Appendix 1. Alternatives Screening Report

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1. Introduction

1.1 Purpose of Report

On September 30 2002, PG&E submitted Application (A.) 02-09-043 seeking authorization by the California Public Utilities Commission (CPUC) for a Certificate of Public Convenience and Necessity (CPCN) for the Jefferson-Martin 230 kV Transmission Project. The Proposed Project is described in detail in Section B of this EIR. This document describes the alternatives screening analysis that has been conducted for the Proposed Project, supplementing the information presented in Section C of the EIR.

Numerous alternatives to the Proposed Project were suggested during the Scoping period (February-March 2003) by the general public, and federal, State and local agencies after PG&E filed its Application for a CPCN. The alternatives screening analysis was carried out in order to determine the range of alternatives that would be carried forward in the EIR. This report summarizes the screening of alternatives and provides a record of the screening criteria and results that were reached regarding alternatives carried forward for full EIR analysis. This report is intended to document: (1) the range of alternatives that have been suggested and evaluated; (2) the approach and methods used by the CPUC Energy Division in screening the feasibility of these alternatives according to guidelines established under CEQA; and (3) the results of the alternatives screening (i.e., which alternatives are analyzed in the EIR).

The Alternatives Screening Report is incorporated as Appendix 1 to the EIR, providing the basis and rationale for whether an alternative has been carried forward to full evaluation in the EIR. For each alternative that was eliminated from further consideration, this document explains in detail the rationale for elimination. Since full consideration of the No Project Alternative is required by CEQA, and must automatically be considered fully in the EIR, this report does not address this alternative (it is defined in Section C). However, "non-wires alternatives"[1] are addressed in this report.

1.2 Summary of the Proposed Project

The Proposed Project is described in detail in Section B of this EIR. PG&E states that the Jefferson-Martin 230 kV Transmission Project is needed to meet the projected electric demand in the cities of Burlingame, Millbrae, San Bruno, South San Francisco, Brisbane, Colma, Daly City, and San Francisco (the northern San Mateo County area). The transmission line project, as proposed by PG&E, includes:

- Installation of a new, approximately 27-mile-long 230 kV transmission line with overhead and underground segments, with the first 14.7 miles of this line to be installed on a rebuilt version of PG&E's existing Jefferson-Martin 60 kV double-circuit transmission line and the remaining 12.4 miles to be installed in a new underground duct bank.

[1] "Non-wires alternatives" include methods of meeting project objectives that do not require major transmission lines (e.g., baseload generation, distributed generation, renewable energy supplies, conservation and demand-side management, etc.).

- Dismantling the existing Jefferson-Martin 60 kV double-circuit tower line and re-building the towers to enable the east side to operate at 60 kV and the west side at 230 kV. Approximately 100 structures will be removed and subsequently replaced.
- Construction of a new transition station near the intersection of San Bruno Avenue and Glenview Drive just east of Skyline Boulevard/Highway 35 to transition from the 14.7-mile overhead 230 kV transmission line to the 12.4-mile underground 230 kV transmission line.
- Modification of the existing Jefferson and Martin Substations to accommodate the new 230 kV transmission line.
- Modifications to equipment at the existing San Mateo, Ralston, Millbrae, and Monta Vista Substations.
- Modification of Hillsdale Junction switching station for new 60 kV arrangement.
- Existing access roads will be used to the extent possible, but new cross-country access and access roads will need to be developed in some areas.
- Pull sites are needed for use by the construction crews to pull and tension sock lines and conductors between towers.

2. Overview of Alternatives Evaluation Process

The range of alternatives in this report was identified through the CEQA/NEPA scoping process, and through supplemental studies and consultations that were conducted during the course of this analysis. The range of alternatives considered in the screening analysis encompasses:

- Alternatives identified by PG&E as part of the Proponent's Environmental Assessment (PEA) and as subsequent refinements to the proposed route;
- Alternatives identified during the public scoping process that was held in accordance with CEQA requirements;
- Alternatives identified by the CPUC Energy Division as a result of the agency's independent review of the alternatives and meetings with affected agencies and interested parties.

Alternatives for this project were restricted to the San Francisco Bay Area, no further south than the Jefferson Substation, but including consideration of routes from the East Bay. This is the geographic area that was encompassed in studies by the CAISO that developed the Jefferson-Martin project.

In total, the alternatives screening process has culminated in the identification and screening of approximately 27 potential alternatives or combinations of alternatives. These alternatives range from minor routing adjustments to PG&E's proposed 230 kV project location, to entirely different transmission line routes, to alternative system voltages, and system designs, as well as non-wires alternatives.

2.1 Alternatives Evaluated

Many alternatives were suggested during the EIR scoping process for consideration in establishing a reasonable range of alternatives. Other alternatives were developed by EIR preparers, presented by PG&E in its PEA, or evaluated by the California Independent System Operator (CAISO) in its Stakeholders process that has been studying San Francisco and Peninsula electricity supply. Each category is presented below. Section 3 presents a summary of which alternatives have been selected for full EIR analysis and which have been eliminated based on CEQA criteria. Section 4 presents detailed descriptions of each alternative and detailed explanations of why each was selected or eliminated.

2.1.1 PG&E Alternatives

In its PEA, PG&E presented the following alternatives:

- **Route Option 1B**: An all-underground route that would follow Cañada Road and Skyline Boulevard in the Highway 280 corridor, then turn east on Trousdale Boulevard to El Camino Real. This alternative would replace the overhead portion of the Proposed Project from the Jefferson Substation to San Bruno Avenue, and would eliminate the underground portion of the route along San Bruno Avenue from Glenview Drive to El Camino Real.
- **Route Option 2A**: The "El Camino North" alternative would require placement of the underground portion of the transmission line within El Camino Real (rather than in the BART ROW as in the Proposed Project) between San Bruno Avenue and Lawndale/McLellan Drive.
- **Route Option 3B**: PG&E's "BART North" alternative would require use of the BART ROW rather than Lawndale/McLellan and Hillside Drive between Lawndale and Serramonte.

- **Route Option 4B**: The "East Market Street" alternative would continue north on Hillside to East Market Street, avoiding the Proposed Project segments on Hoffman and Orange Streets.

In addition, in a Supplement Response to CPUC Data Request No. 2, dated May 28, 2003, PG&E proposed three optional underwater segments to PG&E's Route Option 1B to avoid crossing Crystal Springs Dam.

2.1.2 Alternatives Suggested During Scoping

Following are all written, oral, and agency consultation scoping comments that suggested an alternative (using the commenter's language verbatim), along with a statement of each suggestion.

Government Agency Suggestions

National Park Service, Golden Gate National Recreation Area

- Underground both the 60 kV and the 230 kV transmission lines in a new utility corridor under Cañada Road.
- EIR should also include Alternative 1B, undergrounding only the 230 kV line along Cañada Road.
- Does not support undergrounding the new 230 kV line in the existing corridor.
- Include alternatives in the EIR that would not constitute an unreasonable interference with GGNRA's easements.

San Francisco Public Utilities Commission

Prefers alternatives that do not involve the placement of the transmission line underground through sensitive areas of the Watershed.

Redwood City, Planning and Redevelopment

Use different tower designs that would create less of a visual impact than the conventional steel lattice towers being proposed. One example of an alternative design is the Collierville-Bellota transmission line, owned by the Northern California Power Agency. The poles have a dark reddish-brown color, the result of a special metal treatment that creates a self-rusting surface. In addition, the pole and crossarm configuration of the towers themselves create a simple profile.

City of San Bruno, Public Works – Administration

Several alternatives were suggested by the City:

- Relocate the Transition Station site to the west side of the Skyline Boulevard away from the residential areas. The 230 kV underground construction should then cross Skyline Boulevard underground.
- Beginning at a Transition Station on the west side of Skyline Boulevard; then crossing Skyline and proceeding down San Bruno Avenue to the edge of the open space west of MP 15; then traversing to the northeast through undeveloped land connecting into Sneath Lane near I-280; then continuing east on Sneath to Huntington Avenue near the BART parking garage; and then proceeding north along the BART R/W as indicated in segment 2B of PG&E's Environmental Assessment. **[Note that the Mayor's letter of March 25, 2003, summarized below, subsequently removed this alternative from their recommendations.]**

- Beginning at a Transition Station on the west side of Skyline Boulevard; then crossing Skyline and proceeding down San Bruno Avenue to the exit/entrance ramp of I-280; then along the northbound ramp north to Sneath Lane (Although the ramp is part of the freeway, it is significantly separated from the freeway, and there appears to be ample space for construction of the 230 kV line. Caltrans may grant a variance for this alignment); then continuing east on Sneath to Huntington Avenue near the BART parking garage; and then proceeding north along the BART R/W as indicated in segment 2B of PG&E's Environmental Assessment.
- Beginning at a Transition Station on the west side of Skyline Boulevard; then crossing Skyline and proceeding down San Bruno Avenue to Cherry Avenue; then north on Cherry to Sneath Lane; then continuing east on Sneath to Huntington Avenue near the BART parking garage; and then proceeding north along the BART R/W as indicated in segment 2B of PG&E's Environmental Assessment, or
- Co-locating the Transition Station adjacent to the Sneath Substation farther to the north along Skyline Boulevard. Routes for the underground segment should also be expanded to include Skyline Boulevard and Sneath Lane, commencing at this alternative location for the Transition Station. [This is the preferred alternative to the other alternatives discussed above.]
- Consider alternative with segment parallel to I-280 or I-380. PG&E's gas pipelines are in this ROW.
- Consider alternatives to use of San Bruno Avenue, including Millbrae Avenue to BART ROW, Skyline to Sneath Lane, and Sneath to BART ROW.
- Consider putting the Option 1B underground segment in the Caltrain ROW and not in El Camino Real. (Caltrans will be re-paving El Camino from Burlingame to South San Francisco.)

City of San Bruno – Mayor Larry Franzella

- Place the entire project underground in order to avoid a considerable impact and burden on any one city;
- Place a transition station at some earlier point in the route (for example, at Trousdale in Burlingame);
- To place the transition station adjacent to the existing PG&E substation on the west side of Skyline Boulevard at Sneath Lane where the impact will be less dramatic; or
- Place a transition station in a less conspicuous place on the west side of Skyline Boulevard.
- Remove from consideration a previously suggested City of San Bruno alternative between San Bruno Avenue and Sneath Lane through Crestmoor Canyon.

City of Daly City

PG&E currently owns in fee and has an adjacent easement directly from Guadalupe Canyon Parkway down to the Martin Substation. The city would like this direct alternative reconsidered both environmentally and part of the CPCN process, however with the existing overhead lines [within Guadalupe Canyon Parkway – Segment 5] included as part of the undergrounding. Currently there is an unrelated amendment to the San Bruno Mountain Habitat Conservation Plan under consideration by the Plan Operators. The city proposes this combined undergrounding alternative become part of the current HCP amendment.

Midpeninsula Regional Open Space District

- Pursue a project alternative that would re-locate the 100 existing overhead towers closer to the built environment and away from protected open space.

- Pursue a project alternative that would not impact or encroach upon dedicated park and open space lands (including land owned/managed by Midpeninsula Regional Open Space District, San Mateo County, and SFPUC)

Town of Hillsborough

- Consider installing the lines underground or on the west side of I-280.
- Suggest retrofitting San Francisco power plants.
- Look at transmission to San Francisco from the East Bay.
- Relocate the I-280 crossing from north of Carolands Substation to south of Carolands; OK to use city's water tank property.
- Research co-generation in San Francisco – use of methane for power generation.
- Minimize the number of I-280 crossing; keep towers from MP 9 to 11 on west side of freeway.
- From MP 7 to 11, install underground or on west side of freeway.

Town of Colma

- Consider use of A Street since it will be paved soon anyway.
- Consider use of Junipero Serra as a north-south route.
- Consider use of SFPUC water line through Colma; there is a 60-foot ROW easement and CCSF fee title.

County of San Mateo

- Underground in Cañada Road would be improvement to proposed route.
- Consider installing the whole project underground, avoiding sensitive habitat and features.
- Consider tower designs that improve aesthetics (including architectural design and color) and consider all types of tower designs for tubular steel poles (TSPs).

Private Organization and Company Suggestions

San Mateo County Trail Users Group

PG&E's Alternative 1B – Underground the proposed new transmission lines under Cañada Road and Skyline Boulevard.

Santa Clara Valley Audubon Society

PG&E's Alternative 1B – Make the southern portion of the proposed 27-mile transmission line also underground.

Highlands Community Association

Segment 1B alternative along Cañada Road underground. The existing transmission lines should also be combined with any additional lines in the same undergrounding.

Highlands Recreation District

Place [the lines] west of 280 or on the west side of the lake. Or better still, find a way to bury them where the terrorists cannot easily disturb or destroy them

Sierra Club, Loma Prieta Chapter

Alternative 1B in the EIR/EIS (undergrounding of the southern 14-mile segment of the route through the San Francisco Watershed). The new lines should — at a minimum — be undergrounded from the Edgewood Substation under Cañada Road to at least the 2.0 milepost. As part of this project, the existing 60 kV lines in this section should also be undergrounded, and the towers removed by helicopter (note that leaving the existing foundations in place may be preferable, as this would avoid any disturbance to the sensitive habitats there). The area that would have high priority for undergrounding from an environmental, habitat and visual resource perspective is the segment between approximately Milepost 4 and Milepost 7.

People For a Golden Gate National Recreation Area

Alternative 1B – Underground the 230 kV transmission line for its entire length, rather than replacing 100 towers with even higher towers than exist today. The existing towers should be removed.

Friends of Edgewood Natural Preserve

Remove the existing 60 kV line that runs within Edgewood's perimeter, and underground it, along with the proposed new 230 kV line beneath the Cañada Road right of way.

280 Corridor Concerned Citizens Group

- Increasing distributed and self-generation projects in San Francisco area, combined with larger local generation projects as well as demand reduction efforts.
- Modified Underground/Overhead Route Along Or Near the Existing 60 kV Line ROW. This alternative route would locate the new line overhead along Segment 1A from the Jefferson Substation to the Ralston Substation then underground to the Hillsdale Substation (approximately MP 6.4; just north of Bunker Hill). A Hillsdale Substation, the line would continue overhead across the canyon to approximately MP 6.9 and then underground to Carolands Substation (approximately MP 8.6; Skyline Boulevard just north of Black Mountain Road). From the Carolands Substation, the line would go overhead to approximately MP 9.9. At approximately MP 9.9, the route for the line would then deviate from Segment 1A and move west of I-280 to approximately 10.9 where the line would then continue along Segment 1A to San Bruno Avenue. The underground segments would include the existing 60 kV line and would be located a sufficient distance west of the existing ROW or the furthest western point in the future 230 kV ROW to mitigate potential health impacts.
- Underground to Trousdale Drive. This route would locate the line underground from the Jefferson Substation along Cañada Road and Skyline Boulevard to Trousdale Drive. Although this route deviates from the existing 60 kV ROW, moving the existing 60 kV line underground with the proposed 230 kV line should be considered. From Trousdale Drive at least 2 alternatives would exist:
- At or near Trousdale Drive, the line would go overhead west of I-280 along Segment 1A to San Bruno Avenue.
- At Trousdale Drive, the line would continue north underground along Skyline Boulevard until San Bruno Avenue. At two points (Trousdale to Millbrae Avenue and Larkspur Road to the Pacifica Exit) the line would need to parallel I-280.
- Underground to the Carolands Substation. This alternative route would locate the line underground from the Jefferson Substation along Cañada Road and Skyline Boulevard to the Carolands Substation. From the Carolands Substation, the line would go overhead to approximately MP 9.9 along Segment 1A. At approximately MP 9.9, the route for the line would move west of Highway 280 to approximately MP 10.9 where the line would then continue along Segment 1A to San Bruno Avenue.

- Underground to MP 2. This alternative route would locate the line underground along Segment 1B from the Jefferson Substation to approximately MP 2, then overhead along Segment 1A to the Ralston Substation. From the Ralston Substation, the line would then go underground west under I-280 and continue underground along Cañada Road and Skyline Boulevard to Trousdale Drive. At Trousdale Drive, both of the alternatives noted above in the Underground to the Carolands Substation alternative would exist.
- Move the Line West of Existing 60 kV ROW. This alternative route would locate the line west of the existing 60 kV ROW. There are a number of variations of this alternative including, (i) moving the line west of I-280; or (ii) moving the line west of the existing 60 kV ROW but staying east of I-280 (except where Segment 1A is located west of I-280). To the extent portions of the line are located east of I-280, the line should be located underground near residential areas.
- Moraga Substation to Potrero Substation. This alternative route consists of constructing a 230 kV line connecting the Moraga and Potrero Substation. The line would cross from Oakland to San Francisco either (i) along the BART transbay tube (ii) along the Bay Bridge; (iii) underwater cable, or (iv) a combination of the Bay Bridge and underwater cable.

California Native Plant Society, Santa Clara Valley Chapter

Alternative Segment 1B – Underground Route Alternative putting the power lines under current existing roadbeds (Cañada Road and Skyline Boulevard).

International Medical Foundation, Inc.

Move the project to west of 280.

Committee for Green Foothills

Alternative 1B (Undergrounding of the southern 14.7-mile segment through the Peninsula Watershed Lands. In addition, it is requested that consideration be given to undergrounding at least a portion (from Edgewood Substation to al least the Milepost 2 area) of the existing 60 kV transmission lines as mitigation for constructing a portion of the proposed new lines above ground. Where tap or distribution lines exist, there could be a transition from underground to above ground in order to avoid excavating within the watershed lands to provide service to these facilities.

Hillside Homeowners Improvement Association

New transmission lines should be put underground in the area of Hoffman Street and Orange Street as it travels through the Hillside neighborhood within the boundaries of Daly City.

Lennie Roberts (Friends of Edgewood Natural Preserve)

In favor of undergrounding along Cañada Road/Skyline Boulevard and underground the existing 60 kV in roads as well.

Private Citizen Suggestions (area of residence noted in parentheses)

David Goncharoff (The Highlands)

- Put the entire segment underground.
- Move the lines to the other side of 280 and cross the freeway near the area that is scheduled to be underground.

Marilyn and Steve Ladas (Town of Hillsborough)

- Underground lines
- Move lines west of 280
- No lines.

Kathleen Means (Redwood City)

Underground the southern segment under Cañada Road and Skyline Boulevard.

Robert Caletti; Ronald C. Wilson; Jerry Hearn; Leslee Hamilton; Marilyn J. Walter; Jane L. Johnson; Jane T. Johnson; John H. Johnson; Kris Carey (Menlo Park, Portola Valley, The Highlands)

Alternative 1B. Also underground the existing 60 kV Transmission lines as part of the project and remove the existing towers.

Jerry Hearn (Los Trancos Woods, Uninc. San Mateo County)

See previous comment. In addition, a generation facility nearer to the points of use and reduction of demand, especially of the concept of highly increased fees for usages significantly above the true needs of entities being supplied with electricity, should be considered.

Spencer Lowe (Town of Hillsborough)

Place the lines underground.

Jeff Smith (The Highlands)

Put the lines farther west.

Elly Hess (San Carlos)

Put the utilities underground along Cañada Road. Remove the towers by helicopter and leave the cement footings in place leaving the least amount of damage.

Bob and Dorothy Young (San Carlos)

Underground the project. Also underground the existing 60 kV transmission lines as part of the project, and, after the removal of the lines, remove the existing towers, especially from Edgewood Park and Natural Preserve.

Drew (no address)

Alternative 1B, which would eliminate the towers and move all the lines underground (as is being done with a related 12-mile segment of the project north of San Bruno. The route for Alternative 1B would be along Cañada Road and Skyline Boulevard, rather than along the existing overhead easement (tower removal in sensitive areas would be done by helicopters).

Michael and Betsy Nelson (no address)

Alternative 1B – put the lines underground

Betty Oen (The Highlands)

Underground them in our neighborhood or place them on the west side of Highway 280.

Jose Cuan (The Highlands)

Put the lines underground or move them further away from the homes next to the lines.

Carmen & Joseph Mahood (no address)

Please consider plan "B" [PG&E's Route Option 1B] seriously.

Michael & Laura Nagle (The Highlands)

- Install the proposed 230 kV line underground. It would be great if they could put the current 60 kV lines underground at the same time, or:
- Develop an underground or an underground/overground route, with lines underground where they are close to homes and overground where they are not near homes and move existing 60 kV lines near homes underground at same time, or
- Move power lines west of 280 where they cannot negatively impact us.

Richard Cole (The Highlands)

No Project Alternative should include should consider the renovation existing fossil-fuel plants in San Francisco, and to create many new small natural gas plants scattered around the city, with an eye on including cogeneration.

Mr. and Mrs. Silvano G. Mazloum and Family (The Highlands)

Install the proposed 230 kV power line underground or move the proposed power line further west and away from our homes, ideally west of Highway 280.

Heather and Chris Cordes (The Highlands)

Run the lines underground or west of 280 away from families, homes, and schools.

Rita Seamans (The Highlands)

Go west of 280.

Peggy Dean (The Highlands)

Move the power lines west away from highlands, ideally west of 280.

Jon Janoska (The Highlands)

Build local power plants

Shirley McKinnie, Carla and Sani Jadallah (The Highlands)

Put the line underground or at least further away from our homes

Kevin McGowan (The Highlands)

Put the line underground or at least west of the 280 freeway

Milton and Sunee Jines (The Highlands)

Move the lines west of Highway 280 along the watershed property. Or, the lines could be buried underground.

Tony and Judy Kwee (The Highlands)

Properly bury the lines as far from residences and schools as possible.

Mary Jean King (Town of Hillsborough)

Create more local electricity generation within the cities where the electricity is needed.

William H. Mahncke (The Highlands)

Move the lines to the west at least ¼ mile or more even if they are placed underground.

Drs. Pamela Kaiser and Barry Fleisher (The Highlands)

Move the power lines west of 280 where there are no homes, and place them underground.

Noreen Hui (The Highlands)

Relocate the project away from residential areas and away from schools.

Pak Ho and household (The Highlands)

Place the lines underground.

Louis and Theresa Burton (The Highlands)

Install underground or away from the currently populated area.

William Glen (The Highlands)

All power towers should be moved far from dwellings or the lines run underground.

Ralph and Doris Voice (The Highlands)

Underground or overhead west of Highway 280.

Donald L. McFarland (The Highlands)

Build a new or rebuild power-generating plant in or near San Francisco.

Dena Fisher (The Highlands)

Power lines and towers should be located west of 280. Where the lines are near homes, they should be located underground to minimize the effects on neighborhoods.

Susanne & Edward Li (The Highlands)

Move this power line away from residence area, west of 280 or install the 230 kV line underground.

Noelle Tan (The Highlands)

Do not install the power lines so close to the houses.

Lauren and John Black (The Highlands)

Put the lines underground, preferably west of 280.

Lynn & John Chakel (The Highlands)

- Explore local generation (in San Francisco).
- Develop an underground/overground system.
- Move towers and lines west between reservoir and HMB neighborhoods.

Frank Toth (The Highlands)

Bury the line.

Charles Lebo, Mahnaz Roshan (Town of Hillsborough;The Highlands)

Have the proposed lines installed underground, and at the same time install the current 60 kV lines underground.

Raymond and Charlene Weiss and Family (The Highlands)

Locate powerlines west of the 280 Freeway.

Donald Coyne (The Highlands)

Underground the lines.

Howard McDonell (The Highlands)

Underground if possible and cost were not astronomical. If new towers have to go in, push them west towards 280 and keep them as low profile as possible. Possibly install on west side of "280".

Ruth M. Anderson, Joanne Hong (Town of Hillsborough;The Highlands)

Install the proposed 230 kV line underground and put the current 60 kV line underground at the same time.

Betty W. Jue and Victor Tan (The Highlands)

Move the tower and power line away from the homes, west of 280.

Sherry & Dan Nolan (The Highlands)

Center the development nearby at the undeveloped land and property off Skyline Boulevard away from existing homes.

Rose Yee (The Highlands)

Move the power lines away from this area, ideally to the less densely populated areas west of Highway 280.

Bettina and Stephen Holquist (Burlingame)

It would be ideal if there was an increase in local generation of power within San Francisco. Otherwise, move the power lines west of 280 and preferably underground.

Hugo Miranda (The Highlands)

Go underground.

Dennis Tom, MD (Town of Hillsborough)

Jefferson Substation – underground along Cañada Road to Edgewood Road. Then underground combined 60 kV/230 kV lines parallel and adjacent (along side) to current towers to MP 4. Lines would then some-how need to cross over 280/92 junction (? Underground or overhead across freeways). From MP 5 – Hillsdale Substation, continue underground alongside current towers. Lines would then run overhead across Crystal Springs Road to MP 7 in Hillsborough (this would avoid undergrounding at San Mateo Creek/Crystal Springs Dam areas). MP 7–MP 8 continue underground to Carolands Substation – begin overhead directly across to West side of 280 along existing rights or way (access roads all the way to MP 15 (San Bruno)/keep lines on west side of 280 between MP 10–MP 11.

Teresa Tom (Town of Hillsborough)

Use an alternative path west of the Crystal Springs Reservoir.

Kurt and Marcena May (The Highlands)

Put all lines underground.

Ivan and Erika Crockett (The Highlands)

- Install the proposed 230 kV line underground and include the 60 kV line as well along PG&E's alternate route 1B (along Cañada Road south of 92, then along El Camino through Millbrae to San Bruno Avenue). Underground from the Ralston Substation (near Juvenile Hall, just north of 92) to the Hillsdale Substation (just north of Bunker Hill) mostly along route 1A but sufficiently far away from the residences, then going overhead across the big canyon, then underground again in Hillsborough along route 1A until the Carolands substation (on Skyline just north of Black Mountain Road in Hillsborough), then cross west of 280 and continue overground, staying west of 280 from then on.
- Move the 230 kV line and the 60 kV line west of I-280.
- Develop more local (i.e., within San Francisco) power generation for increased reliability.

Karen, Andrew, and Granger Brenneman (The Highlands)

Place the lines underground as it passes through the Crystal Springs area. The existing 60 kV line could be buried and no towers would be required at all.

Scott D. S. Young, Elisebeth Eros, Charles Kuanz, James Dawes, Sarah Le Forge, Karen Meredith, Michael Yantos, Alan Fernandez, Carolyn Dorsch, Andy Butcher, John Steiner (Menlo Park, Redwood City, San Carlos, Sunnyvale, Alameda)

Undergrounding Alternative 1B for the southern portion of the project.

Perla C. Schmidt (The Highlands)

- Move the power lines west away from our houses, west of 280 freeway.
- Put the power lines under Cañada Road and Skyline Boulevard.

Ronald Small (Burlingame)

The route in populated areas should either be underground or on the west side of Interstate 280.

Kay Blickley Schilling (Town of Hillsborough)

Install the proposed 230 kV lines underground, and at the same time install the current 60 kV lines underground.

Lawrence A. Smith (The Highlands)

Put the line over on the west side of 280.

Drew Donovan (The Highlands)

Put the new line underground or use an alternative route along the Highway 280 easement away from the homes.

Lester D. and Ruthild Candee (Town of Hillsborough)

Retrofit Hunters Point, using the Williams agreement generators. Or have the proposed 230 kV line put underground, away from homes, ideally west of 280.

Bruce Eimon (Town of Hillsborough)

San Francisco should build their own power plant, or put the line underground.

Daniel Chau (The Highlands)

Relocate the towers to west of 280 or underground them.

Don M. Wong (The Highlands)

Move the power line as far away from populated areas as possible. I.e., underground from the Ralston Substation (near Juvenile Hall, just north of 92) to the Hillsdale Substation (just north of Bunker Hill) mostly along route 1A until the Carolands Substation (on Skyline just north of Black Mountain Road in Hillsborough), and then cross west of 280 from then on.

Drew Shell (San Carlos)

Alternative 1B would move all current and future transmission lines from the present overhead alignment to an underground alignment along Cañada Road

Frank Mak (Town of Hillsborough)

Build the power lines underground or at the very minimum, they should be moved to the west side of Interstate 280, away from the existing homes and schools.

Gregory Stein (The Highlands)

- Local electricity generation within the immediate San Francisco area, or
- Alternative transmission that does not result in such unsightly and potentially noise-polluting effects.

Mel and Sherie Friedman (The Highlands)

Move the wires west of Crystal Springs or place them underground.

Min Eimon (Town of Hillsborough)

Install an underground route or build a power plant in San Francisco.

Yuen Ling Tam, Owen Cheung (Town of Hillsborough)

Move the power lines away from our houses or put in underground lines instead.

Yen Lee (The Highlands)

Put the lines underground or west of the 280.

Jay Roshan (The Highlands)

Underground all facilities.

John Minkel (Town of Hillsborough)

Underground or relocate next to 280 or west of I280.

Dr. Paul Hsiao and Dr. Pi Ling Fan (The Highlands)

Move the project to the west of 280.

Judy C. Kwee, Jackie Chan, Noreen Hui, Sherrie Friedman, Gail Oshima, Alejandra Virgen, Isabel Marquez, Alex Howard, Eunice Sherer, Collen M. Sullivan, Derek Vroom, Linda Vercelli, Ana Lopez, Maria Sandoval, Aurel Nagle, Donald Nagle, Anton McBurnie, Pat Garcia Luna, J. J. Garcia Luna, Lee Anne Mau, Denise Haas, Karen Li, Grace Kim, Brigitte S. Shearer, Debbie Cooper, Steve Hamaguchi, Adele C. Runcke, Emiko Fujii, Florence Yuen, Shannon Dobbs, Carolee Fucigna, Bonnie Halpern-Relsher, Connie Hamaguchi, Pam Barasch, Kandace Torreano, Julie Lord, Meire Bremer, Diane Prentiss, Janet Fuller (The Highlands, San Mateo, Burlingame)

- Generate the power locally, in San Francisco.
- Properly underground the lines, so that the magnetic fields will be significantly reduced.

Race J. Chen (Town of Hillsborough)

Partially bury the line, relocated to west of 280.

Ed and Elsie Carlson (The Highlands)

We want the line undergrounded.

Mrs. Kwan Yee Liu (Burlingame Hills)

- The underground alternative, or
- Move the towers to the uninhabited side of 280.

Kristina Klausen (The Highlands)

- Move the power lines west away from our houses, ideally west of 280.
- Install the proposed 230 kV line underground with proper shielding to reduce EMFs near houses. Ideally put the current 60 kV lines underground at the same time to enhance the beauty of the watershed and our community, or
- Develop an underground/overground route, with the lines underground where they are close to homes and overground where they are not near homes.

R. Nuri Otus (Town of Hillsborough)

Move the power lines underground wherever possible.

Pamela Merkadeau (The Highlands)

Relocate the towers or underground the power lines.

Arline Dixon (no address)

Underground part of lines close to homes.

Mr. and Mrs. Robert J. Traube (The Highlands)

- An alternative means of delivering the power to San Francisco. For example, an underwater cable system in the Bay, or
- Construct a power generation facility within the geographic confines of San Francisco itself.

Karen M. Heaney Hook (The Highlands)

Move these lines underground.

Janet Paslin (The Highlands)

Put the lines underground or closer to the freeway.

George & Julie Beck (Town of Hillsborough)

Let it be built in San Francisco or in the San Francisco area and not in Hillsborough.

Marjorie H. Palmer (The Highlands)

Urge that all lines go underground.

James F. Mahon (The Highlands)

The obvious solution is underground.

Sharon and Herbert Hwang (The Highlands)

Another site would be much more appropriate (e.g., west of Highway 280).

Rita Castello (Redwood City)

- Look for more local alternatives, or
- Make the power lines west, further away from the Highlands residential area and the Highlands School and Recreation Center, or
- Put the lines underground, or at least where they are close to the houses.

Karen Olson Stern (Burlingame Hills)

- Local electricity generation, which is more reliable than transmission line electricity.
- Town of Hillsborough–introduced underground/overground route.
- Move the power lines west, away from residences, preferably west of Highway 280.

Steve Shannon (Town of Hillsborough)

If you can't bury the lines, there is a lot of land on the other side of the freeway. In fact, these same set of lines travel much of the way on the other side of the freeway already.

Patricia J. Doolittle (The Highlands)

- Consider a second high voltage along the same existing line down by the Bay. If the point is to have a back up, the second line could be that back up. If more power is needed, the second line moving along the same towers as the first line near the Bay could be installed for that reason as well.
- If the power substations need to be updated to be more reliable or to deliver more power, then expand the substation near the line that runs along the Bay. Put the substation in a large building, if people near the substation object to the larger substation.
- New power plants and substation could be placed underground so people do not have to look at them.
- Suggestions presented by people objecting to the current plan for a new line along the 280 corridor.

Scott Buschman (San Bruno)

Alternative routes, such as going down Hickey or Westborough, not San Bruno Avenue, and with the transition station at Highway 92. Or maybe along Highway 101 via Highway 92. Maybe have the alignment follow Highway 1 down near Serramonte Boulevard and tie in at a Daly City station.

Michelle Nemschoff (The Highlands)

Consider using local generation. If new transmission lines must be added, the alignment should be underground as in Alternative 1B.

Paul Grech (no address)

Suggest moving the towers to the west side of I-280 or run the lines underground for aesthetic purposes.

Cathryn Carlin (no address)

Take this historic opportunity to underground the existing line.

Lenny Low (no address)

Solution is to underground the line to eliminate EMF and aesthetic concerns.

2.1.3 Alternatives Developed by EIR Preparers

The alternatives listed below were developed by EIR preparers as possible means of avoiding or reducing certain impacts of the Proposed Project. Note that as described in Section 3, not all of these alternatives were carried forward for full analysis in the EIR.

- **Millbrae 60 kV Transmission Line Route**: This route would avoid use of San Bruno Avenue and would allow collocation within an existing 60 kV transmission corridor.
- **SFPUC Water Pipeline ROW**: This route would also allow avoidance of San Bruno Avenue, as well as the proposed route north through Colma, by following an existing pipeline ROW through San Bruno, South San Francisco, and Colma.
- **Transition Station Relocations**: Alternate transition station locations (west of Skyline Boulevard near San Bruno Avenue, near the Sneath Lane Substation, or near Westborough) would eliminate the proposed transition station at San Bruno Avenue and Glenview Drive.
- **Modified Existing 230 kV Underground Collocation Route**: Use of a portion of the existing PG&E 230 kV underground transmission line route from the San Mateo to Martin Substations along with a new underground route segment in South San Francisco would eliminate the portion of the Proposed Project through South San Francisco, Colma, and Daly City, and would avoid crossing San Bruno Mountain in Guadalupe Canyon Parkway.
- **Non-Wires Alternatives**: These alternatives would not require construction of major new transmission lines, and include consideration of renewable energy (wind and solar), demand-side management, distributed generation, new baseload and peaker generation, and combinations of these options.

2.1.4 Alternatives Suggested in San Francisco Stakeholders Processes

The CAISO's process that resulted in the selection of the Jefferson to Martin project also considered other transmission alternatives, including the following routes:

- San Mateo Substation to Martin Substation
- Moraga Substation to Potrero or Embarcadero Substation
- Sobrante Substation to Potrero Substation
- Jefferson Substation to various San Francisco Substations

2.2 Alternatives Screening Methodology

The evaluation of the alternatives identified above was completed using a screening process that consisted of three steps:

Step 1: Clarify the description of each alternative to allow comparative evaluation

Step 2: Evaluate each alternative using CEQA criteria (defined below)

Step 3: Based on the results of Step 2, determine the suitability of the each alternative for full analysis in the EIR. If the alternative is unsuitable, eliminate it from further consideration.

Infeasible alternatives and alternatives that clearly offered no potential for overall environmental advantage were removed from further analysis. In the final phase of the screening analysis, the advantages and disadvantages of the remaining alternatives were carefully weighed with respect to CEQA's criteria for consideration of alternatives. These criteria are discussed in the following section.

2.3 CEQA Requirements for Alternatives

One of the most important aspects of the environmental review process is the identification and assessment of reasonable alternatives that have the potential for avoiding or minimizing the impacts of a Proposed Project. In addition to mandating consideration of the No Project Alternative, CEQA Guidelines (Section 15126(d)) emphasize the selection of a reasonable range of feasible alternatives and adequate assessment of these alternatives to allow for a comparative analysis for consideration by decision makers. CEQA Guidelines (Section 15126(a)) state that

> ***An EIR shall describe a reasonable range of alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project.***

In order to comply with CEQA's requirements, each alternative that has been suggested or developed for this project has been evaluated in three ways:

1. Does the alternative allow meeting of most basic project objectives?
2. Is the alternative feasible (legal, regulatory, technical)?
3. Does the alternative avoid or substantially lessen any significant effects of the Proposed Project (including consideration of whether the alternative itself could create significant effects potentially greater than those of the Proposed Project)?

2.3.1 Consistency with Project Objectives

CEQA Guidelines require the consideration of alternatives capable of eliminating or reducing significant environmental effects even though they may "impede to some degree the attainment of project objectives" (Section 16126.6(b)). Therefore, it is not required that each alternative meet all of PG&E's objectives.

The objectives of the Proposed Project are defined by PG&E in its PEA (Section 2.2.1). This EIR does not adopt or endorse the objectives that PG&E has defined for its Proposed Project.[2] PG&E's four stated objectives are presented below; each is described in more detail in the subsequent sections.

- **Meet Electric Demand**. The first project objective is to provide additional electricity to the region in order to ensure that the electric system includes adequate capacity to safely and reliably serve the San Francisco and northern San Mateo County area, even under reduced generation scenarios. This objective is based on the limited generation existing in CCSF and the possible upcoming closure of Hunters Point Power Plant.
- **Comply with Planning Criteria**. The second project objective is to ensure that the region's transmission system will continue to meet planning standards and criteria established by the ISO and the North American Electric Reliability Council (NERC) to ensure the safety and reliability of this system. Compliance with these criteria would also result in continued consistency with the pre-

[2] The CPUC's CPCN proceedings will separately and specifically evaluate the need for the project.

ISO planning guide entitled "Supplementary Guide for Application of the Criteria for San Francisco," which was considered as part of the October 2000 stakeholder study.

- **Create a More Diverse Transmission System in the Area.** The third project objective is to further increase transmission system reliability in the San Francisco and northern San Mateo County area by providing a second independent major transmission line pathway into the area. By meeting this objective, the Project would eliminate the "all eggs in one basket" concern that currently exists in the area (all major transmission lines currently connect the San Mateo and Martin Substations and are located in the general Highway 101 corridor).
- **Implement the ISO Board of Governors' April 2002 Resolution.** The fourth project objective is to implement the April 2002 ISO Board of Governors' resolution approving the Jefferson-Martin Project for addition to the ISO-controlled grid, consistent with the ISO Tariff as adopted by the Federal Energy Regulatory Commission pursuant to the Federal Power Act.

2.3.1.1 Meet Electric Demand

Section 1.2 summarizes the unique energy situation of San Francisco and the peninsula. While the need for additional transmission is primarily driven by reliability criteria, the amount of additional transmission required is a function of regional electric demand and generation. The amount by which demand exceeds the sum of available transmission imports and available internal generation, represents the required incremental transmission import capability that must be provided. This value (incremental import need), being a function of load forecast and additions or deletions in generation, will vary depending upon the timeframe under consideration. The screening analysis for alternatives to the Proposed Project, considers the amount of increased import capacity that an alternative could provide, as compared to the 350 MW achieved with the Proposed Project.

Alternatives that connect the existing Jefferson Substation to Martin Substation are essentially the same electrically as the Proposed Project, and therefore little, if any, additional system data is required for analysis to determine if they would meet electric demand. Other alternatives, such as routes between San Mateo and Martin Substations, Jefferson to various CCSF substations, or the cross-Bay alternatives, required careful study to determine the degree to which they would meet PG&E's first objective regarding meeting electric demand.

Before the 2001 energy crisis and the current economic downturn, the northern San Mateo County area had been experiencing rapid economic expansion. According to the California Independent System Operator, ". . . the electricity demand in the CCSF grew from about 850 MW in the early 1990s to about 900 MW throughout the late 1990s, and to 950 MW in 2000. Between the years 1998 and 2000, peak electric demand including northern San Mateo County increased from 1,130 MW to 1,245 MW,[3] or an average of about 57 MW per year. Peak electric demand in 2001 dropped by 122 MW to 1,123 MW. While there is uncertainty in any load growth forecast, the present uncertainty is especially large in light of California's changing energy and economic environment, which has caused forecast demands to change dramatically over the last three years. Four different load forecast scenarios presented by PG&E show peak summer demand projections for 2005 in CCSF and northern San Mateo County ranging from 1,275 MW to 1,516 MW, about a 20 percent difference (which is significant when developing electricity plans) (PG&E, 2002).

[3] San Francisco accounted for about 950 MW of the 1245 MW total electricity use in year 2000.

There are currently two power plants in the CCSF: the Potrero Power Plant (currently operating with Units 3 through 6 at 362 MW) [owned and operated by Mirant Corporation] and the Hunters Point Power Plant (HPPP), owned by PG&E and currently operating with Units 1 and 4 only at about 215 MW. Current total CCSF generation is therefore about 578 MW of which 371 MW are "peaker" facilities that are restricted by air quality requirements to running only 10 percent (or fewer) of the hours in a year. The CCSF and PG&E have agreed that HPPP will be closed when replacement generation is developed within the CCSF; however, the ultimate decisionmaker on HPPP closure is the Cal-ISO. There is also a small 28 MW co-generation power plant, United Airlines Cogen, near the airport. The remaining electric supply is delivered through transmission lines from generation resources outside the area.

Given the uncertainties in local generation availability and future load growth mentioned above, scenario analysis was performed by PG&E to evaluate the impact of different demand forecasts and generation assumptions on the need for the Jefferson-Martin 230 kV Transmission Project to meet electric demand. The analysis was based on results of power flow analysis for conditions specified in the CAISO grid planning criteria and determined whether for each scenario analyzed, planning criteria violations would be expected, and, if so, when would the predicted violations materialize.

Three different peak demand forecasts were considered: High (SF Long Term Study Forecast); Medium (December 2000 Forecast); and Low (August 2002 Forecast). For each peak demand forecast, generation uncertainties were evaluated by considering whether or not: (a) Potrero 7 is assumed to have been constructed; (b) Hunters Point Power Plant is assumed to have been retired; and (c) Potrero Unit 3 is assumed to have been shutdown. Hence, with each peak demand forecast, eight different generation scenarios were evaluated.

Based on power flow analysis, transmission load serving capability of the northern San Mateo County area transmission system was determined for each of the scenarios. The peak demand forecasts were then compared with this total load serving capability to determine the timing of need. The results showed that by 2006 all peak demand forecasts (i.e., the High, Medium, and Low forecasts) would exceed electric supply without the Jefferson-Martin project installed. Incorporating the probability of different outage events and contingencies, the study, showed about an 84 percent probability of need for the Jefferson to Martin Project by summer 2006, and about 96 percent probability of need by 2011. Thus, even after taking into account peak demand and generation uncertainties associated with planning the supply to this area, the decision analysis that PG&E presented in the PEA results showed a high probability that the Proposed Project would be needed by 2006 summer. With the project in place, by contrast, all line loadings were within acceptable levels under all examined contingencies. Therefore, PG&E states that the Proposed Project must be online by summer 2006 in order to meet electric demand in the area.

2.3.1.2 Comply With Planning Criteria

PG&E and other regulated utilities are mandated to meet applicable reliability standards established by NERC and CAISO, and routinely conduct system-planning studies to determine whether these standards are met with the existing system. Based on the existing transmission connecting the PG&E system with surrounding electrical systems and current generation within the PG&E system, PG&E has identified the potential for the existing PG&E system to violate certain reliability standards in the future by providing system duplication that is less than that required by NERC and CAISO.

As discussed in Section 2.3.1.1 above, in the absence of the Jefferson to Martin project, available supply will likely exceed peak demand in the CCSF and northern San Mateo County area, thereby leading to violations of NERC and CAISO planning criteria and resultant outages. The project is needed by 2006 under each of the three most likely generation and demand scenarios described above in Section 2.3.1.1.

The Proposed Project is needed to ensure reliable service for meeting customer electric demand without overloading the existing electric facilities that supply San Francisco and the northern peninsula area. The ISO establishes grid-planning criteria to ensure the safety and reliability of transmission systems.[4] Pursuant to these criteria, PG&E uses both normal and emergency ratings for transmission infrastructure equipment.[5] Normal ratings are equipment operating limits for continuous use. Emergency ratings are slightly higher equipment operating limits that are allowed for short durations. Projects that propose to increase transmission capacity to meet load growth must satisfy the grid planning criteria. The criteria that are applied in evaluating whether a project satisfies the grid planning criteria are Categories A, B, and C, as described below.

- Category A: Normal ratings of equipment will not be exceeded with all generators, lines, and transformers in service. The voltage must be maintained within normal limits under these conditions.[6] No loss of load is allowed.
- Category B: Emergency ratings of equipment will not be exceeded with the loss of a single circuit, generator, or transformer or of a single circuit and a single generator. The voltage must be maintained within emergency limits under these conditions. No loss of load, except as noted in the footnote below, is allowed.[7]
- Category C: Emergency ratings of equipment will not be exceeded with the loss of a single circuit, generator, or transformer, or of a single circuit and a single generator; followed by manual system adjustments, and then followed by loss of another single circuit, generator, or transformer. The voltage must be maintained within emergency limits under these conditions. Loss of load, except as noted in the footnote below, is allowed.[8]

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[4] Included as part of the ISO California Grid Planning Criteria are the Planning Standards and Guidelines of the North American Electric Reliability Council (NERC), an international organization focused on coordinating power system reliability in North America. The area covered by NERC is divided into ten regional councils. PG&E is a member of the Western Electricity Coordinating Council, one of the regional councils. In February 2002, the California ISO modified its Grid Planning Criteria to include, among other changes, the San Francisco Greater Bay Area Generation Outage Standard. This Standard applies to the San Francisco Greater Bay Area and requires that the system normal condition assumes that three generating units are off-line: one 50 MW CT in the Greater Bay Area but not on the San Francisco Peninsula; the largest single unit on the San Francisco Peninsula; and, one 50 MW CT on the San Francisco Peninsula. Traditional contingency analysis, based on the standards specified in the NERC, WECC (including voltage stability), and ISO standards (such as single line outage, single generator line outage, etc.) would be conducted on top of this base condition. The one exception is that when screening for the most critical single generation outage, only units that are not on the San Francisco Peninsula should be considered.

[5] Overhead-transmission-line ratings are based on the conductor tensile strength, distance above the ground, conductor temperature, and ambient weather conditions. Underground cable ratings are based on the loading cycle on the cable, thermal resistivity of the soil surrounding the cable, and ambient temperature conditions. Transformer ratings are based on maximum temperature rise, hot-spot temperature, and ambient weather conditions.

[6] Normal voltage and emergency limits are based on average customer equipment voltage requirements and CPUC Electric Rule 2.

[7] "Planned or controlled interruption of generators or electric supply to radial customers or some local network customers, connected to or supplied by the faulted component or by the affected area, may occur in certain areas without impacting the overall security of the interconnected transmission systems. To prepare for the next contingency, system adjustments are permitted, including curtailments of contracted firm (non-recallable reserved) electric power transfers." (NERC Planning Standards, Table 1, footnote b).

[8] "Depending on system design and expected system impacts, the controlled interruption of electric supply to customers (load shedding), the planned removal from service of certain generators, or the curtailment of contracted firm (non-recallable reserved) electric power transfers may be necessary to maintain the overall security of the inter-

As electric demand increases, power line conductors and power transformers will reach and exceed their rated capacities. When the demand on the equipment exceeds its rated capacity, the equipment becomes overheated and can be damaged.[9] The electric system is designed with protective and control equipment to prevent this type of damage. Circuit breakers remove equipment from service when equipment failure occurs or when preset design limits are reached. However, removing equipment from service will lead to power outages in the areas served by the affected power lines and transformers.

2.3.1.3 Create a More Diverse Transmission System

On December 8, 1998, a power disruption caused by human error at PG&E's San Mateo Substation caused a blackout in most of the CCSF and the loss of 1,200 MW of load. This event reinforced the CAISO's and PG&E's determination of the need for additional generation in the CCSF and for increased transmission reliability.

Unique circumstances surround power generation and supply to the San Francisco Peninsula. Because the peninsula is geographically isolated from the rest of the State except from the south, there are no transmission lines entering the CCSF from any direction except the south. All of the major transmission lines serving the CCSF are closely spaced along the Highway 101 corridor: there are currently five 115 kV circuits, one 60 kV circuit, and one 230 kV circuit serving the Martin Substation, and all originate at the San Mateo Substation. Like the Jefferson-Martin Proposed Project, the existing transmission lines parallel the San Andreas Fault (at a distance of 2 to 5 miles east of the fault). These two facts place these lines at risk, and have been of major concern to transmission planners over the years, because a major accident or a large earthquake could destroy all of the transmission into the city simultaneously. As shown in Figure Ap.1-1, by adding a different route to Martin Substation that would originate at a different substation, PG&E would diversify the transmission system and eliminate the existing "all the eggs in one basket" problem that is more likely to lead to a system failure.

2.3.1.4 Implement the ISO Board of Governors April 2002 Resolution

In response to the December 1998 citywide power outage in the PG&E system, the ISO in early 1999 began evaluating the long-term electricity supply to San Francisco. The document produced as a result of this first study group was the "*San Francisco Peninsula Long-Term Electric Transmission Planning Technical Study*" (completed in October 2000). This study evaluated several options to enhancing reliability and supply in San Francisco, concluding that the best option would be a 230 kV transmission line from the Jefferson to the Martin Substations. A Stakeholders Group was formed and a two-year study undertaken to develop potential solutions. The Stakeholders Group ultimately recommended a Jefferson to Martin route as the

connected transmission systems." (NERC Planning Standards, Table 1, footnote d). CAISO Planning Standards specify that: "Involuntary load interruptions are an acceptable consequence in planning for ISO Planning Standard Category C and D disturbances (multiple contingencies with the exception of the combined outage of a single generator and a single transmission line), unless the ISO Board decides that the capital project is clearly cost effective (after considering all the costs and benefits)." In cases where this application would result in the elimination of a project or relaxation of standards that would have been built under past planning practices, these cases will be presented to the ISO Board for a determination as to whether or not the projects should be constructed. (CAISO Planning Standards; February 7, 2002, page 3).

9 The electrical and mechanical properties of materials in the equipment will irreversibly degrade when the heat build-up exceeds design thresholds. For example, prolonged overheating of power line conductors will cause the conductors to lose elasticity and eventually fail mechanically. The conductors can then drop to the ground and become a safety hazard. Likewise, when a power transformer becomes overheated, the insulating materials in the transformer are degraded and permanent damage and equipment failure can occur.

Figure Ap.1-1a. Overview of All Alternatives: Southern Segment
For security reasons this figure is not included in the online version of the report.

Figure Ap.1-1b. Overview of All Alternatives: Northern Segment
For security reasons this figure is not included in the online version of the report.

best solution to the identified problem. On April 25, 2002, the ISO Board of Governors determined that this project was needed and approved the Jefferson to Martin 230 kV Transmission Line Project without regard to route. The ISO Management stated that they believed that "the Jefferson to Martin 230 kV Transmission Project is needed no later than 2005, and that deferral beyond this date could lead to the need for load shedding within the San Francisco Peninsula Area should critical single contingencies occur . . . The development of the Jefferson to Martin 230 kV Transmission Project represents a first step resulting from a commitment on the part of the ISO and stakeholders to develop a long-term plan for the San Francisco Area." Furthermore, in granting its final approval as the preferred long-term transmission alternative, the ISO Board of Governors directed PG&E "to proceed expeditiously with design and licensing activities for the Proposed Project." (CAISO, 2002).

2.3.2 Feasibility

CEQA Guidelines (Section 15364) define feasibility as:

> ***. . . capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.***

In addition, CEQA requires that the Lead Agency consider site suitability, economic viability, availability of infrastructure, general plan consistency, other regulatory limitations, jurisdictional boundaries, and proponent's control over alternative sites in determining the range of alternatives to be evaluated in the EIR (CEQA Guidelines Section 15126.6(f)). Feasibility can include three components:

- **Legal Feasibility**: Does the alternative have the potential to avoid lands that have legal protections that may prohibit or substantially limit the feasibility of permitting a 230 kV transmission line?
- **Regulatory Feasibility**: Does the alternative have the potential to avoid lands that have regulatory restrictions that may substantially limit the feasibility of, or permitting of, a 230 kV transmission line by September 2005 or summer 2006?
- **Technical Feasibility**: Is the alternative feasible from a technological perspective, considering available technology; the construction, operation, and maintenance or spacing requirements of multiple facilities using common rights-of-way, and the potential for common mode failure?

For the screening analysis, the legal, technical, and regulatory feasibility of potential alternatives was assessed. The assessment was directed toward reverse reason, that is, a determination was made as to whether there was anything about the alternative that would be infeasible on technical or regulatory grounds.

This screening analysis does not focus on relative economic factors or costs of the alternatives (as long as they are found to be economically feasible) since CEQA Guidelines require consideration of alternatives capable of eliminating or reducing significant environmental effects even though they may "impede to some degree the attainment of project objectives or would be more costly" (Guidelines Section 16126.6(b)).

2.3.3 Potential to Eliminate Significant Environmental Effects

A key CEQA requirement for an alternative is that it must have the potential to "avoid or substantially lessen any of the significant effects of the project" (CEQA Guidelines Section 16126.6(a)). If an alternative was identified that clearly does not provide potential overall environmental advantage as compared to the Proposed Project, it was eliminated from further consideration. At the screening stage, it is not possible to evaluate all of the impacts of the alternatives in comparison to the Proposed Project with

absolute certainty, nor is it possible to quantify impacts. However, it is possible to identify elements of an alternative that are likely to be the sources of impact and to relate them, to the extent possible, to general conditions in the subject area.

Table Ap.1-2 presents a summary of the potential significant effects of the Proposed Project. This impact summary was prepared prior to completion of the EIR analysis, so it may not be complete in comparison to the detailed analysis now presented in Section D of this EIR. However, the impacts stated below are representative of those resulting from preliminary EIR preparation and were therefore used to determine whether an alternative met this CEQA requirement.

Table Ap.1-2. Summary of Preliminary Significant Impacts of the Proposed Project

Issue Area	Impact
Air Quality	• Construction dust and equipment emissions violating ambient air quality standards • Naturally-occurring asbestos emissions with construction disturbance of serpentinite rock
Biological Resources	• Serpentine grassland habitat and associated special status species • Wetland and riparian habitat degradation and disturbance in the watershed lands • Erosion, sedimentation, and compaction of soils • Wildlife disturbance
Cultural Resources	• Construction disturbance to recorded and/or unknown cultural and historic resources • Stone RR bridge and Crystal Springs Dam are historic resources
Environmental Contamination	• Possible existing contamination in urban commercial areas • Worker and public exposure to contaminated soil or groundwater during excavation • Health effects of naturally-occurring asbestos in serpentinite rock
Geology, Soils, and Paleontology	• Fault rupture potential at proposed transition station, Highway 35 crossing, and MP 13.5 to end of Segment 1 • Portions of the route are within mapped Alquist-Priolo fault zone and could experience significant groundshaking • Soils on Franciscan rock may be corrosive • Slope instability in vicinity of proposed transition station • Several known paleontological resources fossiliferous units occur along the alignment
Hydrology and Water Quality	• Construction-related erosion or degradation of water quality through sedimentation • Disturbance of contaminated groundwater • Spill of harmful material into the watershed • Exposure of the underground cable or tower damage from stream scour and erosion • Construction related groundwater depletion
Land Use	• Construction noise and dust on sensitive land use features • Potential policy conflicts with NPS Scenic and Scenic/Recreation Easements
Public Health, Safety, and Nuisance	• Increase in baseline levels for Electric and Magnetic Fields from 60 kV to 230 kV lines • Corona and audible noise from the transmission lines • Induced currents and shock hazards • Radio/TV/electronic equipment interference • Effects on cardiac pacemakers
Noise	• Short-term noise from construction activity on sensitive land uses • Continuous operational noise from transformers, substations, and/or transmission line corona
Recreation	• Degradation of visual resources to recreation areas • Construction disturbance to recreational activities, including access interference, air quality degradation, and noise • Noise and vibration impacts from helicopter construction of overhead towers • Preclusion of portions of Crystal Springs Golf Course and its parking lot during construction • Conflicts with Peninsula Watershed Management Plan Policy WA6
Socioeconomics	• EMF impacts in the lower income areas along the underground segment
Public Services and Utilities	• Conflicts with underground utilities during construction and excavation • Potential policy inconsistencies with encroachment permits from affected jurisdictions
Transportation and Traffic	• Short-term closures of highways and roads during construction • Short-term construction disturbance to pedestrian/bicycle/vehicular traffic, public transit, property access, and/or emergency response vehicles
Visual Resources	• Degradation of the viewshed due to taller towers in the overhead segment • Increased visibility of industrial feature in highly valued and recognized scenic corridor

3. Summary of Alternative Screening Results

Proposed alternatives identified by the Applicant, agencies, and the public are listed below according to the determination made for EIR analysis (i.e., whether or not each is analyzed in the EIR or eliminated from EIR analysis). Section 4 describes each of the listed alternatives in detail, and presents the rationale for elimination of each alternative that is not analyzed. This section presents a summary of the conclusions of Section 4, identifying alternatives that were eliminated and those that are carried forward for full EIR analysis.

Criterion 1: Project Objectives

Most alternatives described in Section 4 are modifications to PG&E's proposed transmission line route between the Jefferson and Martin Substations. All of these alternatives meet all four of PG&E's project objectives, including the objective of complying with the ISO approval of the "Jefferson-Martin Project."

Alternatives that provide a new 230 kV circuit to the Martin Substation by starting from a different substation (e.g., San Mateo Substation or Moraga Substation) meet most project objectives, but not all. Such alternatives may provide a reduced reliability benefit (Objective #2), may not completely eliminate the "all eggs in one basket" concern (Objective #3), and would not be consistent with the ISO's approved project (Objective #4). Consistency with each of these objectives is addressed in Section 4 below.

Criterion 2: Feasibility

The alternatives vary in their ability to meet legal, regulatory, and technical feasibility criteria described in Section 2 above. Technical feasibility issues for alternatives related primarily to physical constraints such as available space in existing rights-of-way and engineering/design limitations on construction on steep slopes or across active faults. Other alternatives had legal and/or regulatory feasibility problems that would not allow construction in the area or would not allow the option to be permitted in a reasonable period of time, as established by project objectives.

Criterion 3: Environmental Effects

The potentially significant environmental impacts of the Proposed Project are summarized in Table Ap.1-2, above, and detailed in Section D of this EIR. Each alternative is evaluated as to its overall ability to reduce or avoid significant effects of the Proposed Project. In some cases, an alternative may eliminate a Proposed Project effect, but it may create a new significant effect in a different discipline or geographic area. In these cases, the aggregate environmental effects of the Proposed Project segment and the alternative segment have been compared to determine whether the alternative meets the overall CEQA requirement.

3.1 Alternatives Analyzed in the EIR

The alternatives listed in Table Ap.1-3 below have been chosen for detailed analysis in this EIR through the alternative screening process. These alternatives are described in Section 4 and are illustrated by groups on Figure Ap.1-1. Individual maps of each alternative are presented in Section 4.

3.2 Alternatives Eliminated from EIR Consideration

The alternatives eliminated from detailed EIR consideration are listed in Table Ap.1-4. The rationale for elimination of each alternative is presented in detail in Section 4 of this Appendix.

Table Ap.1-3. Alternatives Fully Analyzed in EIR

Alternative		Project Objectives	Feasible?	Avoid/Reduce Environmental Effects?
PG&E Underground Route Option 1B		Meets all project objectives	Meets legal, regulatory, and technical feasibility criteria	Meets environmental criteria. Eliminates visual, biological, and EMF impacts of proposed route; eliminates transition station at San Bruno Avenue & Glenview Dr.
Partial Underground Alternative		Meets all project objectives	Meets legal, regulatory, and technical feasibility criteria	Meets environmental criteria. Reduces visual, biological, and EMF impacts of proposed route
West of Skyline Blvd Transition Station Alternative	With proposed underground route	Meets all project objectives	Meets legal, regulatory, and technical feasibility criteria	Meets environmental criteria. Eliminates visual and land use impacts of transition station at San Bruno Avenue & Glenview Dr.
	With Westborough Blvd. underground	Meets all project objectives	Meets legal, regulatory, and technical feasibility criteria	Meets environmental criteria. Eliminates visual and land use impacts of transition station at San Bruno Avenue & Glenview; avoids Huntington Dr. grade separation
	With Sneath Lane underground route	Meets all project objectives	Meets legal, regulatory, and technical feasibility criteria	Meets environmental criteria. Eliminates visual and land use impacts of transition station at San Bruno Avenue & Glenview; avoids Huntington Dr. grade separation
Sneath Lane Transition Station	With proposed underground route	Meets all project objectives	Meets legal, regulatory, and technical feasibility criteria	Meets environmental criteria. Eliminates visual and land use impacts of transition station at San Bruno Avenue & Glenview
	With Westborough Blvd. underground	Meets all project objectives	Meets legal, regulatory, and technical feasibility criteria	Meets environmental criteria. Eliminates visual and land use impacts of transition station at San Bruno Avenue & Glenview; avoids Huntington Dr. grade separation
	With Sneath Lane underground route	Meets all project objectives	Meets legal, regulatory, and technical feasibility criteria	Meets environmental criteria. Eliminates visual and land use impacts of transition station at San Bruno Avenue & Glenview; avoids Huntington Dr. grade separation
Cherry Avenue Alternative		Meets all project objectives	Meets legal, regulatory, and technical feasibility criteria	Meets environmental criteria. Eliminates conflict with proposed grade separation at San Bruno Avenue and Huntington Drive
Modified Underground Existing 230 kV Collocation Alternative and new South San Francisco Segment		Meets all project objectives	Meets legal, regulatory, and technical feasibility criteria	Meets environmental criteria. Eliminates construction over San Bruno Mountain and construction through BART ROW and in Colma/Daly City; avoids transition station at San Bruno Avenue & Glenview if used with Route Option 1B
PG&E's Route Option 4B: East Market St Alternative		Meets all project objectives	Meets legal, regulatory, and technical feasibility criteria	Meets environmental criteria. Eliminates route segment in residential portions of Hoffman and Orange Streets
Junipero Serra Alternative		Meets all project objectives	Meets legal, regulatory, and technical feasibility criteria	Meets environmental criteria. Eliminates proposed route segment along McLellan and part of Hillside; avoids passing High School

Table Ap.1-4. Alternatives Eliminated from EIR Consideration

Alternative	Project Objectives	Feasible	Avoid/Reduce Environmental Effects
PG&E's 1B with Underground 60 kV Line	Not analyzed (not a legal alternative)	Would not meet legal feasibility criteria with CEQA requirements concerning collocation	Not analyzed because alternative is legally infeasible under CEQA. Not carried through the tiering analysis since it is not a permissible alternative under CEQA Guidelines. Alternatives that reduce or avoid impacts of the Proposed Project need to be considered, not alternatives that only improve the existing environment.
Alternatives to Trousdale Drive: Existing Millbrae 60 kV ROW Alternative	Meets all project objectives	Would not meet technical feasibility criteria unless reroute established (could not be constructed within existing ROW)	Eliminates visual, recreational, biological impacts, but would run up steep slopes and through narrow residential areas. Not analyzed because alternative is technically infeasible (could not be constructed).
Alternatives to Trousdale Drive: SFPUC Water Facility ROW Alternative	Meets all project objectives	Would not meet regulatory feasibility criteria, because SFPUC does not allow other uses of its ROW	Would reduce seismic issues and would use existing utility corridor avoiding San Bruno Ave., Hillside Dr., McLellan Dr., and BART ROW, but would cross several schools/residential areas and would have engineering concerns with collocation. Not analyzed due to regulatory infeasibility (no access to ROW).
West of Existing Corridor, East of I-280 Alternative	Meets 3 of 4 project objectives, but may not meet on-line date	Would not meet regulatory feasibility criteria (sensitive species) with US Fish & Wildlife Service and NPS	Reduces EMF and visual concerns, but would be located in sensitive grasslands and subject to Section 7 consultation and review. Not analyzed due to regulatory infeasibility (regulatory compliance within required timeframe)
West of Reservoirs Alternative	Meets 3 of 4 project objectives, but may not meet on-line date	Would not meet regulatory feasibility criteria due to conflict with SFPUC Watershed Plan and GGNRA Scenic Easement	Reduces seismic, visual, EMF, and short-term construction concerns of the Proposed Project, but would establish a new utility corridor in biologically sensitive lands. Not analyzed due to regulatory infeasibility and greater significant impacts on resources.
PG&E's Underwater Cable Alternatives Segments to PG&E Route Option 1B (Options 2 and 3)	Meets all project objectives	Would not meet technical feasibility criteria due to near-term infeasibility of locating a spliced cable in very deep water.	Reduces seismic and short-term construction concerns of PG&E Route Option 1B Alternative. Not analyzed due to technical feasibility.
I-280 Northbound Ramp Alternative	Meets all project objectives	Would not meet regulatory feasibility criteria, because Caltrans would not allow use of its ROW	Avoids construction impacts to parts of San Bruno and Huntington Ave., but would move the impacts to Sneath Lane. Not analyzed due to regulatory infeasibility (Caltrans permitting)
PG&E's Route Option 2A: El Camino North Alternative	Meets all project objectives	Meets legal, regulatory, and technical feasibility criteria	Does not meet environmental criteria, due to greater construction and traffic impacts compared to the Proposed Project and no overall impact reduction
PG&E's Route Option 3B, BART North Alternative	Meets all project objectives	Meets legal, regulatory, and technical feasibility criteria	Does not meet environmental criteria, due to greater construction impacts to historic cemetery property compared to the Proposed Project and no overall impact reduction

Table Ap.1-4. Alternatives Eliminated from EIR Consideration

Alternative	Project Objectives	Feasible	Avoid/Reduce Environmental Effects
Mission/El Camino Real to A Street Alternative	Meets all project objectives	Meets legal, regulatory, and technical feasibility criteria	Does not meet environmental criteria, due to increased impacts to narrow residential streets and busy commercial corridors
San Bruno Mountain Collocation Alternative	Not analyzed (not a legal alternative)	Would not meet legal feasibility criteria with CEQA requirements concerning collocation	Not analyzed because alternative is legally infeasible under CEQA. Not carried through the tiering analysis since it is not a permissible alternative under CEQA Guidelines. Alternatives that reduce or avoid impacts of the Proposed Project need to be considered, not alternatives that only improve the existing environment.
San Mateo Substation to Martin Substation	Meets 3 objectives; would not meet objective to improve system diversity (PO #2)	May not meet technical feasibility criteria, due to space constraints in some streets	Eliminates impacts of the overhead segment and is a shorter route so less construction impacts, but would be located in crowded corridor. Not analyzed because alternative does not meet most project objectives
Moraga Substation to Potrero or Embarcadero Substations	Would not meet project objective to implement the ISO April 2002 Resolution (PO #4) and may not be able to meet on-line date.	Does not meet regulatory feasibility criteria due to Bay crossing (BCDC, BART, Caltrans)	Travels through fewer residential land use areas and is a shorter route so less construction impacts, but would have biological impacts in the East Bay and with the Bay crossing. Not analyzed because Bay crossing is infeasible
Sobrante Substation to Potrero or Embarcadero Substations	Would not meet PO criteria to implement the ISO April 2002 Resolution (PO #4) and may not be able to meet on-line date	Does not meet regulatory feasibility criteria due to Bay crossing (BCDC, BART, Caltrans)	Travels through fewer residential land use areas and is a shorter route so less construction impacts, but would have biological impacts in the East Bay and with the Bay crossing. Not analyzed because Bay crossing is infeasible
Jefferson to Various Substations	Would not meet PO criteria to implement the ISO April 2002 Resolution (PO #4) and may not be able to meet on-line date	Meets legal, regulatory, and technical feasibility criteria	Does not meet environmental criteria, because of increased construction disturbance than the Proposed Project due to the greater length of the underground line; no overall impact reduction

4. Alternative Descriptions and Determinations

4.1 Introduction

The alternatives presented in this section range from minor routing adjustments to PG&E's proposed 230 kV project location, to alternative system voltages, system designs and routing options that have been under consideration in other parts of CCSF and northern San Mateo County, as well as renewable energy supplies and other non-wires alternatives. After initial screening, if a potential alternative was proven infeasible or if it did not appear to reduce or avoid potentially significant impacts of the Proposed Project without creating other significant impacts of its own, then it was eliminated from full evaluation. The alternatives that have been determined to meet all three of CEQA's criteria have been retained for full analysis in the EIR. Each alternative discussion also includes a map and a discussion of compliance with each of CEQA's alternatives screening criteria.

The first two sections below address route variations to the Proposed Project; all of these alternatives connect the Jefferson and Martin Substations. Section 4.2 presents a description of each potential alternative that is in the southern segment of the Proposed Project. Section 4.3 describes alternatives through the northern segment, north of San Bruno Avenue to Martin Substation. Each alternative has an individual map and all alternatives are depicted on an overview Figure Ap.1-1. Section 4.4 discusses transmission alternatives that do not originate at Jefferson Substation and/or end at Martin Substation. Finally, non-wire alternatives, including renewable resource, system enhancement, alternative transmission, new generation, and integrated resource alternatives are evaluated in Section 4.5. The No Project Alternative, because it must be considered in an EIR, is described in Section C of the EIR and is not discussed in this appendix.

4.2 Southern Segment – Jefferson Substation to Transition Station

Each of the following alternatives is located within the southern segment of the Proposed Project from Jefferson Substation to the general area of the proposed transition station at San Bruno Avenue. Unless specified in alternatives descriptions, alternatives involve only the single-circuit 230 kV transmission line and the existing 60 kV would remain untouched. The discussions below explain the reasons for elimination or retention for full analysis for each potential alternative.

4.2.1 PG&E Underground Route Option 1B

Alternative Description

This alternative is an underground option to the southernmost 11.2 miles of the overhead segment of the Proposed Project along the I-280 corridor. It was suggested by PG&E in its PEA as Route Option 1B. This option was endorsed during the scoping process by numerous agencies and individuals, including residents of the Town of Hillsborough and the San Mateo Highlands (an unincorporated area of San Mateo County).

In Route Option 1B, the existing overhead double circuit 60 kV line would be untouched, and would remain in its current configuration and location. As illustrated in Figure Ap.1-2, the new 230 kV line would transition underground at Jefferson Substation and would be installed within Cañada Road for about 5.0 miles to Highway 92. It would then turn onto a 0.7-mile stretch of Highway 92 (just west of

I-280), before turning back onto Skyline Boulevard (Highway 35). The route would continue north in Skyline Boulevard (2.6 miles), crossing over Crystal Springs Dam above San Mateo Creek, to Golf Course Road where it would turn east, crossing below I-280 then turning north on the continuation of Skyline Boulevard to Carolands Substation, 0.4 miles north of Black Mountain Road in the Town of Hillsborough. Skyline Boulevard between Hayne Road and Carolands Substation has a few residences on the eastside.

From Carolands Substation, the route would travel along Skyline Boulevard for approximately 2.6 miles through the Town of Hillsborough (1.7 miles) and the City of Burlingame (0.9 miles) to its intersection with Trousdale Drive. This portion of Skyline Boulevard has several residences and a school (south of Butternut Drive) on its eastside, but they are set back from the road and/or there is a sound wall between Skyline Boulevards and these houses. From Skyline Boulevard, this alternative would turn northeast onto Trousdale Drive in the City of Burlingame. Trousdale Drive is a four-lane road with multi-family residences on north side at its intersection with Skyline Boulevard. Sensitive land uses include Franklin Elementary School to the south of the route and Mills-Peninsula Hospital, which has a future expansion project planned. The road becomes primarily commercial just west of Magnolia Street. The route would travel approximately 1.7-mile route down Trousdale Drive to the corner of Trousdale Drive and El Camino Real. At this point the route would turn north onto El Camino Real and travel down the roadway until it would rejoin the Proposed Project at El Camino Real and Huntington Drive or transition to one of the Northern Segment Alternatives (see Section 4.3).

Crossing of Crystal Springs Dam. Route Option 1B as proposed by PG&E would require installation of the 230 kV solid dielectric cables either on the existing Crystal Springs Dam or on the roadway bridge along Skyline Boulevard over the dam. This crossing presents challenges with respect to design and potential new environmental impacts, first because there are seismic retrofits planned for both the bridge (by San Mateo County) and the dam (by the SFPUC), and second, because there is California red-legged frog (CRLF) habitat on the top of the dam that could be affected by both projects. EIR preparers requested that PG&E address these concerns.

Because the existing bridge cannot support the 230 kV cables, PG&E focused its analysis on the dam. After consultation with the SFPUC and the County, PG&E identified five technically feasible options for crossing the dam that would avoid use of the bridge or conflict with its construction. All of these options take into account the planned modifications to the dam and the required future operations of the spillway. The options identified by PG&E and the SFPUC for installing the 230 kV cable across the dam are the following:

1. **Top of the Dam**. Installation of the duct bank on the top of the dam, next to the existing down-stream parapet. The duct bank would be in a 2 by 2 or a 1 by 4 duct configuration and enclosed in a concrete box anchored to the dam surface. In the spillway section, a trench would be cut into the top of the dam. Conduits would be placed in this trench (approximately four feet wide by one foot deep) and the trench would be filled with concrete. The surface of the duct bank would be at the same grade as the spillway. In effect, the duct bank would become a part of the dam.
2. **Face of the Dam**. Attachment of the cable directly to face of the dam on the lake side. The final design would ensure protection of the cable from floating debris and/or boat impact.
3. **Temporarily Cross the Creek Above the Dam**. Using two riser structures, the cable would be located in an overhead configuration to temporarily span the dam until construction on the new Cañada Road Bridge by San Mateo County is completed. PG&E is currently working with San Mateo County to ensure that design aspects of the new bridge would include room for the cable. During the bridge repair, a system for attaching the cables to the bridge would be developed.

Figure Ap.1-2. PG&E's Underground Route Option 1B
For security reasons this figure is not included in the online version of the report.

Figure Ap.1-2a. PG&E's Underwater Cable Alternatives to PG&E's Route Option 1B (Option 1)
For security reasons this figure is not included in the online version of the report.

Figure Ap.1-2b. Overhead Crossing of Crystal Springs Dam
For security reasons this figure is not included in the online version of the report.

4. **Underwater Cable Design**. A 3,000-foot underwater cable (a single segment with no splices) would be installed around Crystal Springs Dam. It would enter and exit the Lower Crystal Springs Reservoir north and south of the dam and the cable would be placed directly on the lakebed, thus avoiding any contact with the dam (see Figure Ap.1-2a). The submarine cable could be placed directly on the lake bottom. Because the SFPUC prohibits boating and fishing in Lower Crystal Springs Reservoir, there would be no risk to the cable from anchoring or fishing equipment, and the reservoirs are not subject to tidal action.

   Access to the lake would be via two bored segments in order to avoid impacts to lakeside habitat. Boring would occur from an existing paved road for the south access point and an existing paved bike trail for the north access point. At both shore crossings locations, most equipment would operate from existing paved surfaces with periodic utilization of temporary workspace adjacent to the paved areas for the six to eight weeks of underwater cable installation.

   A bore pit would be excavated within the footprint of the existing road. The cable would be delivered in a single 3,000-foot segment on one reel (the reel would be approximately 153 inches in diameter and 86 inches wide; and would weigh approximately 65,900 pounds). Temporary work area of 5 feet by 50 feet down-slope and 15 feet by 50 feet upslope of the bore pit would be used along the sides of the road to accommodate spoils and equipment, although most work would be expected to occur from the existing road. An additional 20 feet wide by 100 feet deep work area would be needed on the upslope side of the bore pit to stage the boring equipment. The length of the bore would be approximately 155 feet. The northern exit point site would be accessed from Skyline Road via the SFPUC public bike path north of the dam. As with the entry point, a bore pit would be excavated within the footprint of the exiting bike path. The site would be fenced off and the bike path would be rerouted around the work area. A temporary work area of 30 feet by 50 feet along and adjacent to the path would be needed to accommodate equipment and spoils. An additional 20 feet wide by 100 feet deep work area would be needed on the upslope side of the bore pit to stage the boring equipment. The length of this bore would be approximately 115 feet.

5. **Temporarily Cross the Dam.** The cable would be place along the top of the dam on a temporary support until the new bridge is constructed by San Mateo County. Design aspects of the new bridge would include room for the cable.

EIR preparers have added a sixth option: a permanent overhead crossing of the dam, illustrated in Figure Ap.1-2b.

Options 1 and 5 above could potentially affect the populations of California red-legged frog (CRLF) that exist on the top of the dam. The extent of impacts with those options would depend on specific construction methods. Options 2, 3, 4, and 6 could be designed to avoid CRLF habitat on the top of the dam. Regardless of the option selected, PG&E would have to consult with the USFWS to determine the type and extent of acceptable mitigation.

Another concern about Options 1, 2, and 5 is that Crystal Springs Dam would have to be modified to some extent in order to accommodate the attached cables. The dam was constructed in 1890 and is a historic structure, so the cultural resources impacts of this type of modification would need to be evaluated.

PG&E believes that Option 5 would not be preferable because construction the bridge around the temporary lines would be both difficult and expensive. Option 3 would also involve redesign work for the bridge and would involve additional costs of design, construction, and maintenance of PG&E facilities. PG&E and the County would need to enter into agreements concerning financial impacts, responsibilities, and liabilities for the transmission line addition. While not preferred by PG&E, both of these options are viable.

While it appears that the dam can be crossed without creating significant effects on the CRLF habitat, it is not certain that this could be accomplished in a manner acceptable to the USFWS. Therefore, a permanent overhead crossing of this segment is also presented as part of Route Option 1B. This is different from Option 3 above because this would be a permanent overhead crossing, as opposed to the temporary crossing described by PG&E. An overhead dam crossing would require construction of two transition stations for the 230 kV line, one south of the dam and one north of the dam. Transition towers would replace proposed towers at 6/35 and 7/39 and the overhead route between the towers would be the same as the proposed route, east of the I-280 bridge. This alternative portion of PG&E's Route Option 1B was developed by the CPUC staff to alleviate cultural resources, seismic, and feasibility concerns associated with the dam crossing.

Consideration of CEQA Criteria

Project Objectives

Route Option 1B would add needed capacity to meet electric demand, while also diversifying the area transmission system by starting at the Jefferson Substation. In addition, this alternative would meet the planning standards and criteria set for by CAISO and NERC and would implement CAISO's April 2002 Resolution approving the Jefferson-Martin project. Therefore, this underground alternative meets all of the stated objectives of the Proposed Project.

Feasibility

As suggested in PG&E's PEA, Route Option 1B would cross the historic Crystal Springs Dam where there are two planned construction projects (a San Mateo County bridge replacement project and a SFPUC dam repair project). Both projects are currently in planning phases and it is unclear when they would occur.

EIR preparers requested PG&E to evaluate directional drilling across San Mateo Creek in order to eliminate the problematic crossings of the dam or roadway. PG&E stated that directional drilling across San Mateo Creek to bypass the dam would not be feasible given the depth of canyon and the geologic conditions. As a result, the only feasible options are those described above: attaching cables to the dam, crossing the dam with an overhead crossing, or using underwater cables to bypass the dam.

The Crystal Springs Dam Bridge was determined to be seismically unsound in 1987. An alternative that would attach the transmission line to the bridge is not feasible in the bridge's current condition. However, the County has indicated that it would be feasible to incorporate the transmission line project into the County bridge replacement project's plan; however, the County's plans would have to be designed to take the additional loading associated with transmission line, and the County would require PG&E to pay any additional cost that would occur as a result of redesign and incorporating the transmission line into the bridge construction (San Mateo County, 2003). The SFPUC will begin preparing a project specific EIR for its dam repair project towards the end of 2003 and would not likely start construction on the project until early 2006 (SFPUC, 2003a).

As described above, there are endangered species concerns at the dam (i.e., California red legged frog) that could affect permitting of Options 1 and 5. The U.S. Fish and Wildlife Service (USFWS) conducted a Biological Opinion for the County's bridge replacement project (dated March 15, 1999), which required that red-legged frog eggs be relocated to a pond at the base of the dam, which is City of San Francisco land. However, San Francisco has indicated that it would not allow the eggs to be relocated to the base of the dam because it would interfere with its dam repair project. The County is currently working with the SFPUC and the USFWS to resolve the issue (San Mateo County, 2003; SFPUC, 2003a).

As described above in "Alternative Description," the SFPUC has determined that installation of the cables on the dam (using one of five possible options) would be feasible, and PG&E states that three of the options would be unlikely to affect the CRLF. EIR preparers concur that Options 2, 3, 4 and 6 could be implemented without disturbance to the CRLF populations on the top of the dam.

While PG&E has expressed a preference for the underwater cable (Option 4), the determination of which option would be implemented will be based on the timing of project construction and the preferences of the SFPUC and the County. Because there are several feasible options for crossing Crystal Springs Dam (including attaching the cable to the face of the dam, constructing a temporary or permanent overhead crossing of the dam, or installing an underwater cable to avoid the dam crossing entirely), Route Option 1B is considered to be feasible.

Lessen Significant Environmental Effects

Under the Proposed Project, the 230 kV transmission line would require construction and tower removal in Edgewood Park, the Pulgas Ridge Preserve, and San Francisco Watershed Lands to comply with the CPUC General Order 95 safety standards, as well as the widening of the existing right-of-way. In addition, the Proposed Project would create significant visual impacts associated with the Proposed Project's taller and wider towers. Biological impacts in Edgewood Park and other serpentine grassland areas could also be significant. The proposed 60/230 kV line would have increased EMF emissions over the existing 60 kV lines, and approximately 4.4 miles of the proposed segment would be adjacent to residences.

From Carolands Substation to Trousdale Drive the proposed route in this segment would be within the Crystal Springs Golf Course west of I-280 (1.2 miles) and then east of I-280 for 0.8 miles. Where the proposed route is east of I-280, it would be immediately adjacent to residences on Loma Vista and Skyview Drives. Potentially significant impacts of the Proposed Project in this area include visual impacts from I-280 and the golf course, recreational impacts, biological impacts, and EMF impacts to residences. In addition, visual and short-term construction impacts to Crystal Springs Golf Course would be avoided.

Use of Trousdale Drive would avoid the use of San Bruno Avenue between Skyline Drive and Huntington Drive. In addition, because it turns east south of San Bruno Avenue, it would avoid the visual and biological impacts of the Proposed Project in the I-280 corridor between Trousdale Drive and San Bruno Avenue. This route would also avoid visual concerns of San Bruno residents regarding the proposed transition station, as well as seismic concerns with a San Andreas Fault crossing at that same site.

This underground alternative would eliminate visual, recreational, and biological impacts, and construction would be entirely within existing roads. EMF impacts to residences adjacent to the underground route would need to be evaluated. The underground alternative clearly has the potential to reduce or avoid significant effects of the Proposed Project.

Potential New Impacts Created

Construction of an underground transmission line, as would occur with Route Option 1B, would require more construction due to the continuous trench, whereas overhead transmission line construction would result in construction disturbance primarily at individual structure sites, located approximately every 800 feet. Underground construction and trenching involves greater short-term construction-related impacts (traffic, air quality and dust, and noise). There is also a greater potential to encounter contamination and cultural resources due to the greater ground disturbance.

Route Option 1B would create a new utility corridor outside of existing easement, which would require maintenance and operation activities in two areas instead of one (the existing 60 kV corridor would remain as it is). This route would include an underground crossing of a trace of the San Andreas Fault in an area of Holocene displacement near the Jefferson Substation. This alternative route would require construction adjacent to a busy, three-way intersection at Cañada Road, Highway 92, and Skyline Boulevard/Highway 35.

Crossing of Crystal Springs Dam. PG&E presented five options for crossing Crystal Springs Dam, and EIR preparers have added a sixth overhead crossing option. Two of PG&E's options (Options 1 and 5) would affect CRLF habitat on top of the dam; these options and Option 2 could also create impacts to the historic dam structure. One option, use of an underwater cable around the dam structure, would require consideration of effects of heat from the on fish and other biological resources in the reservoir, but due to the relatively short length of the cable (approximately 3,000 feet long), heat effects are not considered to be significant; however, a submarine cable longer than 3,000 feet would require splicing, which would present technical feasibility issues (see also impacts addressed under PG&E's Underwater Cable Alternative Segments to Alternative 1B, Section 4.2.7 below).

As stated above, under Option 4, the shoreline boring would allow the cable to enter the reservoir at a considerable distance and depth away from the shoreline, avoiding impacts to plant communities and wildlife habitat at or near the reservoir shoreline. At the north and south bore locations, use of temporary work space would disturb 0.10 and 0.07 acres respectively. The plant communities at the locations of both bore pit sites consist of coyote brush scrub and nonnative grassland. No emergent wetland vegetation was observed by PG&E biologists at either location.

The two bore locations for Option 4 are not within documented San Francisco garter snake breeding habitat and are located more than one mile north of historic San Francisco garter snake observations made along bays at the south end of Upper Crystal Springs Reservoir. The nearest known CRLF population exists on top of the Crystal Springs Dam located approximately 0.25 miles from each of the bore locations. While it is possible that a red-legged frog may wander a significant distance from the dam, where a population is documented, red-legged frogs are not likely to occur near the impact areas where boring activities would occur due to the upslope distance from the shoreline area.

If a permanent or temporary overhead crossing of San Mateo Creek and Crystal Springs Dam is utilized, the presence of two transition structures or temporary riser poles and conductors in the vicinity of the dam would likely create adverse visual impacts. The parking area immediately north of the dam is heavily used by recreationists and the towers/lines would be visible to travelers on Skyline Boulevard. In addition, the permanent overhead crossing would require two transmission line crossings of I-280.

Alternative Conclusion

RETAINED FOR ANALYSIS. Route Option 1B is feasible and would meet all project objectives. Potential adverse environmental impacts to air quality, cultural resources, contamination, noise, and traffic could be expected from underground construction and system failure during operation. Regardless, overall this alternative has the potential to reduce or avoid significant environmental impacts to visual, recreational, geologic, and biological resources and to reduce EMF, and the additional impacts it would create would be primarily short-term construction impacts. Therefore, this alternative, PG&E's Route Option 1B was retained for full analysis in this EIR.

4.2.2 PG&E's Route Option 1B with Undergrounding the 60 kV Line

Alternative Description

The route of this alternative would be exactly the same as PG&E's Route Option 1B (Section 4.2.1) depicted in Figure Ap.1-2. However, in this alternative, the single-circuit 60 kV line would be undergrounded as well as the 230 kV line. Under this option, which was suggested in scoping comments, the line would transition underground at Jefferson Substation and continue north through public roadways in the SFPUC Watershed Lands (8.3 miles), unincorporated San Mateo County (0.5 miles), the Town of Hillsborough (2.9 miles), and the Cities of Burlingame (0.9 miles), Millbrae (1.8 miles), and San Bruno (1.3 miles) for the length of the Southern Area Component. The line would travel down Cañada Road, Highway 92, Skyline Boulevard/Highway 35, Trousdale Drive and El Camino Real. Approximately 11.2 miles of the Proposed Project would be installed underground, but would also include undergrounding the existing 60 kV transmission lines, so construction would include removing the existing 60 kV towers. The existing tower platforms would be left in place through Edgewood Park in response biological concerns involving invasive plants species and ground disturbance in the serpentine soils. Land uses along this segment are the same as those of the underground alternative mentioned above in Section 4.2.1.

Consideration of CEQA Criteria

This suggested alternative that would include placing both the proposed 230 kV line and the existing 60 kV line underground along a new alignment is not considered to be within CEQA's required "reasonable range of alternatives," and therefore cannot be considered for full analysis in the EIR. While undergrounding of only the proposed 230 kV line along an alternate route is a legitimate, potentially feasible alternative that should be included within CEQA's required "reasonable range of alternatives," the relocation of the existing 60 kV line to such a new route is not a permissible alternative under CEQA Guidelines. The reasons for this are explained below.

The Proposed Project involves the construction of a new 230 kV transmission line. The 60 kV line is already in place, and thus is part of the environmental setting against which environmental impacts are judged. See CEQA Guidelines section 15125(a) ("the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published . . . will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant.") The impacts of a Proposed Project do not include the effects of activities already occurring or facilities already in existence, such as the 60 kV line. See Riverwatch v. County of San Diego, 76 Cal. App. 4th 1428, 1451-1453 (1999) (even prior illegal activities were part of the environmental baseline); accord, Fat v. County of Sacramento, 97 Cal. App. 4th 1270 (2002). While it is true that the Proposed Project would involve some modifications to the existing 60 kV line (removal of existing towers and replacement of the line on new towers that could also accommodate the 230 kV line), those changes would be merely to accommodate locating the proposed 230 kV line in the same alignment as the existing 60 kV line. For this reason, any alternative that would entail placing the 230 kV line underground along the current alignment of the existing 60 kV line may properly consider co-locating the 60 kV line in such an underground alignment. However, any alternative that would place the 230 kV line along a different alignment than the 60 kV line could not properly include relocation and/or undergrounding of the 60 kV line since none of the impacts of the Proposed Project will result from the existence, location or operation of the existing 60 kV line, which is properly part of the environ-

mental baseline. In explaining the "rule of reason" by which alternatives are selected for evaluation, CEQA Guidelines section 15126.6(f) states, "The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project." Because "the project" includes only the 230 kV line, and the effects of the project are limited to the impacts associated with the proposed 230 kV line, appropriate alternatives must be limited to those that could avoid or lessen the effects of the 230 kV transmission line. CEQA does not permit the lead agency to try and "fix" or improve the existing environmental setting using a proposed change to the environment as a hook.

As a related point, CEQA specifies that in order for a mitigation measure (and by inference, an alternative) to be feasible, it must meet relevant constitutional standards. See CEQA Guidelines section 15124.4(a)(4). Such standards include a requirement that there be an essential connection or relationship between an alternative and a legitimate lead agency interest dealing with the Proposed Project, and that the alternative be "roughly proportional" in nature and scope to the impacts of the Proposed Project. Again, since the impacts of the Proposed Project stem solely from construction of a new 230 kV line, and not from the existing 60 kV line, the relocation of the existing 60 kV line to a wholly new alignment cannot reasonably be required by the CPUC. For these reasons, this alternative will not be considered further in the screening process and/or be considered for full analysis in the EIR.

Alternative Conclusion

ELIMINATED. This alternative would meet all project objectives. However, this alternative is in conflict with CEQA law due to the relocation of the 60 kV circuit from the existing corridor to the separate underground ROW. Therefore, because of the legal feasibility issues defined above, under the guidelines of CEQA this alternative will not be evaluated for full analysis in the EIR.

4.2.3 Partial Underground Alternative

Alternative Description

This alternative, shown in Figure Ap.1-3, was developed as a partial overhead/underground alternative in response to scoping comments voicing concerns about biological impacts in and around Edgewood Park and visual and EMF issues near residences along the I-280 corridor.

The first segment of the Partial Underground Alternative would require installation of the new overhead towers and lines between the Jefferson Substation and proposed tower 2/13 to an alignment nearer to Cañada Road (see detail in Figure Ap.1-3a). This 2.8-mile segment of the route would be located entirely within SFPUC Watershed Lands. The route would cross I-280 near the Cañada Road undercrossing, and then follow the east side of Cañada Road at a distance of between 100 and 900 feet east of the roadway. The existing 60 kV distribution line to Watershed Substation at tower 2/17 would need to be extended approximately 600 feet to connect to the new 230 kV line. The segment would involve relocation of the proposed new towers and both the 60 and 230 kV lines, and would replace 2.3 miles of the Proposed Project. From tower 2/13, the route would be identical to the Proposed Project for about three miles to the Ralston Substation.

From Ralston Substation to tower 8/50 (just south of the Carolands Substation), the Partial Underground Alternative would follow the Proposed Project route for 3.5 miles, but the alternative would be installed underground where it would be adjacent to residences, from proposed towers 5/27 to 6/37 and from proposed towers 7/39 to 8/50. The underground line, requiring a trench of about 2 feet wide, would be installed within the existing disturbed dirt road that parallels the existing overhead 60 kV transmission

Figure Ap.1-3. Partial Underground Alternative
For security reasons this figure is not included in the online version of the report.

Figure Ap.1-3a. Partial Underground Alternative: Detail of Edgewood Road Segment
For security reasons this figure is not included in the online version of the report.

Figure Ap.1-3b. Partial Underground Alternative: Detail of West of I-280 Segment
For security reasons this figure is not included in the online version of the report.

line through these areas. Because an underground crossing of San Mateo Creek would not be feasible (see discussion in Section 4.2.1), the line would transition to overhead for about 0.5 miles. Transition towers would replace proposed towers at 6/37 and 7/39 to allow an overhead crossing of San Mateo Creek, which would be the same as the crossing for the Proposed Project. This alternative would transition to overhead again at tower 8/50 (on land of the Town of Hillsborough's water storage facility), and there would be an overhead crossing of I-280 at that point. From tower 8/53 where the Proposed Project would cross I-280, this alternative would rejoin the Proposed Project route north until tower 9/62.

North of the new I-280 crossing at tower 8/50, this alternative would remain entirely on the west side of the freeway (see detail in Figure Ap.1-3b). This would eliminate two crossings of the freeway that would be required with the Proposed Project. Where the Proposed Project would cross I-280 to the east (proposed towers 10/63 through 10/68 would be east of the freeway), this alternative would remain west of the interstate until it would rejoin the proposed route between towers 10/68 and 10/69 and continue north to the Proposed Transition Station at San Bruno Avenue and Glenview Drive. This segment of the Partial Underground Alternative would only be slightly longer than the 1.0 miles of the Proposed Project that it would replace, and both segments would be on SFPUC Watershed Lands. North of tower 10/69, this alternative would rejoin the Proposed Project.

Consideration of CEQA Criteria

Project Objectives

This alternative would meet all of the stated objectives of the Proposed Project. The alternative route would add needed capacity to meet electric demand, while also diversifying the area transmission system by starting at the Jefferson Substation. In addition, this alternative would meet the planning standards and criteria set for by CAISO and NERC and would implement CAISO's April 2002 Resolution approving the Jefferson-Martin project. Therefore, the Partial Underground Alternative meets all of the stated project objectives.

Feasibility

Both technical and regulatory feasibility concerns have been raised about the Partial Underground Alternative. PG&E mentioned in its scoping comment letter dated March 7, 2003 that the Partial Underground Alternative could present technical feasibility concerns due to the presence of PG&E's existing underground gas transmission lines 109 and 132 because the lines are not designed for traffic loading (which could occur during transmission line construction), and because there could be interference with existing gas transmission maintenance and operation plans and/or cathodic protection. However, if the transmission and gas lines were placed more than 10 feet apart or if protective measures were instituted, such as cathodic protection, concerns about induced current and collocation would be mitigated. Therefore, this alternative is technically feasible.

The regulatory feasibility issues arise connected with SFPUC and NPS concerns about the creation of a new utility corridor along a portion of Cañada Road near Edgewood Road based on the Watershed Plan and the Scenic and Recreation Easement. However the benefit of this route segment is that it would be the elimination of the existing and proposed transmission line through Edgewood Park and the Pulgas Ridge Preserve. Therefore, it is possible that the SFPUC and NPS would determine that this alternative, while creating a new utility corridor in one area, provides a net benefit to the environment. As stated in Section 4.2.2 above, any alternative that would entail placing the 230 kV line underground

along the current alignment of the existing 60 kV line may properly consider co-locating the 60 kV line in such an underground alignment.

Lessen Significant Environmental Effects

The Partial Underground Alternative would result in elimination of all new transmission facilities from Edgewood Park, and would allow existing transmission towers in the park to be removed (the method of removal would be determined by biologists and may require that tower footings remain to minimize disturbance of sensitive habitats). This alterative would also eliminate the visual impacts of the Proposed Project in Edgewood Park and the Pulgas Ridge Preserve. Edgewood Park has an assemblage of highly sensitive serpentine soils plants and invertebrate species, and the Proposed Project would require both removal of existing towers and construction of new towers within the park. Even with the proposed helicopter supported construction and mitigation, impacts on biological resources from the construction of new towers and removal of existing towers would be significant.

The EMF levels from the center of the underground line to about 15 feet from center would be much higher than for the proposed overhead line portion, but beyond 20 feet the EMF level from an underground line would be much reduced. In contrast, the overhead transmission lines, because of their height above the ground where EMF receptors are located, have a wider range of elevated magnetic field emissions. Therefore, because underground transmission lines have a narrower area of magnetic field effects and the line would be installed at a distance greater than 20 feet from the residences, the EMF impacts adjacent to residential areas would be reduced in comparison to the Proposed Project.

Towers 1/3 to 1/10 also create significant visual impacts to viewers on I-280, recreationists in Edgewood Park and the Pulgas Ridge Preserve, and travelers on Edgewood Road. These impacts would be reduced (but not eliminated) with implementation of this segment of the alternative. Visual resource effects of the Proposed Project would be entirely eliminated where it would be adjacent to residential areas of The San Mateo Highlands and the Town of Hillsborough and along the I-280 corridor through the City of Burlingame (between towers 9/62 and 10/69). The relocation of towers in this alternative would eliminate two overhead crossings of I-280 (south of tower 10/63 and south of tower 10/69); the visual impact of the I-280 crossing south of tower 10/69 is especially great.

Potential New Impacts Created

The new overhead reroute section of the Partial Underground Alternative along Cañada Road would establish a new utility corridor within the SFPUC Watershed Lands, so there may be policy inconsistencies with the Watershed Management Plan WA6. The SFPUC Peninsula Watershed Management Plan states that "all new construction activities within the Watershed have the potential to degrade water quality and quantity, disturb ecological and cultural resources, and affect the scenic or historic value of the surroundings . . . . Uses and activities, other than those undertaken by the SFPUC for normal watershed operation and maintenance, on SFPUC-owned lands require the execution of a lease and/or permit from the SFPUC. This is to ensure that uses and activities on SFPUC lands are conducted in an acceptable fashion, consistent with the goals and policies of their Watershed Management Plan." Also, there may be a policy inconsistency because it may be in conflict with the SFPUC Watershed Management Plan, which prohibits the creation of new utility corridors. Policy WA6 states that the Plan "restrict[s] new utility lines proposed on the watershed for the transmission of or communications to existing utility corridors, and require[s] that new power lines be buried, where feasible. All proposed alignments shall undergo a scenic impact analysis." However, due to the

overall environmental benefit that could be gained by implementation of this alternative (to biological and visual resources), this potential inconsistency is not considered to be significant.

In addition, this alternative would not create a second utility corridor (as would occur with Route Option 1B) because the overhead and underground route segments would remain in a single corridor at all times with the new tower reroute segments. Therefore, the alternative is considered to present a benefit overall.

New potentially significant visual impacts would be created by this route to travelers on Cañada Road in the vicinity of Edgewood Road; however, these visual impacts are much less severe than those of the Proposed Project segment because the individual towers would be better screened and would be viewed by many fewer people. Near Jefferson Substation, the alternative would be located in an Alquist-Priolo Seismic Zone, but because the line is overhead the seismic impacts would not be significant. While the Proposed Project requires an overhead crossing of San Mateo Creek as well, this alternative would have the additional visual impacts of the transition stations, which are larger and more massive than standard towers. The parking area immediately north of the dam is heavily used by recreationists and the towers/lines would be visible to travelers on Skyline Boulevard. However, the area is not visible to travelers on I-280. The placement of towers west of I-280 on Watershed Lands adjacent to the City of Burlingame could create new biological and cultural resources impacts, and visual impacts to travelers on I-280. However, careful placement of individual towers could effectively mitigate this concern.

While construction of the underground line would occur within an existing dirt road to minimize biological impacts, construction equipment could damage sensitive serpentine plant associations in the project area. Construction of the underground segments of this alternative would have greater short-term construction impacts (noise, dust, etc.) due to trenching, which also creates the potential for releasing asbestos fibers to the air from disturbance of the serpentine soils.

Alternative Conclusion

RETAINED FOR ANALYSIS. This Partial Underground Alternative is currently feasible and meets all project objectives. It has the potential to avoid serious biological concerns in the vicinity of Edgewood Park and Pulgas Ridge Open Space Preserve. It has the potential to reduce or avoid significant visual impacts and to reduce EMF concerns to residences in the proposed segment east of the I-280 corridor. The alternative would also eliminate two overhead crossings of I-280.

New adverse environmental impacts created by this alternative would be primarily short-term construction impacts associated with tower and transition-station construction and underground trenching. In addition, there could be visual impacts to travelers along Cañada Road and from the larger transition structures associated with the overhead to underground transitions, especially north and south of San Mateo Creek. Because the alternative has the overall potential to reduce significant impacts of the Proposed Project, this alternative was retained for full analysis in this EIR.

4.2.4 Alternatives to Trousdale Drive

PG&E's Route Option 1B suggests use of Trousdale Drive as a route for the underground transmission line to travel east from the I-280 corridor to the El Camino Real and BART ROW. This section considers two options to that east-west route: the Millbrae 60 kV ROW and the SFPUC water pipeline ROW. These options are considered due to concerns stated by the City of Burlingame regarding the use of Trousdale Drive as an underground route. Franklin Elementary School and the Mills-Peninsula

Hospital are located along Trousdale Drive. In addition, the main water line from the San Francisco Water Department to the Cities of Burlingame and San Mateo and other areas to the south is buried under Trousdale Drive at Magnolia and cannot be disturbed (City of Burlingame, 2003).

4.2.4.1 Millbrae 60 kV ROW Alternative

Alternative Description

This alternative was developed by the CPUC staff in order to evaluate the potential for co-location of a new underground 230 kV line with an existing transmission corridor, a 60 kV line that runs between Sneath Lane Substation and the Millbrae Substation (near Highway 101 and Millbrae Avenue). The City of Burlingame requested that Trousdale Drive be avoided if possible because of a planned expansion project for the Mills-Peninsula Hospital. As shown in Figure Ap.1-4, this route would diverge from the Skyline corridor at about MP 11.6 at Tower 11/73. It would follow the existing overhead Millbrae 60 kV corridor for approximately 1.6 miles to El Camino Real, west of Millbrae Substation. The line would have to utilize a narrow ROW through steep hillsides through residential areas and past several schools near Tioga Drive before traveling down the hill through open space and meeting Richmond Drive. The 60 kV ROW runs between homes and along residential back yards. At the point where it reaches Richmond Drive, the ROW is wider and the lines are located along a center median. There are multi-family residential land uses on the north and south sides of Richmond Drive, and a school located on the south side. From Richmond Drive the line continues to the east, through a shopping center and across to El Camino Real. The route would turn north onto El Camino Real and rejoin the proposed route at El Camino Real and San Bruno Avenue.

Consideration of CEQA Criteria

Project Objectives

The Millbrae 60 kV Alternative meets all project objectives, because it would be a component of a new 230 kV line that provided increased electricity and reliability to the CCSF and northern San Mateo County and it would be consistent with the ISO's approved project.

Feasibility

The existing 60 kV overhead line follows very steep terrain and utilizes a very narrow ROW between homes as it is followed from Skyline Boulevard to Richmond Drive. There is inadequate space in the existing ROW to install an underground line, and the ROW cannot be widened due to the proximity of adjacent homes. Installation of an underground line along this portion of the corridor also creates geotechnical concerns due to required construction on very steep and potentially unstable hillsides. Even if the ROW were wide enough to accommodate an underground line, construction of trenches perpendicular to steep slopes can create erosion and exacerbate existing slope instability. Therefore, the Millbrae 60 kV Alternative is not considered to be technically feasible.

Lessen Significant Environmental Effects

This alternative would diverge from the Proposed Project and the I-280 corridor 3.0 miles south of San Bruno Avenue (where the Proposed Project would turn east). Therefore, it would eliminate visual, recreational, and biological impacts along that segment of the proposed route. This segment of the Proposed Project route crosses several recreational trails, including the Sawyer Camp Trail and its access point at Proposed Project MP 11.4 and 11.6, which is heavily used by hikers, bicyclists, and

Figure Ap.1-4. Millbrae 60 kV ROW Alternative
For security reasons this figure is not included in the online version of the report.

joggers. It would also eliminate the transition station at San Bruno Avenue and Glenview Drive, which is located on a parcel designated in the City of San Bruno's General Plan for trailhead parking, and it would eliminate the use of San Bruno Avenue and the San Andreas Fault crossing at Skyline Boulevard and San Bruno Avenue.

Potential New Impacts Created

The Millbrae 60 kV line corridor runs along residential backyards and across steep hillsides in the City of Millbrae with narrow easements. In comparison to Trousdale Drive, which is a wide four-lane street with gentler slopes, this alternative poses much greater geotechnical concerns regarding slope stability, and greater land use and EMF impacts to residential homes. Construction impacts associated with underground construction would be severe in the narrow and steep ROW.

Alternative Conclusion

ELIMINATED. The alternative would meet project objectives. However, construction of an underground transmission line in the existing 60 kV ROW is not considered feasible due to engineering issues with the steep hill and through a narrow easement immediately adjacent to residential properties. It has overall greater significant impacts than the proposed Trousdale Drive. Therefore, this alternative was eliminated from further analysis in this EIR.

4.2.4.2 SFPUC Water Facility ROW Alternative

Alternative Description

This route, recommended for consideration by the Town of Colma, is depicted in Figure Ap.1-5 and would follow the existing SFPUC water pipeline ROW from the Skyline corridor, through the cities of Millbrae, San Bruno, and South San Francisco where it would join the proposed or an alternative alignment. This Trousdale Drive Alternative would diverge from the Proposed Route at tower 12/82, following the SFPUC water pipeline ROW north-northeast to San Bruno Avenue, Sneath Lane, Junipero Serra Boulevard, or Serramonte Boulevard. The route would follow Crystal Springs Road east from the SFPUC facility, cross under, and then parallel I-280 to the west to San Bruno Avenue, where it would cross east under I-280 again traveling north towards El Camino Real (crossing Sneath Lane just west of Cherry Avenue). From just west of the intersection of El Camino Real and 2nd Street in the City of South San Francisco, the SFPUC pipeline ROW would roughly parallel El Camino Real (west of Junipero Serra) to Serramonte Boulevard in the Town of Colma. The route would be in an existing utility corridor. However, the ROW passes through residential areas and cemeteries (Woodlawn Memorial Park, Greenlawn Memorial Park, Greek Orthodox Memorial Park, Cypress Lawn Cemetery, and Golden Gate National Cemetery) and near four schools.

Consideration of CEQA Criteria

Project Objectives

This alternative would meet all of the stated objectives of the Proposed Project.

Feasibility

The SFPUC does not allow utility collocation with its water pipeline, therefore, this alternative would not be regulatorily feasible to permit (SFPUC, 2003). In addition, the ROW at its southern terminus, near Crystal Springs Road, is very narrow and runs along the side of a steep canyon that presents geotechnical concerns regarding slope stability. Also, additional space in this portion of the ROW does not appear to be available.

Lessen Significant Environmental Effects

This alternative would be located within an existing utility corridor and would avoid the proposed use of San Bruno Avenue, the BART corridor, and Hillside and Lawndale/McLellan Drives. The Town of Colma suggested consideration of this alternative because it would minimize disturbance to streets in the Town of Colma. In addition, this route would reduce geological impacts because it would avoid the crossing of the San Andreas Fault zone at San Bruno Avenue.

Potential New Impacts Created

Due to the collocation of utilities, cathodic protection and/or insulation may need to be installed on the water pipeline (to avoid electric shocks). The existing water pipeline may also require installation of special non-conducting couplings to reduce the possibility of it carrying an induced current that would pose a hazard to people touching exposed pipeline components (valves, etc.). While this impact is mitigable with engineering modifications, additional cost and construction disruption would be created. The route also crosses several residential areas and cemeteries and near four schools, which could raise EMF and construction impact concerns.

Alternative Conclusion

ELIMINATED. Though this alternative to Trousdale Drive meets the project objectives, there are regulatory and technical feasibility issues with collocation with the water pipeline based on SFPUC policies. In addition, the collocation with the existing pipeline would create additional engineering concerns that would need to be resolved. There would also be EMF and construction impact concerns to residences and schools along the route. Because this alternative does not appear to be feasible, it was eliminated from full analysis in the EIR.

4.2.5 West of Existing Corridor, East of I-280 Alternative

Alternative Description

This 3.1-mile alternative from Ralston Substation to just north of Hayne Road would relocate both the 230 and 60 kV lines, and was suggested during scoping and could be either overhead or underground in the suggested route. Because the route would be the same, and the impacts are similar, both the underground and overhead options are addressed together. The alignment would be entirely west of the Proposed Project, and would relocate the segment from towers 5/28 to 6/34, and from 7/40 to 8/49 to the west to increase their distance from residences. The route would remain east of I-280 and would remain entirely on SFPUC Watershed Lands, but would be located on lands that are currently undisturbed. If the route were underground, then there would be an overhead crossing of San Mateo Creek, similar to the Proposed Project and to the alternate crossing explained above for the Route Option 1B and Partial Underground Alternatives. Transition stations would be required both north and south of the creek crossing. The route is illustrated in Figure Ap.1-6.

Consideration of CEQA Criteria

Project Objectives

The alternative would meet most of the stated objectives of the Proposed Project. It may be difficult to construct within the timeframe (2005/2006) of the Proposed Project due to required surveys and coordination to define and mitigation potential biological impacts.

Figure Ap.1-5. SFPUC Water Facility ROW Alternative
For security reasons this figure is not included in the online version of the report.

Figure Ap.1-6. West of Existing Corridor, East of I-280 Alternative
For security reasons this figure is not included in the online version of the report.

Feasibility

It would be technically feasible to construct an overhead or underground transmission line in the suggested areas, and it is believed to be possible for PG&E to eventually obtain permits from the resource agencies. However, due to the extent of habitat disturbance and the sensitivity of resource agencies to the high value of this habitat, it would be considered very difficult to obtain required permits/approvals within a reasonable period of time from the U.S. Fish and Wildlife Service and the California Department of Fish and Game (for impacts to sensitive species), the SFPUC (for a new easement as discussed in Section 4.2.3), and the National Park Service (for disturbance within its scenic and recreation easement). The West of Existing Corridor Alternative would require extensive disturbance of currently undisturbed serpentine grasslands, which is a protected habitat. New access roads and tower footprints would be placed in a highly valuable area of serpentine grassland east of I-280, which is considered sensitive habitat by the CDFG and USFWS. The habitat in this area is protected by the Federal and State Endangered Species Act and the Native Plant Protection Act. The amount of increased indirect and direct impacts to this area would trigger consultation and a biological opinion from the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Federal Endangered Species Act (the extent of anticipated disturbance from the Proposed Project in this area would not trigger USFWS consultation requirements). The San Francisco gum plant, Marin dwarf flax, Presidio clarkia, and San Francisco owl's clover are Federally protected plant species in the area, as well as the Bay checkerspot butterfly who depends on this native-grassland habitat.

The Federal Endangered Species Act (FESA) protects plants and wildlife that are listed as endangered or threatened by the USFWS and the National Marine Fisheries Service. Section 9 of FESA prohibits the taking of endangered wildlife, where taking is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct" (50CFR 17.3). For plants, this statute governs removing, possessing, maliciously damaging, or destroying any endangered plant on federal land and removing, cutting, digging-up, damaging, or destroying any endangered plant on non-federal land in knowing violation of state law (16 USC 1538). Under Section 7 of FESA, federal agencies are required to consult with the USFWS if their actions, including permit approvals or funding, could adversely affect an endangered species (including plants) or its critical habitat. Through consultation and the issuance of a biological opinion, the USFWS may issue an incidental take statement allowing take of the species that is incidental to another authorized activity provided the action will not jeopardize the continued existence of the species. A biological opinion from the USFWS requires submittal of detailed approved biological surveys and would take several months, substantially delaying the project timeline.

The California Endangered Species Act (CESA) generally parallels the main provisions of the federal ESA, but unlike its federal counterpart, CESA applies the take prohibitions to species proposed for listing (called "candidates" by the state) as well. Because serpentine grassland is a listed sensitive habitat by the State and the West of the Corridor Alternative would result in destruction or adverse modification of this essential habitat, California Department of Fish and Game (CDFG) consultation would be necessary to ensure that the continued existence of the serpentine grassland is not jeopardized.

Finally, the Native Plant Protection Act (NPPA) of 1977 (Fish and Game Code Sections 1900-1913) was created with the intent to "preserve, protect and enhance rare and endangered plants in this State". The NPPA is administered by the Department of Fish and Game (CDFG). The Fish and Game Commission has the authority to designate native plants as "endangered" or "rare" and to protect endangered and rare plants from take. The California Endangered Species Act of 1984 (Fish and Game Code Section 2050-2116) provided further protection for rare and endangered plant species, but the NPPA remains part of the Fish and Game Code.

While the Proposed Project in this area would also disturb this habitat and would be subject to the same regulations mentioned above, disturbance would be limited to areas immediately adjacent to existing towers where an existing dirt road is present. Therefore, disturbance or pristine habitat caused by the Proposed Project would be minimal, in comparison to this alternative, and it would not require Section 7 consultation and a biological opinion. An underground route through the serpentine grasslands would be even more disruptive than an overhead route, as a 50-foot-wide construction corridor would be disturbed for approximately 2.2 miles, resulting in disturbance of more than 13 acres of land. However, even a new overhead route through this pristine area would result in nearly as much habitat loss because of the need to develop additional access roads. Even if the towers were installed by helicopter, each tower footprint would result in permanent loss of previously undisturbed habitat.

In addition to the SFPUC Watershed Plan, Utility Easement Policy W6 (discussed in Section 4.2.3), the Golden Gate National Recreation Area (GGNRA) of the National Park Service is a holder of a Scenic and Recreation Easement for the area. The Scenic Easement issued to the U.S. Department of the Interior states that "the land shall be preserved in its present natural state and shall not be used for any purpose other than for the collection, storage, and transmission of water and protection of water quality, and other purposes, which shall be compatible with said use and preserving said land as open-space land. No structures shall be erected upon said land except such structures as may be directly related to and compatible with aforesaid uses". The Grant goes on to say that ". . . the general topography of the landscape shall be maintained in its present condition and no substantial excavation or topographic changes shall be made . . . there shall be no cutting or permitting of cutting, destroying, or removing any timber or brush" (Department of the Interior, 1969). While the easement does not specifically prohibit utility structures, its prohibition of "structures" in general would clearly cause the installation of a transmission corridor through the undisturbed lands west of the existing ROW to be in conflict with these provisions.

Lessen Significant Environmental Effects

This alternative would move transmission line farther from residences along the I-280 corridor, especially in the vicinity of Lexington Avenue and Black Mountain Road, reducing their EMF concerns and some visual impacts. Visual impacts to these residences would be eliminated if the lines were placed underground (but visual impacts of the overhead version of this alternative would likely be significant from I-280).

Potential New Impacts Created

This alternative would create significant biological impacts as a result of the placement of towers or undergrounding in the highly sensitive serpentine grasslands in the SFPUC watershed lands to which the relocation was suggested. The towers and line associated with an overhead route would also have increased visual impacts to travelers on I-280 (affecting a far greater number of viewers than those affected in residences along Lexington Avenue and Black Mountain Road). If the lines were placed underground then there would be much greater construction impacts to the grasslands, and the requirement for permanent access roads to be maintained. Impacts would likely be significant and unavoidable, even after implementation of required mitigation.

Alternative Conclusion

ELIMINATED. This alternative would meet most project objectives. However, because there would be extensive and significant impacts to the rare serpentine grasslands, and conflicts with the SFPUC (Water-

shed Management Plan) and the NPS (holder of a scenic and recreational easement), the alternative may be regulatorily infeasible because required permits could not be obtained within a reasonable period of time.

While this alternative would reduce EMF and some visual impacts of the Proposed Project, it would create significant impacts to rare and valuable biological resources in sensitive serpentine grasslands, requiring Section 7 consultation and review. Therefore, this alternative was eliminated from further analysis in this EIR.

4.2.6 West of Reservoirs Alternative

Alternative Description

This alternative alignment was proposed in scoping comments by residents in The San Mateo Highlands and the Town of Hillsborough. It would require construction of an underground 230 kV line or new 230 kV overhead towers to the west of the Crystal Springs and San Andreas Lakes. The West of the Reservoirs alternative would replace approximately 14.6 miles of the proposed route and would be within the SFPUC Watershed lands. No specific route has been defined so only a conceptual route is presented for the reader's information (see Figure Ap.1-7). The 60 kV line would remain unchanged with this alternative.

Consideration of CEQA Criteria

Project Objectives

Because there is no specifically defined route at this time, this area has not been evaluated for presence of biological or cultural resources. The time required to complete biological and cultural resources surveys would substantially delay the project timeline and would fail to achieve the objective of meeting electric demand by September 2005 or summer 2006.

Feasibility

The discussion in Section 4.2.5 on the USFWS and CDFG Endangered Species Act would also apply to this alternative and would create similar timing delays and resulting feasibility concerns. In addition, the West of Reservoirs Alternative presents regulatory feasibility constraints because it is unlikely to be permitted by the SFPUC since the Watershed Management Plan prohibits creation of new utility corridors. The SFPUC Peninsula Watershed Management Plan states in Section 4.10 that "all new construction activities within the Watershed have the potential to degrade water quality and quantity, disturb ecological and cultural resources, and affect the scenic or historic value of the surroundings . . . . Uses and activities, other than those undertaken by the SFPUC for normal watershed operation and maintenance, on SFPUC-owned lands require the execution of a lease and/or permit from the SFPUC. This is to ensure that uses and activities on SFPUC lands are conducted in an acceptable fashion, consistent with the goals and policies of their Watershed Management Plan." Further, Policy WA6 states that the Plan "restrict[s] new utility lines proposed on the watershed for the transmission of or communications to existing utility corridors, and require[s] that new power lines be buried, where feasible. All proposed alignments shall undergo a scenic impact analysis."

In addition, this alternative would almost certainly be considered as inconsistent with the NPS Scenic Easement, discussed in Section 4.2.5 above, because it would require construction of new access roads and new transmission towers in a currently undisturbed area, creating a significant new visual impact on the western side of the Watershed Lands. The GGNRA, under the National Park Service, is also a

holder of a Scenic and Recreation Easement for the area. The Scenic Easement originally issued by the U.S. Department of the Interior states that "the land shall be preserved in its present natural state and shall not be used for any purpose other than for the collection, storage, and transmission of water and protection of water quality, and other purposes, which shall be compatible with said use and preserving said land as open-space land. No structures shall be erected upon said land except such structures as may be directly related to and compatible with aforesaid uses". The Grant goes on to say that ". . . the general topography of the landscape shall be maintained in its present condition and no substantial excavation or topographic changes shall be made . . . there shall be no cutting or permitting of cutting, destroying, or removing any timber or brush" (Department of the Interior, 1969).

Therefore, permitting obstacles associated with this highly sensitive land under the SFPUC's Watershed Management Plan and the NPS's Grant of Scenic and Recreation Easement would make this alternative regulatorily infeasible, as it would be very difficult to permit within a reasonable period of time.

Lessen Significant Environmental Effects

In the West of Reservoirs Alternative, the towers would be considerably farther from residences for which the Proposed Project presents EMF and aesthetic concerns. The route would be located further from the San Andreas Fault for the majority of the southern component. The alternative would also avoid short-term construction impacts related to noise and traffic because of its location in an isolated area.

Potential New Impacts Created

With this alternative, the 60 kV line would remain in place and there would be a new utility corridor established in an undeveloped area. There would likely be extensive impacts to biological resources due to the undisturbed nature of the western Watershed Lands. Biological surveys have not been completed for much of the watershed area and these would take substantial time; the Watershed Lands are rich in biological resources. Because road access to the western watershed lands is very limited, extensive new access roads would be required for construction and for maintenance, adding to the impacts of the transmission line construction itself (the Proposed Project requires a few new access roads, but most portions of the route are accessible by existing access roads).

In addition to biological impacts, there could be impacts to cultural resources in this undisturbed area. The Proposed Project corridor is disturbed and has been surveyed for cultural resources; however, this new area has not been surveyed so potential cultural impacts are not known. Because the area was inhabited by prehistoric cultures due to the proximity of the lands to the creeks that followed the valley (prior to dam inundation), the potential for cultural resources exists.

The western watershed lands are also susceptible to landslides. Visual impacts of a new overhead line in an undisturbed corridor could be significant. As discussed above, these visual impacts would also create a policy inconsistency with the SFPUC WA6 and NPS Scenic Easement, both of which are intended to protect the viewshed surrounding the Peninsula Watershed.

Alternative Conclusion

ELIMINATED. Due to biological survey requirements, this alternative would not meet the objective of meeting electrical demand within the necessary timeframe of September 2005 or summer 2006. In addition, it would establish a new utility corridor in addition to the existing 60 kV line through undeveloped Watershed Lands, which would conflict with WA6 and therefore would not be regulatorily feasible. Though the route would reduce some visual, EMF, and construction impacts of the Proposed

Figure Ap.1-7. West of Reservoir Alternative (Conceptual)
For security reasons this figure is not included in the online version of the report.

Project near residences in The Highlands and Hillsborough, the West of Reservoirs Alternative would create much greater impacts to biological, cultural, and visual resources. Given the significant regulatory and legal feasibility issues, as well as the additional environmental impacts, this alternative was eliminated from further analysis in this EIR.

4.2.7 PG&E's Underwater Cable Alternative Segments to PG&E Route Option 1B Alternative

Alternative Description

PG&E and its consultants met with the SFPUC in April 2003 to discuss options for crossing Crystal Springs Dam in conjunction with the Route Option 1B Alternative (see Section 4.2.1). At this meeting, SFPUC staff suggested that PG&E consider installing the cable in the reservoir to avoid CRLF habitat across the dam. SFPUC asked PG&E to provide analysis to show that such a crossing would not affect water quality and/or natural resources.

PG&E proposed three possible options for the underwater cable alternative segments for its Route Option 1B Alternative. The first option would require about 3,000 feet of cable and would enter and exit the Lower Crystal Springs Reservoir near the dam, minimizing the length of cable in the reservoir. This route is illustrated in Figure Ap.1-2b (Section 4.2.1 above) and discussed as one of several options for crossing Crystal Springs Dam under the PG&E Route Option 1B Alternative. The second underwater cable option would be over 9,200 feet long, entering the Lower Reservoir north of the dam and exiting the reservoir near the southern end of the Lower Crystal Springs Reservoir and is depicted in Figure Ap.1-8. The third option would maximize the distance that the cable would travel underwater, and would require over 12,000 feet of cable. Because it was determined to be infeasible while still in the conceptual phase, there is no figure for this option. Under this option, the cable would enter Lower Crystal Springs Reservoir near the dam and would travel to the southern end of the reservoir. The cable would be bored through the old Crystal Springs Dam (which now supports Highway 92) to reach the Upper Crystal Springs Reservoir. The transmission line would exit the Upper Reservoir on the eastern shore after traveling about half of the reservoir's length. Once out of the reservoirs, each of these options would continue along the PG&E Route Option 1B Alternative route.

The sub-lacustrine or underwater route would utilize the same type of cable as would be used in the underground route segments of the Proposed Project (i.e., 2,500 kcmil cross linked polyethylene (XLPE) insulated cable). The cable would be bored across the shoreline to avoid affecting sensitive shoreline habitats. Divers would assist threading a sock-line cable from the pull boxes, through the bore, into the reservoir, through the second bore, and into the second pull box. The sock- line would be pulled into place using a commercial-duty boat. Smaller support vessels would also be utilized during the operation to support the main pull boat, divers, and other activities. The boats would be launched using the existing SFPUC boat launch south of the cable entry point. This sock- line would be connected to the cable and the cable will be pulled into place. As the cable exits the bore, with the help of divers, air-filled buoyancy bags would be used to support the cables from the entry to the exit point. Once the cable has reached the northern exit point, the buoyancy bags would be deflated sequentially to allow for a controlled lowering of the cables to the reservoir bottom. The cables would be spliced to the conventional underground cable within a vault installed at the pull box location, above the reservoir surface. Cable spools and associated equipment would be set up on the existing access road. Once the cable is on the reservoir bottom, it would be secured in place by tethers attached to dead-man anchors. The entire underwater cable operation of the first option would likely occur over a six- to eight-week period.

Consideration of CEQA Criteria

Project Objectives

The alternative would meet all of the stated objectives of the Proposed Project.

Feasibility

Analysis of regulatory feasibility of an underwater cable requires consideration of Caltrans permitting and SFPUC Watershed Management Plan consistency. A Caltrans permit would be required for the bored crossing of Highway 92 at the dam between Upper and Lower Crystal Springs Reservoirs for the extended underwater route. This permit would likely be obtained as long as it could be shown that the boring would pose no threat to the roadway.

PG&E claims that the location of the transmission cable within the reservoir for the short distance would be consistent with the SFPUC's Watershed Plan and its policy of protecting and enhancing wildlife resources and habitat as described in Policy W1-W6. Policy WA6 of the Watershed Management Plan provides that the "SFPUC will [r]estrict new utility lines proposed on the watershed for the transmission of or communications to existing utility corridors, and require that new power lines be buried, where feasible. All proposed alignments shall undergo a scenic impact analysis". All of PG&E Route Option 1B (above) would arguably be located in a new utility corridor, though locating the cable underground along an existing road would ensure minimal impacts. Locating the cable along Cañada Road as it crosses the Crystal Springs Dam, however, would likely raise more significant biological impacts than avoiding the dam and crossing the creek along the lakebed, because of the presence of CRLF habitat on the top of the dam. Therefore, this alternative is regulatorily feasible.

Underwater cables in general are considered to be technically feasible; however the highest voltage underwater cable installed to date is 170 kV; a 230 kV underwater cable has never been installed. Transmission engineers and cable manufacturers confirm that 230 kV XLPE cable products would be suitable for installation in an underwater application, such as proposed by PG&E. This is consistent with the survey of existing "submarine" and underwater cables of various voltages performed by PG&E, and a similar recent study performed by R. W. Beck. PG&E has indicated that XLPE insulated cable is a technique-mature product for medium voltage, high voltage, and extra- high voltage applications, including a 230 kV line. In most underwater cable cases, external damage is the most frequent cause of cable failure. The restricted uses of Crystal Springs Reservoir (no boating or fishing) eliminate the most common sources of external cable damage (i.e., anchoring, fishing equipment, and tidal action). In the absence of these external threats, an underwater 230 kV cable would be expected to have the same reliability as a conventional underground cable system.

However an underwater cable alternative installed in the Crystal Springs Reservoirs would require that segments of cable be spliced together approximately every 3,000 feet. According to PG&E, the splices of the underwater cable would not be reliable over the long-term due to the depth of the lakes (about 100 feet). Therefore, for this purpose, an underwater cable longer than 3,000 feet would not be technically feasible. Also, as stated above, because a 230 kV underwater cable has never yet been installed, the long-term feasibility is also uncertain. For these reasons, the use of an extended underwater cable as proposed by PG&E in this alternative is technically infeasible and could not be constructed without significant difficulty. Consideration of a feasible 3,000-foot underwater cable section is presented in Section 4.2.1 above, as a component of the PG&E Route Option 1B Alternative.

Figure Ap.1-8. PG&E's Underwater Cable Alternative Segment to PG&E's Route Option 1B (Option 2)
For security reasons this figure is not included in the online version of the report.

Lessen Significant Environmental Effects

The alternative segments to PG&E's Route Option 1B Alternative would move the 230 kV transmission line away from residences along the I-280 corridor, especially in the vicinity of Lexington Avenue and Black Mountain Road, eliminating the visual impacts and the potential for EMF concerns. Moreover, the alternative segments would avoid impacts to the scenic shoreline by utilizing existing access roads and a bore to enter and exit the reservoir below the water line, and by providing for complete underground construction along the southern segment. Maximizing the length of the route located in the reservoir(s) would reduce the amount of underground duct bank, and the accompanying construction-related short-term impacts. These submarine alternative segments would avoid CRLF habitat on the dam, and would not conflict with the County of San Mateo's Cañada Road Bridge repair/replacement.

Potential New Impacts Created

Biological resources of the lakes have the potential to be affected by heat from the transmission lines. PG&E has calculated that heat associated with conduction would result in water temperatures of approximately 90°C immediately adjacent to the cable, under normal conditions. However, this heating effect would rapidly dissipate, resulting in a return to ambient water temperatures approximately one meter from the cable. PG&E found that overall reservoir heating associated with the cable would be less than the resolution of conventional temperature recorders and would therefore be immeasurable, although some heating would be measurable immediately adjacent to the cable. Because these heat effects would be minor and limited to the area immediately adjacent to the cable alignment, they would not create any significant impacts to biological resources within the reservoir.

The proposed routing of the submarine cable in Lower Crystal Springs Reservoir lakeward of the dam would be east of the eastern trace of the San Andreas Fault. Minor ground deformations, including those noted in 1906 observations, with potential deformations up to one foot, would have no effect on the integrity and operation of cables laid on the lake bottom. Strong groundshaking might result in some minor lateral movement of portions of the cables, but should not risk damage to the cable.

Water quality could be affected by boat operation, cable installation, and/or cable operation. The primary water quality issue associated with underwater cable installation would be possible fuel and/or oil leakage or spill from the motorized watercraft. Disturbed areas adjacent to the bore sites would also need to be stabilized to prevent sediment deposition into the reservoir. The underwater cables and casings would not contain any liquid material or other product that could leak during operation and degrade water quality. To the address the possible water quality impacts resulting from the use of the motorized watercraft, PG&E notes that following preventative measures could be incorporated into the underwater cable alternative (these measures have been incorporated into a mitigation measure in Section D.7, Hydrology and Water Quality, in its discussion of Route Option 1B):

- Motorized watercraft will be steam-cleaned prior to entering the reservoir;
- Oil-absorbent booms will be onboard all watercraft at all times;
- Refueling of watercraft will occur out of the reservoir on dry land;
- All watercraft with outboard engines would utilize four-stroke engines meeting the California Air Resources Board new emission standards for outboard engines manufactured after 2001.

Alternative Conclusion

ELIMINATED. All of these alternative segments (Options 1, 2, and 3) to PG&E Route Option 1B Alternative would meet project objectives. However, with optional segments 2 and 3, there could be policy inconsistencies with the Peninsula Watershed Plan, Caltrans permitting requirements, and the long term reliability of the lengthy underwater cables at 230 kV are uncertain since this high a voltage has never before been installed underwater. In addition, the reliability of underwater cable splices at the depth of the reservoirs is not guaranteed, so this technology is not considered to be technically feasible at this time. While these alternative segments to PG&E Route Option 1B Alternative would also reduce EMF and visual impacts of the Proposed Project, they are not technically feasible; therefore, these alternative segments (Options 2 and 3) were eliminated from detailed analysis in this EIR.

4.3 Northern Segment

Each of the following alternatives is located within the northern segment of the Proposed Project. This segment includes the primarily north/south route segments, starting from Trousdale Boulevard in the south, and offering connections to San Bruno Avenue, Sneath Lane, Westborough, and other connectors from the Skyline corridor to the BART or El Camino Real corridors. All of these alternatives would be underground. The discussions below describe each potential alternative segment and explain the reasons for elimination or retention for full analysis for each.

4.3.1 Transition Station Alternatives

Two possible locations for an overhead-to-underground transition station are described in this section: a location west of Skyline Boulevard near the end of San Bruno Avenue, and a location adjacent to the existing Sneath Lane Substation. The alternative transition stations are assumed to have the same general design and footprint as proposed by PG&E for the transition station at San Bruno Avenue and Glenview Drive, illustrated in Figure B-7a. Both alternative locations are illustrated on Figure Ap.1-9. These options are presented in response to concerns from the residents and City of San Bruno regarding the proposed transition station at the corner of San Bruno Avenue and Glenview Drive, and the likelihood that a significant visual impact would result from installation of a transition station at that location.

Each of the transition station alternatives could be used in conjunction with three different underground transmission line routes: the proposed route down San Bruno Avenue, an alternative route down Sneath Lane, and a route continuing north on Skyline Boulevard to Westborough Boulevard. The discussion below for each transition station location addresses the feasibility and impacts of each of these three underground routes.

4.3.1.1 West of Skyline Boulevard (Highway 35) Transition Station Alternative

Alternative Description

This alternative transition station is depicted in Figure Ap.1-9 and would be located west of Skyline Boulevard, southwest of near its intersection with San Bruno Avenue, on the SFPUC Watershed Lands. The line would transition to underground at the West of Skyline transition station, and the underground transmission line could then follow three different routes: (a) travel north on Skyline Boulevard for 0.1

miles, turning east at San Bruno Avenue to join the Proposed Project route on San Bruno Avenue near Glenview Drive in the City of San Bruno; (b) continue north underground in Skyline Boulevard to Sneath Lane, turning east on Sneath and continuing to the BART ROW, or (c) continue north underground along Skyline Boulevard for 2.1 miles to Westborough Boulevard, then turn east and continue in Westborough to either Junipero Serra (see Section 4.3.8) or the BART ROW. The following paragraphs consider the transition station itself, and also in combination with each of the three possible routes.

Consideration of CEQA Criteria

Project Objectives

West of Skyline Transition Station and All Route Options. Similar to the proposed transition station location at San Bruno Avenue and Glenview Drive, this transition station alternative would be located within the Alquist-Priolo seismic zone of the San Andreas Fault and an underground transmission line leaving the station would cross traces of the San Andreas Fault. Therefore, this raises concerns about the reliability of a transmission line in this location. This issue would apply to each of the three routing options described above, with varying lengths of the project included in the fault zone.

Assuming that the transmission system is designed to meet the NERC and WECC reliability criteria and to withstand a single contingency, which call for loads to be served assuming loss of the largest area generator and transmission facility or two transmission lines (i.e., sufficient generation on the peninsula and/or new transmission), the loss of a Jefferson-Martin line should not impact the ability to serve load during a relatively short period (3-4 weeks) following a large seismic event.

However, for some period after an initial earthquake there is likely to be a wide spread loss of power on the peninsula (as was the case after the Loma Prieta Earthquake in 1989). The duration and area of the initial outage would depend upon system damage, but most service could probably be restored within 24 to 48 hours. Peninsula generation could be expected to trip off due to vibration, but should be able to be restarted fairly quickly. There would also probably be a general decline in area load level due to the reduction of a number of activities. One large variable would be the degree of damage to on-peninsula generation. Assuming that there is no long-term damage to generation or other peninsula transmission and assuming that Jefferson-Martin would be out of service for an extended time due to cable failure (the term for this condition is “an N-minus-1 state”), the remaining existing system should be capable of meeting load. In order to meet the operating criteria the system would have to be operated such that the next contingency (moving from N-minus-1 to N-minus-2 state) would not result in the uncontrolled loss of load. The degree of this potential problem would depend upon the status of the peninsula load and generation.

From a reliability standpoint as one of the stated objectives, the need for this type of contingency to be considered in regional planning is somewhat subjective. The relatively unlikely nature of its occurrence is similar to any natural disaster. Because the Proposed Project’s crossing of the San Andreas Fault Zone is not considered to be a significant reliability concern, then a similar conclusion can be reached with this alternative, even though this alternative would cross a greater portion of the fault zone. Therefore, the West of Skyline transition station alternative, as well as all three route options and the Proposed Project route, would meet all of the stated objectives of the Proposed Project.

Figure Ap.1-9. Transition Station Alternatives
For security reasons this figure is not included in the online version of the report.

Figure Ap.1-9a. Detail of Transition Station Locations
For security reasons this figure is not included in the online version of the report.

Feasibility

West of Skyline Transition Station and All Route Options. The San Andreas Fault is an active fault with its most recent activity being the 1906 San Francisco Earthquake which resulted in significant surface rupture in the project area. Future activity is likely on this fault and anticipated surface rupture and offsets of up to 17 feet are predicted by geologists. Many sub-parallel fault traces lying east or west of the trace that ruptured in 1906 have been identified within the San Andreas Fault Zone. Any of these traces could be reactivated, or a new trace could develop during the next earthquake. An Alquist-Priolo (A-P) Earthquake Hazard Zone is designated around the fault; this designation requires special consideration by local jurisdictions for aboveground structures within the A-P Zone. (Note that the transition structure would not be considered inconsistent with the requirements of the A-P Zone because they apply to structures intended for human occupancy, but the designation of the A-P Zone is still a strong indication of seismic risk.) Because of the amount of anticipated offset and the uncertainty in the exact location of the next rupture trace, it is assumed that any structure placed in or on the ground within the Alquist-Priolo Earthquake Hazard Zone would experience damage during an earthquake on this section of the San Andreas Fault.

From strictly an engineering perspective, the West of Skyline Transition Station Alternative and all route options would involve placing underground structures in the Alquist-Priolo zone. In this location, these structures would be susceptible to damage during an earthquake on this section of the San Andreas Fault. However, the Proposed Project transition station site is also within the A-P Zone (though east of the 1906 fault trace), and PG&E clearly considers the Proposed Project to be feasible.

Each route option would require installation of the underground cable within Skyline Boulevard, parallel to the San Andreas Fault zone, for varying distances. Distances of this underground segment along Skyline range from 0.1 miles (to San Bruno Avenue) to 2.1 miles (to Westborough Boulevard). This increased exposure to fault movement increases the likelihood that the underground transmission would be damaged in a major earthquake.

Given the uncertainties related to forecasting the location and extent of the rupture zone in the next major earthquake, it is not possible to define the specific impacts of an earthquake on any underground structure in this area. Therefore, this alternative (including all three possible underground routing options) is considered to be similar to the Proposed Project in its feasibility. Therefore, the San Andreas Fault crossing, and all three route options that could be used if the West of Skyline Transition Station were constructed would be technically feasible to construct.

West of Skyline Transition Station to San Bruno Avenue (proposed route). An underground route connecting the west of Skyline Transition Station Alternative with the proposed underground route in San Bruno Avenue would cross nearly the entire A-P zone. However, as described above, it would be technically, regulatorily, and legally feasible.

West of Skyline Transition Station and Sneath Lane Underground Route. The transition station itself and the underground route across or along Skyline Boulevard would be feasible. The Sneath Lane route between Skyline Boulevard and the BART ROW would be costly and difficult but would also be technically feasible. Because Sneath Lane crosses over I-280 (rather than crossing below the freeway through an underpass), the underground transmission cables' crossing of the freeway required engineering assessment.

Unless the cables could be attached to the Sneath Lane bridge over I-280, the 230 kV line would have to be directionally drilled beneath the freeway, most likely from the golf course area south of Sneath Lane on the west side of the freeway. The principal concerns that might limit the feasibility of an underground crossing of I-280 are: (1) the length and depth of the required crossing; (2) the availability

of suitable locations for jacking and receiving pits at either side of the crossing; and (3) the nature of the geology in the region. Based on the limited inspection conducted by EIR staff, none of these three factors appeared to make the crossing infeasible. The worst scenarios would be either solid bedrock or silty sand, though neither feature is predominant in the area. The steepness of the terrain in the area would not be a limiting factor in construction of the project.

It is assumed that the crossing would be constructed using traditional directional boring methods whereby a hydraulically powered tunneling head is driven through the earth under the freeway at a depth of perhaps eight to 12 feet. A steel casing about 30 inches in diameter is then either pushed (jacked) or pulled through the boring. Conduits and spacers are installed in the casing to contain the power cables. A specially engineered material is then pumped into the casing to fill all voids around the conduits, maximizing the heat conducting capability of the system. Finally, the conduits are connected to the rest of the system on either end and the cables are pulled through.

The length of the crossing is estimated to be 800 to 1,000 feet, well within the capability of readily available directional boring equipment. This boring method requires a staging area on each side of the bore suitable for construction of jacking and receiving pits that are approximately 12 feet wide, 20 to 30 feet long, and 12 feet deep. Potential boring locations would be located either within the cloverleaf off-ramps south of Sneath Lane (either east or west of I-280), southwest of the interchange in the golf course parking area, or northeast of the interchange on cemetery property.. Therefore, at this time the crossing of I-280 is considered to be feasible.

In general, Sneath Lane would be a suitable as an alignment for the Proposed Project, because the street is amply wide and is not too steep to make construction impractical. It is very likely that the following utilities exist in the street: streetlighting, natural gas, water, sewer, storm drain, and telecommunications, including telephone and fiber optic. The presence of overhead power distribution lines on either side of the street indicates that it is unlikely there are existing underground distribution lines in the street.

It is feasible to construct an underground crossing of I-280 in the vicinity of Sneath Lane and based on input from the City of San Bruno, the use of Sneath Lane overall would be feasible (City of San Bruno, 2003).

West of Skyline Transition Station to Westborough Boulevard. The underground route from the West of Skyline Transition Station to Westborough Boulevard would be almost completely within the A-P zone for 2.1 miles. While presenting a risk of rupture in a major earthquake, this alternative would be technically, regulatorily, and legally feasible. Both Skyline and Westborough Boulevards have adequate space for an additional underground facility.

Lessen Significant Environmental Effects

West of Skyline Transition Station. The transition station itself, located west of Skyline Boulevard and not at San Bruno Avenue and Glenview Drive, would be located adjacent to the existing and proposed transmission line towers, which present an industrial component to the existing setting adjacent to Skyline. The station would be located adjacent to tall trees, reducing the visibility of the structure, which at the Proposed Project location (even with proposed landscaping) would be more highly visible.

West of Skyline Transition Station to San Bruno Avenue (proposed route). The West of Skyline transition station location, if used in conjunction with the Proposed Project route, would eliminate the transition station for the Proposed Project, which would have significant visual impacts that would be very difficult to mitigate due to the height of the proposed structure. The City of San Bruno requested

consideration of alternative transition station sites because there are residential land uses near the proposed site. In addition, the City of San Bruno's Planning Commission has already approved the Church of the Highlands' plans to create an open parking lot on the proposed transition station site. The church has a ten-year lease from Caltrans at the proposed site. San Mateo County has also proposed a trailhead parking area at the Proposed Project's transition station location for access to the trails and bicycle paths west of Skyline Boulevard. Visual effects on Glenview Drive/San Bruno Avenue travelers would be reduced, and future effects on proposed residential land use east of the proposed transition site would also be eliminated by this alternative.

West of Skyline Transition Station to Sneath Lane. If Sneath Lane (rather than San Bruno Avenue) were used with the West of Skyline alternative transition station, the route would allow avoidance of the intersection of San Bruno and Huntington Avenues where there is a grade separation project planned to allow the Caltrain tracks to cross above San Bruno Avenue on a bridge. Avoidance of this intersection has been requested by the City of San Bruno.

West of Skyline Transition Station to Westborough Boulevard. This route would avoid the same impacts of the Proposed Project as would the Sneath Lane route option. The width of Westborough Boulevard (four lanes, with center divider) and less commercial land uses means that traffic impacts during construction will be more minor than those of the Proposed Project route.

Potential New Impacts Created

West of Skyline Transition Station. The construction of the transition station in this location would require clearing of approximately 4,000 square feet of land (0.1 acre). Surveys would be completed to ensure that no sensitive biological species were removed, but there would still be a loss of grassland habitat in this area. Also, the visual impact of the transition structure itself would be added to the adjacent transmission towers; it would be visible to recreationists on the hiking/biking trail and also by motorists on Skyline Boulevard.

West of Skyline Transition Station to San Bruno Avenue (proposed route). This option would require a slightly longer underground transmission line segment with associated short-term construction impacts, and would result in a crossing of a wider segment of the San Andreas Fault zone. As with the Proposed Project transition station location, there are seismic concerns associated with locating a transition station and an underground crossing at or very near the San Andreas Fault. An overhead transmission line crossing of the 1906 fault trace zone would be preferable to an underground crossing for reliability reasons. Further, it would be preferable to use overhead construction for the entire width of the fault zone. If this type of displacement occurs at an underground transmission duct bank it would essentially destroy the duct bank and 230 kV cables. It is estimated that the damage could extend for some distance on each side of the actual rupture through crushing and distortion of the ducts. From a repair perspective, an estimated 300 feet of duct bank would need to be uncovered, demolished and rebuilt. This duct bank reconstruction, pulling of new cables and splicing could take up to two to three weeks.

From a qualitative perspective, the West of Skyline Boulevard transition station location would be less preferable in a seismic impact comparison with the proposed transition station, because the underground transmission segment uses underground construction across a greater distance of the 1906 trace and is within the Alquist-Priolo zone for a longer distance. Therefore, this alternative would appear to have a higher probability for facility damage than the Proposed Project transition station location.

West of Skyline Transition Station to Sneath Lane. Plans to widen Skyline Boulevard between I-280 and Sneath Lane in the City of San Bruno could be impacted by this alternative. The City is currently working on a General Plan Update that will identify the plans for the Skyline Boulevard widening project. The City intends to reserve the west side of the subject parcel for the expansion project; however, funding has not yet been secured for the project. Seismic concerns would be the same as those addressed above for the West of Skyline Transition Station to San Bruno Avenue option, but a longer segment of the underground transmission line would be located within the A-P zone.

West of Skyline Transition Station to Westborough Boulevard. Land uses along Westborough Road are residential to the south, commercial at Gellert Boulevard, with Westborough High School and Westborough Park located on the north side. The California Golf Club of San Francisco borders Westborough Boulevard to the south from Junipero Serra Boulevard to West Orange Avenue. The San Andreas Fault zone would be crossed with this alternative, similar to that at Sneath Lane, and a 2.1-mile underground cable installation, most of which would be within the A-P zone. Also, there would be short-term construction impacts during construction in Skyline and in Westborough Boulevards (similar in type to those that would result from construction in San Bruno Avenue for the Proposed Project). However, Westborough has fewer commercial land uses and less traffic overall than San Bruno Avenue.

Alternative Conclusion

West of Skyline Transition Station: Retained For Analysis. This alternative site is feasible and would meet all project objectives. The alternative transition station site would eliminate the visual and land use impacts of the proposed transition structure and would avoid the proposed trailhead-parking project and impacts to a planned residential development east of Glenview Drive. Also, the new transition station would be farther from sensitive land uses, as defined in the City of San Bruno's scoping comments. Though less preferred than the Proposed Project due to greater potential for earthquake damage to the underground segment because of greater distance within the A-P Zone, the seismic issues associated with this alternative are similar to those of the Proposed Project, also significant (though to a lesser extent) for the Proposed Project so no new significant impacts are created. Therefore, under CEQA guidelines this alternative was retained for further analysis in this EIR.

West of Skyline Transition Station with Proposed Project Route: Retained for Analysis. This route is feasible and would meet all project objectives. The underground transmission line route would cross the entire San Andreas Fault zone, creating increased geologic impacts. However, these impacts do not outweigh the land use and visual resources benefits of the alternative transition station location. Therefore, the San Bruno (Proposed Project) route option for the West of Skyline Transition Station Alternative was retained for further analysis.

West of Skyline Transition Station to Sneath Lane Route: Retained for Analysis. This alternative would meet project objectives, and the alternative, including the crossing of the I-280 freeway, would be feasible. Sneath Lane is preferred by the City of San Bruno over San Bruno Avenue because it would avoid the proposed grade separation project and has fewer land use concerns than the Proposed Project. Therefore, it was retained for detailed EIR consideration.

West of Skyline Transition Station to Westborough Boulevard Route: Retained for Analysis. Similar to the use of this transition station with the Proposed Project route, this option would meet all project objectives and is considered feasible. This route would have the longest underground segment within the San Andreas Fault zone, but would allow elimination of the proposed route down San Bruno Avenue and the conflict with the proposed grade separation project at Huntington Drive. There are also fewer commercial land uses along this route than the Proposed Project route. Therefore, this route was retained for EIR consideration.

4.3.1.2 Sneath Lane Transition Station Alternative

Alternative Description

The Sneath Lane Transition Station Alternative route was suggested during the scoping process as a means of eliminating the Proposed Project transition station and avoiding San Bruno Avenue. The Sneath Lane transition station location requires that the new overhead 60/230 kV line would continue north-northwest along Skyline Boulevard/Highway 35 for 0.6 miles past San Bruno Avenue to the Sneath Lane Substation where a transition station would be installed adjacent to the existing substation. At this point, an underground route would begin.

Like the West of Skyline Transition Station Alternative, this transition station could be used with three possible underground transmission line routes: the Proposed Project route down San Bruno Avenue, the Sneath Lane route, and the Westborough Boulevard route.

Consideration of CEQA Criteria

Project Objectives

This alternative transition station location, in combination with any of the three underground routes, would meet all of the stated objectives of the Proposed Project. The reliability discussion presented for the West of Skyline Boulevard transition station (Section 4.3.1.1) is also relevant here due to the required crossing of the San Andreas Fault zone.

Feasibility

Sneath Lane Transition Station and All Route Options. Construction of an overhead 60/230 kV line between San Bruno Avenue and the Sneath Lane Substation is feasible. Construction of a transition station adjacent to the Sneath Lane Substation is also feasible, and underground construction out of the substation would be feasible. The discussion of seismic risk presented for the West of Skyline Transition Station above is also relevant here.

Sneath Lane Transition to San Bruno Avenue (proposed route). It would be feasible to construct a transition station at Sneath Lane, then have the underground transmission line turn back to the south for 0.5 miles, and following Skyline Boulevard to San Bruno Avenue.

Sneath Lane Transition to Sneath Lane. As discussed above for the West of Skyline Transition Station, the Sneath Lane underground route is feasible.

Sneath Lane Transition Station to Westborough Boulevard. A transition station at the Sneath Lane Substation followed by an underground transmission line route along Skyline Boulevard to Westborough Boulevard is considered to be feasible. As discussed above (for the West of Skyline Transition Station connecting to Westborough Boulevard), there are similar seismic concerns about the length of the underground route within the San Andreas Fault Zone for the other routes crossing the San Andreas Fault Zone, but both could be constructed.

Lessen Significant Environmental Effects

See discussion of the effects of the Proposed Project's transition station and route in Section 4.2.1.1 above; the same issues are relevant to this alternative. The new transition station itself would be located adjacent to the existing substation, so new impacts would be minimal. Visual impacts of the structure

would not be significant in the context of the adjacent substation. The land adjacent to the substation is graded, so there would be minimal habitat impacts.

Potential New Impacts Created

Sneath Lane Transition Station. The new transition station itself would be located adjacent to the existing substation, so new impacts would be minimal. Visual impacts of the structure would not be significant in the context of the adjacent substation. The new transition station would be visible from Skyline Boulevard, but would be adjacent to the existing (and proposed) substation and transmission towers so would be in a setting with other industrial uses. The land adjacent to the substation is graded, so there would be minimal habitat impacts.

Sneath Lane Transition Station to San Bruno Avenue (proposed route). As discussed above under "Feasibility" the additional length (0.5 miles) of underground route between Sneath Lane and San Bruno Avenue would be within the San Andreas Fault Zone. There would be short-term traffic impacts during construction in Skyline Boulevard.

Sneath Lane Transition Station to Sneath Lane. This underground route would require crossing of the entire A-P Zone, as discussed above. There would also be short-term traffic impacts during construction in Sneath Lane.

Sneath Lane Transition Station to Westborough Boulevard. If the line were to transition underground at Sneath Lane and continue north on Skyline Boulevard to Westborough Avenue, an underground transmission line along Skyline Boulevard would be nearly entirely within the San Andreas Fault Zone for approximately 1.4 miles.

Alternative Conclusion

Sneath Lane Transition Station: Retained for Analysis. This Sneath Lane Transition Station and all underground routes would meet project objectives and is considered to be feasible. The transition station location has the potential to avoid several impacts of the proposed route in that it would eliminate the proposed transition station site, which has significant visual impacts and land use conflicts. This alternative site would collocate the new transition station next to an existing utility substation. Therefore, the Sneath Lane Transition Station is retained for EIR analysis.

Sneath Lane Transition Station to San Bruno Avenue (proposed route): Retained for Analysis. While this route would require "backtracking" along Skyline Boulevard to the south it is feasible and would meet all project objectives. The underground route along Skyline Boulevard would be within the San Andreas Fault zone for a longer distance than the proposed route, and construction would cause short-term traffic impacts. However, this route in combination with the Sneath Lane Transition Station would allow elimination of the Proposed Project transition station location, which would have significant visual impacts and land use conflicts. Therefore, this alternative is retained for EIR analysis.

Sneath Lane Transition Station to Sneath Lane: Retained for Analysis. The use the Sneath Lane Substation as a transition station location, followed by an underground transmission line route east on Sneath Lane would be feasible, and meets all project objectives. It would have a longer segment than the Proposed Project within the San Andreas Fault Zone, and would have short-term construction impacts. This transition station and route is preferred by the City of San Bruno because there are fewer sensitive land uses along this road and it would allow elimination of the Proposed Project transition station and the route down San Bruno Avenue. Therefore, this alternative is retained for EIR analysis.

Sneath Lane Transition Station to Westborough Boulevard: Retained for Analysis. The use the Sneath Lane Substation as a transition station location, followed by an underground transmission line route north on Skyline Boulevard and east on Westborough would be feasible, and meets all project objectives. It would have the longest segment within the San Andreas Fault Zone, and would have short-term construction impacts. But as with the connection to San Bruno Avenue and Sneath Lane, this transition station and route would allow elimination of the Proposed Project transition station and the route down San Bruno Avenue. Therefore, this alternative is retained for EIR analysis.

4.3.2 Cherry Avenue Alternative

Alternative Description

This route within the City of San Bruno was proposed by the City of San Bruno Planning Department and would diverge from the Proposed Project route at the intersection of San Bruno Avenue and Cherry Avenue. It would follow Cherry Avenue for 0.5 miles to the north. The route would follow Cherry Avenue to Sneath Lane, continuing east on Sneath Lane to El Camino Real or Huntington Avenue near the BART ROW.

Cherry Avenue is a wide four-lane road with a median, crossing under I-380. Land uses include an office park, Commodore Park, multi-family residences. At 0.5 miles in length, Cherry Avenue would replace roughly the same distance of the proposed route (which would be in the BART ROW) and is shown in Figure Ap.1-10.

Consideration of CEQA Criteria

Project Objectives

The Cherry Avenue alternative meets all of the stated objectives of the Proposed Project.

Feasibility

This alternative would be feasible; the I-380 undercrossing would allow underground construction through the street.

Lessen Significant Environmental Effects

This route would avoid short-term construction impacts to the eastern portion of San Bruno Avenue and the intersection of San Bruno and Huntington Avenues, where there is a proposed grade separation project planned. This alternative would join Sneath Lane east of the steep hillside portion, and would cross under I-380, eliminating feasibility concerns associated with the I-280 crossing in the Sneath Lane transition station alternative.

Potential New Impacts Created

Short-term construction impacts encountered along Cherry Avenue would be similar to those of the Proposed Project.

Alternative Conclusion

RETAINED FOR ANALYSIS. This alternative meets the project objectives and is feasible. The Cherry Avenue Alternative would avoid the proposed Huntington Drive grade separation project, and new impacts would not be greater overall than those of the Proposed Project. Therefore, this alternative was retained for EIR analysis.

4.3.3 I-280 Northbound Ramp Alternative

Alternative Description

Proposed by the City of San Bruno, this alternative shall diverge from the Proposed Project at the entrance/exit ramp of I-280 along San Bruno Avenue and would proceed adjacent to the northbound ramp, east of I-280, for approximately 0.5 miles north to Sneath Lane. PG&E has an existing gas pipeline along the west side of I-280. The route would then continue east on Sneath Lane to the BART ROW where it would rejoin the proposed route within the City of San Bruno boundaries. Entirely within the City of San Bruno, this route would be roughly the same distance as the proposed route and is shown in Figure Ap.1-11. This alternative would not change the location of the proposed transition station at San Bruno Avenue and Glenview Drive.

Consideration of CEQA Criteria

Project Objectives

Use of the I-280 northbound ramp would meet all of the stated objectives of the Proposed Project.

Feasibility

Although the exit ramp is within the Caltrans ROW and is part of the I-280 freeway, it is significantly separated from the freeway, and there appears to be ample space for construction of the 230 kV line. While Caltrans generally denies longitudinal encroachments, the City of San Bruno stated that Caltrans may grant a variance for this alignment because the PG&E gas pipeline was allowed to be installed in Caltrans ROW, west of the freeway. However, given Caltrans' general policy on use of its controlled access roadways, there could be permitting feasibility issues with this alternative. PG&E would have to show that there are no other options, in which case Caltrans would work with the applicant through the Exception Permit Process (Caltrans, 2003 and 2003b). Given that there are other options (as described throughout this Appendix), the regulatory feasibility of this alternative is very questionable. In addition, it would be difficult or impossible to achieve Caltrans approval within a reasonable period of time, as required by the project objective timeframes.

Lessen Significant Environmental Effects

This route would avoid short-term construction impacts to San Bruno Avenue and the intersection of San Bruno and Huntington Avenues, where there is a proposed grade separation project planned. It would also avoid construction in San Bruno Avenue between I-280 and the BART ROW.

Potential New Impacts Created

There would be short-term underground construction impacts along Sneath Lane, similar to those of the Proposed Project along San Bruno Avenue.

Figure Ap.1-10. Cherry Avenue Alternative
For security reasons this figure is not included in the online version of the report.

Figure Ap.1-11. I-280 Northbound Ramp Alternative
For security reasons this figure is not included in the online version of the report.

Alternative Conclusion

ELIMINATED. Though this alternative meets the project objectives, there are significant regulatory feasibility issues associated with acquiring a variance from Caltrans and using the I-280 off-ramp. In addition, this alternative does not significantly lessen any impacts of the Proposed Project; it simply relocates them from San Bruno Avenue to Sneath Lane. Due to these factors, this alternative was eliminated from full analysis in this EIR.

4.3.4 Modified Underground Existing 230 kV Collocation Alternative and New South San Francisco Segment

Alternative Description

PG&E currently operates an underground 230 kV transmission line between San Mateo and Martin Substations. The line was installed in 1969 and is located entirely in city streets. This alternative would use a portion of the route of the existing PG&E underground 230 kV transmission line through the cities of Millbrae, San Bruno, and Brisbane, and would incorporate a new route segment through South San Francisco and adjacent cities. The new route segment, described below, was developed to avoid several very congested utility areas in South San Francisco, especially along Linden Avenue, Airport Boulevard, and Bayshore Boulevard near the ongoing Highway 101 "flyover" construction area. This alternative is illustrated in Figure Ap.1-12.

Either the Proposed Project route (at San Bruno Avenue and Huntington Avenue), Route Option 1B (at San Bruno Avenue and El Camino Real), or the Sneath Lane Underground Route (into Tanforan Avenue, boring under two railroad crossings to Shaw Drive) could also connect with this Northern Segment Alternative. The Modified Underground Existing 230 kV Collocation Alternative and new South San Francisco Segment would continue east of Huntington Avenue on San Bruno Avenue for 0.4 miles, then north into PG&E's 115 kV overhead line corridor just east of 7th Avenue (adjacent to Highway 101). PG&E has stated that use of this corridor would require acquisition of an additional easement from Caltrans (the property owner) and the boring beneath a culvert and a waterway. However, PG&E states that it appears to be technically feasible to use this overhead corridor for an underground transmission line.

Just south of I-380, the route would jog west onto 7th Avenue then cross under I-380 and enter the City of South San Francisco where 7th Avenue becomes Shaw Road. After traveling on Shaw Road for 0.7 miles, the route would require a bored crossing of a tributary of Colma Creek and travel through a large parking lot east of Golden Gate Produce Terminal for approximately 0.3 miles before joining Produce Avenue. Where Airport Boulevard crosses under Highway 101 (0.3 miles to the north), this route would turn east and cross below Highway 101, then turn northeast onto Gateway Boulevard. The route would travel along Gateway Boulevard for approximately 1.1 miles before crossing Oyster Point Boulevard and entering a vacant parcel. From this point, the underground alternative route would follow the eastern edge of the UPRR for approximately 1.0 mile into the City of Brisbane to Sierra Point Parkway. Just south of the Sierra Point development, the route would cross a City of South San Francisco drainage structure, using an emergency access road constructed by the City. It would continue north, staying immediately east of the UPRR ROW, then it would turn west into Sierra Point Parkway. At that point, the route would cross below Highway 101, then leave Sierra Point Parkway and with a bored crossing, traverse under the railroad tracks into Van Waters and Rogers Road (private) for 0.2 miles before joining Bayshore Boulevard.

The alternative route would follow the existing 230 kV underground line in Bayshore Boulevard for 1.1 miles, around the east side of San Bruno Mountain. This route would rejoin the Proposed Project route at the corner of Guadalupe Canyon and Bayshore, following the Proposed Project route for the last 0.8 miles into the Martin Substation.

Land uses along the Modified Underground Existing 230 kV Collocation Alternative and new South San Francisco Segment consist entirely of industrial areas and large office and hotel complexes. For two blocks of the route, immediately north of San Bruno Avenue, the route would be in PG&E's overhead transmission corridor, which has residences along its western side, and the Highway 101 freeway on the east side. The remainder of the route in South San Francisco is industrial. Bayshore Boulevard near Old Country Road (City of Brisbane) has an island divider with four lanes and is about 78 feet from curb to curb. Immediately west of the eastern curb is fiber line. West of the fiber line, but still in the eastern bike lane is the 230 kV transmission line. The joint fiber trench is in the westernmost north-bound lane, immediately adjacent to the divider island. In the southbound lane closest to the island is a large three-foot-wide scar in the road associated with a utility line (identity unknown). A fiber line is located in the western bike lane. There do not appear to be space constraints along this portion of Bayshore Boulevard.

Consideration of CEQA Criteria

Project Objectives

This alternative would meet all of the stated objectives of the Proposed Project. Because there is adequate space in the route segments where the alternative would be collocated with the existing 230 kV line, the new line would maintain spacing between it and the existing 230 kV line so there would be no reliability concerns regarding use of a common corridor.

Feasibility

There are no special electrical engineering constraints associated with locating the proposed transmission line immediately adjacent to PG&E's existing 230 kV oil filled pipeline. However, there would be concerns of physically damaging the oil filled pipe and other utilities during construction. A buffer of at least 10 feet from the proposed trench and the nearest other utility would be necessary, and using a buffer of under 5 feet from other utilities would be infeasible. The major feasibility concern related to this alternative is availability of adequate space within the city streets (both within and outside of the existing 230 kV corridor), given that the existing 230 kV transmission line is already located there and there are also other underground utilities.

According to City of San Bruno, Huntington Avenue in the area of the PG&E's existing 230 kV line is one of the most tightly packed utility corridors that exists (San Bruno, 2002). Utilities in this portion of Huntington Avenue include a 23-inch storm drain, a 16-inch gas pipe, a water line, and sewer line. These utilities are primarily on the west side of Huntington Boulevard. In addition, there are many other utilities that perpendicularly cross Huntington Avenue. There would be space constraint issues with the addition of another 230 kV line within the road, however with careful design and construction, it would be possible.

In preliminary analysis, CPUC staff identified potential space constraint issues along portions of the existing underground 230 kV route, primarily in the City of South San Francisco. Though there appear to be no major space constraints in Dollar Avenue (South San Francisco/San Bruno), which is a two-lane

Figure Ap.1-12. Modified 230 kV Underground Alternative
For security reasons this figure is not included in the online version of the report.

street with no divider island, it could not be used without a Linden Avenue alignment. Linden Avenue south of the Colma Creek Bridge in South San Francisco is a two-lane street with a double yellow line divider. It is about 42 feet from curb to curb with sidewalks on both sides and parking on the west side. Fiber conduit is in the area of the eastern sidewalk. A sewer line is in the northbound lane (east side of road). The "joint trench" for dozens of fiber lines is in the northbound lane, just east of the double yellow lines (center of road). A water line runs along the western sidewalk. Gas and electric lines are in the parking lane within the western edge of the road. Therefore, there appear to be major space constraints along Linden Avenue.

Airport Boulevard, north of Linden Avenue to California Avenue in the City of South San Francisco, has an island divider with 4 lanes and is about 78 feet from curb to curb. Just east of the eastern curb are traffic signal and street lighting lines. In the eastern bike lane is a fiber conduit. The joint fiber trench runs is in the northbound lane closest to the island divider. There appear to be utilities in the island divider, including irrigation lines. A City line is in the second southbound lane closest to the island. In the southbound bike lane is a fiber conduit. In the western sidewalk are a gas line and the existing 230 kV transmission line. Information provided by the SFPUC indicates that there also is a 44-inch water main along this portion of Airport Boulevard, however, the location of this line was not verified by CPUC staff in the field. There appear to be no major space constraints along this portion of Airport Boulevard.

Major feasibility concerns surround the potential use of Airport Boulevard from California Avenue to Sister Cities Boulevard in South San Francisco. While this five-lane roadway is about 85 feet from curb to curb, it is very congested with underground utilities. The joint fiber line is the eastern bike lane, but makes a long, smooth turn north (crossing the other utilities), up Sister Cities Boulevard. In the first northbound lane is a storm drain line. In the second northbound lane is the existing 230 kV transmission line. Below the third northbound lane, closest to the center divider island, is a San Francisco Water Department main line. Immediately adjacent to the east side of the island is a storm drain. Along the island are irrigation and traffic signal lines. A sanitary sewer manhole in the southbound lane closest to the island indicates a sewer line. An AT&T line is in the middle of the southbound lane closest to the island. In the westernmost lane is an eight-inch water line. Just east of the bike lane is gas line. In the sidewalk are a 24-inch gas line and a high voltage power line. Approximately 20 feet west of the western curb is a 60-inch water main.

Therefore, due to the potential space constraint feasibility issues that were identified during the alternatives screening process, CPUC staff developed this Modified Underground Existing 230 kV Collocation Alternative and new South San Francisco Segment.

Lessen Significant Environmental Effects

Use of the Modified Underground Existing 230 kV Collocation Alternative and new South San Francisco Segment would be a more direct route to the Martin Substation, eliminating approximately 3.7 miles of construction and the Proposed Project's crossing of San Bruno Mountain within Guadalupe Canyon Parkway. While the use of Guadalupe Canyon Parkway would minimize Proposed Project impacts on the sensitive species of San Bruno Mountain, it would be preferred to eliminate any or all construction disturbance (noise, dust, etc.) on the mountain by relocating the project elsewhere.

The Modified Underground Existing 230 kV Collocation Alternative and new South San Francisco Segment would allow use of an existing transmission corridor, eliminating the new (underground) corridor created by the Proposed Project route through San Bruno, South San Francisco, Daly City, and

Colma. Land uses along the Modified Existing 230 kV corridor are primarily industrial, whereas those of the Proposed Project are primarily commercial with some residential areas. If Trousdale Drive (see Section 4.2.1) were used to connect to this alternative route, then seismic concerns associated with the crossing of the San Andreas Fault Zone near the proposed transition station would be avoided, as would impacts to the existing and proposed uses on San Bruno Avenue (between Glenview Drive and El Camino Real).

Potential New Impacts Created

Construction of this alternative would be in a primarily industrial corridor as the route traverses El Camino Real, central and eastern South San Francisco, and Bayshore Boulevard in Brisbane. There would be short-term air quality, noise, and traffic impacts associated with underground construction; these would be similar to those of the Proposed Project but in different locations. Unless rerouted along the 115 kV transmission corridor, the line would go through 0.4 miles of residential land uses along 7th Avenue. The route would also still encounter the planned San Bruno Avenue/Huntington Avenue grade separation project though it would cross the intersection at a more favorable angle than the Proposed Project (i.e., the route would be along San Bruno Avenue and would not turn onto Huntington Avenue so it would create less impact to the grade separation project). Cultural resource impacts may be greater than for the Proposed Project, because areas nearer to the San Francisco Bay have greater sensitivity from past land uses.

Alternative Conclusion

RETAINED FOR ANALYSIS. This alternative meets the project objectives and is feasible. The Modified Underground Existing 230 kV Collocation Alternative and new South San Francisco Segment corridor offers a reduction in impacts associated with the Proposed Project in that it avoids San Bruno Mountain and potentially avoids the active fault crossing at Skyline Boulevard as well as the proposed transition station location in San Bruno. By utilizing a primarily commercial and industrial existing corridor, it also avoids impacts to schools and residences in the Cities of San Bruno, South San Francisco, Colma, and Daly City. This alternative was therefore retained for full analysis in this EIR.

4.3.5 PG&E's Route Option 2A: El Camino North Alternative

Alternative Description

This alternative was presented in the PEA as PG&E's Route Option 2A. This underground line segment would diverge from the proposed route at the intersection of El Camino Real and San Bruno Avenue, where it would turn north in El Camino Real and be in that roadway for about 3.7 miles. It would turn east on Lawndale/McLellan Drive, rejoining the proposed route at the corner of Lawndale/McLellan and El Camino Real. The alternative segment would be located in the Cities of San Bruno (0.9 miles) and South San Francisco (2.2 miles) and the Town of Colma (0.6 miles), the same jurisdictions that would be affected by the relevant Proposed Project segment.

This alternative segment would replace roughly the same distance of the Proposed Project; which would be entirely within the BART ROW. Land uses along El Camino Real are generally commercial, and traffic is heavy. The route would pass South San Francisco High School and Kaiser Foundation Hospital, both to the east of El Camino Real. Figure Ap.1-13 shows a map of this potential alternative.

Figure Ap.1-13. PG&E's Route Option 2A: El Camino North Alternative
For security reasons this figure is not included in the online version of the report.

Consideration of CEQA Criteria

Project Objectives

Because this alternative would be electrically the same configuration as the Proposed Project (i.e., a 230 kV line between Jefferson and Martin), it meets all of the stated objectives of the Proposed Project.

Feasibility

PG&E has existing franchise agreements with San Mateo County and the Cities in the affected segment (San Bruno, South San Francisco, and Colma). As a result, PG&E would be allowed to install the transmission lines within El Camino Real. Because this option was presented in PG&E's PEA, it is assumed that there is adequate space available in El Camino Real given other existing underground utility lines for the 2- to 3-foot-wide trench that would be required to install the transmission line, and that this alternative is feasible

Lessen Significant Environmental Effects

Because this alternative would be installed in El Camino Real and not the BART ROW, the alternative route would avoid conflict with the City of San Bruno's planned grade separation project at the corner of Huntington and San Bruno Avenues. It would also avoid passing Los Cerritos Elementary School along the BART ROW.

Potential New Impacts Created

The Proposed Project route segment that would be replaced by this alternative would be within BART ROW and have minimal traffic impacts. The El Camino North Alternative would require the installation of an underground line along the region's busiest commercial highway, and would thus cause temporary disruption to businesses along El Camino Real and to a few residences during construction. Also, because the BART ROW includes new fill (deposited after BART construction), there are no contamination concerns there. However, the El Camino Real Alternative would likely include a number of contaminated sites due to its long history of use for commercial and industrial (gas station) purposes.

Alternative Conclusion

ELIMINATED. The El Camino Real North alternative meets project objectives and would be feasible. However, by using El Camino Real, a heavily used commercial highway, it would create substantially greater construction impacts than the Proposed Project, which follows the BART ROW. Potential EMF impacts to the Los Cerritos School would be mitigated through PG&E's EMF mitigation plan. In addition, the planned Caltrain grade separation project would be avoided by this alternative. However, this alternative would create greater impacts than the Proposed Project segment, and was therefore eliminated from further analysis in this EIR.

4.3.6 PG&E's Route Option 3B: BART North Alternative

Alternative Description

The BART North alternative was developed by PG&E as an alternative to the use of Lawndale/McLellan Drive (0.6 miles) and to part of the Hillside Boulevard segment (1.7 miles) of the Proposed Project. It was presented as Route Option 3B in the PEA. As shown in Figure Ap.1-14, this alternative would locate the transmission line in a 2.0-mile segment of the newly constructed and recently finished BART ROW between Lawndale/McLellan Drive and Serramonte Boulevard.

The route would diverge from the Proposed Project route by staying in the BART ROW, rather than turning east onto Lawndale/McLellan. It would remain in the BART ROW for about one mile to Serramonte Boulevard, where it would turn east into Serramonte. This alternative would rejoin the proposed route at the corner of Serramonte and Hillside. Implementation of this alternative would require that PG&E acquire a ROW extension from BART further north than the ROW currently proposed for the Proposed Project.

Consideration of CEQA Criteria

Project Objectives

This alternative would meet all of the stated objectives of the Proposed Project.

Feasibility

This alternative would require construction across the landscaped front entrance to a historic Colma funeral home business, Holy Cross Cemetery, which overlies the restored BART ROW and is a National Register eligible historic property. Based on the BART project, an alternative through this site is feasible, but it would require documentation regarding the project plans that would consider a variety of potential impacts to the property. PG&E would have to demonstrate that there would be no significant effect to either the cemetery or to the cemetery setting. It could be fairly costly, but not impossible. Therefore, there are no engineering or regulatory constraints that would prevent construction in the BART ROW. Therefore this alternative is feasible.

Lessen Significant Environmental Effects

This alternative route would eliminate the 2,400-foot segment of underground transmission line adjacent to El Camino High School (at the southeast corner of El Camino Real and Lawndale/McLellan). Project construction could disrupt school activities, and operation of the project would create new magnetic field emissions adjacent to the school. However, it is noted that PG&E has proposed to mitigate the EMF impacts in this area by burying the transmission line deeper to reduce magnetic field emissions. Deeper burial of the underground transmission line would not reduce the EMF levels below significant levels (2 mG). Instead, the line would need to be relocated to the north side of Lawndale/McLellan Drive to reduce the EMF impacts at the school to less than significant.

Construction of this alternative in the BART ROW would have fewer traffic impacts than construction under Lawndale/McLellan Drive and Hillside Boulevard, because the BART ROW is not a roadway in this area. In addition, use of the BART ROW would have fewer potential utility conflicts that use of roadways. Because of these factors, construction in the BART ROW is likely to be completed more quickly compared to the Proposed Project, and construction in the BART ROW would also be expected to encounter fewer hazardous materials since it contains new fill.

Potential New Impacts Created

Serramonte Boulevard is a busy, commercial street lined with several car dealerships that draw customers from the entire Bay Area, so construction in the street could cause short-term disruption to these businesses. The City of South San Francisco has expressed concern that further construction in the BART ROW north of Lawndale/McLellan Drive would negatively impact local businesses that were severely impacted during the lengthy BART construction. In addition, this alternative would require construction across the landscaped front entrance to a historic Colma funeral home business, Holy Cross/Cypress

Figure Ap.1-14. PG&E's Route Option 3B: BART North Alternative
For security reasons this figure is not included in the online version of the report.

Lawn Cemetery, which overlies the restored BART ROW and is a National Register eligible historic property. This site was disturbed during BART construction and has recently been restored and revegetated. Additional disturbance to this historic property could be damaging.

Alternative Conclusion

ELIMINATED. This BART North alternative would meet all project objectives and is feasible. This route would eliminate EMF and construction impacts at El Camino High School by relocating the transmission line from McLellan/Lawndale to Serramonte, but those impacts would be mitigated to less than significant levels by relocating the lines to under the north side of the street**.** While reducing construction and traffic impacts along Hillside and Lawndale/McLellan, this alternative would create greater overall significant impacts from construction and traffic impacts to commercial properties along Serramonte Boulevard and it would disturb the historic funeral home/cemetery located just east of El Camino Real in Colma. This alternative would not significantly lessen environmental impacts of the Proposed Project. In addition, it would create additional significant impacts of its own. Therefore, this alternative was eliminated from further analysis in this EIR.

4.3.7 PG&E's Route Option 4B: East Market Street Alternative

Alternative Description

The East Market Street alternative was developed to be an option for the Hoffman and Orange Streets segment of the Proposed Project. It was presented by PG&E as Route Option 4B in the PEA. This alternative would be entirely within the City of Daly City, and would diverge from the Proposed Project route by continuing north on Hillside (where the Proposed Project turns east onto Hoffman). The route would follow Hillside for 0.4 miles, and then turn northeast into East Market Street (see Figure Ap.1-15), where it would rejoin the proposed route at Orange Street (East Market becomes Guadalupe Canyon Parkway at Orange Street). This alternative is a total of approximately 0.6 miles long, and would replace 0.8 miles of the Proposed Project.

Land uses along Hillside and East Market include commercial and residential properties, and the main entrance to Susan B. Anthony Elementary School along the southeast side of East Market.

Consideration of CEQA Criteria

Project Objectives

This alternative would be only a minor route variation of the Proposed Project, so would meet all of the stated objectives.

Feasibility

No feasibility concerns have been identified for this alternative.

Lessen Significant Environmental Effects

This alternative would eliminate the Proposed Project impacts along the narrow Hoffman Street (entirely residential on the north side; cemetery to the south) and Orange Streets (which is entirely residential). The residential land uses are considered sensitive with respect to construction impacts and operational

impacts, including EMF. Hillside and East Market are wider four-lane streets, which provide more construction options (allowing certain lanes to left open rather than closing the entire street), and also have more commercial land uses and less residential properties. In addition, EMF concerns to residences nearby would be lessened because this route is more commercial and the roadway is wider. EMF is more effectively reduced by distance than by deeper line burial. Pollicita Middle School's playing fields are also along the Proposed Project route on Orange Avenue, but Alternative N-5 would pass these same fields on East Market.

Potential New Impacts Created

The alternative would require construction past the main entrance of Susan B. Anthony Elementary School at the corner of East Market Street and Hillside Drive. Construction of the East Market Street alternative would likely be more disruptive to traffic because Hillside and East Market have much greater traffic volumes than Hoffman and Orange.

Alternative Conclusion

RETAINED FOR ANALYSIS. This alternative meets the project objectives and is feasible. This alternative has the potential to reduce or avoid significant environmental impacts to residences along the proposed route and to reduce EMF impacts to these residences. Construction impacts along the busier streets in the alternative would affect more people, but would be short-term and mitigable with effective traffic control. While EMF impacts would essentially be relocated from Hoffman/Orange to Hillside and Market, these streets are larger so mitigation would be easier to implement (by placing the line across the street from the school and/or by deeper burial of the line). Therefore, this alternative has been retained for full analysis in this EIR.

4.3.8 Junipero Serra Boulevard Alternative

Alternative Description

This alternative alignment is a total of 2.8 miles long, and was suggested during scoping by the Town of Colma. The underground transmission line route would utilize Junipero Serra Boulevard for 1.8 miles (beginning at Westborough Boulevard in the City of South San Francisco), rather than the BART ROW. This route would also avoid the Proposed Project's use of Lawndale/McLellan, and most of Hillside.

Because Junipero Serra Boulevard does not extend south to Sneath Lane, this route could be used only with the Sneath Lane or West of Skyline transition station alternatives with the feasible Skyline to Westborough route options (see Section 4.3.1). This route alternative could use either the Sneath Lane or West of Skyline Transition Station Alternatives, and would continue north along Skyline Boulevard until it would turn east onto Westborough Boulevard to the intersection of Westborough Boulevard and Junipero Serra Boulevard. The route along Junipero Serra would traverse the City of South San Francisco for 0.2 miles before entering the Town of Colma. Junipero Serra is a wide road with a median and few pedestrians. The land uses along the route become commercial as it approaches Serramonte Boulevard. The route would turn east into Serramonte Boulevard, staying in Serramonte for about one mile to Hillside, where it would rejoin the Proposed Project route. Figure Ap.1-16 presents a map of this alternative route.

Figure Ap.1-15. PG&E's Route Option 4B: East Market Street Alternative
For security reasons this figure is not included in the online version of the report.

Figure Ap.1-16. Junipero Serra Boulevard Alternative
For security reasons this figure is not included in the online version of the report.

Consideration of CEQA Criteria

Project Objectives

The Junipero Serra Boulevard Alternative would meet all of the stated objectives of the Proposed Project.

Feasibility

The Town of Colma Public Works Department indicated that there would be no space restraint problems associated with existing utilities (Town of Colma, 2003). The Town is planning a phased road improvement project for Junipero Serra Boulevard that is likely to begin soon (though there is no schedule yet) and the Town would prefer that the road not be dug up after the improvements; however, the Town would likely be able to plan their construction around the Proposed Project. This alternative would be feasible.

Lessen Significant Environmental Effects

The Proposed Project would require construction through two streets that are expected to be newly paved and landscaped prior to project construction: 1) Lawndale Boulevard from Mission Road to Hillside Boulevard (nearing completion in early 2003), and 2) Hillside Boulevard from South San Francisco to Daly City (a street beautification project is scheduled to begin construction in August 2003). Like the BART North alternative described in Section 4.3.6, this alternative route would also avoid passing El Camino High School on Lawndale/McLellan Drive. This alternative would avoid use of all of Lawndale and most of Hillside. Land uses along Junipero Serra Boulevard are conducive to a utility corridor (wide, not apparently congested with utilities, etc.) and there are no schools with potential for creation of EMF impacts.

Potential New Impacts Created

There would be short-term construction impacts along Junipero Serra and Serramonte Boulevards. As described for the BART North alternative (see Section 4.3.6), the commercial businesses (auto dealerships) along Serramonte Boulevard would be exposed to short-term traffic, noise, and dust impacts from construction in that street.

Alternative Conclusion

RETAINED FOR ANALYSIS. This alternative meets the project objectives and is feasible. This alternative would not pass any schools and it would avoid areas that the Town of Colma would like to see bypassed, avoiding impacts to newly paved roadways. There would be short-term construction impacts similar to the Proposed Project to Junipero Serra Boulevard and Serramonte Boulevard. Overall, it appears to create less significant effects than the Proposed Project. Therefore, this alternative was retained for full evaluation in the EIR.

4.3.9 Mission/El Camino Real to A Street Alternative

Alternative Description

This alternative route, recommended by the Town of Colma planning department, is shown in Figure Ap.1-17. It would require use of either the El Camino North alternative or the BART North alternative, both recommended for elimination, but would allow avoidance of both Lawndale/McLellan and

Serramonte Boulevard. The alternative route would follow along Mission Road/El Camino Real from Serramonte to A Street. The route would turn east onto A Street and would travel down A Street until turning north onto Hillside Boulevard in the City of Daly City. The route would follow Hillside Boulevard to Market Street, turn east on Market Street (as described for the East Market alternative in Section 4.3.7 above) and rejoin the proposed route at the intersection of Orange Street and East Market Street. A Street is a narrow road with single and multi-family residential land uses.

Consideration of CEQA Criteria

Project Objectives

This alternative would meet all of the stated objectives of the Proposed Project.

Feasibility

This alternative would be feasible.

Lessen Significant Environmental Effects

This alternative, in conjunction with PG&E's El Camino North or BART North Route Options, would avoid construction impacts to Lawndale/McLellan Drive and to Hillside Boulevard and Hoffman Street from the City of South San Francisco to the City of Daly City.

Potential New Impacts Created

Mission/El Camino Real is a very busy, congested commercial corridor and A Street is narrow, multi-family residential road. Therefore, there would be increased short-term traffic impacts associated with this route and heightened EMF concerns along A Street.

Alternative Conclusion

ELIMINATED. This alternative meets project objectives and is feasible. It allows for the avoidance of a portion of Hillside Boulevard and Hoffman Street by using Market Street, but moves the impacts to other streets where impacts would be the same or greater. The route through A Street is very narrow and has residential land uses, and would result in location of the transmission line in narrow streets in a residential area, creating construction traffic disturbance and EMF concerns. Therefore, the alternative was eliminated from full analysis in this EIR because it would not reduce or avoid impacts of the Proposed Project.

4.3.10 San Bruno Mountain Collocation Alternative

Alternative Description

This alternative route, recommended by the City of Daly City Planning Department in its scoping comment letter, would diverge from the proposed route in Guadalupe Canyon Parkway at approximately MP 26. At this point, the alternative would turn north and follow the existing 60 kV utility corridor for approximately 0.4 miles down the mountain, paralleling Linda Vista Drive into the Martin Substation. If placed in public roadways, the underground route could follow Linda Vista Drive north, turn east onto Main Street, entering the City of Brisbane to Martin Substation (see Figure Ap.1-18). This 0.4-mile route segment would eliminate over one mile of the Proposed Project route. The City states that Bayshore

Figure Ap.1-17. El Camino Real to A Street Alternative
For security reasons this figure is not included in the online version of the report.

Figure Ap.1-18. San Bruno Mountain Collocation Alternative
For security reasons this figure is not included in the online version of the report.

Boulevard may be nearing its capacity to accept further underground infrastructure. While this is true in the portion of Bayshore Boulevard in South San Francisco, investigation has demonstrated that the Brisbane portion has adequate space for additional utilities.

As defined by the City, this alternative would require undergrounding the existing power lines that traverse the northern face of San Bruno Mountain in an undisturbed area for a length of about 1,000 feet, and removing the existing towers in the entire 0.4-mile route segment. San Bruno Mountain State and County Park is unincorporated San Mateo County land and is maintained as open space for endangered species habitat, and also used for hiking and other public recreation. The San Mateo County Parks and Recreation Division has primary oversight of the management of these parks. The San Bruno Mountain Master Plan and Habitat Conservation Plan (HCP) divides different geographical areas within the HCP bounds of San Bruno Mountain into Management Units. The Management Unit that the Project crosses is called "PG&E Fee 2 (1-12-02)" and includes the open spaces south of Martin Street. This parcel (open space area only) is contained in the transmission and gas-line corridor, which is adjacent to the Rio Verde Heights Area. This unit also contains the Martin Substation, but the policies contained in the plan apply only to the open-space portions of the Martin Substation parcel.

The open space habitat on San Bruno Mountain is protected. Construction impacts associated with underground construction would greatly disturb sensitive habitat, especially for several endangered butterfly species (e.g., Mission blue butterfly). A Section 7 biological consultation and opinion (see discussion in Section 4.2.5) would be required under the Endangered Species Act. In addition, this alternative would conflict with the San Bruno Mountain HCP. Currently there is an unrelated amendment to the San Bruno Mountain HCP under consideration by the Plan Operators. The City of Daly City proposes that this combined undergrounding alternative within the fee corridor become part of the current HCP amendment in order to improve the visual quality of this sensitive area.

The Specific Conservation Needs of the HCP state that **"**maintenance activities should be kept to existing disturbed areas where feasible (i.e., roads and dirt trails). Human or mechanical encroachment in habitat areas during PG&E utility-maintenance activities are to be minimized. New disturbance to conserved habitat should be minimized" (PG&E, 2002 and San Mateo County Parks and Recreation, 1982). In addition to the CEQA legal issues, permitting associated with trenching over San Bruno Mountain, which would require an amendment to the HCP, would be difficult and regulatorily infeasible.

Consideration of CEQA Criteria

Similar to PG&E's 1B with Underground 60 kV Line (described in Section 4.2.3 above), this suggested alternative that would include placing both the proposed 230 kV line and the existing power lines underground along a new alignment in Guadalupe Canyon Parkway is not considered to be within CEQA's "reasonable range of alternatives," and therefore cannot be evaluated in the EIR. The relocation of the existing lines (which has no relation to the Proposed Project) to a new route as part of the Proposed Project is not a permissible alternative under CEQA Guidelines. The reasons for this are explained below.

The Proposed Project involves the construction of a new 230 kV transmission line. The existing lines are already in place, and thus is part of the environmental setting against which environmental impacts are judged. See CEQA Guidelines section 15125(a) ("the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published . . . will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant.") The impacts of a Proposed Project do not include the effects of activities already occurring

or facilities already in existence, such as the existing transmission and power lines. See Riverwatch v. County of San Diego, 76 Cal. App. 4th 1428, 1451-1453 (1999) (even prior illegal activities were part of the environmental baseline); accord, Fat v. County of Sacramento, 97 Cal. App. 4th 1270 (2002). The 230 kV line could be installed over San Bruno Mountain without affecting the existing power and transmission lines in any way.

In explaining the "rule of reason" by which alternatives are selected for evaluation, CEQA Guidelines section 15126.6(f) states, "The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project." Because "the project" includes only the 230 kV line, and the effects of the project are limited to the impacts associated with the proposed 230 kV line, appropriate alternatives must be limited to those that could avoid or lessen the effects of the 230 kV transmission line. CEQA does not permit the lead agency to try and "fix" or improve the existing environmental setting (i.e., in this situation, to relocate the existing overhead lines to an underground location) using a proposed change to the environment as a hook.

As a related point, CEQA specifies that in order for a mitigation measure (and by inference, an alternative) to be feasible, it must meet relevant constitutional standards. See CEQA Guidelines section 15124.4(a)(4). Such standards include a requirement that there be an essential connection or relationship between an alternative and a legitimate lead agency interest dealing with the Proposed Project, and that the alternative be "roughly proportional" in nature and scope to the impacts of the Proposed Project. Again, the impacts of the Proposed Project stem solely from construction of a new underground 230 kV line in the San Bruno Mountain area, and not from the existing transmission and power lines. The relocation of the existing lines to a wholly new alignment cannot reasonably be required by the CPUC. For these reasons, this alternative option will not be considered further in the screening process and/or be considered for full analysis in the EIR.

Alternative Conclusion

ELIMINATED. This alternative in Guadalupe Canyon Parkway is not feasible because it conflicts with CEQA law. In addition, it creates conflict with the current HCP for San Bruno Mountain. Therefore, the alternative was eliminated from full analysis in this EIR.

4.4 Other Transmission Alternatives

This section addresses transmission alternatives that would not originate at Jefferson Substation and/or end at Martin Substation. The discussions below explain the reasons for elimination or retention for full analysis for each potential alternative.

4.4.1 San Mateo Substation to Martin Substation

Alternative Description

This alternative was evaluated in the San Francisco Long-Term Electric Transmission Planning Technical Study, October 24, 2000 (the study that ultimately recommended the Jefferson-Martin Project), and is also being considered in the San Francisco Peninsula Long-Term Transmission Planning Study, Phase 2 Study Plan (February 2003).

This alternative would consist of a new 14.3-mile 230 kV underground cable constructed between San Mateo and Martin Substations in the Cities of San Mateo, Burlingame, Millbrae, San Bruno, South San Francisco, and Brisbane. This alternative is depicted in Figure Ap.1-19. The routing of this alternative as suggested in the ISO Study, would be in the same ROW as the existing underground 230 kV transmission line between San Mateo and Martin Substations (use of a modified northern portion of that route is described in Section 4.3.4 above).

This alternative would have the same internal transmission reinforcement and reactive support requirements as Proposed Project. Martin Substation is an outdoor 230/115kV transmission substation that has property available for substation facilities expansion.

The alternative would follow the existing 230 kV underground route, departing northward out of San Mateo Substation and heading across the Coyote Point Recreation Area (across the golf course) to the Highway 101 corridor. The route would roughly parallel Highway 101 along Airport Boulevard/Old Bayshore Highway. From the corner of Millbrae Avenue and El Camino Real (State Highway 82), the route heads north in El Camino Real for 1.3 miles. From this intersection to the north, El Camino Real is a major commercial roadway with at least 4 lanes and generally with a center median. The route turns east for two blocks just south of Santa Maria Avenue, and then turns north into San Antonio/Huntington Avenues (the BART ROW) for approximately 1.3 miles. Between San Bruno Avenue and I-380, this alternative would be collocated with the Proposed Project route for about 1,300 feet. (The intersection of San Bruno Avenue and Huntington is the location of the upcoming grade separation project in the City of San Bruno.) Land uses along Huntington are residential and light industrial.

Immediately south of I-380, this route would turn east, cross under the freeway, and turn immediately north in Herman Street, which is a wide roadway with a railroad corridor to the east and residential land uses to the west. After 0.6 miles in Herman Street, the route turns into Linden Avenue for 0.9 miles, traveling into central South San Francisco. Linden Avenue is fairly wide with mostly industrial and commercial enterprises along the roadway and some residences around Village Avenue. On Linden, the route would have to be bored below a railroad crossing (at Railroad Avenue) and a canal, crossing Linden at Canal Street. The route turns east on Baden Avenue for one block, then north into Bayshore Boulevard.

The alternative route would follow the existing 230 kV underground line in Bayshore Boulevard for 4.0 miles, around the east side of San Bruno Mountain to the east to Martin Substation. Bayshore Boulevard is mostly light industrial with several scattered residences west of the road around San Bruno Mountain. There is on-going construction along Bayshore at the South San Francisco Highway 101 off-ramp that constricts Bayshore to a single lane, but aside from that temporary construction, Bayshore Boulevard is generally wide and well used. This route would rejoin the Proposed Project route at the corner of Guadalupe Canyon and Bayshore, following the Proposed Project route for the last 0.8 miles into the Martin Substation.

Consideration of CEQA Criteria

Project Objectives

Currently the San Mateo Substation is essentially the only source of externally generated power to the CCSF and northern San Mateo County. With this alternative, if there were a loss of 230 kV power at the San Mateo Substation, the CCSF would lose nearly all of its ability to import power. Based on power flow and contingency studies, if there were a loss of the San Mateo 230 kV bus, the Jefferson-Martin project would require less load shedding than would a second San Mateo–Martin cable. The Jefferson-Martin project would be able to supply about 410 MW more than the second San Mateo–Martin project.

Based on the bus outage study results, the ISO found that a Jefferson-Martin route would provide improvements in load shedding requirements as compared to a second San Mateo–Martin cable. In addition, the ISO found that the San Mateo–Martin Alternative did not provide a net reliability benefit because it still originated at the San Mateo Substation. This alternative does not connect Jefferson Substation to Martin Substation; therefore it would not satisfy the fourth project objective, which is to implement the ISO Board of Governors' April 2002 Resolution. Therefore, this alternative would meets only two of the four objectives of the Proposed Project.

Feasibility

The major feasibility concern related to this alternative is availability of adequate space within the city streets, given that the existing 230 kV transmission line is already located there and there are also other underground utilities. These utility conflicts are described in Section 4.3.4 above. As also demonstrated in that section, a modified route can be developed to avoid the most constricted areas.

The proposed new underground transmission line would need to be separated from PG&E's existing underground line by at least 10 feet (preferably 15 feet) in order to prevent the heat generated by each line from affecting the transmission capacity of the other line. There would also be concerns about physically damaging the other utilities during construction. A buffer of at least five feet between the proposed trench and the nearest other utility would be necessary.

According to City of San Bruno, Huntington Avenue in the area of the PG&E's existing 230 kV line is one of the area's most tightly packed utility corridors. Utilities in this portion of Huntington Avenue include a 23-inch storm drain, a 16-inch gas pipe, a water line, and a sewer line. These utilities are primarily on the west side of Huntington Boulevard. In addition, there are many other utilities that perpendicularly cross Huntington Avenue. There would be space constraint issues with the addition of another 230 kV line within the road, but it would be feasible. However, there are major space constraints in Linden Avenue and Bayshore/Airport Boulevard through the City of South San Francisco, as described above for the Modified Underground Existing 230 kV Collocation Alternative and new South San Francisco Segment in Section 4.3.4.

Lessen Significant Environmental Effects

This alternative would have the shortest overall transmission line route of those proposed, resulting in overall less extensive construction impacts. The alternative would be entirely underground and primarily be within existing roadways, eliminating environmental impacts to the SFPUC Watershed Lands and visual impacts of the overhead portion of the Proposed Project.

This alternative would also avoid all impacts to San Bruno Mountain. No visual impacts would be created because the route would be entirely underground. Impacts to schools affected by the Proposed Project would be avoided.

Potential New Impacts Created

As described in Section 4.3.4, construction through this crowded corridor would be disruptive; however these impacts would likely be less than significant with implementation of standard traffic control measures. Cultural resource impacts may be greater than for the Proposed Project, because areas nearer to the San Francisco Bay have greater sensitivity from past land uses. This alternative route would be located in an already-disturbed corridor so likelihood of encountering cultural resources is low, however, further studies would be necessary to determine if any cultural resources were present.

Figure Ap.1-19. San Mateo Substation to Martin Substation
For security reasons this figure is not included in the online version of the report.

Alternative Conclusion

ELIMINATED. While this alternative has the potential to eliminate many significant impacts of the Proposed Project, it does not meet two important project objectives: use of San Mateo Substation as its power source fails to diversify the electric system, and collocation with the existing 230 kV line would reduce overall reliability. A loss of the San Mateo bus would result in a loss of all 230 kV power into Martin Substation, whereas the Jefferson to Martin Substation route would diversify the 230 kV sources. Also, there are technical feasibility issues due to lack of space along Linden Avenue and portions of Airport Boulevard that would prevent the construction of an additional 230 kV line. Because of its inability to meet key project objectives, and because of technical feasibility, this alternative has been eliminated from EIR analysis.

4.4.2 Moraga Substation to Potrero or Embarcadero Substations

Alternative Description

This "cross-bay" alternative was presented in the San Francisco Long-Term Electric Transmission Planning Technical Study, October 23, 2000 and is also being studied in the ongoing the San Francisco Peninsula Long-Term Transmission Planning Study, Phase 2 Study. This alternative would not enter San Mateo County and would instead be located in Alameda County and in the City and County of San Francisco, as described below.

Moraga-Potrero 230 kV Transmission Line

An approximately 20-mile kV circuit would be constructed connecting the Moraga and Potrero Substations. Figure Ap.1-20 illustrates the route. The route would utilize an existing transmission corridor from Moraga Substation to Claremont Substation and would then for the most part utilize a common corridor from the Claremont Substation, through Oakland, to the east side of the San Francisco Bay. Initiating from Moraga Substation in the City of Orinda in Contra Costa County the line would travel northwest for approximately 1.3 miles before crossing Brookside Road and turning west. The overhead line would continue for approximately 1.0 mile before entering unincorporated Contra Costa County for 0.3 miles and Robert Sibley Volcanic Regional Preserve, part of the East Bay Regional Park District (EBRPD) for 0.9 miles. At the western border of the preserve, the line would enter the City of Oakland in Alameda County. The line would continue overhead for approximately 1.2 miles through the City of Oakland and adjacent to residences on Broadway Terrace to Claremont Substation, which is located southwest of the intersection of Highway 13 and Highway 24, and would transition underground.

From Claremont Substation the underground line would follow Broadway, a frontage road to Highway 24 for approximately 1.6 miles until its intersection with Forest Street in the Rockridge neighborhood of the City of Oakland. At this point PG&E suggested that the existing transmission line route would continue southwest down Shafter Avenue, turn west onto 51st Street, then south onto West Street to its intersection with 40th Street.

To avoid impacts to narrow residential land uses along Shafter Street and to the Oakland Children's Hospital along 51st Street at Martin Luther King Jr. Way, EIR preparers modified this alternative at the corner of Forest Street and Shafter, where the route would turn west onto Forest Street for 0.2 miles, then southwest onto Claremont Avenue for 1.1 miles to the intersection of Telegraph Avenue. Forest Street is a two-lane residential road, however, BART ROW and a parking lot border the road to the north so the line could possibly be installed in the BART parking lot. Claremont Avenue has mostly

commercial land uses with some multi-family residences. The line would follow Telegraph Avenue, a busy four-lane commercial street, south for approximately 0.7 miles until rejoining the route defined by PG&E at its intersection with 40th Street. Traveling west on 40th Street (0.9 miles), a four-lane road with a median and residential land uses, the line would cross San Pablo Avenue then turn south on Emery Street (0.2 miles) to MacArthur Boulevard where it would bear southwest onto Peralta Street. The route would travel southwest on Peralta for 1.9 miles before turning west onto 7th Street (2.6 miles) to the eastern edge of the San Francisco Bay.

There are four options for bringing the transmission line across the San Francisco Bay: (a) run the cable through the BART service tunnel (between the two tunnels for the eastbound and westbound trains); (b) hang the cables from the Bay Bridge (new bridge in east half; existing bridge in west half); (c) lay a new submarine cable; or (d) use a combination of hanging on the Bay Bridge and a submarine cable.

Within the CCSF after the Bay crossing south of I-80, the route would travel 3.3 miles south along The Embarcadero, turn west onto King Street, then southwest onto 3rd Street. The route would turn south onto Illinois Street and follow it to the corner of 23rd Street in CCSF. Potrero Substation is located at 23rd Street and Illinois Street and is an outdoor 115 kV transmission substation that has property available for substation facilities expansion. It interconnects the existing Potrero Power Plant to the 115 kV transmission system. Land use within the CCSF would be primarily industrial and commercial.

Moraga-Embarcadero 230 kV Transmission Line

This alternative is similar to the Moraga-Potrero alternative described above, except it would be terminated at the Embarcadero Substation in CCSF, rather than at the Potrero Substation. The Embarcadero Substation is located at First and Folsom Streets. This option is also being considered in the Phase 2 Study. Embarcadero Substation is an indoor 230 kV distribution substation. Two 230 kV underground cables from Martin Substation presently supply Embarcadero Substation.

Consideration of CEQA Criteria

Project Objectives

The alternatives would provide a different transmission source to the city than San Mateo Substation, consistent with the third objective of the Proposed Project. The ISO study group did find reliability benefits in providing a different transmission supply source other than San Mateo substation for this area. As stated above, one of the objectives of the Jefferson-Martin Project is to further increase reliability in the San Francisco and north of San Mateo County area by providing a second independent major transmission line pathway into the area. Inherently, having a second independent pathway separate from the existing San Mateo to Martin corridor would increase diversity of supply and increase transmission reliability. However, because this alternative does not connect Jefferson Substation to Martin Substation, it does not satisfy the fourth project objective, which is to implement the ISO Board of Governors' April 2002 Resolution. Therefore, this alternative meets three of the four stated objectives of the Proposed Project.

Feasibility

Embarcadero Substation

Addition of a 230 kV line at the Embarcadero Substation from a new source such as Moraga Substation would require converting the Embarcadero 230 kV bus to a transmission bus configuration with all facilities electrically connected on the 230 kV side. Several 230 kV breakers and switches would be

Figure Ap.1-20. Moraga and Sobrante Substations to Potrero Substation
For security reasons this figure is not included in the online version of the report.

needed. Space is extremely limited and not available for the amount of equipment needed for such a conversion. PG&E has stated that it is not technically feasible to add another 230 kV line to the Embarcadero Substation, since it is an indoor substation with no room to expand (PG&E, March 28, 2003 letter). Therefore, the Embarcadero Substation alternative is eliminated, and this analysis focuses on a Potrero Substation termination point, which has property available for substation facility expansion according to PG&E.

San Francisco Bay Crossing

There are engineering, maintenance, and timeline feasibility concerns related to installing a transmission cable across the San Francisco Bay, as discussed in the three sections below.

Submarine Cable Crossing

Clean Water Act Permitting – U.S. Army Corps of Engineers. Clean Water Act Section 10 and 404 permits from the U.S. Army Corps of Engineers (USACE) would be required in order to lay marine cable across the San Francisco Bay. Nationwide Permit 12 under the Clean Water Act for standard utility line activity could also apply if general conditions are met. This USACE permit would be simpler than receiving the individual Section 10 and 404 permits. While there are several potential environmental and design concerns regarding the permitting, the USACE has stated that a bay crossing would be feasible according to its regulations (USACE, 2003). The biggest concerns are the potential for impedance of navigation and/or dredging and the potential impacts to sensitive eelgrass habitat at the bay margins. The Port of Oakland is in the process of analyzing its future operation, which may involve allowing shipments from Pacific Rim ships, which have a deeper draft than the present ships. This allowance would involve deeper (minimum of 50 feet) and/or more frequent dredging of the federally maintained shipping channel beneath the Bay Bridge. A transmission cable would have to be deep enough not to affect this dredging.

McAteer-Petris Act Permitting – Bay Conservation and Development Commission (BCDC). An electric cable installed across the San Francisco Bay would require a permit from the BCDC. Because the Proposed Project from Jefferson to Martin Substations is a feasible upland alternative that would avoid a bay crossing, there are regulatory feasibility constraints associated with the BCDC under the McAteer-Petris Act and the *San Francisco Bay Plan* that greatly question the ability to acquire project approval in a reasonable period of time within the project objective timeframe (BCDC, 2003). The BCDC's authority is the McAteer-Petris Act. According to the McAteer-Petris Act, installation of a submarine cable would be considered as "fill" within the Bay. Section 66605 of that Act mentioned above states that the BCDC cannot approve a project that requires bay fill unless there are no feasible upland alternatives. While the BCDC can override this provision if a project has public benefit that is found to outweigh the impacts of the project, the BCDC has recently been unwilling to approve overrides in similar situations. An example of a similar situation is the proposed Potrero Power Plant Unit 4, which requires construction of a new cooling water outfall into the Bay. While the California Energy Commission has not yet completed its CEQA review of the Potrero facility, the BCDC has finished its review process. The BCDC did not approve this project, finding that there were feasible upland alternatives (dry cooling or hybrid cooling) that would not require bay fill. The BCDC's findings and declarations for this alternative would be based on the McAteer-Petris Act, the *San Francisco Bay Plan* (Bay Plan), their federally-approved management plan for the San Francisco Bay, and the federal Coastal Zone Management Act (CZMA). The following discussion is taken from "Staff Recommendation on the Commission's Report to the California Energy Commission on the Potrero Power Plant Expansion" (2001), and addresses issues that would also apply to permitting of a submarine cable.

Section 66605 of the McAteer-Petris Act identifies criteria that must be satisfied before the BCDC can approve submarine cable construction in the Bay. BCDC's implementing laws, policies and requirements state that for a permit the applicant must show that there are no feasible upland alternatives to the route and/or available technologies that could feasibly be implemented. The BCDC also requires information on the potential adverse environmental impacts of alternative technologies before it can determine whether the use of such technologies is feasible and available as required under the McAteer-Petris Act. Section 66605 of the McAteer-Petris Act states, in part, that: (1) the project can be authorized only when public benefits of the fill exceed the public detriment; (2) the project can be authorized only when no alternative upland location exists for such purposes; (4) the disturbed area should be the minimum necessary to achieve the purpose of the project; and (5) the nature, location and extent of construction should be such that it will minimize harmful effects to the Bay Area, such as, the reduction or impairment of the volume surface area or circulation of water, water quality, fertility of marshes or fish or wildlife resources, or other conditions impacting the environment, as defined in Section 21060.5 of the Public Resources Code…". Section 21060.5 of the Public Resources Code defines environment as "the physical conditions which exist within the area which will be affected by a Proposed Project, including land, air, water, minerals, flora, fauna, noise, objects of historic or aesthetic significance."

Section 66602 of the McAteer-Petris Act states, in part, that: ". . . existing public access to the shoreline and waters of the San Francisco Bay is inadequate and that maximum feasible public access, consistent with a Proposed Project, should be provided." Section 66632 states, in part, that "[w]hen considering whether a project provides maximum feasible public access in areas of sensitive habitat, including tidal marshlands and mudflats, the Commission shall, after consultation with the Department of Fish and Game, and using the best available scientific evidence, determine whether the access is compatible with wildlife protection in the Bay." The *San Francisco Bay Plan* policies on public access further state that ". . . maximum feasible public access should be provided in and through every new development in the Bay or on the shoreline . . . the access should be permanently guaranteed . . . should be consistent with the physical environment . . . provide for the public's safety and convenience . . . and be built to encourage diverse Bay related activities and movement to and along the shoreline." In evaluating a project's proposed public access, the Commission relies on the San Francisco Bay Plan policies to determine whether the project includes maximum feasible public access consistent with the project. In assessing whether public access requirements should be included as a condition of a permit, the Commission is guided, in part, by the decisions contained in Nollan et. ux. v. California Coastal Commission and Dolan et. ux. v. City of Tigard. In these decisions, the U.S. Supreme Court held that a public agency must show a nexus, or essential connection, between a permit condition and the public burden created by a private development project and that the condition must be roughly proportional to the burden.

The *San Francisco Bay Plan* policies on Appearance, Design, and Scenic Views state that, "[t]o enhance the visual quality of development around the Bay and to take maximum advantage of the attractive setting it provides, the shores of the Bay should be developed in accordance with the Public Access Design Guidelines . . . . All bayfront development should be designed to enhance the pleasure of the user or viewer of the Bay and maximum efforts should be made to provide, enhance, or preserve views of the Bay and shoreline, especially from public areas, from the Bay itself, and from the opposite shore" (Policies 1 and 2).

Section 66605(a) and (d) of the McAteer-Petris Act, cited above, provides the Commission authority to require mitigation for loss of surface water area and water volume and other adverse impacts to the Bay bottom habitat. The *Bay Plan* policies on mitigation state, in part, that "[m]itigation should consist of measures to compensate for the adverse impacts of the fill to the natural resources of the Bay . . . [and

should provide] area and enhancement resulting in characteristics and values similar to . . . [those] . . . adversely affected . . . [and should be provided] at the fill site, or if the Commission determines that on-site mitigation is not feasible, as close as possible . . . and provided concurrently with those parts of the project causing adverse impacts . . . ."

BCDC Required Mitigation for Bay Impacts. Assuming BCDC would permit the project, the BCDC noted that a project such as installation of a submarine cable would require that PG&E provide mitigation for Bay impacts. Mitigation acceptable to BCDC includes purchase of bayshore land or facilities and removal of obsolete structures (e.g., abandoned piers or unused shoreline industrial facilities) — these options are very expensive. The Commission maintains that the project should have a component that mitigates for adverse impacts. The Department of Fish and Game, NMFS, and BCDC staff agree that mitigation for the adverse impacts should address the identified impacts directly. The mitigation should increase production to offset "takes" for each species that is adversely affected and the mitigation plan must account for the success rates of similar mitigation projects so that the end result is a minimum 1:1 ratio. To achieve this, the mitigation proposed should cite similar mitigation projects. In some cases it may be appropriate to contribute to existing mitigation projects as a part of a mitigation package. However, a single contribution toward a general fund should be discouraged, because it does not usually provide a direct benefit to the Bay.

For instance, for the Potrero Power Plant proposed once-through cooling application, the Applicant arranged with the Port of San Francisco to pay for a portion of removing the derelict Pier 5 in the Pier 70 vicinity. The Port estimates that the cost of removing the pier would be $500,000 to $750,000 and the applicant has proposed to BCDC to pay up to $300,000 toward the cost. Mitigation for other adverse impacts associated with the intake and discharge structures has not been proposed, in part because the impacts have not been fully identified by the applicant and the resource agencies at this time. The applicant is working through an agency working group to develop a mitigation proposal, or at a minimum to develop a process for determining appropriate mitigation (BCDC, 2002).

Bay Bridge Crossing – Caltrans

If the Bay Bridge were used to support the line, the crossing would require that Caltrans grant an exception to their longitudinal encroachment policy. It is unlikely that Caltrans would permit such a crossing, but not impossible (Caltrans, 2003). Currently, Caltrans is working on an "internal alternatives report" concerning an existing electric U.S. Navy submarine line that runs from the Oakland area to Treasure Island because it conflicts with the Bay Bridge Retrofit Project. One of the alternatives Caltrans is considering is placing the line on the bridge. The timeline and coordination with the Bay Bridge Retrofit Project could also conflict with this project. It would not be logical to place the transmission line on the existing bridge now, because this span will be removed when the eastern span replacement project (now under construction) is completed.

Installation of Cable within Existing BART Tunnel

Based on discussions with BART engineers and real estate managers, it would be technically possible to install a high voltage line in one of the BART tunnels, but there are serious BART concerns about loss of needed space in tunnels and safety concerns, especially related to heat dissipation due to the high heat of the transmission cables (BART, 2003b). In order for this alternative to be feasible, a BART permit for construction, and then a license agreement or lease for long-term use of the tunnel would be required. Because this alternative has never been formally proposed, detailed analysis has not been completed by BART. PG&E would have to submit a detailed design in order for BART to review it and make a formal determination of potential impacts to its operation. The approval decision would be

made in the BART Real Estate Department regarding use of BART property, but technical information regarding operational impact on BART of a transmission project would come from the Electrical and Mechanical Engineering division of BART.

There are a total of four tunnels under the Bay. Two are the train tunnels themselves, one for each direction. If PG&E were to formally propose use of the train tunnels, concerns would be (1) transmission cables may not fit in the tunnels with the trains, and (2) construction would be very disruptive to the BART system, requiring single-tracking through the tunnels for a long time during construction (BART, 2003c).

In addition to the train tunnels, there are two galleries next to the train tunnels that are used for maintenance purposes and for leased fiber optic lines. The lower gallery is the access point for the train tunnels in the event of an accident and is needed for passenger evacuation. Concerns about use of this gallery include: (1) the high voltage cables could not be located in an area where the heat generated by the cables could be easily dissipated, and (2) the gallery is only 10 feet tall so it would be difficult to locate the line in a place where it could be adequately shielded from potential contact with people (would need to eliminate "step and touch" potential). In addition, since some of the space in this gallery is currently used, BART would like to retain other space for its future use (BART, 2003c).

Given the concerns about the train tunnels and the lower gallery, only the upper gallery is left as potential option for a 230 kV transmission line. This gallery is where the leased fiber optic lines are located and is the most logical location for the PG&E cable. However, the upper gallery is also where smoke from a fire in the tube would be extracted to and vented from. Smoke from a major fire can be very hot (about 350°C). This type of heat would destroy a high voltage cable. If there were a fire and the cable was destroyed, it would take up to two years to replace it and the cost would be high.

The most serious safety concern relates to the fact that the transmission lines would have to enter and leave the BART tunnel by way of the vent structures at each end of the tunnel (on the CCSF side this is at the World Trade building behind the Ferry Building) (BART, 2003a and 2003c). These vents also serve as the emergency exits from the tunnel in the event of an accident. They each have 100-foot staircases leading from the tunnels to the surface and the high voltage cables would have to be run in the same area as the stairs, creating a safety concern given proximity of people to the cables.

BART personnel concluded that a transmission line installation in BART tunnels or galleries would present unacceptable safety and engineering risk (BART, 2003c).

Conclusion – Feasibility

The Moraga-Potrero Alternative would be regulatorily infeasible due to the likely inability to obtain permission to construct from BCDC, Caltrans, or BART (the three potential crossing methodologies) within a reasonable period of time.

Lessen Significant Environmental Effects

Because this route is located in Contra Costa County, Alameda County, and the CCSF, there would be no project impacts to San Mateo County. No construction would occur on Watershed Lands, avoiding visual and biological resources impacts, and underground construction through San Mateo County Cities of San Bruno, South San Francisco, Colma, and Daly City would be eliminated. The route is also shorter than the Proposed Project route (20 miles as compared to 25 miles for the proposed route), which would reduce the physical length of construction impacts, but not construction time since the bay

crossing may take a substantial length of time (even if permission were finally obtained). The Proposed Project route would have significant visual and EMF impacts, whereas the overhead portion of this route has almost no residential exposure and less recreational use, thereby reducing those impacts. This alternative would have 4.4 miles of open space as opposed to 9.6 miles with the overhead portion of the Proposed Project. With less open space, impacts to biological resources would also be reduced.

Potential New Impacts Created

This alternative would require construction of 4.7 miles of overhead transmission line through the City of Orinda and East Bay Hills (open space east of Oakland where a wide range of wildlife species and special status plants would be affected). The route would pass through Robert Sibley Volcanic Regional Preserve, one of the EBRPD's original parks, for approximately 0.9 miles. Sibley Volcanic Preserve's main entrance is on Skyline Boulevard just east of the intersection with Grizzly Peak Boulevard in the Oakland hills.

Round Top, a peak within Sibley preserve approximately 0.5 miles south of the transmission line route is one of the highest peaks in the Oakland hills and provides an unsurpassed outdoor laboratory for the study of volcanism in the Central Coast Ranges. Volcanic dikes, mudflows, lava flows, and other evidence of the extinct volcanoes are visible throughout the park's 660 acres. There are also vistas of Mt. Diablo and the hills of Las Trampas, and beautiful displays of wildflowers in season. This alternative would pass through the park, widening the existing ROW, which already contains three transmission lines so incremental additional impacts would be created. The route would also cross a Bay Area Ridge Trail within the EBRPD. Large towers and transmission lines could biologically, geologically, recreationally, and visually affect this important preserve area. There may be public concerns about upgrading the existing 115 kV corridor to a 230 kV corridor, but the residential areas affected by this route would be much less than the proposed route.

One segment of the overhead line would pass adjacent to residences: on Broadway Terrace in the City of Oakland for approximately 0.2 miles. The line would transition to underground at PG&E's existing Claremont Substation. South of the Claremont Substation, there would be an additional 9.2 miles of underground construction in Oakland, passing through industrial, commercial, and some residential areas. The underground construction through Oakland would have very similar types of impacts to those of the Proposed Project's underground segment. However, approximately 8.6 miles of the Oakland underground route are through industrial and commercial land uses, with approximately 0.6 miles in residential areas on Peralta Street, Claremont Avenue, and Forest Street. The Proposed Project would travel underground through approximately 3.6 miles of land designated as residential use over the course of 12.4 miles to Martin Substation.

While there are several options for crossing the Bay, the specific technology of the bay crossing has not been defined. There would be marine impacts resulting from installation of a submarine cable. There is also reliability risk to submarine cables from ship anchors and dredging activities, so the line would have to be buried well below dredging depths, which would make maintenance more difficult. Beyond navigation and dredging concerns of the USACE, there would be biological concerns with construction impacts to essential fish habitat. Most of the route of the proposed transmission line is in an area that is regularly disturbed by dredging so marine impacts in that area are not of major concern, but at both the east and west Bay margins, there could be significant biological effects, especially in areas of eel grass. There could also be cultural resources issues associated with shipwrecks and the closer proximity to the Bay increases chance of significant resources. Use of the BART tunnel for a bay crossing would not affect the resources of the San Francisco Bay.

The construction of an underground 230 kV cable from the bay landing, through the CCSF (along the Embarcadero, Third Street, and Illinois Street) would also have traffic impacts similar to those of the underground segment through Daly City and Brisbane. This route segment along the Embarcadero passes Pacific Bell Park (which is used for SF Giants baseball games and other events), and the Third Street corridor is undergoing major construction associated with the Mission Bay development, so coordination with those activities would be required.

Alternative Conclusion

ELIMINATED. While this alternative meets most project objectives, each of the bay crossing options would be infeasible. The impacts of this route would be similar in type to those of the Proposed Project, though the Moraga-Potrero route would affect less commercial land, less open space, and less residential areas. There would be approximately 4.7 miles of overhead transmission line with this alternative, as opposed to 14.7 miles with the Proposed Project. Underground construction would be for approximately 15.3 miles, compared to the 12.4 miles with the proposed route. Traversing overhead through Sibley Volcanic Preserve and underground through the densely populated City of Oakland would also create both short-term construction impacts and similar long-term EMF concerns as the Proposed Project.

Due to engineering issues and permitting constraints with the BCDC under the McAteer-Petris Act and the San Francisco Bay Plan, a submarine crossing would not be feasible or could not be permitted within a reasonable period of time. If the Bay Bridge were used to support the line, the crossing would require that Caltrans grant an exception to their longitudinal encroachment policy, which is very unlikely. The timeline and coordination with the Bay Bridge Retrofit Project could also conflict with this project. If the transmission line is placed on the existing bridge now, there will be problems when the eastern span replacement project (now under construction) is completed in the future. The BART tunnel Bay-crossing option would also be considered infeasible. Even if one of the crossing options were eventually technically and regulatorily possible, the permitting and construction timelines of all three options would be very difficult to meet the project objective of being online in 2005-2006. Therefore, this alternative was eliminated from full analysis in this EIR.

4.4.3 Sobrante Substation to Potrero Substation

Alternative Description

Similar to the Moraga Alternatives, these options are under consideration in the San Francisco Peninsula Long-Term Transmission Planning Study, Phase 2. As explained in Section 4.4.2, the Embarcadero Substation would be infeasible for addition of another 230 kV line.

The Sobrante Substation is located east of Bear Creek Road and south of the Briones Dam in the City of Orinda in Contra Costa County, about 4.6 miles north-northwest of the Moraga Substation (Section 4.4.2). The line would travel south from the Sobrante Substation for approximately 3.3 miles and would join the Moraga line just north of Brookside Road in the City of Orinda. From that point the route would turn west and would be identical to the Moraga alternatives. The route is also shown in Figure Ap.1-20.

Consideration of CEQA Criteria

Project Objectives

The Sobrante alternatives would satisfy the Proposed Project's reliability objectives and would be a different source than San Mateo Substation solving the "all the eggs in one basket" problem. Similar to the Moraga alternatives in Section 4.4.2 above, this alternative meets three of the four stated objectives of the Proposed Project.

Feasibility

The feasibility concerns related to this alternative are the same as those for Moraga alternatives (Section 4.4.2). The Embarcadero Substation would be unable to accept another 230 kV line, so the Potrero Substation is the only termination point that could be considered.

Lessen Significant Environmental Effects

Because this route is located entirely within Contra Costa County, Alameda County, and the CCSF, all impacts of the Proposed Project to San Mateo County would be eliminated, as described in Section 4.4.2 above.

Potential New Impacts Created

Impacts would be the same as those described in Section 4.4.2 above, except that the overhead route between the Sobrante Substation and Claremont would be slightly different. General impacts would be similar, since both routes would be within East Bay open space, with potential impacts to biological and visual resources and recreation.

Alternative Conclusion

ELIMINATED. While this alternative meets most project objectives, the Bay crossing would be infeasible, as described in Section 4.4.2. The impacts of this route would be similar in type to those of the Proposed Project, though the Sobrante-Potrero route would affect less commercial land, less open space, and less residential areas. Traversing overhead through Sibley Volcanic Preserve and through the densely populated City of Oakland would also create both short-term construction impacts and similar long-term EMF concerns as the Proposed Project. Therefore, due to the infeasibility of the Bay crossing, this alternative was eliminated from full analysis in this EIR.

4.4.4 Jefferson Substation to Various San Francisco Substations

Alternative Description

This alternative includes potential termination points at Hunters Point Substation, Potrero Substation, Embarcadero Substation, Bayshore Substation, and Mission Substation (illustrated in Figure Ap.1-21). Therefore, while this alternative would still begin at the Jefferson Substation (utilizing the Proposed Project route or any of the alternatives defined in Sections 4.2, 4.3, or 4.4), this alternative would not terminate at the Martin Substations. This alternative was presented in the San Francisco Long-Term Electric Transmission Planning Technical Study, October 24, 2000. The routes considered in this section would travel north through San Mateo County and would terminate in the City and County of San Francisco.

Jefferson-Hunters Point or Potrero 230 kV Transmission Line

This option is similar to the proposed Jefferson-Martin route, except the new 31-mile 230 kV circuit would end at the Hunters Point Substation (or 33-mile circuit to Potrero Substation). Along with a 230 kV line to Potrero or Hunters Point switchyards, a 230/115 kV transformer would need to be installed at either substation to deliver power from the 230 kV line to the 115 kV system. This would increase the amount of power the existing 115 kV cable system would have to deliver from Potrero or Hunters Point. This increased power delivery may require that the capability of the 115 kV cable system be increased by installing additional 115 kV cables. Potrero Substation is an outdoor 115 kV transmission substation that has property available for substation facilities expansion. It interconnects the existing Potrero Power Plant to the 115 kV transmission system. Hunters Point Substation switchyard is an outdoor 115 kV transmission substation that has property available for substation facilities expansion. It interconnects the existing Hunters Point Power Plant to the 115 kV transmission system. This option is projected to cost approximately $140 million (CAISO, 2000).

Jefferson-Embarcadero 230 kV Transmission Line

While termination at the Embarcadero Substation was considered in previous ISO studies, PG&E states that there is inadequate space available at this location so termination at Embarcadero will not be considered in the Phase 2 study (PG&E, 2003b). Therefore, this option is considered to be infeasible and is not further discussed below.

Jefferson-Mission 230 kV Transmission Line

Mission Substation, located at Mission Street and 8th/9th Streets in CCSF, is an indoor 115 kV distribution substation and was not designed to be a 230/115 kV substation. There are no 230 kV facilities at Mission substation. The 115 kV bus is in a ring bus configuration. Space is extremely limited at Mission substation. There is physically no room to install a 230/15 kV transformer and associated 230 kV and 115 kV breakers, buses, and switches (PG&E, 2003b).

Jefferson-Bayshore 230 kV Transmission Line

Bayshore Substation is a small outdoor 115 kV distribution substation that supplies the Bay Area Rapid Transit System (BART). There are two 115/12 kV transformers located at the substation. There are no 230 kV facilities located at the substation. Converting this distribution substation to a transmission substation would require installing a 230/115kV transformer, several 230 kV and 115 kV breakers and associated buses and switches. Space is very limited at Bayshore substation, and space is not available to install this conversion (PG&E, 2003b).

Consideration of CEQA Criteria

Project Objectives

As stated earlier, one of the objectives of the Jefferson to Martin Project is to further increase reliability in the San Francisco and north of San Mateo County area by providing a second independent major transmission line pathway into the area. Inherently, having a second independent pathway separate from the existing San Mateo to Martin corridor would increase diversity of supply and increase transmission reliability. However, because this alternative does not connect Jefferson Substation to Martin Substation, it does not satisfy the fourth objective, which is to implement the ISO Board of Governors' April 2002 Resolution. Therefore, this alternative meets three of the four stated objectives of the Proposed Project.

Figure Ap.1-21. Martin Substation to Vraious San Francisco Substations
For security reasons this figure is not included in the online version of the report.

Feasibility

In general, an alternative to Hunters Point or Potrero Substations appears to be feasible. However, there are upgrade and space constraint feasibility issues at Mission, Embarcadero, and Bayshore Substations which would preclude the upgrades needed for the Proposed Project.

Lessen Significant Environmental Effects

These alternatives would all require installation of the complete Proposed Project and then up to 4 miles of additional transmission line. No impacts of the Proposed Project would be reduced; in fact, the impacts of the alternative options would all be greater than those of the Proposed Project.

Potential New Impacts Created

The Potrero and Hunters Point options would require construction within city streets between the Martin Substation and the two CCSF substations. Neighborhoods between these sites are densely populated and traffic is heavy. Short-term construction impacts (noise, dust, equipment emissions) would result, as well as long-term concerns about EMF effects.

Alternative Conclusion

ELIMINATED. All of these alternatives meet most of the project objectives. Only Jefferson to Potrero/Hunters Point is feasible. Mission, Embarcadero, and Bayshore substations are infeasible due to space constraints. None of alternative substations analyzed in this alternative reduce or avoid significant impacts of the Proposed Project, but rather there is increased construction disturbance due to the greater length of these routes. Therefore, this alternative was eliminated from further analysis.

4.5 Non-Wires Alternatives

Sections 4.2 through 4.4 of this Appendix consider various transmission line route alternatives. Non-wires alternatives are those that do not involve major new transmission lines. Renewable energy and fossil fuel generation, if they can be produced near the location it is used, are potential non-wires alternatives. In addition, demand-side management (conservation) and distributed generation can reduce the need for the Proposed Project. These alternatives are considered in this section.

4.5.1 New Generation Alternatives

In accordance with the alternative screening criteria discussed in Section 2.3, generation alternatives are evaluated for their ability to meet CEQA requirements. Each alternative that has been suggested or developed for this project has been evaluated to determine whether it meets most of the project objectives, is feasible, and whether it avoids or substantially lessens any significant effects of the Proposed Project (including consideration of whether the alternative itself could create significant effects potentially greater than those of the Proposed Project). Two alternatives are considered in this section: the proposed Potrero Power Plant Unit 7 (now under consideration by the CEC), and the Williams turbines that have been made available to the CCSF.

4.5.1.1 Potrero Power Plant Unit 7, San Francisco

Alternative Description

Mirant proposes to construct and operate the Potrero Power Plant Unit 7 Project as an expansion to its existing Potrero Power Plant that is located on the eastern shore of the City and County of San Francisco. Mirant filed an Application for Certification (AFC) on May 31, 2000 for a proposed Potrero project which would be a nominal 540 MW natural gas-fired, combined cycle power generating facility. In its original application, Mirant proposed to use water from San Francisco Bay for circulating cooling purposes at the rate of 158,000 gallons per minute (228 million gallons per day). Interconnection with the state's high voltage transmission system would be through a proposed new Potrero Power Plant Switchyard, located onsite, and to two existing PG&E substations. These would be a direct interconnection to PG&E's Potrero Substation adjacent to the Potrero Power Plant, and a separate underground interconnection to the Hunters Point Substation located approximately 1.8 miles to the south of the Potrero Power Plant site.

CEC staff filed its Final Staff Assessment (FSA) for the project on February 11, 2002 and recommended that the Energy Commission license the Potrero Power Plant Unit 7 Project with mitigation, including replacement of the proposed once-through cooling system with an alternative cooling system and air quality mitigation to reduce local diesel emissions from buses and trucks. The CEC staff's proposed mitigation measures are needed to reduce or avoid local and regional air quality impacts, aquatic biological impacts, thermal impacts to San Francisco Bay, and impacts to historical structures at the Potrero Power Plant site. Two cooling options that CEC staff recommended were: a hybrid cooling system that would use reclaimed water and cooling towers, and a dry cooling system that could cool power plant exhaust without use of substantial quantities of water. The FSA identifies significant impacts that would result if Mirant continues with its current proposal to use a once-through power plant cooling system that utilizes water from San Francisco Bay. In response, in July 2003, Mirant is expected to file an AFC amendment that will analyze the use of recycled-water cooling systems and proposes use of hybrid cooling, eliminating the previously proposed once-through cooling system.

In addition to concerns about the effect of Potrero Unit 7 on aquatic resources, there are public concerns about public health, safety, and environmental justice due to visual impacts, emissions, and noise from operation of the power plant in an area of disproportionate minority population.

Consideration of CEQA Criteria

Project Objectives

There are significant reliability benefits from adding in-City generation, thus Potrero Unit 7 would clearly meet PG&E's reliability objective. However, because this alternative does not connect Jefferson Substation to Martin Substation, it does not satisfy the fourth project objective, which is to implement the ISO Board of Governors' April 2002 Resolution. The most significant concern though, is that because Potrero has not been approved, and construction after approval would take at least two years, this alternative could not meet the objective of meeting electric demand by September 2005 or summer 2006. A previously proposed San Francisco power plant, the San Francisco Energy Center, was approved by the CEC in the mid-1990s but the CCSF denied required permits.

A related concern is that if Potrero Unit 7 were constructed and the addition of this plant were used as a means to retire the Hunters Point Power Plant, then the incremental benefit to the SF Peninsula would be reduced to about 200 MW. This could potentially defer (but not eliminate) the need for the external

230 kV upgrade, but it would perpetuate the need for an Reliability-Must-Run (RMR) contract (or similar mechanism) which could be more costly over the long run than the Proposed Project. In general, there is no process to ensure either that Potrero Unit 7 will, in fact, be constructed, or that it will be operational within a certain timeframe. Even if such a facility were constructed and operational within the timeframe of immediate need, the new facility would merely defer, not eliminate, the need for additional transmission capacity in the project area. Therefore, this alternative only meets the reliability and diversity objectives of the Proposed Project.

Feasibility

Construction of a combined cycle power plant at Potrero is a feasible technology. However, there are regulatory feasibility constraints to project approval. The project needs the approval of the CCSF (Port of San Francisco) to cross Port property, and the CCSF has significant concerns about environmental impacts in the City and the use of once-through cooling. In addition, the BCDC has recommended disapproval of the permit because of impacts to the Bay from the intake and outfall pipes. If hybrid or dry cooling technologies (both found to be feasible in the CEC's FSA) were adopted by Mirant, these feasibility constraints may be resolved, but project approval will not likely be obtained within a reasonable period of time to meet the project objective timeframe.

Lessen Significant Environmental Effects

The construction and operation of Potrero Unit 7 would eliminate impacts from construction and operation of the proposed transmission line that would occur with the Proposed Project.

Potential New Impacts Created

Impacts typically associated with fossil fuel electric generation plants include increased air emissions, increased noise levels, traffic congestion, and the potential for releases of hazardous substances. Sulfur dioxides, unburned hydrocarbons, NOx, CO, and particulates emitted by the gas turbines cause air quality impacts. Noise impacts are caused by the air intakes, gas turbine-generators, turbine exhausts, and cooling towers. Visual impacts vary depending on the plant structures, exhaust stacks, cooling towers, steam plume, fuel, and electric facilities to be used at the plant. Hazardous substance impacts can result from aqueous ammonia used with the selective catalytic reduction system to reduce nitric oxide emissions. Plant personnel entering and leaving the plant at peak traffic times can cause potential traffic impacts. Therefore, new air quality, noise, traffic, and visual impacts would be created near residential and industrial neighborhoods.

Alternative Conclusion

ELIMINATED. The Potrero Unit 7 Project is technically feasible, and meets some project objectives, especially by providing increased system reliability. However, regulatory feasibility is questionable given that the project has not yet been approved and there is no assurance that it will be approved, so construction of the plant before 2006 is unlikely. In addition, a power plant creates substantial environmental impacts, and while these impacts would occur in a different location from those of the Proposed Project, they may be greater overall in the San Francisco area due to the operational air emissions.

4.5.1.2 Williams Energy Company Settlement

Alternative Description

Under an agreement approved by San Francisco supervisors at their last meeting of 2002, the CCSF is scheduled to receive four LM6000 turbines to increase energy reliability and encourage the planned phase-out of the power plant at Hunters Point. The turbines are part of a $417 million deal that the Okalahoma-based Williams Energy Company (Williams) negotiated with the state to reduce prices for electricity in long-term contracts and pay for a variety of local costs. CCSF is expected to receive $19 million to assist with siting the small turbines.

The City expects to file an Application for Certification with the California Energy Commission (CEC), the CEQA lead agency, by the end of 2003 and will select an Engineer, Procure and Construct contractor in 2004 (CCSF, 2003). At this time, the City expects that if a CEC license and all other required permits are obtained in 2003, and the power plant(s) could achieve commercial operation in 2005. However, the City notes that this is a very preliminary schedule. CCSF is evaluating potential sites within the City at which it may build a power plant or plants. At this time, the City has not identified final sites for the turbines and it does not have control of potential sites (site control is required for CEC application submittal).

Consideration of CEQA Criteria

Project Objectives

As with the Potrero Unit 7 Project, there is no assurance that the turbines will, in fact, be constructed, or that they will be operational within a certain timeframe. Even if such a facility were constructed and operational within the timeframe of the Jefferson-Martin Project objectives, the new generation would merely defer, not eliminate, the need for additional transmission capacity in the project area. There are clear reliability benefits in providing a local source of power generation for San Francisco. However, this alternative would only serve CCSF and the uncertainty associated with the timeframe of construction could fail to achieve the objective of meeting electric demand by September 2005 or summer 2006. In addition, because this alternative does not connect Jefferson Substation to Martin Substation, it does not satisfy the fourth project objective, which is to implement the ISO Board of Governors' April 2002 Resolution. Therefore, this alternative meets two of the four Project objectives.

Feasibility

City planners with the Department of the Environment have noted that finding an acceptable location of turbine generators could pose a problem, since such industrial operations are not generally popular with neighbors and there are severe land constraints within the CCSF. The current schedule calls for the location decision to be made by the end of 2003; if an appropriate site(s) cannot be identified, this alternative may be infeasible. Even if sites are found, the facilities would still require CEC approval which could be granted only after a year-long proceeding, providing many opportunities for public involvement. It cannot be assumed at this time that the application will be filed and approved.

Lessen Significant Environmental Effects

Similar to Potrero Unit 7, the installation of generation would eliminate impacts from construction and operation of the 25-mile transmission line.

Potential New Impacts Created

Impacts typically associated with fossil fuel electric generation plants include increased air emissions, increased noise levels, traffic congestion, and the potential for releases of hazardous substances. Sulfur dioxides, unburned hydrocarbons, NOx, CO, and particulates emitted by the gas turbines cause air quality impacts. Noise impacts are caused by the air intakes, gas turbine-generators, turbine exhausts, and cooling towers. Visual impacts vary depending on the plant structures, exhaust stacks, cooling towers, steam plume, fuel, and electric facilities to be used at the plant. Hazardous substance impacts can result from aqueous ammonia used with the selective catalytic reduction system to reduce nitric oxide emissions. Plant personnel entering and leaving the plant at peak traffic times can cause potential traffic impacts. Therefore, new air quality, noise, traffic, and visual impacts would be created near narrow residential neighborhoods within CCSF.

Alternative Conclusion

ELIMINATED. Siting of the Williams turbines may present regulatory feasibility difficulties, and because the turbines would have to be evaluated through the CEC's CEQA process, it cannot be known whether they could be permitted. It would therefore be speculative to consider that the development of new local power plants is a viable alternative to the Proposed Project. Depending upon the pace of load growth and when older generating facilities (e.g., Hunters Point or Potrero Unit 3) are retired, the construction of the Williams Settlement's proposed turbines may only replace existing generation (not solving the reliability needs of the area) or they may postpone the need for increased transmission capacity only for a short period of time. Because the Williams Energy Company Settlement alternative meets only two of the basic project objectives and may not be feasible, it was rejected from further evaluation.

4.5.2 Renewable Resource Alternatives

Conscious efforts are being made to increase the renewable resource component of California's generation supply. As of 2001, about 54 percent of California's in-state generation was from oil, gas, and coal plants and 38 percent from hydroelectric, wind, waste-to-energy, geothermal, and solar plants. This section considers the principal renewable electricity generation technologies that could serve as alternatives to the Proposed Project. These technologies are wind, solar, and tidal energy. Geothermal energy and biomass generation are not considered here because there are no geothermal resources in the San Francisco Bay Area and there is no source of fuel (usually agricultural waste) for biomass facilities. The technologies could be attractive from an environmental perspective because of the absence or reduced level of air pollutant emissions. However, these technologies also have environmental consequences, feasibility problems, and they may not meet the objectives of this Proposed Project.

Renewable Portfolio Standard Program. The CPUC, in collaboration with the California Energy Commission (CEC), has initiated a proceeding to implement the State's Renewable Portfolio Standard Program as mandated by Senate Bill 1078 (SB 1078, Sher, Chapter 516, Statutes of 2002) under Public Utilities Code sections 381, 383.5, 399.11 through 399.15, and 445. California's Renewable Portfolio Standard (RPS) requires retail sellers of electricity to increase their procurement of eligible renewable energy resources by at least 1 percent per year so that 20 percent of their retail sales are procured from eligible renewable energy resources by 2017. The RPS legislation requires that the CPUC and CEC work collaboratively to implement the RPS and assigns specific roles to each agency. Pursuant to SB 1078, the CEC's responsibilities include:

- Certifying eligible renewable resources that meet criteria contained in the bill, including those generating out-of-state
- Designing and implementing a tracking and verification system to ensure that renewable energy output is counted only once for the purpose of the RPS and for verifying retail product claims in California or other states
- Allocating and awarding supplemental energy payments as specified in SB 1038 to eligible renewable energy resources to cover above-market costs of renewable energy.

The CPUC is addressing its responsibilities in implementing the RPS through a separate proceeding titled, Order Instituting Rulemaking to Establish Policies and Cost Recovery Mechanisms for Generation Procurement and Renewable Resource Development (R. 01-10-24). The CPUC's responsibilities include:

- Establishing a process to determine market price referents, setting the criteria for IOU ranking of renewable bids by least cost and best fit, and establishing flexible compliance rules, penalty mechanisms and standard contract terms and conditions
- Establishing initial renewable generation baselines for each IOU, making subsequent changes to these baselines as needed, and determining annual procurement targets (APTs)
- Directing the IOUs to develop procurement plans, and approving, amending or rejecting the plans
- Making specific determinations of market price referents for products under contract
- Approving or rejecting IOU requests to enter specific contracts for renewable power, including determining if a solicitation was adequately competitive
- Factoring transmission and imbalance costs into the RPS process and identifying the transmission grid implications of renewable development
- Defining rules for the participation of renewable Distributed Generation (DG), Electric Service Providers (ESP), Community Choice Aggregators (CCA), and potential Procurement Entities

The CPUC and the CEC have developed a schedule for addressing RPS issues, and have established guidelines for how the two agencies work collaboratively on the RPS. The schedule and collaborative process are described in the CEC's Committee Order on RPS Proceeding and CPUC's Collaborative Guidelines. The Order also describes administrative procedures for interested parties who wish to participate in the CEC's RPS proceeding.

San Francisco Electricity Resource Plan. The Electricity Resource Plan, a joint effort by the SFPUC and San Francisco's Department of the Environment, proposes a plan to avoid future energy crises through energy efficiency, new cleaner generation and imported power, and provides a framework for shifting San Francisco's dependence on fossil-fuel burning power plants to clean, renewable forms of energy. The Board of Supervisors directed the agencies to produce the Plan as part of the May 2001 ordinance, "Human Health and Environmental Protections for New Electric Generation." Mayor Willie Brown signed the Plan in December 2002.

The purpose of the Plan is to show how The City can meet its future electricity by building cleaner in-City generation, implementing aggressive energy efficiency and peak load management, as well as supporting completion of planned transmission upgrades. At the same time, the Plan assumes that PG&E's Hunters Point and Potrero's antiquated Unit Three power plant can be shut down, and that the City will require no new large-scale central electricity generation.

Before drafting the Plan, SF Environment and SFPUC held numerous public meetings in neighborhoods across CCSF to identify resident and business community priorities. Major concerns include reliability, efficiency, affordability, and the reduction of harmful emissions associated with the production of electricity. In answer to these concerns, the plan provides a means to shut down Hunters Point power plant in 2005, and reduce operation at the existing plant on Potrero Hill. This will be accomplished by developing sufficient replacement power through a combination of aggressive energy efficiency and conservation programs, and by building new renewable and cleaner, smaller scale fossil fuel generation.

Some of the renewable projects proposed in the Plan include a football field-sized solar photovoltaic system at the new Moscone Center, and a second solar installation at the Southeast wastewater treatment plant. The Plan also addresses the potential for wind turbines to be placed outside the City in the Altamont Pass, and tidal current and wave generation could be developed in cooperation with other municipalities at various locations in the Bay. Other proposed municipal sites for development of renewable power projects include the airport and the port.

4.5.2.1 Wind Technology

Alternative Description

Wind carries kinetic energy that can be utilized to spin the blades of a wind turbine rotor and an electrical generator, which then feeds alternating current (AC) into the utility grid. Most state-of-the-art wind turbines operating today convert 35 to 40 percent of the wind's kinetic energy into electricity. Modern wind turbines represent viable alternatives to large bulk power fossil power plants as well as small-scale distributed systems. The range of capacity for an individual wind turbine today ranges from 400 watts up to 3.6 MW. California's 1,700 MW of wind power represents 1.5 percent of the state's electrical capacity.

The perception of wind as an emerging energy source reached a peak in the early 1980s, when wind turbine generators to convert wind power into electricity were being installed in California at a rate of nearly 2,000 per year. Progress slowed a few years later, however, as startup tax subsidies disappeared and experience demonstrated some deficiencies in design. At the present time, technological progress again has caught up, contributing lower cost, greater reliability, and reason for genuine optimism for the future (Lamarre, 1992). A major factor has been the inclusion of environmental externalities by electric utilities in their resource planning programs. The more penetrating analysis, which has included these potential costs, has shown wind power to be substantially more economically attractive than was previously thought.

There are now more than 16,000 wind turbines installed in the U.S., with almost all located in California. Their aggregate power rating is about 1,500 MW, and they generated some 2.7 billion kilowatt-hours (kWh) of electricity in 1991. It has been estimated that with fully commercial development, 20 percent of the nation's electricity needs could be supplied by wind power. And while California is providing a large share of this resource, there still are opportunities for substantial growth. California currently generates about 1,800 MW of electricity from 105 separate wind facilities.

The technology is now well developed, and can be used to generate significant amounts of relatively low-cost power. Modern wind turbines have increased in size and output to megawatt scale machines. San Francisco could possibly obtain significant amounts of wind power in areas such as the Altamont Pass, where wind speeds are high and other conditions like proximity to transmission can be met. As a result of the Energy Plan, the SFPUC is currently looking at several sites including those adjacent to its

own Bay Area reservoirs. The estimated potential for wind development in the greater Bay Area for San Francisco's use could possibly exceed 150 megawatts, but this would not offset the Proposed Project or estimated demand. Approximately 40 to 50 acres are needed per megawatt of power, therefore, to achieve the approximately 400 MW proposed to be provided to Martin Substation by the Proposed Project, 1,600 to 2,000 acres would be needed.

Consideration of CEQA Criteria

Project Objectives

There are reliability concerns with wind technology because of the need for a consistent wind source. Extensive wind generation would also require additional transmission to serve areas of high demand. The extensive land required to generate enough electricity to meet demand is not available in the project area. As stated earlier, one of the objectives of the Jefferson to Martin Project is to further increase reliability in the San Francisco and north of San Mateo County area by providing a second independent major transmission line pathway into the area. Inherently, having a second independent pathway separate from the existing San Mateo to Martin corridor would increase diversity of supply and increase transmission reliability in that way. However, because this alternative does not connect Jefferson and Martin Substations, it does not satisfy the fourth objective, which is to implement the ISO Board of Governors' April 2002 Resolution. Except for increasing diversity, this alternative does not meet any of the stated project objectives.

Feasibility

This alternative is considered infeasible because there is not yet an adequate area for significant wind generation within CCSF or northern San Mateo County. Wind generation is possible in other locations throughout California, but because generation is not feasible locally, any power generated would still require transmission to import the power to CCSF and northern San Mateo County.

Lessen Significant Environmental Effects

Wind technology would not require the burning of fossil fuels, so it would reduce the environmental and resource impacts associated with natural gas-fired or nuclear power. However, use of wind resources outside of the Bay Area would require new transmission lines to be constructed with impacts similar to those of the Proposed Project.

Potential New Impacts Created

In general, the areas in California with the best wind resources have already been developed. Centralized wind generation areas generally require 40 to 50 acres per megawatt. This large area needed for wind electricity generation would create significant land use, biological, cultural, and visual concerns. In addition, wind turbines would have noise impacts associated with both construction and operation. Wind turbines have been documented to kill large numbers of raptors because these fast-flying birds do not account for movement of the rotating blades.

Alternative Conclusion

ELIMINATED. Wind technology has the advantage of not requiring the burning of fossil fuels and the resulting environmental and resource impacts associated with natural gas fired power. However, wind has the potential to cause significant land use, biological, cultural resources, and visual impacts. Wind

technology has great promise for the future, but there are substantial cost and regulatory hurdles to overcome before they can provide substantial amounts of power. In summary, wind technology is eliminated from EIR consideration because it cannot feasibly meet project objectives.

4.5.2.2 Solar Technology

Alternative Description

Recent estimates by the California Energy Commission considered that photovoltaics might be able to provide a maximum of 221 MW of statewide generation over the next 10 years. Currently, there are two types of solar generation available: solar thermal power and photovoltaic (PV) power generation.

Solar thermal power generation uses high temperature solar collectors to convert the sun's radiation into heat energy, which is then used to run steam power systems. Solar thermal is suitable for distributed or centralized generation, but requires far more land than conventional natural gas power plants. Solar parabolic trough systems, for instance, use approximately five acres to generate one megawatt.

Photovoltaic (PV) power generation uses special semiconductor panels to directly convert sunlight into electricity. Arrays built from the panels can be mounted on the ground or on buildings, where they can also serve as roofing material. Unless PV systems are constructed as integral parts of buildings, the most efficient PV systems require about four acres of ground area per megawatt of generation.

Solar resources would require large land areas in order to meet the project objective to generate 520 MW of electricity. For example, assuming that a parabolic trough system was located in a maximum solar exposure area, such as in a desert region, generation of 400 MW would require nearly 2,000 acres. For a PV plant, generation of 400 MW would require about 1,500 acres.

The use of solar energy in California offers obvious promise as an environmentally preferred resource. However, it is limited by its availability (only during daytime hours) and by the relatively high cost of solar panels. California currently produces about 400 MW of power from solar thermal projects. Centralized solar projects using the parabolic trough technology require approximately five acres per megawatt. Photovoltaic arrays require similar acreage per megawatt. However, electricity production is dependent on sunlight. Clouds, fog and shading limit the amount of power that a system produces. Solar is, however, particularly valuable when used at the local level to reduce peak power usage and to defer distribution infrastructure development.

San Francisco Electricity Resource Plan. This planning effort provides a local example of an aggressive solar energy program. In an effort to address the CCSF electricity issues, the San Francisco Electricity Resource Plan was adopted by the Board of Supervisors and signed by Mayor Willie Brown in December 2002 as a policy guide to be used in proposing and implementing specific actions related to providing electricity to San Francisco. Those actions that require the expenditure of CCSF funds or require compliance with environmental laws will likely require additional analysis and public review. This Plan provides a long-term vision of the City's possible electricity future. Because the Plan extends over a ten-year time horizon, it may need to be adapted and revised to accommodate changing circumstances.

The CCSF in November of 2001 passed a proposition that would provide $100 million to support solar power and other renewable programs. In addition and discussed earlier, the City has prepared an Energy Resource Plan (in accordance with the Maxwell Ordinance) to guide the various energy efforts underway in the City. These programs will likely result in increased solar (or other renewable) generation within the CCSF. The City has not yet determined the amount of power that might be generated

with the $100 million investment, nor do they know how long it will take to invest the $100 million in order to fully implement the program. Therefore, while the system will reduce the City's future reliance on fossil fuel plants, it is very unlikely to occur within the timeframe stated in the objectives of this project, or that enough power will be generated to significantly reduce the need for the Proposed Project.

As mentioned in the Energy Resource Plan, the CCSF's first large solar power development is at the Moscone Center. With approximately 90,000 square feet of perfectly flat unshaded roof, this football-field sized showpiece will significantly reduce Moscone's purchase of power and provide a solar showplace for visitors from all over the world. The SFPUC has installed radiometers at eleven sites on City buildings and schools to collect data about the availability of sunlight. The variability in solar incidence is based on microclimate and geography, and when cross-referenced with availability of appropriate space, limits the application of solar technologies in some areas of the City. To develop a well thought-out strategy of implementation, the City needs to understand the resource and develop it where it is most cost effective. If sufficient participation by commercial and residential customers is obtained, at least 50 megawatts of solar could be installed in San Francisco. Price of systems is a major consideration in achieving this magnitude of installation. A sustained program to develop solar in San Francisco can help reduce the overall cost of solar technologies.

Consideration of CEQA Criteria

Project Objectives

There are reliability concerns with the technology and the need for a consistent solar source. Both solar thermal and PV facilities generate power during peak usage periods since they collect the sun's radiation during daylight hours. However, even though the use of solar technology may be appropriate for some peaker plants, solar energy technologies cannot provide full-time availability due to the natural intermittent availability of solar resources. Extensive solar generation would also require additional transmission to serve areas of high demand. Therefore, solar generation technology would not meet the project's goal, which is to provide immediate power to meet peaks in demand.

The extensive land required to generate enough electricity to meet demand is not available in the project area and transmission would still be required to transport the power in from other areas. As stated earlier, one of the objectives of the Jefferson to Martin Project is to further increase reliability in the San Francisco and north of San Mateo County area by providing a second independent major transmission line pathway into the area. Inherently, having a second independent pathway separate from the existing San Mateo to Martin corridor would increase diversity of supply and increase transmission reliability in that way. However, because this alternative does not connect Jefferson Substation to Martin Substation, it does not satisfy the fourth objective, which is to implement the ISO Board of Governors' April 2002 Resolution. Except for increasing diversity, this alternative does not meet the stated project objectives.

Feasibility

As demonstrated by the Moscone Center project, solar photovoltaics are technically feasible and California clearly has a climate where this technology would be useful. However, the cost of these systems currently prohibits their widespread use. Solar generation is a feasible technology on a small scale, but it cannot generate power in the hundreds of megawatts, as required for the Jefferson-Martin Project.

Lessen Significant Environmental Effects

Solar technology would not require the burning of fossil fuels and the environmental and resource impacts associated with natural gas fired power. The visual and construction impacts of the Proposed Project would not occur if a feasible source of solar power were available near the locations where energy is consumed.

Potential New Impacts Created

While solar generation facilities do not generate air emissions and have relatively low water requirements, there are other potential impacts associated with their use. Construction of solar thermal plants can lead to habitat destruction and visual impacts. PV systems can also have negative visual impacts, especially if ground-mounted. Furthermore, PV installations are highly capital intensive, and manufacturing of the panels generates some hazardous wastes.

Alternative Conclusion

ELIMINATED. Given the project objectives of providing reliable electric power to the CCSF and northern San Mateo County in the near term, this technology is not considered to be a feasible project alternative. Therefore, this alternative was eliminated from further consideration.

4.5.2.3 Tidal Technology

Alternative Description

The San Francisco Board of Supervisors approved a resolution on May 6, 2003 for a pilot project to explore using tides to make electricity. The board asked the City's Department of the Environment to head the project. The project, approved unanimously by the City's Board of Supervisors, is part of San Francisco's efforts to pursue nonpolluting energy (see above description of the Energy Resource Plan). The pilot project in San Francisco would be the first working project in the United States to test tidal power. This effort stems from California's recent energy shortages and the city's plan to decommission HPPP.

The initial goal for tidal power is to create one megawatt of renewable energy, and have the project added to San Francisco's grid by Jan. 1, 2006. Among the details to be worked out are funding and where along the bay or ocean shoreline the power project should be built. The supervisors also asked Marin County and the cities of Richmond and Vallejo to participate in a regional task force that will look at creating other tidal energy projects in the Bay Area.

Each day, nearly 400 billion gallons of water pass through the mouth of San Francisco Bay under the Golden Gate Bridge, enough to generate an estimated 2,000 megawatts (more than twice the city's peak power demand). If harnessed, the energy from this water could be an answer to the city's power needs (Llanos, 2003). The system would not impact shipping since it would be far below the surface, probably on the sea floor itself. The cost of building a 1,000-megawatt system is estimated at $600 million, but San Francisco's Environment Department estimates that over 30 years, costs would average out to 6 cents per kilowatt-hour — about the same as natural gas and less than what San Franciscans now pay for power (Llanos, 2003). Within 10 years, San Francisco could build enough clean tidal power to meet its daily energy needs, as well as generate surplus energy to sell — all with a price tag of about one-third the cost per megawatt of solar power. Unlike the sun and wind, tidal current is consistent and predictable. Tidal generators could produce electricity up to 16 hours a day.

Consideration of CEQA Criteria

Project Objectives

There are reliability concerns with the technology because it is so new. San Francisco must first line up support from 17 State and federal agencies before it selects a developer, a process that could take a year, but it has been looking closely at technology developed by HydroVenturi Inc., which started in London and now has a San Francisco office. Expanding from a test to an underwater grid powering the entire city would take many years (beyond the timeframe of the Proposed Project) and would need to overcome environmental hurdles (see below).

As stated earlier, one of the objectives of the Jefferson to Martin Project is to further increase reliability in the San Francisco and north of San Mateo County area by providing a second independent major transmission line pathway into the area. Because this alternative does not connect Jefferson Substation to Martin Substation, it does not satisfy the fourth objective, which is to implement the ISO Board of Governors' April 2002 Resolution. Except for increasing diversity, this alternative does not meet the stated project objectives.

Feasibility

There would be regulatory feasibility issues associated with permitting from the USACE, BCDC, and/or the California Coastal Commission (depending on the location) for the large underwater area required for tidal energy generation. This technology is also new, and it is not clear whether the technology is feasible.

Lessen Significant Environmental Effects

Tidal technology would not require the burning of fossil fuels and the environmental and resource impacts associated with natural gas fired power. It would also avoid the specific impacts associated with the construction and operation of the Proposed Project.

Potential New Impacts Created

Extensive underwater habitat would be required to generate enough electricity to meet demand. Tidal technologies have the potential to cause significant biological impacts, especially to marine species and habitats. Fish could be caught in the unit's fins by the sudden drop in pressure near the unit. The passageways, more than 15 feet high and probably sitting on the bay floor, could squeeze out marine life that lives there or alter the tidal flow, sediment build-up, and the ecosystem in general. San Francisco's test project as well as environmental impact studies would be necessary to determine potential significant impacts.

Alternative Conclusion

ELIMINATED. Tidal generation is not yet a feasible technology on the scale required to replace a transmission project that would bring up to 400 MW to the northern San Francisco Peninsula. In addition, it has the potential to create significant impacts, which would result in potential regulatory infeasibility. Therefore, this alternative was eliminated from further consideration.

4.5.3 System Enhancement Alternatives

4.5.3.1 Demand-Side Management Alternative

Alternative Description

Demand-side management programs are designed to reduce customer energy consumption. Regulatory requirements dictate that supply-side and demand-side resource options should be considered on an equal basis in a utility's plan to acquire lowest cost resources. One goal of these programs is to reduce overall electricity use. Some programs also attempt to shift such energy use to off-peak periods.

The California Energy Commission's (CEC) forecasts contain assumptions regarding conservation. As detailed in the CEC's 2002-2012 Electricity Outlook Report, February 2002, "The uncertainty about what caused the demand reduction in the summer of 2001, in particular, the uncertainty about how much was due to temporary, behavioral changes and how much was due to permanent, equipment changes contributes to increased uncertainty about future electricity use trends. The three scenarios discussed in this chapter were developed to provide a range of possible electricity futures that account for the demand reductions of the summer of 2001 and uncertainties about future demand reductions and future economic growth. These scenarios combine different levels of temporary and permanent reductions to capture a reasonable range of possible electricity futures."

The CEC report describes the three scenarios as follows: "The most likely scenario, labeled "Slower Growth in Program Reductions, Faster Drop in Voluntary Reductions . . .," assumes that program benefits increase in 2002 but stay constant after that, while voluntary impacts on energy consumption reduction decrease more rapidly starting with a drop of 1,500 MW in 2002. The lower scenario, labeled "Slow Growth in Program Reductions, Slow Decline in Voluntary Reductions," assumes that program impacts grow from 2001 to 2006 while benefits of voluntary reductions drop slowly over the period after a drop of 1,000 MW in 2002. The higher scenario, labeled 'No growth, then drop in Program Reductions, No Voluntary Reductions," assumes that there are no benefits from voluntary actions in 2002 and after, while benefits of programs stay constant until 2005 and then start declining."

The CPUC supervises various demand-side management programs administered by the regulated utilities, and many municipal electric utilities have their own demand-side management programs. The combination of these programs constitutes the most ambitious overall approach to reducing electricity demand administered by any state in the nation. In spite of the state's success in reducing demand to some extent in 2001, California continues to grow and overall demand is increasing. Economic and price considerations but also long-term impacts of state-sponsored conservation efforts, such as the Governors 20/20 rebate program and new appliance efficiency standards are considered in load forecasts. However, there are electricity-trend uncertainties about how much the demand reduction in the summer of 2001 was due to temporary behavioral changes and how much was due to permanent equipment changes.

PG&E uses a program of voluntary reduction in electricity use known as Customer Energy Efficiency (CEE). PG&E has had an active CEE program over the past two decades. Its cumulative reduction of use has been substantial. For any given planning area, the historical CEE energy and peak demands experienced year by year and thus their impacts are automatically included in PG&E's forecasts of peak growth. Such is the case within the north of San Mateo County area. Thus, the demand forecasts presented for this Project already account for any load reductions that could result from locally focused CEE. The projected CEE benefits (no more than 2 to 7 MW in the Project Area) would not defer the required capacity addition (approximately 400 MW).

Consideration of CEQA Criteria

Project Objectives

The projected CEE benefits (up to 7 MW in the Project Area) would not defer the required capacity addition (approximately 400 MW). While reductions in demand are considered an essential part of PG&E's future operation and are incorporated into its system base and peak load forecasts, the available energy savings from these programs is insufficient to improve the service reliability to the Bay Area to the level desired. Further, the noted conservation programs would do little to increase the simultaneous import capacity rating of the PG&E system, nor would they provide additional access to the California power market. For these reasons, this alternative has been eliminated from further consideration. As a stand-alone alternative to the Proposed Project, energy conservation and load management programs were eliminated from its consideration since they represent a small fraction of the capacity requirements needed to meet PG&E's project import and reliability objectives.

As stated earlier, one of the objectives of the Jefferson to Martin Project is to further increase reliability in the San Francisco and north of San Mateo County area by providing a second independent major transmission line pathway into the area. Demand-side management would not increase diversity of supply nor increase transmission reliability in that way. In addition, because this alternative does not connect Jefferson Substation to Martin Substation, it does not satisfy the fourth objective, which is to implement the ISO Board of Governors' April 2002 Resolution. This alternative does not meet any of the stated project objectives.

Feasibility

Demand-side management is feasible on a small scale, but not on a scale that would be required to replace the Jefferson-Martin Project.

Lessen Significant Environmental Effects

This alternative would reduce energy consumption, thus would reduce the need for gas-fired power generation and new transmission lines. All effects of the Proposed Project would be avoided.

Potential New Impacts Created

Because there would be no construction, no new impacts would be created.

Alternative Conclusion

ELIMINATED. While reductions in demand are considered an essential part of PG&E's future operation and are incorporated into its system base and peak load forecasts, the available energy savings from these programs is insufficient to improve the service reliability to the Bay Area as required by project objectives. As a stand-alone alternative to the Proposed Project, energy conservation and load management programs represent a small fraction of the capacity requirements needed to meet PG&E's project import and reliability objectives. Further, the noted conservation programs would do little to provide additional access to the California power market. For these reasons, this alternative has been eliminated from further consideration.

4.5.3.2 Distributed Generation

Alternative Description

Consideration of Distributed Generation (DG) as an alternative to the Proposed Project was suggested during scoping. The CEC defines DG as "generation, storage, or demand-side management devices, measures, and/or technologies connected to the distribution level of the transportation and distribution grid, usually located at or near the intended place of use (CEC 2002b). There are many DG technologies, including microturbines, internal combustion engines, combined heat and power (CHP) applications, fuel cells, photovoltaics and other solar energy systems, wind, landfill gas, digester gas and geothermal power generation technologies. Distributed power units may be owned by electric or gas utilities, by industrial, commercial, institutional or residential energy consumers, or by independent energy producers. To the extent that it is established, DG acts to either reduce the load on the PG&E system or be applied as additional system generation. In either case, it would help to support PG&E's ability to meet the applicable reliability criteria.

Distributed generation is the generation of electricity from facilities that are smaller than 50 MW in net generating capacity. Local jurisdictions — cities, counties and air districts — conduct all environmental reviews and issue all required approvals or permits for these facilities. Most DG facilities are very small, for example, a fuel cell can provide power in peak demand periods for a single hotel building.

There are several incentive programs designed to provide financial assistance to those interested in operating Distributed Generation systems in California. Senate Bill 1345 (Statutes of 2000, Chapter 537, Peace, signed by Governor Davis in September 2000) directs the Energy Commission to develop and administer a grant program to support the purchase and installation of solar energy and small distributed generation systems. Solar energy systems include solar energy conversion to produce hot water, swimming pool heating, and electricity, as well as battery backup for PV applications. Small distributed generation systems include micro-cogeneration, gas turbines, fuel cells, electricity storage technologies (in systems other than PV), and reciprocating internal combustion engines.

Consideration of CEQA Criteria

Project Objectives

While DG technologies are recognized as important resources to the region's ability to meet its long-term energy needs, DG does not provide a means for PG&E to meet its objectives for the Project because of the comparatively small capacity of DG systems and the relatively high cost.

In conjunction with construction of new transmission lines, the distributed generation alternative may have the potential to slightly extend the time in which PG&E would be able to meet industry reliability standards. However, DG technologies do not have the capability to meet PG&E's stated objectives for increased import capacity, increased export capacity and grid enhancement. Distributed sources would not meet project objectives of allowing increasing reliability of power in CCSF. Therefore, this alternative would not meet the project objectives.

Feasibility

Consideration of DG as an alternative to the Proposed Project is not feasible because no single entity has proposed implementing a substantial DG program. Also, a number of serious barriers, including technical issues, business practices, and regulatory policies, make interconnection to the electrical grid in

the United States difficult. Broad use of distributed resources would likely require regulatory support and technological improvements. There could be regulatory feasibility issues with the lengthy permitting process. Air permits are generally the first permits sought for DG facilities because air district requirements influence equipment selection. Once the DG equipment has been selected, the land use approval process can begin. Local governments must know what makes and models of equipment will be installed to evaluate potential significant environmental impacts (e.g., noise and aesthetics) and to specify mitigation measures. Building permits are sought last because construction plans must incorporate all project changes required by the local government planning authority to mitigate environmental impacts. This lengthy permitting process would make it impossible to construct this technology within the timeframe of the Proposed Project.

In a recent report on DG (January 2002) the CEC concluded that "DG is capable of providing several Transmission and Distribution (T&D) services, but the extent to which DG can be successfully deployed to effectively supply them are limited by (1) the technical capabilities of various DG technologies; (2) technical requirements imposed by the grid and grid operators; (3) business practices by T&D companies; and (4) regulatory rules and requirements . . . some technical barriers resulting from key characteristics of the prime mover will prevent some DG technologies from providing certain T&D services." Some problems of specific types of distributed generation include the following:

- **Renewable Energy Sources.** As discussed above, the high cost and limited dispatchability of small-scale renewable energy sources such as solar and wind power essentially inhibit their market penetration (Iannucci, 2000; see the following section for discussion of larger scale renewable energy). In addition, biomass and wind facilities require specific circumstances for siting (i.e., near sources of bio-fuel or in high wind areas), and have their own environmental consequences (e.g., requiring large land areas or resulting in large quantities of air emissions).
- **Fuel Cells.** The present high cost of and small generation capacity of fuel cells precludes their widespread use.
- **Other Fossil-fueled Systems.** Microturbines and various types of engines can also be used for distributed generation; these technologies are advancing quickly, becoming more flexible, and impacts are being reduced. However, they are still fossil-fueled technologies with the potential for significant environmental impacts, including noise. Such systems also have the potential for significant cumulative air quality impacts because individually they are typically small enough to avoid the regulatory requirements for air pollution control. Therefore, use of enough of these systems to constitute an alternative to the Proposed Project would potentially cause significant unmitigated air quality impacts.

Lessen Significant Environmental Effects

Linear construction impacts of transmission lines would be less because the source of energy generation would be in close proximity to the location of demand. Other lessening of environmental effects would depend on the type of generation would be used (see individual discussions).

Potential New Impacts Created

Potential new impacts created by DG would depend on the type of generation that would be used. Impacts of solar and wind facilities are addressed above. Other types of DG have air quality and noise impacts.

Alternative Conclusion

ELIMINATED. This alternative does not meet project objectives to provide a major new source of electric power to the area, and it is not yet feasible to construct and operate in sufficient quantity to meet projected demand. In January 2002, the CEC concluded that "distributed generation is capable of providing several transmission and distribution services, but the extent to which distributed generation can be successfully deployed to effectively supply them are limited by the technical capabilities of various distributed generation technologies, technical requirements imposed by grid and grid operators, business practices by transmission and distribution companies, and regulatory rules and requirements . . . . Some technical barriers resulting from key characteristics of the prime mover will prevent some distributed generation technologies from providing certain technology and distribution services." For these reasons, this alternative was eliminated from further analysis.

4.5.4 Integrated Resources Alternative

Alternative Description

An integrated resources alternative could be made up of several components, rather than consideration of only a single transmission line project. The components could include a combination of the following:

- Demand-side management
- Transmission system upgrades
- Development of solar power and other renewables
- Distributed generation
- Generating facilities or co-generation facilities.

This type of integrated resources planning is being implemented by the CCSF, with the combination of its Electricity Resource Plan and the Williams turbines discussed above.

Consideration of CEQA Criteria

Project Objectives

None of these alternatives individually meet the stated project objectives. Taken together and if implemented, they would diversify the system and would add needed capacity. However, there is no certainty in their implementation, especially within the 2005 to 2006 timeframe. In addition, because this alternative does not connect Jefferson Substation to Martin Substation, it does not satisfy the fourth project objective, which is to implement the ISO Board of Governors' April 2002 Resolution. Therefore, this option would not meet the project objectives.

Feasibility

Each of these components is technically feasible, and each could be implemented on a limited scale in CCSF and northern San Mateo County. However, each also has environmental and regulatory obstacles to their implementation (described in the individual sections above). The combination of these alternatives would have no fewer obstacles than they would individually. Furthermore, implementation of a combination of resources could not be accomplished by the applicant in this project, and would require regulatory changes or financial incentives that are not available in today's market.

Lessen Significant Environmental Effects

Depending on which configuration of the options would be implemented would determine overall effects. See the individual discussions above for impacts that would be avoided by the individual technology options.

Potential New Impacts Created

Depending on which configuration of the options would be implemented would determine overall effects of this alternative. The individual discussions above address potential impacts that would be created by the individual technology options.

Alternative Conclusion

ELIMINATED. Each of these components addressed separately above is technically feasible, but there would be regulatory obstacles to their implementation and they would not meet the stated project objectives (described above). Therefore, this alternative was eliminated from further analysis.