

Alternatives

5.1 Introduction

This discussion is included to comply with the CPUC's General Order (GO) 131-D, Section IX.B.1.c, but is not required as part of the CEQA analysis because this Proponent's Environmental Assessment has concluded that all impacts from the proposed project will be less than significant. CEQA does not require a review of alternatives where, as with this project, the proposed project would result in no significant environmental impacts after mitigation (CEQA Guidelines, CCR Title 14, Chapter 3 (Guidelines), § 15126.6, subd. (a) and (f)(2)(A); CPUC Decision (D.)10-09-025 at 10.). This is because, under CEQA, a "reasonable alternative" is one that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects of the project (Guidelines, § 15126.6, subd. [a]).

PG&E evaluated alternative methods for achieving the basic project objectives, purpose, and need defined in Section 2.2 before recommending the proposed project for approval by the CPUC. This chapter describes the decision analysis process PG&E used to select the proposed project for recommendation to the CPUC; provides a description of alternatives considered and the ability of each to meet the need for the project; discusses the advantages and disadvantages of each alternative; and includes a qualitative discussion of the potential environmental impacts of each considered alternative. In compliance with GO 131-D, this section summarizes and compares the environmental advantages and disadvantages of the project and the alternatives considered.

This chapter begins with a brief description of the No Project alternative,¹ then provides a description of the proposed project, two alternative routes, and three locations near the existing Potrero Switchyard that PG&E evaluated for the new 230 kV switchyard.

PG&E examined several potential routes for the project before selecting three routes that would meet the project objectives described in Section 2. The proposed route and the two alternative routes were further examined and compared to determine which one best met the selection criteria, as summarized in Table 5-1 located in Section 5.3.4 below. All three routes will require the same upgrades and installation of new equipment at Embarcadero Substation and at Potrero Switchyard. Three locations were considered for the new 230 kV Potrero Switchyard: (1) the proposed GenOn site, (2) the Hoe Down Yard, and (3) the Laydown Yard. The yards are PG&E-owned properties across 22nd Street from the existing switchyard. More detailed descriptions of the route and switchyard location alternatives are included in later sections of this chapter.

5.1.1 Route Alternatives

The project route alternatives PG&E retained for consideration are listed below and are shown in Figure 5-1.





No Project—Transmission facilities would not be constructed under the No Project Alternative.

Proposed Project—The proposed project will install a single-circuit, 230 kV, three-phase extruded dielectric cable system in a primarily submarine configuration, with land-based interconnections to Embarcadero Substation and Potrero Switchyard. The same modifications are needed at Embarcadero Substation and Potrero Switchyard regardless of the route alternative. The proposed project route is approximately 3.5 miles in total length—2.5 miles of which is submarine cable in the Bay; 0.6 mile of which is comprised of two underground sections; and 0.4 mile of which is comprised of two HDD sections. A more detailed summary of the proposed project is provided in Section 5.4 and in Chapter 2, Project Description.

Alternative Route 1—This route, referred to as the Preferred Onshore Route in the Feasibility Study (B&V, 2012), would travel underground for approximately 3.8 miles under city streets between Embarcadero Substation and

¹ As noted above, a "no project" alternative analysis is not required by CEQA because the project does not have any significant unavoidable impacts, but is included for purposes of describing alternatives considered for purposes of compliance with the CPUC's GO 131-D, and satisfaction of PEA analytical guidelines.



-  Proposed Transmission Line
-  Alternative Route 1
-  Alternative Route 2
-  Substation/Switchyard

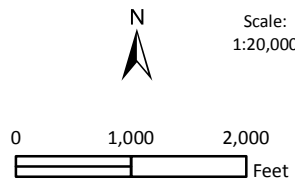


FIGURE 5-1
Potential Alternative Transmission Line Routes
 Embarcadero-Potrero 230 kV Transmission Project
 San Francisco, CA



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Potrero Switchyard. The onshore alternatives would consist of one 230 kV rated circuit using one cable per phase and are similar in design and construction methods to those described for the underground, onshore portions of the proposed project in Section 2.0. Solid-dielectric, cross-linked polyethylene, insulated-copper-conductor underground land cables would be installed in a buried, reinforced, concrete-encased duct bank system. Precast concrete manholes would be installed, as required, for splice locations.

Trenchless technology, specifically a jack-and-bore technique, is expected to be used for approximately 0.06 mile along 17th Street, to cross under the railroad tracks located underneath I-280. The jack and bore will extend beyond the tracks where it will transition back to duct bank construction. A jack-and-bore segment is also expected where the route crosses under the MUNI at 3rd Street for approximately 0.06 mile. A more detailed summary of the Alternative Route 1 is provided in Section 5.5.

Alternative Route 2 —Alternative Route 2, referred to as the Alternate Onshore Route in the Feasibility Study (B&V, 2012), would also travel under city streets, except where it would cross underneath China Basin channel, for a total length of approximately 3.1 miles. The same engineering described for the underground, onshore portions of the proposed project and Alternative Route 1 would be anticipated to be used, with the exception of an additional trenchless technology segment for Alternative 2. An HDD would be used for approximately 0.3 mile where the route crosses under the China Basin channel. A more detailed summary of Alternative Route 2 is provided in Section 5.6.

5.1.2 Switchyard Location Alternatives

Three locations near the existing switchyard were reviewed for the new 230 kV Potrero Switchyard and are shown on Figure 5-2. These include the proposed location (the GenOn site) and two alternative locations on PG&E-owned land at the Hoe Down Yard and the Laydown Yard on 22nd Street.

The switchyard facility components would remain generally unchanged from the description in Section 2.4.4 and shown in Figures 2-17 to 2-20 regardless of location. The layout of the components at each site would differ slightly due to differing site dimensions.

5.1.3 Summary of PG&E Findings

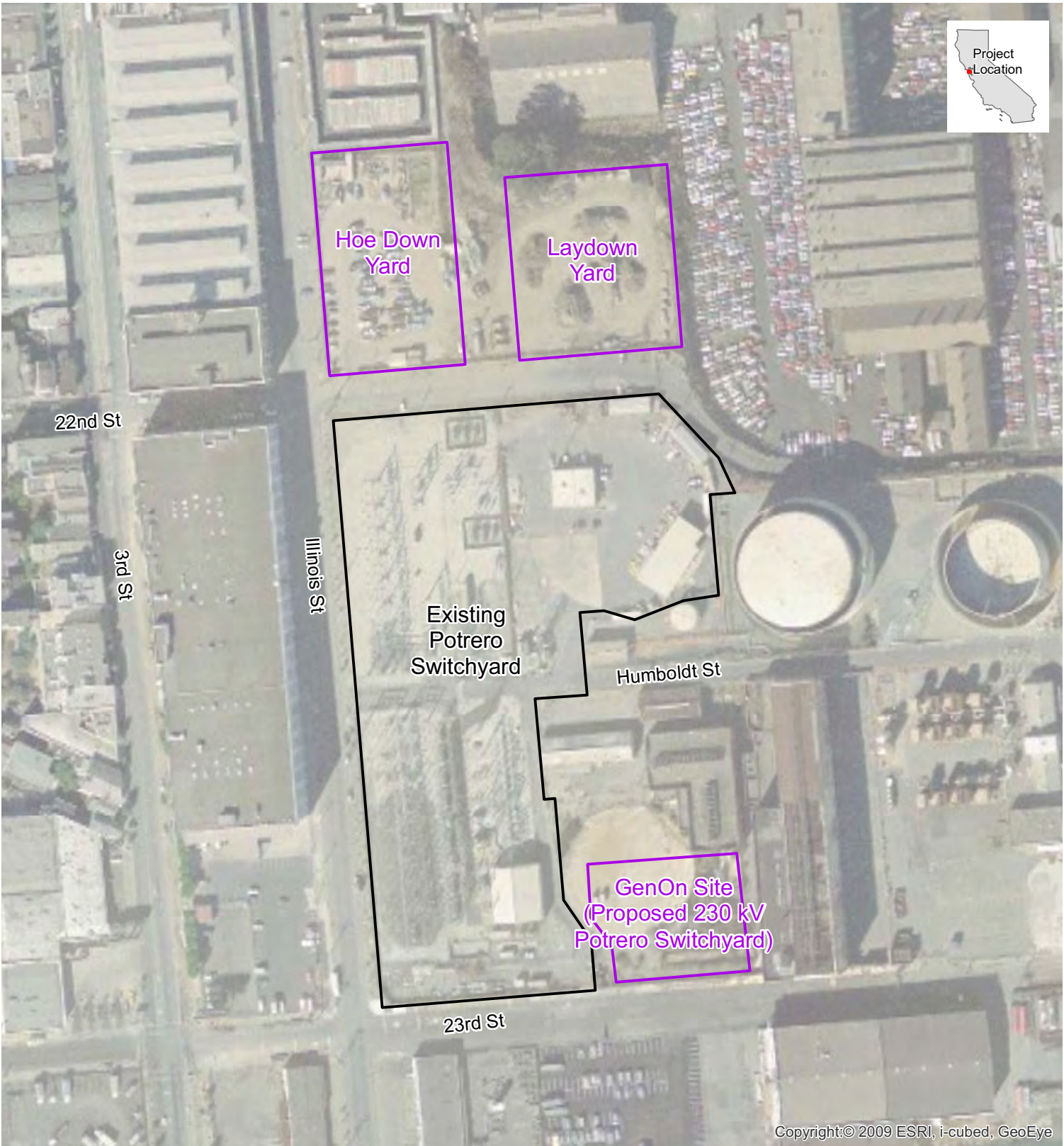
PG&E evaluated each alternative for its ability to meet the project objectives. As discussed below, these analyses determined that implementation of the No Project Alternative would not satisfy PG&E's project objectives. PG&E concluded that the proposed project and Alternative Route 1 are feasible and are capable of being implemented within the timeframe dictated by the area's electric needs; however, these alternatives differ according to reliability, environmental impacts, engineering feasibility, and cost.

The switchyard can be accommodated at each of the three sites: the proposed GenOn site, the Hoe Down Yard and the Laydown Yard. After performing the alternatives analysis and selecting the GenOn site for the proposed switchyard, PG&E has proposed to sell the Hoe Down Yard and Laydown Yard to the Port, given their proximity to the Pier 70 Redevelopment Plan area.



5.2 Analysis of Alternatives

To support project objectives, purpose, and need, PG&E conducted an initial screening and a feasibility study of potential transmission line routes and switchyard locations. Potential routes, submarine landings associated with the proposed project, and switchyard locations were identified and screened for potential seismic and other environmental impacts, constructability, and technical feasibility.

Potential routes and submarine landings that were retained received further evaluation in the context of project objectives, operational reliability, engineering and constructability constraints, environmental permitting and regulatory considerations, and cost and schedule considerations. Potential submarine landings and onshore routes were considered but rejected during review when they did not substantially meet the project objectives, purpose, and need or presented major environmental, constructability, or feasibility constraints (B&V, 2012).



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-  Existing Switchyard
-  Potential Switchyard Locations



Scale:
1:3,600

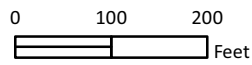


FIGURE 5-2
Potential Alternative Switchyard Locations
Embarcadero-Potrero 230 kV Transmission Project
San Francisco, CA



5.2.1 Routes Considered But Rejected

PG&E initially screened 10 potential routes before selecting two onshore routes and one marine route for further review. The eliminated routes are summarized in Section 4.0 of the B&V Feasibility Study (B&V, 2012). These routes were eliminated for a variety of reasons, including being located in areas with higher susceptibility to liquefaction; underground congestion from other utilities; designation by the City as under an excavation moratorium; interference with public transportation lines and highway on- or off-ramps; and proximity to sensitive land uses such as schools, hospitals, and parks. The analysis resulted in retention of the proposed submarine route, Alternative Route 1 and Alternative Route 2.

5.2.2 Submarine Route Transition Locations Considered but Rejected

Three possible transition locations for the cables at each end of the route were considered. The rejected northern terminus transition locations would have created a longer onshore portion of the route and would have increased the amount of trenching and other excavation needed to construct the underground portion of the line, and therefore had greater potential construction period impacts, such as those to traffic and transportation, air quality, noise, and existing land use. The rejected southern terminus transition locations would have been located in an area of proposed development (Pier 70) and these routes may not have been compatible with the land use depending on the final development design.

5.2.3 Proposed Project and Retained Alternatives

PG&E conducted a feasibility study to examine the retained alternative routes in further detail with an emphasis on seismic considerations and estimated construction costs based on field investigations, surveys, preliminary design criteria, and conceptual engineering (B&V, 2012). The study identified a submarine route (the proposed project) and retained two alternative onshore routes that supported the project objectives, purpose, and need. The proposed project (submarine route) was refined using marine surveys and soil investigations performed in the San Francisco Bay. Seismic vulnerabilities associated with each of the retained routes were considered, and a construction cost estimate was prepared (B&V, 2012). The physical attributes and anticipated potential feasibility, environmental impacts, and cost issues of the proposed project and both onshore route alternatives are summarized in Table 5-1.

5.2.4 Proposed Switchyard and Alternatives

The three alternative switchyard locations near the existing Potrero Switchyard were reviewed. These included the proposed location (the GenOn site) and two alternative locations (the Hoe Down Yard and the Laydown Yard). PG&E reviewed the locations in the context of the existing setting, evaluating compatibility with existing resources, and planned land use. Existing environmental resources at the three locations proved relatively similar, with the exception of land use as discussed in Section 5.8.

5.3 No Project Alternative

5.3.1 Description

Under the No Project Alternative, there would be no new third 230 kV electric transmission line connecting Embarcadero Substation and Potrero Switchyard to provide improved reliability and a higher likelihood of continued electric service to downtown San Francisco in the event of unplanned outages on both existing lines, such as might occur following a major seismic event or in the event of a forced outage on one of the existing cables while the other is subject to a planned outage. Similarly, there would continue to be no connection between the 230 kV and 115 kV systems, which would not allow these systems to reinforce each other in the event of outages or replacements of existing lines.

Without this new line, there is a higher risk of a potentially lengthy outage in downtown San Francisco in the low-probability but high-impact scenarios described in detail in Section 2.2, Project Purpose and Need.

TABLE 5-1
Summary of Key Elements and Analysis of Selection Criteria for Proposed Project and Alternative Route Comparison
Embarcadero-Potrero 230 kV Transmission Project

Issue	Proposed Project	Alternative Route 1	Alternative Route 2
<i>Route Length (approximate miles)</i>	3.5	3.8	3.1
<i>Underground</i>	0.7	3.7	2.7
<i>Submarine</i>	2.4	0.0	0.0
<i>HDD</i>	0.4	0.0	0.3
<i>Jack and Bore</i>	0.0	0.1	0.1
<i>Land Use, Traffic, and Transportation</i>	<p>Because the proposed project is located either within existing city streets or underwater, no permanent land use, traffic, or transportation impacts are expected.</p> <p>Temporary disruption along 0.2 mile of underground construction at Spear and Folsom. Minimal impacts at Potrero along 23rd Street.</p> <p>Some temporary lane and sidewalk closures and access detours to maintain safe work area during construction of the onshore sections and HDD. HDD in Spear Street cul-de-sac on north end less disruptive than major street.</p>	<p>Because the proposed project is located within existing city streets, no permanent land use, traffic, or transportation impacts are expected.</p> <p>Temporary disruption to existing land uses and routes would occur along 3.7 miles of route along commercial and residential areas.</p> <p>Some temporary lane and sidewalk closures and access detours to maintain safe work area during construction of the onshore sections and HDD.</p>	<p>Because the proposed project is located either within existing city streets or underwater, no permanent land use, traffic, or transportation impacts are expected.</p> <p>Temporary disruption to existing land uses and routes would occur along 3.1 miles of route along commercial and residential areas.</p> <p>Some temporary lane and sidewalk closures and access detours to maintain safe work area during construction of the on-shore sections and HDD.</p> <p>Goes through Mission Bay, under railway, and China Basin; requires HDD on 5th Street.</p>
<i>Land Use Route length (approximate miles)</i>			
<i>Residential</i>	0.3	0.4	0.6
<i>Residential-Commercial</i>	0.2	0.0	0.0
<i>Commercial</i>	0.0	0.4	0.5
<i>Industrial</i>	0.3	1.1	0.9
<i>Marine</i>	2.6	0.0	0.0
<i>Urban-Mixed Use</i>	0.0	2.0	1.0
<i>Biological Resources</i>	<p>Temporary localized disruption of submarine and benthic habitat on sand and mud bottom. No special aquatic sites. Project will follow work windows to avoid impacts to steelhead and herring. Hydroplow intake fish screen reduces impacts on other fish species. A frac-out plan would be developed.</p>	<p>Line placed under existing roadway and work would be limited to existing paved areas in developed areas.</p>	<p>Line placed under existing roadway and work would be limited to existing paved areas in developed areas.</p> <p>A frac-out plan would be developed for implementation as needed to support the China Basin channel crossing using HDD technology.</p>

TABLE 5-1
Summary of Key Elements and Analysis of Selection Criteria for Proposed Project and Alternative Route Comparison
Embarcadero-Potrero 230 kV Transmission Project

Issue	Proposed Project	Alternative Route 1	Alternative Route 2
<i>Cultural Resources</i>	No known significant resources; potential for some buried resources, as is true for all alternatives. Few known resources; lowest archaeological sensitivity for both prehistoric and historical archaeological sites. Historical structures and sensitive areas are limited to the land areas of the route; submarine section has low sensitivity for archaeological resources.	Most sensitive of the project alternatives, with two previously identified prehistoric sites (P-38-000002 and -004499). About one percent of the route is within areas of high sensitivity for prehistoric resources. About three-fifths (58.5 percent) of the route crosses areas of moderate potential for buried sites. Based on historic land use maps, approximately 65 percent of the total route is of high sensitivity for surface or near surface deposits and approximately 35 percent is of moderate sensitivity. Approximately 71 percent of the route is considered of high sensitivity for deeply buried deposits and approximately 29 percent is of low sensitivity.	Two previously identified prehistoric sites (P-38-004326 and -004329) within 1/16-mile of Alternative Route 2. Roughly 35 percent of this route crosses areas of moderate sensitivity; nearly 65 percent has low to very low potential for buried archaeological deposits. Highly sensitive for both surface and deeply buried historic-era deposits. Folsom Street borders the original shoreline in some areas and several Gold Rush-era piers and docks are depicted on historical maps. Presence of 102 historic buildings along route; moderate to high sensitivity for historical resources. Several city blocks have been subjected to archaeological excavations adjacent to this route and contain numerous privies, wells and trash deposits identified as eligible for the NRHP. Roughly 54 percent of the alignment is considered to have high sensitivity for deeply buried deposits, 21 percent is moderately sensitive for deep deposits and 24 percent is considered to have low potential for encountering deeply sensitive deposits.
<i>Visual Resources</i>	No permanent visual impact from underground or submarine transmission line. New structures at Potrero Switchyard visible, under all alternatives, but due to industrial nature of the existing site, impact is less than significant	No permanent visual impact from underground transmission line. Same switchyard impacts as proposed project.	No permanent visual impact from underground or submarine transmission line. Same switchyard impacts as proposed project.
<i>Hydrology and Water Quality</i>	Use of the hydroplow and HDD borings has potential to have temporary and localized impacts to water quality. Frac-out plan will be implemented and potential impacts will be less than significant. Temporary impacts to water quality due to erosion during construction will be further minimized through Best Management Practices and will not be significant.	Temporary impacts to water quality due to erosion during construction will be further minimized through Best Management Practices and are anticipated to be less than significant. No permanent hydrological impacts are expected with the underground sections of any alternative. This route does not involve use of HDD under a water body.	HDD crossing under China Basin channel. Frac-out plan will be implemented and potential impacts will be less than significant. Temporary impacts to water quality due to erosion during construction will be further minimized through Best Management Practices and will not be significant.

TABLE 5-1
Summary of Key Elements and Analysis of Selection Criteria for Proposed Project and Alternative Route Comparison
Embarcadero-Potrero 230 kV Transmission Project

Issue	Proposed Project	Alternative Route 1	Alternative Route 2
<i>Geology</i>	Submarine section will be less susceptible to damage during a seismic event than alternatives. HDD sections are expected to have minimal cable elongation during a seismic event. Crosses less than 1,000 feet of high liquefaction potential area at onshore HDD transition locations.	Crosses over 10,000 feet of high or very high liquefaction potential area.	Crosses over 10,000 feet of high or very high liquefaction potential area. At China Basin HDD crossing, initial review concluded that potential elongation of the cable beneath the channel caused by liquefaction-induced lateral spreading of channel banks likely could not be reliably accommodated.
<i>Hazards and Hazardous Materials</i>	HDD and 23rd Street crosses near Potrero Power Plant, a contaminated site, and may require special handling.	More known hazardous sites in Environmental Data Report (EDR, 2012) than the proposed project or the Alternative Route 2.	Fewer sites than Alternative Route 1.
<i>Air Quality and Noise</i>	Temporary construction-related dust and noise. The proposed project will have less impact to sensitive populations because the majority of the construction will occur away from most sensitive receptors and the onshore portions are relatively short in length.	Greater length through developed areas and greater number of schools and residences than proposed project. Increased duration of construction and proximity to more residential and commercial development.	Greater length through developed areas and greater number of schools and residences than proposed project. Shorter length and construction duration than Alt Route 1.
<i>Engineering Feasibility</i>	Shortest length in developed areas. Submarine construction in this area has minimal utility conflicts or potential for induced voltage/current. Less disruption to traffic, residences, and commercial uses	Slower construction in heavily urbanized area. Potential utility conflicts may increase cost and schedule, induced voltage/current issues. Greater disruption to traffic, residences and commercial uses.	Slower construction in heavily urbanized area. Potential utility conflicts may increase cost and schedule, induced voltage/current issues. Greater disruption to traffic, residences, and commercial uses.
<i>Impact of Design Basis Earthquake</i>	Low. Marine portion expected to survive without damage. 0.4 mile underground construction: reinforced concrete duct bank required to protect power cable from ground deformation to short onshore portions associated with liquefaction caused by the design basis earthquake.	High. 3.7 miles of onshore underground construction: reinforced concrete duct bank required to protect power cable from design basis earthquake. Would survive event but duct bank may require repair or replacement.	Very High. 3.1 miles of underground construction: reinforced concrete duct bank required to protect power cable from design basis earthquake. Power cable should survive event but duct bank may require repair or replacement. HDD crossing of China Basin channel could have cable elongation of up to 40 inches and likely cannot reliably be accommodated.
<i>Acquisition of Easement/Land Rights</i>	Approximately 38,000 square feet	Approximately 22,000 square feet	Approximately 42,080 square feet
<i>Technical/ Constructability Issues</i>			
<i>HDD count</i>	6 (3 phases each for 2 borings)	0	1
<i>Jack-and-bore count</i>	0	2	1

TABLE 5-1

Summary of Key Elements and Analysis of Selection Criteria for Proposed Project and Alternative Route Comparison

Embarcadero-Potrero 230 kV Transmission Project

Issue	Proposed Project	Alternative Route 1	Alternative Route 2
<i>Splices</i>	9	36	27
<i>Manholes</i>	7	12	9
<i>Construction Duration (Months)</i>	15	20	16
<i>Estimated EPC cost (in Millions; does not include substations)</i>	\$104 - \$108	\$108 - \$131	\$ 89 - \$106
Summary of Route Alternative Comparison	The proposed project (submarine route) is preferred.	Alternative Route 1 is considered the preferred onshore alternative.	Alternative Route 2 is not preferred; HDD crossing not considered technically viable.

Note:

Switchyard locations are addressed in Section 5.8.

Additionally, if new transmission facilities are not in place by the year 2030, the load served by Embarcadero Substation will likely exceed the capability of one of the existing Martin-Embarcadero cables. The transmission facilities in the project area could then fail to meet ISO and North American Electric Reliability Corporation transmission planning criteria.

In short, the No Project Alternative fails to meet PG&E's basic project objectives. PG&E therefore rejected this alternative.

5.4 Proposed Project

5.4.1 Description

The proposed project includes onshore underground, HDD transition, and submarine sections. On land, the three phases will be installed in a single underground duct bank; in San Francisco Bay the three phases will be installed as three separate cables in the Bay floor. From Embarcadero Substation, the cable will head underground northeast along Folsom Street, then southeast to Spear Street. An HDD will be used to transition from Spear Street under The Embarcadero and the seawall to the submarine section in Berth 30 between Piers 28 and 30/32. The submarine section continues offshore (eastward) before turning southward to parallel the shoreline towards Potrero. The route will turn westward and transition to land using HDD to arrive at the extension of 23rd Street near the DHL facility. The route continues underground 23rd Street to the new Potrero Switchyard.

An enhanced reinforced concrete duct bank will be installed for the onshore sections to protect the cable during the specified seismic event. The engineering requirement to address potential cable elongation caused by duct bank deformation during the specified seismic event (calculated to be approximately 6 inches) would be incorporated into the design of the duct bank, manhole, and cable racking system. The cables will transition from onshore to marine segments within high-density polyethylene conduits installed by HDD construction at a depth that avoids existing foundations and structures and minimizes ground displacements from the specified seismic event. The geotechnical investigation and conceptual engineering performed on the transition and submarine portions of the proposed project indicate that the cable will be able to withstand the tensile force caused by ground deformation associated with liquefaction during strong ground shaking generated by the design basis earthquake. For the onshore segments, while the cable system is expected to survive the specified seismic event and continue in service, the duct bank system will likely deform as a result of an event of this magnitude and may require repair or replacement. The submarine segment is expected to survive without damage.

5.4.2 Potential Environmental Impacts

The potential environmental impacts associated with the proposed project were summarized above in Table 5-1. Potential temporary less-than-significant impacts are anticipated for land use, traffic and transportation, air quality, noise, and hazards and hazardous materials for the onshore sections, as well water quality and biological resources for the submarine section, as discussed below. The proposed project will be minimally affected by geotechnical conditions associated with liquefaction potential; with inclusion of appropriate design and installation measures the impact will be less than significant. The proposed project will have no permanent visual impacts from the submarine or underground portions of the proposed project. The new structures at Potrero Switchyard will have a less than significant visual impact given the existing industrial setting. No impacts associated with cultural resources are expected, with appropriate design and implementation measures developed during final design to protect the adjacent structure at Potrero Switchyard.

5.4.2.1 Proposed Project: Land Use, Traffic, and Transportation

Because the proposed project is located either within existing city streets or underneath the Bay, no permanent land use, traffic, or transportation impacts are expected. Temporary less-than-significant impacts to existing land uses, traffic, and transportation are expected during construction from disruption of access and routes. Some temporary road and sidewalk closures and access detours will be required to maintain a safe work area during the construction of the onshore sections. During underground construction activities, temporary traffic disruptions are anticipated to occur, primarily related to trenching, splice vault construction, and bore pit activities. The HDD on the north end is located at a cul-de-sac, minimizing effects on traffic. Adjacent residential and commercial

uses are expected to be temporarily affected by changes in access and the presence of construction activities. The proposed project minimizes the length of construction in residential and commercial areas; the south end is located in an industrial area. Please refer to Chapter 4 of this Preliminary Environmental Assessment for a detailed discussion of potential impacts associated with the proposed project.

The proposed project is anticipated to have less impact than either of the alternative onshore routes, which are located near more residences and businesses. The proposed project will have no permanent land use, traffic, or transportation impacts.

5.4.2.2 Proposed Project: Cultural Resources

The proposed project construction corridor has the fewest known resources and generally contains the lowest archaeological sensitivity for both prehistoric and historical archaeological sites. The proposed project's historical structures and sensitive areas are limited to the land areas of the route; the majority of the proposed route is beneath the seabed and has low sensitivity for archaeological resources. The prehistoric sensitivity is low for the proposed project route where work areas are located. The proposed project route has low to moderate historical sensitivity. During field review, 17 built-environment resources were observed.

Embarcadero Substation has moderate sensitivity for prehistoric and high sensitivity for historical archaeological sites. One eligible building is adjacent to the substation. Potrero Switchyard has low sensitivity for prehistoric and moderate to high sensitivity for historical archaeology.

5.4.2.3 Proposed Project: Biological Resources and Hydrology and Water Quality

Temporary, less-than-significant impacts associated with biological resources are expected. Onshore biological impacts are expected to be less than significant because the line will be placed under existing roadways, and work will be limited to existing paved areas in developed areas. Because construction on land will be within or under existing paved city streets, no impacts to biological resources are expected for the onshore sections of the alternatives.

Potential proposed project-related impacts to special-status fish and managed fish species covered under the Magnuson-Stevens Act will be less than significant with avoidance and minimization measures, such as seasonal work windows and/or monitoring of herring spawn, limited construction duration, and a screened hydroplow water intake. Special-status species include the North American green sturgeon (*Acipenser medirostris*), Pacific herring (*Clupea pallasii*), steelhead (*Oncorhynchus mykiss*: Central Valley and Central California Coast), and Chinook salmon (*Oncorhynchus tshawytscha*: Sacramento River spring- and winter-run, Central Valley spring- and fall-run). Seasonal restrictions may be implemented for the submarine and HDD exit section whenever possible; in the event that seasonal work windows cannot be maintained for certain activities, additional measures such as monitoring for herring spawn may be required. The authorized work window to avoid potential impacts to Pacific herring is March 1 to November 30 (BCDC, 2011). For steelhead and Chinook salmon, the authorized work window is June 1 to November 30.

Hydroplow operations have the potential to create impacts to water quality and biological resources due to resuspension of sediments during construction; however, that effect would be localized, temporary, and less than significant. Work windows and a screened hydroplow intake will minimize effects on fish species. Potential impacts to biological resources associated with turbidity created by hydroplow and HDD operations are expected to be less than significant and temporary.

5.4.2.4 Proposed Project: Air Quality and Noise

Air quality and noise impacts will be limited to construction equipment-related emissions, dust, and noise, and are expected to be less than significant. The proposed project will have less impact to sensitive receptors because the line is located primarily underwater, with 0.6 mile of onshore section, as opposed to the onshore routes at 3.8 and 3.1 miles, respectively.

The northern onshore segment of the proposed project is located in densely developed commercial and residential development for approximately 0.4 mile. However, the onshore construction area for the proposed project's northern transition section will be located at the southeastern extent of Spear Street, which is a cul-de-

sac. These temporary construction impacts on the proposed project will be less than significant and further minimized with the implementation of applicant-proposed measures. The proposed project is located near fewer sensitive receptors than the two alternatives.

Onshore equipment for the proposed project will include trucks, mobile cranes, backhoes, a horizontal bore machine, and a horizontal directional drill rig, as described in Chapter 2, Project Description. Offshore equipment for the submarine section of the proposed project will include a cable-laying ship and support boats. The submarine section is expected to take approximately 22 days to complete, while the underground sections, including manhole/vault excavation, trenching, cable installation, and terminations, are expected to take approximately 7 months. The proposed project is expected to create air quality impacts through use of motorized construction equipment on land and use of a cable-laying ship and tending tugboats offshore. These impacts, however, will be temporary and less than significant and will be further minimized with the implementation of APMs. The proposed project will have no permanent air quality or noise impacts.

5.4.2.5 Proposed Project: Hazards and Hazardous Materials

An Environmental Data Report was obtained from Environmental Data Resources, Inc., and will be provided to CPUC separately. A review was performed for federally and state recognized contamination sites (for example, National Priority List, Leaking Underground Storage Tank) within 0.25 to 1 mile of the proposed project and alternatives. The majority of the potential areas of concern among the proposed project and alternatives are leaking underground storage tanks, primarily associated with gasoline stations, and the releases from the former manufactured gas plant (MGP) at the Potrero Power Plant site and nearby properties, including Potrero Switchyard. The proposed project and alternatives would involve similar construction and disturbance near the former MGP. Because a relatively small portion of the proposed project is proximate to known hazardous waste sites, it has the least potential to disturb existing hazardous waste during construction. Construction-related hazardous material impacts will be temporary and less than significant and will be further minimized with the implementation of APMs. Permanent hazards and hazardous materials are not expected.

5.5 Alternative Route 1

5.5.1 Description

Alternative Route 1 is the preferred onshore route, and would be located under city streets between Embarcadero Substation and Potrero Switchyard for approximately 3.8 miles. Alternative Route 1 would start at Embarcadero Substation at the southwest corner of Fremont Street and Folsom Street and head southeast on Fremont Street to Harrison Street, as shown on Figure 5-1. The route would turn southwest on Harrison Street and continue to 5th Street, turn southeast on 5th Street to Bryant Street, then southwest on Bryant Street to 8th Street. At 8th Street, the route would turn southeast and continue to the circle at Division Street, Townsend Street, and Henry Adams Street. The route would pass through the circle and turn south on Henry Adams Street. Henry Adams Street becomes Kansas Street; the route would follow Kansas Street to 17th Street. The route would continue east on 17th Street, which passes under I-280 to Iowa Street. (Note: 17th Street between Pennsylvania Street and Iowa Street and Iowa Street between 17th Street and Mariposa Street are currently "paper streets" [that is, a road or street that was planned and appears on maps, but was never constructed]). The route would continue south on Iowa Street to Mariposa Street, then turn east on Mariposa Street to Tennessee Street. The route would follow Tennessee Street south to 23rd Street, where it would terminate at the new Potrero Switchyard.

Alternative Route 1's Owens Street Option would begin at 17th Street and turn north on Missouri Street, then east on 16th Street to Owens Street. It would then follow Owens Street south for one block back to 17th Street, where it would rejoin Alternative Route 1.

Alternative Route 1 does not require an HDD boring but does involve two jack and bores. The route would be entirely under existing city streets, with the exception of a small segment under I-280 east of the intersection of 17th Street and Pennsylvania Avenue that crosses a lot currently under development for the new UCSF Medical Center and campus north of the intersection of Mariposa and Indiana Streets. This area could require acquisition of a new right of way since a portion would not be under city streets.

5.5.2 Potential Environmental Impacts

Impacts associated with Alternative Route 1 are similar in nature to the onshore portions of the proposed project and to Alternative 2. This route would pass through more areas of high liquefaction risk than the proposed project and is therefore less desirable from an engineering perspective. For Alternative 1, the primary environmental impacts would be temporary impacts associated with disruption of existing land uses and traffic, air quality, and noise during construction. These potential environmental impacts are summarized in Table 5-1.

5.5.2.1 Alternative Route 1: Land Use, Traffic, and Transportation

Land use, traffic, and transportation temporary impacts from construction of Alternative Route 1 would be similar to that of Alternative Route 2 but would have more traffic and potential land use impacts than the proposed project. Alternative 1 would travel approximately 3.8 miles under city streets adjacent to urban residential and commercial development. Temporary disruption to existing land uses and traffic and transportation routes would occur during construction when road and sidewalk closures and detours would be required. The proposed project route would be largely in the Bay with only short segments underground and would have fewer impacts to nearby land uses, traffic, or transportation than either alternative. Alternative Route 1 also has higher potential for conflicts with other utilities than does the proposed project.

5.5.2.2 Alternative Route 1: Cultural Resources

Alternative Route 1 is the most sensitive of the project alternatives, with two previously identified prehistoric sites (P-38-000002 and -004499) located along the route. Land within 50 meters (about 164 feet) of known prehistoric sites is considered highly sensitive for prehistoric resources. About one percent of the route is within areas of high sensitivity for prehistoric resources. About three-fifths (58.5 percent) of the route crosses areas of moderate potential for buried sites. Compared to the proposed project route, Alternative 1 has higher archaeological sensitivity for both prehistoric and historical archaeological sites.

The majority of the route extends through original ground; only a short segment near Potrero Switchyard extends through fill. Based on historical land use maps, approximately 65 percent of the total route is of high sensitivity for surface or near surface deposits and approximately 35 percent is of moderate sensitivity. Numerous sites have been identified adjacent to this line, primarily by Sonoma State University (Praetzellis and Praetzellis, 2009), and have significant deposits contained in privies, wells and a cesspool. Based on known deposits and land use patterns, approximately 71 percent of Alternative Route 1 is considered of higher sensitivity for deeply buried deposits and approximately 29 percent is of low sensitivity.

In addition to the buried deposit potential, the majority of this route follows streets that are known to contain significant subsurface utilities, including the San Francisco Fire Department Auxiliary Water Supply, brick sewers, and wood water pipes (Byrd et al., 2010). These streets are considered of high sensitivity. This route is lined with 129 historic buildings, the most of the three routes under study, and is of moderate to high sensitivity for historical resources. Alternative Route 1 has a higher potential for encountering cultural resources than the proposed project and Alternative Route 2.

5.5.2.3 Alternative Route 1: Air Quality and Noise

Temporary air quality and noise impacts associated with Alternative Route 1 would be similar to the onshore construction for the proposed project and Alternative Route 2. However, Alternative 1 would have greater temporary air quality and noise impacts than Alternative 2 given its proximity to more extensive residential and commercial development and longer route which likely would correspond to a longer duration of use of construction equipment. The proposed project would have significantly lower air quality and noise impacts than Alternative 1 because the majority of construction would take place in marine sediments.

5.5.2.4 Alternative Route 1: Hazards and Hazardous Materials

As with the onshore portions of the proposed project, hazardous materials impacts associated with Alternative Route 1 would primarily be related to abandoned underground storage tanks and the MGP near Potrero Switchyard. Onshore sections of the proposed project and the alternatives would involve similar construction and disturbance near the former MGP. The EDR report indicates a greater number of known sites along the 3.8-mile

route length of Alternative Route 1 than the proposed project or Alternative 2; therefore, it would be the least-preferred option in terms of this resource area. Compared to Alternative 1, the proposed project would have a lower potential for encountering hazards and hazardous materials due to its placement in offshore sediments.

5.6 Alternative Route 2

Alternative Route 2 is considered less viable from an engineering design perspective because the preliminary design review determined the potential cable elongation caused by duct bank deformation under the China Basin channel in the event of the design-level earthquake may not be reliably accommodated. This concern with the route's feasibility is what led PG&E to designate Alternative Route 1 as the "preferred" onshore route.

5.6.1 Description

Alternative Route 2 would travel under city streets between Embarcadero Substation and Potrero Switchyard, except for a short crossing underneath the China Basin channel, for a total length of approximately 3.1 miles.

Alternative Route 2 would begin on Folsom Street just south of the corner with Fremont Street. It would continue southwest on Folsom Street to 3rd Street, then turn southeast on 3rd Street to Bryant Street. The route would continue southwest on Bryant Street and follow Bryant Street to 5th Street, then turn southeast on 5th Street and cross under the railroad yard between Townsend and King Streets to its end at Berry Street. The route would continue through the 5th Street Plaza (part of Mission Creek Parks), then cross under the Mission Creek Channel and another parcel of Mission Creek Parks. The route would cross Channel Street, pass through a future Mission Creek Park parcel, cross the future Long Bridge Street, and pass through a future Mission Street Parks parcel to reach China Basin Street. At that point, the route would continue east on China Basin Street, then south on 4th Street through the UCSF Medical Center complex (under construction) to Mariposa Street. At Mariposa, the route would continue south on Minnesota Street to 22nd Street. At 22nd Street, the route would turn east for one block to Tennessee Street, south to 23rd Street, then east to Illinois Street, where it would terminate at Potrero Switchyard.

5.6.2 Potential Environmental Impacts

For Alternative Route 2, the primary environmental impacts would be temporary and associated with land use, traffic, transportation, air quality, noise, and water quality as discussed below.

5.6.2.1 Alternative Route 2: Land Use, Traffic, and Transportation

Land use, traffic, and transportation temporary impacts from the construction of Alternative Route 2 would be similar to those created by Alternative Route 1. Alternative Route 2 would travel approximately 3.1 miles under city streets adjacent to residential and urban development. Temporary disruption to existing land uses and traffic and transportation routes would occur during construction when road and sidewalk closures and detours would be required. This route would be located near somewhat less residential but more urban development than Alternative Route 1.

The HDD under China Basin to 5th Street could require closure of at least two lanes of 5th Street for several months. Installation of the underground transmission line for Alternative 2 would not have a permanent impact on land use because the line would be installed in existing city streets.

Alternative Route 2 would also involve crossing through a large vacant lot that is planned for redevelopment adjacent to China Basin to the southeast, as well as through a lot currently under development for a new UCSF medical center and campus, where the line would transition from Minnesota Street to 4th Street between Mariposa Street and 16th Street. A surface roadway is under construction that would connect Minnesota to 4th Street, but according to architectural drawings of the new hospital, this street would not allow through traffic, and therefore a new right of way may be needed for this section. Constructing an underground transmission line in these lots would not likely create land use or traffic impacts, though further consultation with the City and the developer of those lots would be needed if this alternative had been selected.

The proposed project route would primarily be located in the Bay with short segments on land, and would have fewer impacts to land uses, traffic, or transportation than the much longer on-land alternatives.

5.6.2.2 Alternative Route 2: Cultural Resources

There are two previously identified prehistoric sites (P-38-004326 and -004329) within 1/16-mile of Alternative Route 2. Roughly 35 percent of this route crosses areas of moderate sensitivity; nearly 65 percent has low to very low potential for buried archaeological deposits, making it the second-least sensitive route in this regard.

Alternative Route 2 is highly sensitive for both surface and deeply buried historic-era deposits. Folsom Street borders the original shoreline in some areas and several Gold Rush-era piers and docks are depicted on historical maps near this alternative. Several city blocks have been subjected to archaeological excavations adjacent to this line, and contain numerous privies, wells and trash deposits identified as eligible for the NRHP (Praetzellis and Praetzellis, 2009). These deposits are located in private parcels adjacent to the alternative land route. The route continues east and south, cutting through the filled historic Mission Bay and China Basin.

An estimated 48 percent of the total alternative land route alignment is considered of high surface sensitivity. The remaining 52 percent is of moderate sensitivity for surface or near-surface deposits. There are significant subsurface utilities that extend under the city streets throughout the project vicinity. Among these is the San Francisco Fire Department Auxiliary Water Supply, which is listed on the NRHP. In addition to the surface sensitivity, roughly 54 percent of the alignment is considered to have high sensitivity for deeply buried deposits, 21 percent is moderately sensitive for deep deposits, and 24 percent is considered to have low potential for encountering deeply sensitive deposits.

This route is lined with 102 historic buildings, the second highest amount of the three route alternatives, and has moderate to high sensitivity for historical resources.

5.6.2.3 Alternative Route 2: Air Quality and Noise

Because of its shorter length and construction duration compared to Alternative Route 1, Alternative Route 2 would have relatively fewer and less severe noise and temporary air quality impacts. However, this route would have more air quality and noise impacts than the proposed project due to greater onshore construction activities.

5.6.2.4 Alternative Route 2: Geology and Seismicity

This alternative runs through approximately the same amount of high-to-very-high liquefaction risk areas as the Alternative Route 1 and more than 10 times more of such risk areas than the proposed project. In addition, this alternative includes an HDD under China Basin that more in-depth engineering studies have determined would present a high risk of failure during a seismic event of the magnitude of the design basis earthquake.

5.7 Proposed Project and Route Alternatives Conclusion

The proposed project has considerably less impact on urbanized areas than either of the alternative onshore routes given that it has only 0.4 mile of underground construction in the north and 0.2 mile of underground construction in an industrial area on the south end. It has the least impact on urbanized residential and commercial areas, including the least construction impacts to land uses, traffic, transportation, noise, and air quality. It also is the most reliable seismically of the three route alternatives and best meets the project purpose and need.

Alternative Route 1 with 3.8 miles of underground construction in an urbanized area would have greater impacts to land use, traffic, transportation, air quality, and noise due to the more extensive disruption in urbanized areas compared to the proposed project. It also has close to 10,000 feet more line in areas of high liquefaction potential than the proposed project. Alternative Route 2 is the least desirable primarily due to potential seismic impact and geotechnical complexity.

5.8 Switchyard Proposed Location and Alternatives

Three locations were considered for construction of the new 230 kV switchyard. These include the PG&E Hoe Down and Laydown Yard sites on 22nd Street and a nearby privately-owned parcel on 23rd Street (the "GenOn Site"). These are described below and shown in Figure 5-2. The GenOn Site has been selected as the proposed location for the new switchyard.

5.8.1.1 GenOn Site Description

The new switchyard is proposed to be located immediately east of the existing Potrero Switchyard on the north side of 23rd Street on a parcel owned by GenOn Energy, Inc.

5.8.1.2 PG&E Hoe Down and Laydown Yards Description

Two of the locations considered for the new 230 kV switchyard are on existing PG&E land north of 22nd Street, across from the existing switchyard, which is on Illinois Street between 22nd Street and 23rd Street (see Figure 5-2. These locations include two existing PG&E general construction facilities known as the Hoe Down Yard and the Laydown Yard.

The Hoe Down Yard and Laydown Yard land available for the new 230 kV switchyard is divided into two pieces by the alignment of Michigan Street, which is a "paper street" in this location, and the remnant Irish Hill, also referred to as Serpentine Hill. The Michigan Street alignment is owned by the City of San Francisco. The dimensions of the two pieces of PG&E land are 329 feet by 200 feet (west of Michigan Street) and 240 feet by 270 feet (east of Michigan Street), with the 80-foot-wide street alignment running north-south along the length of the site. Though it has been abandoned, this paper street would be avoided if a switchyard were to be built on either or both of the two pieces of land. Neither site would disturb the existing hill but would be located entirely within PG&E's existing area of industrial use. At either location, PG&E's existing construction trailers, equipment, and/or material storage areas would be replaced with a switchyard surrounded by a landscaped wall.

5.8.1.3 Potential Environmental Impacts

The potential environmental impacts associated with the proposed switchyard location and alternative switchyard locations are generally similar. Potential temporary less-than-significant impacts are anticipated for traffic and transportation, air quality, noise, and hazards and hazardous materials previously discussed for the onshore portions of the proposed project and the alternative routes. The proposed and alternative switchyard locations will be minimally affected by geotechnical conditions associated with liquefaction potential, and with inclusion of appropriate design and installation measures the impact will be less than significant.

The new structures at Potrero Switchyard will be visible at the proposed location and at the alternative locations, but due to the industrial nature of the existing site, this impact would be less than significant. The Potrero Switchyard area is of low sensitivity for prehistoric archeology and moderate to high sensitivity for historical archaeology. The GenOn switchyard location is near three historic buildings and immediately adjacent to four buildings (referred to collectively as Building 19) contained in Station A, an NRHP-eligible gas manufacturing plant. The buildings would not be impacted by construction of new structures. Potential removal or demolition of the foundation remains of Station A from excavation for the switchyard structures will be reduced to a less-than-significant level through implementation of APM CUL-7.

The Hoe Down and Laydown Yard locations have been severely impacted by modern disturbances and are currently in use as a construction yard. A review of existing conditions at the three locations found no cultural sites. The Hoe Down and Laydown Yards have no built environment resources on or adjacent to them and are considered of low sensitivity for archaeological resources. No impacts associated with biological resources and hydrology and water quality are expected.

5.8.1.4 Land Use

Both the proposed switchyard location and alternative switchyard locations are outside of the jurisdictional areas of the Port of San Francisco and BCDC, so the impact analysis is limited to reviewing the San Francisco General Plan, including the Central Waterfront Area Plan (San Francisco Planning Department, 2008) and the Recreation and Open Space Element (San Francisco Board of Supervisors, 2011).

Construction of the switchyard at the Hoe Down or Laydown Sites would not preclude future development or increased public access to new or expanded open spaces along the shoreline, nor would it preclude mixed use development in the adjacent Pier 70 Preferred Master Plan Area (Port of San Francisco, 2010). Therefore, the proposed and alternative switchyard locations are compatible with existing land use and land planning policies and zoning in the area; there will be no impact to land use.

Zoning. For all three sites, the underground cable connecting into the switchyard location would be installed in 23rd Street through an area that is designated as M-2-Heavy Industrial in the existing zoning that is incorporated into the Central Waterfront Area Plan. The GenOn Site and PG&E-owned Hoe Down Yard Site are zoned M-2 Heavy Industrial, and the PG&E-owned Laydown Yard Site (just east of the Hoe Down Yard) is zoned P-Public Use (San Francisco Planning Department, 2011). Note that as a public utility regulated by the CPUC, PG&E is not subject to regulation under the San Francisco Zoning Code. Nonetheless, development of a new switchyard at the GenOn Site or the alternative locations would be compatible with existing zoning.

Port Waterfront Land Use Plan. The Southern Waterfront, a subarea plan in the Port's Waterfront Land Use Plan, recognizes Pier 70 as a potential Mixed Use Opportunity Area. This area is between 18th and 21st Streets and is just north of the Hoe Down Yard Site. The plan would permit non-maritime land uses resulting in preservation of historic buildings as well as improved public access. Project facilities would be located outside of the boundaries of the Waterfront Land Use Plan in the Southern Waterfront (Port of San Francisco, 2004).

Pier 70 Preferred Master Plan. Adopted by the Port in April 2010, the Pier 70 Preferred Master Plan (Port of San Francisco, 2010) broadens land use in the planning area from heavy industrial to encompass more mixed uses, including residential, office, biotech, commercial, research and development, and production, distribution and repair uses. It also defines a series of interconnected open spaces and pedestrian pathways that include Irish Hill. All three switchyard locations are located outside of the planning area but both alternative switchyard locations are immediately adjacent and just outside the boundary of the Pier 70 Preferred Master Plan.

The Pier 70 Preferred Master Plan has zoned the parcel just south of 20th Street along Illinois Street, which is immediately north of the Hoe Down Yard Site, as "mixed-use residential allowed." The plan requires residential developments to be compatible with the ship repair industry. The Pier 70 Preferred Master Plan designates most of the area along 22nd Street east of the project for development with office, biotech, commercial, research and development, and production/distribution/repair uses.

5.8.1.5 Switchyard Alternative Conclusion

PG&E selected the GenOn site as the proposed location due to engineering feasibility and ease of connectivity to existing facilities. Additionally, PG&E preferred the GenOn site given the location of the Hoe Down and Laydown Yards in relation to the Port's Pier 70 redevelopment project. Subsequent to PG&E's decision to propose the GenOn site as the proposed location, PG&E entered into negotiations to sell the Port its Hoe Down and Laydown Yard sites as a condition precedent to issuance of a Port license for construction and operation of the proposed project.

5.9 References

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