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TECHNICAL MEMORANDUM

VIA E-MAIL

To: Marcia McLaren (PG&E) **Date: December 23, 2011**

From: Ray de Wit

Subject: Summary Report-OBS ROV Revised Cable Route Survey **JN 1102-0621**

Marcia:

Below is the subject report which: (1) summarizes the results of the ROV survey of the rock features within and adjacent to the proposed revised segments of the OBS cable; (2) discusses potential impacts; (3) provides a comparison of potential impacts between the original and proposed cable routes and temporary OBS #4 (Temp-4) locations; and (4) provides a recommendation to reduce or eliminate potential impacts.

Introduction

As a result of a request from the California Department of Fish and Game (CDFG) to minimize the amount of seafloor disturbance within the State Marine Reserve (SMR) portion of the Point Buchon Marine Protected Area (MPA), 3.4 kilometers (km) (2.1 miles [mi]) of cable and the proposed location of temporary OBS Unit #4 (Temp-4) were relocated into the State Marine Conservation Area (SMCA), with 0.8 km (0.5 mi) remaining in the SMR. Figure 1 shows the locations of the original proposed cable route (orange line) and Temp-4 with the CDFG-recommended proposed cable realignment (dark blue line) and new location for Temp-4. Because the seafloor habitats along that realigned portion of the cable and at the new Temp-4 location were not included in a June 2011 ROV survey, CDFG requested PG&E to complete a survey of these areas (Reference CDFG letter to the California State Lands Commission, dated October 6, 2011). Water depths listed below were taken from bathymetric data recorded on the ROV video footage.

On December 9, 2011, a focused ROV survey of segments of the proposed revised alignment of PG&E's OBS cable and the proposed revised location of Temp-4 offshore the Diablo Canyon Power Plant (DCPP) was completed. The survey provided video and still images of the seafloor habitats and associated biota within and adjacent to the pre-selected segments of the new cable corridor shown in Figure 2. The ROV, a Phantom 2 + 2 owned and operated by Aqueos, Inc. (Ventura, CA), collected video within a 3 meter (m) (10 feet [ft]) -wide viewing area along the alignment between Stations 8 and 6, 5 and 4, and 2 and 1 and across rock features within the survey area. In addition, video and still photographs were taken at locations where rocky habitat was suspected (e.g., Station 7), at other sites adjacent to the cable alignment (between Stations 5 and 4), and at the proposed revised location for Temp-4 (Station 3). Figure 3 shows the actual survey locations (post-plots of navigational fixes taken during the survey) along the proposed revised cable alignment segment and at the proposed revised Temp-4 location. Figure 4 is an enhanced view of the area between Stations 5 and 4.

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Below is a summary of a review of the video footage, a comparison of the potential impacts between the original and proposed realigned cable routes and original and revised Temp-4 location and a recommended mitigation to reduce potential impacts along a portion of the realigned cable route. Photographs of representative seafloor habitats and biota are provided at the end of this memorandum. The photographs are presented in sequence as they were recorded during the ROV survey, which was completed from east to west (Station 8 to 6) and south to north (Station 5 to 1) as shown in Figures 2 and 3.

Cable Segment Between Stations 8 and 6

The seafloor habitat between Stations 8 and 6 was 95 percent sedimentary, consisting of areas of coarse sand and shell hash where sand waves (Photos 1 and 6) (from 0.2 to 1 m [0.5 to 3 ft] high) are interspersed among relatively flat areas of finer sediments (Photos 2 and 10). As is shown in Figure 3, rock features were observed 9 to 31 m (30 to 100 ft) from the proposed alignment and consisted of low to high (up to 3 m [10 ft]) relief reefs and scattered rock. Those features were located at Station 7 and at a site 457 m (1,500 ft) east of Station 6 (Location 14, Photos 3 through 5, and 7 through 9). Rock features that were observed along this segment of the realignment consisted of a sediment-covered, low relief (0.3 to 0.6 m [1 to 2 ft]) broken rock reef in 58 m (190 ft) of water, 305 m (1,000 ft) east of Station 6 (Location 15). The water depth along this segment ranged from 53 to 62 m (173 to 203 ft).

Dominant sediment-associated macroepibiota observed within this area included three species of sea pens (*Stylatula elongata, Ptilosarcus* sp., and *Acanthoptilum* sp.), a sea slug (*Pleurobranchus* sp.), an unidentified burrowing anemone, and three seastars (*Astropecten* sp, *Orthasterias koehleri*, and a multi-armed sunstar *Solaster* sp.). Dungeness crabs (*Metacarcinus =Cancer magister*), juvenile lingcod (*Ophiodon elongatus*) (Photo 8), and sanddabs (*Citharichthys sordidus*) were present but not common on the sedimentary seafloor within these water depths.

Although lower relief rock features tended to be covered with a veneer of sediment, that substrate supported epifauna typical of that reported in other surveys within these water depths. Near the base of the features, solitary corals (i.e. *Coenocyathus bowersi*), unidentified ectoprocts and hydroids, and the strawberry anemone (*Corynactis californica*) were present to common. The powder puff anemone (*Metridium giganteus*) was common to abundant on the upper surfaces of the higher relief features where sediment cover was absent. A gorgonian coral (cf *Eugorgia* sp.) was also present on the higher features. Fish were not abundant on any of the rock features surveyed within these water depths, however the yellowtail rockfish (*Sebastes flavidus*) and the convict fish (*Oxylebius pictus*) were observed.

Cable Segment Between Stations 5 and 4

The seafloor along the 549 m (1,800 ft) section between Stations 5 and 4 was 70 percent sediment, consisting of sand waves with coarse sand and shell hash among flat surface area with fine surficial sediments, with the remainder comprised of rock substrate (cobble/boulder, broken rock low relief features, and high relief ridges). The highest relief area was a series of 2 to 3 m (6 to 10 ft)-high

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ridges, 76 m (250 ft) northwest of Station 5 (Locations 18 to 20 in Figure 3); lower relief features were observed 152 and 229 m (500 and 750 ft) northwest of Station 5 (Locations 21 and 22). The feature located 15 m (50 ft) southeast of Station 4 (Location 26) consisted of low-relief ledges, boulders, and broken rock pieces (Photos 12 through 16). Water depths between Stations 5 and 4 ranged from 62 to 65 m (203 to 212 ft).

Biota observed within this segment was similar to that observed between Stations 8 and 6 (see above and Photo 11), but there were a few minor differences. Unidentified brittle stars were locally abundant in the flat, fine-sediment areas in this segment and, except for the feature southeast of Station 4 (Location 26), rock habitat here supported fewer powder puff anemones than the features between Stations 8 and 6. Adult and sub-adult rockfish, including yellowtail, rosy, copper, and blue (*S. rosaceus, S. caurinus,* and *S. mystinus*, respectively), were observed in the water above and around these features. Lingcod were also present around the base of outcrops and on the lower relief features within this segment.

Proposed OBS Temp-4 Location and Cable Segment Between Stations 2 and 1

The seafloor habitat at the proposed revised Temp-4 location was flat, fine sediments (Photo 17). No rock features were detected within 15 m (50 ft) of the center point using the ROV's scanning sonar. Common biota within this area included seapens and seastars.

The two rock features detected east of Stations 2 and 1 (Locations 30 and 31 in Figure 3) consisted of low to moderate relief (0.3 to 1 m [1 to 3 ft]) ledges that supported relatively abundant powder puff anemones. Gorgonian and solitary corals were also present, but not abundant, and three adult yellowtail rockfish were observed around those features.

Conclusions

Within the proposed cable corridor, rocky seafloor habitat is limited to three relatively distinct areas: a broken rock/cobble area in 58 m (190 ft) of water 305 m (1,000 ft) east of Station 6 (Location 15 in Figure 3), a 75 m- (246 ft) long feature in water depths between 62 to 65 m (203 to 212 ft) northwest of Station 5 (Locations 18 to 20), and a 10 m- (33 ft) long feature approximately 10 m (33 ft) further northwest (Locations 21 to 22). Maximum vertical relief was 3 m (10 ft) and consisted of a series of ledges at a feature between Stations 5 and 4. Other rocky habitat was observed adjacent to and within 9 m (30 ft) west of that segment. The rock habitat that the proposed revised cable would cross supports biota that are typical of that found elsewhere within the region and within these water depths; no listed (threatened or endangered) species were observed within the area surveyed. Further, the presence of the rock features is not expected to preclude the placement of the cable, but could result in some areas of freespanning (unsupported cable) on either side of higher relief features. With minor adjustments of the proposed cable route, most of the high-relief rock features could be avoided. The proposed location for Temp-4 is flat sediment with no rock habitat within 15 m (50 ft) of that point.

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Comparison of Potential Impacts Between the Original and Proposed Revised Routes and Temp-4 Locations

Temp-4 Locations: The seafloor habitat at the original and proposed revised locations for Temp-4 is sedimentary and no significant impacts are expected from the placement of that unit in that location. The relocation does reduce the amount of habitat affected within the SMR.

Cable Route: The original cable route that was located within the SMR crossed approximately 6 m (20 ft) of rock that consisted of low-relief (up to 1 m [3 ft]) ridges, which could have been avoided during cable installation. The proposed revised alignment results in the cable crossing approximately 85 m (280 ft) of rock habitat, with approximately 10 m (33 ft) being high relief (3 m [10 ft]). The remaining 75 m (246 ft) of rock is low to moderate relief (1 to <3 m [3 to <10 ft]. Impacts to the habitat and epibiota are not expected to be significant, however high-relief features are generally considered sensitive as they tend to support longer-lived organisms (i.e. gorgonian coral) and higher concentrations of rockfish.

The impacts to the habitat would be expected to occur within a relatively narrow area (estimated to be 1 to 2 m [3 to 6 ft] due to abrasion of the rock surface; no significant effects to the fish community is expected. The sedimentary habitat supports epibiota that is common throughout the area and the effects to that substrate and the associated biota are expected to be less than significant and the area affected smaller than that for rocky substrate due to the expected self-burial of the cable into the sediment. Actual impacts will be assessed from technical review of video footage recorded during the post-installation ROV survey.

Recommended Mitigation

Based on the CDFG request to limit the amount of cable within the SMR and due to the presence of rock substrate within that portion of the SMCA of the MPA between Stations 5 and 4 (see Figure 2), it is not possible to completely avoid crossing rock. However, video recorded during this ROV survey suggests that sediment or lower-relief rock is present east of the proposed alignment between Stations 5 and 4 (Figure 4). Therefore, to avoid the rocky habitat at Locations 23, 24, and 25, it is recommended that the cable route from 200 m (656 ft) northwest of Station 5 to 75 m (246 ft) southeast of Station 4 be moved 50 m (164 ft) east of the proposed realigned cable (see dashed green line in Figure 4). The proposed alignment south of the dashed line does not need to be moved as it will avoid the high-relief features observed at Locations 20 and 21. With the implementation of this mitigation, approximately the same amount of rock habitat will be crossed. However implementation of this mitigation will: 1) eliminate or substantially reduce the amount of high-relief structures crossed, 2) provide for the cable to remain outside the SMR, and 3) reduce potential damage to the cable from freespaning and increased tension. No other revisions to the currently-proposed alignment are recommended.

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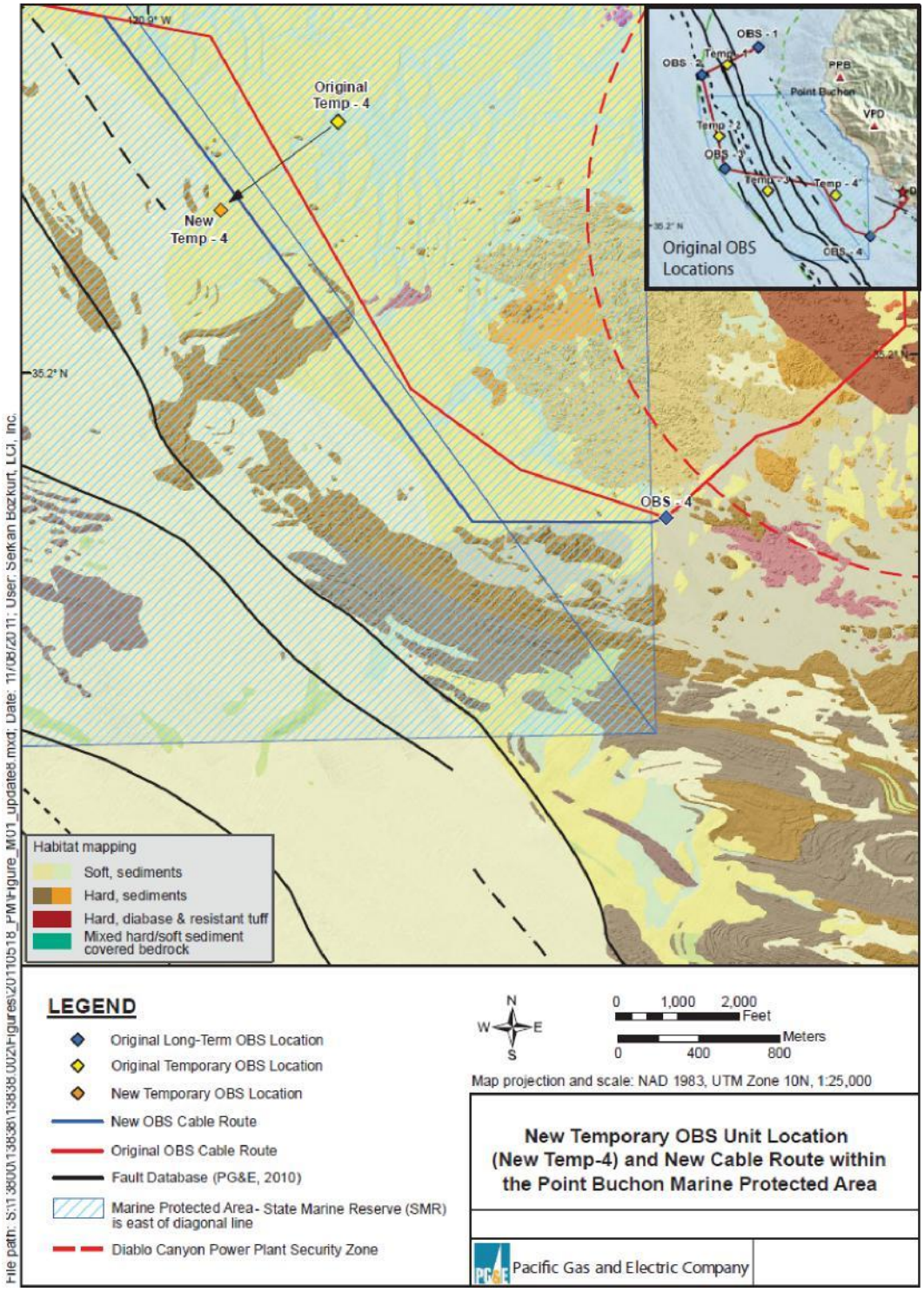

Figure 1. Original and Proposed Revised Cable Alignment and Temporary OBS Unit #4 Relocation

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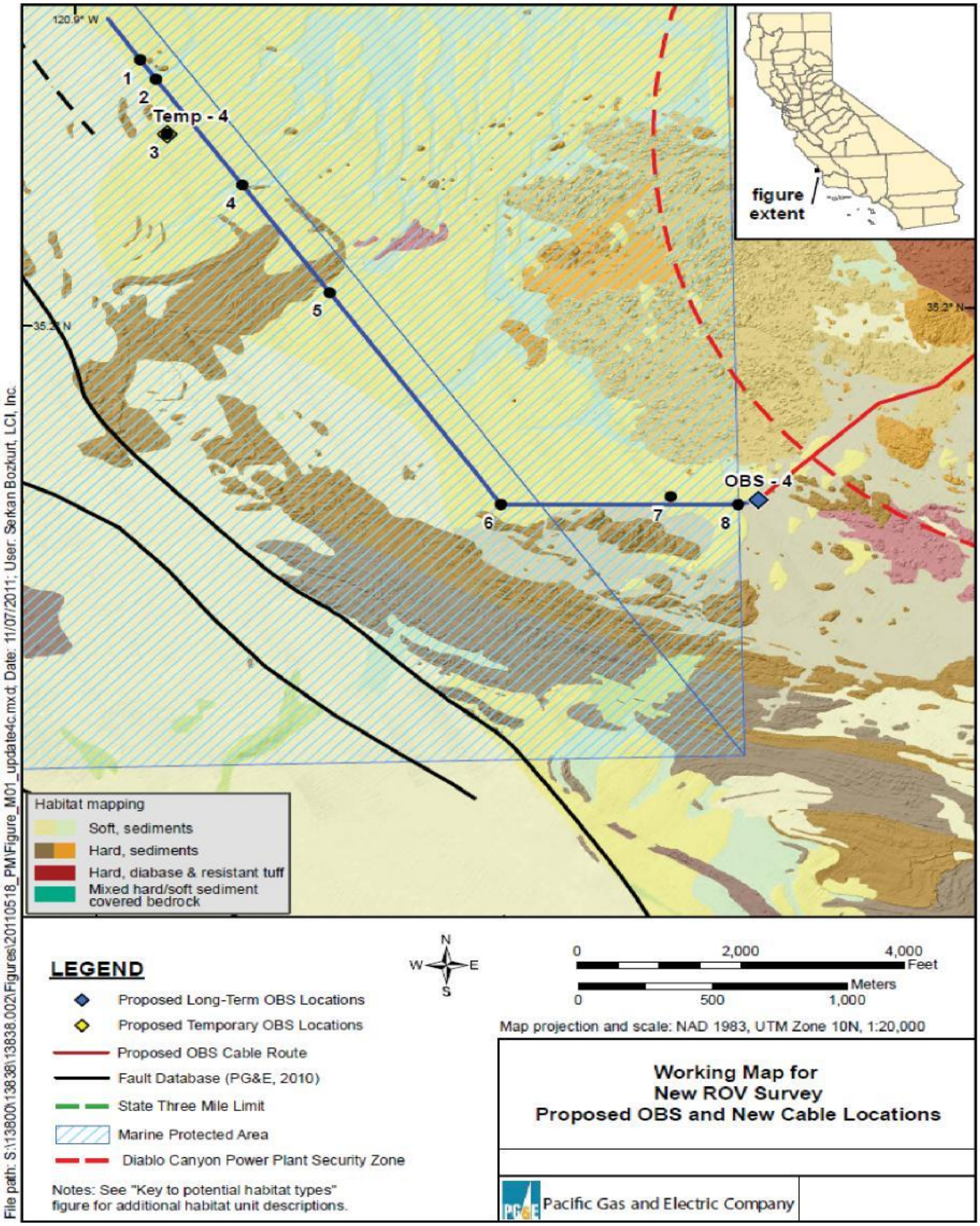

Figure 2. ROV Pre-Plotted Survey Locations

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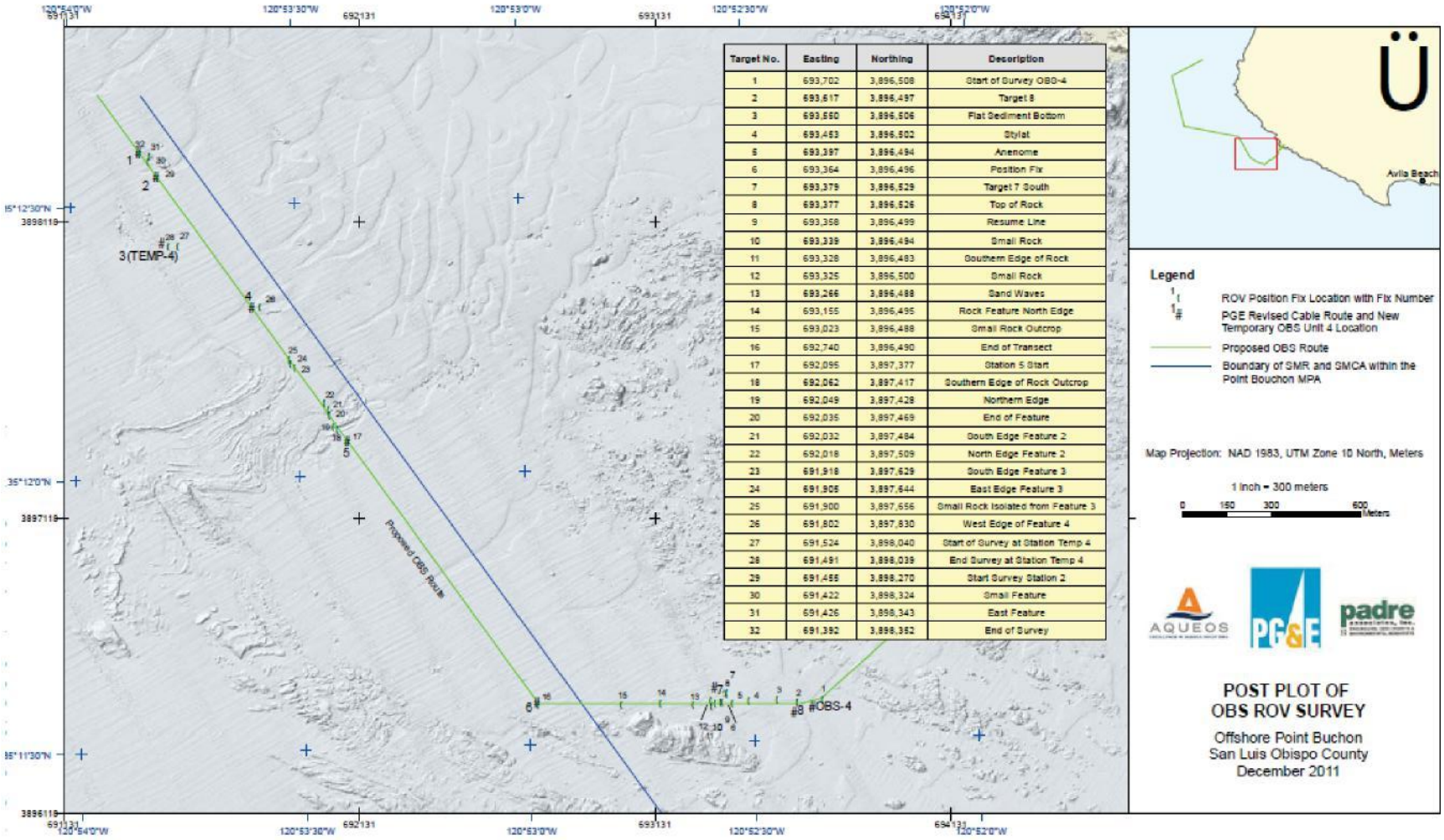

Figure 3. ROV Post-Plot Survey Locations Along the Proposed Revised Cable Route

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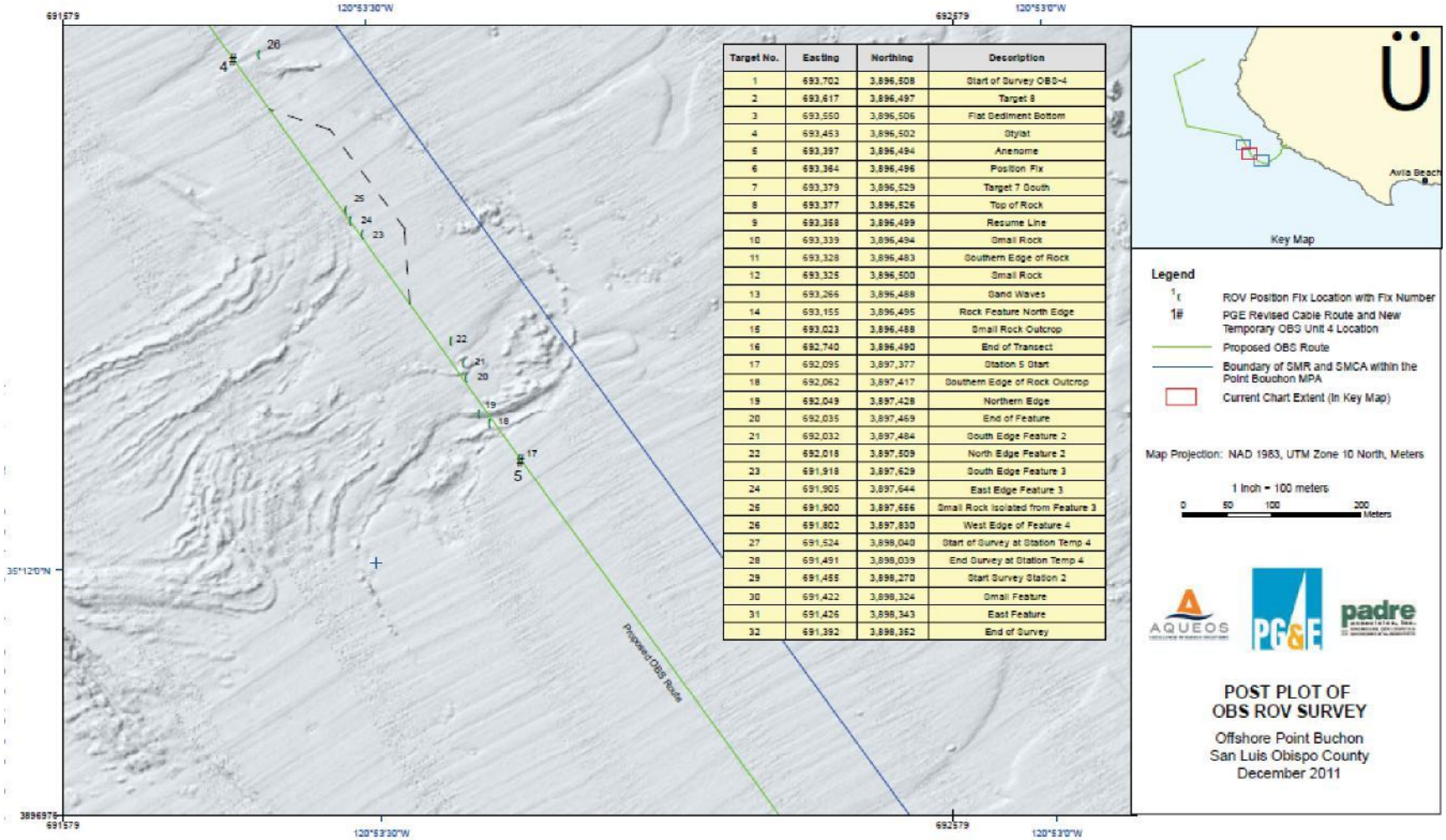

Target No.	Easting	Northing	Description
1	693,702	3,896,508	Start of Survey OBS-4
2	693,617	3,896,497	Target 8
3	693,550	3,896,506	Flat Sediment Bottom
4	693,453	3,896,502	Stylist
5	693,397	3,896,494	Anenome
6	693,364	3,896,496	Position Fix
7	693,379	3,896,529	Target 7 South
8	693,377	3,896,526	Top of Rock
9	693,358	3,896,499	Resume Line
10	693,339	3,896,494	Small Rock
11	693,328	3,896,483	Southern Edge of Rock
12	693,325	3,896,500	Small Rock
13	693,266	3,896,488	Sand Waves
14	693,155	3,896,495	Rock Feature North Edge
15	693,023	3,896,488	Small Rock Outcrop
16	692,740	3,896,490	End of Transect
17	692,095	3,897,377	Station 5 Start
18	692,062	3,897,417	Southern Edge of Rock Outcrop
19	692,049	3,897,428	Northern Edge
20	692,035	3,897,469	End of Feature
21	692,032	3,897,484	South Edge Feature 2
22	692,018	3,897,509	North Edge Feature 2
23	691,918	3,897,629	South Edge Feature 3
24	691,905	3,897,644	East Edge Feature 3
25	691,900	3,897,656	Small Rock Isolated from Feature 3
26	691,802	3,897,830	West Edge of Feature 4
27	691,524	3,898,040	Start of Survey at Station Temp 4
28	691,491	3,898,039	End Survey at Station Temp 4
29	691,455	3,898,270	Start Survey Station 2
30	691,422	3,898,324	Small Feature
31	691,426	3,898,343	East Feature
32	691,392	3,898,352	End of Survey

Figure 4. Expanded View of the Proposed Revised Cable Route Between Stations 3 and 4. Black Dashed Line is the Mitigation to Avoid Rocky Habitat at Locations 23, 24, and 25.

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ROV SURVEY PHOTOGRAPHS

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Photo 1. Sand Waves at OBS-4 Location, Inshore End of Proposed Revised Cable Route

Photo 2. Flat Sedimentary Seafloor with Sea Pen (*Stylatula elongata*) Along Proposed Revised Cable Route Between Stations 8 and 6

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Photo 3. Rock Feature #7 (Location 7 in Figure 3), 100 ft North of Cable Alignment with Solitary Coral (cf *Coenocyathus bowersi*) and Strawberry Anemones (*Corynactis californica*)

Photo 4. Top of Rock Feature #7 (Location 8 in Figure 3) with Powder Puff Anemones (*Metridium giganteum*), Encrusting Ectoprocts, and Solitary Corals

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Photo 5. Base of Rock Feature Along Proposed Revised Cable Route Between Stations 8 and 6 with a Sunstar (cf *Solaster* sp), Unidentified Anemones, and Solitary Corals

Photo 6. Sand Wave Habitat Near Station 6 with Sandstar (*Astropecten* sp)

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Photo 7. North Edge of Rock Feature Between Stations 8 and 6 with Powder Puff Anemones and Unidentified Encrusting Sponge

Photo 8. Subadult Lingcod (*Ophiodon elongatus*) on Sedimentary Seafloor Between Stations 8 and 6

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Photo 9. Rock Feature East of Station 6 with Powder Puff Anemones, Unidentified Ectoprocts, Solitary Corals, and Gorgonian Coral (cf *Eugorgia* sp)

Photo 10. Sedimentary Seafloor Habitat at Station 6

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Photo 11. Sedimentary Seafloor Habitat at Station 5

Photo 12. South Edge of Rock Feature North of Station 5 with Drift Algae

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Photo 13. Top of Rock Feature North of Station 5 with Unidentified

Photo 14. Typical Ledge at Rock Feature North of Station 5 with Unidentified Encrusting Sponges, Solitary Coral, and Strawberry Anemones

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Photo 15. Top of Rock Feature North of Station 5 with Blue Rockfish (*Sebastes mystinus*)

Photo 16. Rock Feature East of Station 4 with Powder Puff Anemone and Unidentified Gorgonian and Solitary Corals

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Photo 17. Sedimentary Seafloor at Revised Location for OBS Temporary #4

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