR and the California Department of Parks and Recreation. Two recreational areas near the northeastern corner of the reservoir have been developed to date, and are located approximately 2,500 feet east of the SBPP across the reservoir. Facilities developed at these recreation areas include a boat ramp, dock, picnic, and parking areas. In addition, the areas serve as a staging area for the bikeway that has been developed along the eastern side of the California Aqueduct. Land uses on the western shore of the reservoir in the vicinity of the SBPP are limited to open space and wind turbine operations. The ECAP designates the site and the surrounding land use as Open Space-Wind Resource Area.

Stage 3 Brushy Creek Pipeline

The Brushy Creek Pipeline is located in Alameda County, northeast of the City of Livermore. The existing pipeline system is located across rolling grasslands used for cattle grazing and wind turbine operations. An access road runs parallel to the pipeline corridor, adjacent to the vault structures serving the existing Stage 1 and Stage 2 pipelines. The pipeline alignment and surrounding land uses are designated by the ECAP as Open Space-Wind Resource Area and Open Space Large Parcel Agriculture. Wind turbines are located in the surrounding hills.

DWR does not currently own land along the existing dual pipeline system. As shown in **Figure 2-6, Chapter 2, Project Description**, DWR maintains a 95-foot permanent easement across the existing Stage 1 and Stage 2 pipeline to maintain access to private property for facility maintenance. Between the SBPP and the Dyer Canal backsurge pool, this easement would be expanded 35-feet to the north to include the new pipeline. Between the backsurge pool and the proposed Dyer Reservoir, the pipeline would be located within DWR's existing right of way east of Dyer Canal.

Dyer Reservoir

Dyer Reservoir would be constructed east of the existing Dyer Canal, with a setback of approximately 700 feet from Dyer Road (see **Figure 2-9, Chapter 2, Project Description**). The proposed reservoir structure would cover an area of approximately 27 acres of undeveloped grassland, which is currently grazed. The ECAP designates the proposed reservoir site as Open Space-Large Parcel Agriculture and Open Space-Wind Resource Area, and wind turbines are located along the ridgelines east and west of the reservoir site. Dyer Canal, the reservoir site, and the wind turbines to the east are accessed by a gated dirt road from Dyer Road. This dirt road also provides secondary access to Altamont Landfill, which is located over the ridgeline to the east, approximately 0.5 miles from the Dyer Reservoir site. The Dyer Reservoir site is owned by Waste Management Incorporated (WMI), which owns and operates the Altamont Landfill. WMI

operates the landfill under Alameda County Conditional Use Permit C-5512, adopted March 6, 2000. Conditions 16 through 27 of this conditional use permit identify a biological mitigation obligation of 750 acres, and identify USGS Quadrangle Sections 15, 16, 17 and 21, consisting of 2,560 acres, as "biological habitat mitigation and buffer area." Condition 16 also states that some or all of WMI's requirement for multi-species, offsite mitigation acreage would be met by the WMI through the dedication of public open space in the Altamont Hills or another suitable area. At the date of this DEIR publication, no conservation easement agreement has been established on Section 17 by WMI; however WMI is proceeding with dedication of Sections 15, 16, 17 and 21 via a United States Army Corps of Engineers (USACOE) Individual 404 Permit and associated Section 7 Consultation with United States Fish and Wildlife Service (USFWS; Lewis, 2004).

The Dyer Reservoir site, and approximately 2,500 feet of the Stage 3 Brushy Creek Pipeline would be located within Section 17. With the exception of the 250 feet of pipeline between the northern boundary of Section 17 and the DWR right-of-way at Dyer Canal, the remainder of the pipeline would be located within DWR right-of-way (see **Figure 3.4-1**).

Approximately 14 residences are located west of Dyer Road, approximately 2,000 feet from the existing Dyer Canal alignment, and proposed Dyer Reservoir site. These residences are accessed directly from Dyer Road, and are identified as Rural Residential Clusters by the ECAP. Other land uses within the vicinity of Dyer Reservoir include the planned Brushy Peak Regional Preserve, which is located on the ridgeline west of Dyer Road. This preserve is operated jointly by East Bay Regional Park District (EBRPD) and Livermore Area Parks and Recreation Department (LARPD). The majority of the preserve is located approximately 1 mile to the west of the SBA alignment; however, the northern-most portion of the preserve is located within 2,000 feet of the SBA alignment. Future access to the preserve is proposed from the terminus of Dyer Road.

Canal Improvements

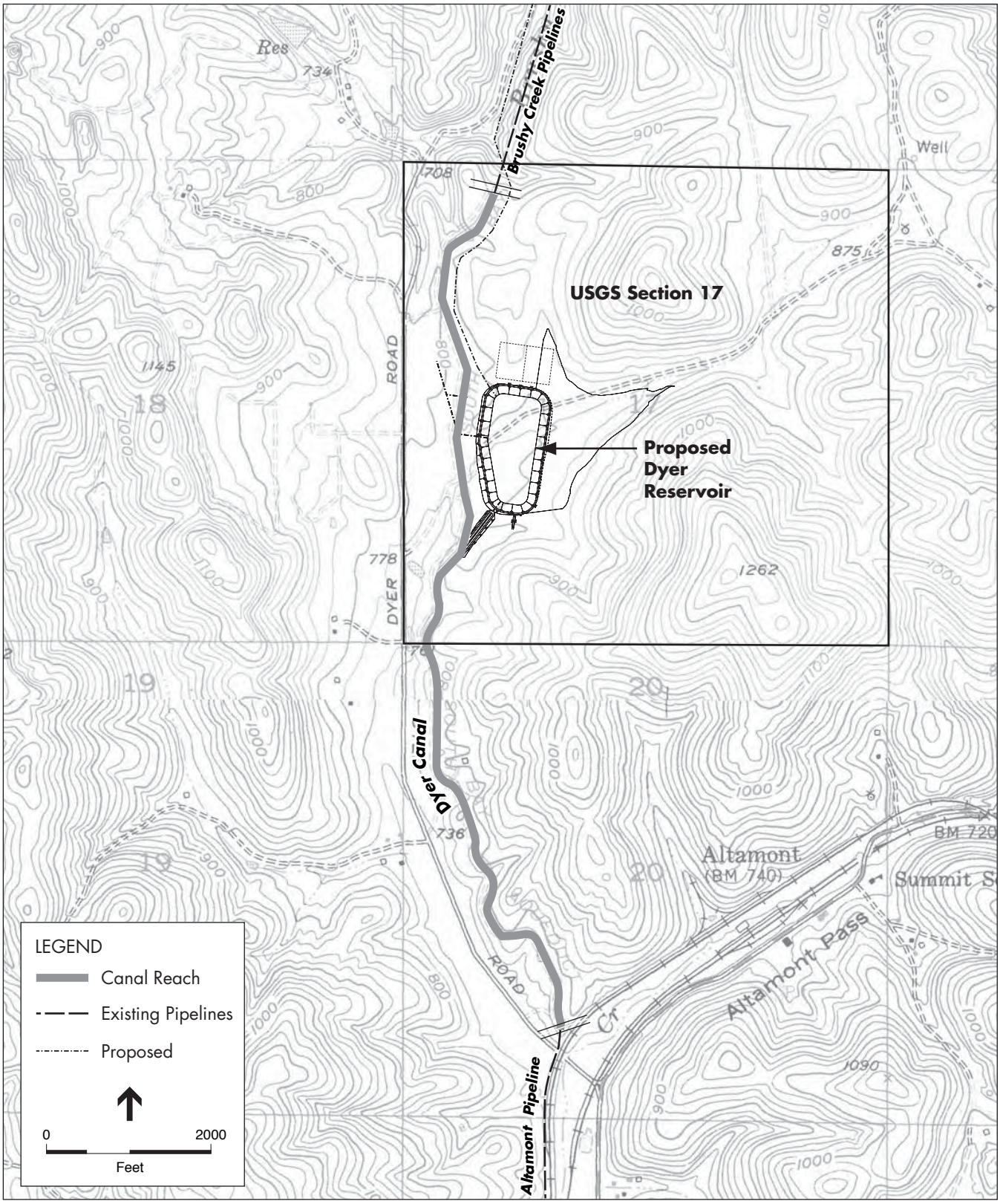
Dyer Canal

The Dyer Canal extends south from the backsurge pool to Altamont Pass Road. The canal runs parallel to Dyer Road. Land uses along Dyer Canal are described in the Dyer Reservoir discussion above.

Livermore Canal

The Livermore Canal extends south from the southern end of the Altamont Pipeline near I-580 to Patterson Reservoir. The canal runs parallel to Greenville Road east of the City of Livermore. Surrounding land uses consist of open space and some light industrial development along Greenville Road, approximately 2,000 feet west of the canal. Two residences are located within 500 feet of the canal (see **Figure A-3, Appendix A**). The land on either side of the canal ~~area~~ is designated as ~~Open Space~~ Large Parcel Agriculture by the ECAP. The canal itself is designated Water Management by the ECAP. This area is also within the Livermore SOI and the Livermore General Plan identifies the land on either side of the canal ~~area~~ as Large Parcel Agriculture (LPA).

~~Agriculture/Open Space and Public Use.~~ The canal itself is identified as Open Space/Water Management Lands (WML).



DWR SBA Improvement and Enlargement Project / 202456 ■

SOURCE: USGS Basemap from Maptech;
Drawn by Environmental Science Associates

Figure 3.4-1
Dyer Reservoir and Proposed
Section 17 Conservation Easement

Patterson Reservoir

The Patterson Reservoir is an existing reservoir facility that serves the Zone 7 Patterson Pass Water Treatment Plant (WTP), and demarks the end point of the Livermore Canal. The reservoir is located approximately 1,500 feet north of Patterson Pass Road, and approximately 50 feet north of the Zone 7 Patterson Pass WTP fenceline (see **Figure A-3, Appendix A**). The area surrounding the canal is designated as ~~Open Space~~ Large Parcel Agriculture by the ECAP. The reservoir itself is designated Water Management by the ECAP. The reservoir site is designated in the Livermore General Plan as Open Space/Water Management Lands (WML) ~~Public Use~~, and the surrounding land ~~area~~ is identified as Large Parcel Agriculture (LPA). ~~Agriculture/ Open Space.~~

Alameda Canal

The Alameda Canal extends from Patterson Reservoir approximately 6 miles east and south of the City of Livermore to Check 6, located approximately 1 mile west of Arroyo Mocho. General land uses along this segment include vineyards, individual ranchettes, cattle grazing, and other agricultural uses. Approximately ten residences are located within 500 feet of the canal. The Sandia/Lawrence Livermore Laboratories are located northwest of the canal near its intersection with Greenville Road (see **Figure A-4, Appendix A**). The land on either side of the canal ~~area~~ is designated as ~~Open Space~~ Large Parcel Agriculture by the ECAP. The canal itsefl is designated Water Management by the ECAP. The Livermore General Plan identifies the canal itself as Open Space/Water Management Lands (WML)~~Public Use~~, the area east and west of the canal as Large Parcel Agriculture (LPA). ~~Agriculture/Open Space, and the area west of the canal as Vacant Industrial and Underdeveloped Industrial land use.~~

EXISTING RECREATIONAL USES

Several recreational facilities are located near the SBA. The EBRPD is responsible for 55 regional parks, recreation areas, wildernesses, shorelines, preserves, land bank areas, and 20 inter-park trails, totaling over 1,000 miles, on approximately 85,000 acres of land. Its jurisdiction covers all of Alameda and Contra Costa counties. The EBRPD owns and/or manages 34,886 acres within the Tri-Valley Area, including the Las Trampas, Ohlone, and Sunol Wilderness Regional Preserves; Bishop Ranch and Round Valley Regional Preserves; Del Valle and Pleasanton Ridge Regional Parks; Tassajara Creek staging area; Morgan Territory Regional Preserve; the proposed Bethany Reservoir Recreation Area; and Shadow Cliffs Recreation Area. The San Francisco Water Department owns additional watershed land, some of which overlaps with the Sunol and Ohlone regional parks, in the southern part of the SBA project corridor. Additionally, a portion of Mount Diablo State Park is within the East County area.

The LARPD provides park and recreational services to the City of Livermore and surrounding areas, including the Brushy Peak Regional Preserve, the Garaventa Wetlands Preserve, Sycamore Grove Park, and Veteran's Park. Other local jurisdictions also operate park and recreational facilities in East County area. A regional trail system connects some of these major park and open space areas. The *East Bay Regional Park District 1997 Master Plan*, and the *Livermore*

Area Recreation and Park District 1992 Regional Trail Plan propose connecting trails to complete the system.

City of Livermore General Plan and Bikeways and Trails Master Plan also propose a trail system, consistent with LARPD and EBRPD Plans, including links to regional facilities such as the proposed Iron Horse Trail and the Brushy Peak to Del Valle Aqueduct Trail.

The Tri-Valley Transportation Council adopted the Tri-Valley Bike Plan in 1992. The plan includes three types of bicycle facilities in the East County area: bicycle paths (Class I), bicycle lanes (Class II), and bicycle routes (Class III). The majority of routes within the East County area are Class II and Class III, although the Iron Horse Trail, which extends along the Southern Pacific right-of-way, is a Class I facility.

A summary of existing recreational facilities is provided in **Table 3.4-2**, and are depicted in **Figure 3.4-2**. Additionally, recreational trails that have been identified in the EBRPD Master Plan as proposed along the SBA alignment are provided in **Table 3.4-3**.

EXISTING AGRICULTURAL USES

The California Department of Conservation, Office of Land Conservation, maps important farmland throughout California. Important farmlands are divided into the following four categories based on their suitability for agriculture:

- *Prime Farmland* is land that has the best combination of physical and chemical characteristics for crop production. It has the soil quality, growing season and moisture supply needed to produce sustained high yields of crops when treated and managed.

- *Farmland of Statewide Importance* is land other than Prime Farmland that has a good combination of physical and chemical characteristics for crop production.

- *Unique Farmland* is land that does not meet the criteria for Prime Farmland or Farmland of Statewide importance which has been used for the production of specific high economic value crops.

- *Farmland of Local Importance* is either currently producing crops, or has the capability of production, and does not meet the criteria of the categories above.

- *Grazing Land* is land in which the existing vegetation is suited to the grazing of livestock.

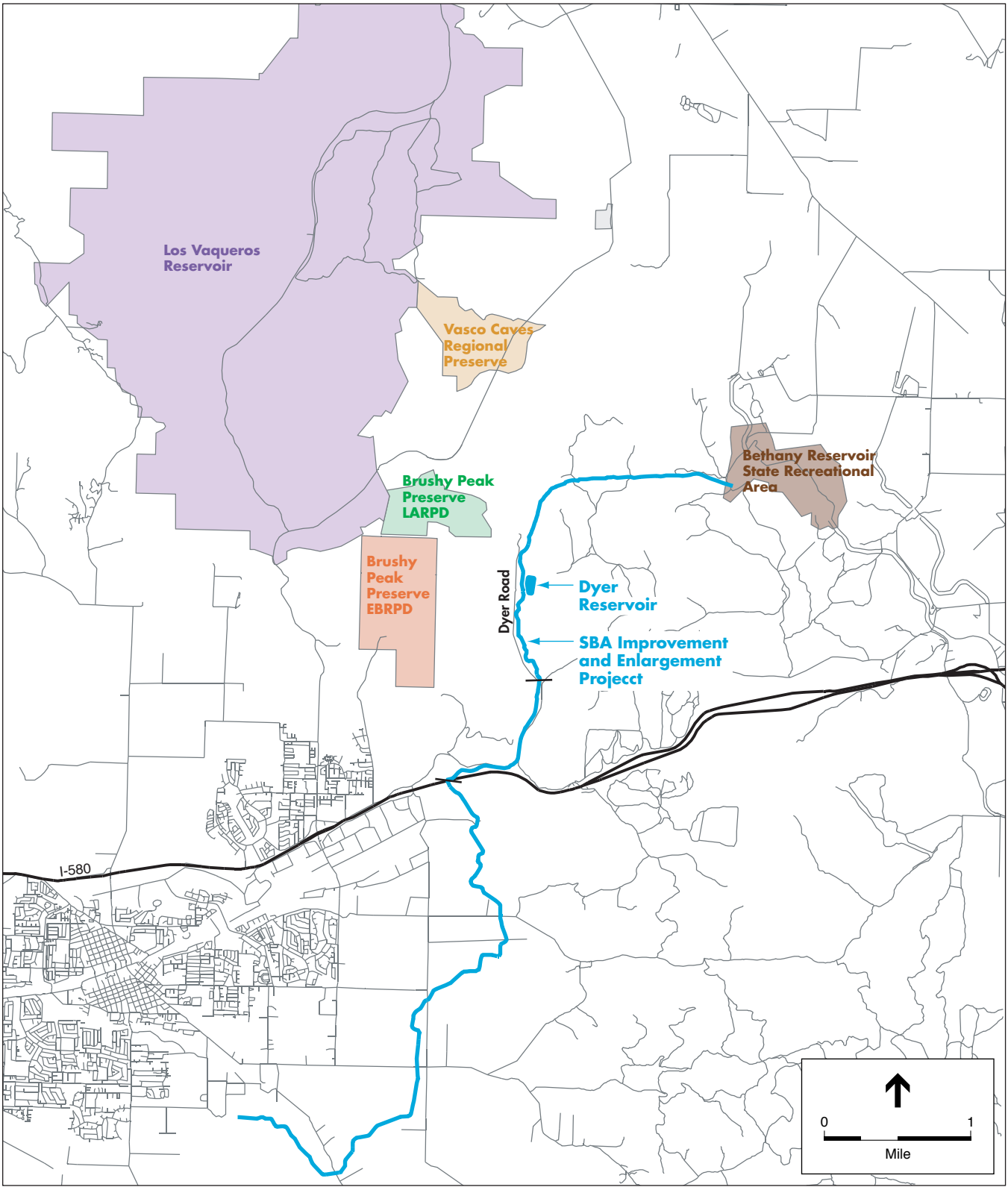
The California Land Conservation Act of 1965, also known as the Williamson Act, is designed to preserve agricultural and open space lands by discouraging their premature and unnecessary conversion to urban uses. The Act creates an arrangement whereby private landowners contract with counties and cities to voluntarily restrict their land to agricultural and compatible open-space uses. In return, Williamson Act contracts offer tax incentives by ensuring that land would be assessed for its agricultural productivity rather than its highest and best uses. Contracts run for a period of ten years, however, some jurisdictions exercise the option of making the term longer, up to twenty years. Contracts are automatically renewed unless the landowner files for non-renewal or petitions for cancellation.

Following is a discussion of existing agricultural uses along the SBA project corridor. See **Table 3.4-4** for a summary of farmland designations along the SBA project corridor by facility.

TABLE 3.4-2
RECREATIONAL FACILITIES LOCATED WITHIN PROXIMITY OF SBA PROJECT CORRIDOR

Project Component	Existing Recreational Facility in Vicinity	Distance from SBA Project Component	Recreational Facility Status	Planning Jurisdiction
South Bay Pumping Plant	Bethany Recreation Area	Located on eastern side of Bethany Reservoir, 2,000 feet east of SBPP	Existing CDPD Facility Identified in EBRPD Master Plan	Alameda County
Brushy Creek Pipeline	Brushy Peak Regional Preserve	Located 2,000 feet west of SBA easement at closest point. Majority of Preserve over 1 mile from SBA alignment.	Joint Ownership by LARPD/EBRPD	Alameda County
Dyer Reservoir/ Dyer Canal	Brushy Peak Regional Preserve	Located 6,000 feet west of Dyer Reservoir and Dyer Canal	Joint Ownership by LARPD/EBRPD	Alameda County
Alameda Canal	Sycamore Grove Park; Veterans Park;	Located approximately 5 miles southwest of Alameda Canal	Existing LARPD Parkland	Alameda County
Alameda Canal	Del Valle Regional Park	Located approximately 5 miles southwest of Alameda Canal	Existing EBRPD Parklands	Alameda County

SOURCE: EBRPD, 1997. Compiled by Environmental Science Associates.



SOURCE: East Bay Regional Park District, 1997

Figure 3.4-2
Recreational Easements within Vicinity of SBA Project Corridor

TABLE 3.4-3
PROPOSED RECREATIONAL FACILITIES LOCATED WITHIN PROXIMITY OF SBA PROJECT CORRIDOR

Project Component	Proposed Recreational Facility in Vicinity	Distance from SBA Project Component	Recreational Facility Status	Planning Jurisdiction
Brushy Creek Pipeline	Brushy Peak to Bethany Reservoir Regional Trail	Identified as along SBA	Identified as "Proposed Trail" in EBRPD Master Plan	Alameda County
Dyer Canal	Brushy Peak to Del Valle Regional Trail	Identified as along SBA	Identified as "Proposed Trail" in EBRPD Master Plan	Alameda County
Livermore Canal	Iron Horse Trail San Joaquin County to Shadow Cliffs	Identified as along SBA	Identified as "Proposed Trail" in EBRPD Master Plan	Alameda County
Livermore Canal	Iron Horse Trail Shadow Cliffs to Alameda County	Identified as along SBA	Identified as "Proposed Trail" in EBRPD Master Plan	Alameda County
Alameda Canal	Del Valle Dam Extension	Identified as along SBA	Identified as "Proposed Trail" in EBRPD Master Plan	Alameda County
Alameda Canal	Ohlone Wilderness Trail	Identified as along SBA	Identified as "Proposed Trail" in EBRPD Master Plan	Alameda County
Alameda Canal	Shadow Cliffs to Del Valle	Identified as along SBA	Identified as "Proposed Trail" in EBRPD Master Plan	Alameda County
Alameda Canal	Pleasanton Ridge to Shadow Cliffs Trail	Identified as along SBA	Identified as "Proposed Trail" in EBRPD Master Plan	Alameda County

SOURCE: EBRPD, 1997. Compiled by Environmental Science Associates.

South Bay Pumping Plant

Lands surrounding the existing SBPP are designated as Grazing Land (Department of Conservation, 1988 and 1996; USDA NRCS, 1966). Construction of the existing SBPP has resulted in disturbance and elimination of previously designated Grazing Land. Since the lands surrounding the SBPP have not recently been used for grazing, this designation is no longer applicable.

Brushy Creek Pipeline

The Brushy Creek Pipeline extends through lands designated as Farmland of Statewide Importance, Grazing Land, and land under Williamson Act contract (Department of Conservation, 1988 and 1996; USDA NRCS, 1966).

Dyer Reservoir

The proposed Dyer Reservoir would cover an area of approximately 27 acres of undeveloped grassland, which is designated as Grazing Land. In addition, portions of the land are under Williamson Act contract.

TABLE 3.4-4
FARMLAND DESIGNATIONS ALONG THE
SBA PROJECT CORRIDOR BY PROPOSED FACILITY

Project Component	Prime Farmland	Farmland of Statewide Importance	Unique Farmland	Farmland of Local Importance	Grazing Land	Williamson Act Contract
South Bay Pumping Plant	No	No	No	No	Yes	No
Brushy Creek Pipeline	No	Yes	No	No	Yes	Yes
Dyer Reservoir	No	No	No	No	Yes	Yes
Dyer Canal	No	No	No	No	No	No
Livermore Canal	No	No	No	No	No	No
Patterson Reservoir	No	No	No	No	No	No
Alameda Canal	No	No	No	No	No	No

No – Lands within the footprint of the proposed facility do not contain this farmland designation.
Yes – Lands within the footprint of the proposed facility contain this farmland designation.

SOURCE: Department of Conservation, 1988 and 1996; USDA NRCS, 1966. Compiled by Environmental Science Associates.

Canal Improvements

Dyer Canal

Dyer Canal extends through lands designated as Farmland of Statewide Importance, Grazing Land, and lands under Williamson Act contract (Department of Conservation,1988 and 1996; USDA NRCS, 1966). However, the canal facility itself is under DWR right-of-way and is not used as farmland or included in any Williamson Act contract.

Livermore Canal

Livermore Canal extends through lands designated as Farmland of Statewide Importance, Grazing Land, and lands under Williamson Act contract (Department of Conservation,1988 and 1996; USDA NRCS, 1966). However, the canal facility itself is under DWR right-of-way and is not used as farmland.

Patterson Reservoir

Lands surrounding Patterson Reservoir are designated as Farmland of Statewide Importance, Grazing Land, and lands under Williamson Act contract (Department of Conservation,1988 and 1996; USDA NRCS, 1966). However, the reservoir itself is under DWR right-of-way and is not used as farmland or included in any Williamson Act contract.

Alameda Canal

Alameda Canal extends through lands designated as Farmland of Statewide Importance, Grazing Land, and lands under Williamson Act contract (Department of Conservation,1988 and 1996; USDA NRCS, 1966). However, the canal facility itself is under DWR right-of-way and is not used as farmland or included in any Williamson Act contract.

LAND USE PLANNING REGULATORY FRAMEWORK

State

California Farmland Mapping and Monitoring Program

The California Department of Conservation, under the Division of Land Resource Protection, has set up the Farmland Mapping and Monitoring Program (FMMP). The FMMP monitors the conversion of the state's farmland to and from agricultural use. The map series identifies eight classifications and uses a minimum mapping unit size of 10 acres. The FMMP also produces a biannual report on the amount of land converted from agricultural to non-agricultural use. The FMMP maintains an inventory of state agricultural land and updates its "Important Farmland Series Maps" every two years (Department of Conservation, 2004).

The FMMP is an informational service only and does not constitute state regulation of local land use decisions. Three categories of farmland are considered valuable and any conversion of land within these categories is typically considered to be an adverse impact: (1) Prime Farmland, (2) Farmland of Statewide Importance, and (3) Unique Farmland.

Tri-Valley Subregional Planning Strategy

The seven local governments in the Tri-Valley Area have established the Tri-Valley Planning Committee (TVPC) to address subregional planning issues that individual jurisdictions acting alone cannot otherwise manage effectively. The TVPC adopted the Tri-Valley Subregional Planning Strategy in 1995, which contains subregional objectives and policies. Objectives and policies (Growth Management/Infrastructure) applicable to the Proposed Project include the following:

> Policy 4. Work with special purpose districts and other service providers to assure that necessary services are provided in advance of or concurrently with development.
>
> Policy 8. Coordinate development policies and capital improvement programs of local governments and special districts at the subregional level, to assure that infrastructure and services are provided on a timely and cost-effective basis.
>
> Policy 9. Consider the subregional impacts and mitigation measures in the environmental review of any major new public or private facility or expansion.

COUNTY AND LOCAL REGULATIONS, GOALS AND POLICIES

Alameda County

In the 1970s, Alameda County began a General Plan amendment process, which included development of documents on a geographic, or planning unit, basis. These geographic planning units associated with the Proposed Project include the ECAP.

The East County Area Plan

The East County planning area encompasses 418 square miles of unincorporated eastern Alameda County that surrounds the Cities of Dublin, Livermore, Pleasanton, and a portion of Hayward. The East County is part of the Tri-Valley subregion, and the planning area extends from the Pleasanton/Dublin ridgeline on the west to the San Joaquin County line on the east. The ECAP was adopted by the Board of Supervisors in May 1994, and most recently amended November 2000 (adopted May 2002). ECAP goals, objectives and policies relevant to the Proposed Project are discussed below:

> **Urban and Rural Development**
>
> Policy 12. The County shall work with cities and service districts to plan adequate infrastructure capacity to accommodate development consistent with the ECAP. The level of development in the ECAP shall depend on the adequacy of transportation and infrastructure improvements and the extent to which these improvements can be funded.
>
> **Sensitive Lands and Regionally Significant: General Open space**
>
> Policy 54. The County shall approve only open space, park, recreation, agricultural, limited infrastructure, public facilities, (e.g., limited infrastructure, research facilities, landfill sites, jails, etc.) and other similar and compatible uses outside of the Urban Growth Boundary.

Agriculture

Policy 71. The County shall conserve prime soils (Class I and Class II, as defined by the USDA Soil Conservation Service Land Capability Classification) and Farmland of Statewide Importance and Unique Farmland (as defined by the California Department of Conservation Farmland Mapping and Monitoring Program) outside the Urban Growth Boundary.

Policy 85. The County shall utilize provisions of the Williamson Act and other appropriate economic incentives to support agricultural uses.

Policy 89. The County shall retain rangeland in large, contiguous blocks of sufficient size to enable commercially viable grazing.

Windfarms

Policy 173. The County shall discourage the development of uses and structures that are not compatible with wind energy operations within the Wind Resource Area.

Policy 174. The County shall require that, where conflicts between a new use and an existing windfarm use are anticipated, the burden of mitigating the conflicts are the responsibility of the new use.

General Services and Utilities

Policy 218. The County shall allow development and expansion of public facilities (e.g., parks and recreational facilities; schools; child care facilities; police, fire and emergency medical facilities; solid waste, water, storm drainage, flood control, subregional facilities; utilities, etc.) in appropriate locations inside and outside the Urban Growth Boundary consistent with the policies and Land use Diagram of the ECAP.

Public Services and Facilities: Water

Policy 252. The County shall encourage Zone 7 to pursue new water supply sources and storage facilities only to the extent necessary to serve the rates and levels of growth established by the Initiative and by the general plans of the cities within its service area.

Policy 253. The County shall approve new development only upon verification that an adequate, long-term, sustainable, clearly identified water supply will be provided to serve the development, including in times of drought.

Project Consistency with Policies

Policies for all jurisdictions generally support the development of infrastructure to provide adequate public services, and include provisions for coordination between agencies to provide these services. Alameda County recognizes water infrastructure limitations; the goals of the Proposed Project are consistent with the relevant County policies, as indicated in the above goals, objectives and policies.

Policies related to the direct impacts of construction projects, such as traffic, noise, and air quality effects, are addressed in the corresponding sections of this report. The land use and growth

objectives of the affected agencies regarding growth within the Zone 7 service area, and the potential secondary effects of that growth, are discussed in **Chapter 4, Growth Inducement Potential and Secondary Effects of Growth**.

3.4.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

This section addresses potential project impacts to land use, recreational facilities, and agricultural uses in the SBA project corridor. The impact significance criteria are based on guidance provided by the California Environmental Quality Act regarding significant environmental effects (Guidelines Section 15065, 15126, and Appendix G). For this DEIR, the Proposed Project would have a significant impact if it would:

- Physically divide an established community;
- Conflict with existing or designated land uses in the area or land use policies;
- Conflict with established recreational, educational, religious, or scientific uses in the area;
- Convert prime agricultural land to non-agricultural use or impair the agricultural productivity of prime agricultural land; or
- Conflict with existing zoning for agricultural use, or a Williamson Act contract.

IMPACTS AND MITIGATION MEASURES

Impact 3.4-1: Project construction would result in short-term disturbance to some adjacent land uses along the project construction corridor. Less than Significant with Mitigation.

Construction of proposed facilities would generate noise, dust, visual intrusion, and construction traffic that could affect adjacent land uses. The construction of facilities in the vicinity of sensitive residential uses, particularly along Dyer Road, and the disruption of land use activities along the construction corridor would be a temporary impact. Construction activities would produce air quality and noise impacts, and changes to existing visual quality in the vicinity of proposed facilities; these impacts are discussed in **Sections 3.6, Air Quality, 3.7, Noise**, and **3.11, Visual Resources**.

Construction is expected to proceed at a rate of approximately 100 feet per day. At this rate, an individual residence along the pipeline or canal routes could expect to be affected for approximately one to two weeks. However, increased construction traffic for residences along Dyer Road, which provides access to Brushy Creek Pipeline, Dyer Canal, and Dyer Reservoir would occur for 20-months. Potential impacts associated with construction related traffic are discussed in **Section 3.8, Traffic and Circulation**. Proposed mitigation includes noticing and

maintenance of public access, which would minimize these impacts. With proper mitigation, temporary construction impacts would have a less-than-significant effect on adjacent land uses.

South Bay Pumping Plant

Project implementation would include construction activities over an approximately 18-month schedule for the initial contract which would include the majority of the exterior site work. The completion contract would extend an additional 16 months for internal pump station modifications. Construction activities would include regrading of existing hill areas to the north and recontouring of the Bethany Reservoir shoreline adjacent to the SBPP. Construction equipment would access the facility via roads extending on the western side of the California Aqueduct from the Harvey O. Banks Pumping Plant.

The facility is surrounded by Bethany Reservoir on the east, and open space on the north, south, and west. Land uses adjacent to the facility would not be adversely affected by short-term construction of the facility. The nearest sensitive receptor is recreational facilities within the Bethany Reservoir Recreational Area, located approximately 2,500 feet to the east, across Bethany Reservoir. Due to its distance from the SBPP construction site, and the application of appropriate Best Management Practices (BMPs), short-term construction related effects would be less than significant.

Stage 3 Brushy Creek Pipeline

Project implementation would include construction activities along the Brushy Creek Pipeline corridor between the SBPP and the proposed Dyer Reservoir. Construction activities would occur within a construction easement north of and parallel to the existing dual pipeline system (see **Figure 2-5, Chapter 2, Project Description**). Access for construction equipment would be via the SBPP or Dyer Road, depending upon the pipeline segment, contractor operations, and private property access agreements.

No sensitive receptors (residences) exist along the Brushy Creek Pipeline alignment, as the alignment crosses privately held open space areas between the SBPP and Dyer Canal. At Dyer Canal, the final 2,500 feet of pipeline between the Dyer Canal backsurge pool and the proposed Dyer Reservoir would be constructed along the eastern side of Dyer Canal. Construction activities for pipeline installation along this segment would be within 2,000 feet of residences located west of Dyer Road. Pipeline installation rate is anticipated to be approximately 100 feet per day. Construction activities would generate short-term noise, dust, and changes in the visual character of the pipeline alignment. However, due to their short-term nature, and the application of BMPs identified in **Sections 3.6, Air Quality, 3.7, Noise**, and **3.11, Visual Resources**, short-term construction related impacts are considered less than significant.

Dyer Reservoir

The proposed Dyer Reservoir would be constructed over an approximately 20-month timeframe. Construction activities at the site would generate short-term construction-related noise, dust generation, and alteration of existing visual characteristics within the construction site. The

proposed reservoir site is located approximately 2,000 feet east of 14 existing residences along the west side of Dyer Road. These residential uses would experience temporary impacts from noise, dust and visual intrusion from construction operations at the proposed reservoir site. However, due to their short-term nature, and the application of BMPs identified in **Sections 3.6, Air Quality, 3.7, Noise**, and **3.11, Visual Resources**, short-term construction related impacts are considered less than significant.

An access road to wind turbines on the ridge east of the reservoir site would be relocated as part of the construction of the reservoir. This roadway also provides secondary access to Altamont Landfill, although it is not currently used by WMI to access the landfill. During construction, DWR would coordinate with wind turbine operators to maintain access or identify alternative access to wind turbines for maintenance, as established in **Measure 3.4-1a**. Therefore, potential impacts would be reduce to a less-than-significant level.

Canal Improvements

The Proposed Project would increase the height of internal canal lining between 1.0 to 2.0 feet along the Dyer, Livermore, and Alameda Canals; localized increases of up to 4.0 feet may be necessary. Additionally, alterations of check structures, overchutes, and siphons would be implemented. All construction activities would be conducted within the footprint of the existing canal facilities inside of the DWR right-of-way with the exception of the siphon crossings, which require additional right-of-way. Construction activities would generate short-term noise and dust along the canal corridors associated with grading and cement pouring along the internal canal structure. Sensitive receptors along the canals are limited, with approximately 14 residences located approximately 2,000 feet west of Dyer Canal, and a total of 12 residences located within 500 feet of the Livermore and Alameda Canals. The short-term nature of construction related impacts, and the application of BMPs identified in **Sections 3.6, Air Quality, 3.7, Noise**, and **3.11, Visual Resources**, would reduce impacts to less than significant.

Canal Check Structures and Siphons

The existing check and siphon structures within the canals would be modified, and second siphon barrels would also be constructed beneath creeks and roadways. For crossing of major roadways, single lane closures would be required at the following locations: Patterson Pass Road; Tesla Road; and Mines Road. Alternate one-way traffic flow would be maintained and flagger-controls would be implemented at these crossings, and traffic may be delayed up to ten minutes during construction.

Mitigation Measures

Measure 3.4-1a: DWR shall require its contractor to prepare a Traffic Control Plan specifying measures for maintaining access to residences along the construction route, including Dyer Road (see **Section 3.8, Traffic and Circulation**).

Measure 3.4-1b: DWR shall coordinate access to wind turbine facilities with operators, and shall include provisions to maintain access or provide alternative access to wind turbine facilities during construction (see **Section 3.8, Traffic and Circulation**).

Additional mitigation measures for construction disturbance to residential receptors are identified in **Sections 3.6, Air Quality** and **3.7, Noise**.

Impact Significance After Mitigation: Less than significant.

Impact 3.4-2: Project construction could result in long-term effects to existing and planned land uses in the vicinity of proposed facilities. Less than Significant with Mitigation.

South Bay Pumping Plant

Project implementation would result in the expansion of existing uses at the SBPP, which consist of the pumping and transport of water supply from Bethany Reservoir. Consistent with the existing structure, the four new pumping units would be fully enclosed. Long-term operation of the SBPP would be consistent with current operations. As previously noted, surrounding land uses are limited to open space, wind turbine operation, and recreational uses located on the eastern shore of Bethany Reservoir. No sensitive receptors are located within 2,500 feet of the facility, and surrounding land use designations are Open Space and Large Parcel Agriculture. Proposed operations of the SBPP would not conflict with these designations. As the Proposed Project would be consistent with existing uses, would be consistent with surrounding land uses, and would not affect sensitive receptors located in the immediate vicinity, potential impacts associated with long-term land use compatibility are considered less than significant.

Stage 3 Brushy Creek Pipeline

Installation of the pipeline would result in the installation of a 78-inch diameter below-grade pipeline along the proposed alignment. The pipeline would also include above grade facilities, including a third surge tank, concrete vaults to provide manhole access, blow-off valves at pipeline low points, and air release valves at pipeline high points. These facilities would be identical to those currently present along the existing dual pipeline system, and would not be anticipated to affect or conflict land uses or with land use designations along the pipeline route.

Between the SBPP and Dyer Canal, installation of the Brushy Creek Pipeline would include acquisition of 20 feet of permanent easement parallel to and north of DWR's easement over the existing dual pipeline system. Consistent with current easements along the dual pipeline system, the easement would be established across private property along the pipeline route, and provide for access and maintenance of DWR facilities. Existing uses within the area, which include grazing, open space, and wind turbine operation, are not precluded by easement acquisition, and would continue to take place along the pipeline alignment following construction. Easement acquisition would be negotiated between DWR and individual land owners. Because easement acquisition would not preclude land uses designated by the ECAP, or conflict with existing land uses along the alignment, impacts are considered less than significant.

Stage 3 Brushy Creek Pipeline implementation and easement acquisition would require the removal of ~~two~~ one power-generating wind turbines located along the pipeline route. DWR

would negotiate with the wind turbine owner to provide appropriate compensation for the removal of this one ~~these two~~ tower~~s~~. As the Altamont Foothill area is extensively developed with wind turbine towers, the removal of one ~~two~~ towers would not affect wind power generation. DWR compensation for removal, as established in **Measure 3.4-2a**, would be consistent with ECAP Policy 174, which requires mitigation for conflicts between new land uses and wind energy operations. Implementation of this measure would reduce potential impacts to less than significant.

Approximately 2,500 feet of the Stage 3 Brushy Creek Pipeline would be located within Section 17, which has been identified as buffer and biological mitigation lands in Conditional Use Permit C-5512. Approximately 250 feet of the pipeline would be located outside of DWR right of way between the northern boundary of Section 17 and the Dyer Canal backsurge pool. Assuming a 20 foot permanent easement, this would require easement acquisition of 0.11 acre. The remainder of pipeline would be located within DWR right-of-way east of Dyer Canal, and would not affect the dedication of lands as mitigation or buffer lands. Please refer to the Dyer Reservoir discussion below regarding potential impacts related to the remaining 250 linear feet of pipeline located outside of DWR right of way.

Dyer Reservoir

Project implementation would result in the placement of a 500 acre-foot reservoir within existing open space areas east of Dyer Canal. The Dyer Reservoir site is owned by WMI, which owns and operates the Altamont Landfill. WMI operates the landfill under Alameda County Conditional Use Permit C-5512, adopted March 6, 2000. Conditions 16 through 27 of this conditional use permit identify a biological mitigation obligation of 750 acres, and identify USGS Quadrangle Sections 15, 16, 17 and 21, consisting of 2,560 acres, as "biological habitat mitigation and buffer area." Condition 16 also states that some or all of WMI's requirement for multi-species, offsite mitigation acreage would be met by the WMI through the dedication of public open space in the Altamont Hills or other suitable area. At the date of this DEIR publication, no conservation easement agreement has been established on Section 17 by WMI; however WMI is proceeding with dedication of Sections 15, 16, 17 and 21 via a USACOE Individual 404 Permit and associated Section 7 Consultation with USFWS (Lewis, 2004)

Implementation of Dyer Reservoir would result in the temporary disturbance of 45 acres of open space area, and the permanent loss of 27 acres associated with the reservoir structure. DWR would acquire both temporary and permanent easements for these acreages. Implementation of Dyer Reservoir would potentially conflict with the conservation easement currently proposed by WMI. However, as previously noted, approximately 2,500 acres of land has been identified by WMI to meet this requirement. Given the additional land availability of 1,500 acres beyond its mitigation obligation, it is unlikely that acquisition of 27 acres of permanent easement would preclude WMI from meeting its mitigation obligation under C-5512. However, this would be dependant upon establishment of final mitigation requirements as part of Section 7 Consultation with USFWS. As part of easement acquisition, DWR would negotiate easement acquisition with WMI and regulatory agencies, as appropriate. Negotiations may include identification of equivalent offsite lands to compensate for loss of onsite conservation acreage. Implementation of

Measure 3.4-2b identifies the need for DWR to negotiate with WMI to ensure that easement acquisition does not preclude WMI from meeting its mitigation obligation. Within that context, DWR may provide additional property or habitat at an appropriate ratio agreed upon by DWR, WMI, and regulatory permitting agencies.

In addition to biological resources mitigation, C-5512 identifies USGS Quadrangle Sections 15, 16, 17 and 21, consisting of 2,560 acres, as "biological habitat mitigation and buffer area." With respect to this second use, implementation of a surface water reservoir on 27 acres of Section 17 would not represent an expansion or augmentation of the landfill, or its operation. The reservoir would be a low-maintenance, "passive" use, compatible with the purpose of the buffer lands in relation to landfill operations. Section 17 currently includes water infrastructure and wind turbine infrastructure, including Dyer Canal. As such, implementation of the reservoir would not conflict with, and would maintain, the area as buffer land between residences and Altamont Landfill operations.

Long-term visual effects that would result from the completed reservoir facility are addressed in **Section 3.11, Visual Resources** and compliance with the mitigation measures recommended in that section would reduce potential visual impacts to a less than significant level.

Reservoir implementation would also require the permanent relocation of a secondary access road to the Altamont Landfill. The rerouting of the Altamont Landfill access road would occur on vacant lands adjacent to the proposed reservoir; potential impacts to land use would be minimal. Potential traffic impacts are addressed in **Section 3.8, Traffic and Circulation**. Implementation of the mitigation measures outlined in that section would result in a less than significant impact.

Canal Improvements

The proposed extensions would be modifications of existing facilities and pose no changes in land use or potential conflicts with land use or planning codes. The extension of embankments and linings of the Dyer, Livermore, and Alameda Canals would result in no impact to existing or planned land use and no mitigation is required.

Canal Overcrossings

The proposed extensions would be modifications of existing facilities and pose no changes in land use or potential conflicts with land use or planning codes. The raising of the over-cross structures and pipelines along of the Dyer, Livermore, and Alameda Canals would result in no impact to existing or planned land use and no mitigation is required.

Canal Check Structures and Siphons

The existing check and siphon structures within the canals would be modified, and second siphon barrels would also be constructed beneath creeks and roadways. The additional siphon barrels would be installed using open trench methods. Construction operations could temporarily disrupt cattle grazing in some areas during the installation of the check and siphon facilities. The

potential temporary disruption of grazing would be represent a less than significant impact as it would be a short-term event and ample alternate grazing is available nearby.

Patterson Reservoir

The Proposed Project includes raising the existing dam crest approximately 1.5 feet in order to accommodate the increased storage capacity planned for the reservoir. This would also involve placing embankment material on the exterior embankment of the existing dam. Improvements would not alter existing land use or conflict with land use regulations. There are no impacts and no mitigation is required.

Mitigation Measures

Measure 3.4-2a: DWR shall negotiate with wind turbine operators to provide replacement compensation for the loss of one ~~two~~ turbines along the Stage 3 Brushy Creek Pipeline. This negotiation shall occur as part of permanent right-of-way acquisition for the pipeline route.

Measure 3.4-2b: DWR shall negotiate with WMI to ensure that easement acquisition does not preclude WMI from meeting its mitigation obligation as identified in C-5512 and subsequent regulatory permits. This may include identification of appropriate lands to offset open space acreage permanently removed from conservation, estimated at 27 acres.

Impact Significance After Mitigation: Less than significant.

Impact 3.4-3: Project construction could result in short-term and long-term disturbance of recreational facility uses. Less than Significant with Mitigation.

Regional and local facilities located in the direct vicinity of proposed recreational facilities are summarized in **Table 3.4-2** and **Table 3.4-3**. Other than the location of the SBPP within the Bethany Reservoir State Recreation Area, proposed facilities do not intersect any current recreational facilities. **Table 3.4-3** includes facilities that have been identified by the *East Bay Regional Park District 1997 Master Plan* and the *Livermore Area Recreation and Park District 1992 Regional Trail Plan,* and do not have firm implementation dates. These facilities are not currently in recreational use and may or may not be open for public use by the time project construction is underway. Implementation of the Proposed Project wouldnot preclude development of the proposed recreational facilities identified in Table 3.4-3.

An informal agreement that permits limited access to Brushy Peak via private property at the end of Dyer Road, has been maintained between LARPD and the Walker family since 1994. The informal agreement provides supervised public access to Brushy Peak as part of LARPD's interpretive tours of the site. (EBRPD, 2002).

Construction activities would be limited to construction easements along the SBA Project Corridor, and would not affect recreational facilities. DWR would notify recreational agencies of construction scheduling and would provide signage as appropriate at proposed construction areas.

Therefore, potential impacts would be less than significant. Direct locational conflicts potentially arising between proposed and existing recreational facilities are limited, and are discussed below by facility.

South Bay Pumping Plant

The SBPP is located within the Bethany Reservoir State Recreational Area. Two day use recreational facilities and a bike path have been developed on the eastern shore of the reservoir, and no recreational improvements or access exists to the western shore of the reservoir. No recreational facilities are located within 2,500 feet of the SBPP. Construction of the proposed SBPP improvements would be located immediately adjacent to the existing pumping plant structure, and would not affect current or proposed recreational facilities. Therefore, no impacts to recreational facilities would occur. Please refer to **Section 3.11, Visual Resources**, for a discussion of potential visual impacts to recreational facilities.

Stage 3 Brushy Creek Pipeline

The EBRPD Master Plan identifies a proposed regional trail along the SBA Project Corridor from Del Valle Reservoir to Bethany Reservoir, with connections to the Brushy Peak Preserve. This trail extends along the alignment of the Stage 3 Brushy Creek Pipeline. Other than identification in the EBRPD Master Plan, there is currently no easement or agreement between DWR, EBRPD, or individual property owners for development of the trail. Lands along the Brushy Creek Pipeline corridor are under private ownership, and DWR would be acquiring an additional 30-foot wide permanent easement parallel to the existing easement. In the event that future trails are developed for implementation along the Brushy Creek Pipeline corridor, installation of the Stage 3 Brushy Creek Pipeline would not affect or preclude recreational uses.

Stage 3 Brushy Creek Pipeline construction would occur within view of the Brushy Peak Regional Preserve. Users accessing the preserve from Dyer Road may experience temporary impacts from noise, dust, traffic, and visual intrusion from construction operations at the proposed pipeline. However, given the distance between proposed facilities and the boundaries of the preserve (over 2,000 feet) these impacts are considered less than significant. Construction-related impacts would be reduced to a less than significant level with implementation of **Measure 3.4-3a** and mitigation measures identified in **Sections 3.6, Air Quality, 3.7, Noise**, and **3.11, Visual Resources**.

Dyer Reservoir

Construction of Dyer Reservoir would occur within view of the Brushy Peak Regional Preserve. Users accessing the preserve from Dyer Road may experience temporary impacts from noise, dust, traffic, and visual intrusion from construction operations at the reservoir site. However, given the distance between proposed facilities and the boundaries of the preserve (over 2,000 feet) these impacts are considered less than significant. Construction-related impacts would be reduced to a less than significant level with implementation of **Measure 3.4-3a** and

mitigation measures identified in **Sections 3.6, Air Quality, 3.7, Noise**, and **3.11, Visual Resources**.

Construction of the proposed Dyer Reservoir would occur east of Dyer Canal. Dyer Canal has been identified by EBRPD as a potential alignment for the Brushy Peak to Del Valle Regional Trail. The conceptual trail alignment would run along Dyer Canal, which is located between Dyer Road and the proposed reservoir. The proposed reservoir site would not alter the location of the potential trail alignment or reduce the opportunity to utilize the alignment for recreation. Therefore, no impacts to the proposed trail would occur and no mitigation is required.

Improvements to Canals and the Patterson Reservoir

The SBA project corridor is identified in the EBRPD Master Plan as a potential alignment for the Del Valle to Bethany Regional Trail. As previously noted, EBRPD does not have easement or property rights to the SBA project corridor. The proposed improvements along the Dyer, Livermore, and Alameda Canals and the Patterson Reservoir would be limited to the SBA easement and would not affect existing or future recreational uses. These improvements are located to within the canal embankments and roadways, and would not preclude the future use of the alignment as a recreational corridor. Therefore, no impacts would occur.

Mitigation Measures

Measure 3.4-3a: Implement **Measure 3.4-1a**.

Impact Significance After Mitigation: Less than significant.

Impact 3.4-4: Implementation of the Proposed Project could result in the disturbance of land designated by the Department of Conservation FMMP as Farmland of Statewide Importance, Grazing Land and lands under the Williamson Act contract. Less than Significant with Mitigation.

Agricultural lands along the SBA project corridor are designated by the Department of Conservation FMMP as Farmland of Statewide Importance, Grazing Land, and lands under Williamson Act contract. Construction and operation of specific project components may affect certain land designations and are discussed below.

South Bay Pumping Plant

As stated in Section 3.4.1, the site has been previously disturbed and is no longer used for grazing. Therefore, no impacts to agricultural resources would occur.

Stage 3 Brushy Creek Pipeline

Construction of the Stage 3 Brushy Creek Pipeline would temporarily impact 63 acres of Farmland of Statewide Importance, Grazing Land, and Williamson Act contract land. Following

construction, the land would be available for grazing uses, consistent with current conditions. Therefore, short-term impacts would be considered less than significant.

Construction of the Stage 3 Surge Tower, access vaults, and access road extensions would permanently impact 0.067 acres of Farmland of Statewide Importance, Grazing Land, and Williamson Act contract land. Implementation of **Measure 3.4-4** would reduce this impact to less than significant.

Dyer Reservoir

Construction of the proposed Dyer Reservoir would temporarily impact 45 acres of Grazing Land and Williamson Act contract land. Following construction, the land would be revegetated and available for grazing consistent with current conditions. Therefore, short-term impacts would be considered less than significant.

Construction of the proposed Dyer Reservoir would permanently impact 27 acres of Grazing Land and Williamson Act contract land. Implementation of **Measure 3.4-4** would reduce this impact to less than significant.

Canal Improvements

As stated in Section 3.4.1, construction at Dyer Canal, Livermore Canal, Patterson Reservoir and Alameda Canal would occur within DWR right-of-way that is not used as farmland or included in any Williamson Act contract. Therefore, no impacts to agricultural resources would occur.

Mitigation Measures

Measure 3.4-4: Implement provisions in Article 6 of the Williamson Act (Government Code Sections 51290-51295, as amended by Senate Bill 1534 in 1994) regarding acquisition of contracted land for public use. Specific provisions define procedures that DWR must follow in notifying the Director of the Department of Conservation, conditions under which a public improvement may not be located within an agricultural preserve, and public improvements which are exempt from these conditions.

Impact Significance After Mitigation: Less than significant.

Impact 3.4-5: In the event that a conservation easement is established at Bethany Reservoir for biological resource mitigation, implementation of a conservation easement could have secondary effects to recreational uses associated with limiting potential future recreational uses at Bethany Reservoir within the conservation easement area. Less than Significant with Mitigation.

Lands surrounding Bethany Reservoir and the reservoir itself (totaling 608 acres) are owned in fee title by the Department of Water Resources. The reservoir and existing facilities, and approximately 388 acres of surrounding land under DWR ownership are a designated State Recreational Area (SRA), and DWR has a lease agreement with the California Department of

Parks and Recreation (CDPR) for recreational rights on this land. CDPR has developed limited recreational facilities along the northeastern shore of Bethany Reservoir, including two parking areas equipped with picnic cabanas, portable toilets, a boat launch ramp, and wheelchair accessible ramps for fisherman. Additionally, the California Aqueduct Recreational Trial begins at the access road to the reservoir, and extends along the eastern shoreline of the reservoir. No other recreational facilities are located within the 388 acres of land surrounding the reservoir, and these remaining lands are currently leased for grazing purposes. Planning documents for Bethany Reservoir were prepared in the early 1970's and identified additional recreational facilities (Bethany Reservoir Master Plan, 1973). These facilities have not been developed, and CDPR currently does not have plans to implement identified facilities, or to update facility planning (Gould, 2004).

In the event that lands owned by DWR are used as a conservation easement for biological resources, the 388 acres of grassland surrounding existing Bethany Reservoir recreational facilities could be constrained from intensive recreational development. Existing facilities would not be affected. It is anticipated that mitigation requirements would be on the order of 200 acres, and that any conservation easement be sited to include appropriate setbacks of greater than 500 feet from the eastern reservoir shoreline, due both to DWR Operations and Maintenance requirements for the 3 dams along the eastern shoreline, and the existing access and recreational focus on the eastern shoreline. Due to the availability of acreage surrounding the reservoir (388 acres), establishment of a conservation easement on the order of 200 acres would not preclude future recreational development at Bethany Reservoir. Consistent with CDPR requests, it is anticipated that the conservation easement could be established to allow recreational opportunities for passive daytime recreational uses, such as recreational trail access or guided tours, consistent with the conservation easement objectives. In light of the lack of planned or funded recreational facilities within the SRA, the availability of acreage beyond that anticipated to meet conservation easement needs, and the ability to allow for passive recreational activities within conservation easements, this potential secondary impact is considered less than significant.

Mitigation Measures

Measure 3.4-5a: Establishment of biological resource conservation easements at Bethany Reservoir shall include provisions to allow for passive or guided recreational access, as appropriate within the context of the conservation easement goals. DWR shall coordinate with California Department of Parks and Recreation with respect to establishment of conservation easements at Bethany Reservoir.

Impact Significance After Mitigation: Less than significant.

REFERENCES – Land Use

Alameda County, *East County Area Plan*, Adopted: May, 1994, Corrected: March, 1996, Amended: September, 1996, July, 1998, and November, 2000, Adopted: May 2002.

California Department of Parks and Recreation (CDPR), *Bethany Reservoir Master Plan*, October, 1973.

Department of Conservation, Division of Land Resource Protection, Farmland Mapping and Monitoring Program, http://www.consrv.ca.gov/DLPR/fmmp/index.htm, accessed August 9, 2004.

Department of Conservation, *Soil Candidate Listing for Prime Farmland and Farmland of Statewide Importance for Alameda County*, 1996.

Department of Conservation, *Alameda County Important Farmland Map*, July 1986, Released February 1988.

East Bay Regional Park District (EBRPD), *Master Plan*, 1997.

East Bay Regional Park District (EBRPD), *Brushy Peak Regional Preserve Land Use Plan*, June, 2002.

Gould, Dave, California Department of Parks and Recreation, personal communication, 2004.

Lewis, Ken, District Manager, Waste Management, Inc., personal communication, June 7, 2004.

Livermore, City of, *Draft General Plan 2003-2025*, Originally adopted: February, 1976.

U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS), *Soil Survey of the Alameda Area, California*, 1966.

3.5 CULTURAL RESOURCES

3.5.1 SETTING

REGIONAL SETTING

The project area lies within the region occupied at the time of historic contact by the Ohlone or Costanoan group of Native Americans. On the basis of linguistic evidence, it has been suggested that the ancestors of the Ohlone arrived in the San Francisco Bay area around 500 A.D., having moved south and west from the Sacramento-San Joaquin Delta region.

The arrival of the Spanish in the San Francisco Bay area in 1775 led to a rapid and major reduction in native California populations. Diseases, declining birth rates, and the effects of the mission system served to eradicate the aboriginal ways of life (which are currently experiencing resurgence among Ohlone descendents).

EXISTING ENVIRONMENT

William Self Associates, Inc. implemented a complete record search, archaeological field survey, and impact assessment of the South Bay Aqueduct (SBA) project corridor from the South Bay Pumping Plant (SBPP) to the terminus of Alameda Canal in Alameda County. The information contained in this cultural resources analysis is based on the results of the *Cultural Resource Assessment of the South Bay Aqueduct and Enlargement Project, Alameda County, California* (William Self Associates, Inc., 2004).

A complete records search of the SBA project corridor was requested from the California Historical Resources Information System Northwest Information Center at Sonoma State University, Rohnert Park, California, and was completed on January 29, 2004 (File No. 03-527). The search identified information on previous archaeological surveys and recorded sites within a ¼-mile radius of the project corridor and included a review of the following:

- National Register of Historic Places, the California Register of Historical Resources;
- California Inventory of Historic Resources;
- California Historical Landmarks;
- California Points of Historical Interest listing;
- Historic Property Directory (Office of Historic Preservation current computer list);
- Survey of Surveys;
- GLO Plats; and
- Other pertinent historic data.

Previous Surveys

Information on previous archaeological surveys and recorded sites within ¼-mile along either side of the aqueduct centerline was gathered and organized by USGS 7.5' series topographic

quadrangles. A total of 43 previous archaeological surveys have been conducted within or adjacent to the project corridor. As a result of the surveys, the record search indicates that there are eight recorded sites (P-01-1772, P-01-1770, P-01-10629, CA-ALA-437, CA-ALA-452H, CA-ALA-525H, and P-01-2128) within ¼-mile of the project corridor.

Native American Consultation

The Native American Heritage Commission was contacted by letter on January 27, 2004 to request information on sacred lands and a contact list for local tribal representatives or most likely descendents. A response was received from the Native American Heritage Commission on February 5, 2004, stating: "A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate SBA project corridor." The letter also provided a list of Alameda County Native American contacts.

Survey Method

A mixed strategy of pedestrian and driving (windshield) surveys were employed for the archaeological reconnaissance of the project corridor from January 28, through March 2, 2004. The pedestrian survey was conducted by walking 15-meter transects designed to cover the entire Areas of Potential Effect (APE) boundary. The ground surface was examined for the presence of features and artifacts indicative of buried prehistoric or historic resources. The survey also included verification of known resources and their proximity to the project alignment. Summary descriptions of the survey results are provided below according to project component.

South Bay Pumping Plant

The proposed SBPP expansion area was surveyed on February 3, 2004. No historic or prehistoric cultural resources were observed within the proposed pumping plant expansion areas. This area is projected to have a low potential for buried cultural resources because the hillsides north and west of the SBPP are moderately steep, the soils have been previously disturbed from the existing SBPP, and no cultural items were observed during the survey.

Stage 3 Brushy Creek Pipeline

The APE for the proposed Stage 3 Brushy Creek Pipeline is a 100-meter wide corridor centered on the proposed location of the new pipe. The survey of the proposed Brushy Creek Pipeline APE resulted in the discovery of two previously unidentified historic structures (Brushy Creek Ranch and Brushy Creek Corral). Brushy Creek Ranch is located north of the proposed pipeline alignment and construction corridor, and northeast of Brushy Creek Corral. The proposed pipeline alignment goes through the Brushy Creek Corral area. Additionally, the Brushy Creek stream terrace was identified as an Archaeological High Probability Area. One previously recorded prehistoric site was field checked (CA-ALA-437), and is located more than 600 feet north of the proposed pipeline alignment.

Dyer Reservoir

The proposed Dyer Reservoir site was surveyed on January 28, 2004. Though the ground surface offered relatively good visibility, no prehistoric or historic artifacts or features were observed in the proposed Dyer Reservoir survey area.

Dyer Canal

The Dyer Canal project alignment was surveyed on March 2, 2004. A timber farm bridge located at milepost (MP) 4.55 was identified during the survey. The bridge is essentially identical to a farm bridge previously recorded by William Self Associates, Inc. on the Livermore Canal in 2003 (Livermore Valley Canal Bridge, P-01-010629). The Dyer Canal MP 4.55 Bridge was constructed in the same manner as the Livermore Valley Canal Bridge, which was constructed around 1960, prior to the completion of the SBA in 1969. The Dyer Canal MP 4.55 Bridge is not a significant historical structure.

Livermore Canal

The survey of the Livermore Canal alignment was conducted on March 2, 2004 and resulted in the identification of two farm bridges over Livermore Canal in addition to the previously discussed Livermore Valley Canal Bridge (P-01-010629). The first bridge is identical to the Livermore Valley Canal Bridge and the second bridge appears to be recently constructed. All three Livermore Canal bridges are not significant historic structures.

Patterson Reservoir

Modifications to Patterson reservoir will occur in soil that has already been disturbed to facilitate the construction of the SBA system. Patterson Reservoir is not an historic structure.

Alameda Canal

The survey of the Alameda Canal alignment was conducted on March 2, 2004 and resulted in the identification of five farm bridges. In addition, the 200 foot-wide corridors around the Arroyo Seco and Arroyo Mucho drainage crossings are locations of high archaeological probability. The ground surface at the Arroyo Seco crossing has been heavily disturbed from cattle ranching and the construction of the original pipeline crossing. The Arroyo Mocho location has also been heavily disturbed by previous pipeline construction and cattle operations. No historic or prehistoric cultural resources were observed within either of the surveyed arroyos.

REGULATORY FRAMEWORK

State of California

The Proposed Project is being evaluated under the California Environmental Quality Act (CEQA) by Department of Water Resources (DWR) as the designated Lead Agency. The following State public resource codes and CEQA regulations apply:

- CEQA: Public Resources Code Sections 5020.1, 5024.1, 21083.2, 21084.1, *et seq.*; requires analysis of potential environmental impacts of proposed projects and application of feasible mitigation measures.

- Title 14, Public Resources Code, Section 5020.1 defines several terms, including the following: (f) "DPR Form 523" means the Department of Parks and Recreation Historic Resources Inventory Form; (i) "historical resource" includes, but is not limited to, any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California; (j)"local register of historical resources" means a list of properties officially designated or recognized as historically significant by a local government pursuant to a local ordinance or resolution; (l) "National Register of Historic Places" means the official federal list of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture as authorized by the National Historic Preservation Act of 1966 (Title 16 United States Code Section 470 et seq.); (q) "substantial adverse change" means demolition, destruction, relocation, or alteration such that the significance of an historical resource would be impaired.

- Title 14, Public Resources Code, Section 5024.1 – establishes a California Register of Historic Places; sets forth criteria to determine significance; defines eligible properties; lists nomination procedures.

- Title 14, Public Resources Code, Section 5097.5 – any unauthorized removal or destruction of archaeological, paleontological resources on sites located on public lands is a misdemeanor.

- Title 14, Public Resources Code 5097.98 - prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn; sets penalties.

- Title 14, Public Resources Code, Section 21083.2 – the lead agency determines whether a project may have a significant effect on unique archaeological resources. If a potential for damage to unique archaeological resources can be demonstrated, such resources must be avoided; if they can't be avoided, mitigation measures shall be required; discusses excavation as mitigation; discusses cost of mitigation for several types of projects; sets time frame for excavation; defines "unique and non-unique archaeological resources"; provides for mitigation of unexpected resources; sets limitation for this section.

- Title 14, Public Resources Code, Section 21084.1 – indicates that a project may have a significant effect on the environment if it causes a substantial change in the significance of a historic resource; the section further describes what constitutes a historic resource and a significant historic resource.

- CEQA Guidelines: Section 15064.5 specifically addresses effects on historic and prehistoric archaeological resources, in response to problems that have arisen in the application of CEQA to these resources.

- Title 14, Penal Code, Section 622.5 – anyone who damages an item of archaeological or historic interest is guilty of a misdemeanor.

- CEQA Guidelines: California Code of Regulations, Sections 15000, *et seq.*, Appendix G (j), specifically defines a potentially significant environment effect as occurring when the

Proposed Project will "…disrupt or adversely affect…an archeological site, except as part of a scientific study."

- Public Resources Code, Section 5097.5. Any unauthorized removal of archaeological resources on sites located on public lands is a misdemeanor. As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority or public corporation, or any agency thereof.

Alameda County

East County Area Plan

Policy 136. The County shall identify and preserve significant archaeological and historical resources, including structures and sites which contribute to the heritage of East County.

Policy 137. The County shall require development to be designed to avoid cultural resources or, if avoidance is determined by the County to be infeasible, to include and implement appropriate mitigation measures that offset the impacts.

Implementation Programs: Program 59. The County shall require a background and records check of a project area if the project is located within an extreme or high archaeological sensitivity zone as determined by the County. If there is evidence of an archaeological site within a proposed area, an archaeological survey by qualified professionals shall be required as part of the environmental assessment process. If any archaeological sites are found during construction, all work in the immediate vicinity shall be suspended pending site investigation by a qualified archeology professional. Proposed structures or roads on property that contains archaeological sites should be located in consultation with a professional archaeologist to avoid damaging the sites. The County shall follow the CEQA Guidelines for cultural resource preservation procedures in reviewing development projects located near identified cultural resources. Appropriate measures for preserving an historic structure include renovation or moving it to another location. Proposals to remove historic structures shall be reviewed by qualified professionals.

Project Consistency with Plans and Policies

Policies in all jurisdictions identify the need to avoid and/or preserve cultural and historical resources. Alameda County requires projects be designed to avoid cultural resources, or if avoidance is infeasible, implement appropriate mitigation measures to offset impacts. County policies also require archival records search and archaeological surveys by qualified personnel as part of the environmental assessment process. The project is consistent with plans and policies of county and local jurisdictions through development of the analysis and implementation of the mitigation measures provided in this DEIR.

3.5.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

In accordance with Section 15064.5(b) of the CEQA Guidelines, a significant effect would normally occur if a project would cause a substantial adverse change (destruction, relocation, etc.) in the significance of a historical resource. Historical resources[1] include:

1. A resource listed in the California Register of Historical Resources, or determined to be eligible by the State Historical Resources Commission.

2. A resource included in a local register of historical resources.

3. Any object, building, structure, site, area, record, or manuscript which a lead agency determines to be "historically significant" or significant in the annals of California may be considered a historical resource, provided the lead agency's determination is supported by substantial evidence. Generally, a resource shall be considered to be historically significant if the resource meets the criteria for listing in the California Register of Historical Resources.[2]

When a project would adversely affect an archaeological site, a lead agency shall first determine whether the site is a historical resource, as defined above. If it is determined that the archaeological site is a historical resource, the provisions of Public Resources Code Section 21084.1 (Historical Resources) apply. If an archaeological site does not meet the criteria, but does meet the definition of a "unique archaeological resource" in Public Resources Code Section 21083.2 (Archaeological Resources), the site must be treated in accordance with the provisions of Section 21083.2. Section 21083.2(g) defines a unique archaeological resource as "an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.

2. It has a special and particular quality, such as being the oldest of its type or the best available example of its type.

3. Is directly associated with a scientifically recognized important prehistoric or historic event or person."

[1] The fact that a resource does not meet the definition of "historical resources" does not preclude a lead agency from determining that the resource may be a historical resource.

[2] Resources that meet the criteria for listing in the California Register of Historical Resources include resources that: (a) are associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage; (b) are associated with the lives of persons important in our past; (c) embody the distinctive characteristics of a type, period, region, or method of construction, or represent the work of an important creative individual, or possess high artistic values; or (d) have yielded, or may be likely to yield, information important in prehistory or history.

While Section 21083.2 of the CEQA Guidelines provides criteria for assessing archaeological "uniqueness," CEQA lacks specific criteria for assessing the significance of historic structures that are not archaeological resources (i.e., standing structures). Criteria used for assessing historic significance are these developed and used by the U.S. Department of the Interior for the National Register of Historic Places pursuant to 36CFR Part 800:

- "The quality of significance in American history, archaeology, and culture is present in districts, sites, buildings, structures, and objects 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 the work of a master, or that possess high artistic values, 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."

In addition to the provisions of CEQA and the eligibility criteria of the National Register of Historic Places, there are laws, acts, and regulations specific for the protection of Native American resources. These generally include Native American participation if Native American resources are affected or if human remains are encountered, and consultation with the Native American Heritage Commission.

For this project, an impact on cultural resources would be considered potentially significant if cultural resource features are identified in the project area, and the identified features or sites meet any of the criteria for the National Register of Historic Places or CEQA. A significant impact would result if the project as proposed would result in the degradation or destruction of an important archaeological or historic resource, or if human activity resulting from project development had the potential to disrupt the integrity of an identified resource.

IMPACTS AND MITIGATION MEASURES

Impact 3.5-1: Construction of proposed facilities would have the potential to impact known archaeological resources. Less than Significant with Mitigation.

Ground-disturbing construction activities would have the potential to directly impact cultural resources in the SBA project corridor by disturbing both surface and subsurface soils. These resources could be prehistoric or historic. Disturbance and alteration of the site setting could result in the loss of integrity of cultural deposits, or loss of information regarding the archaeological resource, both of which would be considered significant impacts under CEQA if not mitigated.

Though the archaeological survey was successful in identifying several historic resources, undetected sites and objects may exist in the SBA project corridor, and may be obscured by vegetation or buried by fill or natural sediments. The inadvertent destruction of potentially significant cultural resources by construction operations would be a significant impact.

In the event that resources are discovered, their significance would be determined in relation to the criteria for eligibility to the California Register of Historic Resources. Undetected resources can be discovered during construction. At the time of discovery, they must be evaluated and a determination made as to their significance. If significant resources are discovered during construction, data recovery would be required to gather sufficient information from the site to consider its loss a less-then-significant impact under CEQA.

Eighteen potential cultural resource sites are located within ¼-mile of project components. Seven previously recorded sites were identified by the California Historical Resources Information System Northwest Information Center and eleven historic sites/structures were recorded during the archaeological survey of the SBA project corridor. Detailed evaluation of the significance of the sites and potential impacts is available in the *Cultural Resource Assessment of the South Bay Aqueduct and Enlargement Project, Alameda County, California* (William Self Associates, Inc., 2004). Potential project-related impacts by facility are discussed below.

South Bay Pumping Plant

No known cultural resource sites were identified within a ¼ mile radius of the proposed construction area. Therefore, potential impacts to known cultural resources would be less than significant.

Stage 3 Brushy Creek Pipeline

The following known cultural resources were identified in the vicinity of the Stage 3 Brushy Creek Pipeline:

- CA-ALA-452H. The site is located at least several hundred feet north of the Stage 3 construction corridor. As contractor access would be restricted to the construction corridor, no adverse impacts to this site are anticipated.

- CA-ALA-437 is a prehistoric archaeological site and would be considered significant under criterion ‘D’ (above) of the California Register, pending future subsurface testing. This site is located more than 600 feet north of the construction corridor. As contractor access would be restricted to the construction easement, no adverse impacts to this site are anticipated.

- Brushy Creek Ranch. This historic farm settlement is on the northern edge of the construction corridor for the proposed Stage 3 Brushy Creek Pipeline route. The site does not appear to be significant under criteria ‘A,’ ‘C,’ or ‘D’ (above), however additional archival research would be necessary to investigate historic property ownership related to criterion ‘B’ prior to a final assessment of site significance. In the event that access via the roadway through Brushy Creek Ranch is required, contractor access shall be restricted to

the roadway through appropriate fencing (**Measure 3.5-1a**). Therefore, potential impacts are considered less than significant.

- Brushy Creek Corral. The corral appears to be located directly in the path of the proposed Stage 3 Brushy Creek Pipeline route. The site does not appear to be eligible for significance under criteria 'A' through 'D' (above) and no mitigation is required to offset its removal.

- Brushy Creek Historic Dump. This ranch debris dump is approximately 350 feet from the Stage 3 Brushy Creek Pipeline corridor. The site does not appear to be eligible for significance under criteria 'A' through 'D' (above). No additional treatment is necessary and no mitigation is required.

- Brushy Creek Terrace. Approximately 8,000 feet of the proposed pipeline alignment is adjacent to, or goes through the Brushy Creek stream terrace. Archaeological High Probability Area monitoring will be required along this reach of the pipeline route.

Dyer Reservoir

No known cultural resource sites were identified within a ¼ mile radius of the proposed construction area. Therefore, potential impacts to known cultural resources would be less than significant.

Canal Improvements

Although representative portions of the SBA were recorded in 1994 (P-01-1770 and P-01-1772), the facility is not eligible for the National (or California) Register. Therefore, the proposed modifications to the canals will not adversely affect the facility. Similarly, the bridge structures identified are not significant based on their age (post-1961) and do not qualify for listing on the California Register. Therefore, impacts are considered less than significant, and no mitigation is required to offset their removal.

Mitigation Measures

Measure 3.5-1a: Known prehistoric and historic archaeological sites located within, or just outside of the project APE, should be designated as Environmentally Sensitive Areas. Construction personnel and equipment will be instructed on avoidance of Environmentally Sensitive Areas.

Measure 3.5-1b: All construction personnel shall be trained regarding the recognition of possible buried cultural remains, including prehistoric and historic resources during construction, prior to the initiation of construction or ground-disturbing activities. DWR shall complete training for all construction personnel. Training shall inform all construction personnel of the procedures to be followed upon the discovery of archaeological materials, including Native American burials. The following issues shall be addressed in training or in preparation for construction:

- Any subsurface disturbance shall require the education of construction personnel regarding the potential for inadvertent exposure of buried archaeological deposits.

- DWR shall provide a background briefing for supervisory construction personnel describing the potential for exposing cultural resources, the location of any potential Environmentally Sensitive Areas and anticipated procedures to treat unexpected discoveries.

- Upon discovery of potential buried cultural materials, work in the immediate area of the find shall be halted and a qualified archaeologist notified. Once the find has been identified, the archaeologist will make the necessary plans for treatment of the find(s) and for the evaluation and mitigation of impacts if the finds are found to be significant according to CEQA.

Measure 3.5-1c: DWR shall develop a Cultural Resources Management Plan that includes procedures for the protection and avoidance of sensitive areas and Archaeological High-Probability Areas; evaluation and treatment of the unexpected discovery of cultural resources including Native American burials; detailed reporting requirements by the Project archaeologist; curation of any cultural materials collected during the Project; and requirements that archaeologists and other discipline specialists meet the Professional Qualifications Standards mandated by the California Office of Historic Preservation. Specific protective measures shall be defined in the Cultural Resources Management Plan to reduce the potential adverse impacts on any presently undetected cultural resources to a less-than-significant level.

Measure 3.5-1d: The Cultural Resources Management Plan shall define construction procedures for areas near known/recorded cultural sites. Wherever trenches, access roads, equipment, etc., must be placed or accessed within 100 feet of a recorded, reported, or known archaeological site eligible or potentially eligible for the California Register of Historic Resources, the site will be flagged on the ground as an Environmentally Sensitive Area (without disclosure of the exact nature of the environmental sensitivity). Archaeological monitoring of Project construction will be focused in the immediate vicinity of the designated Environmentally Sensitive Areas.

Measure 3.5-1e: Archaeological monitoring shall be conducted by a qualified archaeologist familiar with the types of historic and prehistoric resources that could be encountered along the transmission line corridor. Monitoring shall occur in all locations specified below or at the discretion of the principle archaeologist. The qualifications of the principle archaeologist shall be approved by DWR. Monitored locations will include the Archaeological High-Probability Areas along Brushy Creek.

Measure 3.5-1f: Should unanticipated finds be uncovered during construction, work in the immediate vicinity must cease until an archaeologist is informed and an assessment of the historic or prehistoric resources is conducted. In the event that Native American human remains or funerary objects are discovered, the provisions of the California Health and Safety Code should be followed. Section 7050.5(b) of the California Health and Safety Code should be implemented in the event that human remains or possible human remains are located.

The County Coroner, upon recognizing the remains as being of Native American origin, is responsible to contact the Native American Heritage Commission within 24 hours. The Commission has various powers and duties to provide for the ultimate disposition of any Native American remains, as does the assigned Most Likely Descendant. Sections 5097.98 and 5097.99 of the Public Resources Code also call for "protection to Native American human burials and skeletal remains from vandalism and inadvertent destruction." A combination of

preconstruction worker training and intermittent construction monitoring by a qualified archaeologist, will achieve compliance with this requirement regarding protection of human remains. Workers will be trained regarding the potential for discovery of cultural or human remains, and both the need for proper and timely reporting of such finds, and the consequences of failure thereof.

Impact Significance After Mitigation: Less than significant.

REFERENCES – Cultural Resources

Alameda County, *East County Area Plan*, Adopted: May, 1994, Corrected: March, 1996, Amended: September, 1996, July, 1998, and November, 2000, Adopted: May 2002.

William Self Associates, Inc., *Cultural Resource Assessment of the South Bay Aqueduct Improvement and Enlargement Project, Alameda County, California*, March 2004.

3.6 AIR QUALITY

3.6.1 SETTING

REGIONAL SETTING

Climate and Meteorology

The primary factors that determine air quality are the locations of air pollutant sources and the amounts of pollutants emitted. Meteorological and topographical conditions, however, also are important. Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. Proposed improvements to the SBA would extend from Bethany reservoir, located just east of the Altamont Foothills, to the Livermore Valley. All proposed facilities are located within Alameda County; the project is within the airshed regulated by the Bay Area Air Quality Management District (BAAQMD). The South Bay Pumping Plant (SBPP) and Brushy Creek Pipeline are located within the Diablo Valley climatological subregion. The remainder of the project is located within the Livermore Valley climatological subregion.

The Diablo Valley is a broad valley, approximately 5 miles wide and 10 miles long. The Coast Range on the west side of these valleys is 1,500 to 2,000 feet high. This is sufficiently high to block much of the marine air from reaching the valleys. During the daytime, there are two weekly predominant flow patterns: upvalley flow, and westerly flow across the lower elevations of the Coast Range. On clear nights, a surface inversion sets up and separates the surface flow from the upper layer flow. When this happens, the terrain channels the flow downvalley toward the Carquinez Straits. This downvalley drainage pattern can be observed all the way to Martinez at the end of the valley (BAAQMD, 1998).

Livermore Valley is a sheltered inland valley. The mountains of the Coast Range on the west side of the Valley are 1,500 to 2,000 feet high, which is high enough to block much of the marine air from reaching the Valley. As such, air pollution potential is high, especially for photochemical pollutants (like ozone) in the summer and fall. High temperatures increase the potential for ozone to accumulate. The valley not only traps locally generated pollutants but can receive ozone and ozone precursors from urbanized areas to the west and south (e.g., San Francisco, Oakland, and San Jose) or from San Joaquin Valley, depending on the wind direction (BAAQMD, 1998).

Plans, Policies, and Standards

Regulation of air pollution is achieved through both national and state ambient air quality standards and emissions limits for individual sources of air pollutants. The federal Clean Air Act requires the U.S. Environmental Protection Agency (U.S. EPA) to identify National Ambient Air Quality Standards (national standards) to protect public health and welfare. National standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, suspended particulate matter $\leq$ 10 microns (PM10), suspended particulate matter $\leq$ 2.5 microns (PM 2.5) and

lead. These pollutants are called "criteria" air pollutants because standards have been established for each of them to meet specific public health and welfare criteria set forth in the federal Clean Air Act. California has adopted more stringent ambient air quality standards for the criteria air pollutants (referred to as State Ambient Air Quality Standards, or state standards) and has adopted air quality standards for some pollutants for which there is no corresponding national standard. **Table 3.6-1** presents both State and National Ambient Air Quality Standards.

Under amendments to the federal Clean Air Act, the U.S. EPA has classified Air Basins, or portions thereof, as either "attainment" or "nonattainment" for each criteria air pollutant, based on whether or not the national standards have been achieved. In 1988, the state legislature passed the California Clean Air Act, which is patterned after the federal Clean Air Act to the extent that it also requires areas to be designated as "attainment" or "nonattainment," but with respect to the state standards rather than the national standards.

The proposed project lies within Alameda County, which is included in the nine-county San Francisco Bay Area Air Basin (Bay Area). The entire Bay Area is designated as "nonattainment" for the state standards for ozone and PM10 (BAAQMD, 2004). Urbanized areas within the Bay Area are "nonattainment" for the national 8-hour-average carbon monoxide standard. The Bay Area is "attainment" or "unclassified" for the other criteria air pollutants.

Regulatory Agencies

The California Air Resources Board (CARB), California's state air quality management agency, regulates mobile emissions sources and oversees the activities of regional/county air districts. The CARB is responsible for establishing emissions standards for on-road motor vehicles sold in California. The BAAQMD is the regional agency empowered to regulate air pollutant emissions from stationary sources in the Bay Area. Both agencies regulate air quality through its permit authority over most types of stationary emission sources and through its planning and review activities.

Permits would not be required for construction and operation of the SBPP expansion, the Stage 3 Brush Creek Pipeline, Dyer Reservoir, or the Canal improvements. BAAQMD's permit authority does not extend to general land use development nor does it extend to operation of on-road motor vehicles (autos, trucks, and buses). However, construction contractors may be required to secure BAAQMD permits for some types of equipment, unless exempt under BAAQMD Regulation 2, Rule 1-105, or for some types of activities, such as aeration of contaminated soils (BAAQMD Regulation 8, Rule 40). Permits could be required for emergency standby generators associated with the for the SBPP expansion. BAAQMD requires permits for four all standby engines, new and existing, larger than 50 horsepower (hp) (except for engines registered under the CARB portable equipment registration program). Additionally, all new diesel engines will be subject to the District's risk management program, which requires emission controls.

TABLE 3.6-1
STATE AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	State[a]	National[b]	Attainment Status[d]
Ozone	1 hour	0.09 ppm[c]	0.12 ppm	N
	8 hour	NA[d]	.08 ppm	U
Carbon Monoxide	1 hour	20 ppm	35 ppm	A
	8 hour	9 ppm	9 ppm	A
Nitrogen Dioxide	1 hour	0.25 ppm	NA	A
	Annual	NA	80 $\mu g/m^3$ [c]	A
Sulfur Dioxide	1 hour	0.25 ppm	NA	A
	24 hour	0.04 ppm	0.14 ppm	A
Particulate Matter (PM2.5)	24 hour	NA	65 $\mu g/m^3$	U
	Annual Arithmetic Mean	12 $\mu g/m^3$	15 $\mu g/m^3$	U
Particulate Matter (PM10)	24 hour	50 $\mu g/m^3$	150 $\mu g/m^3$	N/U
	Annual Arithmetic Mean	20 $\mu g/m^3$	50 $\mu g/m^3$	A
Sulfates	24 hour	25 $\mu g/m^3$	NA	A
Lead	30 day	1.5 $\mu g/m^3$	NA	A
Hydrogen Sulfide	1 hour	0.03 ppm	NA	A
Vinyl Chloride (chloroethene)	24 hour	0.010 ppm	NA	A
Visibility Reducing Particles	8 hour	see note [e]	see note [f]	**NA**

[a] California standards for ozone, carbon monoxide, sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter - PM10, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded.

[b] National standards other than for ozone, particulates and those based on annual averages, are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the 4th highest daily concentrations are 0.08 ppm or less.

[c] ppm = parts per million by volume; $\mu g/m^3$ = micrograms per cubic meter.

[d] A=Attainment; N=Nonattainment; U=Unclassified; NA = Not Applicable.

[e] Statewide VRP Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

[f] USEPA encourages state and tribal communities to participate in regional planning organizations to address visibility.

SOURCE: BAAQMD, 2003. Bay Area Attainment Status as of January 2003.

Existing Air Quality

BAAQMD's regional air quality monitoring network provides information on ambient concentrations of criteria air pollutants. Monitored ambient air pollutant concentrations reflect the number and strength of emissions sources and the influence of topographical and meteorological factors. The closest BAAQMD monitoring station in the SBA project corridor is located on Rincon Avenue in Livermore, which became operational in 2000. Prior to operation of the Rincon Avenue station, the closest monitoring station for the SBA project corridor was located at Old First Street.

Table 3.6-2 presents a five-year summary of air pollutant (concentration) monitoring data collected at these stations. Pollutant concentrations measured at these stations should be generally representative of background air pollutant concentrations in the SBA project corridor.

Carbon Monoxide

Ambient carbon monoxide concentrations are considered a local effect and typically correspond closely to the spatial and temporal distributions of vehicular traffic. Carbon monoxide concentrations are also influenced by wind speed and atmospheric mixing. Under inversion conditions, carbon monoxide concentrations may be distributed more uniformly over an area, ultimately moving away from the emission source (i.e. mobile). When inhaled at high concentrations, carbon monoxide combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood (BAAQMD, 1999). This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical fetuses and people with cardiovascular diseases, chronic lung disease, or anemia.

The data contained in **Table 3.6-2** show the downward trend in carbon monoxide concentrations and indicate that background carbon monoxide concentrations do not approach the state standards, even during stagnant wintertime conditions. However, carbon monoxide concentrations in the vicinity of congested intersections and freeway segments would be expected to be higher than the monitoring data in **Table 3.6-2**. Carbon monoxide concentrations are expected to continue to decline in the Bay Area through 2010 due to existing controls and programs as well as the continued retirement of older, more polluting vehicles from the mix of vehicles on the road network.

Suspended Particulate Matter (PM 2.5 and PM 10)

PM 2.5 consists of particulates 2.5 microns (a micron is one one-millionth of a meter) or less in diameter and PM10 consists of particulates 10 microns or less in diameter, which can be inhaled and cause adverse health effects. Particulates in the atmosphere result from many kinds of dust- and fume-producing industrial and agricultural operations, combustion, and atmospheric photochemical reactions. Some of these operations, such as demolition and construction activities, primarily contribute to increases in local PM concentrations, while others, such as vehicular traffic, affect regional PM concentrations.

TABLE 3.6-2
AIR POLLUTANT SUMMARY FOR THE SBA PROJECT CORRIDOR, 1999-2003

Pollutant	Std.[b]	Concentrations, by Year[a] 1999	2000	2001	2002	2003
Ozone:						
Highest 1-hour-average concentration, ppm[c]	0.09	**0.15**	**0.15**	**0.11**	**0.16**	**0.13**
Number of violations[d]		14	7	9	10	10
Highest 8-hour-average concentration, ppm[c]	0.08	**0.12**	**0.11**	**0.9**	**0.11**	**0.09**
Number of violations		5	2	2	6	5
Carbon Monoxide:						
Highest 1-hour-average concentration, ppm	20	5.2	4.5	5.8	4.8	3.7
Number of violations		0	0	0	0	0
Highest 8-hour-average concentration, ppm	9.0	2.9	2.7	3.2	2.5	1.9
Number of violations		0	0	0	0	0
Suspended Particulate (PM2.5):						
Highest 24-hour-average concentration, $\mu g/m^3$ [c]	65	NA	56	**108**	62	42
Violations/Samples[e]			0/86	2/92	0/96	0/95
Annual Geometric Mean, $\mu g/m^3$	12	**NA**	20.9	21.1	19.4	9
Suspended Particulate (PM10):						
Highest 24-hour-average concentration, $\mu g/m^3$	50	**87**	**71**	**109**	**64**	32
Violations/Samples[e]		3/60	2/62	3/61	2/64	0/61
Annual Geometric Mean, $\mu g/m^3$	20	26	22	25	25	19

[a] Monitoring data for calendar year 1999 was collected from the Old First Street station in Livermore, which closed in 2000. Monitoring data for years 2000 - 2003 collected from Rincon Avenue station in Livermore.
[b] State standard, not to be exceeded.
[c] ppm: parts per million; $\mu g/m^3$: micrograms per cubic meter.
[d] For ozone, "number of violations" refers to the number of days in a given year during which standards were exceeded.
[e] Indicates the number of violations and the number of samples taken in a given year.

NOTE: **Bold** values are in excess of applicable standard. NA = Not Available.

SOURCES: BAAQMD, *Air Quality Data Summaries*, 1999, 2000, 2001, 2002, 2003.

Extended exposure to PM can increase the risk of chronic respiratory disease (BAAQMD, 1999). **Table 3.6-2** indicates that background PM10 concentrations in Livermore have decreased over the past five years, although violations of the state 24-hour-average standard still occur on occasion. PM10 concentrations in the Bay Area are expected to increase in the future due to the predicted overall increase in the number of vehicle-miles traveled and the associated increase in entrained paved road dust.

Sensitive Receptors

In general, some receptors are considered more sensitive than others to air pollutants. The reasons for greater than average sensitivity include pre-existing health problems, proximity to the emissions source, or duration of exposure to air pollutants. Land uses such as schools, hospitals, and convalescent homes are considered to be sensitive to poor air quality, because infants and children, the elderly, and people with health afflictions, especially respiratory ailments, are more susceptible to respiratory infections and other air-quality-related health problems than the general public. Residential areas are also considered to be sensitive to air pollution, because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Such uses are located in the immediate vicinities of portions of the proposed new and existing pipeline alignments.

Sensitive land uses, such as schools, hospitals, and convalescent homes, in the project vicinity are generally limited as the area along the project corridor is primarily undeveloped. Sensitive receptors at the SBPP are limited to recreational uses at Bethany Recreational Area, located approximately 0.5 mile east of the construction area. No sensitive receptors are located along the Brushy Creek Pipeline alignment between the SBPP and Dyer Canal until the final 2,500 feet along the east side of Dyer Canal, which would be located within approximately 2,000 feet of residences located west of Dyer Road. Sensitive receptors are located in the vicinity of the Brushy Creek Pipeline, Dyer Canal and Dyer Reservoir, and include 14 residences located on the western side of Dyer Road, approximately 0.49 mile east of the construction corridor. A limited number of residences (approximately 12) are located within 500 feet of the Livermore and Alameda Canal alignments. (Sensitive uses are identified on the alignment maps found in **Appendix A**.)

3.6.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The California Environmental Quality Act (CEQA) Guidelines indicate that a project may be deemed to have a significant effect on the environment if it would: 1) conflict with or obstruct implementation of the applicable air quality plan, 2) violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation, 3) result in a cumulatively considerable net increase of any criteria pollutant for which the project regions is non-attainment, 4) expose sensitive receptors to substantial pollutant concentrations, or 5) create objectionable odors affecting a substantial number of people (Governor's Office of Planning and Research, 2004).

For construction-phase dust impacts, BAAQMD recommends that significance be based on a consideration of the control measures to be implemented (BAAQMD, 1999). If appropriate mitigation measures are implemented to control respirable particulate matter (PM10) emissions, then the impact would be less than significant. BAAQMD Guidelines contain a list of feasible control measures for construction-related PM10 emissions. The BAAQMD Guidelines also indicate that construction-related emissions of criteria pollutants are accounted for in the district's

emission inventory that is the basis for regional air quality plans; thus, construction-related emissions are not expected to impede attainment or maintenance of ozone or carbon monoxide standards in the Bay Area. Therefore, construction-related emissions of criteria air pollutants are not analyzed further.

BAAQMD Guidelines also include significance criteria for evaluating operational-phase emissions associated with projects. There would be essentially no emissions during the operational phase (i.e., once construction is completed) except for intermittent testing and use of emergency generators. As previously discussed, permits would be required for the emergency generators if greater than 50 hp. Additionally, all new diesel engines will be subject to the District's risk management program. This program allows for three levels of emission control:

1) The project is acceptable if the annual emissions would result in an incremental cancer risk equal to or less than one in a million.

2) The project is acceptable if the engine emits less than 0.15 gm/bhp-hr and the annual emissions would result in an incremental cancer risk equal to or less than ten in a million.

3) The project is acceptable if the engine emits less than 0.15 gm/bhp-hr, followed by a catalyst-based diesel particulate filter, and the annual emissions would result in an incremental cancer risk equal to or less than one hundred in a million.

IMPACTS AND MITIGATION MEAUSRES

Impact 3.6-1: Construction and demolition activities associated with facility construction would generate short-term emissions of criteria pollutants, including suspended and inhalable particulate matter and equipment exhaust emissions. Less than Significant with Mitigation.

Construction of all alternatives would require ground clearing and excavation. The open storage basin would require the largest footprint but may not require as much excavation as the partially buried and below ground alternatives. Regional construction activities would occur during a 23-month period. Project construction would generate fugitive dust[1] (including PM10) and other criteria pollutants, primarily through excavation activities, construction equipment exhaust and haul truck trips, and related construction worker commute trips. This impact would be temporary on a local level, as pipeline construction and canal improvements would proceed at approximately 100 feet per day.

Construction conducted for the project could generate substantial amounts of fugitive dust. Fugitive dust emissions would vary from day to day depending upon the level and type of activity, silt content of the soil, and the prevailing weather. Primary sources of fugitive dust during construction would include excavation, earth movement, grading, and wind erosion from exposed surfaces. Larger-diameter dust particles (i.e., greater than 30 microns) generally fall out of the atmosphere within several hundred feet of construction sites, and represent more of a

[1] "Fugitive" emissions generally refer to those emissions that are released to the atmosphere by means other than through a stack or tailpipe.

soiling nuisance than a health hazard, but the smaller-diameter particles (e.g., PM10) generally remain airborne until removed from the atmosphere by moisture, and are associated with adverse health effects. Construction activities for this project would occur in the immediate vicinity of the pipeline segment or facility site under excavation at a given time. As indicated above, residential uses occur along the proposed alignments; therefore, unmitigated construction dust emissions could result in significant local effects. BAAQMD recommends that significance with respect to construction impacts, be based on inclusion of feasible control measures for PM10, and not on quantification of emissions and comparison to thresholds.

Construction equipment, on-road heavy-duty trucks, and construction-worker commute vehicles would also generate criteria air pollutant emissions. Heavy-duty trucks would be used to transport excavated soil materials from the construction area to disposal or deposition sites established by the contractor. Potentially, the contractor could use excavated materials at another construction site, or dispose of such materials as a demolition waste. In the event that excavated material is found to be contaminated, potential disposal locations could include Altamont landfill, in close vicinity to the project components (see **Section 3.10, Public Services and Utilities**).

Emissions from construction-worker commute trips would be negligible compared to emissions from heavy-duty hauling trucks. Criteria pollutant emissions of reactive organic gases and nitrogen oxides from these emissions sources would incrementally add to regional atmospheric loading of ozone precursors during the 23-month construction period. BAAQMD Guidelines recognize that construction equipment emits ozone precursors, but indicate that such emissions are not expected to impede attainment or maintenance of ozone standards in the Bay Area (BAAQMD, 1999).

Mitigation Measures

Measure 3.6-1: DWR shall require the contractor to prepare and implement a Dust Abatement Program to minimize fugitive dust generation. At a minimum, contractor(s) shall include the following measures as applicable[2]:

BAAQMD Basic Control Measures

- Water all active construction sites at least twice daily, and more often on days when winds exceed 10 to 15 miles per hour (mph).
- Cover all trucks hauling soil, sand, and other loose materials *or* require all trucks to maintain at least 2 feet of freeboard.
- Pave, apply water three times daily, or apply non-toxic chemical soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep daily with water sweepers all paved access roads, parking areas, and staging areas at construction sites.

[2] Control measures for construction emissions of PM10 were selected from BAAQMD's *CEQA Guidelines for Assessing the Air Quality Impact of Projects and Plans.*

- Sweep streets daily with water sweepers if visible soil material is carried onto adjacent public streets.

- Enclose, cover, water twice daily, or apply non-toxic chemical soil binders to exposed stockpiles (dirt, sand, etc.).

- Limit the speed of all construction vehicles to 15 mph while on unpaved roads at the project site.

In addition to the Basic Control Measures, the following measures, as applicable, will be implemented because the construction site is greater than 4 acres in area and is located near sensitive receptors:

- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).

- Enclose, cover, water twice daily or apply (non-toxic) chemical soil stabilizers to exposed stockpiles (dirt, sand, etc.).

- Limit traffic speeds on unpaved roads to 15 mph.

- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.

- Replant vegetation in disturbed areas as quickly as possible.

- Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving a construction site.

- Install wind breaks, or plant trees/vegetative wind breaks at windward side(s) of construction areas.

- When winds (instantaneous gusts) exceed 25 mph, watering will need to occur more frequently.

- Limit the area subject to excavation, grading, and other construction activity at any one time.

- Pave all roadways, driveways, sidewalks, etc. as soon as practical. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.

- Designate a person or persons to monitor the dust control program and order increased watering, as necessary, to prevent transport of dust offsite. The name and telephone number of such persons shall be provided to the BAAQMD prior to the start of construction.

Impact Significance After Mitigation: Less than significant.

Impact 3.6-2: Operation of Proposed Project components would result in operational air emissions from powering of pumps, testing and potential use of emergency generators, and from increased employee trips. Emissions from these sources would not be substantial and would not exceed significance criteria of the BAAQMD. Less than Significant.

Potential emission sources resulting from project implementation and operations include air emissions from powering of pumps at the SBPP and from increased employee trips. Emissions from power generation to supply pumps could occur anywhere in the Western U.S. power grid and emissions from motor vehicles to service the pumps would be regional.

No operational emissions would result from the Stage 3 Brushy Creek Pipeline, Dyer Reservoir, or the canal improvements, which are all construction-related improvements**.**

Expansion of the SBPP would include installation of four additional 45 cubic feet per second pump units with motors rated at 3,500 hp. Electrically driven pumps proposed by the project would not generate local emissions, but could result in distant power-plant emissions within the basin. However, an objective of the project is to enable pumping operations to shift to an off-peak schedule, thereby reducing peak energy demands and resulting emissions. Energy would be supplied by permitted power sources, such as sources permitted by the California Energy Commission's Application for Certification process (CEQA equivalent). The off-peak shift of power demand could result in positive impacts to air quality. Proposed project components, once in-place, would not be labor-intensive to operate. Operation of SBPP, Brushy Creek Pipeline, Dyer Reservoir, and the canals would require one or two additional workers, and would be integrated with DWR's normal maintenance activities along the SBA. Indirect vehicle emissions from worker vehicle trips would not be substantial (less than one pound per day for any pollutant) and would not substantially contribute to project operational emissions. Consequently, project operations would not have a significant impact on regional air quality, and no mitigation is required.

Mitigation Measures

No mitigation measures are required.

Impact 3.6-3: Project operation could result in operational odor emissions. Less than Significant.

The SBPP, Stage 3 Brushy Creek Pipeline, Dyer Reservoir, and canal improvements are construction-related improvements to a regional untreated water canal and pipeline conveyance system, and would not be expected to result in odor emissions. Storage and conveyance of untreated raw water is not a significant odor source.

Periodic maintenance of Dyer Reservoir and Patterson Reservoir would include removal of accumulated organic matter and solids from reservoir sidewalls and bottoms. This would include draining of the reservoir and pumping of residual solids to adjacent land areas. Maintenance

dredging would occur over a period of weeks, once every 5 years. This maintenance activity would have the potential to generate odors associated with disturbance of organic material, and could be perceived as a nuisance to residential land uses located west of the reservoir site. As previously noted, prevailing winds within the Altamont Foothill area are to the east, and the nearest residential receptors are located over 2,000 feet west of the reservoir site. Due to these conditions, and the periodic nature of this maintenance activity (once every 5 years), impacts are considered less than significant.

Mitigation Measures

No mitigation measures are required.

REFERENCES – Air Quality

Bay Area Air Quality Management District (BAAQMD), *BAAQMD CEQA Guidelines, Assessing the Impacts of Projects and Plans*, available online at http://www.baaqmd.gov/pln/ceqa/ceqa_guide.pdf, April 1996, Revised December 1999.

Bay Area Air Quality Management District (BAAQMD), *Particulate Monitoring Matter Network Description for the Bay Area Air Quality Management District Planning. BAAQMD Meteorology and Data Analysis Section Air Monitoring Section Technical Services*. April 10, 1998.

Bay Area Air Quality Management District (BAAQMD), *Air Quality Data Summaries*, 1999, 2000, 2001, 2002, 2003, available online at http://www.baaqmd.gov/pio/aq_summaries/index.asp, accessed May 13, 2004.

Bay Area Air Quality Management District (BAAQMD), *Ambient Air Quality Standards and Attainment Status*, available online at http://www.baaqmd.gov/pln/air_quality/ambient_air_quality.asp, accessed May 22, 2004.

Governor's Office of Planning and Research, *CEQA: California Environmental Quality Act Statutes and Guidelines*, as amended January 1, 2004.

3.7 NOISE AND VIBRATION

3.7.1 SETTING

INTRODUCTION

Noise

Environmental noise usually is measured in A-weighted decibels (dBA).[1] Some representative noise sources and their corresponding noise levels (in dBA) are shown in **Figure 3.7-1**. Environmental noise typically fluctuates over time, and different types of noise descriptors are used to account for this variability. Typical noise descriptors include the energy-equivalent noise level (L_{eq}) and the day-night average noise level (L_{dn}).[2] The L_{dn} is commonly used in establishing noise exposure guidelines for specific land uses. Generally, a 3-dBA increase in ambient noise levels represents the threshold at which most people can detect a change in the noise environment; an increase of 10 dBA is perceived as a doubling of loudness.

Vibration

Vibration is low frequency mechanical energy transmission through air, soil, rock, or water. It is similar to noise in that both are forms of energy that propagate through matter as waves. Vibration is transmitted in noise-like (compression) or ocean-like (transverse) waves through the earth. Like noise, vibrations can be described in terms of amplitude and frequency. Vibration may be described by either its peak amplitude, normally referred to as the peak particle velocity (PPV) in units of inches per second (e.g., 0.5 inches per second or 0.5 PPV), or its root mean square (rms)[3] amplitude. The vibration amplitude can be described in two ways: displacement and velocity. Particle displacement is the distance the soil particles travel from their original location, usually expressed in inches or millimeters. Particle velocity is the speed of the soil particles, usually expressed in inches per second or millimeters per second. Typically, evaluations of building damage potential are based on the PPV expected at the site of a given structure. Evaluation of the human response to vibration, on the other hand, is typically based on the rms amplitude.

Depending upon geologic conditions, controlled detonations, produced by blasting techniques involving explosives, could be employed to fracture rock materials to facilitate their removal during construction, depending upon geologic conditions encountered. The detonations would occur infrequently, usually more than once or

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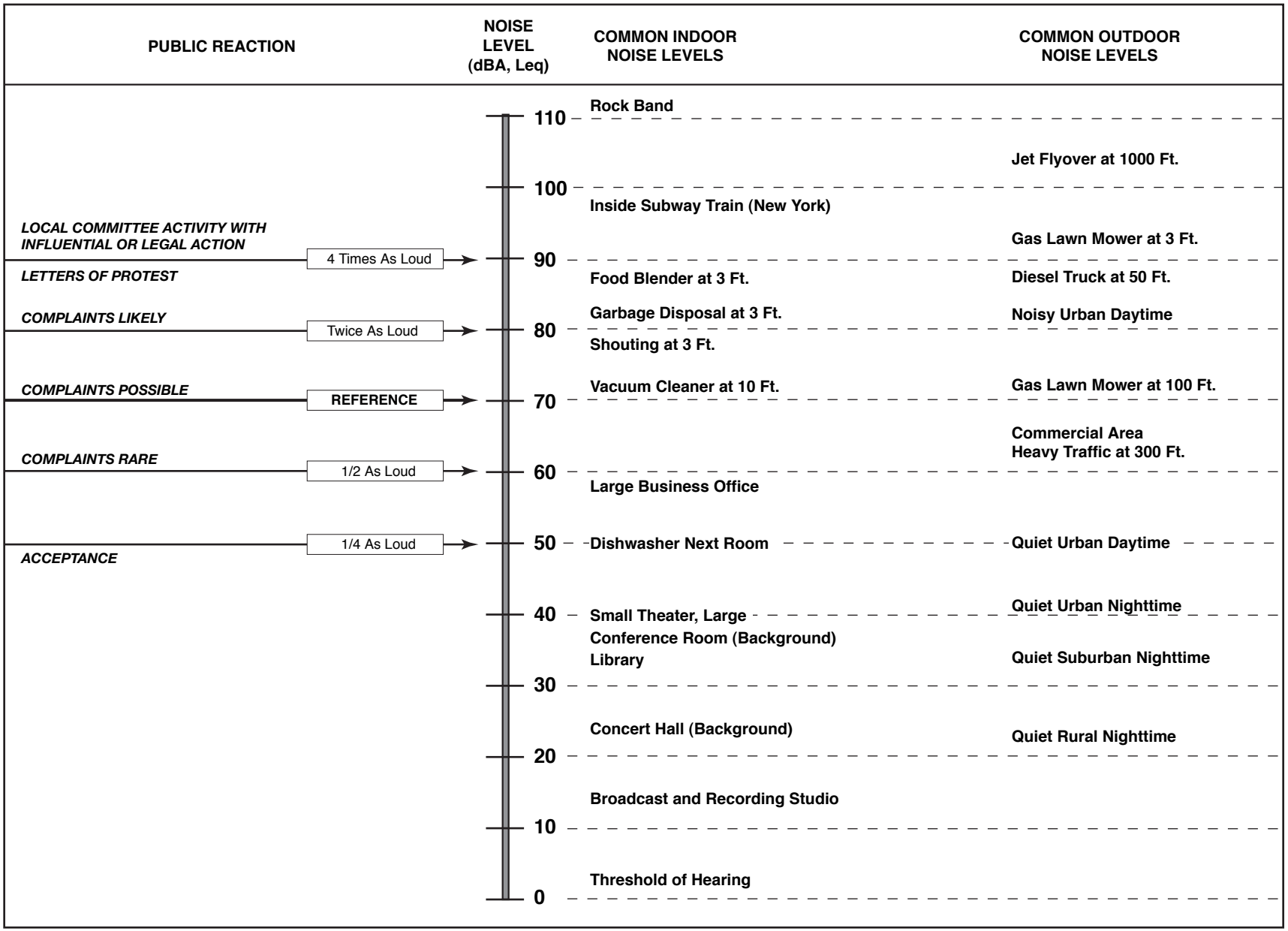
1 A decibel (dB) is a unit of sound energy intensity. Sound waves, traveling outward from a source, exert a sound pressure level (commonly called "sound level") measured in dB. dBA is a decibel corrected for the variation in frequency response of the typical human ear at commonly encountered noise levels.

2 L_{eq}, the energy-equivalent noise level (or "average" noise level), is the equivalent steady-state continuous noise level which, in a stated period of time, contains the same acoustic energy as the time-varying sound level that actually occurs during the same period. L_{dn}, the day-night average noise level, is a weighted 24-hour noise level. With the L_{dn} descriptor, noise levels between 10:00 p.m. and 7:00 a.m. are adjusted upward by 10-dBA to take into account the greater annoyance of nighttime noise as compared to daytime noise.



SOURCE: Caltrans, 1982; Modified by Environmental Science Associates

Figure 3.7-1
Noise Sources and Effects on People

twice per day, after which the fractured rock would be removed by excavators. Controlled detonation is performed by drilling holes approximately two inches in diameter in a specified pattern in the area of excavation. The holes are packed with small amounts of explosive and primer. The explosives are detonated in one hole at a time, using a time delay between successive detonations.

REGIONAL SETTING

The regional noise environment along the South Bay Aqueduct (SBA) is dominated by open space and agricultural lands, with limited segments located near major roadways. The majority of the alignment is between the South Bay Pumping Plant (SBPP) and Altamont Pass Road and is dominated by noise from wind turbine operations. Modern wind turbines generate noise of about 50 dBA at a distance of 300 to 600 feet from the turbine. The noise is primarily a rhythmic "swishing" or "whooshing" sound from the blades cutting through the wind. The effect of wind turbine noise varies depending on distance from the turbine, wind speed and direction, the amount of background noise, and the time of day.

Major transportation sources such as aircraft, railways, and freeways and highways, are generally limited along the alignment. Highways that intersect the SBA are limited to Interstate 580 (I-580), which is located adjacent to and north of the starting point of the Livermore Canal. I-580 is the primary regional noise source and generally has a 60-dBA contour that extends about 2,000 feet from the centerline of the highway (Alameda County, 2002). Union Pacific Railroad is located south of the southern terminus of Dyer Canal (see **Figure A-2, Appendix A**) and approximately 1,000 feet west of portions of the Livermore Canal (see **Figure A-3, Appendix A**). Rail activity and corresponding noise are intermittent along railways. Freeway and highway vehicle traffic represent a much more consistent noise source regionally.

Source of groundborne vibration in the project area include local automobiles and trucks along I-580, Altamont Pass Road, and Dyer Road. Vibration from these sources is not likely perceptible, or might be barely perceptible, to residents along Dyer Road.

LOCAL SETTING

Sensitive Receptors and Existing Noise Environment

Some land uses are considered more sensitive to ambient noise levels than others, due to the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities typically involved. Residential areas, schools, and hospitals generally are more sensitive to noise than are commercial and industrial land uses. Sensitive receptors at the SBPP are limited to recreational uses at Bethany Reservoir, located approximately 2,500 feet east of the construction area. No sensitive receptors are located along the Stage 3 Brushy Creek Pipeline alignment between the SBPP and Dyer Canal until the final 2,500 feet along the east side of the Dyer Canal that would be located within approximately 2,000 feet of residences located west of Dyer Road. Sensitive receptors in the vicinity of Dyer Canal and Dyer Reservoir include approximately 14 residences located on western side of Dyer Road, approximately 2,000 feet east

of the construction corridor. (Sensitive uses are called out on the alignment maps found in **Appendix A**.) Sensitive receptors within 500 feet of the construction corridor include two residences along the Livermore Canal, and about 10 residences along the Alameda Canal.

REGULATORY FRAMEWORK

Noise Regulations, Plans, and Policies

Alameda County

The Noise Element of the East County General Plan identifies noise/land use compatibility guidelines for development in the unincorporated portions of Alameda County and contains policies addressing community noise issues (Alameda County, 2002). For low density residential areas, the Noise Element compatibility guidelines indicate that noise levels up to 60 dBA, L_{dn} are normally acceptable, and noise levels up to 70 dBA, L_{dn} are conditionally acceptable.[4] For water recreation areas, the normally acceptable noise level is up to 75 dBA, L_{dn}.

Alameda County's Noise Ordinance, contained in Alameda County General Code, Title 6 Health & Safety, Chapter 6.60 Noise, establishes maximum exterior noise exposure standards for sensitive land uses, as well as commercial properties (Alameda County, 2003). The ordinance addresses noise using a system of noise criteria not to be exceeded based on the duration of noise over a given hour. **Table 3.7-1** summarizes the exterior noise standards applicable to the project.

Sections 6.60.070(E) and 6.60.070(G) of the noise ordinance exempt construction activities from the noise limits contained in **Table 3.7-1** provided that: 1) such activities are limited to between 7:00 a.m. to 7:00 p.m. on weekdays and between 8:00 a.m. and 5:00 p.m. on Saturdays and Sundays; and 2) equipment, including mufflers, used for construction activities are maintained in the condition for which it was designed or intended.

Vibration Regulations, Plans, and Policies

Alameda County

Section 6.60.050 of the Alameda County General Ordinance Code lists prohibited noise disturbances. Part 8 of the section includes operating or permitting the operation of any device that creates a vibration which is above the vibration perception threshold of an individual; (i) at or beyond the property boundary of the source if on private property or (ii) at 150 feet from the source if on a public space or public right-of-way (Alameda County, 2003).

The Bureau of Mines in Report of Investigations 8507 recommends a particle velocity/ frequency based criteria (Siskind, 1983). At high frequencies (>40Hz) they recommend 2.0 in/s. At low frequencies (<40 Hz), the recommendation is 0.5 or 0.75 in/s depending on the type of structure interior, plaster on lathe or drywall, respectively.

[4] The East County General Plan defines "conditionally acceptable" as: new construction or development [that] should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise

TABLE 3.7-1
ALAMEDA COUNTY NOISE ORDINANCE STANDARDS (EXTERIOR)[a,b,c]

Cumulative Number of Minutes in any one hour time period	Noise Level Standards (dBA) Daytime (7:00 a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)
30	50	45
15	55	50
5	60	55
1	65	60
0	70	65

[a] These standards apply when the receiving land use includes single- or multiple-family residential, school, hospital, church or public library properties. The noise ordinance also has noise standards that apply to commercial properties that are 15 dBA higher for each period of time.

[b] In the event the measured ambient noise level exceeds the applicable noise level standard in any category above, the applicable standard shall be adjusted so as to equal said ambient noise level.

[c] The ordinance also states that the standards identified in this table shall be reduced by 5 dBA for impulsive or simple tone noises, or for noises consisting primarily of speech or music. "Impulsive noise" means a noise characterized by brief excursion of sound pressures whose peak levels are very much greater than the ambient noise level, such as might be produced by the impact of a pile driver, punch press or drop hammer, typically with a duration of one second or less. "Simple tone noise" means a noise characterized by the presence of a predominant frequency or frequencies such as might be produced by a whistle or hum.

SOURCE: Alameda County General Code, 2003, Title 6 Health & Safety, Chapter 6.60 Noise, Section 6.60.040.

3.7.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Noise

Based on the California Environmental Quality Act (CEQA) Guidelines (Governor's Office of Planning and Research, 1996), a project may be deemed to have a significant effect on the environment if it would increase substantially the ambient noise levels for adjoining areas. With regard to increases in A-weighted noise level, it is widely accepted that the average person can barely perceive noise level changes of 3 dBA, while a change in noise levels of 5 dBA is a readily perceptible increase in noise levels and the minimum required increase for a change in community reaction (Caltrans, 1998; U.S. DOT,1990). With temporary noise impacts, identification of "substantial increases" depends upon the duration of the impact, the temporal daily nature of the impact, as well as the absolute change in dBA levels and the time of day in which the noise occurs.

insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice. "Normally acceptable" requires no special noise insulation.

For the purposes of this Environmental Impact Report (EIR), a construction-related noise is considered significant if it is predicted to exceed the noise level standards contained in **Table 3.7-1** at the property line of nearby sensitive receptors during the period from 7:00 a.m. to 7:00 p.m. on weekdays, and 8:00 a.m. to 5:00 p.m. on Saturdays and Sundays.

With respect to project operation, this EIR also considers changes in ambient noise levels from sources directly attributed to the Proposed Project. A sliding scale is commonly used for this purpose, allowing greater increases at lower absolute sound levels than at higher levels. As described in section earlier in this section, a 3 dBA noise increase is barely perceptible to the average healthy ear and a 5 dBA increase is readily perceptible. Thus, the significance criteria for changes in noise from project operations are as follows:

- If the noise level resulting from project operations would exceed the "normally acceptable" range for a given land use where the existing noise level exceeds the normally acceptable range, a 3 dBA or greater increase due to the project is considered significant.
- If the noise level resulting from project operations would exceed the "normally acceptable" range for a given land use where the existing noise level is within the normally acceptable range, a 5 dBA or greater increase due to the project is considered significant.
- If the noise level resulting from project operations would be within the "normally acceptable" range for a given land use, a 10 dBA or greater increase due to the project is considered significant.

The normally acceptable range is up to 60 dBA, L_{dn} for low density residential uses, and up to 75 dBA, L_{dn} for recreation/park uses.

Vibration

With respect to ground-borne vibration, substantial vibrations from construction activities that could damage property would be considered significant. The impact analysis considers two principal vibration-related concerns:

- The exposure of people to vibration and to groundborne noise in terms of sleep disturbance or interruption of normal living activity; and
- The potential for facility damage.

IMPACTS AND MITIGATION MEASURES

Impact 3.7-1: Construction activities would intermittently and temporarily generate noise levels above existing ambient levels in the project vicinity. Less than Significant with Mitigation.

Construction-related noise levels along the SBA construction corridor would fluctuate depending on the particular type, number, and duration of use of various pieces of construction equipment. The effect of construction noise would depend upon how much noise would be generated by the

equipment, the distance between construction activities and the nearest noise-sensitive uses, the existing noise levels at those sensitive uses, and the time of day in which construction activities would occur.

South Bay Pumping Plant

The SBPP construction would take place over a 34-month period, and would include earth moving, dredging, and facility construction. The initial contract of 18 months includes the majority of exterior site work. Completion contract would extend an additional 16 months for internal pump station modifications. The SBPP is located on the western shore of Bethany Reservoir in an open space area with limited noise receptors. The only receptor in the area includes users of a small recreational area consisting of picnic tables and a boat launch on the western shore of Bethany Reservoir east of the SBPP (see **Figure A-1, Appendix A**). This recreational area is managed by the California Department of Parks and Recreation, and is located approximately 2,500 feet east of the proposed construction area. The picnic area is shielded from the pumping plant by local topography, and is open for day time use only.

Table 3.7-2 shows typical noise levels generated by different types of construction equipment. The types of construction equipment that would be used for the proposed plant expansion include an excavator, a backhoe, a scraper and bulldozers during earthmoving activities. SBPP improvements would also require the use of a forklift, a paver, a water truck, a hydraulic impact hammer, and a flatbed and pick up trucks. As shown in **Table 3.7-2**, the noisiest non-impact construction equipment would generate approximately 68 to 96 L_{eq} at 50 feet, assuming no noise mitigation features. The receptors nearest to the SBPP construction area are roughly 2,500 feet to the east and are limited to day time recreational use. At this distance, construction noise would be reduced to 32 to 62 L_{eq}. The impact would be short-term and the recreational users and their exposure to the attenuated construction noise levels would be intermittent. In addition, shielding provided by local topography and the lack of sensitive receptors, construction-related noise impacts associated with the SBPP improvements would be less than significant and no mitigation would be required.

Controlled detonation activities associated with construction in areas of hard rock could also generate noise. The amounts and delay times of any explosive charges used would limit the maximum noise level at the closest receptor to 65 dBA Community Noise Equivalent Level (CNEL). It should be noted that the 65 CNEL criterion could allow noise levels above 65 dBA to occur for short periods of time, such as a short-term detonation noise lasting a few seconds. The receptors nearest to the SBPP construction area are roughly 2,500 feet to the east. Therefore, noise impacts from controlled detonation would be less than significant.

Brushy Creek Pipeline

As discussed in the setting section, no sensitive receptors are located along the Brushy Creek Pipeline alignment, until the pipeline reaches Dyer Canal. The final 2,500 feet along the east side of Dyer Canal would be located within approximately 2,000 feet of residences located west of

TABLE 3.7-2
TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVELS

Equipment	Noise Level at 50 feet (L_{eq})
Backhoes [a]	71–95
Dozers	74–93
Trucks	70–96
Pumps	69–80
Generators	69–82
Compressors	68–95
Hydraulic Impact Hammer	85–95

[a] Backhoes are a common type of excavator.

SOURCE: *Handbook of Noise Control*, Cyril M. Harns, 1979; *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, U.S. Environmental Protection Agency, 1971.

Dyer Road. The anticipated rate of pipeline installation is 100 feet per day; therefore construction along this reach would have an approximate duration of 20 to 30 days, depending upon actual installation rates. Construction of the Brushy Creek Pipeline would use open trench installation techniques. **Table 3.7-2** shows typical noise levels generated by different types of construction equipment. The types of construction equipment that would be used for the Brushy Creek Pipeline installation include bulldozers, backhoes, a forklift, loaders, compactors, a roller, pickups, flatbed trucks, scrapers, a paver, excavators, a trencher, a hydraulic impact hammer, and water trucks. The pipeline would be constructed by up to two construction crews of 20 to 25 employees. As shown in **Table 3.7-2**, the noisiest non-impact construction equipment would generate approximately 68 to 96 L_{eq} at 50 feet, assuming no noise mitigation features. At 2,000 feet, construction noise for pipeline installation would be reduced to 36 to 64 L_{eq}. Noise at these levels could exceed the maximum exterior noise exposure standards contained in **Table 3.7-1**, and be considered significant, unless the construction hours were limited to those outlined in the County's Noise Ordinance. Implementation of **Measure 3.7-1a** to the pipeline installation along Dyer Canal (Sta 172+00 to Sta 197+00) and **Measure 3.7-1b** would reduce impacts to less than significant.

Small detonation charges to assist in the rock fracturing and removal process may be used along the Brushy Creek Pipeline. The amounts and delay times of any explosive charges used would limit the maximum noise level at the closest receptor to 65 dBA (CNEL). It should be noted that the 65 CNEL criterion could allow noise levels above 65 dBA to occur for short periods of time, such as a short-term detonation noise lasting a few seconds. Pipeline construction would occur within approximately 2,000 feet of residences located west of Dyer Road. Nonetheless, **Measure 3.7-1a** would be implemented to ensure that noise impacts from controlled detonations are less than significant.

Dyer Reservoir

Sensitive receptors in the vicinity of Dyer Reservoir include about 14 residences located west of Dyer Road. These sensitive receptors are located approximately 2,000 feet from the reservoir construction site and have a direct line of sight to the proposed reservoir location. During the peak of earthmoving activity, it is estimated that up to 20 pieces of earthmoving equipment would be operating simultaneously to excavate the reservoir, compact the base, install the liner, and establish compacted embankments. **Table 3.7-2** shows typical noise levels generated by different types of construction equipment. The types of construction equipment that would be used for the proposed Dyer Reservoir construction include bulldozers, backhoes, a forklift, a loader, compactors, rollers, pickups, flatbed trucks, scrapers, a paver, excavators, a trencher, a hydraulic impact hammer, and water trucks. As shown in **Table 3.7-2**, the noisiest non-impact construction equipment would generate approximately 68 to 96 L_{eq} at 50 feet, assuming no noise mitigation features. Construction activities would be located approximately 2,000 feet from noise-sensitive receptors. At this distance, construction noise would be reduced to 36 to 64 L_{eq} from single equipment operation. Noise levels would be incrementally higher with the simultaneous operation of multiple pieces of construction equipment. The proposed construction schedule indicates a 20-month construction period. Noise at these levels could exceed the maximum exterior noise exposure standards contained in **Table 3.7-1**, and be considered significant, unless the construction hours were limited to those outlined in the County's Noise Ordinance. Although not currently proposed, the Dyer Reservoir completion contract may require nighttime or weekend finish work (pipe welding, connections, interior finishing, electrical) to meet the project schedule. This work would not involve heavy equipment or types of noise sources examined below. Implementation of **Measures 3.7-1a** and **3.7-1b** would reduce noise impacts to less than significant.

Canal Embankment Improvements

Sensitive receptors within 500 feet of the construction corridor include 2 residences along the Livermore Canal, and about 10 residences along the Alameda Canal that would be within 2,000 feet of proposed construction. The closest residences would be within about 500 feet of the proposed canal improvements. Construction noise related to the canal improvements would be predominantly associated with raising of the canal lining and embankment. Overall, construction is anticipated to require 23 months, with fill installation, cement pouring anticipated to occur at a rate of 100 feet per day, so the source of noise would move on a daily basis and any one residence would be exposed for a limited amount of time. Improvements to Patterson Reservoir would occur within this time period also. **Table 3.7-2** shows typical noise levels generated by different types of construction equipment. The types of construction equipment that would be used for the proposed canal embankment improvements include bulldozers, a loader, compactors, rollers, pickups, a flatbed truck, a hydraulic impact hammer, and water trucks. For siphon installation, new siphons would be installed using open trench methods. At some locations, this may include use of speed shoring or other suitable shoring technique. No pile driving is anticipated. As shown in **Table 3.7-2**, the noisiest non-impact construction equipment would generate approximately 68 to 96 L_{eq} at 50 feet, assuming no noise mitigation features. Construction activities would be located at distances as close as 500 feet from the residential receptors along the canal alignments. At this distance, construction noise would be reduced to 48 to 76 L_{eq},

which could be substantially above existing noise levels. Noise at these levels could exceed the maximum exterior noise exposure standards contained in **Table 3.7-1** and be considered significant unless the construction hours were limited to those outlined in the County's Noise Ordinance. For this reason, this impact is considered potentially significant. Implementation of **Measures 3.7-1a** and **3.7-1b** would reduce impacts to less than significant.

Mitigation Measures

Measure 3.7-1a: For Brushy Creek Pipeline along Dyer Canal (Sta 172+00 to Sta 197+00), Dyer Reservoir, and Canal Improvements, construction contractors shall adhere to the Alameda County General Code, Title 6 Health & Safety, Chapter 6.60 Noise, Sections 6.60.070(E) and 6.60.070(G):

- Construction hours shall be limited to between the hours of 7:00 a.m. and 7:00 p.m. on weekdays and 8:00 a.m. and 5:00 p.m. on Saturdays and Sundays; and

- All equipment used on the project shall be muffled and maintained in good operating condition. All internal combustion engine-driven equipment shall be fitted with intake and exhaust mufflers which are in good condition.

Measure 3.7-1b: Construction contractors shall locate fixed construction equipment such as compressors as far as possible from noise-sensitive receptors during construction.

With mitigation, construction activities would still increase ambient noise levels along the project corridors. However, mitigation would reduce the increase in noise due to construction and would reduce the chance of exposing people to substantial noise levels. Because of the limited and non-permanent duration of the impact, the residual impact would be less than significant.

Impact Significance After Mitigation: Less than significant.

Impact 3.7-2: Construction truck traffic would generate noise levels above existing ambient levels along haul routes used to transport excavated materials. Less than Significant with Mitigation.

Construction-related material haul trips and vehicle traffic to and from construction sites would raise ambient noise levels along construction routes, depending on the number of haul trips made and types of vehicles used. The specific sources for required equipment and construction materials for each project component and the destination(s) for hauling of excavated materials not balanced on-site are not known at this time, so the exact haul routes are unknown. It is expected that construction equipment and haul trips for each of the components would primarily use the following roadways:

- South Bay Pumping Plant – Mountain House Road and Kelso Road

- Brushy Creek Pipeline – Mountain House Road, Kelso Road, Altamont Pass Road, and Dyer Road

- Dyer Reservoir – Dyer Road and Altamont Pass Road
- Canal Embankment Improvements – Dyer Road, Altamont Pass Road, Patterson Road, Greenville Road, Telsa Road and Mines Road

These roadways pass through rural areas of Alameda County where scattered rural residences are located in close proximity. At least portions of each of these roadways have a low traffic volume.

The project component that would generate the greatest amount of truck trips on a daily basis during construction would be the Dyer Reservoir construction that would generate roughly 40 worker round trips and 68 truck round trips on a peak day, followed by the Brushy Creek Pipeline, which would generate on peak days roughly 32 worker round trips and 24 truck round trips per day. The peak number of construction-related trips in a given hour would include 8 truck trips and 6 worker trips. Using the Federal Highway Administration's Noise Prediction Model, noise generated by these trips in an hour would be about 64 dBA at a distance of 50 feet from the center of the roadway, assuming an average speed of 35 miles per hour. Noise levels observed along portions of these roadway segments were on the order of about 49 to 53 dBA. As such, noise from construction equipment would be substantially above existing levels. The addition of construction-related traffic noise would be potentially significant in those areas where the existing background noise is low. By limiting the hours of construction activities, and given the temporary nature of construction-related truck traffic, this impact would be reduced to a less than significant level.

Mitigation Measures

Measure 3.7-2: Implement **Measure 3.7-1a**.

Impact Significance After Mitigation: Less than significant.

Impact 3.7-3: Operational activities would generate noise levels above existing ambient levels in the project vicinity. Less than Significant.

South Bay Pumping Plant

The SBPP would be expanded to include four new pumping units, all of which would be completely enclosed, similar to the existing SBPP facility. The SBPP is located in an open space area on the western shore of Bethany Reservoir, over 2,500 feet from the nearest potential sensitive receptor, the recreational area on the western side of Bethany Reservoir. The picnic area is shielded from the pumping plant by topography in the area.

The existing SBPP is equipped with nine existing pumping units of four different capacities: one rated at 15 cubic feet per second (cfs) with a 1,250-horsepower(hp) motor, three at 30 cfs with 2,500-hp motors, two at 45 cfs with 3,500-hp motors, and three at 45 cfs with 4,000-hp motors. The existing pumping plant building includes nine rooftop vents and nine exhaust louvers (about

10 feet high and 6 feet wide) along on one side of the building. Noise from pumping plant operation includes transformer noise, and noise from pump operation that escapes through the rooftop vents and louvers. A series of noise measurements were taken around the building to characterize noise from pump operation. Noise levels were greatest along the side of the building with the nine louvers. At a distance of about 10 feet from the pumps (measured on the exterior of the building with the pumps on the opposite side of the louvers), noise levels were measured at up to 88 dBA. Not taking into account the shielding afforded by local topography, noise from pump operation would attenuate to 40 dBA at a distance of 2,500 feet, the distance to the nearest recreational area.

On the same day, the recreational area was visited to determine the audibility of the pumping plant. Pumping plant operation was not audible nor was it within the line of sight of the picnic area. At this location, noise from nearby wind turbine operation was the predominant noise source.

As a general rule, the sum of two noise sources of equal loudness is 3 dBA greater than the noise generated by just one of the noise sources (e.g., a noise source of 60 dBA plus another noise source of 60 dBA generates a composite noise level of 63 dBA).

Project implementation would expand the existing SBPP structure to accommodate four additional 45 cfs pump units with motors rated at 4,000 hp. Simultaneous operation of the new pumps with that of the existing SBPP would result in an increase of noise levels of less than 3 dBA. This would be the maximum increase in noise at the recreation area. Again, without taking into account local topography, noise at the recreation area would be 43 dBA with the Proposed Project. This noise level is within the normally acceptable range for recreation uses (up to 75 dBA, L_{dn}) established in the East County Area Plan, and would not result in perceptible increases in noise within the recreational areas on the western bank of Bethany Reservoir. Consequently, operation of the SBPP would not result in a significant noise impact.

Brushy Creek Pipeline

This project element would consist of a pressurized water conveyance pipeline located roughly 10 feet below ground. Because of the lack of air in the pipeline and depth of burial, noise generated by flows would not be audible. Consequently, use of the pipeline would not have a significant noise impact. Consistent with the current facilities, operation of the air release valves would generate noise when air is vented from the pipeline. However, release valves are located below grade within concrete vaults, and noise would be periodic and is not expected to be audible within the context of wind noise and wind turbine noise generated along the pipeline route. Therefore, this would be a less than significant impact.

Dyer Reservoir

Dyer Reservoir would receive inflow from the Brushy Creek Pipeline and would flow by gravity to Dyer Canal; no operational pumping would be required. Reservoir operations, which are limited to water storage, are not anticipated to generate appreciable noise levels. Inspection and

daily maintenance operations would include daily inspection, would not generate appreciable noise on-site. On a 5-year schedule, maintenance of the reservoir would require emptying of the reservoir to Dyer Canal, and subsequent maintenance of the liner and embankments, including pumpage of accumulated sediment and organic material to adjacent land area. It is anticipated that cleaning would occur over a two week period, and that pumpage would be limited to daytime construction hours (7:00 a.m. to 7:00 p.m.). As previously noted, the nearest sensitive receptors are located approximately 2,000 feet west of the reservoir site. Due to the short-term and periodic nature of this maintenance activity, and the distance to sensitive receptors, impacts associated with long-term operations of Dyer Reservoir are less than significant.

Canal Improvements

Implementation of canal improvements would not alter the current noise environment along the SBA. Although the canal facilities would have the capacity to convey additional water, conveyance of flow within the canals would continue to be via gravity. No additional noise generating facilities would be implemented. Therefore, impacts associated with long-term operational noise for the Canal Improvements are less than significant, and no mitigation is required.

Mitigation Measures

No mitigation measures are required.

Impact 3.7-4: Construction activities such as shoring, grading, excavation and controlled detonation could result in vibration impacts which could affect adjacent structures and create human annoyance. Less than Significant with Mitigation.

The Proposed Project could generate groundborne vibration during construction. However, excavation, grading and earth movement operations associated with construction of the Proposed Project would not typically result in significant groundborne vibration effects. While not anticipated, controlled detonation could be used at the following locations: SBPP, Brushy Creek Pipeline, and Dyer Reservoir.

The most common impacts associated with groundborne vibration include annoyance, damage to structures and/or equipment; disruption of sensitive operations or activities; and triggering of land slides. However, the proposed project would cause minimal vibration impacts. In the event that geologic conditions require controlled detonation to break up bedrock for excavation, DWR would require compliance with Bureau of Mines criteria of 2.0 in/s (high frequency >40 Hz) or 0.5 in/s (low frequency <40 Hz), or more stringent criteria as applicable for adjacent DWR facilities (Measure 3.7-4). Compliance with criteria would reduce potential impacts to less than significant.

Alameda County Code (Alameda County, 2003) states that an operation on public property that creates vibration which is above the vibration perception threshold of an individual (0.5 in/s) should occur at a distance of greater than 150 feet. In the case of the proposed project, the closest

residences are located approximately 2,000 feet from the location where detonation would occur. Therefore, vibration impacts would be less than significant.

Mitigation Measures

Measure 3.7-4. In the event that controlled detonation is required in order to effectively remove bedrock, DWR shall require contractors to comply with Bureau of Mines criteria of 2.0 in/s (high frequency >40 Hz) or 0.5 in/s (low frequency <40 Hz), or more stringent criteria as applicable for individual facilities.

Impact Significance After Mitigation: Less than significant.

REFERENCES – Noise

Alameda County, *East County Area Plan*, Adopted: May, 1994, Corrected: March, 1996, Amended: September, 1996, July, 1998, and November, 2000, Adopted: May 2002.

Alameda County General Ordinance Code, Title 6 Health & Safety, Chapter 6.60 Noise, available online at: http://www.acgov.org/admin/admincode/index.htm, 2003.

Siskind, D.E., etal., *Report of Investigations 8507, Structure Response and Damage Produced by Ground Vibration from Surface Mine Blasting*, U.S. Department of the Interior, Bureau of Mines, 1983.

Caltrans, *Laboratory Noise Manual*, 1982.

California Department of Transportation (Caltrans), *Traffic Noise Analysis Protocol for New Highway Construction and Highway Reconstruction Projects*, October 1998.

Federal Transit Administration (FTA), *Transit Noise and Vibration Impact Assessment, Final Report*, April 1995.

Governor's Office of Planning and Research, *CEQA: California Environmental Quality Act Statutes and Guidelines*, December 1996.

Harns, Cyril M., *Handbook of Noise Control*, 1979.

Hendricks, Rudy, Caltrans, *Transportation-Related Earthborne Vibrations, Technical Advisory, Vibration TAV-02-01-R9601*, February 20, 2002.

U.S. Department of Transportation, Urban Mass Transportation Administration, *Guidance Manual for Transportation, Noise and Vibration Impact Assessment*, July 1990.

U.S. Environmental Protection Agency (U.S. EPA), *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, 1971.

3.8 TRAFFIC AND CIRCULATION

3.8.1 SETTING

INTRODUCTION

Construction of project components would have temporary effects on segments of the roadway network in the South Bay Aqueduct (SBA) project corridor by increasing traffic volumes on roads that provide access to the construction work areas and by reducing the available width of some roads during periods of the day when pipeline installations would occur.

Access to the SBA project corridor is provided by regional Interstate 580 and local roadways such as Altamont Pass Road, Dyer Road, Grant Line Road, Mountain House Road, Kelso Road, Greenville Road, Patterson Pass Road, Tesla Road, and Mines Road (see **Figure 3.8-1**) Characteristics of these roadways are described below.

REGIONAL SETTING

Interstate 580 (I-580) is the main throughway in eastern Alameda County and connects to other transportation facilities in the region, including I-680, I-880, I-205, and I-5. Freeway interchanges that provide access to the network of local roads are located at Greenville Road to the west and at Grant Line Road to the east.

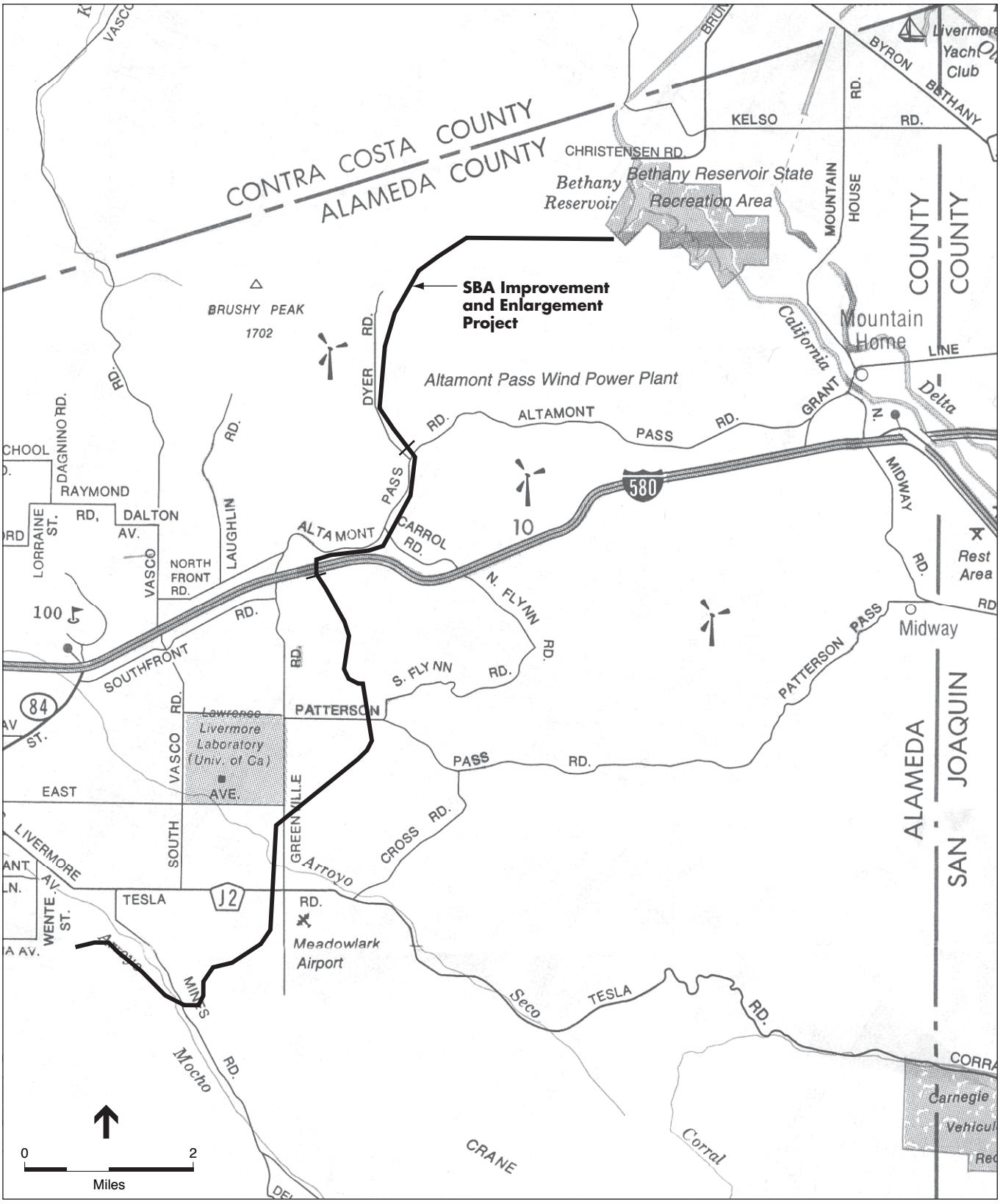
LOCAL SETTING

Local Access Roadways

Altamont Pass Road is a two-lane undivided arterial that parallels I-580, and connects with Greenville Road (and the I-580 interchange, to the west) and with Grant Line Road (and the I-580 interchange, to the east). The posted speed limit is 55 miles per hour (mph), with advisory speeds of 40 and 45 mph along curves. Altamont Pass Road has paved shoulders that vary in width.

Dyer Road is a two-lane local roadway with a pavement width of about 20 feet, except at an undercrossing of a railroad trestle (where the width narrows to about 14 feet) and at the end of the road (where it narrows to about 17 feet). There are unpaved shoulders of minimal width. Dyer Road is not a through road, and provides access for ranches and for portions of the Altamont Pass Wind Power facilities. The unsignalized intersection of Dyer Road and Altamont Pass Road is channelized (i.e., separate lanes for turns between the two roads); available sight distance for drivers turning from Stop-sign-controlled Dyer Road onto Altamont Pass Road is somewhat restricted (about 550 feet) to the left and is unlimited to the right.[1]

[1] Intersection sight distance should be sufficient for the driver on the minor street to cross or turn onto the major street without requiring traffic on the major street to reduce speed. The minimum sight distance for 60 mph is 600 feet.



SOURCE: Rand McNally; Environmental Science Associates

DWR SBA Improvement and Enlargement Project / 202456 ■

Figure 3.8-1
Project Area Roadways

Grant Line Road is a two-lane roadway connecting I-580 (at a full interchange) with the eastern terminus of Altamont Pass Road and with Mountain House Road. There are shoulders of minimal width. The posted speed limit on Grant Line Road is 50 mph.

Mountain House Road is a two-lane roadway between Grant Line Road (which connects to I-580) and Byron-Bethany Road (County Road J4). There are unpaved shoulders of minimal width. The posted speed limit on Mountain House Road is 50 mph, with an advisory speed of 45 mph along curves. Mountain House Road is Stop-sign controlled at its intersection with Grant Line Road, and available sight distance for drivers on Mountain House Road is unlimited.

Kelso Road is a two-lane roadway with a pavement width of about 21 feet, running from Byron-Bethany Road (County Road J4) to its terminus near the Bethany Reservoir State Recreation Area. There are unpaved shoulders of minimal width. Kelso Road is Stop-sign controlled at its intersection with Mountain House Road, and available sight distance for drivers on Kelso Road is unlimited.

Greenville Road is primarily a two-lane roadway with paved shoulders / bike lanes. There are sections with a median two-way left-turn lane, as well as four-lane sections. The posted speed limit on Greenville Road is 45 mph. The intersection of Greenville Road and Tesla Road is controlled with Stop signs on all four approaches.

Patterson Pass Road is a two-lane roadway with unpaved shoulders. The posted speed limit is 50 mph. Patterson Pass Road is Stop-sign controlled at its intersection with Greenville Road, and available sight distance for drivers on Patterson Pass Road is unlimited.

Tesla Road is a two-lane roadway. Some sections have unpaved shoulders, and others have paved shoulders / bike lanes. The posted speed limit is 50 mph. The intersection of Tesla Road and Greenville Road is controlled with Stop signs on all four approaches.

Mines Road is a two-lane roadway with paved shoulders / bike lanes. Some sections have unpaved shoulders, and others have paved shoulders and/or bike lanes. The posted speed limit is 45 mph.

Transit Service

There is no public transit service on roads in the project study area.

REGULATORY FRAMEWORK

County Regulations, Goals, and Policies

The policies that relate to short-term traffic impacts during construction are described below by jurisdiction.

Alameda County

East County Area Plan (1994)

Goal. To reduce East County traffic congestion.

Policy 169. The County shall seek to minimize traffic congestion levels throughout the East County street and highway system.

Policy 170. The County shall seek to minimize the total number of average daily trips throughout East County.

3.8.2 IMPACTS AND MITIGATION MEASURES

APPROACH TO ANALYSIS

ESA's registered traffic engineer evaluated potential traffic and circulation impacts on the basis of the following, augmented by professional traffic engineering judgment:

- Field reconnaissance of characteristics of roads that are proposed to accommodate construction-generated vehicle trips, including the number of travel lanes, traffic control (e.g., posted speed limits, and traffic signals or stop signs at intersections), available sight distance at intersections where construction vehicles would turn, and land uses served by the affected roadways.

- Estimated vehicle trips that project-related activities would generate during each construction phase, on both a daily and peak hourly basis.

Assessment of impacts related to construction of project components involved evaluating the effects of those activities on traffic and circulation resulting from increases in traffic volumes, loss of parking areas, and potential safety effects associated with construction. Construction characteristics, including proposed manpower and equipment, location of construction and rate of construction were used to conservatively determine the potential number of vehicles that could be required for facilities installation.

SIGNIFICANCE CRITERIA

California Environmental Quality Act Guidelines indicate that a project would normally result in an impact to transportation and traffic if it would cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system. Direct impacts of construction of the project components would not be long-term, on-going effects. Occasional post-construction maintenance activities would briefly affect only local segments; these would be a less than significant effect. The duration of potentially significant impacts, related to short-term disruption of traffic flow and increased congestion generated by construction vehicles, would be limited to the period of time needed to complete construction of the project components. Therefore, measures identified in this DEIR are focused on reducing the short-term project construction effects; long-term mitigation measures are not needed.

The project also would be considered to have a significant impact if construction activity would generate parking demand that would exceed the available parking supply, causing traffic safety/operational problems; or if truck trips generated by project construction would cause substantial deterioration of roadway pavements on the designated haul routes.

IMPACTS AND MITIGATION MEASURES

Impact 3.8-1: Construction activities would intermittently and temporarily generate increases in vehicle trips by construction workers and construction vehicles on area roadways and would require single lane closures on major roadways. Less than Significant with Mitigation.

As stated in **Chapter 2, Project Description**, Department of Water Resources (DWR) proposes improvements to, and expansion of, the existing SBA facilities. Construction activity at the South Bay Pumping Plant (SBPP), as well as construction of a new pipeline (and surge tank), a new reservoir, and improvements to existing canals, would generate short-term increases in vehicle trips by construction workers and construction vehicles on area roadways. Construction-generated traffic would be temporary and therefore would not result in any long-term degradation in operating conditions or LOS on any SBA project corridor roadways. The primary off-site impacts from the movement of construction trucks would include short-term and intermittent lessening of roadway capacities due to slower movements and larger turning radii of the trucks compared to passenger vehicles.

The construction scenario characteristics described herein have been developed to allow general assessment of the nature and magnitude of potential construction impacts. The final construction scheduling of specific facility projects would be determined when design plans are finalized and may vary from that presented here. Similarly, the exact construction characteristics, such as excavation quantities or estimated truck trips, may vary somewhat from those presented here.

South Bay Pumping Plant

SBPP is located on the upper end of Bethany Reservoir at the beginning of the South Bay branch of the California Aqueduct. Construction-generated traffic would use I-580, Grant Line Road, Mountain House Road, and Kelso Road. The proposed expansion of the SBPP structure, and other associated construction at that location, would generate vehicle trips by construction workers and by trucks transporting material to and from the site. Construction crews would number approximately 15 to 20 workers, and construction worker trips are not anticipated to exceed 25 round trips (50 one-way trips) per day. Excavation and grading would generate about 120,000 cubic yards (cy) of material, which would be spoiled adjacent to the SBPP site. Truck trips to and from the site would be limited to the initial delivery of equipment to the site, miscellaneous (irregular) deliveries of other construction components (transported on demand to the site throughout the construction period), and removal of equipment at the conclusion of construction. The number of added traffic on the above-cited roadways would not be substantial, and the impact on traffic flow conditions on those roads would be less than significant.

Stage 3 Brushy Creek Pipeline

Traffic-generating construction activities related to the Brushy Creek Pipeline construction (a third set of pipelines and surge tank) would consist of the daily arrival and departure of construction workers to each day's work site along the alignment; trucks hauling equipment and materials to the construction corridor; and the hauling of excavated spoils from, and import of new fill to, each day's work site. The pipeline would be constructed by up to two construction crews, with a total of about 20 to 25 people, and construction worker trips traveling to and from each work site are not anticipated to exceed 32 round trips (64 one-way trips) per day.

The installation of the 78-inch diameter pipeline would use open trench installation techniques. The trench width for the pipeline installation would range from 30 to 45 feet, with a depth of 3 to 10 feet depending on depth of bedrock in the alignment. The pace of work is estimated to average about 100 feet per day. DWR typically uses excavated material as backfill unless that material is unsuitable for that use. For purposes of this analysis, it is assumed that the volume of the pipeline approximately 95 percent of material excavated would be reused as native backfill. The remaining 5 percent would be spread over the construction easement and revegetated. Imported backfill would be delivered to stockpiles near the open trench or in the contractor's staging yard.

Using the above-described trench size and construction rate estimates, assuming about 95 percent backfilling of soil, and an average haul load of 10 cy per truck, it is estimated that an average of 24 truck haul round trips (48 one-way trips) would be generated per work day. There also would be miscellaneous (irregular) deliveries of other construction components, which would be shipped on demand to the construction site throughout the construction period. Construction-generated traffic would access the pipeline alignment using different roads depending on the location of each day's work site. Work sites at the portion of the alignment in proximity to the Bethany Reservoir would be accessed using I-580, Grant Line Road, Mountain House Road and Kelso Road, while I-580, Greenville Road, Altamont Pass Road and Dyer Road would be used to access work sites in proximity to the new Dyer Reservoir. Work sites between the termini could be accessed by either or both of the above-described set of roadways.

The percent increase in traffic volumes caused by project-generated construction traffic on the I-580 freeway would not be substantial (falling within the daily fluctuations of traffic volumes), nor would project traffic significantly disrupt daily traffic flow on that roadway. The primary impacts from construction truck traffic would include a temporary and intermittent reduction of roadway capacities on the two-lane roadways serving the construction sites, due to the slower movements and larger turning radii of the trucks compared to passenger vehicles. Construction-related truck traffic occurring on weekdays during the hours of 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. would coincide with peak-period traffic volumes on area roadways, and therefore, would have the greatest potential to impede traffic flow. However, as described above, project-generated truck trips would take different routes depending on the location of each day's work site, and project traffic would be dispersed throughout the eight-hour work day, lessening the effect on traffic conditions in any one hour. The highest number of hourly one-way truck trips (estimated to be a maximum of one truck every seven minutes) would not cause significant traffic

delays. Therefore, the short-term increase in vehicle trips would not significantly affect LOS and traffic flow on area roadways.

As described in the Setting, above, the unsignalized intersection of Dyer Road and Altamont Pass Road has separate lanes for turns between the two roads, and the available sight distance for drivers turning from Stop-sign-controlled Dyer Road onto Altamont Pass Road is somewhat restricted (about 550 feet) to the left and is unlimited to the right. Intersection sight distance should be sufficient for the driver on the minor street to cross or turn onto the major street without requiring traffic on the major street to reduce speed; the minimum sight distance for 60 mph is 600 feet. The presence of turn lanes would ensure that through traffic on Altamont Pass Road would not be impeded at the intersection. The less-than-desirable available sight distance would have a potentially significant effect on traffic safety related to left turns by construction trucks from Dyer Road onto Altamont Pass Road. Installation of advance warning signs on Altamont Pass Road (e.g., "Slow Trucks Entering Roadway Ahead," with an advisory speed limit of 50 mph) would reduce the potential impact to a less than significant level.

As also described in the Setting, above, the pavement width of two-lane Dyer Road narrows to about 14 feet at an undercrossing of a railroad trestle; the width is generally about 20 feet elsewhere on Dyer Road. The possibility of construction trucks passing under the trestle when other vehicles are present would have a potentially significant effect on traffic safety related to available width. Installation of advance warning signs on Dyer Road (e.g., "Caution – Road Narrows to 14 Feet Ahead") would reduce the potential impact to a less-than-significant level.

LOS standards for roadways that are part of the Alameda County Congestion Management Program (CMP) network are intended to regulate long-term traffic increases from operation of new development, and do not apply to temporary construction projects. As such, the proposed Master Plan improvements would not exceed level-of-service standards established by the Alameda County Congestion Management Agency for designated CMP roadways.

Dyer Reservoir

The proposed Dyer Reservoir would be located east of Dyer Road in an area where an existing road provides access to windmill leases, ranching lands and to the Altamont Landfill (the latter as a secondary access). Construction-generated traffic would use I-580, Altamont Pass Road, and Dyer Road. Construction activities related to the new reservoir would generate vehicle trips by construction workers and by trucks transporting material to and from the site. Construction crews would number approximately 15 to 30 workers, and construction worker trips are not anticipated to exceed 40 round trips (80 one-way trips) per day. Excavation and grading would generate about 790,000 cy of material, the majority of which would be balanced onsite. As much as 60,000 cy of excavated material could be exported for the proposed Canal Improvements, discussed below, and the soil would be transported each day (as needed) to the canal corridor south of I-580. The pace of work for the canal improvements is estimated to average about 100 feet per day. Using an average haul load of 10 cy per truck, this would amount to up to about 68 truck haul round trips (136 one-way trips) generated per work day. There also would be

miscellaneous (irregular) deliveries of other construction components, which would be shipped on demand to the construction site throughout the construction period.

The percent increase in traffic volumes caused by project-generated construction traffic on the I-580 freeway would not be substantial (falling within the daily fluctuations of traffic volumes), nor would project traffic significantly disrupt daily traffic flow on that roadway. The primary impacts from construction truck traffic would include a temporary and intermittent reduction of roadway capacities on the two-lane roadways serving the construction sites, due to the slower movements and larger turning radii of the trucks compared to passenger vehicles. Construction-related truck traffic occurring on weekdays during the hours of 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. would coincide with peak-period traffic volumes on area roadways, and therefore, would have the greatest potential to impede traffic flow. However, project-generated traffic would be dispersed throughout the eight-hour work day, lessening the effect on traffic conditions in any one hour. The highest number of hourly one-way truck trips (estimated to be a maximum of one truck every three minutes) would not cause significant traffic delays. Therefore, the short-term increase in vehicle trips would not significantly affect LOS and traffic flow on area roadways.

See discussion above, under Brushy Creek Pipeline, of potential significant effects related to (1) available sight distance for drivers turning from Stop-sign-controlled Dyer Road onto Altamont Pass Road, and (2) the narrow pavement width on Dyer Road at an undercrossing of a railroad trestle, as well as identified measures that would reduce the potential impacts to a less-than-significant level.

LOS standards for roadways that are part of the Alameda County CMP network are intended to regulate long-term traffic increases from operation of new development, and do not apply to temporary construction projects. As such, the proposed Master Plan improvements would not exceed level-of-service standards established by the Alameda County Congestion Management Agency for designated CMP roadways.

Canal Improvements

Traffic-generating construction activities related to improvements to the Dyer, Livermore and Alameda Canals (raising embankments and extension of canal lining) would consist of the daily arrival and departure of construction workers to each day's work site along the canals; trucks hauling equipment and materials to the work sites; and the import of new fill to each day's work site. Construction crews would number approximately 10 to 15 workers, and construction worker trips are not anticipated to exceed 20 round trips (40 one-way trips) per day.

The canal embankments would be raised using a combination of excess excavated material from the Dyer Reservoir (described above) and material from borrow site(s) near the affected canal work site. It is estimated that as much as 60,000 cy of material would be transported from the Dyer Reservoir site to the canal's work sites (on an as-needed basis). The pace of work for the canal improvements is estimated to average about 100 feet per day. Using an average haul load of 10 cy per truck, this would amount to up to about 20 truck haul round trips (40 one-way trips)

per work day on Dyer Road, and (as appropriate for the day's work site) Altamont Pass Road, Greenville Road, Patterson Pass Road, Tesla Road and Mines Road. There also would be miscellaneous (irregular) deliveries of other construction components, which would be shipped on demand to the construction site throughout the construction period.

The primary impacts from construction truck traffic would include a temporary and intermittent reduction of roadway capacities on the two-lane roadways serving the construction sites, due to the slower movements and larger turning radii of the trucks compared to passenger vehicles. Construction-related truck traffic occurring on weekdays during the hours of 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. would coincide with peak-period traffic volumes on area roadways, and therefore, would have the greatest potential to impede traffic flow. However, project-generated truck trips would take different routes depending on the location of each day's work site, and project traffic would be dispersed throughout the eight-hour work day, lessening the effect on traffic conditions in any one hour. The highest number of hourly one-way truck trips (estimated to be a maximum of one truck every ten minutes) would not cause significant traffic delays. Therefore, the short-term increase in vehicle trips would not significantly affect LOS and traffic flow on area roadways.

Construction of second siphon barrels crossing Arroyo Mocho and Arroyo Seco would use open trench methods. For crossing of major roadways, single lane closures would be required at the following locations: Patterson Pass Road; Tesla Road; and Mines Road. Alternate one-way traffic flow would be maintained and flagger-controls would be implemented at these crossings, and traffic may be delayed up to ten minutes during construction.

See discussion above, under Brushy Creek Pipeline, of potential significant effects related to (1) available sight distance for drivers turning from Stop-sign-controlled Dyer Road onto Altamont Pass Road, and (2) the narrow pavement width on Dyer Road at an undercrossing of a railroad trestle, as well as identified measures that would reduce the potential impacts to a less-than-significant level.

LOS standards for roadways that are part of the Alameda County CMP network are intended to regulate long-term traffic increases from operation of new development, and do not apply to temporary construction projects. As such, the proposed Master Plan improvements would not exceed level-of-service standards established by the Alameda County Congestion Management Agency for designated CMP roadways.

Mitigation Measures

Measure 3.8-1a: DWR shall obtain the necessary road encroachment permits prior to construction and will comply with the applicable conditions of approval. Road encroachment permits may be necessary on the following roadways: Patterson Pass Road, Tesla Road and Mines Road.

Measure 3.8-1b: DWR will require the contractor to prepare a Traffic Control Plan in accordance with professional engineering standards prior to construction. The Traffic Control Plan could include the following requirements:

- DWR shall post advanced warning of construction activities to allow motorists to select alternative routes in advance.
- DWR shall arrange for a telephone resource to address public questions and complaints during project construction.
- DWR shall comply with roadside safety protocols, so as to reduce the risk of accident.
- For roadways requiring single lane closures, DWR (and the construction contractor) shall maintain alternate one-way traffic flow and utilize flagger-controls.

Measure 3.8-1c: During periods when Dyer Road is used by project construction trucks, DWR shall install warning signs (in compliance with County permit conditions) on Altamont Pass Road in advance of the Dyer Road intersection to alert drivers of slow-moving trucks turning onto Altamont Pass Road.

Measure 3.8-1d: During periods when Dyer Road is used by project construction trucks, DWR shall install warning signs on Dyer Road in advance of the train trestle to alert drivers of narrowed pavement width at the trestle undercrossing.

Impact Significance After Mitigation: Less than significant

Impact 3.8-2: Construction activities would generate a demand for parking spaces for construction worker vehicles. Less than Significant.

South Bay Pumping Plant, Brushy Creek Pipeline, Dyer Reservoir and Canal Improvements

Proposed improvements would create limited new, temporary parking demand for construction workers and construction vehicles as crews move along the SBA project corridor. Assuming each worker drives alone to each day's work location, each crew would require up to about 12 to 30 parking spaces. There is no on-street parking provided on roadways serving the SBA project corridor, but given the locations of those work areas (i.e., generally separated from public roads), construction workers would park in the vicinity of the active work area within the DWR right of way. The traffic control plan, identified in **Measure 3.8-1b**, could require the construction contractor to establish methods for accommodating the construction-generated parking demand. Because the project's parking demand would not affect traffic flow on area roadways, and would not displace any current parking, the impact would be less than significant.

Mitigation Measures

No mitigation measures are required.

Impact 3.8-3: Construction activities would intermittently and temporarily increase potential traffic safety hazards for vehicles, bicyclists and pedestrians on public roadways. Less than Significant with Mitigation.

South Bay Pumping Plant, Brushy Creek Pipeline, Dyer Reservoir and Canal Improvements

Heavy equipment operating adjacent to or within a road right-of-way could increase the risk of accidents. Construction-generated trucks on SBA project corridor roadways would interact with other vehicles. Potential conflicts also could occur between construction traffic and bicyclists and pedestrians.

Mitigation Measures

Measure 3.8-3: DWR or its contractors shall obtain the necessary road encroachment permits prior to construction and will comply with the applicable conditions of approval. As deemed necessary by the governing jurisdiction, the road encroachment permits will require the contractor to prepare a traffic control plan in accordance with professional engineering standards prior to construction (see **Measure 3.8-1b**).

Impact Significance After Mitigation: Less than significant

Impact 3.8-4: Construction activities would increase wear-and-tear on the designated haul routes used by construction vehicles to access the project work sites. Less than Significant with Mitigation.

South Bay Pumping Plant, Brushy Creek Pipeline, Dyer Reservoir and Canal Improvements

The use of big trucks to transport equipment and material to and from the project work sites could affect road conditions on the designated haul routes by increasing the rate of road wear. The degree to which this impact would occur depends on the design (pavement type and thickness) and existing condition of the road. Major arterials and collectors are designed to accommodate a mix of vehicle types, including heavy trucks. The project's impacts are expected to be negligible on those roads. Local streets are generally not built with a pavement thickness that would withstand substantial truck traffic volumes.

Two options are available along the affected routes to determine the before and after construction conditions. The recommended option is provided as **Measure 3.8-4**, below. An alternate option would be to require an independent survey of existing and post-construction pavement conditions to identify affected roadway segments.

Mitigation Measures

Measure 3.8-4: DWR and the affected jurisdiction(s) shall enter into an agreement prior to construction that will detail the pre-construction conditions and the post-construction

requirements of the rehabilitation program. Roads damaged by construction would be repaired to a structural condition equal to that which existed prior to construction activity.

Impact Significance After Mitigation: Less than significant.

REFERENCES – Traffic and Circulation

Alameda County, *East County Area Plan*, Adopted: May, 1994, Corrected: March, 1996, Amended: September, 1996, July, 1998, and November, 2000, Adopted: May 2002.

City of Livermore, *City of Livermore General Plan (2003-2025)*, 2003.

3.9 HAZARDOUS MATERIALS

Materials and waste may be considered hazardous if they are poisonous (toxicity), can be ignited by open flame (ignitability), corrode other materials (corrosivity), or react violently, explode or generate vapors when mixed with water (reactivity). The term "hazardous material" is defined as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment.[1] In some cases, past industrial or commercial uses on a site can result in spills or leaks of hazardous materials and petroleum to the ground, resulting in soil and groundwater contamination. Federal and state laws require that soils having concentrations of contaminants such as lead, gasoline, or industrial solvents that exceed acceptable levels must be handled and disposed as hazardous waste during excavation, transportation, and disposal. The California Code of Regulations (CCR), Title 22, §66261.20-24 contains characteristics that classify a soil as a hazardous waste. The use of hazardous materials and disposal of hazardous wastes are subject to numerous laws and regulations at all levels of government.

3.9.1 SETTING

REGIONAL SETTING

The South Bay Aqueduct (SBA) project corridor extends from the South Bay Pumping Plant (SBPP) at Bethany Reservoir, over the Altamont Hills, and into the Livermore Valley. Land uses along the project corridor north of Interstate 580 (I-580) are primarily open space and rural land uses. Within the Livermore Valley, land uses include rural and urban land uses that involve hazardous materials and other substances that can become a health hazard to humans or the environment if not properly contained and managed. Rural land uses include farming and ranch operations that use petroleum fuels, pesticides, and fertilizers. These uses can include storage of bulk quantities of diesel and gasoline for equipment in aboveground and underground storage tanks that are often unregistered and do not comply with current fuel tank regulations.[2] Farms and ranches can also operate unregulated, private refuse dumps in remote areas. A wide array of potential hazardous materials sources originate from urban land uses and can include soil and groundwater contamination from gasoline service stations, releases from industrial operation that rely on solvents and other caustic and poisonous chemicals, stored chemicals used in research and development, and household cleaning chemicals and pesticides in commercially-available quantities. These rural and urban sources of hazardous materials are present in the existing environment along the SBA project corridor, and if encountered by workers or the general public, can cause exposure that could result in adverse environmental and health effects.

The Altamont Landfill is located approximately 0.5 miles east of the SBA Dyer Canal, and Lawrence Livermore National Laboratory is located approximately 500 feet west of the Alameda Canal. Sources of soil contamination in these areas could include gasoline from leaking above-

1 State of California, Health and Safety Code, Chapter 6.95, Section 25501(o).
2 Underground farm tanks less than 1,000 gallons and aboveground storage tanks are exempt from recent petroleum storage tank regulations.

or below-ground petroleum storage tanks (used for agricultural operations), hazardous or solid wastes from illegally disposed drums, previous onsite uses, or chemicals or other raw hazardous materials from past spills.

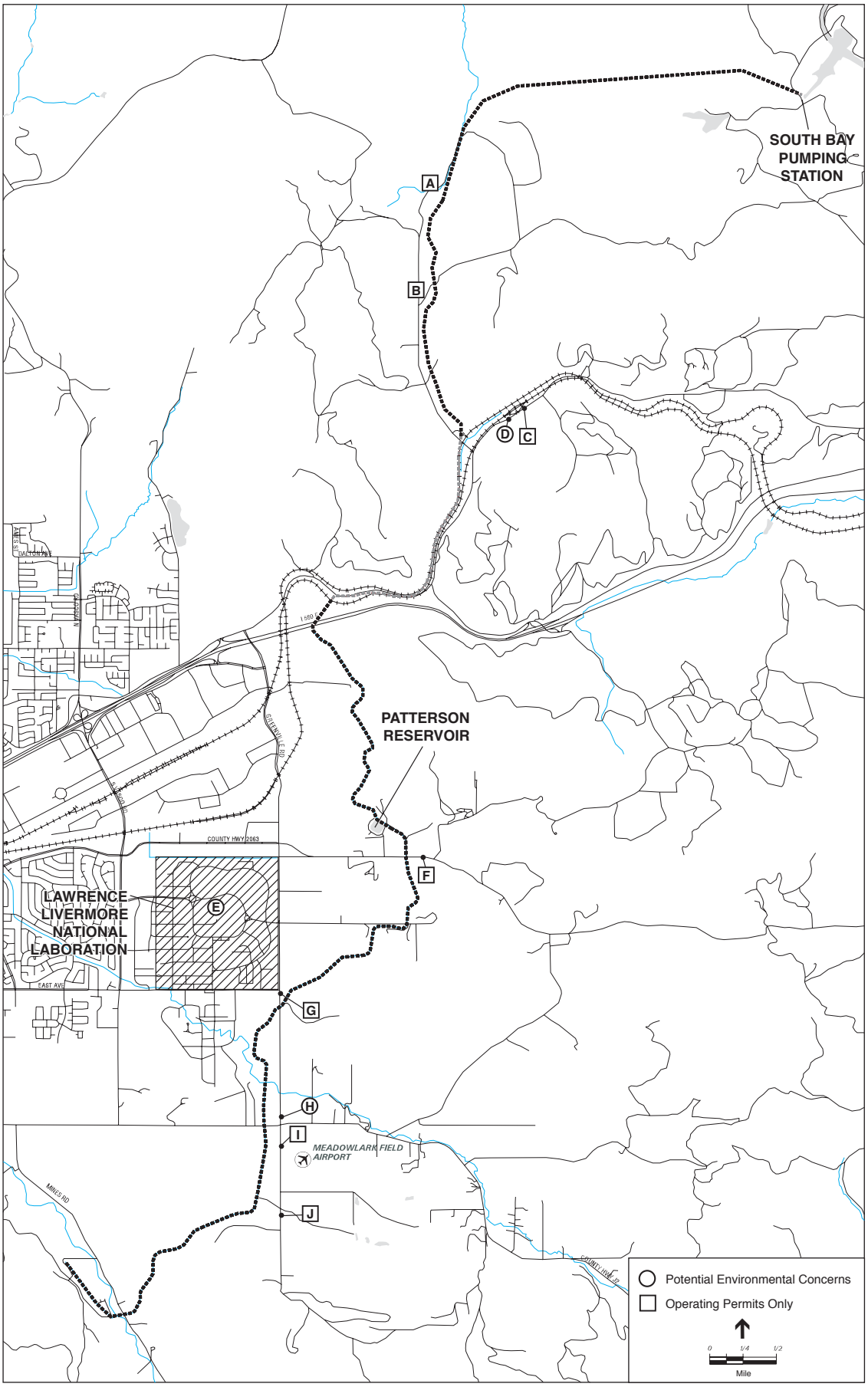
An underground storage tank (UST) system is a tank and underground piping connected to the tank that has at least 10 percent of its combined volume underground. Until the mid-1980s, most USTs were made of single-walled bare steel which can corrode over time resulting in leakage. Faulty installation or maintenance procedures also lead to UST leakage, in addition to potential releases associated with spills. Recently revised UST regulations have significantly reduced the incidents of UST leakage from new UST systems and the consequential soil and groundwater contamination. However, there are some older UST systems that remain in service, and many sites contaminated by leaking USTs that are still under investigation and clean-up. Similarly, spills resulting from poor maintenance or improper installation associated with aboveground storage tanks (ASTs) can result in localized, shallow soil contamination. USTs installed prior to the mid-1980's that have leaked, as well as improperly installed USTs and ASTs that have resulted in fuel spills, can present contamination issues in the region.

Hazardous materials are used regionally by public utility facilities, such as the Zone 7 Patterson Pass Water Treatment Plant, located adjacent to the Patterson Reservoir. These hazardous materials are generally used in conformance with a Hazardous Materials Business Plan (required by the Sate of California) that outlines procedures for the proper use, storage, and disposal of the hazardous materials. In addition, as described in the *Regulatory Framework*, below, federal, state, and local guidelines also control hazardous materials use, storage, and disposal.

Airports present a variety of hazards and hazardous materials use. Three airports are located within the general vicinity of the SBA project corridor: Livermore Municipal Airport, the Contra Costa County Byron Airport, and the Meadowlark Field Airport. The Livermore Municipal Airport is located on Airway Boulevard south of I-580, approximately 7 miles west of the SBA project corridor and the Contra Costa County Byron Airport is located off Byron Hot Springs Road at Holey Road, approximately 20 miles northeast of the SBA project corridor. The Meadowlark Field Airport has a physical address of 4300 Greenville Road and is east of Greenville Road between Tesla Road and the Poppy Ridge Golf Course, approximately ¼ mile east of the Alameda Canal. The Meadowlark Field Airport is a privately-owned, privately-used airport with six aircraft based on the field (AirNav, 2004).

EXISTING ENVIRONMENT

Environmental Data Resources (EDR) conducted a regulatory database search that included a list of sites adjacent to, and in the vicinity of, the SBA project corridor that are listed on agency files for the documented use, storage, or releases of hazardous materials or petroleum products. The database search included several lists generated by federal, state, county, and/or city regulatory agencies for historically contaminated properties, businesses that use, generate, or dispose of hazardous materials or petroleum products in their operation, and lists of active contaminated sites that are currently undergoing monitoring and remediation. **Figure 3.9-1** illustrates the locations of the regulatory listed sites in the SBA project corridor and **Table 3.9-1** provides a



SOURCE: Environmental Data Resources, 2004

Figure 3.9-1
Regulatory Listed Sites within
1/4 Mile of SBA Project Corridor

TABLE 3.9-1
REGULATORY LISTED SITES
WITHIN ¼ MILE OF SBA PROJECT CORRIDOR

Site Name	Address	Regulatory List	Site Identification see Figure 3.9-1	Project Segment
Enxco, Inc.	4595 Dyer Road, Gate 17	HAZNET	A	Brushy Creek / Dyer Canal to Dyer Reservoir; Dyer Reservoir
Greenridge Services	4010 Dyer Road	HAZNET	B	Brushy Creek / Dyer Canal to Dyer Reservoir; Dyer Reservoir
Zond Windsystems Operating Corp.	10619 Altamont Pass Rd	HAZNET	C	Dyer Canal
Altamont Landfill	Altamont Pass Rd	ERNS	D	Dyer Canal
Lawrence Livermore National Laboratory	7000/7261 East Avenue	NPL, Calsites	E	Alameda Canal
Thos. G. Greer	9355 Patterson Pass Rd	HIST UST, CA FID UST	F	Alameda Canal
Livermore County Veterinary Hospital	2110 Greenville Rd	HAZNET	G	Alameda Canal
RC Ready Mix Co.	1227 N. Greenville Rd	FINDS, CA WDS, EMI	H	Alameda Canal
MBI M Bumgarner Inc.	1175 Greenville Rd	RCRIS, FINDS, HAZNET	H	Alameda Canal
Not listed	1129 Greenville Rd	CHMIRS	H	Alameda Canal
Weaver Industries, Inc.	1120 Greenville Rd	FINDS, EMI	H	Alameda Canal
Eugene Caldeira Trust / Gene Caldeira Grading and Paving	1119 Greenville Rd	Cortese/CA FID UST, HIST UST	H	Alameda Canal
Sierra Products Inc.	1113 Greenville Rd	FINDS, EMI	H	Alameda Canal
Livermore Truck and Trailer	1101 Greenville Rd	CA FID UST	H	Alameda Canal
Penske Truck Leasing Co	820 Greenville Rd	HAZNET	I	Alameda Canal
Smith Dennison Construction	800 Greenville Rd	HAZNET	I	Alameda Canal
Former Exxon Station	800 Greenville Rd	Cortese	I	Alameda Canal

TABLE 3.9-1 (Continued)
REGULATORY LISTED SITES
WITHIN ¼ MILE OF SBA PROJECT CORRIDOR

Site Name	Address	Regulatory List	Site Identification see Figure 3.9-1	Project Segment
RGW Construction / Charles Pankow Builders	550 Greenville Rd	UST, RCRIS, FINDS, HAZNET, AST	J	Alameda Canal
Analysystems	510 Greenville Rd	HAZNET	J	Alameda Canal
Bishop Industries, Inc.	500 Greenville Rd	HAZNET	J	Alameda Canal
Bishop Industries, Inc.	500 N. Greenville Rd	FINDS	J	Alameda Canal
CW Roen Construction	495 N. Greenville Rd	HAZNET	J	Alameda Canal

SOURCE: EDR, 2004

summary of sites identified within ¼ mile of the SBA project corridor. A discussion by facility is provided following **Table 3.9-1**. Databases included in the EDR report include the following:

- Aboveground Storage Tank Database (AST) – Contains a list of registered ASTs.
- California Hazardous Material Incident Report System (CHMIRS) – Contains information on reported hazardous material incidents, i.e., accidental releases or spills.
- Cortese – Identifies public drinking water wells with detectable levels of contamination, hazardous substance sites selected for remedial action, sites with known toxic material identified through the abandoned site assessment program, sites with USTs having a reportable release, solid waste disposal facilities from which there is known migration.
- Emissions Inventory Data (EMI) – Toxics and criteria pollutant emissions data collected by the Air Resources Board and local air pollution agencies.
- Facility Index System (FINDS) – Contains both facility information and "pointers" to other sources of information that contain more detail.
- Facility Inventory Database (CA FID) – Contains active and inactive UST locations.
- HAZNET – HAZNET is a California Department of Toxic Substances Control (DTSC) database that records annual hazardous waste shipments, as required by Resource Conservation and Recovery Act (RCRA). All businesses that use and dispose of hazardous materials are entered into the database.

- HIST UST – Contains a list of registered historical USTs.
- Leaking Underground Storage Tank Incident Report (LUST) – Contains an inventory of reported leaking UST incidents.
- National Priority List (NPL) – Also known as Superfund, NPL is a subset of the Comprehensive Environmental Response, Compensation, and Liability Information System and identifies over 1,200 sites for priority cleanup under the Superfund Program. The source of this database is the U.S. Environmental Protection Agency (U.S. EPA).
- Resource Conservation and Recovery Information System (RCRIS) – Includes sites which generate, transport, store, treat, and/or dispose of hazardous waste as defined by the RCRA.
- Solid Waste Facilities / Landfill Sites (SWF/LF) – SWF/LF records contain an inventory of solid waste disposal facilities and landfills in a particular state.
- Underground Storage Tank Database (UST) – Contains a list of registered USTs.
- Waste Management Unit Database System (WMUDS/SWAT) – Used for program tracking and inventory of waste management units.
- CA WDS – Waste Discharge System.

South Bay Pumping Plant

There are no sites within ¼ mile of the SBPP that are listed on regulatory databases reviewed for this EIR analysis.

Brushy Creek Pipeline / Dyer Reservoir

There are two sites listed on the HAZNET database located within ¼ mile of the proposed pipeline near Dyer Canal: enXco Inc., located at 4595 Dyer Road, Gate 17, in Livermore; and Greenridge Services, located at 4010 Dyer Road, in Livermore (see **Table 3.9-1** and **Figure 3.9-1**). Please refer to Dyer Canal for further discussion of these sites.

Canal Improvements

Dyer Canal

There are two sites listed on the HAZNET database within ¼ mile of Dyer Canal: enXco Inc., located at 4595 Dyer Road, Gate 17, in Livermore; and Greenridge Services site, located at 4010 Dyer Road, in Livermore. In addition, there are two additional listed sites in this area: the Zond Windsystems Operating Corp. Site, located at 10619 Altamont Pass Road is listed on the HAZNET database. The Altamont Landfill site, located on Altamont Pass Road is listed on the ERNS database, and is a Class III landfill located approximately 0.5 mile from the SBA project corridor, in a separate subwatershed. According to the EDR report, in 1991, a garbage truck dumped hazardous contents at the Altamont Landfill; the garbage company responsible for the dumping was called to remove the waste and properly dispose of it (EDR, 2004). In 1988, a hole was punched in a waste oil container causing a release to the immediate environment (EDR, 2004). In the 1988 and 1991 hazardous materials cases, Altamont Landfill notified the

appropriate regulatory agencies and complied with regulatory corrective measures. Although the Altamont Landfill is located within ¼ mile of the SBA, the potential for hazardous material releases at the landfill to affect the SBA project corridor is low because most releases would typically affect a localized area and would be contained within the landfill boundaries.

Livermore Canal

There are no sites within ¼ mile of the Livermore Canal that are listed on regulatory databases reviewed for this EIR analysis.

Patterson Reservoir

There are no sites within ¼ mile of the Patterson Reservoir that are listed on regulatory databases reviewed for this EIR analysis.

Alameda Canal

There are six sites listed on regulatory databases (see **Figure 3.9-1** and **Table 3.9-1**) within ¼ mile of the Alameda Canal. The Lawrence Livermore National Laboratory site, located at 7000/7261 East Avenue, is listed on the NPL and Cortese lists. According to the DTSC Cortese database, this site is an active case. The current Remedial Action Implementation Plan schedule identifies milestones for expanding existing and constructing new extraction and treatment facilities through 2006. Treated groundwater is primarily discharged to a recharge basin, located on the Sandia National Laboratories property and to Arroyo Las Positas. The remediation activity has achieved hydraulic control of a volatile organic compound plume and has caused the leading edge of the plume to retreat from offsite areas. Remedial efforts are now focused on source area cleanup (DTSC, 2004). According to the EDR report, this site is an active NPL site (EDR, 2004).

The 1129 Greenville Road site (Site H) is listed on the CHMIRS list. According to the EDR report, in April 2001, as a result of an internal failure of a transformer on the site, mineral oil was released; the release was subsequently contained (EDR, 2004). The EDR report also identified two sites on the Cortese list: the Eugene Caldeira Trust site located at 1119 Greenville Road (Site H) and the Former Exxon Service Station located at 800 Greenville Road (Site I). These two sites are not currently listed on the Cortese list (DTSC, 2004).

The remaining listed sites within ¼ mile of the Alameda Canal are listed on either the HIST UST, CA FID, HAZNET, CA WDS, EMI, UST, RCRIS, FINDS, and/or AST databases. Sites listed on these databases are registered with their respective regulatory agencies; therefore, it is assumed that they are in general compliance with all applicable regulatory laws and requirements.

REGULATORY FRAMEWORK

Table 3.9-2 provides a brief overview of federal and state laws and regulations.

State

Soil Contamination

Soils having concentrations of contaminants higher than certain acceptable levels must be handled and disposed as hazardous waste when excavated. The California Code of Regulations, Title 22, Section 66261.20-24 contains technical descriptions of characteristics that would classify a soil as a hazardous waste.

Hazardous Materials Management

The California Hazardous Materials Release Response Plans and Inventory Law of 1985 (Business Plan Act) requires that businesses handling hazardous materials prepare a business plan, which must include the following:[3]

- Details of the facility and business conducted at the site
- An inventory of hazardous materials that are handled or stored on site
- An emergency response plan
- A safety and emergency response training program for new employees with annual refresher courses

In January 1996, the California Environmental Protection Agency (Cal EPA) adopted regulations implementing a Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program). The program has six elements: hazardous waste generators and hazardous waste on-site treatment; underground storage tanks; ASTs; hazardous materials release response plans and inventories; risk management and prevention programs; and Unified Fire Code hazardous materials management plans and inventories. The plan is implemented at the local level, and the agency responsible for the implementation of the Unified Program is called the Certified Unified Program Agency (CUPA). In Alameda, Alameda County Environmental Health is the designated CUPA.

Hazardous Waste Management and Handling

Under the RCRA, individual states may implement their own hazardous waste programs in lieu of RCRA as long as the state program is at least as stringent as federal RCRA requirements. The U.S. EPA must approve state programs intended to implement federal regulations. In California, Cal EPA and DTSC, a department within Cal EPA, regulate the generation, transportation, treatment, storage, and disposal of hazardous waste. The U.S. EPA approved California's RCRA

[3] "Hazardous Materials Release Response Plans and Inventory Law," California Health and Safety Code, Chapter 6.95.

TABLE 3.9-2
HEALTH AND SAFETY LAWS AND REGULATIONS

Hazardous Materials Management	State and federal laws require detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of, and in the event that such materials are accidentally released, to prevent or to mitigate injury to health or the environment. These laws require hazardous materials users to prepare written plans, such as Hazard Communication Plans, Hazardous Materials Business Plans, and Chemical Hygiene Plans. Laws and regulations require hazardous materials users to store these materials appropriately and to train employees to manage them safely. A number of agencies participate in enforcing hazardous materials management requirements. For the SBA project corridor, Alameda County Environmental Health is the agency most involved.
Hazardous Waste Handling	The California Cal EPA DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous material waste. These laws impose "cradle-to-grave" regulatory systems that require generators of hazardous materials waste to handle it in a manner that protects human health and the environment to the extent possible. The DTSC permits and oversees hazardous materials waste treatment, long-term storage, and disposal facilities.
Hazardous Materials Transportation	The U.S. Department of Transportation (U.S. DOT) regulates the transportation of hazardous materials between states. Within California, the state agencies with primary responsibility for enforcing federal and state regulations, and for responding to transportation emergencies, are the California Highway Patrol (CHP) and the California Department of Transportation (Caltrans). Together, federal and state agencies determine driver-training requirements, load labeling procedures, and container specifications. Although special requirements apply to transporting hazardous materials, requirements for transporting hazardous waste are more stringent, and hazardous waste haulers must be licensed to transport hazardous waste on public roads.
Soil and Groundwater Contamination	The Comprehensive Environmental Response, Compensation, and Liability Act and associated Superfund Amendments provide the U.S. EPA with the authority to identify hazardous sites, to require site remediation, and to recover the costs of site remediation from polluters. California has enacted similar laws intended to supplement the federal program. The DTSC is primarily responsible for implementing California's Superfund Law.
Emergency Response	California has developed an emergency response plan to coordinate emergency services provided by federal, state, and local government and private agencies. Responding to hazardous materials incidents is one part of this plan. The plan is administered by the State Office of Emergency Services (OES), which coordinates the responses of other agencies, including Cal EPA, CHP, the Department of Fish and Game, the San Francisco Bay Regional Water Quality Control Board (RWQCB), and the local fire department. The fire department provides first response capabilities, if needed, for hazardous materials emergencies within the SBA project corridor.

SOURCE: Environmental Science Associates (2004)

program, called the Hazardous Waste Control Law (HWCL), in 1992. DTSC has primary hazardous material regulatory responsibility, but can delegate enforcement responsibilities to local jurisdictions that enter into agreements with DTSC for the generation, transport, and disposal of hazardous materials under the authority of the HWCL.

The hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; prescribe the management of hazardous wastes; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in ordinary landfills. Hazardous waste manifests must be retained by the generator for a minimum of three years. Hazardous waste manifests provide a description of the waste, its intended destination, and regulatory information about the waste. A copy of each manifest must be filed with the state. The generator must match copies of hazardous waste manifests with receipts from treatment, storage, and disposal facilities.

Contaminated soils and other hazardous materials removed from a site during construction or remediation may need to be handled as hazardous waste. In Alameda County, remediation of contaminated sites is performed under the oversight and with the cooperation of Alameda County Environmental Health Environmental Cleanup Oversight and RWQCB.

Hazardous Materials Transportation

The State of California has adopted U.S. DOT regulations for the intrastate movement of hazardous materials; state regulations are contained in 26 CCR. In addition, the State of California regulates the transportation of hazardous waste originating in the state and passing through the state (26 CCR). Both regulatory programs apply in California.

The two state agencies with primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies are the California Highway Patrol (CHP) and Caltrans. The CHP enforces hazardous material and hazardous waste labeling and packing regulations to prevent leakage and spills of material in transit and to provide detailed information to cleanup crews in the event of an accident. Vehicle and equipment inspection, shipment preparation, container identification, and shipping documentation are the responsibility of the CHP, which conducts regular inspections of licensed transporters to assure regulatory compliance. Caltrans has emergency chemical spill identification teams at as many as 72 locations throughout the state that can respond quickly in the event of a spill.

Common carriers are licensed by the CHP, pursuant to California Vehicle Code Section 32000. This section requires the licensing of every motor (common) carrier who transports, for a fee, in excess of 500 pounds of hazardous materials at one time, and every carrier, if not for hire, who carries more than 1,000 pounds of hazardous material of the type requiring placards.

Every hazardous waste package type used by a hazardous materials shipper must undergo tests that imitate some of the possible rigors of travel. Every package is not put through every test. However, most packages must be able to be kept under running water for a time without leaking;

dropped, fully loaded, onto a concrete floor; compressed from both sides for a period of time; subjected to low and high pressure; and frozen and heated alternately.

Hazardous Materials Emergency Response

Pursuant to the Emergency Services Act, California has developed an Emergency Response Plan to coordinate emergency services provided by federal, state, and local governmental agencies and private persons. Response to hazardous materials incidents is one part of this plan. The plan is administered by the state OES. The OES coordinates the responses of other agencies, including the U.S. EPA, CHP, the California Department of Fish and Game, the RWQCBs, the local air pollution control districts (Bay Area Air Quality Management District), and local agencies.

Pursuant to the Business Plan Law, local agencies are required to develop "area plans" to response to releases of hazardous materials and wastes. These emergency response plans depend to a large extent on the Business Plans submitted by people who handle hazardous materials. An area plan must include pre-emergency planning and procedures for emergency response, notification, and coordination of affected governmental agencies and responsible parties, training, and follow up. As described above under *Hazardous Materials Management*, the Alameda County Environmental Health, which is also the designated CUPA, is responsible for implementing the Unified Program which includes provisions for the implementation of hazardous materials release response plans.

California Accidental Release Prevention Program (CalARP) regulations became effective January 1, 1997, replacing the California Risk Management and Prevention Program. CalARP was created to prevent the accidental release of regulated substances. It covers businesses that store or handle certain volumes of regulated substances at their facilities. A list of regulated substances is found in Section 2770.5 of the CalARP regulations. If a business has more than the listed threshold quantity of a substance, an accidental release prevention program must be implemented and a risk management plan may be required. The California OES is responsible for implementing the provisions of CalARP.

Local

Underground Storage Tanks

In Alameda County, remediation of contaminated sites is performed under the oversight of Cal EPA and in cooperation with Alameda County Environmental Health Agency Environmental Cleanup Oversight and the RWQCB. At sites where contamination is suspected or known to occur, the responsible party is required to perform a site investigation and prepare remediation plans, if necessary. For typical development projects, actual site remediation is done either before or during the construction phase of the project. The Alameda County Environmental Health Agency and the local fire department has regulatory authority for removal of USTs.

Alameda County General Plan – East County Area Plan

The East County Area Plan addresses hazards including wildland fires and airport hazards. The purpose of the East County Area Plan is "to present a clear statement of the County's intent concerning future development and resource conservation within East County." The Plan contains the following pertinent policies:

- Policy 134. The County shall not approve new development in areas with potential natural hazards (flooding, geologic, wildland fire, or other environmental hazards) unless the County can determine that feasible measures will be implemented to reduce the potential risk to acceptable levels, based on site-specific analysis.

- Policy 148. The County shall work with cities to ensure that all new uses approved within the Livermore Airport Land Use Commission referral area are consistent with the Airport Land Use Commission Policy Plan.

- Policy 150. The County shall recognize the Byron (East Contra Costa County) Airport as a regional resource, and shall work with Contra Costa County to ensure that land uses approved in Alameda County within the Byron Airport's referral area are compatible with the airport's operations.

- Policy 154. The County shall abide by the policies and Siting Criteria in the Alameda County Hazardous Waste Management Plan to ensure the responsible handling of hazardous waste in the County.

- Policy 319. The County shall adhere to the provisions of the Alameda County Fire Protection Master Plan and Fire Hazard Mitigation Plan.

3.9.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

This section addresses potential project impacts to hazardous materials and hazards. The impact significance criteria are based on guidance provided by CEQA regarding significant environmental effects (CEQA Guidelines 15065, 15126, and Appendix G). For the purposes of this analysis, the project would result in potentially significant impacts if it would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;

- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;

- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;

- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment;

- Be located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, and would result in a safety hazard for people residing or working in the project area;
- Be located within the vicinity of a private airstrip, or within 2 miles of a public airport or public use airport, and would result in a safety hazard for people residing or working in the project area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

For the purposes of this analysis, areas with no known contamination (based on the records search), and with relatively few businesses that manage, store, or dispose of hazardous materials, have a low potential for encountering hazardous materials during construction activities. Therefore, these areas would not result in a significant impact associated with hazardous materials. However, cases of contamination may still be encountered in areas of low potential. Areas with sites that have past records of contamination, but have since been remediated or corrected, are also considered to result in a less than significant associated with hazardous materials.

Heavy industrial land uses, which can generate hazardous materials and waste, are considered sources of hazardous materials. However, the SBA project corridor is not located in an industrial area. Therefore, for the purposes of this analysis, sites listed with regulatory agencies that are currently contaminated or that have an unmitigated contaminate release, are considered to have a high potential for contamination. If in proximity to the Proposed Project, these areas would have the potential to impact the Proposed Project during construction and throughout the life of the project.

The Proposed Project would not change or alter existing emergency and evacuation plans. For additional discussion of temporary emergency access impacts resulting from project construction, see **Section 3.8, Traffic and Circulation** and **Section 3.10, Public Services and Utilities**. While the Proposed Project would be located in wildland areas, the project would not attract or require the public at the facilities, and therefore, people and structures would not be subject to a significant risk of loss, injury, or death due to wildland fire. In addition, project construction would not take place on a site that is on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, nor would it emit hazardous emissions within ¼ mile of a school.

IMPACTS AND MITIGATION MEASURES

Impact 3.9-1: Construction excavation could encounter contaminated materials, causing an increase in risk of exposure (human and the environment) to hazardous materials. Less than Significant with Mitigation.

The Proposed Project would require construction excavation for pipelines and pump station expansions and improvements. Disturbance and exposure of chemical or petroleum impacted soils or groundwater during construction could expose construction workers, the public, or the physical environment to adverse health conditions due to the chemical characteristics of the contaminant. Soil disturbance during construction could further disperse contamination into the environment and expose construction workers or the public to these contaminants. As previously described, there are three sites (the Lawrence Livermore National Laboratory site on the Cortese and NPL lists; the Altamont Landfill site on the ERNS database; and the 1129 Greenville Road site on the CHMIRS database) that have had previous hazardous materials releases to the environment. Recorded areas of potential contamination could be encountered at the southern portion of the Dyer Canal, along the Alameda Canal near the intersection of Tesla Road, and along the Alameda Canal near the southeast corner of the Lawrence Livermore Laboratory site. Implementation of **Measures 3.9-1a** and **3.9-1b**, would reduce this impact to a less than significant level.

Mitigation Measures

Measure 3.9-1a: DWR shall incorporate into contract specifications, the requirement that, in the event that previously unidentified hazardous substances are encountered during construction, the contractor(s) will have a contingency plan for sampling and analysis of potentially hazardous substances and will coordinate with the appropriate regulatory agencies, if necessary. Evidence of potential hazardous contamination includes soil discoloration, noxious odors, presence of underground storage tanks, or buried building material. The required disposal method shall depend on the types and concentrations of chemicals identified in the soil. Any site investigations or remediation shall comply with applicable laws.

Measure 3.9-1b: If unknown USTs are discovered during construction, the UST, associated piping, and impact soil shall be removed by a licensed and experienced UST removal contractor. The UST and contaminated soil shall be removed in compliance with applicable county and state requirements governing UST removal.

Impact Significance After Mitigation: Less than significant.

Impact 3.9-2: Construction activities requiring the use of hazardous materials may increase the risk of exposure to hazardous materials. Less than Significant with Mitigation.

Construction activities would require the use of certain hazardous materials such as fuels, oils, solvents, and glues. Exposure or inadvertent release of large quantities (i.e., 25 gallons or more) of these materials into the environment could expose construction workers, the public, and/or the

environment to potentially hazardous conditions, or adversely impact soil, surface waters, or groundwater quality. Construction activities could also involve the cutting, burning, sand blasting, or high-pressure water stripping of lead based paints and primers. This activity produces fumes and dusts that could directly expose workers and the public to lead and chemicals through inhalation. For example, during construction of the Stage 3 Surge Tank would include sandblasting of the Stage 1 and Stage 2 Surge Tanks, and application of concrete to thicken the surge tank shells. Potential impacts associated with use and potential inadvertent releases of hazardous materials during construction activities would be less than significant with implementation of the following mitigation measures.

Mitigation Measures

Measure 3.9-2a: Consistent with Storm Water Pollution Prevention Plan requirements identified in **Measure 3.2-1a**, DWR shall require the contractor to implement best management practices for handling hazardous materials onsite. The use of construction best management practices would minimize the potential negative effects on groundwater and soils, and will include the following:

- Follow manufacturer's recommendations and regulatory requirements for use, storage and disposal of chemical products and hazardous materials used in construction;
- Avoid overtopping construction equipment fuel gas tanks;
- During routine maintenance of construction equipment, properly contain and remove grease and oils.
- Properly dispose of discarded containers of fuels and other chemicals.

Measure 3.9-2b: In the event of an inadvertent release of hazardous materials during project operations, containment and cleanup shall occur in accordance with the applicable regulatory requirements.

Measure 3.9-2c: Oil and other solvents used during maintenance of construction equipment shall be recycled or disposed of in accordance with all applicable regulatory requirements. All hazardous materials shall be transported, handled, and disposed of in accordance with all applicable regulatory requirements.

Measure 3.9-2d: Abrasive blasting, or water blasting and metal work including weldings, cutting, and torch burning that involves removal of lead-based paints or primers shall be completed in strict compliance with worker safety regulations outlined in OSHA's Lead in Construction Standard, Title 8 CCR 1532.1, as applicable. Implementation of BMPs including, but not limited to, constant light water spray, structure tenting, or fume hoods, would capture vapors, fumes, and dust generated from the painted metal work. Water, soil, or other media contaminated by lead dusts and fumes shall be removed from the site and disposed. Excavations to capture spray or high-pressure stripping water shall be lined with impermeable materials (i.e., plastic sheeting) and constructed to direct water to lined sumps. Water in sumps shall be pumped into storage tanks prior to removal and disposal to an appropriate treatment, storage and disposal facility. Verification soil sampled shall be collected in fall-out area following project completion to document the presence or absence of residual lead.

Measure 3.9-2e: A construction health and safety plan shall be prepared which describes hazardous materials used during construction and their associated health hazards, as required by the California Occupational Safety and Health Administration.

Impact Significance After Mitigation: Less than significant.

Impact 3.9-3: Construction activities in grassland areas would have the potential to expose people or equipment to risk of loss, injury, or death involving wildland fires. Less than Significant with Mitigation.

Portions of the Proposed Project are located in rural areas that may be susceptible to wildfire. The project primarily involves installation of underground pipeline, surge tanks, expansion of existing facilities, and construction of a new reservoir. No housing structures would be built as part of this project. Implementation of **Measures 3.9-3a** through **3.9-3b** would reduce impacts to less-than-significant levels.

Mitigation Measures

Measure 3.9-3a: DWR will work closely with local fire districts to develop a fire safety plan which describes various potential scenarios and action plans in the event of a fire.

Measure 3.9-3b: During construction all staging areas, welding areas, or areas slated for development using spark producing equipment, will be cleared of dried vegetation or other materials that could serve as fuel. Any construction equipment that includes a spark arrestor will be equipped with an arrestor in good working order.

Significance After Mitigation: Less than significant.

REFERENCES – Hazardous Materials

AirNav, *Meadowlark Field Airport*, http://www.airnav.com/airport/63CN, accessed May 14, 2004.

California Department of Toxic Substances Control (DTSC), *Site Cleanup – Site Mitigation and Brownfields Reuse Program Database*, http://www.dtsc.ca.gov/database/Calsites, accessed May 17, 2004.

Environmental Data Resources (EDR), *EDR Data Map Environmental Atlas, South Bay Aqueduct Project, Alameda, CA*, May 3, 2004.

RED STRIKE TEXT = CHANGES FROM FINAL EIR
BLUE STRIKE TEXT = CHANGES FROM MMRP

3.10 PUBLIC SERVICES AND UTILITIES

3.10.1 SETTING

REGIONAL SETTING

Portions of the proposed pipeline, reservoir, and associated elements would be constructed within unincorporated Alameda County, including the Sphere of Influence of the City of Livermore. The providers of public services and utilities to these areas along the proposed alignment are described below with respect to potential construction impacts.

EXISTING ENVIRONMENT

Alameda County

Emergency Service Providers

The Alameda County Sheriff's Department provides police protection in unincorporated Alameda County and police services for incorporated areas are provided by the police departments of each city. All emergency vehicles (fire and police vehicles, and ambulances) are dispatched from the Sheriff Department's central switchboard. The nearest Sheriff's station to the East County area[1] is in the San Leandro Eden Township Substation, 15 miles to the west. If an urgent call occurs and the Sheriff's Department officer is an extended distance from the emergency, police from the cities of Livermore or Pleasanton, or the California Highway Patrol would then respond under mutual aid agreements.

Fire protection in the western portion of the East County unincorporated area is provided through a contract with the California Division of Forestry; the eastern portion of the area is served by the Alameda County Fire Department. The Alameda County Fire Department has a mutual aid agreement with the Twin Valley Mutual Aid System, which is comprised of the Cities of Pleasanton and Livermore Fire Departments, the Doughty Regional Fire Authority, and the Lawrence Livermore National Laboratory Fire Department. For major disasters, the Alameda County Fire Department is part of a larger county-wide mutual aid system.

Alameda County Emergency Services oversees emergency medical services throughout East County. While Alameda County Emergency Services does not provide the service directly, it organizes and contracts its services to ensure that all jurisdictions are served according to approved standards. Alameda County Emergency Services contracts with numerous ambulance companies and ensures that emergency units respond to 90 percent of the calls within eight minutes. Alameda County Emergency Services also provides fire districts with basic life support training and equipment. While basic emergency service provided by the fire department must

[1] The East County area encompasses 418 square miles of eastern Alameda County and includes the cities of Dublin, Livermore, Pleasanton, and a portion of Hayward as well as surrounding unincorporated areas.

arrive within five minutes, ambulance paramedics generally arrive up to three minutes later (Alameda County, 2002).

Water Facilities

The Zone 7 Water Agency (Zone 7) is the water management agency for the Livermore-Amador Valley water basin, a 425 square mile service area within the East County area. Zone 7 is responsible for the following: bulk water purchase and treatment; distribution of treated drinking water and untreated agricultural irrigation water; surface water and groundwater basin management; and, flood control.

Imported water from the State Water Project (SWP) supplies about 60 percent of the water used in the Zone 7 service area. Zone 7 provides water to the Livermore-Amador Valley via SWP pumping facilities near Tracy, and the South Bay Aqueduct (SBA). SWP water intended for municipal use is treated by Zone 7 at either the Patterson Pass Water Treatment Plant (WTP) or the Del Valle WTP, and then distributed to the local water retailers via underground pipes (Alameda County, 2002). An additional WTP is currently planned by Zone 7 for the Altamont Hills area near Dyer Road. Most of the SBA project corridor is currently undeveloped and not presently served by a water system.

City of Livermore operates a 20-inch pipeline for water supply to the City of Livermore that crosses the Livermore Canal approximately at milepost (MP) 9.0. The pipeline connects the City's Altamont Reservoir, a 3 MG above ground reservoir, directly to the City's distribution system on Greenville Road. The pipeline has a 3 to 6 foot of freeboard clearance above the existing canal lining.

Wastewater Collection

The Livermore-Amador Valley Water Management Agency (LAVWMA) operates the Livermore trunk line, a pipeline that transports treated effluent out of the East County area. The treated effluent is exported to the San Francisco Bay. Most of the SBA project corridor is largely undeveloped and is not served by an integrated wastewater system.

Stormwater

Zone 7 is responsible for maintaining and improving flood control channels in East County. Extensive widening and straightening of existing arroyo channels have significantly reduced flood hazards for low magnitude events, although some portions of the Livermore-Amador Valley remain within flood-prone zones for large events. Zone 7 flood control channels in the SBA project corridor include: Altamonte Creek; Arroyo Seco; and Arroyo Del Valle.

Other Utilities

Electricity is provided to Alameda County by Western, the Pacific Gas and Electric Company (PG&E), and Northern California Power Agency. The East County area is traversed by several above-ground 69-, 115-, 230-, and 500 kilovolt (kV) electric transmission lines. Two of the County's three major substations, Tesla and Tracy, are located in East County. These substations

are the distribution points for various line and voltages. The East County area also contains 11 of the County's 69-kV substations.

Wind turbine fields are located in the areas north and south of Altamont Pass, near the San Joaquin County line, and in the vicinity of the project corridor. This area is the most developed wind resource area in the world with approximately 7,000 wind turbines, approximately 5,800 of which are in Alameda County. The operators of the turbines in this area include PowerWorks, EnXco, Altamont Power, Green Ridge Services, and Seawest Windfarms. These turbines produce about 1,100 million kilowatt hours annually for distribution by PG&E.

Natural gas, oil pipelines, and petroleum product pipelines traverse the East County area. Santa Fe Pacific Pipeline Partners operates a pipeline that extends southwest from Tracy across the East County area, and to Santa Clara County. PG&E has several natural gas pipelines traversing East County. In addition, five oil pipelines traverse the northeast corner of the East County area. One landfill gas facility is located at the Altamont Sanitary Landfill. The landfill gas is used to produce electricity for PG&E.

The 2,170-acre Altamont Sanitary Landfill and the 644-acre Vasco Road Landfill, located in northeastern Alameda County, handle most of the County's solid waste. The Tri-City Recycling and Disposal Facility in Fremont is the County's only other active landfill. The Altamont facility is located east of Dyer Canal.

Schools and Parks

Two school districts serve the project corridor region: Livermore Valley Joint Unified School District and Mountain House Elementary School District. The Livermore Valley Joint Unified School District serves the City of Livermore and most of unincorporated Alameda County east of the city. The Mountain House Elementary School District, which consists of one primary school, is located in the northeast corner of Alameda County. No school facilities are located along the project corridor.

Two regional park districts are located within the East County Area: the East Bay Regional Park District (EBRPD); and the Livermore Area Recreation and Park District (LARPD). A detailed discussion of the park districts and descriptions of their facilities is provided in **Section 3.4, Land Use, Planning and Recreation**.

City of Livermore

Emergency Service Providers

The Livermore Police Department provides police services both within the city limits and to unincorporated areas in the event that Alameda County Sheriff units are unable to respond. The Department operates one police station located on 1110 South Livermore Road. The Livermore-Pleasanton Fire Department provides fire protection and fire-fighting services within the city of Livermore and in unincorporated Alameda County under mutual aid agreement. American

Medical Response has a 911 contract with selected areas of Alameda County, including Livermore, and with individual hospitals.

Water Facilities

California Water Service Company and the City of Livermore supply water within the majority of the city limits. Zone 7 provides water to households on the eastern edge of Livermore and in some unincorporated areas within the City's Sphere of Influence. Water mains are generally present in city streets within the city limits.

Wastewater Collection

Within the city, sewer service is provided by the City of Livermore's Public Services Department. With the exception of two pump stations, all of the wastewater flow in Livermore is conveyed to the wastewater treatment plant by gravity. Livermore Water Reclamation Plant (WRP) provides wastewater collection and treatment services within the city limits (treatment and trunk sewer). The WRP also treats wastewater from the Lawrence Livermore National Laboratory and the Sandia Corporation located in unincorporated Alameda County. Treated effluent generated by the WRP then flows by gravity to the LAVWMA junction structure via the Livermore trunk line. The treated wastewater is eventually disposed of in San Francisco Bay.

Stormwater

The existing storm drainage system within the city limits consists mostly of underground pipes and local creeks. These facilities carry runoff water within the drainage basin to nearby flood control channels and arroyos. Zone 7 is responsible for flood control and/or stream management of some portions of Arroyo Las Positas, relocated Arroyo Las Positas, Altamont Creek, a portion of Arroyo Mocho, Arroyo Seco, and Collier Canyon Creek.

Other Utilities

PG&E provides electricity within the Livermore area. Most of Livermore's electric power is delivered via a 230-kV transmission line running between the Contra Costa Power Plant near Antioch and the Newark Substation. The power is then distributed to local substations, which reduce the power to a lower voltage so it can be passed on to consumers. PG&E operates several 69-kV electrical substations within and in the vicinity of Livermore, including the Las Positas Substation near First Street/I-580, and the Vasco Substation south of I-580/east of Vasco Road. The Las Positas Substation serves customers in the City of Livermore and surrounding unincorporated areas of Alameda County. The Vasco Substation serves customers in the area east of Vasco Road.

The City of Livermore receives natural gas via three main pipelines. A 24-inch natural gas pipeline main traverses the City of Livermore from southwest to northeast. A 36-inch and a 22-inch natural gas pipeline main enters the Livermore area north of Vasco Road and extends south until Tesla Road before continuing west through the city.

SBC Communications, Inc. provides residential and commercial telephone service within the Livermore area. SBC Communications, Inc. also provides or hosts a variety of other telecommunications services, such as Digital Subscriber Lines, Internet Service Provider, web hosting, virtual private networking, and wireless/cellular and paging services.

Currently, the City of Livermore maintains a contract with Waste Management of Alameda County, Inc. to collect and transport solid waste from Livermore to the Republic Services Vasco Road, LLC Landfill for disposal.

Schools and Parks

The City of Livermore is served by the Livermore Valley Joint Unified School District. The Livermore Valley Joint Unified School District covers a 240-square-mile area including the City of Livermore and a portion of the East County Area. The District includes twelve elementary schools, four middle schools, two comprehensive high schools, and three alternative high schools. No school facilities are located along the project corridor.

The LARPD provides park and recreational services to the City of Livermore and surrounding areas, including the Brushy Peak Regional Preserve, the Garaventa Wetlands Preserve, Sycamore Grove Park, and Veteran's Park. The Brushy Peak Regional Reserve, which is operated jointly with the EBRPD, is located approximately one-half mile to the west of the Brushy Creek Pipeline segment of the project corridor. The Alameda Canal right-of-way also traverses Sycamore Grove Park/Veteran's Park. A detailed discussion of Livermore area park and recreation facilities is provided in **Section 3.4, Land Use, Planning and Recreation**.

3.10.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

A project would have a significant adverse impact on public services or utilities under the California Environmental Quality Act if it would: breach published, national, State, or local standards relating to solid waste; contaminate a public water supply; interfere with emergency services; extend a sewer trunk line with capacity to serve new development; or interfere with emergency response plans or emergency evacuation plans. For the purposes of this DEIR, if the project would breach any of the above-referenced standards, disrupt utilities service to create a public health hazard, or extended service disruption, it would be considered to have a significant impact on the environment. Potential impacts associated with expansion of export capacity are discussed in **Chapter 4, Growth Inducement Potential and Secondary Effect of Growth**, and **Chapter 5, Cumulative Impacts**.

IMPACTS AND MITIGATION MEASURES

Impact 3.10-1: Construction of the proposed facilities could result in temporary, planned or accidental disruption of water deliveries to the three South Bay Contractors: Zone 7 Water Agency, Alameda County Water Agency, and Santa Clara County Water Agency. Less than Significant with Mitigation.

Project implementation has been designed to minimize and avoid disruption of deliveries to individual contractors via the SBA. Stage 3 components, including the 4 new pumping units at the SBPP, Stage 3 Brushy Creek Pipeline, and Dyer Reservoir, would be constructed as separate off-line components without shutdown or alteration of scheduled deliveries. Proposed facility improvements are located between the SBPP and Alameda Canal Check 7 within the Zone 7 service area. Deliveries to Alameda County Water District and Santa Clara Valley Water District would not be affected during project implementation, and no outages south of Alameda Canal Check 7, the downstream limit of the project, would occur. No dewatering of SBA facilities downstream of this location would be required, and project implementation would not affect DWR maintenance operations downstream of this location.

Deliveries to these agencies during construction outages on the reaches of the SBA would be made from stored supplies in Del Valle Reservoir per the Department of Water Resources' (DWR's) current operational agreements for that reservoir. All agencies, including EBRPD, which operates recreational facilities at Del Valle Reservoir, would be appropriately notified. The City of Livermore water pipeline would also not be affected by canal improvements due to the existing freeboard clearance above the canal lining. Canal improvements will be scheduled with Zone 7 such that local supplies are available to meet service demands. DWR regularly scheduled service deliveries to the SBA Contractors. Thus, impacts to service deliveries within individual systems, are anticipated to be less than significant.

Mitigation Measures

Measure 3.10-1: Consistent with its current operational practices, DWR shall coordinate construction activities and delivery outage schedules with SBA Contractors and other affected agencies, as appropriate.

Impact Significance After Mitigation: Less than significant.

Impact 3.10-2: Pipeline construction could result in temporary, planned or accidental disruption to utility services. Less than Significant with Mitigation.

Utility services could be disrupted as a result of project construction. In most cases, impacts to utilities and services involve temporary disruption that would not exceed one day. All utility lines and cables that would be disrupted during pipe installation will be identified during preliminary design. As a condition of approval for either a utility excavation permit or an encroachment permit, a detailed engineering and construction plan, which thoroughly describes

construction techniques and protective measures for minimizing impacts to utilities, would be prepared by DWR. This plan requires review by special service districts and utility services in the SBA project corridor.

Accidental disruption of smaller utility lines and cables could be possible along some portions of the project alignment. Temporary and accidental impacts to smaller utility lines would be considered adverse, but not significant, because the affected area and duration of the impacts would be short-term. Disruptions to major utility lines would be considered significant, but mitigable.

Mitigation Measures

Measure 3.10-2: A detailed study identifying utilities along the affected portions of the project alignment shall be conducted during the pre-design stages of the project to complement the existing utilities study for the disturbed portions of the project alignment. For locations with adverse impacts, the following mitigations will be implemented:

a. Utility excavation or encroachment permits shall be required from the appropriate agencies. These permits include measures to minimize utility disruption. DWR and its contractors shall comply with permit conditions, and such conditions shall be included in construction contract specifications.

b. Utility locations shall be verified through field survey (potholing) and use of the Underground Service Alert services.

c. Detailed specifications shall be prepared as part of the design plans to include procedures for the excavation, support, and fill of areas around utility cables and pipes. All affected utility services shall be notified of DWR's construction plans and schedule. Arrangements shall be made with these entities regarding protection, relocation, or temporary disconnection of services.

d. DWR shall employ special construction techniques in areas where the pipeline would parallel underground utility lines. These special measures, which would be included in the engineering specifications, should include trench wall-support measures to guard against trench wall failure and possible resulting loss of structural support for the excavated areas.

e. Residents and businesses in the SBA project corridor shall be notified of any planned utility service disruption two to four days in advance, in conformance with county and State standards.

Impact Significance After Mitigation: Less than significant.

Impact 3.10-3: Construction may result in utility conflicts or require relocation of existing utilities. Less than Significant with Mitigation.

Water, sewer, storm drain, natural gas, oil, electric, and/or communication lines are located within some SBA project corridor roadways.

The Proposed Project's components would run parallel to and cross under or over, or be situated adjacent to these utilities. Utility conflicts may occur at intersections in which a number of pipelines cross. The proximity of wastewater lines, in particular, may complicate the construction of Proposed Project's components, as Department of Health Services (DHS) regulations require a ten-foot horizontal separation between parallel water and wastewater effluent lines, and a 1-foot vertical separation for crossing water and effluent lines.

Mitigation Measures

Measure 3.10-3: In conjunction with **Measure 3.10-**1, the following measures shall be implemented:

- Disconnected cables and lines shall be reconnected promptly.
- DWR shall observe DHS standards which require (1) a 10-foot horizontal separation between parallel sewer and water mains (gravity or force mains); (2) 1-foot vertical separation between perpendicular water and sewer line crossings. (In the event that separation requirements could not be maintained, DWR shall obtain DHS variance through provisions of sewer encasement, or other means deemed suitable by DHS.); and (3) encasing sewer mains in protective sleeves where a new water line crosses under or over an existing wastewater main.
- DWR shall coordinate final construction plans and specifications with affected utilities such as PG&E and DHS Sanitary Engineering Branch.

Impact Significance After Mitigation: Less than significant.

Impact 3.10-4: Construction operations could require the displacement of one~~two~~ power generation wind turbines in the Altamont Pass area. Less than Significant.

Construction of the Stage 3 Brushy Creek Pipeline would require the removal of one~~two~~ existing wind turbines. This~~These~~ turbine~~s~~ represents one~~two~~ out of approximately 7,000 power generating turbines located in the Altamont Pass Wind Resource Area that extends through Alameda and Contra Costa counties. ~~All 7,000 wind turbines produce approximately 1,100 kilowatt hours of electricity annually. The removal of the two turbines by the project would result in the temporary reduction of total wind turbine energy output by approximately 0.32 kilowatt hours per year.~~

~~DWR proposes to relocate the two turbines and restore their operation to offset a potential long-term reduction of energy output.~~ DWR shall coordinate with turbine's owners and Alameda County planning authorities regarding wind turbine relocation to assure compatibility under Policy 173 of the East County Area Plan as discussed in detail in **Section 3.4, Land Use, Planning and Recreation**. Furthermore, DWR will consult with the County to develop and implement appropriate mitigation measures as required under Policy 174 of the East County Area Plan.

~~The relocation of the wind turbines would result in a temporary reduction of electricity supplies. However, the reduction of less than one kilowatt hour per year~~ The loss of a single wind turbine would represent a minor reduction of present annual output of 1,100 kilowatt hours, and the resulting additional demand on other electricity suppliers in the region would be less than significant. ~~Electrical generation output in the region would be restored upon completion of relocation operations. Therefore, no mitigation is required.~~

Mitigation Measures

Implement **Measure 3.4-2a.**~~No mitigation measures are required.~~

Impact 3.10-5: Construction operations would potentially disrupt access to wind turbines in the Dyer Road area. Less than Significant with Mitigation.

Wind turbine operators could experience short-term disruptions to access of turbines during construction activities in the Dyer Road vicinity. Construction-related traffic along Dyer Road could impede the use of the turbine access gates by operations and maintenance personnel.

PowerWorks operates 150 wind turbines in the area west of Dyer Road, and 100 turbines east of Dyer Road. The operators must maintain 24-hour, seven-day-per-week access to these turbines to maintain their operation. Another operator in the vicinity, SeaWest, must use Dyer Road to access their sub-station for meter readings. SeaWest's turbines, however, are located east of the Altamont Landfill, outside of the SBA project corridor. EnXco also uses Dyer Road to access their turbines on the east side of Dyer Road, but has an alternate access available; therefore impacts to enXco's turbine access would be less than significant.

Potential construction-related impacts to wind turbine access would be mitigated to a less than significant impact with implementation of **Measure 3.10-6**. No long-term impacts to wind turbine access during project operations are anticipated.

Mitigation Measures

Measure 3.10-5: Implement **Measures 3.4-1a** and **3.4-1b** in **Section 3.4, Land Use, Planning and Recreation**; and **Measures 3.8-1a through 3.8-1d** in **Section 3.8, Traffic and Circulation**.

Impact Significance After Mitigation: Less than significant.

Impact 3.10-6: Construction activities for all facilities could require short-term police and fire protection services to assist in traffic management or in the event of an accident. Less than Significant with Mitigation.

The Proposed Project has the potential to generate a short-term increase in demand for police and fire services if an accident were to occur during construction. Project-related hazards include traffic congestion, rough road conditions, open trenches, and operation of heavy construction equipment. Construction activities could also result in interference with high-pressure gas lines, petroleum product lines, and high-voltage lines. In the event of such an occurrence, response from fire units may be required.

Mitigation Measures

Measure 3.10-6: DWR shall provide, upon request, a copy of the Traffic Control Plan to the County sheriff's department, local police departments, County fire department, and local fire departments for their review prior to construction. DWR shall provide 72-hour notice to the local service providers prior to construction of individual pipeline segments. Discussion on the Traffic Control Plan is provided in **Section 3.8, Traffic and Circulation**, under **Measure 3.8-1b**.

Implementation of **Measure 3.10-5**, above, would reduce potential impacts to a less than significant level. No additional measures would be required.

Impact Significance After Mitigation: Less than significant.

Impact 3.10-7: Project implementation would incrementally increase electrical demands at the SBPP. However, project implementation would provide for shifting of SBPP electrical demands to off-peak periods, thereby reducing peak electrical demands. Beneficial Impact.

Operation of the SBPP at 430 cfs would incrementally increase electrical demand at the SBPP by approximately 8.5 megawatts (MW). However, project implementation would allow DWR to shift pumpage to off-peak demand hours. Under current peak month operations, the SBPP operates at a uniform rate of 24 hours per day for the entire month. DWR cannot regulate pumpage to avoid peak electrical demand periods without affecting deliveries to SBA Contractors. Under the proposed project, daily water delivery patterns could be shifted based on the pumping capacity, the volume of water scheduled for delivery that month, and the energy rates identified for the 6, 10, and 12 hour on-peak periods. Pumping patterns would be adjusted, within the limits of the pumping capacity available, to minimize the total pumping cost and corresponding loads during peak demand periods. The additional storage provided by Dyer Reservoir would provide for pumping variation and electrical load shift, with correspond energy rates, without interrupting water deliveries. On an annual basis, approximately 38,000 MW hours of electrical consumption would be shifted from peak hours to off-peak hours. The benefit/cost ratio for the shift to off-peak pumping is 1.78. As such, the Proposed Project represents a benefit to the State Water Project, and would help alleviate peak energy demands within California.

Mitigation Measures

No Mitigation Measures Required.

REFERENCES – Public Services and Utilities

Alameda County Community Development Agency, *Draft Environmental Impact Report; Repowering a Portion of the Altamont Pass Wind Resource Area*, August 1998

Alameda County, *East County Area Plan*, Adopted: May, 1994, Corrected: March, 1996, Amended: September, 1996, July, 1998, and November, 2000, Adopted: May 2002.

Department of Water Resources, *South Bay Aqueduct Improvement and Enlargement Study*, December 2003.

EIP Associates, *Altamont Water Treatment Plant Draft Environmental Impact Report*, prepared for Zone 7 of Alameda County Flood Control and Water Conservation District, January 22, 2001.

3.11 VISUAL RESOURCES

3.11.1 APPROACH TO ANALYSIS

This section assesses the visual attributes, patterns of features, and scenic quality of the areas surrounding project components, including landforms, vegetation, and land use. The impact analysis considers view obstruction, negative aesthetic effects, conflicts with adopted environmental plans or goals, and light and glare issues. In addition to evaluating project impacts on the existing visual character, this section describes publicly available views of the project sites as well as presumed views from private viewpoints. The analysis is based on information obtained during field investigations and from the Alameda County East County Area Plan (ECAP).

3.11.2 SETTING

REGIONAL SETTING

The Livermore-Amador Valley contains visual resources representative of California's northern coast range and inland valley landscapes. These visual elements include expansive grass-covered grazing lands; steep, rolling hills and narrow ravines; broad valleys and prominent ridges; meandering tree-lined creeks and drainages; oak woodlands; and various agricultural lands, including pasturelands, vineyards, dry farmlands, orchards, and row croplands. Wind turbine operations can be seen throughout the valley. Peaks and ridgelines of the Diablo Range and Las Trampas/Pleasanton/Sunol range are visually prominent landform features. The visual quality of the area is based largely on its suburban, pastoral character and its topographic diversity.

Both interstate highways passing through the Livermore Valley Area, Interstate 580 (I-580), oriented east-west, and I-680, oriented north-south, provide panoramic views. I-680 is an officially designated State Scenic Highway, which requires special measures by local governments to protect views along the travel corridor. I-580 is an Alameda County-designated scenic highway.

The South Bay Aqueduct (SBA) project corridor is located in the Altamont Range, a series of hills that separate the flat valley lands of the Livermore Valley from those of the San Joaquin Valley to the east. The range is part of a transitional region between the landscapes of the San Francisco Bay Area and those of the Central Valley. In contrast to the portions of the Bay Region along the coast and closest to the Bay where marine-influenced climatic conditions make for relatively verdant landscapes, conditions in this area are considerably drier, making for an open, grass-covered landscape whose appearance is more akin to that of the Central Valley.

The hills of the Altamont range, which rise up to 1,500 feet above the floors of the two valleys, are the dominant background element in views toward the east from Livermore and to the west from the region of the San Joaquin Valley between Bryon and Tracy. In views from the

Livermore area, the range appears as a series of steep hills that rise up sharply from the valley, creating a distinctive visual contrast with the valley floor and forming a well-defined ridgeline silhouetted against the sky. In views from the San Joaquin Valley, the range appears as a less visually dramatic series of hills and valleys that create a layered composition rather than a single distinct ridgeline seen from the Livermore Valley.

The landscape is characterized by rounded hill forms and smooth contours. In just a few places the underlying geology breaks through the soil mantle. The most notable of these is Brushy Peak, with an elevation of 1,700 feet. Vegetation consists of grazed upland grasslands, with occasional clumps of oaks or eucalyptus, and is accented with riparian growth in the major drainage swales and along streams.

The visual character within the Livermore Valley reflects several overlays of human use. The area is primarily a rural, agricultural landscape devoted mostly to cattle ranching, with a few scattered areas that are used for dry farming. It is also a landscape in which a large number of major infrastructure facilities of various kinds have been superimposed, creating a scene that is a mix of rural and technological. Facilities that are visible within the area include: I-580; high voltage electric transmission lines; and the wind farms consisting of wind turbines and the access roads, transformers, and power lines associated with them.

Within the Livermore Valley, residential use is relatively limited, consisting primarily of isolated dwellings associated with ranches and a few scattered rural residential homes. The biggest single concentration of residences along the SBA project corridor is a cluster of approximately 14 homes along Dyer Road.

EXISTING ENVIRONMENT

South Bay Pumping Plant

The South Bay Pumping Plant (SBPP) is located on a manmade inlet on the northwest end of Bethany Reservoir. The site is paved with one access road leading to the SBPP. The SBPP site is surrounded by Bethany Reservoir to the east and open grassland to the north, south and west. The open grassland is used for cattle grazing and wind turbine operations. The plant is visible from recreational uses on the eastern side of Bethany Reservoir and from open space ridgelines. The SBPP is not visible from Brushy Peak Regional Preserve, Altamont Pass Road or I-580.

Brushy Creek Pipeline

The Brushy Creek Pipeline corridor extends between Bethany Reservoir and the backsurge pool of Dyer Canal. Lands along the pipeline route are used for cattle grazing and wind turbine operations. The Brushy Creek Pipeline corridor can be seen from open space ridgelines and Brushy Peak Regional Preserve. The existing pipelines are not visible in these areas, from residential uses, recreational uses, Altamont Pass Road or I-580. **Figure 3.11-1** shows the previously disturbed Brushy Creek Pipeline corridor, access vault structures, and Stage 1 and Stage 2 Surge Tanks.

Brushy Creek Pipelines looking North towards Surge Tanks

SOURCE: Environmental Science Associates

Figure 3.11-1
Brushy Creek Pipelines –
Existing View

Stage 3 Surge Tank

The existing Stage 1 and Stage 2 Surge Tanks are located northwest of Bethany Reservoir. Surrounding land uses include cattle grazing and wind turbine operations. The site contains one unimproved access road to the surge tanks. The surge tanks are visible from open space ridgelines, Brushy Peak Regional Preserve, and recreational uses along Bethany Reservoir. The surge tanks are not visible from Altamont Pass Road and I-580.

Dyer Reservoir

Dyer Reservoir would be constructed east of the existing Dyer Canal, approximately 700 feet from Dyer Road. The proposed reservoir is surrounded by low-density residential uses to the west and open grassland to the north, east and south. The open grassland is used for cattle grazing and wind turbine operations. The site contains Dyer Canal as well as graveled access roads.

Approximately 14 residences are located along Dyer Road, west of the proposed reservoir. Most of the homes are located on lots ranging from 5 to 10 acres in size that have been developed with gardens, sheds, ornamental plantings, and pens for animals. These homes are all sited fairly close to the base of the ridges forming the valley's west side at elevations greater than 800 feet above mean sea level, and are set back from Dyer Road.

The reservoir site is visible from public vantage points along Dyer Road, open space ridgelines and Brushy Peak Regional Reserve. The reservoir site is not be visible from Altamont Pass Road or I-580.

Canal and Siphon Improvements

Dyer Canal is located east of Dyer Road, and the site contains graveled access roads. Surrounding land uses include low-density residential, cattle grazing and wind turbine operations. The canal is visible from Dyer Road and is not visible from Altamont Pass Road or I-580.

Livermore Canal extends from I-580 to Patterson Pass Road and is surrounded by open grassland used for grazing and agriculture. The canal is not visible from Altamont Pass Road, but is briefly visible from I-580.

Alameda Canal extends from Patterson Reservoir to the project terminus at Del Valle Check 7. Surrounding land uses include open space, vineyard, and agricultural uses. Ten residences are located within 500 feet of the canal alignment residential and open grassland used for grazing and agriculture. The canal is visible from Greenville Road and I-580.

The second siphon barrels would be located below-ground and would be constructed at the following locations: underneath an existing access road at Dyer Canal; beneath Patterson Pass Road; beneath Arroyo Seco; beneath Tesla Road; and beneath Mines Road and the Arroyo Mocho. Land uses surrounding the proposed second siphon barrels include open grassland used for grazing and agriculture.

The bridges, overchutes and pipelines are surrounded by open grassland used for grazing and agriculture.

The Patterson Reservoir is an existing reservoir facility that demarks the end point of the Livermore Canal. The reservoir is located approximately 1,500 feet north of Patterson Pass Road, and approximately 50 feet north of the Zone 7 Patterson Pass WTP fenceline. Surrounding land uses include open grassland used for grazing and agriculture. The reservoir is not visible from the roadway.

REGULATORY FRAMEWORK

Plans and Policies

Alameda County - East County Area Plan

The following visual policies relevant to the project are identified in the ECAP (adopted May 2004).

> Policy 106. Structures may not be located on ridgelines or hilltops or where they will project above a ridgeline or hilltop as viewed from public roads, trails, parks, and other public viewpoints unless there is no other site on the parcel for the structure or on a contiguous parcel in common ownership on or subsequent to the date this ordinance becomes effective. New parcels may not be created that have no building site other than a ridgeline or hilltop, or that would cause a structure to protrude above a ridgeline or hilltop, unless there is no other possible configuration.
>
> Policy 108. To the extent possible, including by clustering if necessary, structures shall be located on that part of a parcel or on contiguous parcels in common ownership on or subsequent to the date this ordinance becomes effective, where the development is least visible to persons on public roads, trails, parks, and other public viewpoints. This policy does not apply to agricultural structures to the extent it is necessary for agricultural purposes that they be located in more visible areas.
>
> Policy 115. In all cases appropriate building materials, landscaping and screening shall be required to minimize the visual impact of development. Development shall blend with and be subordinate to the environment and character of the area where located, so as to be as unobtrusive as possible and not detract from the natural, open space or visual qualities of the area. To the maximum extent practicable, all exterior lighting must be located, designed and shielded so as to confine direct rays to the parcel where the lighting is located.
>
> Policy 116. To the maximum extent possible, development shall be located and designed to conform with rather than change natural landforms. The alteration of natural topography, vegetation, and other characteristics by grading, excavating, filling or other development activity shall be minimized. To the extent feasible, access roads shall be consolidated and located where they are least visible from public view points.

Project Consistency with Plans and Policies

The Proposed Project is consistent with the plans and policies outlined above. The Proposed Project is not visible from scenic roadways and highways. To the maximum extent possible, the

project would be located and designed to conform with natural landforms. The Proposed Project blends with the surrounding environment and character of the area, and does not detract from the natural, open space and visual qualities of the area. Although the Stage 3 Surge Tank would project above a hilltop as viewed from public roads and parks, it is consistent with existing views which contain wind turbine operations. The Brushy Creek Pipeline would be underground and would not be visible following installation. All disturbed areas would be restored by reestablishing existing topography and reseeding with a native seed mix typical of the immediately surrounding area.

3.11.3 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

This section addresses potential project impacts to visual aesthetics. The impact significance criteria are based on guidance provided by California Environmental Quality Act (CEQA) regarding what constitutes a significant environmental effect (Guidelines Sections 15065, 15126, and Appendix G). For this EIR, a project would normally be considered to have a significant impact if it would:

- Have a substantial, demonstrable negative aesthetic effect;
- Substantially degrade the existing visual character of the site and surroundings;
- Substantially damage scenic resources;
- Disrupt or divide the physical arrangement of an established community; or
- Conflict with adopted environmental plans.

In addition, CEQA Guidelines identifies project effects on scenic vistas and designated scenic routes and new sources of light and glare as potentially significant impacts. Criteria applicable to the Proposed Project are discussed below.

View Obstruction

Views from or of a project site may be physically blocked, reduced, or reconfigured by elements of a proposed project. View sequences of a project site or of a site feature, such as views from a vehicle traveling along a roadway or from a pedestrian path, may be shortened or interrupted by a proposed development.

Negative Aesthetic Effects

Impairment of the quality of important views may result from the degradation of an existing visual feature that has aesthetic significance, or from the introduction into an existing view of objects or patterns that exhibit a relatively high degree of visual contrast with the existing objects and patterns on the site. Physical changes that may impair the quality of important views include changes in scale, form, color and texture of natural and cultural features existing on the site. Such changes could result from new land uses, new structures, grading and excavation, landscaping, or elimination of existing vegetation.

Conflict with Adopted Environmental Plans

General Plan policies pertaining to visual quality are discussed in the preceding section.

Light and Glare

New or additional glare may result from project development due to use of reflective exterior materials and finishes in construction, including bright or reflective paints, or glass and metal surfaces. Light impacts could result from the nighttime illumination of a project site or facility, or from lights on automobiles or vehicles associated with the project.

IMPACTS AND MITIGATION MEASURES

Impact 3.11-1: Proposed facilities could diminish the visual aesthetics at certain proposed sites. Less than Significant with Mitigation.

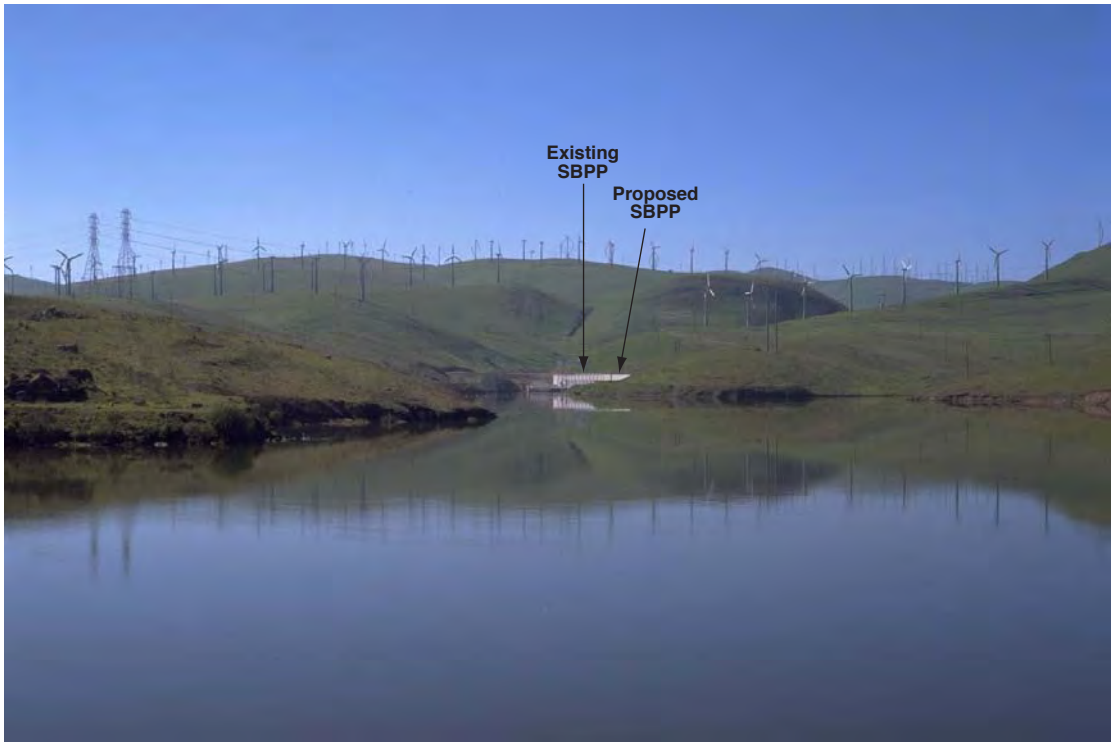
South Bay Pumping Plant

Construction of the SBPP expansion would slightly change the existing visual appearance of the pumping plant from recreational uses along Bethany Reservoir. The existing plant (6,900 square feet) would be expanded northward, adding an additional 4,400 square feet (120 x 37) to the structure. Project implementation would include construction of an additional 360 square-foot service bay that would be constructed southwest of the existing SBPPP structure. **Figure 3.11-2** contains a visual simulation of existing and constructed views of the SBPP from recreational uses along Bethany Reservoir. While the expanded SBPP would be visible, it would not substantially alter the visual character of the area because the expansion would be adjacent to, and consistent with the existing SBPP, and would not introduce a new feature to the area. The surrounding landscape is dominated by wind turbine operations, so the pumping plant expansion would not affect a pristine view. Implementation of **Measures 3.11-1a** and **3.11-1b** would reduce the visual impacts of the pumping plant expansion to less-than-significant levels.

Stage 3 Brushy Creek Pipeline

Pipeline construction would temporarily impact visual resources in the SBA project corridor. During construction, excavated trenches and stockpiled soils, pipe, and other materials within the construction easement would constitute negative aesthetic elements in the visual landscape that would directly affect the area. In addition, construction of the pipelines would remove native vegetation along the alignments. However, these effects would be temporary during project construction.

South Bay Pumping Plant from Bethany Reservoir Recreation Area – Existing View



South Bay Pumping Plant from Bethany Reservoir Recreation Area – Constructed View

SOURCE: Created by Environmental Science Associates

DWR SBA Improvement and Enlargement Project / 202456 ■

Figure 3.11-2
South Bay Pumping Plant –
Existing and Constructed Views

Following construction, the proposed pipelines would be located entirely below-ground and would be unobtrusive. Due to the limited nature of these improvements, views from Brushy Peak Regional Preserve would not be adversely affected. Implementation of **Measure 3.11-1a** would reduce long-term visual impacts from the Stage 3 Brushy Creek Pipelines to less-than-significant levels.

Construction of the concrete access vaults, corrosion sampling stations, and approximately 0.5 mile of new roads would not significantly affect the existing visual environment. The concrete access vaults and corrosion sampling stations would be small in size, placed intermittently along the Brushy Creek Pipeline alignment, and would not require removal or alteration of scenic resources. The access vaults, corrosion sampling stations, and new roads would not be visible from I-580, Altamont Pass Road, or Brushy Peak Regional Preserve. Therefore, impacts to scenic resources would be considered less than significant.

Stage 3 Surge Tank

The Stage 3 Surge Tank would be located less than 100 feet north of the existing Stage 2 Surge Tank. The proposed surge tank would be similar in design and visual appearance, although it would be located at a slightly lower elevation than both Stage 1 and Stage 2 tanks. The tank would be approximately 20 feet in diameter and 100 feet high.

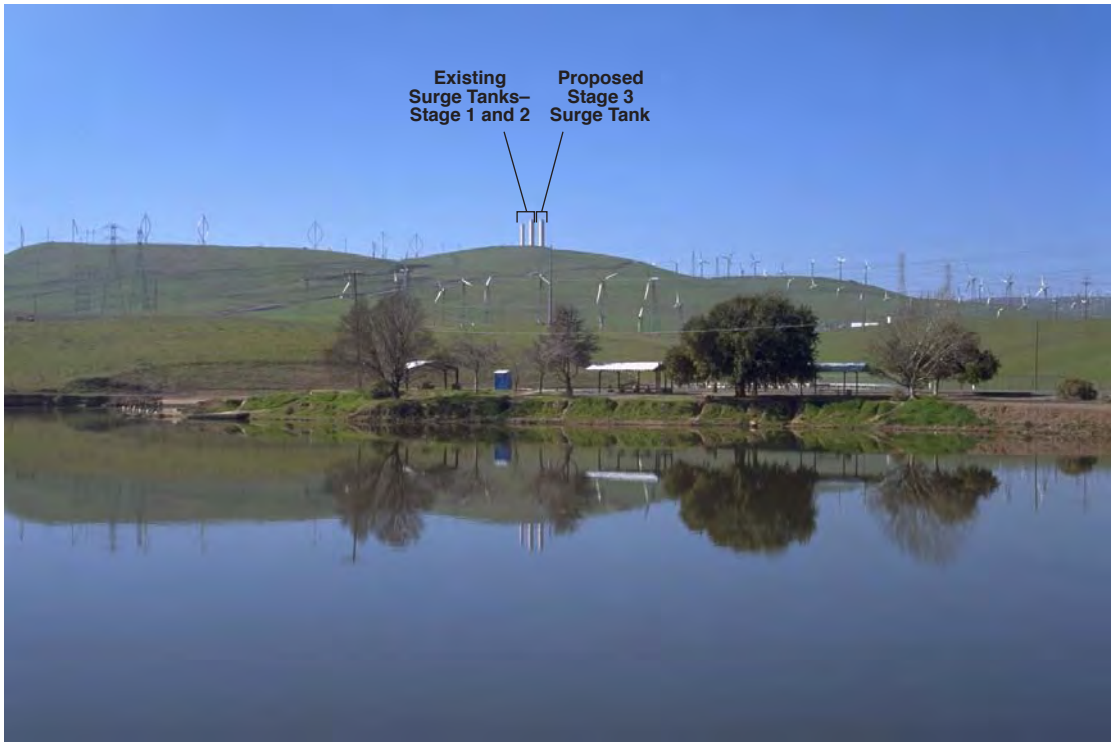
Construction of the Stage 3 Surge Tank would not significantly alter the existing landscape, which contains Stage 1 and Stage 2 tanks and wind turbine operations. **Figure 3.11-3** contains a visual simulation of existing and constructed views of the Stage 3 Surge Tank from recreational uses along Bethany Reservoir. Views from Brushy Peak Regional Preserve and recreational uses along Bethany Reservoir would not be significantly impacted. Therefore, visual impacts would be considered less than significant.

Dyer Reservoir

Construction of Dyer Reservoir would result in short-term visual impacts during construction. Construction activities would require the use of heavy equipment and storage of materials at the construction zone for approximately 20 months. During construction, excavated trenches, stockpiled soils, and other materials within the construction easement would constitute negative aesthetic elements in the visual landscape that would directly affect the area. However, these effects would be temporary during project construction. Following construction, all disturbed areas would be restored by reestablishing existing topography and reseeding with a native seed mix (see **Measure 3.11-1a**). Although not currently proposed, in the event that limited nighttime construction is required, lighting would be directed downward and oriented to ensure that no light source is directly visible from neighboring residential areas (see **Measure 3.11-1c**). Therefore, short-term visual impacts would be considered less than significant.

Construction of the proposed reservoir would remove vegetation and change existing land contours. The reservoir would be visible from public vantage points along Dyer Road and Brushy Peak Regional Reserve. **Figure 3.11-4** contains a visual simulation of existing and

Surge Tank from Bethany Reservoir Recreation Area – Existing View



Surge Tank from Bethany Reservoir Recreation Area – Constructed View

SOURCE: Created by Environmental Science Associates

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Figure 3.11-3
Surge Tank –
Existing and Constructed Views

Dyer Reservoir from public road at 3226 Dyer Road – Existing View

Dyer Reservoir from public road at 3226 Dyer Road – Constructed View

SOURCE: Created by Environmental Science Associates

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Figure 3.11-4
Dyer Reservoir –
Existing and Constructed Views

constructed views of the proposed Dyer Reservoir from Dyer Road. For modeling purposes, the embankment is shown as un-vegetated. Following construction, the embankment would be re-vegetated with native grasses to provide consistency with the surrounding hillsides (see **Measure 3.11-1d**). **Figure 3.11-5** contains a visual simulation of existing and constructed views of the proposed Dyer Reservoir from Brushy Peak Regional Preserve. Water storage is a common feature in agricultural landscapes and the proposed reservoir would be consistent with the existing visual character of the area which includes Dyer Canal. In addition, the proposed reservoir would be set back from Dyer Road and disturbed areas would be revegetated with native seed mixes. Therefore, long-term impacts would be considered less than significant.

Canal and Siphon Improvements

Construction of the canal and siphon improvements would result in short-term visual impacts during construction. Construction activities would require the use of heavy equipment and storage of materials at the construction zone for approximately 23 months. During construction, excavated trenches, stockpiled soils, and other materials within the construction easement would constitute negative aesthetic elements in the visual landscape that would directly affect the area. However, these effects would be temporary during project construction.

Following construction, all disturbed areas would be restored by reestablishing existing topography and reseeding with a native seed mix (see **Measure 3.11-1a**). The proposed second siphon barrels would be located entirely below-ground and would be unobtrusive. Due to the limited nature of these improvements, views from residences, I-580 and Greenville Road would not be adversely affected. Therefore, no long-term visual impacts would result from development of the canal and siphon improvements.

Mitigation Measures

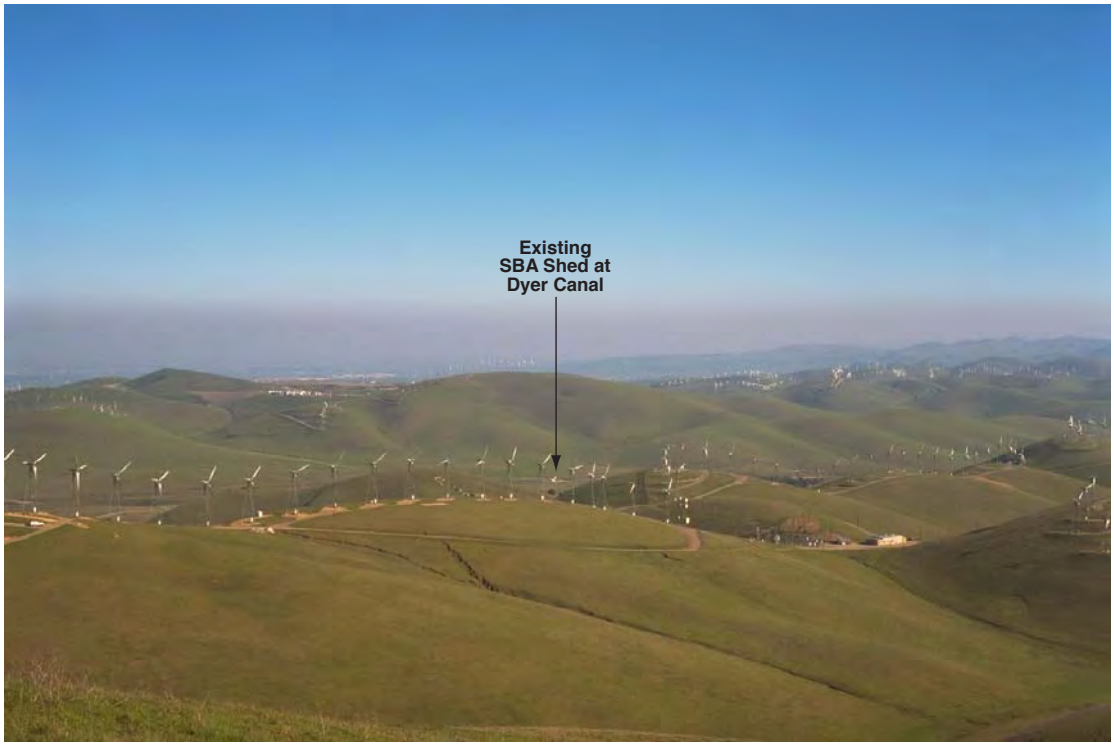
Measure 3.11-1a: Following construction activities, the Department of Water Resources (DWR) shall restore disturbed areas by reestablishing existing topography and reseeding with a native seed mix typical of the immediately surrounding area.

Measure 3.11-1b: DWR shall use design elements to enhance visual integration of the proposed above-ground facilities with their surroundings. Proposed facilities shall be painted low-glare earth-tone colors that blend with the surrounding terrain.

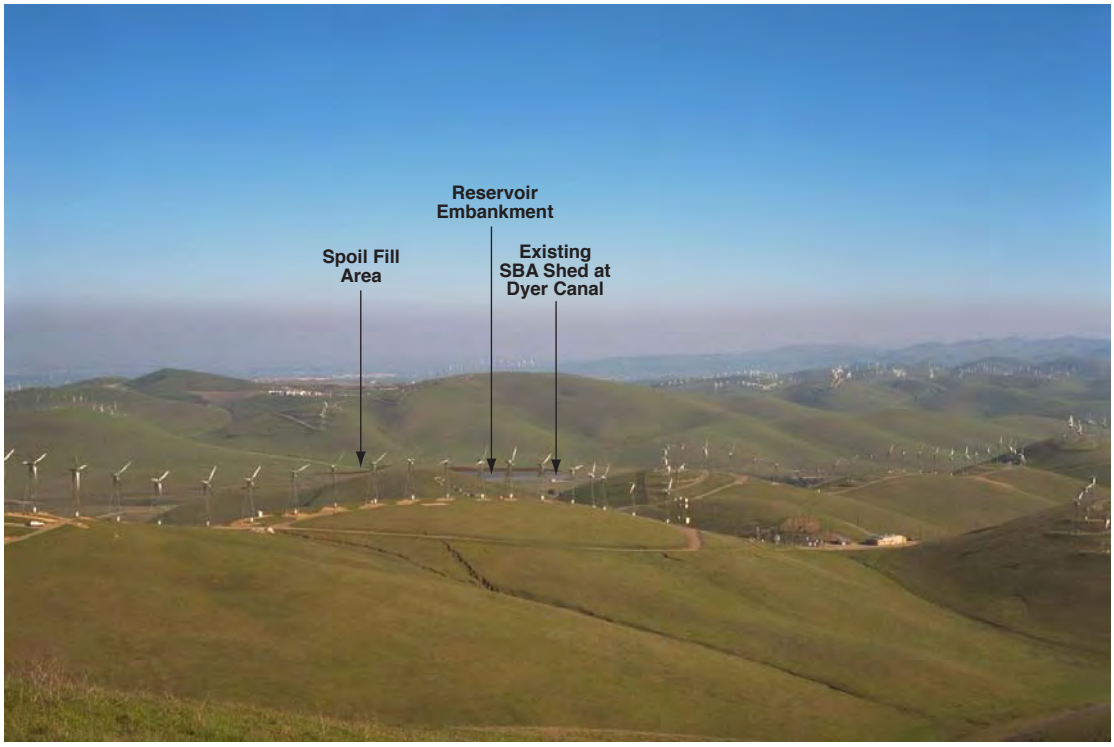
Measure 3.11-1c: DWR shall ensure that lighting used for nighttime construction is shielded and directed downward to minimize impacts to neighboring residential areas.

Measure 3.11-1d: DWR shall construct berms around the reservoir and vegetate the berms with native seed mixes.

Impact Significance After Mitigation: Less than Significant.



Dyer Reservoir from Brushy Peak Preserve – Existing View



Dyer Reservoir from Brushy Peak Preserve – Constructed View

SOURCE: Created by Environmental Science Associates

DWR SBA Improvement and Enlargement Project / 202456 ■

Figure 3.11-5
Dyer Reservoir –
Existing and Constructed Views

Impact 3.11-2: Construction of the project components would introduce new sources of light onto the project sites and increase ambient light in the SBA project corridor. Less than Significant with Mitigation.

Exterior security lighting at the SBPP and Dyer Reservoir could introduce light and create nighttime impacts. Because the SBPP is not located near residences, exterior lighting impacts are considered insignificant. Exterior lighting for Dyer Reservoir could be visible from residences, but the lighting would only be used for security purposes and would be timed.

Therefore, the exterior lighting at Dyer Reservoir would not substantially increase ambient light in the SBA project corridor. Implementation of the following measure at Dyer Reservoir would reduce potentially significant lighting impacts to a less-than-significant level.

Mitigation Measures

Measure 3.11-2a: DWR shall ensure that all exterior lighting is shielded and directed downward to minimize impacts to neighboring residential areas. If necessary, landscaping shall be provided around proposed facilities. The vegetation shall be selected, placed, and maintained to minimize off-site light and glare onto surrounding areas. In addition, highly reflective building materials and/or finishes shall not be used in the designs for proposed structures.

Impact Significance After Mitigation: Less than significant

REFERENCES – Visual Resources

Alameda County, *East County Area Plan*, Adopted: May, 1994, Corrected: March, 1996, Amended: September, 1996, July, 1998, and November, 2000., Adopted: May 2002.