URS

March 2, 2009

U.S. Environmental Protection Agency, Region IX
Air Division (AIR-3)
Attention: Mr. Gerardo C. Rios
75 Hawthorne
San Francisco, CA 94105

Re: Biological Evaluation for Mirant Willow Pass Generating Station

Dear Mr. Rios:

Mirant Willow Pass, LLC (Mirant Willow Pass) is proposing to construct a new 550-megawatt electric generation facility at the site of the Pittsburg Power Plant (PPP) owned by Mirant Delta, LLC (Mirant Delta) in the City of Pittsburg, California.

Mirant Willow Pass has filed an Application for Certification (AFC) with the California Energy Commission (CEC) and has also submitted an Authority to Construct/Permit to Operate (ATC/PTO) application to the Bay Area Air Quality Management District (BAAQMD). Additionally, the project will trigger Prevention of Significant Deterioration (PSD) review by the U.S. Environmental Protection Agency (U.S. EPA). For its PSD review, the U.S. EPA must comply with the Federal Endangered Species Act (FESA). The FESA requires that all federal agencies evaluate projects that they fund or approve for the project's potential effects on federally listed endangered or threatened species (Section 7 of the FESA).

The enclosed Biological Evaluation (BE) for the Willow Pass Generating Station (WPGS) describes the proposed project and evaluates the project's potential impact on federally-listed endangered or threatened species in order to assist the U.S. EPA in fulfilling its consultation requirements under Section 7 of the FESA.

The Proposed Action consists of constructing a new 550 megawatt (MW) natural-gas-fired electric generating WPGS facility; construction of electric and gas transmission lines adjacent to the WPGS facility; and construction of water supply and wastewater discharge pipelines connecting the WPGS to the Delta Diablo Sanitation District (DDSD) Wastewater Treatment Plant (WTP). The WPGS generating units, natural gas line, transmission lines, and construction laydown and parking areas would all be located within the existing PPP site and adjacent Pacific Gas and Electric Company (PG&E) Switchyard. The only Proposed Action components that would extend beyond the boundaries of the PPP site and PG&E switchyard would be the water supply and wastewater discharge pipelines.

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Mirant Willow Pass is requesting that the U.S. EPA initiate *informal consultation* with the U.S. Fish and Wildlife Service (USFWS) for the Proposed Action and transmit the BE to USFWS as supporting documentation. The occurrence or potential for occurrence of federally listed, proposed to be listed, or candidate species within the action area and vicinity and the potential for effects to these species by the Proposed Action were evaluated based upon record searches, current known species distributions, elevation requirements (for plants), occurrence record details, an assessment of habitat suitability, field survey observations, and a review of the Proposed Action description. Based on this review, one federally protected species, the California red-legged frog (*Rana draytonii*) (Federally threatened), has a low potential to occur in the action area. With the implementation of the proposed avoidance and minimization measures, as described in the BE, the Proposed Action is *not likely to adversely affect* the California red-legged frog.

Please request concurrence from the USFWS on the following determinations for the proposed action:

- California red-legged frog – Not likely to adversely affect
- All other federally listed, proposed to be listed, or candidate species – No effect.

We respectfully request U.S. EPA fulfill its FESA obligations in a timely manner to not delay issuance of the PSD permit and consequently delay the start of construction. It is anticipated that the CEC will complete the AFC certification in the 4th quarter of 2009.

Please contact Jon Stead at (510) 874-3058 or Kathy Rushmore at (415) 243-3833 if you have any questions regarding this submittal. We are available to discuss this submittal at your earliest convenience.

Sincerely,

URS CORPORATION

Kathy Rushmore
Senior Project Manager

Enclosures
cc: Jon Sacks, Mirant
Ron Kino, Mirant
Ivor Benci-Woodward, CEC
Jonathan Stead, URS

Biological Evaluation

for
WILLOW PASS GENERATING STATION
Pittsburg, California

February 2009

Prepared for:

MIRANT℠
WILLOW PASS, LLC

Prepared by:

URS

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EXECUTIVE SUMMARY

Mirant Willow Pass, LLC (Mirant Willow Pass) is proposing to construct the Willow Pass Generating Station (WPGS) (the Proposed Action) at the site of the Pittsburg Power Plant (PPP) facility owned by Mirant Delta, LLC (Mirant Delta) in Pittsburg, California. For the purposes of this Biological Evaluation (BE), the project area (termed in this BE as the "action area") is located in the City of Pittsburg in Contra Costa County, approximately 30 miles northeast of the city of San Francisco, in the City of Pittsburg, approximately 2 miles west of the centre of the City of Pittsburg and directly south of the eastern end of Suisun Bay.

The Proposed Action consists of the construction of a new 550-megawatt (MW) natural-gas-fired electric generating facility; construction of electric and gas transmission lines; and construction of a water supply pipeline and a wastewater discharge pipeline. The water supply and wastewater discharge pipelines are each approximately 5 miles in length and connect the WPGS to the Delta Diablo Sanitation District (DDSD) Wastewater Treatment Plant (WTP). The WPGS generating units, natural gas line, transmission lines, and construction laydown and parking areas will all be located within the site of the existing PPP and the adjacent PG&E switchyard. The only Proposed Action components that would extend beyond the boundaries of the PPP site and PG&E switchyard are the water supply and discharge pipelines.

Habitat within the action area is largely developed or modified (i.e., paved, disturbed, unvegetated). The majority of the construction activities associated with the Proposed Action will be located entirely within the boundaries of the existing PPP site and PG&E switchyard on previously disturbed, graded, paved or unvegetated areas. Construction of the water supply and discharge pipelines will primarily involve trenching through a disturbed railroad corridor that contains ruderal and primarily non-native vegetation. Construction of the pipelines would require two crossings of Kirker Creek, one crossing of an unnamed tributary of Kirker Creek, and two drainage channel crossings. All of these crossings will be constructed using techniques that would avoid disturbance of any potential wetlands or waters of the U.S. Direct effects to wetland and waters habitat will be avoided through the use of pipe ramming, microtunneling, and installation within existing roadways.

This BE comprises an assessment of the occurrence, or potential for occurrence, of federally listed, proposed to be listed, or candidate species within the action area and vicinity. The evaluation is intended to determine the potential for effects on these species from the Proposed Action, based on record searches, current known species distributions, elevation requirements (for plants), occurrence record details, an assessment of habitat suitability, field survey observations, and a review of the Proposed Action description.

Findings from this BE confirmed that only one federally listed species, the California red-legged frog (*Rana draytonii*) (Federally threatened), has the potential to occur in the action area. There is a low potential for Kirker Creek and its unnamed tributary, crossed by the proposed water supply and wastewater discharge pipelines, to provide dispersal habitat for the California red-legged frog. In order to minimize impacts on Kirker Creek and its unnamed tributary, pipeline crossings in this area would be installed via pipe ramming, a technique that would avoid disturbance to the creek, limiting disturbance to adjacent ruderal upland areas. Additional avoidance and minimization measures to avoid adverse effects to the California red-legged frog include preconstruction surveys, worker environmental awareness training, biological monitoring, and restricting the timing of the construction activities for these crossings to April 1 to November 1.

General avoidance and minimization measures would also be implemented as a part of the Proposed Action and would include use of erosion control measures to prevent run-off and impacts to water quality, installation of appropriate fencing to indicate limits of construction areas and ensure workers and

equipment operate in designated construction zones, and implementation of spill and secondary containment systems to prevent soil and groundwater contamination. All temporarily disturbed areas will be regraded to restore to pre-action topography and will be revegetated with appropriate native species following construction.

With the implementation of the proposed avoidance and minimization measures, the Proposed Action is *not likely to adversely affect* the California red-legged frog.

No federally listed, proposed to be listed, or candidate species are expected to occur within the portions of the action area within the PPP site or PG&E switchyard.

There is some potential for vernal pool tadpole shrimp (*Lepidurus packardi*) and vernal pool fairy shrimp (*Branchinecta lynchi*) to occur in depressions and wetland areas near the water supply and wastewater discharge pipelines route, but outside of the action area. Since the pipeline will be separated from all of these depressions by an existing highway or railroad grade, the Proposed Action is expected to have *no effect* to these species.

Federally listed fish species (i.e., green sturgeon (*Acipenser medirostris*), Delta smelt (*Hypomesus transpacificus*), Central Valley steelhead (*Oncorhynchus mykiss*), Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*), and Central Valley winter-run Chinook salmon (Sacramento River) (*Oncorhynchus tshawytscha*)) are known to occur in the San Joaquin River located approximately 100 feet north of the action area. The Proposed Action would have *no effect* on fishes in the San Joaquin River.

A June 2008 botanical survey prepared for the WPGS Application for Certification (submitted to the California Energy Commission in February 2009) indicated that no federally listed, proposed to be listed, or candidate species occur within the action area. Therefore, the Proposed Action would have *no effect* on these species. Most of the areas within the action area are highly developed and disturbed with little habitat value and are not likely to support other federally listed, proposed to be listed, or candidate species. The Proposed Action is expected to have *no effect* on all other federally listed, proposed to be listed, or candidate species. The botanical survey is included as Appendix A.

1.0 INTRODUCTION

Mirant Willow Pass, LLC (Mirant Willow Pass) is proposing to construct the Willow Pass Generating Station (WPGS) (the Proposed Action) at the site of the Pittsburg Power Plant (PPP) facility owned by Mirant Delta, LLC (Mirant Delta) in Pittsburg, California (Figure 1). This Biological Evaluation (BE) evaluates potential effects of the Proposed Action on species that are listed or are proposed for listing or are candidates under the Endangered Species Act of 1973 (as amended) (ESA). These species will be referred to as "federally protected species" throughout the remainder of this document. In addition, this BE describes measures which could be implemented to avoid and/or minimize take or disturbance to potentially affected federally protected species. This BE has been prepared in order to assist the U.S. Environmental Protection Agency (U.S. EPA) in fulfilling its consultation requirements under Section 7 of the ESA. Additional information regarding biological resources potentially affected by the Proposed Action is presented in the Application for Certification (AFC) for the Willow Pass Generating Station, submitted to the California Energy Commission for the Proposed Action in 2008 (URS, 2008).

2.0 DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action consists of the construction of a new 550-megawatt (MW) natural-gas-fired electric generating facility; construction of electric and gas transmission lines; and construction of a water supply pipeline and a wastewater discharge pipeline. The proposed water supply and wastewater discharge pipelines are each approximately 5 miles in length and would connect the WPGS to the DDSD WTP. The WPGS generating units, natural gas line, transmission lines, and construction laydown and parking areas will all be located within the site of the existing PPP and the adjacent PG&E switchyard. The only Proposed Action components that would extend beyond the boundaries of the PPP site and PG&E switchyard will be the water supply and discharge pipelines. When completed, the WPGS would occupy approximately 26 acres in the northeastern portion of the PPP site that are currently occupied by existing retired power generation Units 1 through 4, an administration building, one unused fuel storage tank, temporary buildings, and other ancillary facilities.

The WPGS facility would consist of two power blocks. Each power block would contain one Siemens Flex Plant 10 combined-cycle combustion turbine generator, one heat recovery steam generator (HRSG), and one steam turbine generator. Each combustion gas turbine and each steam turbine will be connected to separate electric generators. The generators for the WPGS will be interconnected to the PG&E switchyard. The WPGS will be interconnected to the transmission grid, and power generated by the facility will be available to serve energy needs throughout California. The WPGS would use natural gas that will be delivered via a new pipeline, which will be constructed to carry natural gas from the existing PPP metering station to the action area.

The only Proposed Action components that would extend beyond the boundaries of the PPP site and PG&E switchyard will be the water supply and wastewater discharge pipelines (Figure 2). These two new 5-mile-long water pipelines would be constructed between the WPGS and the DDSD WTP. Approximately 3.8 miles of these water pipelines would extend beyond the PPP site boundary. One water supply pipeline would be used to supply recycled water from the DDSD WTP to the WPGS, and one wastewater pipeline would be used to return wastewater from the WPGS to the DDSD WTP. These water pipelines would connect directly to existing facilities located at the DDSD WTP. This connection will be constructed within the existing footprint of the DDSD WTP, and would not result in additional land disturbance outside of the pipeline construction area. The construction area of the water pipelines would generally consist of a 15-foot wide corridor, including laydown and staging areas, unless noted otherwise below. Three miles of the five-mile-long route currently contains an unused fuel oil pipeline owned by Mirant Delta, which historically was used to convey oil. The existing pipeline is 10.75 inches in diameter, is now out of service, and will be replaced by the new water pipelines.

Construction of the pipelines would require two crossings of Kirker Creek (Creek Crossings 1 and 3), one crossing of an unnamed tributary of Kirker Creek (Creek Crossing 2), and two drainage channel crossings (Drainage Channel Crossing 1 south of the PPP site, and Drainage Channel Crossing 2 in the railroad switchyard). General locations of all crossings are shown on Figure 3. Proposed construction activities associated with these crossings are discussed in more detail below. Detailed locations of each crossing are shown on Figures 4 through 8.

On-site construction for the Proposed Action is expected to commence in the fourth quarter of 2009. Construction and startup of the new generating units should be completed by July 2012. For each crossing, work would occur during one season (June 15 to October 15) between 2009 and 2012.

Creek Crossing 1 (Figure 4)

Creek Crossing 1 is located at Kirker Creek, south of the Pittsburg-Antioch Highway. The crossing at this location is approximately 30 feet wide, from top of bank to top of bank. Pipe ramming would be used to install the pipes underneath the channel at this location. Pipe ramming is a system of installing a crossing by driving an open-ended casing using a percussive hammer from a shaft that displaces a volume of soil equivalent to only the wall thickness of the casing. Soil would remain in the casing until the crossing has been completed and then will be removed by water, augering, jet-cutting or compressed air. This method does not use hydraulic drilling muds such as those used in some other underground pipe installation methods.

Pipe ramming operations are relatively compact and require a pneumatic hammer mounted on the casing and a pipe cradle to permit correct casing alignment during driving. Both of these items will be within the temporary jacking shaft excavation. On the surface, an air compressor is required to operate the hammer. Spoils from within the casing can be removed using compressed air to push the column of soil into the receiving pit, or an auguring system can be used within the pit to mechanically remove the soil. An excavator will be needed to excavate the jacking shafts, a pile driver will be used to drive sheet piles and dump trucks would remove spoils. A fusion bonding machine will be needed for fusing the high density polyethylene (HDPE) carrier pipe joints together.

The estimated depths of the pipelines at this location is approximately 24 feet, based on an estimated creek depth of 10 feet, a minimum clearance of 7 feet between the bottom of the creek channel and the top of the new pipe, as well as allowing for the casing pipe diameter and equipment.

At Creek Crossing 1, the launching and receiving pits will be at least 10 feet back from the top of the banks of Kirker Creek. Several existing pipelines cross Kirker Creek at this location. Due to the presence of these pipelines, the area is regularly maintained and is relatively free of vegetation. The only vegetation that will be affected as a result of the construction of Creek Crossing 1 would be nonnative annual grassland.

Temporary access and staging of construction equipment would occur on two areas approximately 50-feet wide and 200-feet long within existing paved or gravel roadway or ruderal nonnative vegetation/bare ground. For temporary construction access, vehicles and equipment would enter the area directly from the adjacent road and no other areas will be affected.

Creek Crossing 2 (Figure 5)

Creek Crossing 2 is located at an unnamed tributary of Kirker Creek west of Loveridge Road. The crossing at this location is approximately 18 feet wide, from top of bank to top of bank. Pipe ramming, as described for Creek Crossing 1, would also be used to install the pipes underneath the channel at this location.

The estimated depths of the pipelines at this location is approximately 20 feet, based on an estimated creek depth of 8 feet, a minimum clearance of 5 feet between the bottom of the creek channel and the top of the new pipe, as well as allowing for the casing pipe diameter and equipment.

At Creek Crossing 2, the launching and receiving pits will be at least 10 feet back from the top of the banks of Kirker Creek. Temporary access and staging of construction equipment would occur on two areas approximately 50 feet wide and 200 feet long within existing paved or gravel roadway or ruderal nonnative grassland/bare ground. For temporary construction access, vehicles and equipment would enter the area directly from the adjacent road and no other areas will be affected.

Creek Crossing 3 (Figure 6)

Creek Crossing 3 is located at the intersection of Pittsburg-Antioch Highway and Arcy Lane. The crossing at this location is approximately 30 feet wide, from top of bank to top of bank. At Creek Crossing 3, the pipeline will be installed via open trench methods within the existing roadway or roadway shoulder (Arcy Lane), and would cross the creek at a location where the creek is already culverted underneath the existing roadway.

Drainage Channel Crossing 1 (Figure 7)

Drainage Channel Crossing 1 is located immediately south of the PPP site. At the location where the new pipeline would intersect with the channel, the existing channel is conveyed underneath the access road to the power plant via a large culvert. The culvert extends beyond the edges of the access road, and is sufficiently long for the new pipelines to be constructed under or over the culvert, either in or adjacent to the power plant access road. The pipelines will be installed via open trench methods across the culverted section of the channel, either above or below the culvert that conveys the channel under the roadway.

Drainage Channel Crossing 2 (Figure 8)

Drainage Channel Crossing 2 is located in a rail switchyard north of Parkside Drive. The crossing at this location is approximately 15 feet wide, from top of bank to top of bank. Microtunneling would be used to install the pipes underneath the railroad switchyard and drainage channel, allowing the pipes to be installed without disturbing the channel. Microtunneling is a trenchless construction method that uses a remote controlled pipeline installation approach, with a control located at the surface that controls the tunneling machine at the head of the pipe using a series of gauges, television cameras, and a laser targeting system. The launching and receiving pits will be located more than 100 feet from the drainage channel. The launching pit will be located on existing pavement in the parking area of a commercial building. The receiving pit will be located in the railroad switchyard in between rail tracks. Access to the receiving pit would occur somewhere along the railroad corridor in an area with very little vegetation. A construction staging area approximately 50-feet by 50-feet will be located in an area between the railroad tracks.

The microtunneling system uses a surface slurry plant, a slurry separation plant, a control container, and a lubrication injection and pumping plant. These would all be located away from the drainage channel. An excavator will be needed to excavate the shafts, a pile driver to drive sheet piles, and dump trucks to remove spoils. A fusion bonding machine will be needed for fusing the HDPE carrier pipe joints together.

The depth of the casing pipe will be approximately 20 feet, with launching and receiving pits depths estimated at approximately 30 feet, subject to further coordination with the Union Pacific Railroad.

3.0 ACTION AREA

The action area is located in Contra Costa County, within U.S. Geological Survey (USGS) 7.5-minute quadrangles Honker Bay and Antioch North. It is directly south of the eastern end of Suisun Bay, adjacent to an urban area, approximately 2 miles west of the centre of the City of Pittsburg and approximately 30 miles northeast of San Francisco (Figure 1). The action area comprises all proposed construction activities associated with implementation of the Proposed Action and includes all areas that may be permanently or temporarily disturbed by the Proposed Action.

The action area includes the following proposed components that will be located within the existing PPP site and PG&E switchyard:

- Willow Pass Generating Station site (26 acres);
- 21.5 acres of construction laydown, parking, and office areas;
- An approximately 2,700-foot-long new natural gas line connecting immediately upstream of the existing PPP gas meter station;
- An approximately 1,600-foot-long new transmission line connecting to the PG&E switchyard;
- Approximately 1 mile of the 5-mile-long water supply and wastewater discharge pipelines;
- A new potable water line connecting to an existing potable water line on the PPP property; and
- A new hazardous material building and a new hazardous waste building which will be located on the PPP sites, west of existing Unit 7.

These components are shown on Figure 2. Outside of the PPP site, the action area also includes the work activities associated with the two new water pipelines (Figure 2).

The majority of the action area (including the WPGS site and construction and laydown areas) would occupy approximately 48 acres at the northeastern portion of the existing PPP site and PG&E switchyard (Figure 2). As described in Section 2.0, no permanent or temporary activities associated with the Proposed Action would occur in the large wetland area located on the west portion of the PPP site or in the retention basin south of the PG&E switchyard (Figure 3), therefore, the action area only includes areas where construction would occur on the eastern portion of the PPP site.

4.0 STUDY METHODS

This Biological Evaluation (BE) comprises an assessment of the occurrence, or potential for occurrence, of federally listed, proposed to be listed, or candidate species within the action area and vicinity. The evaluation is intended to determine the potential for effects on these species from the Proposed Action, based on record searches, current known species distributions, elevation requirements (for plants), occurrence record details, an assessment of habitat suitability, field survey observations, and a review of the Proposed Action description.

4.1 Background Review

Prior to the field reconnaissance, a list of species federally protected species with potential to occur in the vicinity of the action area was created using historical records and known occurrences. The following sources were searched:

- Sacramento U.S. Fish and Wildlife Service (USFWS) online database Honker Bay and Antioch North U.S. Geological Survey (USGS) 7.5-minute quadrangles (USFWS, 2009; Appendix B).

- California Department of Fish and Game (CDFG) California Natural Diversity Data Base (CNDDB): 10-mile radius search surrounding the action area of documented occurrences of federally listed, proposed for listing, or candidate species (CDFG, 2009).

The background data review identified 15 wildlife species, 5 fish species, and 7 plant species that are federally listed as threatened, endangered, or proposed for listing, or are candidates that have recorded occurrences in the vicinity of the action area, and/or have the potential to occur based on historic range and suitable habitats in the vicinity of the action area (Table C-1, Appendix C). Known or historic occurrences of federally protected species within 10 miles of the action area are shown on Figure 9.

Many of the federally protected species listed above are not expected to occur in the action area because either the habitat elements they require are not present in the action area or the action area is not within the geographic or elevation range of the species. In addition, habitat within the action area is largely developed or modified (i.e., paved, disturbed, unvegetated), and is not suitable for many of the federally protected species.

Federally protected species with ranges overlapping the action area and for which potential suitable habitats are present in the action area are discussed in Section 6.0. Federally protected species that may have potential suitable habitats directly adjacent to the action area are discussed in Section 7.0. Federally protected species that are not likely to occur in the action area or immediate vicinity are not discussed outside of Section 9.0, but are listed in Appendix C. Section 9.0 includes an independent evaluation of potential effects of air emissions on soils and species that may occur within several miles of the action area.

All federally protected species with potential to occur in the action area vicinity were reviewed to determine whether the action area overlaps proposed or designated critical habitat.

4.2 Personnel and Survey Dates

Site reconnaissance field surveys of the action area were conducted by URS Corporation (URS) biologists Jonathan Stead and Katherine Caldwell on May 7 and May 16, 2008. All areas of potential ground disturbance within the boundaries of the Proposed Action area (Figure 3) were surveyed. Areas not directly affected by the Proposed Action but within 1,000 feet of the action area were also surveyed through review of aerial imagery, previous studies, and the databases described above to identify any habitat that could support federal plants or animals in the areas surrounding the action area (Figure 3). Focused surveys for federal plant species potentially occurring in the Proposed Action area were

conducted on May 21 and 28, 2008 and also on August 8, 2008. A wetland delineation of potential jurisdictional wetlands and waters at Creek Crossing 3[1] was conducted on June 20, 2008.

5.0 ENVIRONMENTAL SETTING AND BIOTIC RESOURCES

Biological resources within the regional and local study areas were identified based upon reviews of database records and field observations. The following sections describe regional and local biological resources and well as the potential sensitive habitats (e.g., wetlands) and species that occur in the study areas.

5.1 Regional Study Area

The regional study area includes the urban and mountainous portions of east Contra Costa County south of the action area as well as islands and waterways of the Bay-Delta, north of the action area. The Bay-Delta region is typically considered the most important water body in California (Contra Costa County, 1996). Other important ecological areas present in the regional study area include expansive grassland habitat located in the hilly region south of the City of Pittsburg. Two regional parks, Contra Loma and Black Diamond Mines, and one state park, Mount Diablo, are also located in this area.

Significant ecological areas located within the regional study area are described below.

The San Joaquin River and the Delta

The Delta is a 1,150-square-mile, triangular region of land and water at the confluence of the Sacramento and San Joaquin Rivers (U.S. EPA, 1996). The Delta's waterways comprise a matrix of aquatic habitat of approximately 75 square miles, and extend from Suisun Bay, in the west, to the towns of Sacramento and Stockton to the north and east. Major inputs of freshwater to the Delta are from the Sacramento River in the north and the San Joaquin River in the south, while tidal fluctuations bring salt water from Suisun and San Francisco Bays, with which the Delta forms an interconnected estuary system. Immediately north of the action area, the San Joaquin River (partially via New York Slough) flows into Suisun Bay, on its way towards the Pacific Ocean.

Within these waterways, saltwater intrudes from the San Francisco Bay, converging with freshwater from the San Joaquin River, to create brackish conditions. Brackish and freshwater marshes located on the coastal areas of Chipps Island, Browns Island, and along the north coastline of the City of Pittsburg (see Figure 3) are dominated by bulrush (*Scirpus acutus* var. *occidentalis* and *S. californicus*) and open waters provide habitat for a variety of wildlife species, including anadromous fish and migratory birds. Due to the diversity of upland, open water, mudflat, and wetland habitats, the Delta is used by a number of species, both for permanent residence and as a migratory route. The San Joaquin River provides habitat for Chinook salmon and steelhead trout, both important sport fish with declining populations (NMFS, 2005). These aquatic habitats are also used by a diversity of invertebrate species, while migrating birds use riparian vegetation, tidal marshes, and open water.

Over the last 150 years, much of the Delta's wetland and upland habitats have been converted for urban or agricultural uses. Most of the remaining areas of natural vegetation have been fragmented into small areas along the margins of sloughs, rivers, and the many islands scattered through the delta. This loss and

[1]At the time of the wetland delineation it had not yet been determined whether installation of the water pipelines would require open trenching through Kirker Creek. Currently, no open trenching of Kirker Creek is planned, all direct effects to potential jurisdictional wetlands will be avoided, and the wetland delineation has not been finalized or submitted to the US Army Corps of Engineers.

fragmentation of habitats has resulted in the decline of many wildlife species. Some of these species are now listed as threatened or endangered and are restricted to small areas of remaining habitat.

Suisun Bay and Suisun Marsh

Suisun Bay is located between Chipps Island, at the western end of the Delta, at the approximate location of the I-680 crossing of the Carquinez Strait, and where the Delta meets San Francisco Bay. Freshwater from the Delta and saltwater from the Pacific Ocean mix in Suisun Bay. Suisun Marsh, located several miles northwest of the action area, across Suisun Bay, is the largest brackish marsh in the United States (U.S. EPA, 1996). The marsh provides important fish habitat as well as nursery areas for juvenile salmon, striped bass, Sacramento splittail, and Delta smelt.

Kirker Creek Watershed

Kirker Creek watershed originates in the foothills of Mount Diablo and encompasses 14.6 square miles, including the eastern half of the City of Pittsburg. Kirker Creek (see Figure 3) drains into New York Slough just east of the DDSD WTP through the Los Medanos Wasteway. The proposed water supply and wastewater discharge pipelines would cross Kirker Creek twice (Creek Crossings 1 and 3), and also cross a small unnamed tributary of Kirker Creek (Creek Crossing 2). The existing drainage system for Kirker Creek is largely composed of open channels fed by a combination of street runoff and underground storm drains. Kirker Creek is a seasonally intermittent stream that does not maintain a significant year-round natural flow (KCWPG and CCRCD, 2004). It flows primarily in the rainy season and dries out in the summer, although irrigation and related urban runoff produce some urban dry-weather flow that keeps areas of the creek wet throughout the year.

Kirker Creek does not currently provide suitable habitat temperature for anadromous species such as salmon and steelhead trout (KCWPG and CCRCD, 2004). The water in Kirker Creek is too high for these species, as large sections of the creek lack canopy cover and lie under direct sunlight. Steelhead trout generally do not pass through culverts over 150 feet long, of which lower Kirker Creek has several. The seasonally intermittent flow of the creek also means there is insufficient water to support the fish upstream. Much of the creek is dry during the summer, except for certain segments sustained by irrigation runoff, and thus does not support young fish.

Dow Wetlands Preserve

The Dow Wetlands Preserve was created in 1989. It lies immediately east of the DDSD WTP on the south bank of the San Joaquin River (see Figure 3). The preserve protects three endangered species, more than 120 species of birds, freshwater and tidal marshes, seasonal wetlands, and grasslands. It is a major stop for migrating birds along the Pacific Flyway.

Brown's and Winter Islands

Brown's Island Regional Preserve and Winter Island are located north of New York Slough at the junction of the Sacramento and San Joaquin Rivers (see Figure 3). This island complex, over 595 acres, consists of large freshwater and estuarine marshes that provide habitat for sensitive plant and bird species. It is the home of six rare and endangered plant species, and a variety of aquatic birds.

New York Slough

New York Slough (see Figure 3) supports fish species of commercial and recreational value. These include striped bass, American shad, black bass, catfish, steelhead, and sturgeon (Contra Costa County,

1996). Chinook salmon migrate through the slough, while Sacramento splittail and delta smelt are potential year-round residents.

Contra Costa Canal

At the east end of the proposed water supply and wastewater discharge pipelines alignment, approximately 0.85 mile to the south, lies the Contra Costa Canal, which diverts Sacramento-San Joaquin Delta water and where white-tailed kite (*Elanus leucurus*) forage in salt marsh habitat (Contra Costa County, 1996).

Antioch Dunes National Wildlife Area

Three miles east of the east end of the proposed water supply and wastewater discharge pipelines alignment, the Antioch Dunes National Wildlife Area protects a small remnant of riverine dune habitat. These dunes are managed by the USFWS to restore and provide habitat for rare species.

Black Diamond Mines Regional Preserve

The Black Diamond Mines Regional Preserve is located 3 miles south of the water pipeline alignment. The preserve provides public access to grassland, foothill woodland, mixed evergreen forest, and chaparral habitats. The preserve supports a variety of rare plant species and abundant wildlife.

5.2 Habitat Types in the Local Study Area

A local study area was also defined, incorporating a 1,000-foot radius around the action area (see Figure 3). A variety of upland and aquatic habitats are located within the local study area. These habitats include Kirker Creek, seasonal wetland, freshwater/brackish marsh, open water, riparian vegetation, grassland/ruderal vegetation, ruderal vegetation/bare ground, landscaped/ornamental; and developed areas (see Figure 3). Habitat types are described below.

Suisun Bay

Suisun Bay is adjacent to the northern boundary of the PPP site. Most of the shoreline on the north side of the PPP site is rip rapped, discouraging development of wetland vegetation. More extensive wetland vegetation has developed in a couple of locations along the shoreline. Extensive marshlands lie in the western portion of the PPP site, outside of the action area. These estuarine wetlands are a mix of intertidal emergent wetlands and subtidal wetlands, as well as a cooling channel associated with the existing PPP that is classified as lacustrine habitat (USFWS, 2008a).

Kirker Creek

Within the local study area, Kirker Creek is a highly altered stream. Immediately south of the proposed water supply and wastewater discharge pipelines alignment and approximately 2,500 feet west of Loveridge Road, the stream was recently modified and connected to a flood control retention basin (see Figure 3). Adjacent to the retention basin, the creek enters a long subterranean culvert and then emerges into the recently modified, open channel that carries it underneath the Union Pacific railroad tracks, to the location where the pipeline alignment crosses the creek (Creek Crossing 1) (Figure 4). As the stream flows north, it enters a culvert under the Pittsburg-Antioch Highway. The channel then turns sharply to the east (Figure 3) and follows a deep, steep-banked artificially constructed trapezoidal channel along the north side of the Pittsburg-Antioch Highway east to Arcy Lane (near Creek Crossing 3; Figure 6). Kirker Creek is culverted under Arcy Lane immediately before its confluence with the Los Medanos Wasteway, which drains north to New York Slough. At high flows Kirker Creek also drains into New York Slough

via Dowest Slough. Historically the creek followed a more natural northward route to New York Slough, but the creek was diverted away from the U.S. Steel (now USS-POSCO) property in the 1940s.

Approximately 0.3 mile east of the flood control retention basin, an unnamed tributary of Kirker Creek joins Kirker Creek (between Creek Crossings 1 and 3). The eastern half of the proposed water supply and wastewater discharge pipelines alignment crosses Kirker Creek twice (Creek Crossings 1 and 3), crosses this unnamed tributary (Creek Crossing 2), and runs between the north side of the Pittsburg-Antioch Highway and the south side of the re-aligned portion of Kirker Creek for a distance of approximately 1.5 miles (Figure 2). Although Kirker Creek and its unnamed tributary have been channelized, and the portion of the creek that runs adjacent to the north side of the Pittsburg-Antioch Highway occupies an artificially constructed, re-aligned channel, Kirker Creek does support wetland vegetation (see Appendix A). The unnamed tributary to Kirker Creek (Creek Crossing 2) is highly ephemeral and largely lacks wetland and riparian vegetation in the action area (see Appendix A).

Near Creek Crossing 1 Kirker Creek supports various rush species (*Scirpus* spp.), narrow leaf cattail (*Typha latifolia*), rabbit's foot grass (*Polypogon monspeliensis)*, saltgrass (*Distichlis spicata*), cudweed (*Gnaphalium* spp.), bristly oxtongue (*Picris echioides*), Oregon ash (*Fraxinus latifolia*), and dock (*Rumex* sp.).

Near Creek Crossing 3, west of Arcy Lane and east of Arcy Lane along the Los Medanos Wasteway, Kirker Creek and the wasteway are dominated by hardstem bulrush (*Scirpus acutus*), western goldenrod (*Euthamia occidentalis*), narrow leaf cattail (*Typha latifolia*), rough cocklebur (*Xanthium strumarium*), spike rush (*Eleocharis macrostachya*), Baltic rush (*Juncus balticus*), sedge (Carex sp.), and barnyard grass (*Echinochloa crus-galli*), joint paspalum (*Paspalum distichum*), perennial pepperweed (*Lepidium latifolium*). There are also a few black walnut (*Juglans californica*), willow (*Salix* sp.), Oregon ash (*Fraxinus latifolia*), and fan palm (*Washingtonia filifera*) scattered along the edge of the seasonal drainages (see Appendix C).

Seasonal Wetland

Seasonal wetlands occur where water is present for limited duration during the wetter months of the year. In the local study area, this includes Kirker Creek, at least one vernal pool, a retention basin, several seasonally ponded depressions, some stream drainages, and potentially at least one drainage channel (Figure 3). At high flows, Kirker Creek also spills into Dowest Slough, a seasonal wetland located north of the Pittsburg-Antioch Highway and approximately 2,000 feet west of Arcy Lane.

Seasonal wetlands also occur in areas south of the Pittsburg-Antioch Highway, west of where Arcy Lane meets the highway. This includes at least one vernal pool (Potential Vernal Pool Branchiopod Habitat 2; Figure 3), a retention basin, several seasonally ponded depressions (including Potential Vernal Pool Branchiopod Habitat 3; Figure 3), and some stream drainages (Potential Vernal Pool Branchiopod Habitat 1 [Figure 3] is an unvegetated, seasonally ponded depression).

One of the seasonal wetlands is in a deep depression adjacent to the Los Medanos Wasteway (Potential Vernal Pool Branchiopod Habitat 3). This feature may have been artificially created when a natural swale was blocked by the Pittsburg-Antioch Highway. At the western end of this same parcel, also south of the Pittsburg-Antioch Highway, is a natural vernal pool (Potential Vernal Pool Branchiopod Habitat 2). Other vernal pools may occur on this parcel. Vernal pool wetlands seasonally pond rain water and have the potential to support rare plants and listed branchiopod species. A subsequent site reconnaissance conducted in May 2008 revealed that the vernal pool described above has been filled with soil by an unknown third party.

Dominant species of the retention basin and depressions (including Potential Vernal Pool Branchiopod Habitat 3; Figure 3) include various rush species, narrow leaf cattail, rabbit's foot grass, saltgrass, and cudweed. A vernal pool (Potential Vernal Pool Branchiopod Habitat 2; Figure 3) near the proposed pipeline right-of-way was dominated by folded downingia (*Downingia ornitissima*).

Railroad Switchyard Area

South of the PPP site, within a railroad switchyard, the route crosses a constructed drainage ditch (Drainage Channel Crossing 2) that could potentially be a jurisdictional wetland, depending on the vegetation that is present.

Retention Basins

At the PPP site, there is a large retention basin that sometimes contains wetland vegetation (Figure 3), but is not considered a jurisdictional wetland by the US Army Corps of Engineers (Bob Smith, USACE, 2008, pers. comm.). This feature, which is designed to contain spills at the PPP, is not included in the action area. Also within the vicinity of but outside of the action area, is a flood control retention basin south of the railroad corridor, east of the unnamed tributary of Kirker Creek.

Freshwater/Brackish Marsh

This vegetation type occurs in association with permanent or nearly permanent water in the local study area, largely in association with the San Joaquin River/Suisun Bay and adjacent sloughs. A low-lying drainage channel south of the PPP site (Drainage Channel Crossing 1; Figure 3) supports this vegetation type, where the vegetation is likely maintained by groundwater. Palustrine emergent species often occur, dominated by California bulrush (*Scirpus californicus*), tule (*Scirpus acutus*), common reed (*Phragmites australis*), and narrow leaf cattail. Soils are composed of alluvial silts and clays. Brackish bulrush-cattail vegetation is considered rare by the CDFG.

Riparian Vegetation

Riparian vegetation in the local study area is limited to small patches associated with waterways and retention basins, and generally exists in an immature state due to routine disturbance. Species include cottonwood (*Populus balsamifera* spp. *trichocarpa*), California black walnut (*Juglans californica*), and Oregon ash (*Fraxinus latifolia*).

Grassland/Ruderal Vegetation

Disturbed annual grasslands dominated by European annual grasses and invasive forbs occur in the local study area. Species include rabbit's foot grass (*Polypogon monspeliensis*), cheeseweed (*Malva parviflora*), hairy vetch (*Vicia villosa* ssp. *villosa*), yellow star thistle (*Centaurea solstitialis*), Harding grass (*Phalaris aquatica*), Italian rye grass (*Lolium multiflorum*), Himalayan blackberry (*Rubus discolor*), bindweed (*Convolvulus arvensis*), Bermuda grass (*Cynodon dactylon*), oat grasses (*Avena* spp.), and foxtail barley (*Hordeum murinum*), among many others. Many of these species are weedy and non-native. Native shrubs include California sage (*Artemisia californica*), silver lupine (*Lupinus albifrons*), hill lotus (*Lotus micranthus*), and California croton (*Croton californicus*).

Ruderal Vegetation/Bare Ground

Ruderal vegetation and bare ground interspersed with ruderal vegetation is found throughout much of the local study area, in disturbed areas. Herbaceous, non native species such as Bermuda grass, broadleaf filaree (*Erodium botrys*), redstem filaree (*Erodium cicutarium*), prickly lettuce (*Lactuca serriola*), black

mustard (*Brassica juncea*), fennel (*Foeniculum vulgare*), broadleaf pepperweed (*Lepidium latifolium*), bur clover (*Medicago polymorpha*), and short pod mustard (*Hirschfeldia incana*) typically dominate these areas. Other species found in ruderal areas include yellow star thistle, Italian thistle, and milk thistle (*Silybum marianum*).

Landscaped/Ornamental

Some portions of the local study area support a landscape that is highly modified for human activities, such as formal recreational areas, and also include non-native ornamental landscape vegetation, such as bluegum eucalyptus (*Eucalyptus globulus*), crimson bottlebrush (*Callistemon citrinus*), blackwood acacia (*Acacia melanoxylon*), oleander (*Nerium oleander*), Peruvian peppertree (*Schinus molle*), fan palm (*Washingtonia filifera*), pine (*Pinus* sp.), pittosporum (*Pittosporum* sp.) cypress (*Cupressus* sp.), and fruit trees (*Prunus* sp.).

5.3 Habitat Types in the Action Area

Habitat within the action area is largely developed or modified (i.e., paved, disturbed, unvegetated) and the majority of the construction activities associated with the Proposed Action will be located entirely within the boundaries of the existing PPP site and PG&E switchyard on paved, disturbed, or unvegetated areas.

The water supply and wastewater discharge pipelines will be primarily located within a disturbed railroad corridor that contains ruderal and non-native vegetation. Construction of the pipelines would require two crossings of Kirker Creek (Creek Crossings 1 and 3), one crossing of an unnamed tributary of Kirker Creek (Creek Crossing 2), and two drainage channel crossings (Drainage Channel Crossing 1 south of the PPP site, and Drainage Channel Crossing 2 in the railroad switchyard) (Figure 3). Through the use of pipe installation techniques such as pipe-ramming, microtunneling, and installation within existing roadways, direct effects to wetland and waters habitats will be avoided.

Representative photographs of the action area are included in Appendix D.

6.0 FEDERALLY-LISTED, PROPOSED OR CANDIDATE SPECIES WITHIN THE ACTION AREA

Based on the field surveys and background review, only one federally protected species has potential to occur in the action area: California red-legged frog (CRLF) (*Rana draytonii*). There is marginally suitable habitat for California red-legged frog along the proposed water supply and wastewater discharge pipelines route, in Kirker Creek and its unnamed tributary. No habitats suitable to support federally protected species were identified within the PPP site and PG&E switchyard. No federally protected plant species were found during plant surveys nor are expected to occupy habitat in the action area (see Botanical Survey in Appendix A).

6.1 CRLF Life History

The CRLF was listed as a threatened species under the federal ESA on May 23, 1996 (USFWS, 1996a). The species is distributed throughout at least 28 counties in California but occurs primarily between Santa Barbara and just north of San Francisco (Jennings and Hayes, 1994; USFWS, 2002; Schaffer et al. 2004). The largest areas of currently occupied habitat are in Monterey, San Luis Obispo, and Santa Barbara Counties (USFWS, 2004). The CRLF uses a variety of aquatic, riparian, and upland habitats up to an elevation of 4,921 feet (Jennings and Hayes, 1994; Bulger et al., 2003; Stebbins, 2003).

The CRLF typically inhabits permanent and semi-permanent water sources such as streams, lakes, marshes, natural and artificial ponds, and ephemeral drainages in valley bottoms and foothills. CRLFs typically breed between November and April in standing or slow-moving water, generally over 2 feet deep (Hayes and Jennings, 1988), although CRLF tadpoles have been observed in shallower (10- to 20-inch) sections of streams not overrun by riparian vegetation (Reis, 1999). Streams suitable for CRLF breeding typically contain shrubby riparian or emergent vegetation, such as cattails (*Typha* sp.), tules (*Scirpus* sp.), and overhanging willows (*Salix* sp.) (Hayes and Jennings, 1988). Egg masses containing 2,000 to 5,000 eggs are attached to vegetation below the surface of the water and hatch in 6 to 14 days (Storer, 1925; Jennings and Hayes, 1994). The fully aquatic CRLF larvae require approximately 11 to 20 weeks for development through metamorphosis, and metamorphosed frogs require appropriate upland refugia for aestivation during dry periods. Refuge for the CRLF includes small mammal burrows, downed logs or vegetation, and dense vegetation/litter layer (USFWS, 2002).

Non-migrating CRLFs typically stay within 200 feet of aquatic habitat 90 percent of the time and have been found to be closely associated with dense cover (e.g., California blackberry [*Rubus ursinus*], poison oak [*Toxicondendron diversilobum*], and coyote bush [*Bacharis pillularis*]) (Bulger et al. 2003). Adult frogs are mainly active at night and may be active year-round in areas with permanent water. Juvenile frogs are active diurnally and nocturnally. Feeding occurs along the shoreline and the surface of the water (USFWS, 2002). Migrating CRLFs are known to disperse to streams up to 2 miles from their breeding sites. These migrations are typically made during wet-weather periods and at night (USFWS, 2002).

Continuing loss of fresh water habitat and the introduction of non-native predatory fish species and bullfrogs (*Lithobates catesbeianus*, formerly *Rana catesbeiana*) are attributed to the continuing population decline of the CRLF (USFWS, 2002).

6.2 CRLF Critical Habitat

On July 20, 2007, the USFWS announced its decision to review eight decisions made under the Endangered Species Act "after questions were raised about the integrity of the scientific information used and whether the decisions were consistent with appropriate legal standards" (USFWS, 2007a). On November 23, 2007, USFWS announced that it would take action to revise seven of the decisions, including the 2006 final critical habitat designation for the CRLF (USFWS, 2007a, b, c), which consisted of a subset of the proposed critical habitat units under consideration and that "may have affected the extent of the critical habitat designation" for this species (USFWS, 2007a, b, c).

On September 16, 2008, USFWS issued a revised proposal for designating critical habitat boundaries for the CRLF (USFWS, 2008b). The area that USFWS proposed as designated critical habitat for the CRLF is three times larger than the 2006 designation for the species. The final critical habitat rule is due to the *Federal Register* by August 29, 2009.

The action area lies outside of all currently designated critical habitat for the CRLF (USFWS, 2006) and all proposed revised designated critical habitat for the CRLF (USFWS, 2008b). The closest designated critical habitat unit, CCS-1A (USFWS. 2006, 2008), is approximately 14 miles southwest of the action area, while the closest proposed critical habitat unit, CCS-2, is approximately 2 miles south of the action area. The action area is not within a CRLF Recovery Plan Core Area (USFWS, 2002).

6.3 Previously Documented Occurrences of CRLF in the Vicinity

Contra Costa County is considered to be within the CRLF's current range (USFWS, 2002). A CNDDB records search within 10 miles of the action area returned 28 previously documented occurrences of the CRLF (CDFG, 2009). The closest occurrence of the CRLF (#531) is 1.4 miles southeast of the action area (CDFG, 2009; Figure 9). This occurrence, from 2002, was in Markley Canyon Creek. This creek is

not hydrologically connected to Kirker Creek. Markley Creek runs from Black Diamond Mines Regional Preserve, through the City of Antioch along its border with Pittsburg, into the West Antioch Creek, and into the San Joaquin River at the Dow Wetlands Preserve.

CRLFs are known to occur in upstream portions of the Kirker Creek watershed, starting approximately 2.1 miles south of the offsite water line (CDFG, 2009), but are not known to occur in the immediate vicinity of the action area or downstream of the action area.

6.4 Potential Suitable Habitats for CRLF in the Action Area

Kirker Creek and its unnamed tributary, near Creek Crossings 1, 2, and 3 (Figure 3), provide potentially suitable habitat for the CRLF. The upland habitats adjacent to these channels provide only low quality habitat for the CRLF. These areas consist of short annual grasses and ruderal vegetation, are maintained as such because they lie within existing utility or transportation corridors, and offer frogs little in the way of cover. Due to the incised nature of the creeks, their steep banks, and the lack of habitat features in the uplands that would attract CRLF, CRLF are not expected to use these uplands.

Kirker Creek and its unnamed tributary, near to, but outside of the action area, provide only marginally suitable aquatic habitat for the CRLF, due to the fragmented nature of these channels, the presence of non-native fishes, and the likely abundance of predators such as domestic cats and raccoons. In May 2008 both channels were full of mosquitofish (*Gambusia affinis*). The segments of Kirker Creek near Creek Crossings 1 and 3 supports some emergent vegetation that could be used as cover by frogs, but the tributary to Kirker Creek (Creek Crossing 2) largely lacks wetland and riparian vegetation. The presence of suitable, occupied habitats farther up in the watershed increases the likelihood that a stray or dispersing frog may occasionally be present in Kirker Creek or its unnamed tributary, within or near the water supply and wastewater discharge pipelines alignment.

Surveys following USFWS (1997) *Guidance on Site Assessment and Field Surveys for California Red-Legged Frogs* were conducted for CRLFs on both channels approximately 0.4 mile upstream of the water pipeline in 2003 for the SR 4 (East) Widening Project (Parsons, 2004, 2005). Only one species of amphibian, a bullfrog (*Rana catesbeiana*), was observed (at West Antioch Creek) during these surveys. While no CRLF were observed during the protocol level surveys, the USFWS conducted a field review of the SR 4 (East) Widening Project area and determined that that West Antioch Creek at the SR 4/Contra Loma Boulevard–L Street Interchange (approximately 2 miles southeast of the WPGS action area) is potential habitat for the CRLF, and prepared a biological opinion with an incidental take statement for the CRLF for that project (Caltrans, 2005). West Antioch Creek is not hydrologically connected to Kirker Creek.

Suitable aquatic and upland habitats for CRLF are absent from Drainage Channel Crossing 1. The artificial drainage channel lacks hydrologic connectivity with the upper Kirker Creek watershed, where California red-legged frogs do occur. Industrial and residential portions of Pittsburg separate the channel from more suitable CRLF habitats in the hills south of Pittsburg. This channel has been excavated for flood control purposes and drains, via a pump, into brackish marsh immediately to the west of the pipeline alignment. The channel closely resembles brackish marsh habitat, which does not support CRLF.

Suitable aquatic and upland habitats for CRLF are also absent from Drainage Channel Crossing 2. This artificial drainage ditch lacks hydrologic connectivity with the upper Kirker Creek watershed, where CRLF's do occur. It is located in the middle of a railroad switchyard, surrounded by rows of railroad tracks, bare ground, and scattered ruderal vegetation. It collects stormwater and appears to drain into a channel that flows into the Suisun Bay. The ditch is largely unvegetated, although it has been conservatively identified as a potential wetland. This drainage ditch is located more than 100 feet from

the launching and receiving pits from which the underground pipeline installation will be conducted (Figure 8). The receiving pit, located within the railroad switchyard, is primarily within a bare area with some railroad tracks, but may support some nonnative species typical of disturbed areas. The launching pit is located in an existing paved parking lot behind a commercial building. Access to the receiving pit would occur somewhere along the railroad corridor in disturbed ground which supports very limited ruderal vegetation.

7.0 FEDERALLY-LISTED, PROPOSED OR CANDIDATE SPECIES ADJACENT TO THE ACTION AREA

Vernal pool tadpole shrimp (*Lepidurus packardi*), vernal pool fairy shrimp (*Branchinecta lynchi*) and listed fish species (i.e., green sturgeon (*Acipenser medirostris*), Delta smelt (*Hypomesus transpacificus*), Central Valley steelhead (*Oncorhynchus mykiss*), Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*), and Central Valley winter-run Chinook salmon (Sacramento River) (*Oncorhynchus tshawytscha*)) have potential suitable habitats adjacent to the proposed water supply and wastewater discharge pipeline route but outside of the action area.

There is some potential for branchiopod species (i.e., vernal pool fairy shrimp and vernal pool tadpole shrimp) to occur in depressions and wetland areas near the proposed water supply and wastewater discharge pipeline route These areas range from a bare (unvegetated) depression beside the railroad tracks to a natural vernal pool. These particular species are endemic to vernal pools and swales in California's Central Valley (USFWS, 1994), but also inhabit scrapings, tire tracks and other artificial depressions (Ebasco Environmental, 1993; USFWS, 1996b). Potential habitat exists for listed vernal pool branchiopods in shallow depressions that pond water during the wet season (October to April).

In particular, three seasonal pools near the proposed water supply and wastewater discharge pipeline route (Potential Vernal Pool Branchiopod Habitat 1, 2, and 3; Figure 3) have been identified as potentially suitable habitat for vernal pool branchiopods. These pools, from west to east, include (1) an unvegetated, seasonally ponded depression on the south side of the Union Pacific railroad tracks, approximately 1,750 feet west of Loveridge Road (Potential Vernal Pool Branchiopod Habitat 1, which is approximately 836 feet southeast of Creek Crossing 1, approximately 620 feet southwest of Creek Crossing 2, and approximately 52 feet south of the proposed water supply and wastewater discharge pipeline route [closest distance]); (2) a natural vernal pool adjacent to the south side of the Pittsburg-Antioch Highway, approximately 1,800 feet east of where the Highway converges with the railroad line (Potential Vernal Pool Branchiopod Habitat 2, which is approximately 792 feet southwest of Creek Crossing 3 and approximately 80 feet south of the water pipeline alignment [closest distance); and (3) a vegetated, seasonally ponded depression on the south side of the Pittsburg-Antioch Highway, approximately opposite Arcy Lane (Potential Vernal Pool Branchiopod Habitat 3, which is approximately 186 feet south of Creek Crossing 3 and approximately 120 south of the proposed water supply and wastewater discharge pipeline route [closest distance]). A subsequent site reconnaissance to Potential Vernal Pool Branchiopod Habitat 2, conducted in May 2008, revealed that the vernal pool has been filled with soil by an unknown third party. The closest documented occurrence of vernal pool fairy shrimp is less than one mile from the proposed water supply and wastewater discharge pipeline route, and vernal pool tadpole shrimp have been documented approximately 3.7 miles from the action area (CDFG, 2009; Figure 9).

Listed fish species are known to occur in the San Joaquin River located approximately 100 feet north of the action area.

In the vicinity of but outside the action area, there is potential for federally protected species to occur in wetlands north of the action area along the San Joaquin River and its tributaries and in the agricultural and grassland areas several miles south of the action area.

8.0 EVALUATION OF POTENTIAL EFFECTS OF THE PROPOSED ACTION

This section evaluates the potential effects of the Proposed Action on federally protected species.

8.1 Construction Effects

The majority of the Proposed Action will be located entirely within the boundaries of the existing PPP site and PG&E switchyard, on paved, disturbed, and unvegetated areas. Within the PPP site and PG&E switchyard, construction would consist of the demolition of existing buildings and the construction of new generation facilities. Since the area is primarily paved and does not contain suitable habitat, there will be no effects to federally protected species associated with this work.

The water supply and wastewater discharge pipelines will be primarily located within a disturbed railroad corridor that contains ruderal vegetation and annual grasses, and along existing roadways. The water pipelines will be located underground, except at the intersection of Harbor Street, where the pipeline would cross overhead adjacent to the railroad tracks, consistent with the location of the existing unused fuel oil pipeline. Construction of the proposed water supply and wastewater discharge pipelines would involve trenching through primarily ruderal vegetation that occurs along the railroad corridor. Construction of the pipelines would require two crossings of Kirker Creek (Creek Crossings 1 and 3), one crossing of an unnamed tributary of Kirker Creek (Creek Crossing 2), and two drainage channel crossings (Drainage Channel Crossing 1 south of the PPP site, and Drainage Channel Crossing 2 in the railroad switchyard) (Figure 3). All of these crossings will be achieved in a manner that avoids disturbance of any potential jurisdictional wetlands or waters of the U.S. Through the use of appropriate pipeline installation methods such as pipe ramming, microtunneling, and installation within existing roadways, direct effects to wetland and waters habitat will be avoided.

As described in Section 6.0, the pipeline alignment intersects marginally suitable habitat for California red-legged frog at Creek Crossings 1-3, while no suitable habitats for CRLF are located at Drainage Channel Crossings 1 and 2.

At Creek Crossing 3, the pipeline will be installed within the existing roadway or roadway shoulder (Arcy Lane), and would cross the creek at a location where the creek is already culverted underneath the existing roadway (Figure 6). Therefore, there will be no effects to CRLF as a result of construction activities at Creek Crossing 3.

To reduce the potential for adverse effects to the CRLF and other biological resources that could sometimes be present in Kirker Creek and its unnamed tributary, a pipe ramming technique which minimizes surface disturbance will be used to install pipes under Creek Crossings 1 and 2 (Figures 4 and 5). There is no use of slurry material with the pipe ramming technique, and therefore there is no risk of frac out at these locations. Potential effects will be limited to temporary disturbance of ruderal habitat no closer than 10 feet from the top of the well defined banks of Kirker Creek and its unnamed tributary, due to construction of launching and exit pads. The upland habitat that will be affected consists of ruderal vegetation and non-native grasses that lie between the Pittsburg-Antioch Highway and the railroad tracks (please refer to Photographs at the end of the document). This corridor is an existing underground utility corridor and regular maintenance activities presumably prevent establishment of other vegetation types. Since potential for occurrence of the CRLF is low, disturbances are small and temporary, and avoidance and minimization measures will be implemented, as described in Section 9.0 below, the Proposed Action is not expected to adversely affect the CRLF.

As described in Section 7.0, there is some potential for federally listed branchiopods to occur at locations near the water pipeline alignment (Potential Vernal Pool Branchiopod Habitats 1, 2, and 3; Figure 3), but that are outside of the action area. No work activities would occur within these depressions. Work

activities would occur within 250 feet of these areas but all work activities will be separated from these habitats by existing roadways or rail lines. (The USFWS typically assumes that all work within 250 feet of vernal pool branchiopod habitat could potentially indirectly affect the habitat [USFWS, 1996b]). West of Arcy Lane, the water supply and discharge pipelines will be installed north of or in the Pittsburg-Antioch Highway, thus avoiding potential adverse effects to vernal pool branchiopod habitat located south of the highway at two locations (Potential Vernal Pool Branchiopod Habitat 2 and 3). Disturbance to the potential vernal pool (Potential Vernal Pool Branchiopod Habitat 1) that occurs on the south side of the railroad grade approximately 1,750 feet west of Loveridge Road would also be avoided. The water supply and discharge pipelines will be installed on the opposite (north) side of the railroad grade from this habitat feature. The Proposed Action is expected to have no effect on listed vernal pool branchiopods.

Fish species listed above in Section 7.0 have potential to occur within the San Joaquin River, approximately 100 feet north of the action area. There will be no construction activities in or immediately adjacent to the river. In addition, erosion control measures will be implemented to avoid any adverse effects to the San Joaquin River or adjacent habitats during construction. Therefore, the Proposed Action is expected to have no effect to federal species that could occur in the river.

Construction of the WPGS would result in temporary noise disturbance to the surrounding areas and a temporary, insignificant increase in dust and suspended particles during demolition. Noise levels, as described in AFC Section 7.5 (URS, 2008), will be temporary and not greatly exceed ambient levels. These temporary effects are not expected to adversely affect federally listed, proposed to be listed, or candidate species. See Section 9.0 for an additional discussion of air quality impacts to soils and vegetation.

8.2 Operational Effects

With regards to long-term operations and maintenance of the WPGS, the potential effects of lighting, noise, electrocution, collision, and stormwater runoff were considered as part of the AFC (URS, 2008). Noise levels are not expected to significantly increase above those levels currently experienced during operation of the existing plant (AFC Sections 7.2.2.2 and 7.5, URS, 2008). These noise levels are not expected to exceed the limits identified by USFWS as potentially adversely affected federally listed species (USFWS, 2006b). The Proposed Action's transmission towers and lines would connect to adjacent transmission lines and will be constructed to avoid adverse effects to bird species and prevent electrocution. In addition, no federally listed, proposed to be listed, or candidate bird species are expected to use the area. No significant increases in impervious surface area would occur as a result of the Proposed Action, and stormwater runoff will be collected and properly discharged or recycled in accordance with permit requirements (AFC Section 7.2.2.2, URS, 2008). There will be no adverse effects to the river, since process makeup water will be supplied from and discharged to the DDSD WTP, east of the action area.

9.0 EVALUATION OF AIR EMISSIONS ON SOILS AND BIOLOGICAL RESOURCES

Many of the soils found in the vicinity of the WPGS site are hydric (high moisture) soils associated with the floodplains, marshes and wetlands adjacent to the Suisun Bay. Clear Lake Clay covers all areas of the WPGS site. Soils found along the proposed water supply and wastewater discharge pipeline alignment and the DDSD WTP include Clear Lake Clay, Omni Silty Clay, Sycamore Silty Clay Loam, Capay Clay, Rincon Clay Loam and Brentwood Clay Loam. The remaining areas are largely mucky soils, which are high in organic material content and associated with the shoreline marshes.

In addition to the soils identified above, soils types present off-site near the WPGS site include: Antioch Loam, Joice Muck, Piper Loamy Sand Suisun Peaty Muck, and Tidal Marsh. Absent from this area are

nutrient-poor soil types such that would be associated with rock outcroppings found in other, higher elevation areas in the Bay Area. Therefore, potential deposition of nitrogen-based nutrients from the air will not cause a significant increase in the nutritive properties of the local soils.

Vegetation types in the local study area include seasonal wetlands, freshwater/brackish marsh, open water, riparian vegetation, grassland/ruderal vegetation, ruderal vegetation/bare ground, landscaped/ornamental, and developed areas.

Several special-status plant species are known to occur near the project site. Federal special-status plants that could potentially occur within several miles of the project area include:

- Large-flowered fiddleneck (*Amsinckia grandiflora*)
- Suisun thistle (*Cirsium hydrophilum* var. *hydrophilum)*
- Soft bird's beak (*Cordylanthus mollis* ssp. *mollis*)
- Contra Costa wallflower (*Erysimum capitatum* var. *angustatum*)
- Contra Costa goldfields (*Lasthenia conjugens*)
- Colusa grass (*Neostapfia colusana*)
- Antioch Dunes evening primrose (*Oenothera deltoides* ssp. *howellii*)

Nitrogen deposition can be problematic in areas where plant species are adapted to grow on nutrient poor soils. Of the special-status species listed above, none are expected to occur within the action area, including the proposed water supply and wastewater discharge pipeline alignment. Two of these species; Antioch Dunes Evening-primrose and Contra Costa goldfields, do occur within 2 miles of the action area. Contra Costa goldfields is found in vernal pools and wet grasslands; these communities are not nutrient limited nor are they particularly sensitive to nitrogen deposition. Antioch Dunes evening primrose occurs on dune systems, which are somewhat nutrient limited due to their old, sandy soils. Although these species could be impacted by large additions of nitrogen, air analyses for this project indicate that increases in NO_x emissions due to the proposed project would be negligible in comparison to existing ambient levels. This is discussed further on the following page.

The potential for federally protected wildlife species to occur in or adjacent to the action area is evaluated separately in Sections 6.0 and 7.0. Special-status wildlife species that could occur within several miles of the project area include:

- Green sturgeon (*Acipenser medirostris*)
- California tiger salamander (*Ambystoma californiense*)
- Lange's metalmark butterfly (*Apodemia mormo langei*)
- Conservancy fairy shrimp (*Branchinecta conservation*)
- Vernal pool fairy shrimp (*Branchinecta lynchi*)
- San Bruno elfin butterfly (*Callophrys mossii bayensis*)
- Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)
- Delta green ground beetle (*Elaphrus viridis*)
- Delta smelt (*Hypomesus transpacificus*)
- Vernal pool tadpole shrimp (*Lepidurus packardi*)
- Alameda whipsnake (*Masticophis lateralis euryxanthus*)
- Central Valley steelhead (*Oncorhynchus mykiss*)
- Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*)
- Central Valley winter-run Chinook salmon (Sacramento River) (*Oncorhynchus tshawytscha*)
- California clapper rail (*Rallus longirostris obsoletus*)

- California red-legged frog (*Rana aurora draytonii*)
- Salt-marsh harvest mouse (*Reithrodontomys raviventris*)
- California least tern (*Sternula antillarum browni*)
- Giant garter snake (*Thamnophis gigas*)
- San Joaquin kit fox (*Vulpes macrotis mutica*)

The maximum incremental 1-hour average nitrogen dioxide (NO_2) concentration estimated by modeling emissions, corresponding to the turbine startup conditions, is 168.6 micrograms per cubic meter ($\mu g/m^3$). When added to the maximum monitored local background concentration of 109.04 $\mu g/m^3$, the resulting total of 278 $\mu g/m^3$ is below the California Ambient Air Quality Standard of 339 $\mu g/m^3$. The maximum incremental project annual average NO_2 concentration estimated by modeling is 0.3 $\mu g/m^3$. When added to the maximum monitored local background concentration of 22.6 $\mu g/m^3$, the total of 22.9 $\mu g/m^3$ is well below the California Ambient Air Quality Standard of 57 $\mu g/m^3$. NO_2 has been shown to be potentially harmful to vegetation but at much higher concentrations than these as discussed below.

EPA has established a screening procedure for determining potential effects to plants, soils and animals (U.S. EPA, 1980). Table 3.1 of the EPA guidance document lists screening concentrations for various pollutants, representing minimum concentrations at which adverse growth effects or tissue injuries have been reported in the scientific literature. Shown in Table 1 below is a comparison of the screening concentrations from the EPA document and the modeled impacts from the WPGS. Note that very conservative comparisons have been made using the highest modeled short-term (hourly) NO2 concentrations, even when the screening threshold concentrations are expressed in 4-hour, 8-hour or monthly averages. Despite this conservatism, maximum predicted concentrations, including background levels, remain far below the screening criteria.

Table 1
Screening Assessment of WPGS Impacts on Soils and Vegetation

Pollutant	Screening Concentration[a] ($\mu g/m^3$)	Averaging Period	WPGS Maximum Modeled Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total (WPGS impact plus background) ($\mu g/m^3$)	Averaging Period for Comparison
NO_2	3,760	4-hr	168.6	109.04	277.6	1-hr
	3,760	8-hr	168.6	109.04	277.6	1-hr
	564	1 month	168.6	109.04	277.6	1-hr
	94	1 year	0.3	22.6	22.9	Annual
CO	1,800,000	1 week	67.4	2,166	2233.4	8-hr

[a] U.S. EPA, 1980.

Table 1 also shows similar comparisons of modeled concentrations and screening levels for carbon monoxide (CO). Figure 10 illustrates the locations of the maximum ground level concentrations shown in Table 1. For reference, a windrose showing the annual average pattern of wind speed and wind direction frequency in the project area is illustrated in Appendix E. Sulfur dioxide (SO_2) effects from WPGS emissions are very low due to the exclusive use of pipeline quality natural gas fuel, and will not result in any adverse effects to soils and vegetation.

The ground level concentrations of NO_2 and CO emissions resulting from WPGS operation would be well below the threshold concentrations shown in Table 1 that have been found to have adverse effects on soils or vegetation. Accordingly, the WPGS project will not result in any adverse effects to soils or vegetation.

The deposition of airborne particulates (PM10) has the potential to affect vegetation through either physical or chemical mechanisms. Physical mechanisms include the blocking of stomata so that normal gas exchange is impaired, as well as potential effects on leaf adsorption and reflectance of solar radiation. Deposition rates of 365 g/m^2/year have been shown to cause damage to fir trees, but rates of 274 g/m^2/year and 400 to 600 g/m^2/year did not damage vegetation at other sites (Lerman and Darley, 1975).

The maximum annual predicted concentration for PM10 due to emissions from the WPGS is 0.08 $\mu g/m^3$.

Assuming a deposition velocity of 2 cm/sec (average deposition velocity, as measured by the California Air Resources Board [CARB] "Lake Tahoe Atmospheric Deposition Study," September 2006, p. 4-71 for PM08 www.arb.ca.gov/research/ltads/final/ch4.pdf),

This concentration converts to an annual deposition rate of 0.05 g/m^2/year, which is several orders of magnitude below the level that is expected to result in injury to vegetation (i.e., 365 g/m^2/year).

The addition of the maximum predicted annual particulate deposition rate resulting from WPGS emissions plus the maximum recorded background local concentration of 20 $\mu g/m^3$, measured at the nearest air quality monitoring station, yields a total estimated particulate deposition rate of 12.7 g/m^2/year, utilizing the same 2 cm/sec deposition velocity. This total is still more than an order of magnitude less than levels expected to result in plant injury.

10.0 CUMULATIVE EFFECTS

The Proposed Action is not expected to adversely affect biological resources, and therefore would not contribute to cumulative effects.

Habitats in the regional and local study areas are mapped on Figure 3, and federally protected species in the area are similar to those with potential to occur near the PPP site and PG&E switchyard. Construction is expected to be undertaken between October 2009 and July 2012. Construction effects would include temporary loss of habitat and disturbance due to noise. Operation activities that could affect federally protected species include increased noise, stormwater discharge, air emissions, herbicide application, and increased lighting.

In combination with other projects in the area, the Proposed Action may contribute to cumulative increases in light, noise, and air emissions. Due to the ruderal nature of habitats in the action area and existing development in the action area, the effects of these increases on biological resources are expected to be minimal. The Proposed Action, including avoidance and minimization measures, is not expected to adversely affect biological resources, and therefore, would not contribute to cumulative effects.

11.0 AVOIDANCE AND MINIMIZATION MEASURES

As described below, measures will be implemented throughout construction of the Proposed Action to avoid and minimize potential adverse effects to federally protected species.

Avoid Sensitive Habitats and Species during Construction by Developing Construction Exclusion Zones and Silt Fencing in Sensitive Areas

In general, disturbance to existing grades and vegetation will be limited to the actual site of the WPGS, the water pipeline alignment, and necessary access routes. Information about environmentally sensitive areas will be shown on contract plans and discussed in the Special Provisions. Environmentally sensitive area provisions could include, but are not limited to, the use of temporary orange fencing to delineate the proposed limit of work in areas adjacent to sensitive resources, or to delineate and exclude sensitive resources from potential construction effects.

Contractor encroachment into environmentally sensitive areas will be restricted (including the staging/operation of heavy equipment or casting of excavation materials). Provisions for environmentally sensitive areas will be implemented as a first order of work, and would remain in place until all construction activities are complete; this includes any nest sites identified during preconstruction surveys. Placement of all roads, staging areas, and other facilities would avoid disturbance to wetlands and other sensitive areas of habitat. Existing ingress or egress points will be used. Equipment parking, action area access, supply logistics, equipment maintenance, and other Proposed Action-related activities would occur at a designated staging area. Following completion of the work, the contours of the area will be returned to preconstruction conditions or better.

Provide Worker Environmental Awareness Training for All Construction Personnel

Training would include the identification of the sensitive biological resources, including federally protected species, and measures required to minimize effects of the Proposed Action during construction and operation.

General Avoidance of Wetland/Stream Effects

The launching and receiving pits will be located at least 10 feet back from the top of the banks of potential wetlands and water's of the U.S. No work will be conducted within Kirker Creek, its tributaries or the drainage channels.

Regional Water Quality Control Board (RWQCB)-approved physical barriers adequate to prevent the flow or discharge of sediment into these systems will be constructed and maintained between working areas and streams, lakes, and wetlands. Erosion control and sediment retention devices (e.g., well-anchored sandbag cofferdams, straw bales, or silt fences) will be incorporated into the Proposed Action design and implemented at the time of construction. These devices will be in place during construction activities, and afterwards if necessary, to minimize sediment adverse effects to the wetlands and input to waters of the United States. These devices will be placed at all locations where sediment input is likely.

A supply of erosion control materials will be kept on hand to cover small sites that could become bare and to respond to sediment emergencies. Oily or greasy substances originating from the contractor's operations would not be allowed to enter or be placed where they would later enter a live or dry stream, pond, or wetland.

An emergency response plan will be prepared and submitted to appropriate agencies prior to the start of construction. The plan would identify actions that will be taken in the event of a spill of petroleum products or other material harmful to aquatic or plant life, and the emergency response materials that will be kept at the site to allow the rapid containment and cleanup of any spilled material.

Avoidance of Potential Vernal Pool Branchiopod Habitat South of Pittsburg-Antioch Highway

West of Arcy Lane, the water supply and wastewater discharge pipelines will be installed north of or in the Pittsburg-Antioch Highway, thus avoiding potential adverse effects to the two potential branchiopod habitats located south of the highway (Potential Vernal Pool Branchiopod Habitats 2 and 3), outside of the action area. No work would occur south of the edge of pavement on the south side of Arcy Lane, between the eastern end of the pipelines and a point that is 250 feet west from the natural vernal pool (Potential Vernal Pool Branchiopod Habitat 2) located south of the highway. If work occurs during the rainy season, straw wattles or silt fences will be installed, as needed, to prevent sediment from disturbed areas from crossing the roadway and reaching pools during rainy periods.

Disturbance to the unvegetated, seasonally ponded depression that occurs on the south side of the railroad grade approximately 1,750 feet west of Loveridge Road (Potential Vernal Pool Branchiopod Habitat 1) would also be avoided. The water supply and discharge pipelines will be installed on the opposite (north) side of the railroad grade from this habitat feature. No construction activities on the south side of the railroad grade will be conducted within 250 feet of this habitat outside of the dry season when listed vernal pool branchiopods are only present as durable resting eggs (cysts). Vehicles or other construction activities would not be allowed within the boundaries of the potential vernal pool branchiopod habitat at any time, to protect the cysts from destruction or damage.

Cap All Open Pipes

Capping open pipes at the end of each day during construction would reduce the potential for wildlife to enter a pipe and become trapped.

California Red-Legged Frog Avoidance and Minimization Measures

Where the water pipeline alignment crosses Kirker Creek at Creek Crossings 1 and 2, pipe ramming techniques are proposed to avoid disturbance to the stream channel, bed, and banks. Additionally, the following measures are proposed to be implemented at Creek Crossings 1 and 2, to avoid potential adverse effects to the California red-legged frog:

- Work areas and their immediate vicinity will be surveyed for California red-legged frog two weeks prior to the beginning of construction, one day prior to the beginning of work, as well as immediately prior to construction activities begin each day when the ground will be disturbed.

- Prior to construction, a qualified biologist would conduct training sessions to familiarize all construction personnel with identification of California red-legged frog, their habitat, general provisions and protections afforded by the Endangered Species Act, measures implemented to protect the species, and a review of the Proposed Action boundaries. This training would also be provided to any new workers. All ground disturbances at this location will be monitored by a qualified biologist.

- California red-legged frogs are not expected to occur in the work areas. If California red-legged frog is found within the construction area, the USFWS will be contacted and work will be postponed until the frog had moved out of the work area of its own volition or other arrangements were made in coordination with USFWS. No handling or relocation of California red-legged frogs is proposed as a part of this Proposed Action.

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

- Construction activities will be timed to occur during the dry season (April 1 to November 1) to minimize the chances of dispersing frogs being present in Kirker Creek.

Revegetation and Restoration of Disturbed Areas

Vegetation disturbed during the installation of the water line will be replanted with appropriate native annual grassland species. The topography will be restored after proposed construction activities have been completed.

12.0 CONCLUSIONS

No federally listed, proposed to be listed, or candidate species are expected to occur within the PPP site and PG&E switchyard. However, there is a low potential for Kirker Creek and its unnamed tributary, crossed by the water pipelines route, to provide dispersal habitat for the California red-legged frog. With the implementation of avoidance and minimization measures, the Proposed Action is *not likely to adversely affect* California red-legged frog. Listed vernal pool branchiopods could occur in depressions near the linear route, but since the pipelines in all cases would be separated from the depressions by an existing highway or railroad grade, the Proposed Action is expected to have *no effect* on these species. Rare plant surveys indicated that no federally listed, proposed to be listed, or candidate species occur within the action area. Most of the areas within the action area are highly developed and disturbed with little habitat value and are not likely to support other federally listed, proposed to be listed, or candidate species. The Proposed Action is expected to have *no effect* on all other federally listed, proposed to be listed, or candidate species.

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FIGURES

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VICINITY MAP

Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

February 2009
28067343

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FIGURE 1

0 2,000 4,000 FEET

0 0.5 1 MILES

ACTION AREA LOCATION

Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

February 2009
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FIGURE 2

Suisun Bay

Willow Pass Generating Station

1000-foot buffer

Proposed Natural Gas Line

Brown's Island

San Joaquin River

Middle Slough

Non-jurisdictional Retention Basin

Drainage Channel Crossing 1

Proposed Transmission Line

3rd St.

Railroad Ave.

Harbor St.

New York Slough

Winter Island

Willow Creek

Willow Pass Road

10th St.

Trib. of Willow

Trib. of Willow

Parkside Dr.

Drainage Channel Crossing 2

Railroad Switchyard

Harbor St.

Union Pacific Railroad

Delta Diablo Sanitation District Wastewater Treatment Plant

Dow Wetland Preserve

Flood Control Retention Basin

Potential Vernal Pool Branchiopod Habitat 1

Dowest Slough

Railroad Ave.

Leland Road

Creek Crossing 1

Kirker Creek

Arcy Ln.

Pittsburg-Antioch Highway

Creek Crossing 2

Kirker Creek

Leland Road

Unnamed Trib.

Loveridge Road

Creek Crossing 3

Potential Vernal Pool Branchiopod Habitat 2

Potential Vernal Pool Branchiopod Habitat 3

LEGEND

1000-foot buffer

Proposed Features

- Proposed Construction Laydown Area
- Willow Pass Generating Station Site
- Water Supply and Discharge Pipelines Route

Existing Features

- PG&E Switchyard (not part of Mirant facility)
- Railroad

*Potential wetlands are identified but have not been formally delineated, nor has Corps jurisdiction been determined

Habitat Types

- Seasonal wetlands*
- Freshwater brackish marsh
- Riparian
- Grassland ruderal
- Landscape ornamental
- Ruderal bare ground
- Developed residential
- Developed industrial commercial

0 2,000 4,000 FEET

0 0.5 1 MILES

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HABITAT TYPES
Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

FIGURE 3

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SCALE IN FEET

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CREEK CROSSING 1

Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

February 2009
28067343

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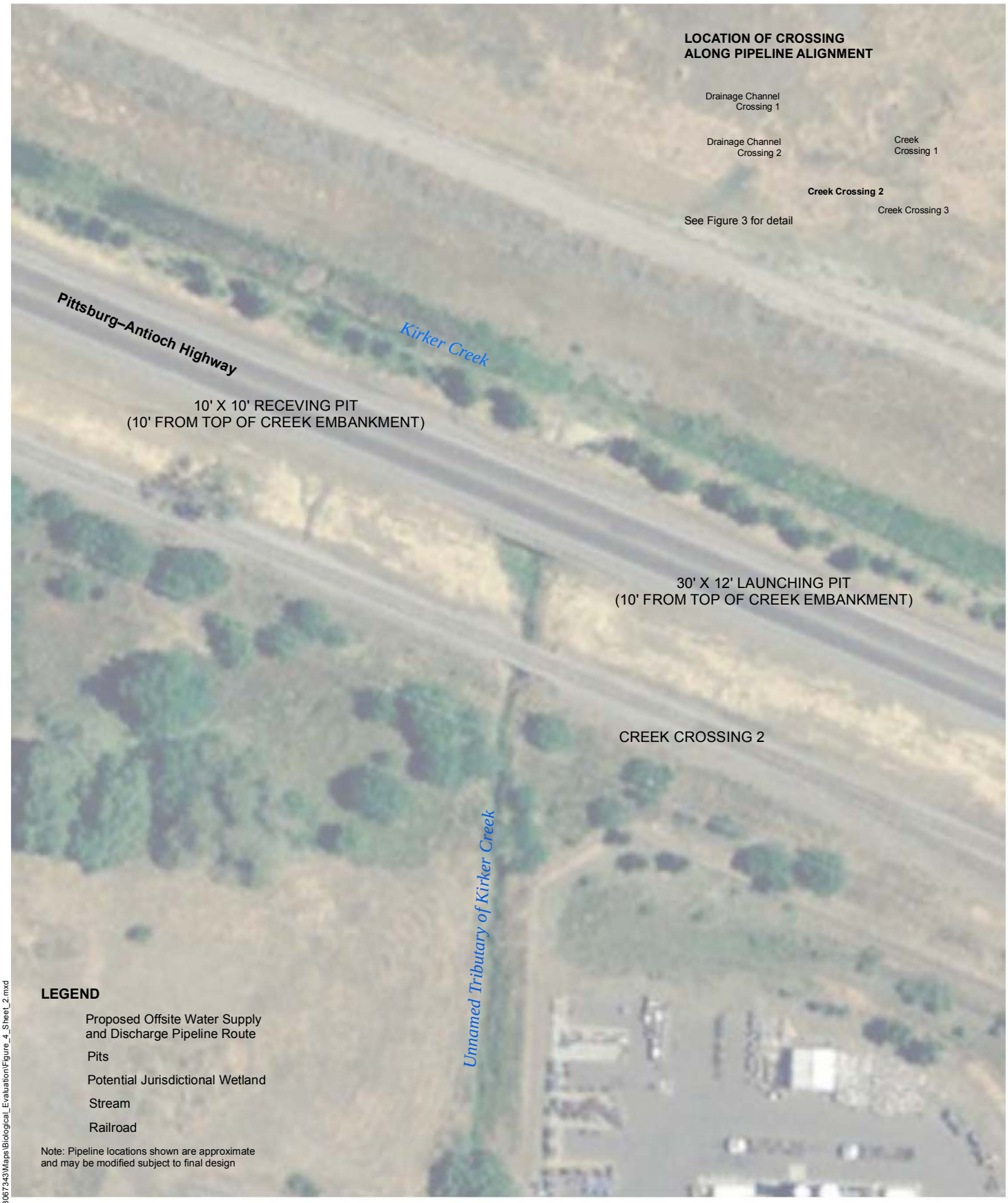
FIGURE 4



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CREEK CROSSING 2

Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

February 2009
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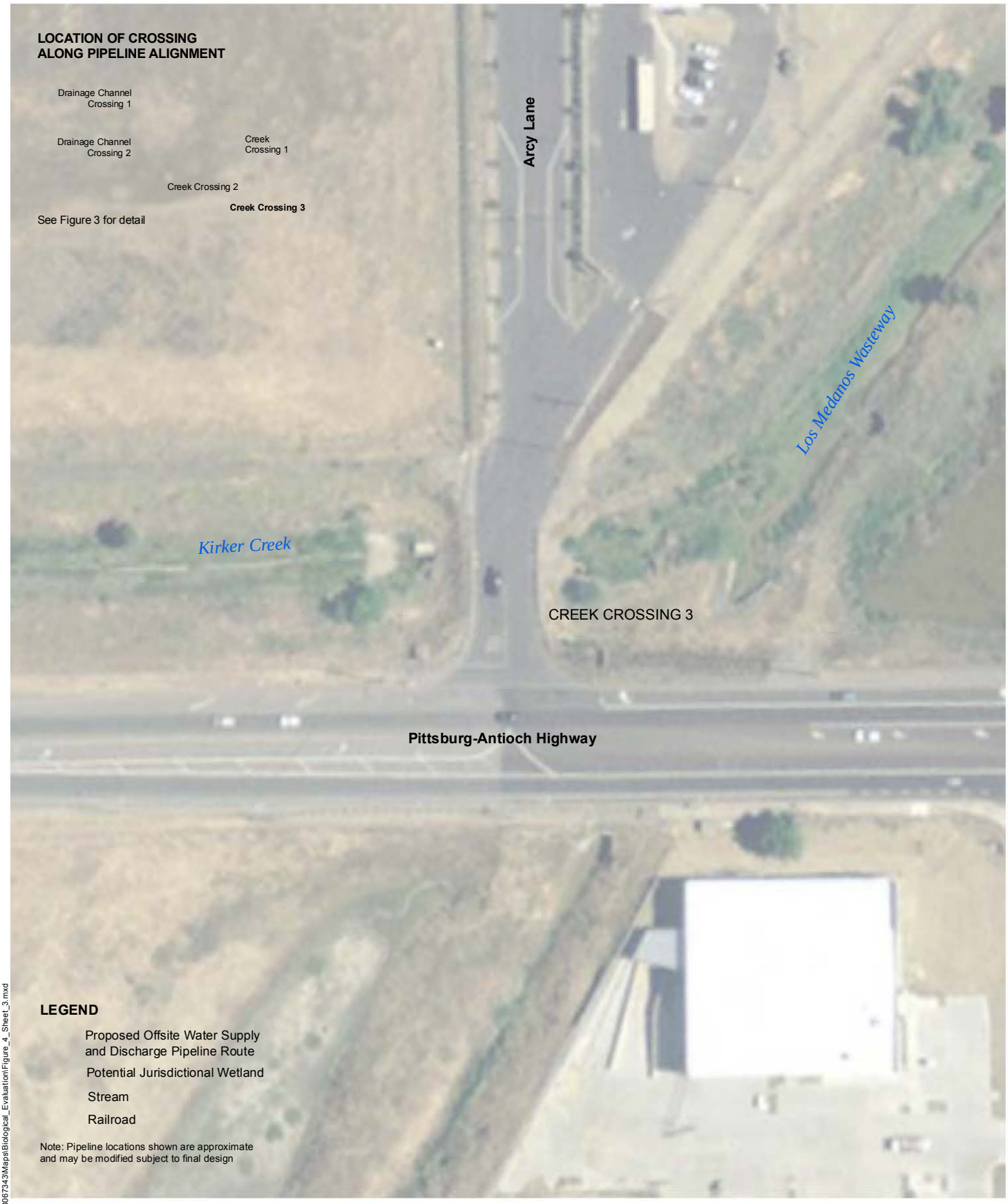
FIGURE 5



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SCALE IN FEET

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CREEK CROSSING 3

Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

February 2009
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FIGURE 6

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DRAINAGE CHANNEL CROSSING 1

Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

February 2009
28067343

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FIGURE 7

0 50 100

SCALE IN FEET

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DRAINAGE CHANNEL CROSSING 2

Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

February 2009
28067343

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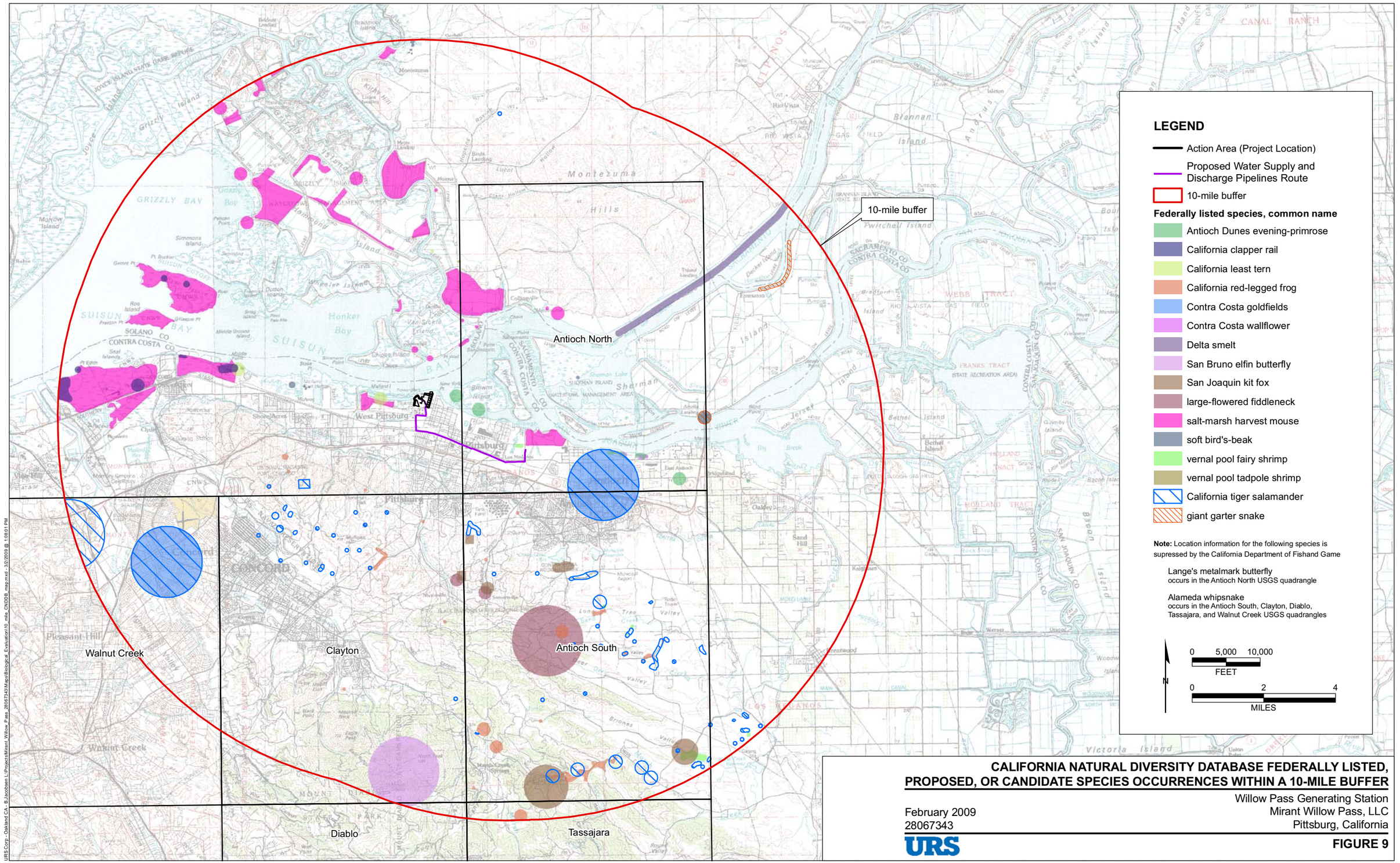
FIGURE 8



LEGEND

- Action Area (Project Location)
- Proposed Water Supply and Discharge Pipelines Route
- 10-mile buffer

Federally listed species, common name

- Antioch Dunes evening-primrose
- California clapper rail
- California least tern
- California red-legged frog
- Contra Costa goldfields
- Contra Costa wallflower
- Delta smelt
- San Bruno elfin butterfly
- San Joaquin kit fox
- large-flowered fiddleneck
- salt-marsh harvest mouse
- soft bird's-beak
- vernal pool fairy shrimp
- vernal pool tadpole shrimp
- California tiger salamander
- giant garter snake

Note: Location information for the following species is supressed by the California Department of Fishand Game

Lange's metalmark butterfly
occurs in the Antioch North USGS quadrangle

Alameda whipsnake
occurs in the Antioch South, Clayton, Diablo, Tassajara, and Walnut Creek USGS quadrangles

CALIFORNIA NATURAL DIVERSITY DATABASE FEDERALLY LISTED, PROPOSED, OR CANDIDATE SPECIES OCCURRENCES WITHIN A 10-MILE BUFFER

Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

February 2009
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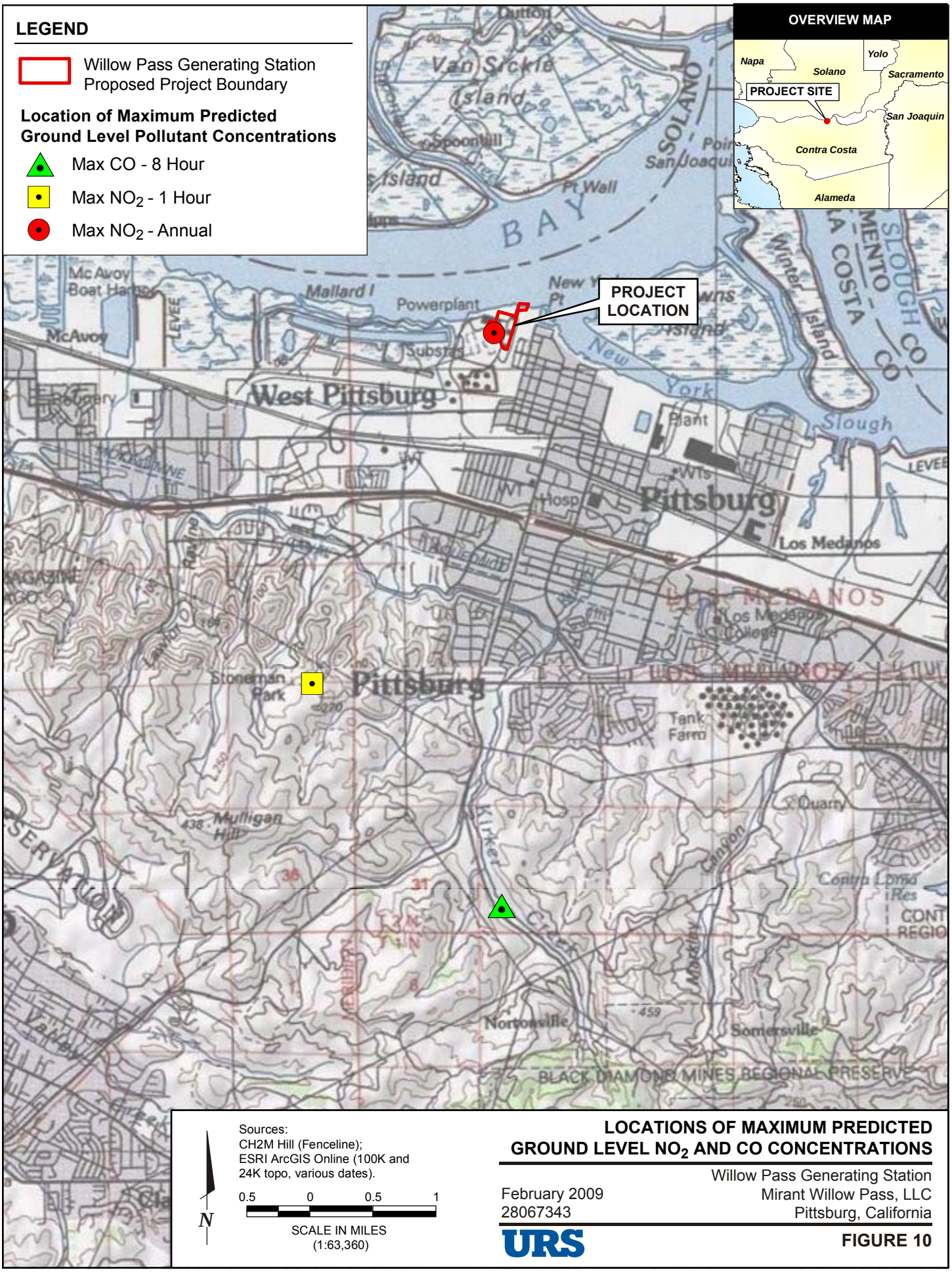
URS

FIGURE 9



LOCATIONS OF MAXIMUM PREDICTED GROUND LEVEL NO_2 AND CO CONCENTRATIONS

Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

February 2009
28067343

URS

FIGURE 10

Path: G:\gis\projects\1577\28067343\mxd\Max_NO2_CO_Concentrations.mxd, 02/25/09, Randall_Clark

2/27/09 vsa ..T:\Mirant Pittsburg-Willow Pass\Graphics\Bio Assessment\Fig 10_locs max NO2-CO_022709.ai

APPENDIX A
BOTANICAL SURVEY

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1.0 INTRODUCTION

This report documents the results of a botanical survey undertaken as part of the preparation of the Willow Pass Generating Station (WPGS) Application for Certification (AFC). Mirant Willow Pass LLC is proposing the construction and operation of a 550-megawatt generation facility, the WPGS, at the site of the existing Pittsburg Power Plant (PPP) facility owned and operated by Mirant Delta, LLC (Mirant Delta) in California.

To identify potential impacts on species that are protected under federal or state regulations (special-status plant species), Mirant Willow Pass commissioned a botanical survey of the eastern portion of the PPP site and the 5-mile offsite water pipelines alignment (the study area) that is proposed as part of the WPGS project. On May 7, 2008, URS conducted an initial site reconnaissance to identify potential areas of suitable habitat. As a result of these surveys, additional surveys of areas considered suitable habitat for special-status plant species were conducted by URS on May 21 and 28, 2008 and August 8, 2008 to coincide with the appropriate flowering periods for the relevant species.

2.0 METHODS

Prior to field reconnaissance, a list of special-status plants with potential to occur in the study area (Table 1) was compiled using historical records from the following data sources:

- U.S. Fish and Wildlife Service (USFWS), Sacramento Fish and Wildlife Office Endangered Species Lists: Federally listed species with historic range or current distribution within the Honker Bay and Antioch North U.S. Geological Survey (USGS) 7.5-minute quadrangles, accessed April 2008 (USFWS, 2008).

- California Department of Fish and Game (CDFG) Natural Diversity Database (CNDDB): Special-status species occurrence records from the Honker Bay, Antioch North and ten surrounding USGS quadrangles, accessed April 2008 (CDFG, 2008).

- California Native Plant Society (CNPS) Rare Plant Database: CNPS-listed plants within the Honker Bay, Antioch North and 10 surrounding USGS quadrangles accessed April 2008 (CNPS, 2008).

Each species on the list (Table 1) that could potentially occur in the study area was evaluated based on several factors, including the presence of suitable habitat within the study area, closest known occurrences of the species, and any other species-specific factors known to influence species distribution.

The results of the evaluation indicated that some special-status plant species typically found in wetlands/ depressions and grasslands and ruderal habitats could potentially occur in the study area, and additional surveys were conducted for these species.

Species typical of vernal pools and seasonally-ponded depressions and potentially occurring in the study area included:

- Alkali milk-vetch (*Astragalus tener* var. *tener*)
- Heartscale (*Atriplex cordulata*)
- Brittlescale (*Atriplex depressa*)
- San Joaquin spearscale (*Atriplex joaquiniana*)
- Pappose tarplant (*Centromadia parryi* ssp. *parryi*)
- Dwarf downingia (*Downingia pusilla*)

- Legenere (*Legenere limosa*)
- Bearded popcorn-flower (*Plagiobothrys hystriculus*)

Species typical of ruderal/grassland habitat and potentially occurring in the study area included:

- Big tarplant (*Blepharizonia plumosa*)
- Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*)
- Pappose tarplant (*Centromadia parryi* ssp. *parryi*)
- Carquinez goldenbush (*Isocoma arguta*)

Surveys for these species were conducted in wetlands and other ecologically sensitive areas in early and late summer (May 21, May 28, and August 8) to identify these special-status species during their flowering period. The eastern portion of the PPP sites and the portion of the offsite water pipelines alignment adjacent to the Union Pacific Railroad were surveyed in May only. Additional surveys of these areas were not considered necessary due to the low potential for the occurrence of special-status species at these locations.

3.0 RESULTS

3.1 Habitat Types

During the May 7, 2008 site reconnaissance survey, the following habitat types were identified within the study area:

- seasonal wetland
- freshwater/brackish marsh
- open water
- riparian vegetation
- grassland/ruderal vegetation
- ruderal vegetation/bare ground
- landscaped/ornamental
- developed areas

Section 7.2.1 of the AFC provides a detailed description of these vegetation types and their locations within the study area. The locations of these areas are shown on Figure 7.2-2 of the AFC.

3.2 Special-Status Species

Approximately 120 plant species were identified during site surveys (Table 2). None of the identified species are considered special-status plants by USFWS, CDFG, or CNPS. The most sensitive habitat identified in the immediate vicinity of the study area was a vernal pool immediately south of the Pittsburg-Antioch Highway and southwest of Arcy Lane that was dominated by folded downingia (*Downingia ornitissima*). The location of this feature is shown on AFC Figure 7.2-3. This vernal pool appeared to have been filled with soil at some time between May and August 2008. This feature could potentially contain special-status plants, but access to this parcel was not available at the time of the surveys. However, as the vernal pool is outside of the proposed water pipelines alignment and located to the south of the Pittsburg-Antioch Highway, it will not be affected by the construction of the water supply and discharge pipelines.

Additional habitat with the potential to support special-status plants was identified in wetland areas (i.e., Kirker Creek, Los Medanos Wasteway, and other scattered wetland depressions) at the east end of the

water pipelines alignment. These areas are shown on Figure 7.2-3 of the AFC. In May, area of wetlands to the east of Arcy Lane were surveyed, but the Los Medanos Wasteway and wetlands west of Arcy Lane could not be accessed and were only observed at a distance. In August, access was granted to survey wetlands north of the Pittsburg-Antioch Highway and east and west of Arcy Lane, including the Los Medanos Wasteway. Access to property near Arcy Lane on the south side of the highway, including a portion of the Los Medanos Wasteway and an adjacent seasonally-ponded depression, was not obtained for any of the surveys. However, no impacts south of the highway are anticipated as a result of the construction of the water supply and discharge pipelines.

No special-status plants were identified in the vicinity of Arcy Lane and the Pittsburg-Antioch Highway during the surveys. Based on the high degree of disturbance in the area and the negative survey results for special-status plants, wetlands near the intersection of Arcy Lane and the Pittsburg-Antioch Highway are not considered likely to support special-status plant species.

Ruderal/grassland habitat along the railroad corridor was also identified as having some potential to support special-status plants. The water supply and discharge pipelines alignment was surveyed in May and no special-status plant species were identified. At the time of the August survey it was noted that the entire railroad corridor had been recently mowed. Due to the recent mowing no plants were in flower and therefore identifiable during the August survey; however, the tarplants and goldenbush species (see Section 2.0) that could have been present and identifiable during the August survey would likely also have been identifiable during the May survey. Given the high level of disturbance it is unlike that any special-status plants occur in grassland and ruderal habitats along the water supply and discharge pipelines alignment.

Surveys revealed that no suitable habitat for special-status plant species occurs within the proposed WPGS site. This area is regularly mowed and treated with herbicide, contains little un-developed or un-paved ground, and lacks undisturbed vegetation.

4.0 CONCLUSIONS

It is not expected that any special-status plant species would be present within the study area. Based on the survey results and the high level of disturbance in the study area, no special-status plants are expected to be impacted as a result of the construction of the WPGS or offsite water supply and discharge pipelines.

5.0 REFERENCES CITED

CDFG (California Department of Fish and Game), 2008. California Natural Diversity Database (CNDDB), Rarefind 3, Accessed April 2008.

CNPS (California Native Plants Society), 2008. Inventory of Rare and Endangered Plants of California (online edition, v7-06b). Sacramento, CA. http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi. February 2008.

USFWS (U.S. Fish and Wildlife Service), 2008b. Species list for 7.5-minute topographic quadrangles: Honker Bay and Antioch North. April 2008.

Table 1
Special-Status Plant Species Reported Within a 10-Mile Radius[1] and Potential for Occurrence

Scientific Name	Common Name	Special Status	Habitat	Probability of Occurrence Within Project Vicinity
Amsinckia grandiflora	large-flowered fiddleneck	Federal: E State: E CNPS: 1B.1	Cismontane woodland; cismontane woodland, valley and foothill grassland; annual grassland in various soils. 275 to 550 m.	Low – Potential suitable habitat, but unexpected due to low elevation. Not observed during May rare plant surveys.
Amsinckia lunaris	bent-flowered fiddleneck	CNPS: 1B.2	Coastal bluff scrub, Cismontane woodland, Valley and foothill grassland.	Low – Potential suitable habitat. No occurrence in CNDDB data file or in 5-mile map. Not identified during May rare plant surveys.
Anomobryum julaceum	slender silver moss	CNPS: 2.2	Broadleaved upland forest; broad-leafed upland forest, lower montane coniferous forest, north coast coniferous forest; moss which grows on damp rocks and soil; usually seen on roadcuts. 100 to 1,000 m.	None – No potential suitable habitat. Elevation too low.
Arctostaphylos auriculata	Mt. Diablo manzanita	CNPS: 1B.3	Chaparral; chaparral; in canyons and on slopes. On sandstone. 120 to 500 m.	None – No suitable habitat is present near the study area. Elevation is too low.
Arctostaphylos manzanita ssp. *laevigata*	Contra Costa manzanita	CNPS: 1B.2	Chaparral; chaparral; rocky slopes. 500 to 1,100 m.	None – No suitable habitat is present near the study area. Elevation is too low.
Astragalus tener var. *tener*	alkali milk-vetch	CNPS: 1B.2	Alkali playa; alkali playa, valley and foothill grassland, vernal pools; low ground, alkali flats, and flooded lands; in annual grassland or in playas or vernal pools. 1 to 170 m.	Low – Suitable habitat is present in depressions with seasonal wetland vegetation and vernal pools near project. Not identified during surveys.
Atriplex cordulata	heartscale	CNPS: 1B.2	Chenopod scrub, Meadows and seeps, Valley and foothill grassland(sandy)/saline or alkaline. 1 to 375 m.	Low – Suitable habitat is present in depressions with seasonal wetland vegetation and vernal pools near project. Not identified during surveys. No occurrences from CNDDB within 5 miles.
Atriplex depressa	brittlescale	CNPS: 1B.2	Chenopod scrub, Meadows and seeps, Playas, Valley and foothill grassland, Vernal pools/alkaline, clay. 1 to 320 m.	Low – Suitable habitat is present in depressions with seasonal wetland vegetation and vernal pools near project. Not identified during surveys.
Atriplex joaquiniana	San Joaquin spearscale	CNPS: 1B.2	Chenopod scrub; chenopod scrub, alkali meadow, valley and foothill grassland; in seasonal alkali wetlands or alkali sink scrub with *Distichlis spicata*, frankenia, etc. 1 to 250 m.	Low – Suitable habitat is present in depressions with seasonal wetland vegetation and vernal pools near project. Not identified during surveys.

Table 1
Special-Status Plant Species Reported Within a 10-Mile Radius[1] and Potential for Occurrence (Continued)

Scientific Name	Common Name	Special Status	Habitat	Probability of Occurrence Within Project Vicinity
Atriplex persistens	vernal pool small-scale	CNPS: 1B.2	Vernal pools (alkaline). 10 to 115 m.	None – Not within 5 miles of the site, no information in CNDDB file. Not identified during surveys.
Blepharizonia plumosa	big tarplant	CNPS: 1B.1	Valley and foothill grassland; valley and foothill grassland; dry hills and plains in annual grassland. Clay to clay-loam soils; usually on slopes and often in burned areas. 15 to 455 m.	Low – Limited suitable habitat occurs in ruderal/disturbed grassland areas. Associated species observed. Not identified during the May survey. Unable to identify during the August survey due to mowing.
California macrophylla	round-leaved filaree	CNPS: 1B.1	Cismontane woodland; cismontane woodland, valley and foothill grassland; clay soils. 15 to 1,200 m.	Low – Suitable habitat in disturbed grasslands and abandoned fields. Not identified during surveys.
Calochortus pulchellus	Mt. Diablo fairy-lantern	CNPS: 1B.2	Chaparral; chaparral, cismontane woodland, riparian woodland, valley and foothill grassland; on wooded and brushy slopes. 200 to 800 m.	None – No suitable habitat is present near the study area. Elevation is too low.
Calystegia atriplicifolia ssp. *buttensis*	Butte County morning-glory	CNPS: 1B.2	Lower montane coniferous forest; lower montane coniferous forest; dry, mostly open slopes. 600 to 1,200 m.	None – No suitable habitat is present near the study area. Elevation is too low.
Campanula exigua	chaparral harebell	CNPS: 1B.2	Chaparral (rocky, usually serpentinite). 275 to 1,250 m.	None – No suitable habitat. Elevation is too low.
Centromadia parryi ssp. *congdonii*	Congdon's tarplant	CNPS: 1B.2	Valley and foothill grassland(alkaline). 1 to 230 m.	Low – Potential to occur in grasslands near marshes/depressions. Associated species observed at site. No occurrences within 5 miles. Not identified during surveys.
Centromadia parryi ssp. *parryi*	pappose tarplant	CNPS: 1B.2	Chaparral, Coastal prairie, Meadows and seeps, Marshes and swamps(coastal salt), Valley and foothill grassland(vernally mesic)/often alkaline. 2 to 420 m.	Low – Potential to occur in depressions/swales. No occurrences within 5 miles. Low potential for occurrence in unsurveyed vernal pools and depressions with seasonal wetland vegetation.
Cirsium hydrophilum var. *hydrophilum*	Suisun thistle	Federal: E CNPS: 1B.1	Marshes and swamps(salt). 0 to 1 m.	Low – Potential for occurrence along Suisun Bay/New York Slough, outside of project impact area.

Table 1
Special-Status Plant Species Reported Within a 10-Mile Radius[1] and Potential for Occurrence (Continued)

Scientific Name	Common Name	Special Status	Habitat	Probability of Occurrence Within Project Vicinity
Cordylanthus mollis ssp. *hispidus*	hispid bird's-beak	CNPS: 1B.1	Meadows and seeps, Playas, Valley and foothill grassland/alkaline. 1 to 155 m.	None– No occurrences within 5 miles. Potential habitat near Suisun Bay, but species typically found in brackish rather than fresh waters. No suitable habitat within the study area.
Cordylanthus mollis ssp. *mollis*	soft bird's-beak	Federal: E State: R CNPS: 1B.2	Marsh and swamp; coastal salt marsh; in coastal salt marsh with *Distichlis, Slicornia, Frankenia,* etc. 0 to 3 m.	None – No occurrences within 5 miles. Potential habitat near Suisun Bay/New York Slough, but species typically found in brackish rather than fresh waters. No suitable habitat within the study area.
Cordylanthus nidularis	Mt. Diablo bird's beak	State: R CNPS: 1B.1	Chaparral; grassy or rocky areas within serpentine chaparral. One site known, 765 m.	None – Only known from one occurrence — elevation is too low.
Cryptantha hooveri	Hoover's cryptantha	CNPS: 1A	Valley and foothill grassland; valley and foothill grassland; in coarse sand. 9 to 150 m.	None – Potential habitat does occur in surrounding grasslands, but there are only three reported occurrences of this species. It is thought to be expatriated to Contra Costa County. Not identified during surveys.
Delphinium californicum ssp. *Interius*	Hospital Canyon larkspur	CNPS: 1B.2	Chaparral (openings), Cismontane woodland (mesic). 230 to 1,095 m.	None – No suitable habitat. Elevation is too low.
Didymodon norrisii	Norris' beard moss	CNPS: 2.2	Cismontane woodland, Lower montane coniferous forest/intermittently mesic, rock. 600 to 1,973 m.	None – No suitable habitat. Elevation is too low.
Downingia pusilla	dwarf downingia	CNPS: 2.2	Valley and foothill grassland; valley and foothill grassland (mesic sites), vernal pools; vernal lake and pool margins with a variety of associates. In several types of vernal pools. 1 to 485 m.	Low – Suitable habitat in vernal pool. Pool was not surveyed during May surveys due to lack of access.
Eriastrum brandegeeae	Brandegee's eriastrum	CNPS: 1B.2	Chaparral, Cismontane woodland/volcanic, sandy. 305 to 1,030 m.	None – No suitable habitat. Elevation is too low.

Table 1
Special-Status Plant Species Reported Within a 10-Mile Radius[1] and Potential for Occurrence (Continued)

Scientific Name	Common Name	Special Status	Habitat	Probability of Occurrence Within Project Vicinity
Eriogonum truncatum	Mt. Diablo buckwheat	CNPS: 1B.1	Chaparral; chaparral, coastal scrub, valley and foothill grassland; dry, exposed clay or sandy substrates. 100 to 600 m.	None – Suitable habitat in grassland areas, but unexpected due to low elevation. Other known occurrences are at higher elevations on Mount Diablo. Not identified during surveys.
Erysimum capitatum var. *angustatum*	Contra Costa wallflower	Federal: E & critical habitat State: E CNPS: 1B.1	Interior dunes; inland dunes; stabilized dunes of sand and clay near Antioch along the San Joaquin River. 3 to 20 m.	None – No suitable habitat within study area.
Eschscholzia rhombipetala	diamond-petaled California poppy	CNPS: 1B.1	Valley and foothill grassland; valley and foothill grassland; alkaline, clay slopes and flats. 0 to 975 m.	None – Potential habitat, but occurrence is unlikely. The only reported nearby occurrence is from 1889 and is thought to be an expatriated specimen. Not identified during surveys.
Fritillaria liliacea	fragrant fritillary	CNPS: 1B.2	Coastal prairie; coastal scrub, valley and foothill grassland, coastal prairie; often on serpentine; various soils reported though usually clay, in grassland. 3 to 410 m.	None – No suitable habitat. No associated species observed. No serpentine or clay soils. No nearby occurrences.
Helianthella castanea	Diablo helianthella	CNPS: 1B.2	Broadleaved upland forest; broadleaved upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland; usually in chaparral/oak woodland interface in rocky, azonal soils. Often in partial shade. 25 to 1,150 m.	None – No suitable habitat is present near the study area. Elevation may be too low.
Hesperolinon breweri	Brewer's western flax	CNPS: 1B.2	Chaparral; chaparral, cismontane woodland, valley and foothill grassland; often in rocky serpentine soil in serpentine chaparral and serpentine grassland. 30 to 885 m.	None – No serpentine habitat is present. Elevation may be too low.
Hibiscus lasiocarpus	woolly rose-mallow	CNPS: 2.2	Freshwater marsh; marshes and swamps (freshwater); moist, freshwater-soaked river banks and low peat islands in sloughs; in California, known from the delta watershed. 0 to 150 m.	None – There are some marsh areas to the north of the WPGS along the Suisun Bay/New York Slough, but no peat islands or sloughs in the vicinity. There are no nearby reports of this species.

Table 1
Special-Status Plant Species Reported Within a 10-Mile Radius[1] and Potential for Occurrence (Continued)

Scientific Name	Common Name	Special Status	Habitat	Probability of Occurrence Within Project Vicinity
Isocoma arguta	Carquinez goldenbush	CNPS: 1B.1	Valley and foothill grassland; valley and foothill grassland; alkaline soils, flats, lower hills. On low benches near drainages and on tops and sides of mounds in swale habitat. 1 to 20 m.	Low – Some habitat, but not ideal. All reported occurrences are from Solano County, and not near the study area. Not identified during surveys.
Juglans hindsii	Northern California black walnut	CNPS: 1B.1	Riparian forest; riparian forest, riparian woodland. Few extant native stands remain; widely naturalized; deep alluvial soil associated with a creek or stream. 0 to 395 m.	None – No suitable habitat is present near the study area identified during surveys.
Lasthenia conjugens	Contra Costa goldfields	Federal: E CNPS: 1B.1	Cismontane woodland; valley and foothill grassland, vernal pools, cismontane woodland. Extirpated from most of its range; extremely endangered; vernal pools, swales, low depressions, in open grassy areas. 1 to 445 m.	Low – Potential suitable habitat in vernal pools and disturbed grasslands. Habitat is not ideal and highly disturbed. Occurrence in Antioch North thought to be expatriated. Not identified during surveys.
Lathyrus jepsonii var. *jepsonii*	Delta tule pea	CNPS: 1B.2	Freshwater marsh; freshwater and brackish marshes; often found with *Typha, Aster lentus, Rosa californica, Juncus* spp., *Scirpus*, etc. Usually on marsh and slough edges.	None – Potential to occur in marsh habitat along the Suisun Bay/New York Slough, but not near study area.
Legenere limosa	legenere	CNPS: 1B.1	Vernal pools. 1 to 880 m.	Low – Potential to occur in vernal pool, which was not surveyed due to lack of access.
Lessingia hololeuca	woolly-headed lessingia	CNPS: 3	Broad-leafed upland forest, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland/clay, serpentinite. 15 to 305 m.	None – No suitable habitat. No serpentinite.
Lilaeopsis masonii	Mason's lilaeopsis	State: R CNPS: 1B.1	Freshwater marsh; freshwater and brackish marshes, riparian scrub; tidal zones, in muddy or silty soil formed through river deposition or river bank erosion. 0 to 10 m.	None – Potential to occur in marsh habitat along the Suisun Bay/New York Slough, but not in study area.

Table 1
Special-Status Plant Species Reported Within a 10-Mile Radius[1] and Potential for Occurrence (Continued)

Scientific Name	Common Name	Special Status	Habitat	Probability of Occurrence Within Project Vicinity
Limosella subulata	Delta mudwort	CNPS: 2.1	Brackish marsh; riparian scrub, freshwater marsh, brackish marsh. Probably the rarest of the suite of delta rare plants; usually on mud banks of the delta in marshy or scrubby riparian associations; often with *Lilaeopsis masonii.* 0 to 3 m.	None – Potential to occur in marsh habitat along the Suisun Bay/New York Slough, but not in study area.
Madia radiata	showy madia	CNPS: 1B.1	Chenopod scrub; valley and foothill grassland, cismontane woodland, chenopod scrub; mostly on adobe clay in grassland or among shrubs. 25 to 1,125 m.	None – Suitable habitat in disturbed grassland areas. However, presence is unlikely as there are only three records from 1938 and 1941. Not identified in surveys.
Malacothamnus hallii	Hall's bush-mallow	CNPS: 1B.2	Chaparral, coastal scrub. 10 to 760 m.	None– No potential habitat.
Micropus amphibolus	Mt. Diablo cottonweed	CNPS: 3.2	Broad-leafed upland forest, Chaparral, Cismontane woodland, Valley and foothill grassland/rocky. 45 to 825 m.	None – No potential habitat. Elevation is too low.
Monardella villosa ssp. *globosa*	robust monardella	CNPS: 1B.2	Broad-leafed upland forest(openings), Chaparral(openings), Cismontane woodland, Coastal scrub, Valley and foothill grassland. 100 to 915 m.	None – No potential habitat. Elevation is too low.
Neostapfia colusana	Colusa grass	Federal: T CNPS: 1B.1	Vernal pools. Usually in large, or deep vernal pool bottoms; adobe soils. 5 to 110 m.	None – No suitable habitat. No nearby occurrence records.
Oenothera deltoides ssp. *howellii*	Antioch Dunes evening-primrose	Federal: E & critical habitat State: E CNPS: 1B.1	Interior dunes; remnant river bluffs and sand dunes east of Antioch. 0 to 30 m.	None – No potential habitat in study area.
Phacelia phacelioides	Mt. Diablo phacelia	CNPS: 1B.2	Chaparral, Cismontane woodland/rocky. 500 to 1,370 m.	None – No suitable habitat. Elevation is too low.
Plagiobothrys hystriculus	bearded popcorn-flower	CNPS: 1B.1	Valley and foothill grassland(mesic), Vernal pools margins/often vernal swales. 0 to 52 m.	Low – Potential to occur in vernal pool, the channelized portion of Kirker Creek, and Los Medanos Wasteway, which were not surveyed during May due to lack of access. Not identified in surveys.

Table 1
Special-Status Plant Species Reported Within a 10-Mile Radius[1] and Potential for Occurrence (Continued)

Scientific Name	Common Name	Special Status	Habitat	Probability of Occurrence Within Project Vicinity
Potamogeton zosteriformis	eel-grass pondweed	CNPS: 2.2	Marsh and swamp; marshes and swamps; ponds, lakes, streams. 0 to 1,860 m.	Low – Potential habitat does occur in the study area, but there are no nearby known occurrences.
Sanicula saxatilis	rock sanicle	State: R CNPS 1B.2	Broad-leafed upland forest, Chaparral, Valley and foothill grassland/rocky. 620 to 1,175 m.	None– No suitable habitat. Elevation is too low.
Senecio aphanactis	chaparral ragwort	CNPS 2.2	Cismontane woodland; cismontane woodland, coastal scrub; drying alkaline flats. 20 to 575 m.	Low – No suitable habitat is present near the study area. Elevation is too low.
Streptanthus albidus ssp. *peramoenus*	most beautiful jewel-flower	CNPS 1B.2	Chaparral, Cismontane woodland, Valley and foothill grassland/serpentinite. 94 to 1,000 m.	None – No suitable habitat is present near the study area. Elevation is too low.
Streptanthus hispidus	Mt. Diablo jewel-flower	CNPS 1B.2	Chaparral, Valley and foothill grassland/rocky. 365 to 1,200 m.	None – No suitable habitat is present near the study area. Elevation is too low.
Symphyotrichum lentum	Suisun Marsh aster	CNPS 1B.2	Brackish marsh; marshes and swamps (brackish and freshwater); most often seen along sloughs with *Phragmites*, *Scirpus*, blackberry, *Typha*, etc., 0 to 3 m.	None – No potential habitat in study area.
Triquetrella californica	coastal triquetrella	CNPS 1B.2	Coastal bluff scrub, coastal scrub. Moss growing on soil. 10 to 100 m.	None – No suitable habitat in study area.
Tropidocarpum capparideum	caper-fruited tropidocarpum	CNPS 1B.1	Valley and foothill grassland; valley and foothill grassland; alkaline clay. 0 to 455 m.	None – Thought to be extinct. Last known record from 1957. Occurrences near study area from 1889 and 1896.
Viburnum ellipticum	oval-leaved viburnum	CNPS: 2.3	chaparral, cismontane woodland, lower montane coniferous forest. 215 to 1,400 m.	None – No suitable habitat is present near the study area. Elevation is too low.

Notes:
[1] This includes the WPGS site, onsite linears, construction laydown and parking areas, and offsite water pipeline alignment

Special-status abbreviations: T = Threatened, E = Endangered, R = Rare, N = None, SSC = Species of Special Concern, BCC = Bird of Conservation Concern; CNPS List (First number): 1 = Plants rare, threatened or endangered in California and elsewhere, 2 = Plants rare, threatened, or endangered in California, but more common elsewhere, 3 = More information about the plant is needed before a determination can be made; CNPS Threat Code Rankings (decimal): 1 = Seriously endangered in California, 2 = Fairly endangered in California, 3 = Not very endangered in California.

Table 2
Plant Species Observed in the Study Area by Habitat

Scientific Name	Common Name	Seasonal Wetland	Freshwater/ brackish Marsh	Riparian	Grassland/ ruderal	Landscaped/ ornamental
Acacia melanoxylon	blackwood acacia					X
Acacia sp. *(*possibly *A. verticillata)*	star acacia					X
Agrostis sp.	bent grass	X				
Ailanthus altissima	tree of heaven				X	
Amsinkia sp. *(*likely *A. manzeisii)*	fiddleneck				X	
Arctostaphylos sp.	manzanita					X
Artemisia californica	California sagebrush				X	
Asclepias fascicularis	narrow leaf milkweed				X	
Atriplex sp. *(likely A. semibaccata)*	Australian saltbrush				X	
Atriplex sp. *(likely Atriplex argentea)*	silverscale	X			X	
Atriplex triangularis	fat hen	X			X	
Avena barbata	slender wild oats				X	
Avena fatua	common wild oats				X	
Baccharis pilularis	coyote brush				X	X
Baccharis salicifolia	mulefat	X				
Brassica nigra	black mustard	X				
Brassica rapa	field mustard				X	
Bromus diandrus	ripgut brome				X	
Bromus madritensis	foxtail brome	X				
Callistemon citrinus	crimson bottlebrush				X	X
Callistemon rigidus	river bottlebrush					X
Campsis radicans	trumpet creeper				X	
Carduus pycnocephalus	Italian thistle				X	
Carex sp.	sedge	X				
Centaurea solstitialis	yellow star thistle				X	
Chamaesyce serpyllifolia	thyme leafed spurge	X			X	
Chenopodium sp. *(possibly C. berlandieri)*	goosefoot	X			X	
Circium vulgare	bull thistle	X				
Convolvulus arvensis	bindweed				X	

Table 2
Plant Species Observed in the Study Area by Habitat (Continued)

Scientific Name	Common Name	Seasonal Wetland	Freshwater/ brackish Marsh	Riparian	Grassland/ ruderal	Landscaped/ ornamental
Conzya sp.	horseweed				X	
Cortaderia jubata	pampas grass		X			
Crepis sp.	hawksbeard				X	
Cynara cardunculus	artichoke thistle				X	
Cyperus eragrostis	tall flatsedge	X				
Cyperus sp.	flatsedge	X				
Dactylis glomerata	orchard grass				X	
Datura wrightii	jimsonweed				X	
Deschampsia sp.	hairgrass	X				
Digitaria sanguinalis	hairy crabgrass				X	
Distichlis spicata	saltgrass	X			X	
Downingia ornitissima	folded downingia	X				
Echinochloa crus-galli	barnyard grass				X	
Eleocharis sp.	spikerush	X				
Elymus glaucus	blue wildrye				X	
Epilobium sp.	willowherb	X				
Epilobium brachycarpum	annual fireweed				X	
Eremocarpus setigerus	turkey mullien				X	
Erodium botrys	broadleaf filaree				X	
Erodium cicutarium	redstem filaree				X	
Eschscholzia californica	California poppy	X				
Foeniculum vulgare	fennel				X	
Fraxinus latifolia	Oregon ash	X	X			
Gnaphalium luteo-album	everlasting cudweed	X				
Gnaphalium stramineum	small flowered cudweed	X				
Grindelia camportum ssp. *camportum*	Great Valley gumplant				X	
Heliotropum europaeum	European heliotrope	X				
Hemizonia sp.	tarplant				X	
Hirschfeldia incana	short pod mustard				X	
Hordeum murinum	foxtail barley				X	

Table 2
Plant Species Observed in the Study Area by Habitat (Continued)

Scientific Name	Common Name	Seasonal Wetland	Freshwater/ brackish Marsh	Riparian	Grassland/ ruderal	Landscaped/ ornamental
Juglans californica	California black walnut					X
Juncus balticus	Baltic rush		X			
Lactuca serriola	prickly lettuce				X	
Lepidium latifolium	broadleaf pepperweed		X		X	
Leymus triticoides	creeping wildrye	X			X	
Lithrum hysopifolium	loosestrife	X				
Lolium perenne	perennial rye grass				X	
Lolium temulentum	Darnel ryegrass				X	
Lotus corniculatus	bird's foot trefoil	X				
Lupinus sp. *(likely L. albifrons)*	lupine				X	
Malva parviflora	cheeseweed				X	
Malva sp. *(possibly M. leprosa)*	mallow				X	
Malvella leprosa	alkali mallow	X			X	
Medicago polymorpha	bur clover				X	
Melilotus sp.	sweet clover				X	
Mentha spicata	spearmint	X				
Mimosa sp.	mimosa				X	
Nassella sp.	needlegrass				X	
Nerium oleander	oleander					X
Oenanthe sarmentosa	water parsley	X				
Panicum sp. *(likely P. capillare)*	witchgrass				X	
Paspalum dilatatum	Dallis grass	X				
Phalaris aquatica	Harding grass	X				
Phalaris sp.	canarygrass	X				
Phragmites australis	common reed	X	X			
Phytolacca americana	pokeweed				X	
Picris echioides	bristly oxtongue	X	X	X	X	
Pinus sp.	pine					X
Pittosporum sp.	pittosporum					X

Table 2
Plant Species Observed in the Study Area by Habitat (Continued)

Scientific Name	Common Name	Seasonal Wetland	Freshwater/ brackish Marsh	Riparian	Grassland/ ruderal	Landscaped/ ornamental
Poa sp.	bluegrass	X				
Polygonum spp.	knotweed	X				
Polypogon sp.	beard grass				X	
Polypogon interruptis	ditch beard grass	X				
Polypogon monspeliensis	rabbit's foot grass	X				
Populus balsamifera spp. *trichocarpa*	cottonwood	X		X		
Prunus sp.	fruit tree					X
Quercus agrifolia	coast live oak				X	X
Raphanus sativus	wild radish				X	
Rhamnus californica	California coffeeberry					X
Rubus discolor	Himalayan blackberry				X	
Rumex crispus	curly dock	X			X	
Salicornia virginica	pickleweed	X				
Salix exigua	sandbar willow			X		
Salix laevigata	red willow			X	X	
Salsola kali	Russian thistle				X	
Schinus molle	Peruvian peppertree					X
Schoenoplectus pungens	common threesquare	X				
Scirpus acutus	common tule	X				
Scirpus californicus	California bulrush		X			
Silybum marianum	milk thistle				X	
Solanum sarrachoides	nightshade				X	
Solidago sp.	goldenrod				X	
Sonchus oleraceus	common sowthistle				X	
Sorghum halepensis	Johnson grass				X	
Stipitatus micranthus	slender popcorn flower	X				
Symphoricarpos albus	snowberry			X		X
Torilis arvensis	hedge parsley	X				
Tribulus terrestris	cowtrop				X	

Table 2
Plant Species Observed in the Study Area by Habitat (Continued)

Scientific Name	Common Name	Seasonal Wetland	Freshwater/ brackish Marsh	Riparian	Grassland/ ruderal	Landscaped/ ornamental
Trifolium hirtum	rose clover				X	
Typha angustifolia	narrow leaf cattail	X	X			
Vicia villosa ssp. *villosa*	hairy vetch				X	
Washingtonia filifera	fan palm				X	X
Xanthium strumarium	rough cocklebur	X			X	

APPENDIX B

U.S. FISH AND WILDLIFE SPECIES LIST

U.S. Fish & Wildlife Service
Sacramento Fish & Wildlife Office
Federal Endangered and Threatened Species that Occur in
or may be Affected by Projects in the Counties and/or
U.S.G.S. 7 1/2 Minute Quads you requested
Document Number: 090211031731
Database Last Updated: January 29, 2009

Quad Lists

Listed Species

Invertebrates

- *Apodemia mormo langei*
  - Lange's metalmark butterfly (E)
- *Branchinecta lynchi*
  - vernal pool fairy shrimp (T)
- *Desmocerus californicus dimorphus*
  - valley elderberry longhorn beetle (T)
- *Elaphrus viridis*
  - delta green ground beetle (T)
- *Lepidurus packardi*
  - vernal pool tadpole shrimp (E)

Fish

- *Acipenser medirostris*
  - green sturgeon (T) (NMFS)
- *Hypomesus transpacificus*
  - Critical habitat, delta smelt (X)
  - delta smelt (T)
- *Oncorhynchus mykiss*
  - Central Valley steelhead (T) (NMFS)
  - Critical habitat, Central Valley steelhead (X) (NMFS)
- *Oncorhynchus tshawytscha*
  - Central Valley spring-run chinook salmon (T) (NMFS)
  - Critical Habitat, Central Valley spring-run chinook (X) (NMFS)
  - Critical habitat, winter-run chinook salmon (X) (NMFS)

- winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

- *Ambystoma californiense*
  - California tiger salamander, central population (T)

- *Rana aurora draytonii*
  - California red-legged frog (T)

Reptiles

- *Masticophis lateralis euryxanthus*
  - Alameda whipsnake [=striped racer] (T)

- *Thamnophis gigas*
  - giant garter snake (T)

Birds

- *Rallus longirostris obsoletus*
  - California clapper rail (E)

- *Sternula antillarum* (=*Sterna*, =*albifrons*) browni
  - California least tern (E)

Mammals

- *Reithrodontomys raviventris*
  - salt marsh harvest mouse (E)

- *Vulpes macrotis mutica*
  - San Joaquin kit fox (E)

Plants

- *Cordylanthus mollis* ssp. *mollis*
  - soft bird's-beak (E)

- *Erysimum capitatum* ssp. *angustatum*
  - Contra Costa wallflower (E)
  - Critical Habitat, Contra Costa wallflower (X)

- *Lasthenia conjugens*
  - Contra Costa goldfields (E)

- *Neostapfia colusana*

  - Colusa grass (T)

- *Oenothera deltoides* ssp. *howellii*
  - Antioch Dunes evening-primrose (E)
  - Critical habitat, Antioch Dunes evening-primrose (X)

Proposed Species

Amphibians

- *Rana aurora draytonii*
  - Critical habitat, California red-legged frog (PX)

Quads Containing Listed, Proposed or Candidate Species:

HONKER BAY (481C)

ANTIOCH NORTH (481D)

County Lists

No county species lists requested.

Key:

- (E) Endangered - Listed as being in danger of extinction.
- (T) Threatened - Listed as likely to become endangered within the foreseeable future.
- (P) Proposed - Officially proposed in the Federal Register for listing as endangered or threatened.
- (NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.
- Critical Habitat - Area essential to the conservation of a species.
- (PX) Proposed Critical Habitat - The species is already listed. Critical habitat is being proposed for it.
- (C) Candidate - Candidate to become a proposed species.
- (V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
- (X) Critical Habitat designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, or may be affected by projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online Inventory of Rare and Endangered Plants.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list.
See our Protocol and Recovery Permits pages.

For plant surveys, we recommend using the Guidelines for Conducting and Reporting Botanical Inventories. The results of your surveys should be published in any environmental documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal consultation with the Service.

- During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.
- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.
- Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our Map Room page.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts.

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site-specific

mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6580.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be May 12, 2009.

APPENDIX C

FEDERALLY LISTED, PROPOSED, OR CANDIDATE SPECIES WITH POTENTIAL TO OCCUR IN THE VICINITY OF THE ACTION AREA

Table C-1
Federally Listed, Proposed, or Candidate Species Reported with Potential to Occur in the Vicinity of the Action Area[1]

Scientific Name	Common Name	Federal Status[3]	Habitat[4]	Probability of Occurrence Within Action Area
Invertebrates				
Apodemia mormo langei	Lange's metalmark butterfly	E	Inhabits stabilized dunes along the San Joaquin River. Endemic to Antioch dunes, Contra Costa County. Primary host plant is *Eriogonum nudum* var. *auriculatum*; feeds on nectar of other wildflowers, as well as host plant.	Low – Recorded from nearby Antioch dunes, but unlikely to approach action area due to lack of suitable habitat within action area.
Branchinecta conservatio	Conservancy fairy shrimp	E	Endemic to the grasslands of the northern two thirds of the Central Valley; found in large, turbid vernal pools. Astatic pools located in swales formed by old, braided alluvium; filled by winter/spring rains and last until June.	None – Pools of the size typically occupied by *B. conservatio* are lacking from the action area.
Branchinecta lynchi	vernal pool fairy shrimp	T	Valley and foothill grassland; endemic to the grasslands of the Central Valley, Central Coast Mountains., and South Coast Mountains, in astatic rain-filled pools. Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	None – All potential vernal pool branchiopod habitat is outside of the action area. One vernal pool and two depressions near the water pipeline alignment may have the hydrology necessary to support fairy shrimp. There is one known occurrence (#212) from within 1 mile of action area (CDFG, 2009; Figure 9).
Callophrys mossii bayensis	San Bruno elfin butterfly	E	Coastal, mountainous areas with grassy ground cover, mainly in the vicinity of San Bruno Mountain, San Mateo County. Colonies are located on steep, north-facing slopes within the fog belt. Larval host plant is *Sedum spathulifolium*.	Low – Immediate vicinity lacks suitable habitat with proper exposure for this species. Action area lacks suitable habitat for this species. Nearest occurrence is at Mount Diablo 8.1 miles from the action area (CDFG, 2009).

Table C-1 **Federally Listed, Proposed, or Candidate Species Reported with Potential to Occur in the Vicinity of the Action Area[1]**				
Scientific Name	**Common Name**	**Federal Status[3]**	**Habitat[4]**	**Probability of Occurrence Within Action Area**
Desmocerus californicus dimorphus	valley elderberry longhorn beetle	T	Associated with elderberry bushes (*Sambucus* sp.), riparian forests along rivers and streams. Prefers to lay eggs in elderberries 2 to 8 inches in diameter; some preference shown for "stressed" elderberries.	None – The action area lacks elderberry bushes.
Elaphrus viridis	delta green ground beetle	T	Restricted to the margins of vernal pools in the grassland area between Jepson Prairie and Travis Air Force Base. Prefers the sandy mud substrate where it slopes gently into the water, with low-growing vegetation, 25 to 100 percent cover.	None – The action area is outside of the known range of this species. No occurrences with 10 miles of the action area (CDFG, 2009).
Lepidurus packardi	vernal pool tadpole shrimp	E	Valley and foothill grassland; inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid water; pools commonly found in grass bottomed swales of unplowed grasslands. Some pools are mud-bottomed and highly turbid.	None – All potential vernal pool branchiopod habitat is outside of the action area. One vernal pool and two depressions near the water pipeline alignment may have the hydrology necessary to support tadpole shrimp. Closest occurrence of this species is 3.7 miles from the action area (CDFG, 2009).
Fish				
Acipenser medirostris	green sturgeon	T	Spawns in the Sacramento River and the Klamath River. Spawns at temperatures between 8 and 14 degrees Celsius. Preferred spawning substrate is large cobble, but can range from clean sand to bedrock.	None – Suisun Bay/New York Slough, north of the action area, serves as suitable habitat, but would not be affected as a result of the Proposed Action.
Hypomesus transpacificus	Delta smelt	T & CH	Aquatic; Sacramento-San Joaquin Delta. Seasonally in Suisun bay, Carquinez Strait and San Pablo Bay; seldom found at salinities > 10 parts per thousand (ppt). Most often at salinities <2 ppt.	None – Suisun Bay/New York Slough, north of the action area, serves as suitable habitat, but would not be affected as a result of the Proposed Action. No critical habitat within the action area.

Table C-1
Federally Listed, Proposed, or Candidate Species Reported with Potential to Occur in the Vicinity of the Action Area[1]

Scientific Name	Common Name	Federal Status[3]	Habitat[4]	Probability of Occurrence Within Action Area
Oncorhynchus mykiss	Central Valley steelhead	T & CH	Populations in the Sacramento and San Joaquin Rivers and their tributaries.	None – Suisun Bay/New York Slough, north of the action area, serves as suitable habitat, but would not be affected as a result of the Proposed Action. No critical habitat within the action area.
Oncorhynchus tshawytscha	Central Valley spring-run Chinook salmon	T & CH	Adult numbers. Depend on pool depth and volume, amount of cover, and proximity to gravel. Water temperature >27° C is lethal to adults. Federal listing refers to population spawning in Sacramento River and tributaries.	None – Suisun Bay/New York Slough, north of the action area, serves as suitable habitat, but would not be affected as a result of the Proposed Action. No critical habitat within the action area.
Oncorhynchus tshawytscha	winter-run Chinook salmon (Sacramento River)	E & CH	Sacramento River below Keswick Dam. Spawns in the Sacramento River but not in tributary streams. Requires clean, cold water over gravel beds with water temperatures between 6 and 14°C for spawning.	None – Suisun Bay/New York Slough, north of the action area, serves as suitable habitat, but would not be affected as a result of the Proposed Action. No critical habitat within the action area.
Amphibians				
Ambystoma californiense	California tiger salamander	T	Cismontane woodland; vernal pools and stock ponds, prefers open grassland. Central valley DPS listed as threatened. Santa Barbara and Sonoma Counties DPS listed as endangered.; need underground refuges, especially ground squirrel burrows and vernal pools or other seasonal water sources for breeding	Low – Combination of suitable breeding habitat surrounded by suitable upland habitat lacking from immediate vicinity and action area lacks suitable habitat for this species. Known occurrences are from hills to the south, all more than approximately 1.9 miles away in less developed areas (CDFG, 2009).

Table C-1 Federally Listed, Proposed, or Candidate Species Reported with Potential to Occur in the Vicinity of the Action Area[1]				
Scientific Name	**Common Name**	**Federal Status[3]**	**Habitat[4]**	**Probability of Occurrence Within Action Area**
Rana draytonii	California red-legged frog	T & PCH	Aquatic; lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation; requires 11 to 20 weeks of permanent water for larval development. Must have access to aestivation habitat—aquatic and riparian, dense shrubby or emergent vegetation close to deep-water pools with fringes of cattails and dense stands of overhanging vegetation (e.g., willows).	Low – Although known from upper Kirker Creek watershed, starting approximately 2.1 miles south of the offsite water line (CDFG, 2009), highly disturbed nature of habitats in the action area makes occurrence of this species less likely. No critical habitat within the action area.
Reptiles				
Masticophis lateralis euryxanthus	Alameda whipsnake	T	Cismontane woodland; restricted to valley-foothill hardwood habitat of the coast ranges between Monterey and the San Francisco Bay. It inhabits south-facing slopes and ravines where shrubs form a vegetative mosaic with oak trees and grasses.	None – The action area lacks suitable habitat.
Thamnophis gigas	giant garter snake	T	Marsh and swamp; overwinters in animal burrows from October to March. Agricultural wetlands, irrigation and drainage canals, sloughs, ponds, slow creeks and adjacent uplands. Requires water, emergent herbaceous wetland vegetation (cattails, rushes), grassy banks and openings, higher elevation uplands. Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches; this is the most aquatic of the garter snakes in California.	None – Known range of this species does not extend as far west in the San Francisco Bay/Delta as the Proposed Action area.

Table C-1
Federally Listed, Proposed, or Candidate Species Reported with Potential to Occur in the Vicinity of the Action Area[1]

Scientific Name	Common Name	Federal Status[3]	Habitat[4]	Probability of Occurrence Within Action Area
Birds				
Rallus longirostris obsoletus	California clapper rail	E	Salt and brackish marshes, typically dominated by pickleweed, Pacific cordgrass. Restricted to major sloughs and rivers, tidal marsh areas.	Low – Marshes associated with Suisun Bay/New York Slough provide suitable habitat but would not be affected by the Proposed Action. No suitable habitats within action area.
Sternula antillarum browni	California least tern (nesting colony)	E	Alkali playa; nests along the coast from San Francisco Bay south to northern Baja, California; colonial breeder on bare or sparsely vegetated, flat substrates: sand beaches, alkali flats, land fills, or paved areas.	Low – Known from brackish marshes immediately west of the PPP, which would not be affected by the Proposed Action. No suitable habitats within action area.
Mammals				
Reithrodontomys raviventris	salt-marsh harvest mouse	E	Marsh and swamp; only in the saline emergent wetlands of San Francisco Bay and its tributaries; pickleweed is primary habitat. Do not burrow, build loosely organized nests. Require higher areas for flood escape.	None – Marshes associated with Suisun Bay/New York Slough provide suitable habitat but would not be affected by the Proposed Action. No suitable habitats within action area.
Vulpes macrotis mutica	San Joaquin kit fox	E	Chenopod scrub; annual grasslands or grassy open stages with scattered shrubby vegetation; needs loose-textured sandy soils for burrowing, and suitable prey density near freshwater marshes. Forages in California prairie and grasslands with dense, tall grasses and San Joaquin saltbrush. Deep, heavy loam soils.	Low – The action area lacks suitable habitat and lies within a matrix of urban, suburban, and commercial development. Closest occurrence is 2.2 miles south of the action area in Contra Loma Regional Park, on the edge of, but within extensive grassland habitat where this species is known to occur (CDFG, 2009).

Table C-1
Federally Listed, Proposed, or Candidate Species Reported with Potential to Occur in the Vicinity of the Action Area[1]

Scientific Name	Common Name	Federal Status[3]	Habitat[4]	Probability of Occurrence Within Action Area
Plants				
Amsinckia grandiflora	large-flowered fiddleneck	E	Cismontane woodland; cismontane woodland, valley and foothill grassland; annual grassland in various soils. 275 to 550 m.	None – Potential suitable habitat, but unexpected since elevation of action area lower than expected for this species. Not observed during May 2008 rare plant surveys. *Amsinckia* sp. was observed, but was determined to not be this species.
Cirsium hydrophilum var. *hydrophilum*	Suisun thistle	E	Marshes and swamps (salt). 0 to 1 m.	None - No suitable habitat within action area. Potential for occurrence along Suisun Bay/New York Slough, outside of action area.
Cordylanthus mollis ssp. *mollis*	soft bird's-beak	E	Marsh and swamp; coastal salt marsh; in coastal salt marsh with *Distichlis*, *Slicornia*, *Frankenia*, etc. 0 to 3 m.	None – No suitable habitat within action area. Potential habitat near Suisun Bay/New York Slough, but species typically found in brackish rather than fresh waters.
Erysimum capitatum var. *angustatum*	Contra Costa wallflower	E & CH	Interior dunes; inland dunes; stabilized dunes of sand and clay near Antioch along the San Joaquin River. 3 to 20 m.	None – No suitable habitat within action area. No critical habitat within the action area.
Lasthenia conjugens	Contra Costa goldfields	E	Cismontane woodland; valley and foothill grassland, vernal pools, cismontane woodland. Extirpated from most of its range; extremely endangered; vernal pools, swales, low depressions, in open grassy areas. 1 to 445 m.	None – Not observed during May 2008 rare plant surveys. Potential suitable habitat in vernal pools near action area and disturbed grasslands. Habitat is not ideal and highly disturbed. Two occurrences within 10 miles of the action area thought to be extirpated (CDFG 2009).
Neostapfia colusana	Colusa grass	T	Vernal pools. Usually in large, or deep vernal pool bottoms; adobe soils. 5 to 110 m.	None – No suitable habitat in action area. No occurrences with 10 miles of the action area (CDFG, 2009).

Table C-1
Federally Listed, Proposed, or Candidate Species Reported with Potential to Occur in the Vicinity of the Action Area[1]

Scientific Name	Common Name	Federal Status[3]	Habitat[4]	Probability of Occurrence Within Action Area
Oenothera deltoides ssp. *howellii*	Antioch Dunes evening-primrose	E & CH	Interior dunes; remnant river bluffs and sand dunes east of Antioch. 0 to 30 m.	None – No suitable habitat in action area. No critical habitat within the action area.

Notes:

1 The species in this table were identified in a search of the following three references:

California Department of Fish and Game. 2009. Rarefind 3, a program created by CDFG allowing access to the California Natural Diversity Database (CNDDB). Ten mile radius search surrounding the action area of documented occurrences of federally listed, proposed for listing, or candidate species.

U.S. Fish and Wildlife Service. 2009. Federal Endangered and Threatened Species that May Occur in or May be Affected by Projects in USGS 7.5-minute quadrangles Honker Bay and Antioch North. Available at http://www.fws.gov/sacramento/es/spp_ lists/auto_list_form.cfm.

2 Federal status codes:

E = Endangered. Species in danger of extinction throughout all or a significant portion of its range.

T = Threatened. Species likely to become endangered within the foreseeable future.

CH = Designated critical habitat located within USGS 7.5-minute quadrangle Honker Bay and/or Antioch North

PCH = Proposed critical habitat located within USGS 7.5-minute quadrangle Honker Bay and/or Antioch North

3 Preferred habitat description complied from the following references:

California Department of Fish and Game 2005. California Interagency Wildlife Task Group. California Wildlife Relationships version 8.1 personal computer program. Sacramento, California.

California Department of Fish and Game 2008. California Natural Diversity Database (CNDDB) Program Rarefind 3. Created by the California Department of Fish and Game, California Native Plant Society. 2008. California Native Plant Society's Inventory of Rare and Endangered Plants of California. On-line Inventory: http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi

Goals Project. 2000. Baylands Ecosystem Species and Community Profiles: Life histories and environmental requirements of key plants, fish and wildlife. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P.R. Olofson, editor. San Francisco Bay Regional Water Quality Control Board, Oakland, Calif.

National Marine Fisheries Service (NMFS). 2005. Endangered and Threatened Species; Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Salmon and Steelhead in California. Federal Register, Vol. 70, No. 170. September 2.

National Marine Fisheries Service (NMFS). 2008a. Fish Species Accounts. Available at: http://www.nmfs.noaa.gov/pr/species/fish/

National Marine Fisheries Service (NMFS). 2008b. ESA Salmon Listing Maps. Available at: http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Maps/

United States Fish and Wildlife Service (USFWS). 2008. Species accounts. U.S. Fish & Wildlife Service Office, Sacramento Division. Accessed from http://www.fws.gov/sacramento/es/spp_info.htm

APPENDIX D

PHOTOGRAPHS OF THE ACTION AREA

Photograph D1. Existing Pittsburg Power Plant site.

Photograph D2. Typical view of the corridor between the railroad tracks and the Pittsburg-Antioch Highway, where the water supply and discharge pipelines would be installed.

Photograph D3. Drainage Channel Crossing 1, looking north along in which the pipelines would be installed. The drainage channel is visible on the left hand side.

Photograph D4. The drainage channel north of Parkside Drive. (Drainage Channel Crossing 2)

Photograph D5. Kirker Creek Channel
(Creek Crossing 1) looking west.

Photograph D6. Unnamed tributary of Kirker Creek
(Creek Crossing 2) looking north.

Photograph D7. Kirker Creek, immediately west of Arcy Lane and Creek Crossing 3.

Photograph D8. Potential Vernal Pool Branchiopod Habitat 1 is an unvegetated, seasonally ponded depression on the south side of the Union Pacific railroad tracks, approximately 1,750 feet west of Loveridge Road, approximately 836 feet southeast of Creek Crossing 1, approximately 620 feet southwest of Creek Crossing 2, and approximately 52 feet south of the water pipeline alignment (closest distance).

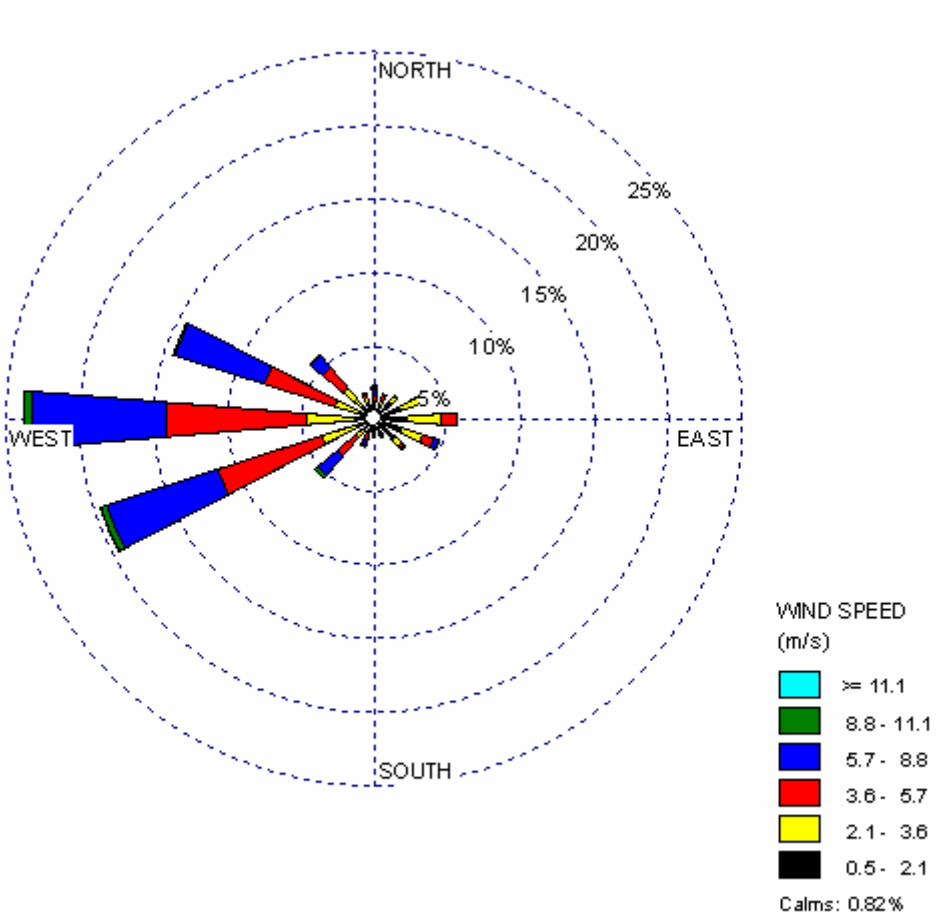
Photograph D9. Potential Vernal Pool Branchiopod Habitat 2, located adjacent to the south side of the Pittsburg-Antioch Highway, approximately 1,800 feet east of where the highway converges with the railroad line. Potential Vernal Pool Branchiopod Habitat 2 is approximately 792 feet southwest of Creek Crossing 3 and approximately 80 feet south of the water pipeline alignment (closest distance).

Photograph D10. A subsequent site reconnaissance to Potential Vernal Pool Branchiopod Habitat 2, (shown above) revealed that the vernal pool described above has been filled with soil by an unknown third party.

Photograph D11. Potential Vernal Pool Branchiopod Habitat 3, is a seasonal wetland in a deep depression on the south side of the Pittsburg-Antioch Highway, west of the Los Medanos Wasteway. Potential Vernal Pool Branchiopod Habitat 3 is approximately 186 feet south of Creek Crossing 3 and 120 feet south of the water pipeline alignment (closest distance).

APPENDIX E

ANNUAL WIND-ROSE



Annual wind rose for Pittsburg Onsite Meteorological Station
Data taken from 2002-2005 for all months.

Displays wind speed, direction (blowing from)

Station ID: 72493 Run ID:
Year: 2002 2003 2004 2005
Date Range: Jan 1 - 31-Dec ANNUAL
Time Range: 00:00 - 23:00

Frequency Distribution
(Count)

Speed m/s

Wind Direction	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	Total
348.75 - 11.25	342	92	136	151	73	20	814
11.25 - 33.75	365	133	99	56	2	4	659
33.75 - 56.25	581	149	35	6	0	0	771
56.25 - 78.75	683	544	160	7	0	0	1394
78.75 - 101.25	783	834	374	10	0	0	2001
101.25 - 123.75	722	511	274	123	21	4	1655
123.75 - 146.25	693	180	74	41	9	4	1001
146.25 - 168.75	398	46	45	17	5	1	512
168.75 - 191.25	273	51	57	47	14	7	449
191.25 - 213.75	274	131	164	124	38	1	732
213.75 - 236.25	302	299	587	593	88	19	1888
236.25 - 258.75	412	919	2589	2760	156	6	6842
258.75 - 281.25	507	1111	3340	3173	184	2	8317
281.25 - 303.75	380	628	1747	2222	51	0	5028
303.75 - 326.25	433	550	631	388	16	0	2018
326.25 - 348.75	354	204	68	38	6	0	670
Sub-Total:	7502	6382	10380	9756	663	68	34751
Calms:							289
Missing/Incomplete:							0
Total:							35040

Frequency of Calm Winds: 0.82%
Average Wind Speed: 4.33 m/s

Station ID: 72493 Run ID:
Year: 2002 2003 2004 2005
Date Range: Jan 1 - 31-Dec ANNUAL
Time Range: 00:00 - 23:00

Frequency Distribution (Normalized)

Speed m/s

Wind Direction	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	Total
348.75 - 11.25	0.00976	0.002626	0.003881	0.004309	0.002083	0.000571	0.023231
11.25 - 33.75	0.010417	0.003796	0.002825	0.001598	0.000057	0.000114	0.018807
33.75 - 56.25	0.016581	0.004252	0.000999	0.000171	0	0	0.022003
56.25 - 78.75	0.019492	0.015525	0.004566	0.0002	0	0	0.039783
78.75 - 101.25	0.022346	0.023801	0.010674	0.000285	0	0	0.057106
101.25 - 123.75	0.020605	0.014583	0.00782	0.00351	0.000599	0.000114	0.047232
123.75 - 146.25	0.019777	0.005137	0.002112	0.00117	0.000257	0.000114	0.028567
146.25 - 168.75	0.011358	0.001313	0.001284	0.000485	0.000143	0.000029	0.014612
168.75 - 191.25	0.007791	0.001455	0.001627	0.001341	0.0004	0.0002	0.012814
191.25 - 213.75	0.00782	0.003739	0.00468	0.003539	0.001084	0.000029	0.02089
213.75 - 236.25	0.008619	0.008533	0.016752	0.016924	0.002511	0.000542	0.053881
236.25 - 258.75	0.011758	0.026227	0.073887	0.078767	0.004452	0.000171	0.195263
258.75 - 281.25	0.014469	0.031707	0.09532	0.090554	0.005251	0.000057	0.237357
281.25 - 303.75	0.010845	0.017922	0.049857	0.063413	0.001455	0	0.143493
303.75 - 326.25	0.012357	0.015696	0.018008	0.011073	0.000457	0	0.057591
326.25 - 348.75	0.010103	0.005822	0.001941	0.001084	0.000171	0	0.019121
Sub-Total:	0.214098	0.182135	0.296233	0.278425	0.018921	0.001941	0.991752
Calms:							0.008248
Missing/Incomplete:							0
Total:							1

Frequency of Calm Winds: 0.82%
Average Wind Speed: 4.33 m/s