

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS
HONOLULU, HAWAII

August 25, 2017

BOARD OF LAND AND
NATURAL RESOURCES
STATE OF HAWAII
HONOLULU, HAWAII

REGARDING: Conservation District Use Application (CDUA) **OA-3799** for the *Hawaiki Submarine Cable Kapolei Landing Project*

APPLICANT: Hawaiki Submarine Cable USA, LLC

AGENT: Megan Higgins, Tetra Tech, Inc.

LOCATION: Waianae District, Island of Oahu

TMKS: *Submerged lands seaward of (1) 9-2-049:001*

AREA OF PARCELS: N/A - Submerged lands of the state

AREA OF USE: 5147 sq. ft.

SUBZONE: Resource

DESCRIPTION OF AREA:

The project site is located on the west side of the Island of O'ahu in the Wai'anae district, from the submerged lands seaward (makai) of *TMK: (1) 9-2-049:001* out to the limits of the State of Hawaii's Territorial Waters (approximately 3 nautical miles) (**Exhibit 1**). The portion of the project that is located within the State Land Use (SLU) Conservation District, and is the focus of this application, includes all work sited *makai* (seaward) of the shoreline, out to three (3) nautical miles – there are no terrestrial components to this application (**Exhibit 2**).

The shoreline in this area is considered rocky with little to no beach sand present or accumulating (**Exhibit 3**). The shoreline area is underlain primarily by unconsolidated calcareous reef rock and marine sediments, including some minor beach deposits. Beach deposits to the north and south of the proposed project site include sand and gravel that are primarily calcareous, with some sandstone material also observed.

The proposed project area encompasses a portion of the Pacific Ocean, this includes all work *makai* of the shoreline. The marine waters in this area are classified as Class A marine waters by the Hawaii Department of Health (HDOH).

Groundwater resources in this area generally occur within aquifers; typically, volcanic-rock aquifers are found throughout the Hawaiian Islands, and are locally overlain by sedimentary deposits. The project site is located within the Mākaha Aquifer System; it should be noted that the Commission on Water Resource Management (CWRM) has not determined the sustainable yield for this aquifer due to a lack of recharge data available for this region. The main groundwater reservoir in the vicinity of the project area occurs in lava flows of the Waianae Volcanic Series. This system is recharged by infiltration from upland surface runoff and meteoric water. In general, the regional direction of groundwater flow for the site vicinity is west-southwest, or towards the coast.

It should be noted that this application does not include any terrestrial project components. All work to be conducted landward (*mauka*) of the certified shoreline is under the regulatory authority of the City and County of Honolulu *Department of Planning and Permitting*. Discussions on project components or site conditions for the terrestrial portions of the proposed project will be used only to provide context to the CDUA review, and will be noted throughout this staff report.

Marine and Costal Biological Resources

A marine diver survey was conducted by an agent for the applicant to determine the biological resources in the vicinity of the project site and surrounding area (**Exhibit 4**). The marine survey included locations *makai* of the shoreline, in places where the proposed project could impact the sea bottom substrate or other marine resources. Species with the potential to be impacted are listed and discussed below. It should be noted that most, if not all, of the species listed were not encountered during the survey – this list represents marine fauna that could be impacted.

Sea Turtles: The applicant has stated that it is anticipated that green sea turtles would be regularly observed from the cable-laying vessel, as they are abundant in the coastal waters of the Hawaiian Islands. Studies show that the green sea turtle accounts for approximately 98% of all sea turtles extant in Hawaii. It was further stated that Sea Turtles are not expected to use the onshore area near the cable laying station as there are no sandy beaches within roughly 328 feet of the proposed project site, or along the shoreline areas immediately adjacent. Four green sea turtle individuals were observed from the surface during the marine diver surveys. Small patches of seagrass, specifically *Halophila decipiens*, were also observed during the survey – these were located at one section of the proposed project area. The seagrass included as part of the diet of the herbivorous Hawaiian green turtle.

No hawksbill sea turtle nests of basking hawksbill sea turtles have been reported on Oahu, nor has foraging been observed in the costal areas of the proposed project site.

Monk Seals: While the monk seal could occur in the waters of the proposed project area, it is not expected to be found on the nearby shoreline portion due to the rocky habitat or the shoreline. Given the lack of sandy beach in or around the project site, and the fact this area is not known or identified

as a pupping location for Hawaiian monk seals, the applicant believes that the impact to this species would be minimal or none.

Other Marine Mammals: Humpback whales are known throughout the Hawaiian waters, and would be expected in the waters of the proposed project area consistently from November through May with peaks in abundance from January through April. There are several other large whale species that could potentially occur in the waters of the project area, such as: the sperm whale, blue whale, fin whale, and others. It was stated by the applicant that these species are either rare or transient, and therefore too limited in distribution to be affected by any of the projects actions or ongoing operations.

The false killer whale has been tagged and tracked in coastal Hawaiian waters, including outside of Harbors. The false killer whale is known to transit up or down the coast, and is expected to occur regularly in the coastal, or offshore waters of the project area.

The spinner dolphin is protected under Federal laws, and is considered abundant and common throughout the Hawaiian Islands. Spinner dolphins occur year-round on coastal waters around the leeward side of Oahu, and have been found to transit up and down the coast in the coastal or offshore waters of the project site.

Corals: Corals are the dominant habitat-forming organisms in the proposed project area. Most hard and soft corals are habitat-forming (i.e., formation of coral reefs). Because of the relatively steep bathymetry of the Hawaiian Islands, reef habitat is largely limited to the coastal environments of the Hawaiian Islands. The proposed project site intersects shallow water coral reef habitat (**Exhibit 4**), and is dominated by sand and rubble material (**Exhibit 5**). In all, 14 coral species were identified during the diver survey; coral cover is patchy and most part of the project area had less than 5% cover. Higher quality reef habitat is located inshore of the project area and away from the proposed project line siting location. It should be noted that the diver survey did not identify "precious coral", therefore the applicant has stated that these types will not coincide with the project area.

Fish: More than 500 reef and coastal fish species are known to occur in Hawaiian waters with nearly ¼ of those considered to be endemic to Hawaii. In general terms, the coastal habitats of Hawaiian waters support a greater density of oceanic and deep-sea species, and each potential habitat type is found within the project area.

Echinoderms: Six (6) species of sea urchins were observed during the marine diver survey: rough-spined urchin, needle-spined urchin, banded urchin, black-black urchin, and red pencil urchin. Overall, urchin density is on the order of 1 per 100 square meters (sq. m), but on the most topographically complex reef patches the urchin density increases to the order of 1 per 1 sq. m. Activity of urchins is evident on the more complex reef patches where the substrate is highly bio-eroded by urchins.

Existing Historic and Cultural Resources

Archeological and Historical Resources: An archeological inventory survey (AIS) was conducted at the coastal and offshore project areas, and are presented in a report titled *Archeological Inventory Survey Hawaiki Submarine Cable Landing*. The AIS included pedestrian surface survey and

subsurface testing at the upland project area. The proposed portion of the project that extends makai of the shoreline will occur at a very substantial depth, ranging from approximately 50-65 feet below the current grade. The applicant believes that this is well below the possible depth for buried historic properties, and the linear extent of the proposed project area is therefore not considered to have a significant potential for effect and was not subject to field surveys or subsurface testing.

Additionally, a *marine archeological survey* of the project area makai of the shoreline was not conducted since the location of the proposed work would be well below the substrate depth, or along the deep-sea floor. The State Historic Preservation Division (SHPD) recommended a desktop analysis of potential coastal resources. A “desktop” analysis of potential coastal resources was undertaken by an agent for the applicant, and included a review of publicly available data and consultation with local contacts as recommended by the SHPD. The desktop analysis did not identify any potential resources within the coastal area of the project site; however, two (2) underwater sites were identified by NOAA historians as being located nearby (i.e., within 0.25 to 0.5 miles) the project area. These two sites include the shipwrecks of Vessel F6F-3 Hellcat (i.e., American carrier-based fighter aircraft of World War II) and Vessel F2A-3 Buffalo (i.e., American fighter aircraft). The university of Hawaii Marine Option Program and an agent for the applicant were contacted regarding coastal cultural resources within or adjacent to the project area; both source produced no findings.

Cultural Resources: A Cultural Impact Assessment (CIA) was conducted for the proposed project by an agent for the applicant; this assessment concluded with a report titled *Cultural Impact Assessment Hawaiki Cable Landing Project* which included background research (e.g., pre-contact and post-contact information, previous archeological studies) and interviews with members of the community knowledgeable about the area.

Pre-contact and ethno-historical information specifically related to the Project Area is sparse to non-existent. The applicant believes this speaks to the remote and generally uninhabited nature of the arid landscape in the vicinity of the proposed project. Previous studies reviewed for this project generally present broad overviews and tend to discuss events and places within the broader Honouliuli area and Ewa Plain which are distant and not adjacent to the project area.

As part of the CIA process, individuals who might have knowledge of, or concerns about, traditional cultural practices at the project site were contacted for interviews. Out of the five (5) persons contacted, only two (2) responded, and only one (1) had significant information regarding the project area. The correspondent that provided information on the cultural uses of the area was not aware of any on-going cultural places and practices occurring within or nearby the project site. However, one (1) site was mentioned (i.e., Hawaiian Fishing Shrine) which is located approximately 250 feet south of the project site. While the correspondent indicated that although the site is important to Hawaiians, no cultural practices are known to be currently performed at the site.

PROPOSED LAND USES:

The applicant, Hawaiki Submarine Cable USA, LLC, is proposing to construct the *Hawaiki Submarine Cable System* – that comprises a trunk cable spanning more than 9,313 miles from Pacific City, Oregon, USA to Coogee, Australia, with branches connecting to Kapolei, Oahu,

American Samoa, and New Zealand (**Exhibit 6**). The Hawaiki Submarine Cable system consists of ten (1) segments lining five (5) landings and three (3) branching units (BU).

The proposed project covered under this application includes the installation of the Hawaiki submarine fiber optic telecommunications cable (F/O cable) and associated infrastructure within the State of Hawaii marine waters and onshore at Kapolei. Project components situated within the State Land Use (SLU) Conservation District include:

HDD: A subterranean Horizontal Directional Drilling (HDD) conduit (**Exhibit 7**), approximately 2,982 feet in length, which is proposed to extend from a Beach Man Hole (BMH) located mauka of Farrington Highway to the subsea “punch-out or daylight” site (i.e., location where conduit breaches the ocean floor substrate) at a depth of approximately 46 feet (**Exhibit 8**). The proposed punch-out point is located approximately 2,520 feet makai of the current shoreline, therefore some upland components of the proposed HDD are outside the jurisdiction of the DLNR. The proposed HDD conduit would be installed beneath TMK: (1) 9-2-051:001, the Farrington Highway Right-of-Way, and the Oahu Railway and Land Company right-of-way (**Exhibit 9**).

The HDD portion of the project will be carried out from the BMH located mauka of Farrington Highway to the seafloor “punch-out” site which occurs at a water depth of 46 feet. The exact location of the “punch-out” point has been determined by coastal geophysical and benthic surveys. HDD is the preferred method of cable placement when it is necessary to avoid obstacles and resources located at the project site (**Exhibit 10**).

A naturally occurring, thixotropic mud (i.e., bentonite clay) is pumped at pressure through the drill string to the cutting face to provide power for the cutter rotation and to carry the cutting back to the surface where they are filtered out and the drilling mud can be reused. At completion of the bore hole, the drill string may be left in place to maintain the hole, or it may be withdrawn and an alternative pipe hauled into the bore. Slurry, or used drilling mud, that cannot be reused would be disposed of offsite at an authorized and approved location.

During the drilling operation, drill pipe would be advanced through the borehole along with the drill bit. Once the drill bit and attached drill pipe clears the submerged “punch-out” hole, either the drilling head would be removed and placed on the barge, or the drill assembly would be recovered back to the drill rig through the bore pipe and a pipe then inserted down the bore conduit.

Cable Laying: A submarine F/O cable would be laid on the seafloor by a cable laying ship along a surveyed, and engineered, route located in the Pacific Ocean (**Exhibit 11**). The cable length is approximately 4.9 miles, which extends from the “punch-out” point offshore to the territorial limit of the State of Hawaii waters (i.e., out to 3 nautical miles (nm)). The applicant has stated that a sufficient amount of cable will be necessary to accommodate topographic variations along the determined F/O cable route. From the 3-nm territorial limit, the F/O cable would extend another 14-nm where it will connect with the larger cable trunk route at a sea-floor Branching Unit (BU).

The submerged segment of the Hawaiki Submarine Cable system would be installed using one of six special purpose Reliance Class cable ships, or an equivalent alternative. These cable ships are approximately 460 feet in length and would operate at speed of up to 6 knots during the cable laying activity. The submarine F/O cable length from the submerged “punch-out” point to the 3 nm State

waters boundary would be approximately 4.9 miles. Cable laying on the high-seas and in federal waters is typically a 24-hour per day operation. It is anticipated that the installation into the HDD “punch-out” point off-shore would take approximately 1 day to complete, depending on external forces such as weather and ocean conditions. Installation of the F/O cable from the punch-out location to the 3-nm boundary would take approximately 0.5 days, pending weather, ocean conditions, and time of day. It was determined that one (1) or two (2) support boats will be required to assist the cable ship during the off-shore landing operation. The support boats are smaller vessels, sourced from local entities. Once the cable ship is properly positioned, it would begin laying out cable while personnel work to guide the line into the subsurface HDD conduit. The off-shore landing operation would occur during daylight hours and under suitable conditions; this work is anticipated to take approximately one (1) to three (3) days to complete.

Two types of cable will be installed: Light-wire Armor (LA) (outer diameter = 28.9 mm) and Double Armor (DA) (outer diameter = 35.9 mm) (**Exhibit 12**). DA cable will be used at the “punch-out” transition, from approximately 164 feet before the “punch-out” and continue for approximately 2,690 feet until roughly 95 feet of water depth. The remainder of cable located within the SLU Conservation District will utilize the LA.

Purpose of Proposed Project: Hawaii relies on transpacific submarine fiber optic cables for the vast majority of broadband capacity required to connect it to the rest of the world. Broadband has been recognized as critical infrastructure to the State of Hawaii advancement in education, health, public safety, research and innovation, economic diversification and public services. Currently there are six (6) transpacific F/O cables systems that provide broadband connection between Hawaii and the US Mainland. However, the applicant has stated that projection indicate that with increased demand for broadband access, additional capacity is needed to facilitate future economic growth. Of the four (4) undersea cables connecting Hawaii and US Mainland, one has reached the end of its lifespan, and two are more than halfway through their anticipated lifespan; the newest cable only has 5 terabits of bandwidth, and will soon reach its capacity.

The overall purpose of this project is to provide direct and affordable telecommunication connectivity between Hawaii, the US Mainland, Australia, New Zealand, and other Pacific Island. As designed, the applicant states this project would respond to the needs identified under the Hawaii Broadband Initiative by contributing to the development of the States broadband infrastructure.

SUMMARY OF COMMENTS:

The Office of Conservation and Coastal Lands (OCCL) referred the application to the following state agencies for review and comment: DLNR – Oahu District Land Office (ODLO), Division of Aquatic Resources (DAR), State Historic Preservation Division (SHPD), Division of Boating and Ocean Recreation (DOBOR), and the Engineering Division (ENG). Additional State Agencies include the Department of Transportation (DOT) – Highways Division; office of Environmental Quality Control (OEQC), the State Department of Health (DOH), and the Office of Hawaiian Affairs (OHA). The application was also provided to the City and County of Honolulu (CCH) – Department of Planning and Permitting (DPP), the CCH – Department of Environmental Services (ENV), the US Fish and Wildlife Service (USFWS), the US Army Corps of Engineers (USACOE) – Honolulu Branch, the National Oceanic and Atmospheric Administration (NOAA), as well as the Kapolei Public Library and Neighborhood Board (#34) for review and comment.

Comments received from the following agencies have been summarized by staff as follows:

DLNR – Engineering (ENG)

No comments received.

DLNR – DAR

The agency had no comments on the proposed project after review.

DLNR – DOBOR

The agency had no comments on the proposed project after review.

DLNR – Oahu District Land Office (ODLO)

Any improvements on lands under the Land Board jurisdiction needs a land disposition from the Board.

Applicant Response: *A request for State Lands (Direct Negotiation) application was submitted to and received by the State of Hawaii Department of Land and Natural Resources, Land Division by Hawaiki Submarine Cable USA, LLC on June 26, 2017 for a right-of-entry and grant of easement for the installation and operation of the Hawaiki submarine fiber optic telecommunications cable and associated infrastructure within the State of Hawaii marine waters at Kapolei, Ewa District, island of Oahu, Hawaii.*

DLNR – State Historic Preservation Division (SHPD)

No comments received from agency.

State Department of Transportation (DOT)

The agency had no comments on the proposed project after review.

State Department of Health (DOH)

No comments received from agency.

Office of Hawaiian Affairs (OHA)

No comments received from agency.

City and County of Honolulu (DPP)

The Department of Planning and Permitting (DPP) accepted applications for an Special management Area (SMA) Use permit (No. 2017/SMA-15) and a Shoreline Setback variance (No. 2017/SV-1) on MAY 22, 2017. The mandatory public hearing for these applications has been scheduled for July 5, 2017.

US Fish and Wildlife Service (USFWS)

We would like to highlight the significant issue of reduced water quality affects upon coral reef resources as a consequence of mobilized sediments during planned cable landing. Bentonite mud will be used during HDD operations and we are concerned that the mud may reduce water quality conditions within the immediate area of the punch out site at the 46 foot depth. We are also concerned that cable laying activities seaward of the 46 foot punch out site may mobilize sediments and further reduce water quality conditions.

Coral reproduction may be negatively affected by altered water quality during three stages of development that include: gamete fertilization, attainment of larval competence and metamorphosis/settlement to coral recruits (Richmond 1995). Altered water quality, such as increased sedimentation and turbidity has been shown to affect all three stages of coral reproduction (Babcock and Davies, 1991; Hodgson, 1990; Richmond 1993, Richmond 1995). Increased sedimentation and turbidity can reduce adult coral fecundity, by altering the production of gametes (Kojis and Quinn, 1984). Elevated turbidity may also interfere with reproductive timing and egg-sperm interactions (Jokiel, 1985; Richmond, 1995). Also, moderate increases in turbidity and sedimentation have been shown to inhibit coral larvae from acquiring the appropriate chemical cues from crustose coralline algae that are necessary for settlement (Richmond 1993; Richmond, 1995).

For coral reefs around Oahu Island, coral larvae mortality is high due to persistently elevated levels of turbidity and lack of sediment-free substrate for coral larval settlement (Richmond, 1997; Richmond, 2007). The degradation of coral reefs around Oahu has resulted in diminished wave energy diffusing functions and an increase in coastal erosion (Wolanski et al. 2009). We recommend the development of a turbidity management plan for the purpose of controlling cable laying-related mobilized sediments, as well as monitoring sediments and any potential sediment-related impacts to coral reef resources. The turbidity plan should also contain the following features:

All authorized activities shall be done in a manner so as to confine and isolate the construction activity and to control and minimize turbidity. Return flow, bentonite mud or runoff from upland dewatering site(s)/disposal site(s) shall be contained on land and shall not be allowed to discharge and/or re-enter any waters of the United States;

No sidecasting or stockpiling of excavated materials in the aquatic environment is authorized. All excavated materials shall be placed above the high tide line (in coastal areas), above the ordinary high water mark at all other waters of the United States, or disposed of in an upland location. The permittee shall demonstrate that there is no reasonable expectation that disposal locations adjacent to high tide lines on the ocean, or in floodplains adjacent to other rivers or streams, would result in the material being eroded into the nearby waterbody by high tides and/or flood events;

Warning signs shall be properly deployed and maintained until the portion of the in-water work is completed and the affected area water quality has returned to its preconstruction condition and turbidity control devices have been removed from the waterway,

Fueling, repair, and other activities with any potential to release pollutants will occur in a location where there is no potential for spills to have an effect on waters of the United States;

If a visible plume and/or floating petroleum products are observed outside of the containment area, the following measures shall be taken:

- A. All in-water work shall stop;*
- B. The permittee or contractor shall inform the Corps immediately and the Corps will consult with appropriate agencies;*
- C. The site shall be inspected by the permittee to ascertain the source of the plume;*

- D. *Control measures shall be refurbished, modified, and/or improved, e.g., additional silt containment devices will be installed, as necessary to ensure the integrity of the containment area; and*
- E. *Work shall not continue until after the plume or oil sheen is no longer visible.*

*The invasive green alga, *Avrainvillea amadeipha*, has been documented in other locations around Oahu, such as the eastern, southern, and western shores from the upper intertidal zone to depths of about 100 feet and in both hard and soft substrate (Foster et al. 1997; Foster et al. 2002; Foster et al. 2007; Foster et al. 2017; Kolinski et al. 2007; Longnecker et al. 2011; Smith et al. 2007). *A. amadeipha* algae may accumulate in such densities as to out-compete corals, native algae and seagrass (Peyton 2009). Fleshy algae, such as *A. amadeipha*, may trap sediments and form sediment layers that alter the biological oxygen demand and produce anoxic conditions (Richmond et al. 2007). Though some efforts to remove *A. amadeipha* have been undertaken in Maunalua Bay (Minton and Conklin, 2012) many areas around Oahu have received little or no attention for controlling *A. amadeipha*.*

*We are concerned that the invasive algae, *A. amadeipha*, is contributing to declining coral reefs around Oahu. We are concerned that cable-laying installation activities may degrade seagrass, algae or coral reef resources within the project area, allowing invasive algae to expand into the project area footprint. Therefore, we recommend that the cable route be planned to avoid installing the cable directly on important seagrass, algae or coral reef habitats. We also recommend post-installation inspection of the cable to determine if *A. amadeipha* has colonized portions of the cable footprint. If *A. amadeipha* has been observed to colonize the fiber optic cable footprint, we recommend the invasive algae be removed to allow for native species such as seagrass, algae and coral to occupy the benthic substrate.*

In 2014 and 2015, coral reefs around the State of Hawaii were subjected to elevated sea surface temperatures for several months in the late summer and fall period. The sustained warm sea temperatures resulted in significant coral bleaching throughout the state and this event was documented by agencies and institutions such as the State of Hawaii Department of Land and Natural Resources, Division of Aquatic Resources, the National Oceanic and Atmospheric Administration Coral Reef Watch and the University of Hawaii, Hawaii Institute for Marine Biology (NOAA, 2015). Corals respond to this stress by expelling zooxanthellae algal cells resulting in the partial or complete loss of pigment in corals. Coral bleaching may result in slower coral growth or increased coral mortality (Douglas, 2003).

Nearshore coral reefs are under stress and controlling suspended sediments can play a significant role in reducing turbidity levels in nearshore marine waters. Therefore, we recommend the development of a turbidity management plan for the purpose of controlling fiber optic cable related mobilized sediments, as well as monitoring sediments and any potential sediment-related impacts to coral reef resources. This plan should also include measures to stop work during periods when sea surface temperatures are elevated and when corals are at risk of bleaching. We recommend that project managers monitor local NOAA Weather stations to determine when planned maintenance dredging may be conducted while avoiding NOAA anticipated coral bleaching events. Prior to starting any authorized activity, determine via surveys or available literature whether coral reef and/or seagrass beds are present near, or downstream of, areas where the activities will be conducted. Where coral reef, native algae, crustose coralline algae or seagrass could be indirectly

impacted by the authorized work, the permittee must minimize any potential impacts by limiting the extent of in-water work by conducting the work from land, limiting the footprint of the work/installation area, and implementing appropriate Best Management Practices (BMPs).

*The Final Environmental Assessment (EA) addresses the following federally listed species: the endangered Hawaiian hoary bat or 'ö pe'ape'a (*Lasiurus cinereus sernotus*); endangered Hawaiian petrel or 'ua'u (*Pterodroma sandwichensis*); threatened Newell's shearwater or 'a4o (*Puffinus auricularis newelli*); endangered hawksbill sea turtle or honu 'ea (*Eretmochelys imbricata*); and the threatened green sea turtle or honu (*Chelonia mydas*). The Final EA (Sections 2.6.2.2, 2.6.3.3, 2.7.3, and 2.8.3) provided various measures that will be implemented to avoid and minimize impacts to the above-mentioned species. Within Section 2.8.3 Best Management Practices and Mitigation Measures for Terrestrial Wildlife Resources it states, "Any fences that are erected as part of the Project would have barbiess top-strand wire to prevent entanglements of the Hawaiian hoary bat on barbed wire." Hawaiian hoary bats are not confined to being caught in the top wire strand of a fence. The Service recommends not using barb wire for fencing.*

Applicant Response:

We appreciate your concern that non-toxic bentonite mud used during HDD operations may reduce water quality in the vicinity of the punch-out site. Hawaiki has developed an Inadvertent Drilling Fluid Release (IDFR) and Contingency Plan which outlines measures and protocols that would be implemented to prevent, identify, contain, and properly respond to any inadvertent releases of drilling fluids. As described in the plan, the location where the drill bit will punch-out has been selected by side-scan sonar and diver surveys to be positioned in the center of a large section of sand-covered, hard bottom substrate. As the drill bit emerges from the hard substrate, the blanketing effect of the greater than 7 feet (2 meters) of sand cover would filter and capture any emergent drilling fluid, and the potential release of any sediments and turbidity. Once daylighting occurs, some minimal drilling fluid loss is expected, which is normal. Furthermore, at a suitable distance prior to the punch-out point (as defined by the seabed geology), the use of drilling mud will be curtailed. The borehole will be flushed with fresh water to bring all free mud not maintaining the borehole integrity back to the surface. The borehole will be completed to the punch-out point using either fresh water or a biodegradable, non-solids, biopolymer fluid such as Xantham gum to minimize release of bentonite onto the seabed. Xanthan gum is an industry standard drilling fluid where solids-free systems are a requirement. Xanthan gum is considered nonhazardous and suitable for use in environmentally sensitive locations and applications.

In addition to the IDFR and Contingency Plan, an Applicable Monitoring and Assessment Plan (AMAP) has been developed to accompany the Clean Water Act Section 401 Water Quality Certification (WQC). The AMAP includes baseline/preconstruction, construction, and post-construction water quality monitoring to confirm that Project work is not adversely affecting water quality. At the punch-out location, sampling is expected to occur in order to monitor turbidity in an area extending approximately 60 feet (18 meters) from and encompassing the punch-out site.

Thank you for raising the concern that cable laying seaward of the punch-out site may mobilize sediments and further reduce water quality. While laying the submarine cable on the seafloor has the potential to increase turbidity and total suspended solids due to disturbance and suspension of bottom sediments, these impacts would be temporary and localized due to the minimal size of the cable, and the short time period that material is expected to be suspended in the ocean's water

column. No burial, trenching or plowing is planned during the cable installation. The cable will be surface laid in Hawaiian waters. Once lying on the seabed, the cable will settle into the seabed under its own weight. Sediment will no longer be disturbed, with turbidity expected to return to background levels within a maximum of a few days, if not hours. Furthermore, at the request of NOAA Fisheries PIRO, the cable route has been micro-sited and shifted to avoid and minimize potential impacts into areas with less than ten percent coral cover. As a supplemental avoidance measure, divers will attempt to position the cable (where possible and within safe diving limits) so as to minimize potential impacts to live coral colonies or seagrass seaward of the HDD punch-out site.

Thank you for providing recommended standard best management practices (BMPs) and minimization measures to avoid potential turbidity impacts. All of the applicable measures have been included in the Final Hawaii Environmental Policy Act Environmental Assessment for the Project and/or captured in the conditions of the U.S. Army Corps of Engineers Nationwide Permit 12 (NWP-12). For example, per the regional/general conditions of the NWP-12, if, during the course of construction, there are found to be unforeseen adverse effects to Essential Fish Habitat (EFH; such as coral), all project work must halt and a marine survey will be conducted to inventory any EFH resources that may have been impacted. The survey would include species, size, percent living tissue, and location of each coral colony impacted. If an in-water IDFR were to occur, the applicants and their chosen contractor(s) would provide plans to ensure that the bentonite fluid and xantham gum is quickly removed from sensitive and hard-to-replace EFH.

*We appreciate your concern regarding the invasive algae *Avrainvillea amadelpha*. The Project has been developed to minimize impacts to coral, seagrass, and algae through appropriate cable siting, the use of divers during cable laying, and various engineering/operational controls. Macroalgae taxa observed during the marine survey included *Caulerpa taxifolia*, *Caulerpa urvilleana*, *Neomeris annulata*, Filamentous red, Fleshy red, *Dasya* sp, *Laurencia* sp, and *Dictyota* sp. Due to the small cable size and lack of *A. amadelpha* documented in the vicinity of the Project during the marine survey, it is not anticipated that *A. amadelpha* would colonize the area as a result of the Project. Furthermore, there is no precedent for post-construction *A. amadelpha* surveys being required for similar projects in the vicinity.*

We appreciate your comment regarding elevated sea surface temperatures and coral bleaching. In-water work for the Project is scheduled to occur in September and October. The nearshore landing operation is anticipated to take approximately one day, and installation of the cable from the punch-out to the 3-nautical mile limit would take approximately 0.5 day. Construction is also being timed to avoid the coral spawning season (mid-May through end of August) and the humpback whale winter migration (December– May). Potential impacts to coral, algae, and seagrass are minimized by the small footprint and appropriate BMPs and minimization measures.

Thank you for your comment on potential impacts to the endangered Hawaiian hoary bat. No barb wire will be used for Project fencing.

US Army Corps of Engineers (USACOE)

No comments received from agency.

National Oceanic and Atmospheric Administration (NOAA)

No comments received from agency.

ANALYSIS:

Following review and acceptance for processing, the Applicant's Agent was notified, by letter dated *May 24, 2017* that:

1. The proposed *Hawaiki Submarine Cable Kapolei Landing* project appears to be an identified land use in the Conservation District *Resource* Subzone pursuant to Hawaii Administrative Rules (HAR) §13-5-22, P-6 **PUBLIC PURPOSE USES**, (D-1) *Not for profit land uses undertaken in support of a public service by an agency of the county, state, or federal government, or by an independent non-governmental entity, except that an independent non-governmental regulated public utility may be considered to be engaged in a public purpose use. Examples of public purpose uses may include but are not limited to public roads, marinas, harbors, airports, trails, water systems and other utilities, energy generation form renewable resources, communications systems, flood or erosion control projects, recreational facilities, community centers, and other public purpose uses, intended to benefit the public in accordance with public policy and the purpose of the conservation district.* Please be advised, however, that this finding does not constitute approval of the proposed use, and that the final decision to approve or deny this application will rest with the Board of Land and Natural Resources (BLNR);
2. Pursuant to HAR §13-5-40, *Hearings*, this project shall require a public hearing;
3. In conformance with §343, Hawaii Revised Statutes (HRS), as amended, and HAR, §11-200-8 a *Finding of No Significant Impact (FONSI)* for the Final Environmental Assessment (FEA) was approved by the *Board of Land and Natural Resources* on May 1, 2017. The FEA-FONSI was published in the OEQC Bulletin *the Environmental Notice* on May 23, 2017.

The OCCL published notification of this Conservation District Use Application (CDUA) in the *May 23, 2017* issue of the Office of Environmental Quality Control (OEQC) publication the *Environmental Notice*.

PUBLIC HEARING:

On *June 29, 2017*, a Public Hearing was held at the Ewa Elementary School to accept any public testimony related to this project. Approximately 6 people attended the meeting; this included the Hearings Officer, hearings staff, the applicant's agents, and the permittee – no public persons attended the meeting.

§13-5-30 CRITERIA:

The following discussion evaluates the merits of the proposed land use by applying the criteria established in HAR §13-5-30.

- 1) *The proposed use is consistent with the purpose of the Conservation District.*

The objective of the Conservation District is to *conserve, protect, and preserve the important natural resources of the state through appropriate management and use to promote their long-term sustainability and the public health, safety and welfare.*

The applicant has stated that the proposed project will provide a communications system that will fulfill a mandated governmental function, activity, or service for public and private benefit, and will be conducted in accordance with public policy and the purpose of the Conservation District. Additionally, the applicant states:

The HDD punch-out would be located offshore at a water depth of approximately 46 ft., approximately 2,520 feet from the shoreline. The punch-out is situated on an area of surficial sandy sediment with minor rock outcrops. The applicant believes that the level of disturbance to the areas of sediment on the seabed would be insignificant compared with natural sediment movement within coastal sites.

Although HDD is considered the preferred cable landing method due to the ability to avoid sensitive features and resources, there is some potential for inadvertent release of drilling fluid (i.e., bentonite clay) into the environment; this is called an Inadvertent Drilling Fluid Release (IDFR) or "Frac-out". Frac-outs can't be caused by a number of issues, but typically occur when highly fractured rock or soils are penetrated and a failure occurs. Even though the applicant states that the potential for an IDFR to occur during the projects HDD activities is considered low, a *IDFR Contingency Plan* was created to outline measures and protocols that would be implemented to prevent, identify, contain and properly respond to an inadvertent release of drilling fluids;

The applicant has stated that the submarine cable does not contain materials that would be harmful to water quality, and that the use of HDD would eliminate the potential disturbance to corals, reefs, and benthic habitat located in the shallower coastal areas. Based on previous work, the use of HDD for the installation of the F/O cable should result in considerably less impact to water resources than trenching or other construction methods.

Staff believes that the proposed project design will aim to minimize the potential impacts within the conservation district.

- 2) *The proposed land use is consistent with the objectives of the Subzone of the land on which the use will occur.*

The objective of the Resource Subzone "*is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas*". The applicant believes the proposed use is consistent with the objectives of the Resource Subzone and will ensure the sustainable use of the natural resources of the area. The applicant states that the proposed project is not anticipated to involve a substantial degradation of environmental quality within the off-shore or cable line area. The planned construction is designed to not alter or modify the existing environmental conditions of coastal resources. The project is designed to have only temporary and localized impacts with the area returning to the existing conditions after construction is completed.

Staff believes that the placement of a small cable along the seafloor, the proposed HDD borehole, and the daylighting area do not constitute a major impact to the resources of the site, and therefore should have minimal effects as long as Best Management Practices (BMPs) are followed as outlined.

- 3) *The proposed land use complies with the provisions and guidelines contained in Chapter 205A, HRS entitled "Coastal Zone Management", where applicable.*

Recreational Resources: The applicant has stated that the proposed action is not anticipated to adversely affect existing coastal recreational resources or restrict the use of the lateral access along the shoreline for ocean recreation. During HDD operations when the drill bit daylight at the ocean end and during installation of the F/O cable by the cable ship, the contractors will control access to the in-water work area around the vessels to maintain safe distances between the public and the active area of work. Closure of offshore waters (i.e., 2500 feet from the shoreline) will include an area no more than 100-ft. by 100-ft. to accommodate the cable laying activities. The applicant has stated that they will publish a notice advising mariners to temporarily avoid the area on days when the ship will be laying cable. It is anticipated that no more than one (1) to three (3) days will be required to lay the cable and close off-shore waters. While the ship is laying cable, an agent for the applicant will keep the public away for safety purposes. This area will be approximately 2500-ft. offshore, in open water, and is not near any known surfing or snorkeling sites (**Exhibit 13**).

The project activity will not preclude the use of any of the shoreline sites, and the shoreline area will remain open during the entire cable laying activity since the HDD will permit the installation of the cable underground of the shoreline area with no proposed disturbance to the uplands.

Historic Resources: An AIS, which included a pedestrian survey and subsurface testing, was conducted for the proposed project. The AIS consisted of a 2-day systematic pedestrian survey that included the excavation of ten (1) test trenches. AIS investigation produced no evidence of surface or subsurface historic properties within the proposed project area.; therefore, the applicant has stated that the project, as proposed, would not have an effect on historic properties and no mitigation is needed or recommended.

Scenic and Open Space Resources: During construction involving the installation of support infrastructure and the FO cable, there will be a temporary impact on coastal views due to the presence of construction equipment, a cable ship, and support vessels in the water. Staff believes that the project design (i.e., use of the HDD process) encourages the protection and preservation of the quality of scenic and open space resources for this coastal site. The installation of the F/O cable using HDD would ensure coastal landforms would remain unaltered and the project would not impact public views towards the ocean or along the shoreline.

Coastal Ecosystems/Marine Resources: Potential short-term and temporary impacts on marine biological resources from the proposed project could occur during the cable laying and off-shore landing operations. The marine survey undertaken for the proposed project was used to identify a route that minimizes the potential for impact to coral reefs and/or disruption or degradation of coastal water resources. Farther offshore, the cable will be

placed along a predetermined route on the ocean bottom where sand and un-colonized habitat dominates thus further minimizing potential impact to ocean resources.

The applicant has stated that potential temporary impacts on marine biological resources from the proposed project could occur when the HDD drill bit punches out on the seafloor at the conclusion of the boring and during the installation of the F/O cable by the cable laying ship. However, marine surveys undertaken for the proposed project were used in identifying a route and design to minimize the potential for impacts to coral reefs and disruption or degradation of coastal water resources. It should be stated that the project is designed to follow appropriate measures recommended by the NOAA Fisheries Protected Resources Division and the US Fish and Wildlife Service to minimize impacts to coastal systems.

Economic Uses/Managing Development: The applicant also states that based on the number of directives, legislation, and recommendations from a variety of agencies throughout the State that the proposed project will facilitate expanded access to telecommunications services necessary to enhance and promote Hawai'i's role as a center of international relations, trade, finance, services, technology, and education. The project is intended to improve the long-distance transmission of domestic and international FO signals and reinforce Hawai'i's position as a hub in transpacific submarine telecommunications networks, which will facilitate the future economic growth of the State.

As the proposed project would increase competition in international and Hawaii-US Mainland broadband, and create direct links to overseas markets, the project should have a positive impact on the economy.

Public Participation: The applicant has stated that several statutorily-triggered public comment periods have concluded and public meetings associated with the various state and county permit approvals will be required. In addition to the required public engagements, the applicant has independently sought public involvement in the project. The applicant has engaged local stakeholders, including adjacent property owners, neighborhood boards, and community associations. It should be noted that a public hearing was held for the proposed project; no one from the public attended the meeting.

- 4) *The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region.*

As described previously, the proposed project should not cause substantial adverse impacts to existing natural resources at the project site due to the minimal nature of the proposed work, the use of the HDD practices, proper siting of the punch-out location to minimize impacts to the coastal substrates, and a marine survey for the proposed cable route which was designed to minimize disturbance to sea bottom resources.

Staff believes that the extent of the proposed cable route and HDD corridor is minor, and impacts associated will be short-term and therefore should not influence the existing natural resources at the site.

- 5) *The proposed land use, including buildings, structures and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels.*

The selection of the proposed landing site is designed to meet the need for connectivity to existing telecommunications infrastructure while minimizing potential interference with other undersea cables. The cable route has been sited to avoid potential undersea hazards, disruption to marine resources and wildlife, and should secure the long-term protection of the cable by allowing it to become naturally buried (as other cables have in this area). Since the entire cable segment located in the Conservation District will be entirely out of view, while sited to minimize impacts to coastal and sea floor habitats, staff believes this proposed project is compatible with the surrounding area and physical conditions of the site.

- 6) *The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable.*

During construction involving installation of support infrastructure and the FO cable, there will be a temporary impact on coastal views due to the presence of construction equipment, and a cable ship and smaller support vessels in the water. Once construction is completed all equipment will be removed from the site with no further disturbance to any scenic resources of the site.

The FO cable will be buried or submerged such that it is not expected to result in potential for adverse visual impacts. It is likely the public will never even know the cable and HDD borehole are present.

- 7) *Subdivision of land will not be utilized to increase the intensity of land uses in the Conservation District.*

The proposed project does not involve the subdivision of Conservation District land however easements associated with the proposed project will be required. A right of Entry and grant of submarine easement within State waters will also be required from the Board of Land and Natural Resources (BLNR) for the placement of SEA-US FO cable in state waters.

- 8) *The proposed land use will not be materially detrimental to the public health, safety and welfare.*

BMPs prescribed in the application and the Final Environmental Assessment (FEA) will be employed as necessary, these measures will include practices designed to:

- Prevent the release of pollutants to land and water resources;
- Provide for preventative measures in-place prior to, during, and following the termination of construction activities when BMPs can be safely removed;
- Utilize a proven construction method (i.e., HDD) that has been shown to be environmentally safe, and consistent with the protection of the environment; and

- Provide for monitoring of environmental resources during all construction activities as well as monitoring to minimize or eliminate impacts to threatened or endangered species.

CULTURAL AND HISTORICAL IMPACT REVIEW:

As previously stated, a local resident knowledgeable in the history of the area was interviewed as part of the CIA process. The interviewee was not aware of any on-going cultural places and practices occurring within or nearby the project area. One culturally significant site was discussed, a traditional Hawaiian fishing shrine, although it is not located in the Conservation District or within the project area. It was determined that while this site may have significance for the Hawaiian people, no cultural practices are known to be performed at this site.

Other dominant traditional Hawaiian cultural practices in the area are fishing and gathering of marine resources. The applicant states that it is currently unknown to what extent traditional Hawaiian subsistence gathering and fishing is still practiced along this section of coastline; however, the beaches and reefs in the area are important loci for residents. The majority of ocean waters would not need to be closed to ocean activities such as boating, surfing, fishing, diving, and swimming during the cable laying or cable installation process, including the area between the shoreline and punch-out site. However, the area immediately around the punch-out site (i.e., 100-ft. by 100-ft.) would be patrolled by small boats during the cable installation into the HDD conduit. Activity in coastal waters would be preceded by published notice advising boaters to avoid the punch-out area; the applicant states that any restricted access would be confined to one (1) or three (3) days, and only within the 100-ft. by 100-ft. area.

The applicant has stated that the proposed project would not impact traditional and customary Native rights including: fishing, rights, use of marine resources, or access or use of the shoreline area. The HDD portion of the proposed project will extend well below and beyond the shoreline with the punch-out site located >2,500 feet offshore. The HDD will be deep underground and will not affect the coastline, access or marine subsistence resources that may be gathered.

DISCUSSION:

The proposed land uses that are covered under this Conservation District Use Application (CDUA) represent a portion of the overall F/O cable landing and facility project. The majority of the structural and development activities will occur *mauka* of the shoreline, and therefore were not part of this review. This CDUA covers a majority of the HDD borehole, the "punch-out" or location where the FO line will go underground offshore, and the laying of the F/O cable from the HDD borehole out to the 3-mile boundary of the States jurisdictional waters.

Staff note: An Environmental Assessment (EA) was completed and finalized for this project, and included reviews and discussion on both the *marine* and *terrestrial* project elements. *Terrestrial* project components (i.e., new telecom facility) the CDUA did not review or discuss will be addressed by the City and County of Honolulu, and other relevant agencies through their respective regulatory programs. The State Historic Preservation Division (SHPD) has also reviewed the projects *terrestrial* archeologic and cultural features, and has made recommendations regarding protection strategies.

The main concerns regarding the proposed land uses within the Conservation District (i.e., *makai* of the “shoreline”) that could impact or effect the natural resources of the area are as follows:

- *The location of the submerged segment of F/O cable from the States territorial limit to the Kapolei Landing site* – The myriad of undersea surveys of the ocean floor have provided a comprehensive image of the approximately 5-mile long path the F/O cable will follow. The applicant has actively sited the cable pathway to minimize impacts to ocean bottom and coastal resources such as coral or other potential habitats.
- *Frac-out occurs during HDD operations; drilling mud (i.e., bentonite) released into water column thus impacting coastal habitats and resources* – At the request of the Office of Conservation and Coastal Lands (OCCL) the applicant has completed a comprehensive *IDFR Contingency Plan* to address the potential for Inadvertent Drilling Fluid Release (i.e., “Frac-out”) during HDD operations. The plan covers before, during, and after construction activities and provides methodology to deal with a frac-out during any one of the construction phases. It should be noted that other projects involving HDD for the installation of submarine F/O cables on O’ahu report that no known frac-out events have occurred, and the geological study reveals that the soils through which the drill bit will pass are not expected to require excessive fluid pressure which could cause a frac-out scenario.
- *Restriction of recreational uses at the coastal area* – The proposed cable laying will only require the cable ship to be in place for approximately one (1) to three (3) days depending on weather, drilling activities, or other factors that may affect HDD operations. Since the cable ship will be offshore approximately 2500 feet, the lack of any need to occupy the coastal area means that recreational activities will remain open and unhindered to all visitors. While an area of off-shore water may need to be closed to ocean activities, (i.e., surfing, diving, boating, and swimming) the total area anticipated to be closed is approximately 100 feet by 100 feet and therefore staff believes this represents a temporary minor inconvenience to ocean activity for only a few days.

The OCCL staff has the duty of evaluating the appropriateness of a project based on a complete and comprehensive assessment that has been assembled from acceptance of the application, to the writing of this staff report. This report outlines the effects the proposed land uses represent to natural resources, recreation, and the environment within the project area; based on the information provided staff believes project impacts will not be significant or cumulative. Additionally, this projects public benefit appears to be necessary for fulfilling County and State plans with regards to the future of Hawaii’s telecommunication services and international connectivity.

In conclusion, staff believes that this project, as proposed, is consistent with Conservation District objectives, and based on the above discussion and information received, Staff recommends as follows:

RECOMMENDATION:

Based on the preceding analysis, Staff recommends that the Board of Land and Natural Resources **APPROVE** this application for the *Hawaiki Submarine Cable – Kapolei Landing* project located in the Ewa District, Island of O’ahu, on submerged lands seaward of Tax Map Key: (1) 9-2-049:001, subject to the following conditions:

1. The permittee shall comply with all applicable statutes, ordinances, rules, and regulations of the federal, state, and county governments, and applicable parts of this chapter;
2. The permittee, its successors and assigns, shall indemnify and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, and death arising out of any act or omission of the applicant, its successors, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit;
3. The permittee shall obtain appropriate authorization from the department for the occupancy of state lands, if applicable;
4. The permittee shall comply with all applicable department of health administrative rules, and the applicable parts of HAR §13-5-42;
5. Unless otherwise authorized, any work or construction to be done on the land shall be initiated within one (1) year of the approval of such use, in accordance with construction plans that have been signed by the chairperson, and shall be completed within three (3) years of the approval of such use. The permittee shall notify the department in writing when construction activity is initiated and when it is completed;
6. All representations relative to mitigation set forth in the accepted environmental assessment and management plan for the proposed use are incorporated as conditions of the permit;
7. The permittee understands and agrees that the permit does not convey any vested right(s) or exclusive privilege;
8. In issuing the permit, the department and board have relied on the information and data that the permittee has provided in connection with the permit application. If, subsequent to the issuance of the permit such information and data prove to be false, incomplete, or inaccurate, this permit may be modified, suspended, or revoked, in whole or in part, and the department may, in addition, institute appropriate legal proceedings;
9. When provided or required, potable water supply and sanitation facilities shall have the approval of the department of health and the county department of water supply;
10. Provisions for access, parking, drainage, fire protection, safety, signs, lighting, and changes on the landscape shall be provided;

11. Where any interference, nuisance, or harm may be caused, or hazard established by the use, the permittee shall be required to take measures to minimize or eliminate the interference, nuisance, harm, or hazard;
12. Obstruction of public roads, trails, lateral shoreline access, and pathways shall be avoided or minimized. If obstruction is unavoidable, the permittee shall provide alternative roads, trails, lateral beach access, or pathways acceptable to the department;
13. During construction, appropriate mitigation measures shall be implemented to minimize impacts to off-site roadways, utilities, and public facilities;
14. Use of the area shall conform to the program of an appropriate soil and water conservation district or plan approved by and on file with the department, where applicable;
15. Specific Best Management Practices (BMP) outlined in the Final Environmental Assessment (FEA) and throughout this staff report shall be utilized during all phases of the proposed project;
16. The permittee acknowledges that the approved work shall not hamper, impede, or otherwise limit the exercise of traditional, customary, or religious practices of native Hawaiians in the immediate area, to the extent the practices are provided for by the Constitution of the State of Hawaii, and by Hawaii statutory and case law;
17. Other terms and conditions as prescribed by the chairperson; and
18. Failure to comply with any of these conditions shall render a permit void under the chapter, as determined by the chairperson or board.

Respectfully submitted,



Alex J. Roy, M.Sc., Staff Planner
Office of Conservation and Coastal Lands

Approved for submittal:



Suzanne D. Case, Chairperson
Board of Land and Natural Resources

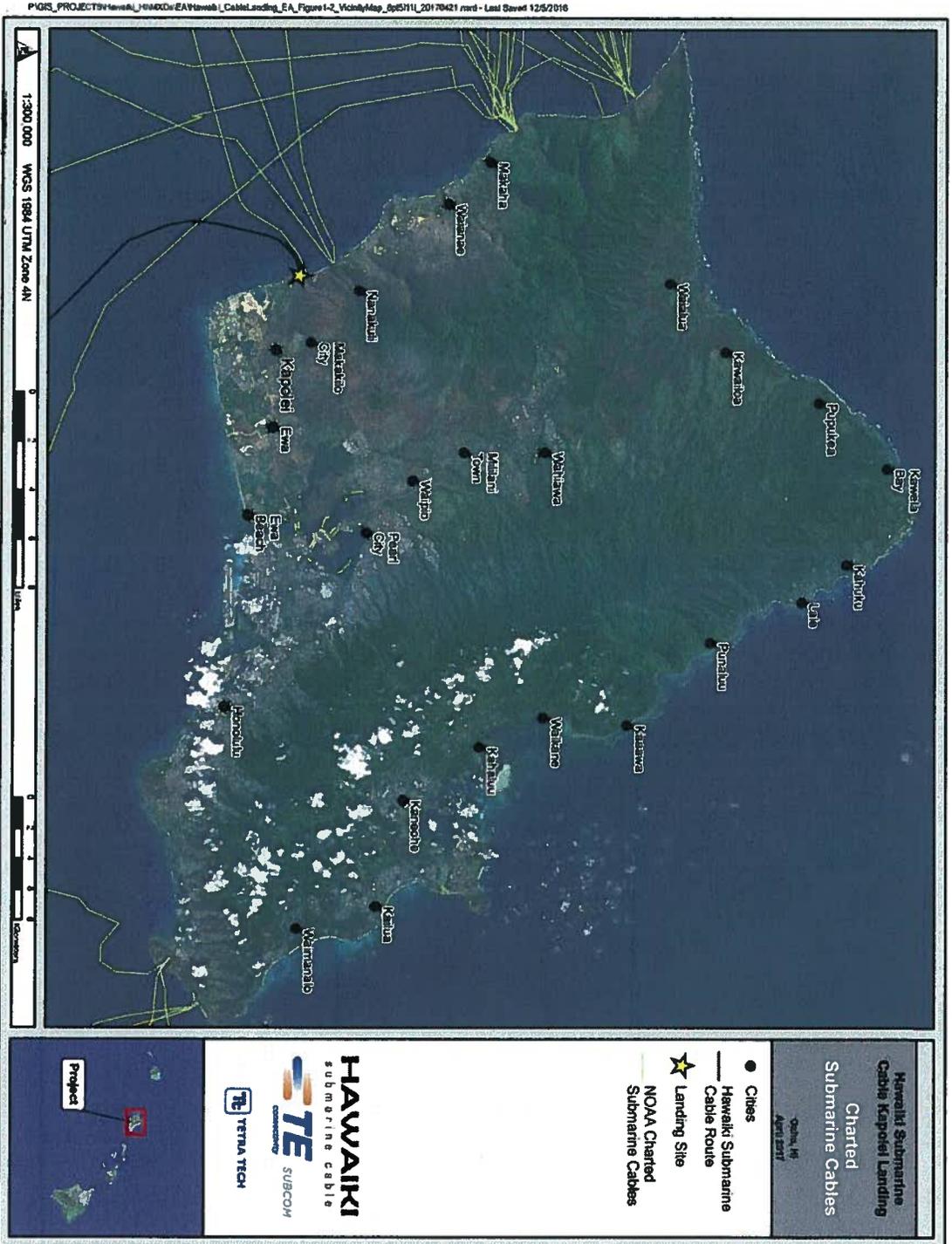


EXHIBIT 1

Charted Submarine Cables.

CDUA: DA-3799



CDUA: OA-3799; Hawaiki Submarine F/O Cable Landing Kapolei

EXHIBIT 2

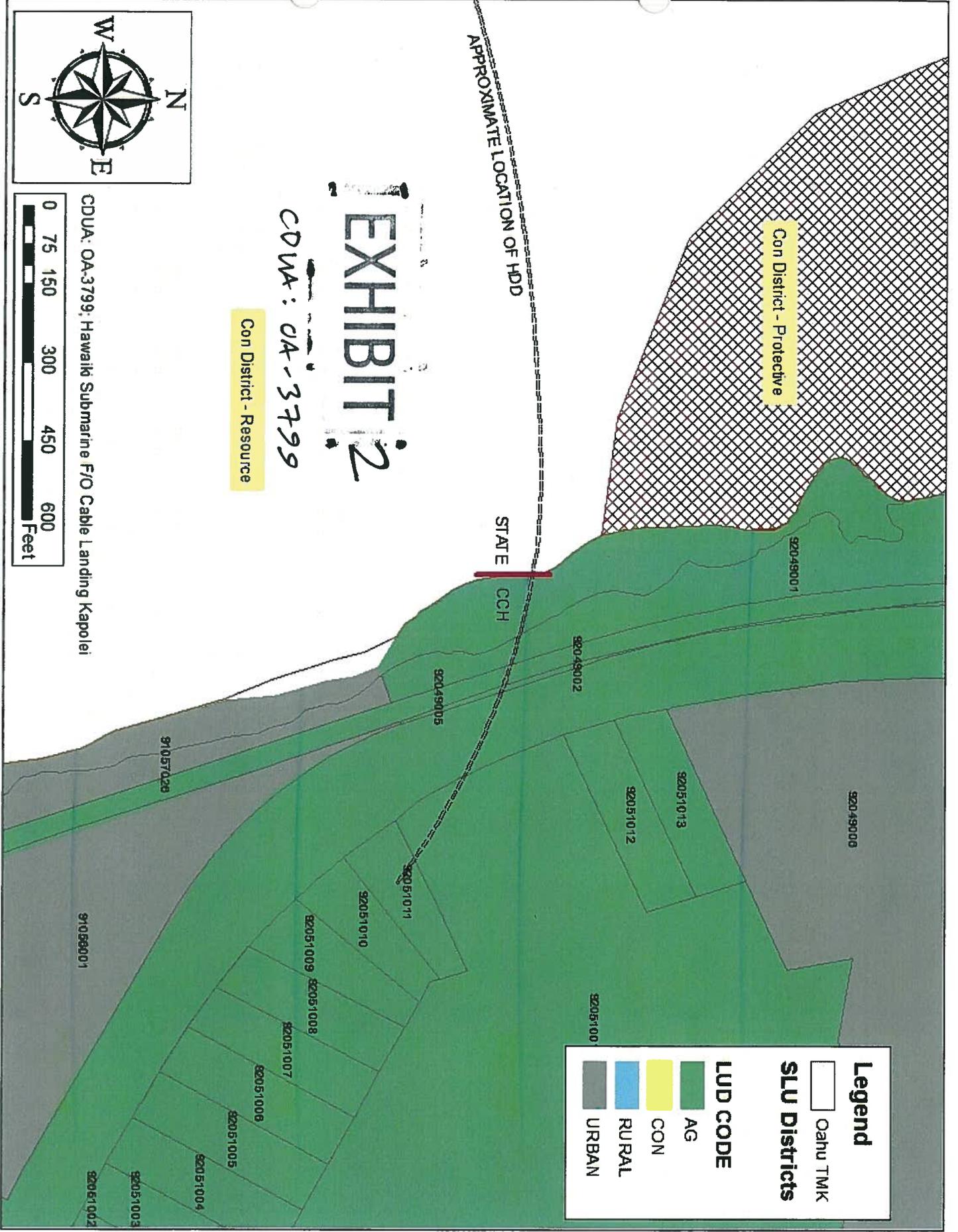
CDUA: OA-3799

Con District - Resource

APPROXIMATE LOCATION OF HDD

STATE CCH

Con District - Protective



Legend

SLU Districts

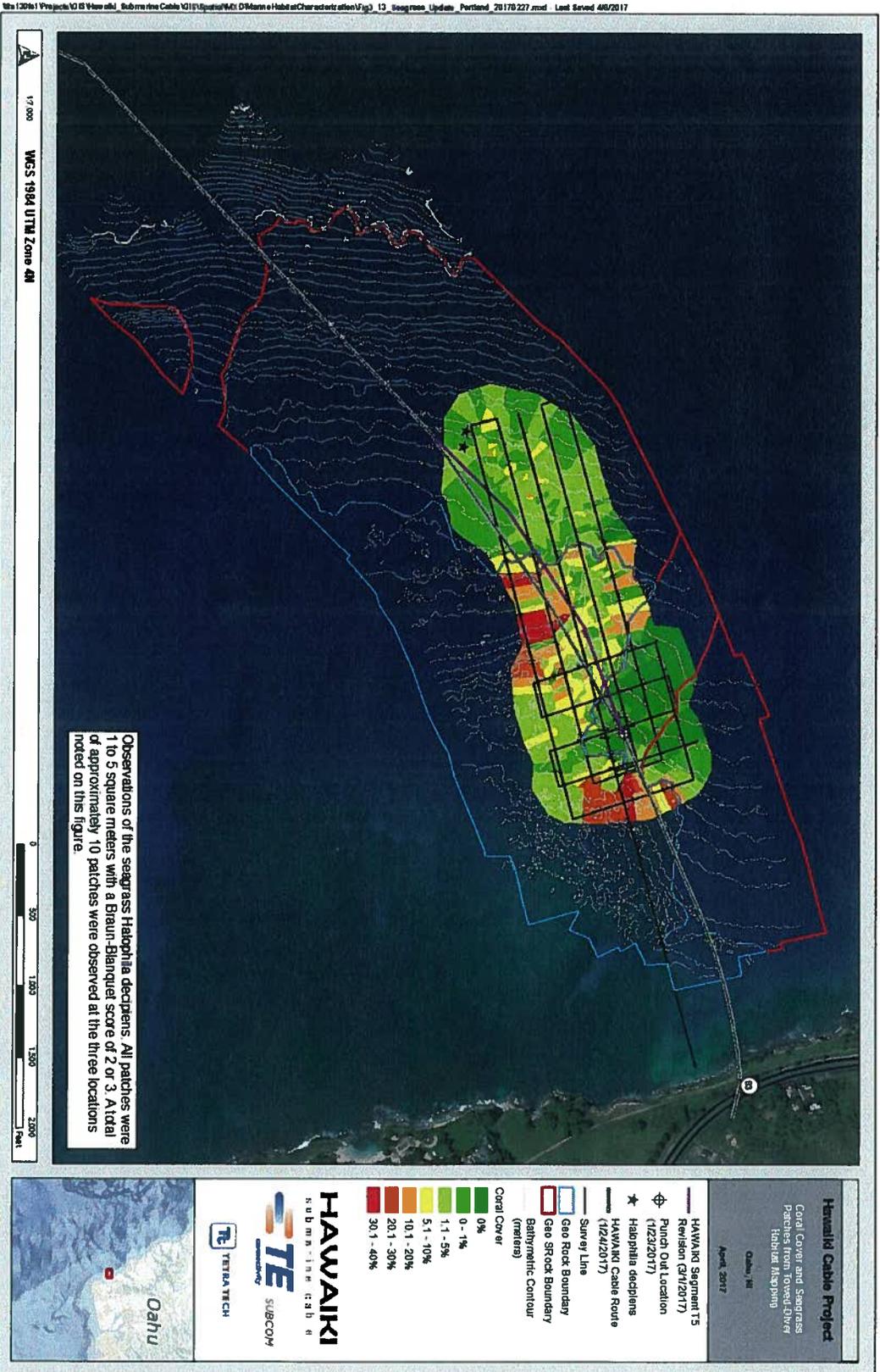
- Oahu TMIK

LUD CODE

- AG
- CON
- RURAL
- URBAN



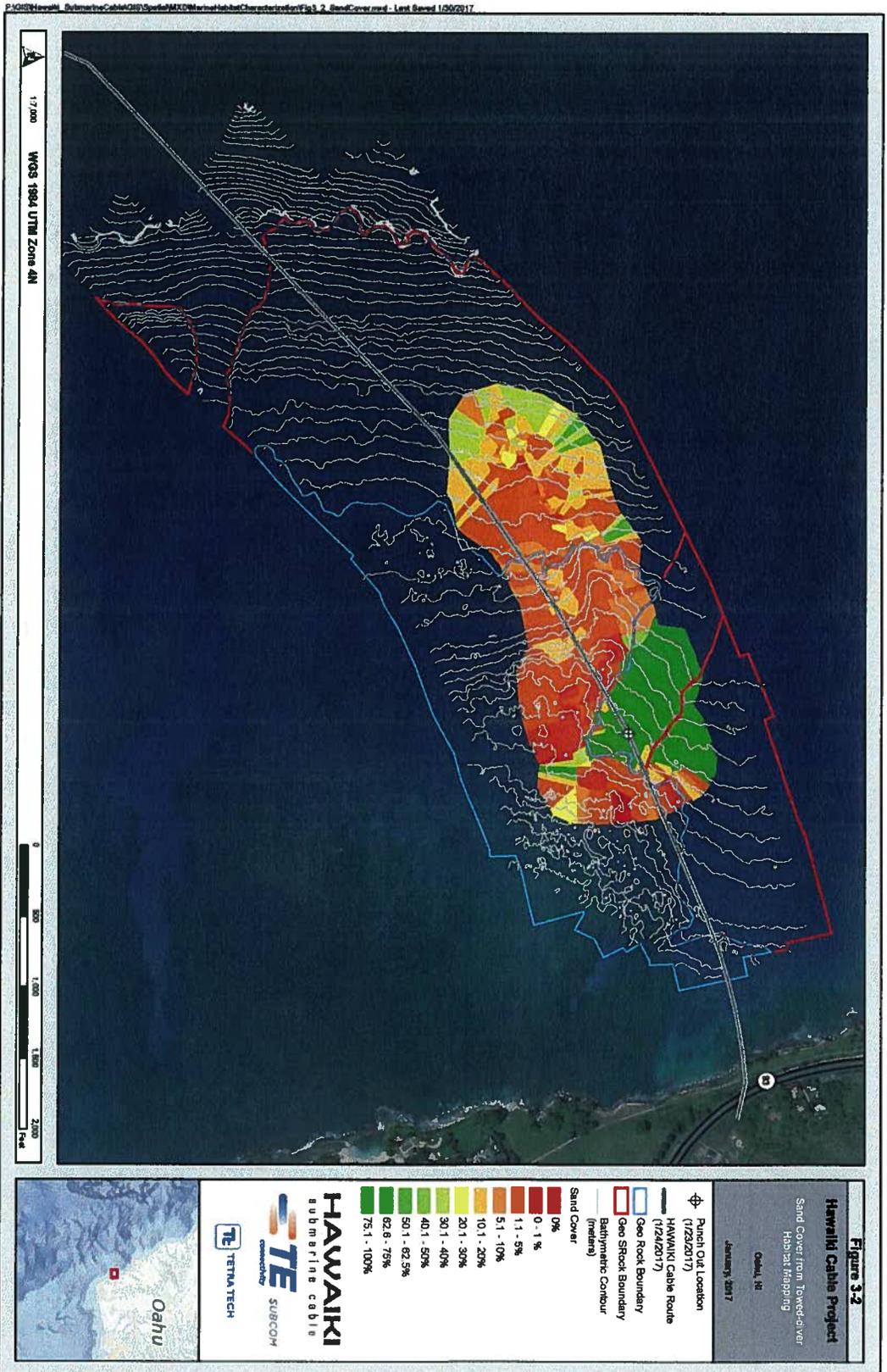
EXHIBIT 3
CDMA: OA-3499



Coral Cover and Seagrass Patches from Towed-Diver Habitat Mapping.

EXHIBIT 4

CDUA: OA-3799



Sand Cover from Towed-diver Habitat Mapping

EXHIBIT 5

CDWA: OA-3499

FIGURE 1-1.
VICINITY MAP

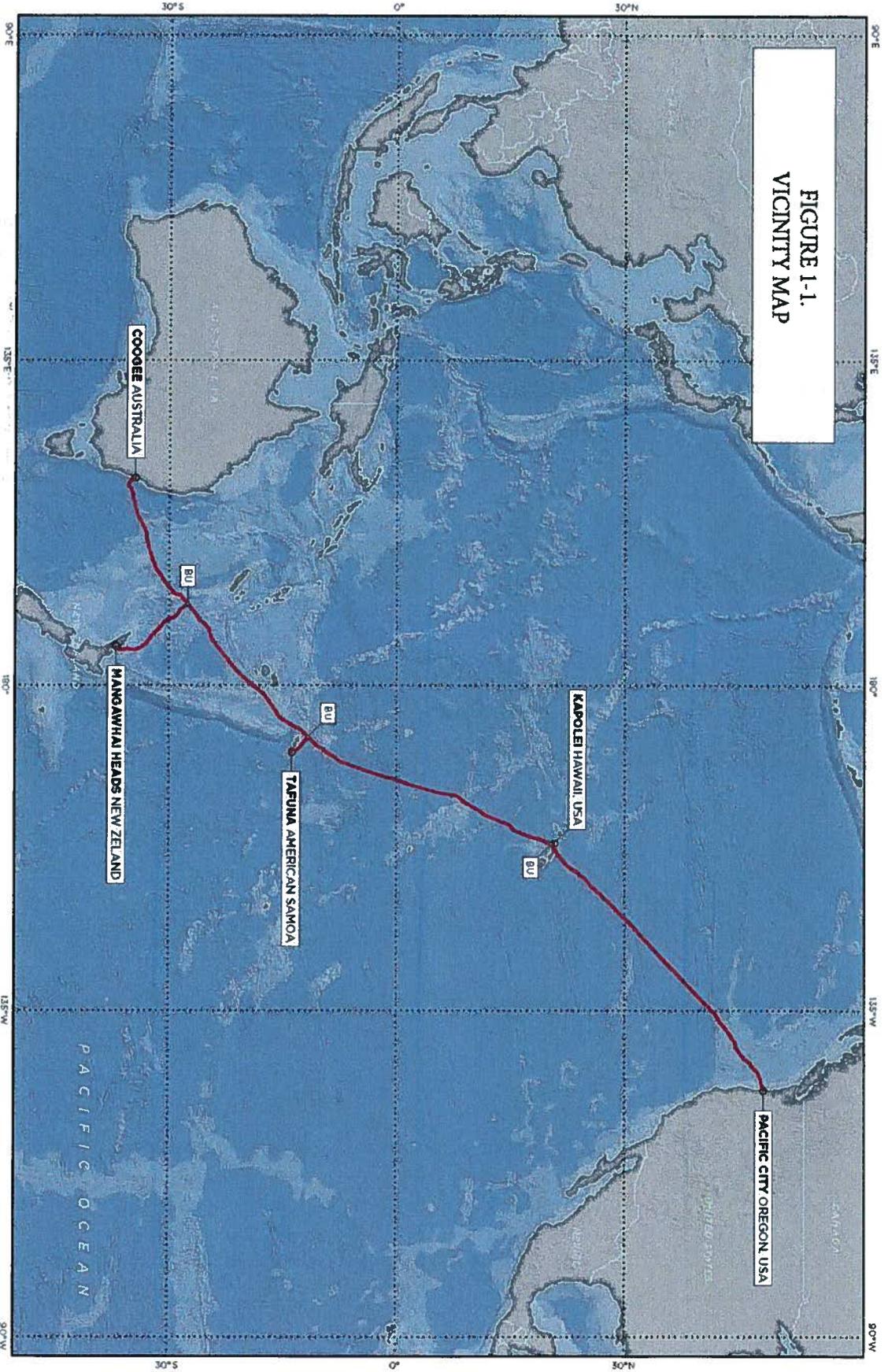
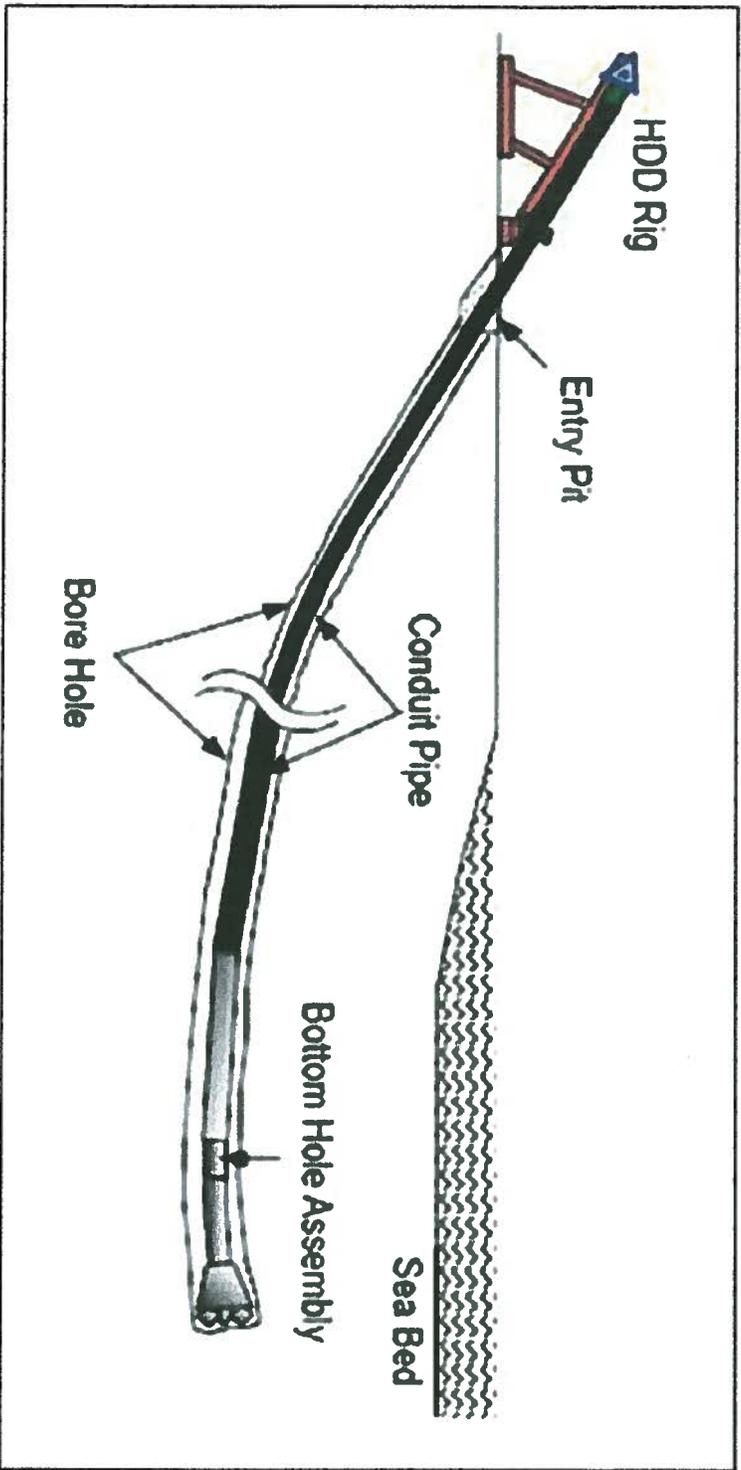


EXHIBIT 6

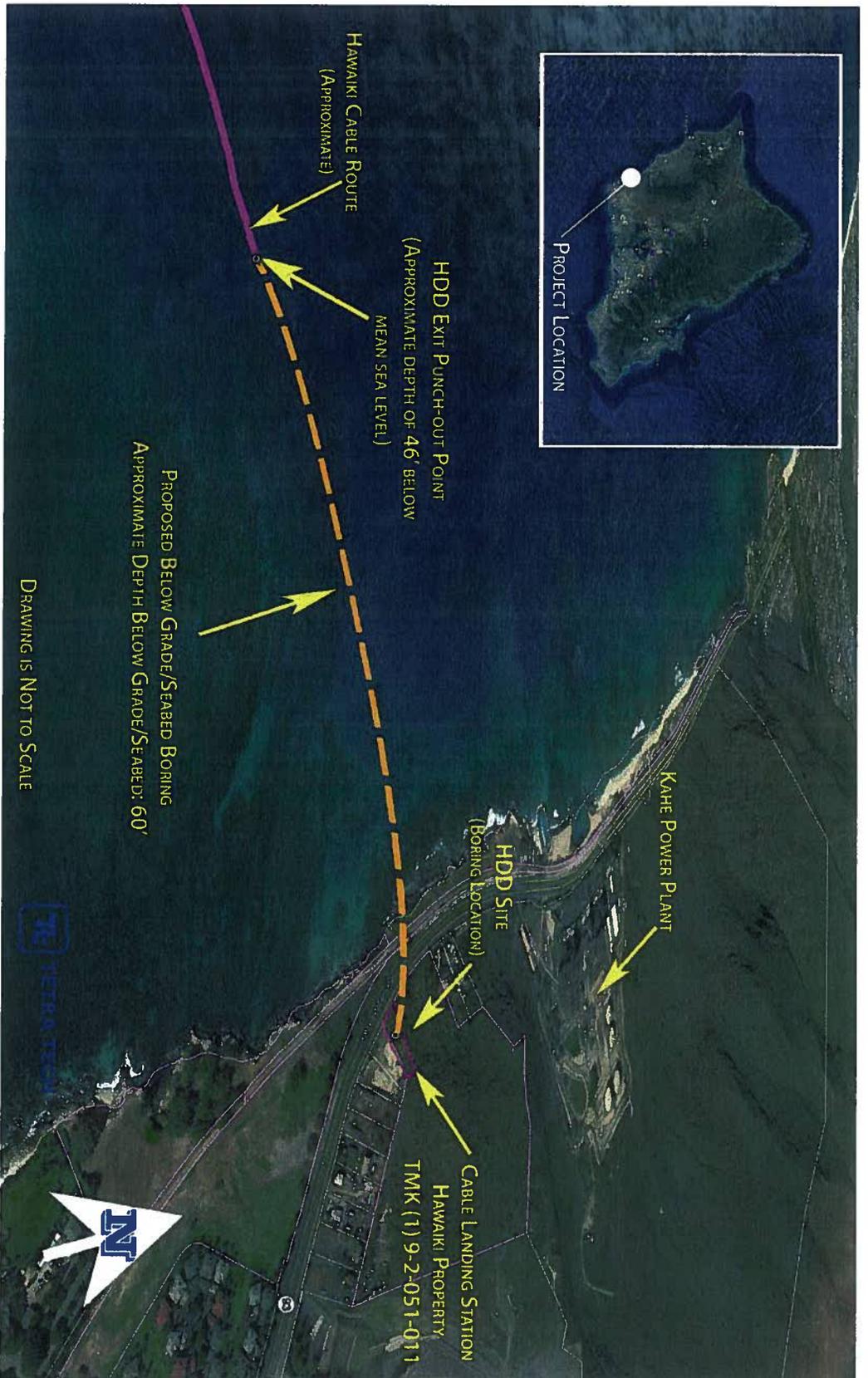
CDWA: OA-2799



HDD Schematic

EXHIBIT 7

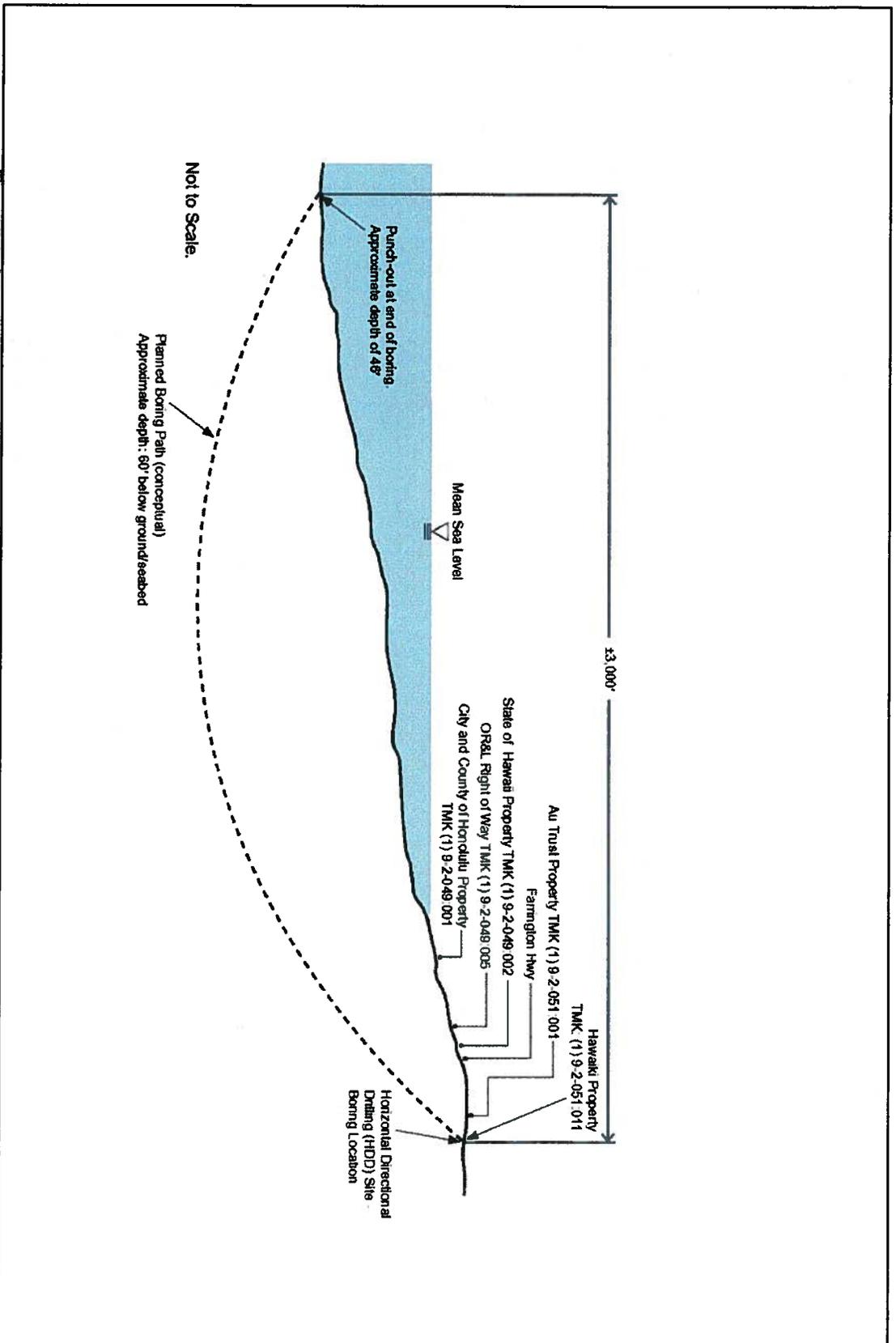
CDMA : OA-3799



Nearshore and Terrestrial Project Location

EXHIBIT 8

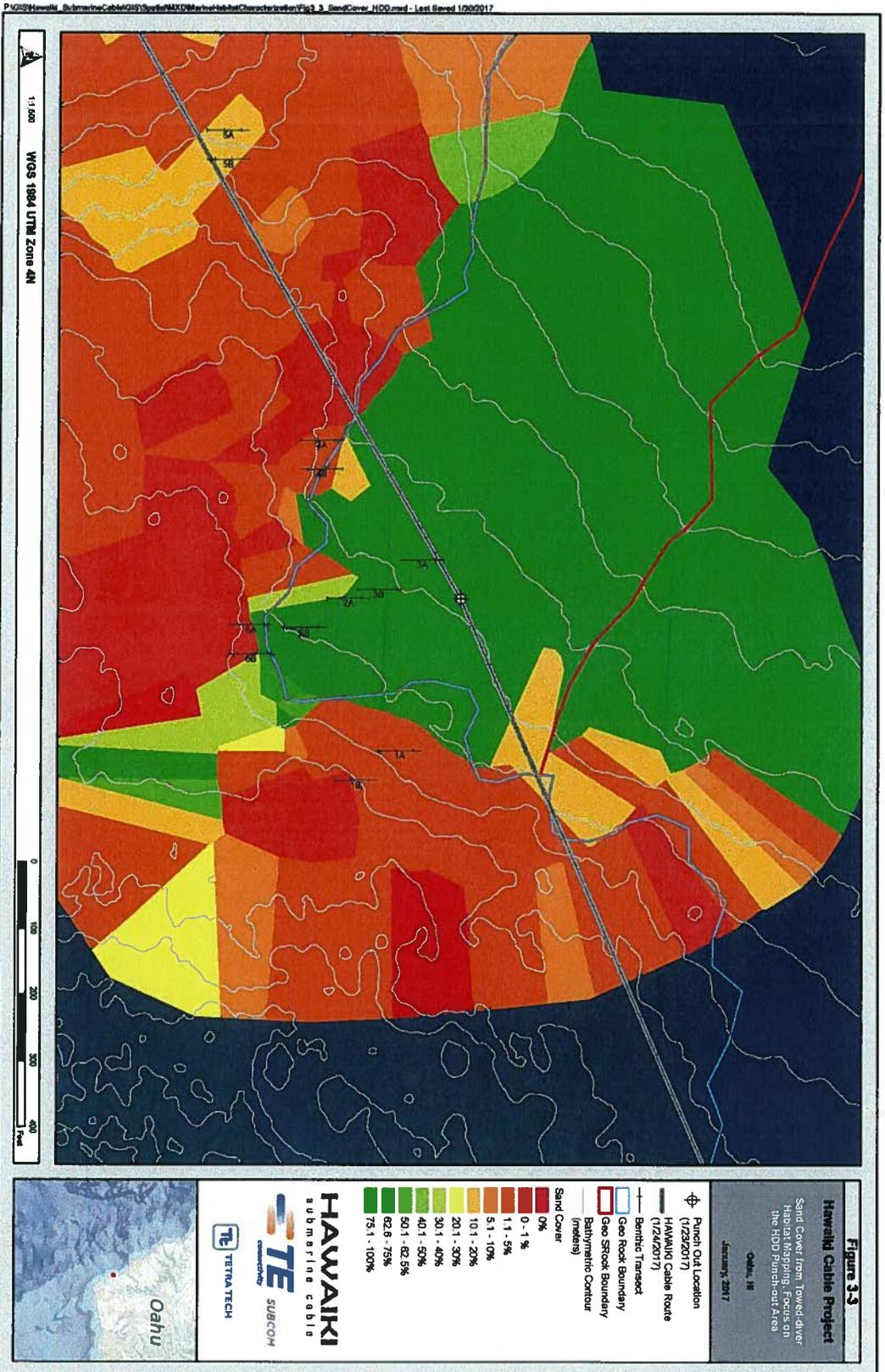
CDUA: OA-3799



HDD Cross-section

EXHIBIT 9

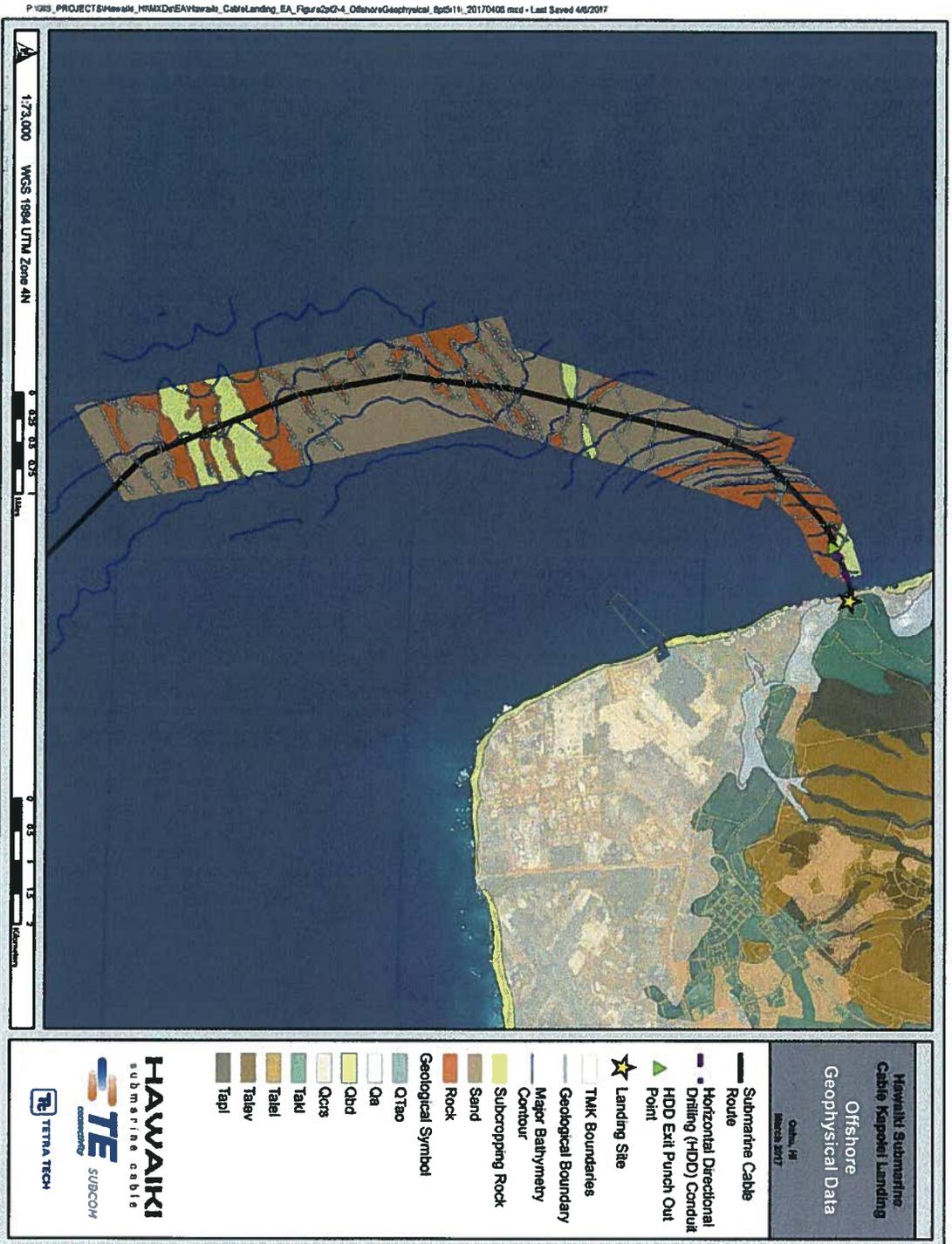
CDUA: OA-3799



Sand Cover from Towed-diver Habitat Mapping, Focus on the HDD Punch-out Area

EXHIBIT 10

CDWA: OA-3799

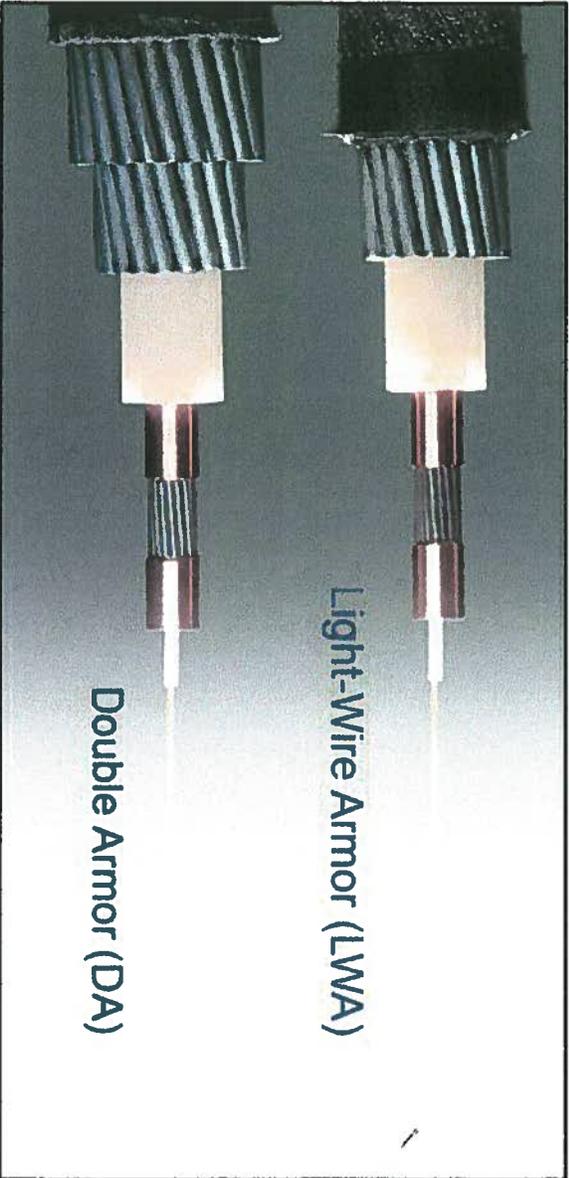


Offshore Geophysical Data.

EXHIBIT 11

CDUA: OA-3799

HAWAIIKI
SUBMARINE CABLES
STE
SUBCOM
TETRA TECH



Cross Section of the Light-Wire Armor and Double Armor cable types to be deployed.

EXHIBIT 12

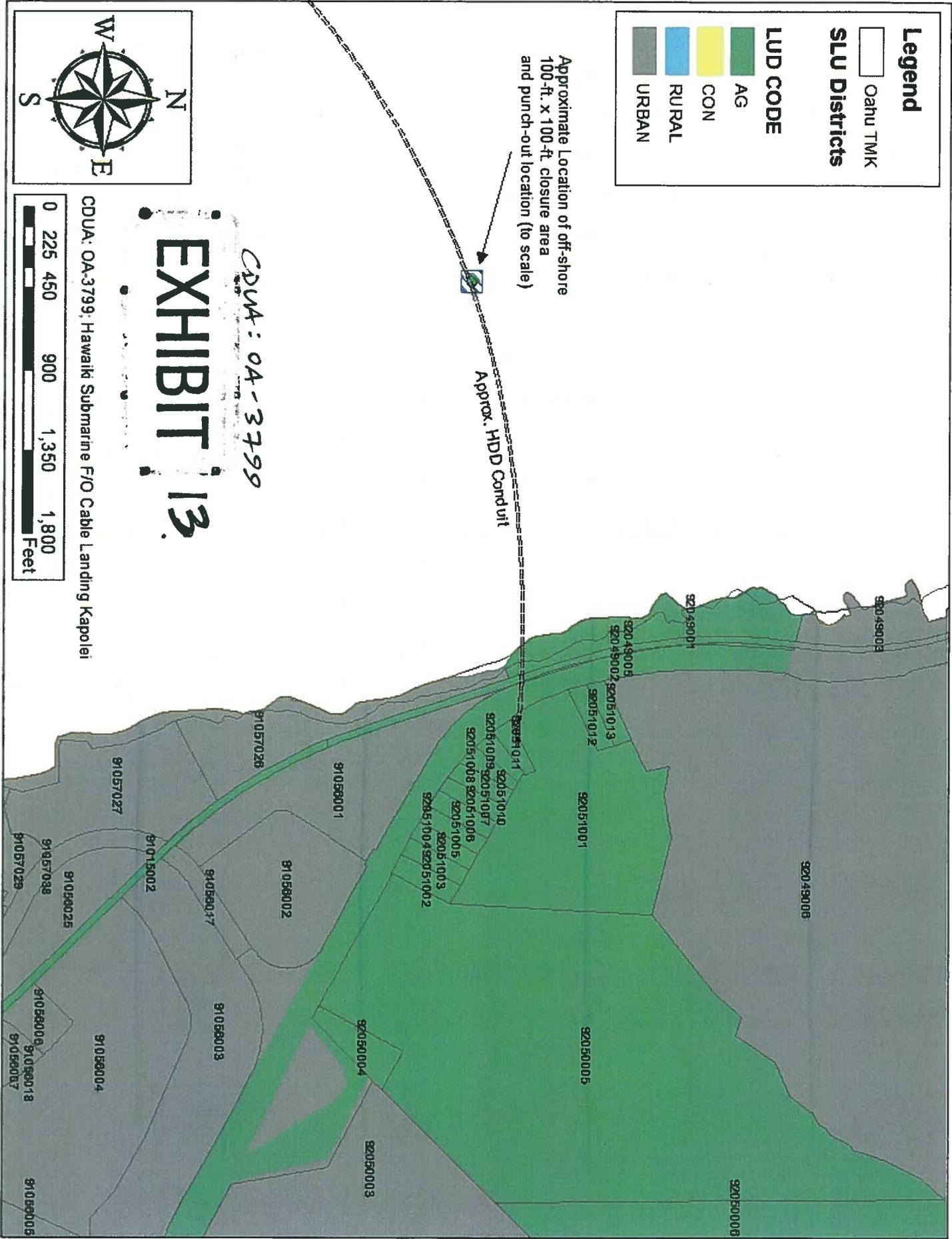
CDYA : OA-3799

Legend

- Oahu TMK
- SLU Districts**
- LUD CODE**
- AG
- CON
- RURAL
- URBAN

Approximate Location of off-shore
100-ft. x 100-ft. closure area
and punch-out location (to scale)

APPROX. HDD Conduit



CDUA: 0A-3799

EXHIBIT 13

CDUA: 0A-3799, Hawaiki Submarine F/O Cable Landing Kapolei

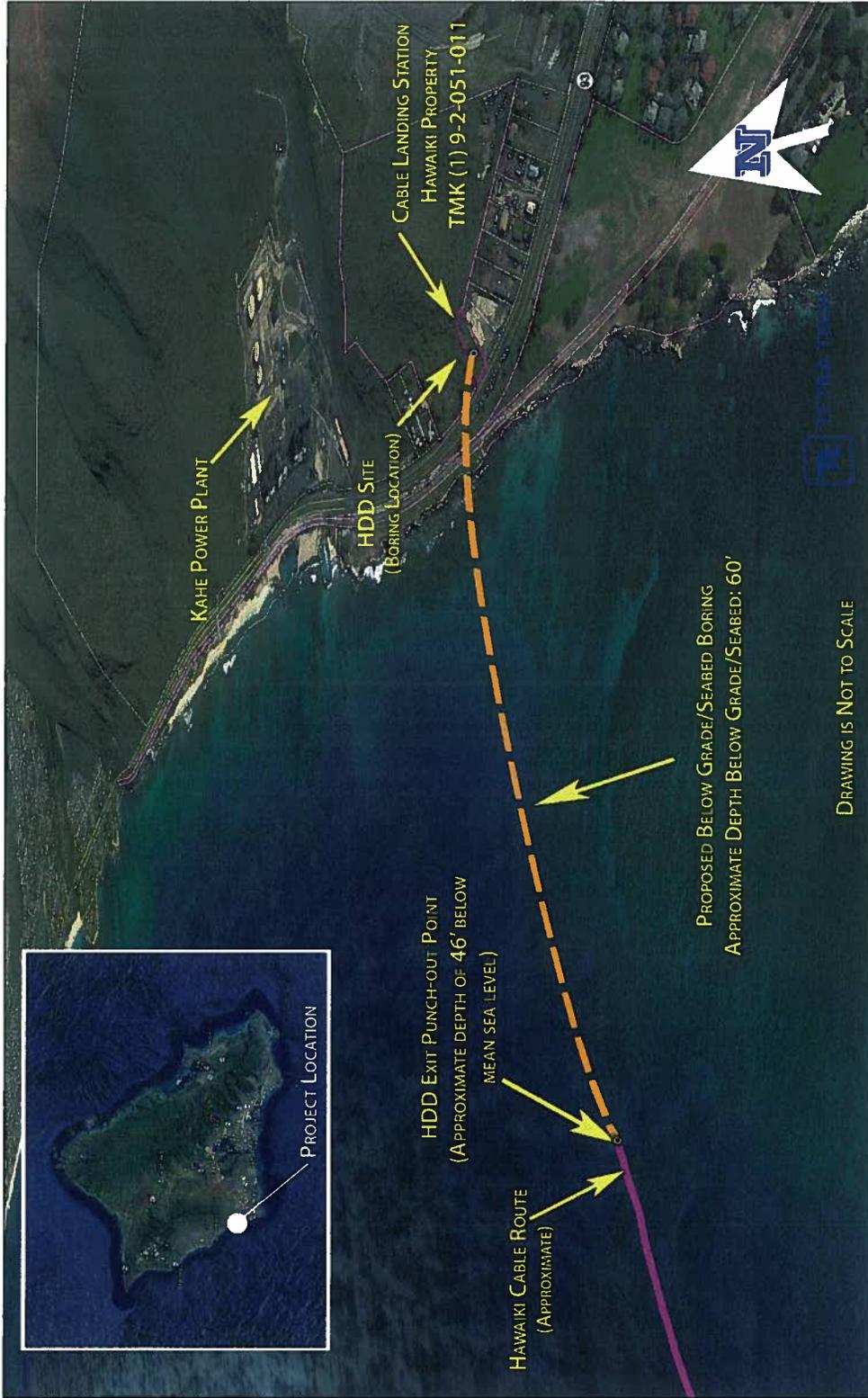


Hawaiiki Submarine Cable Kapolei Landing CDUA



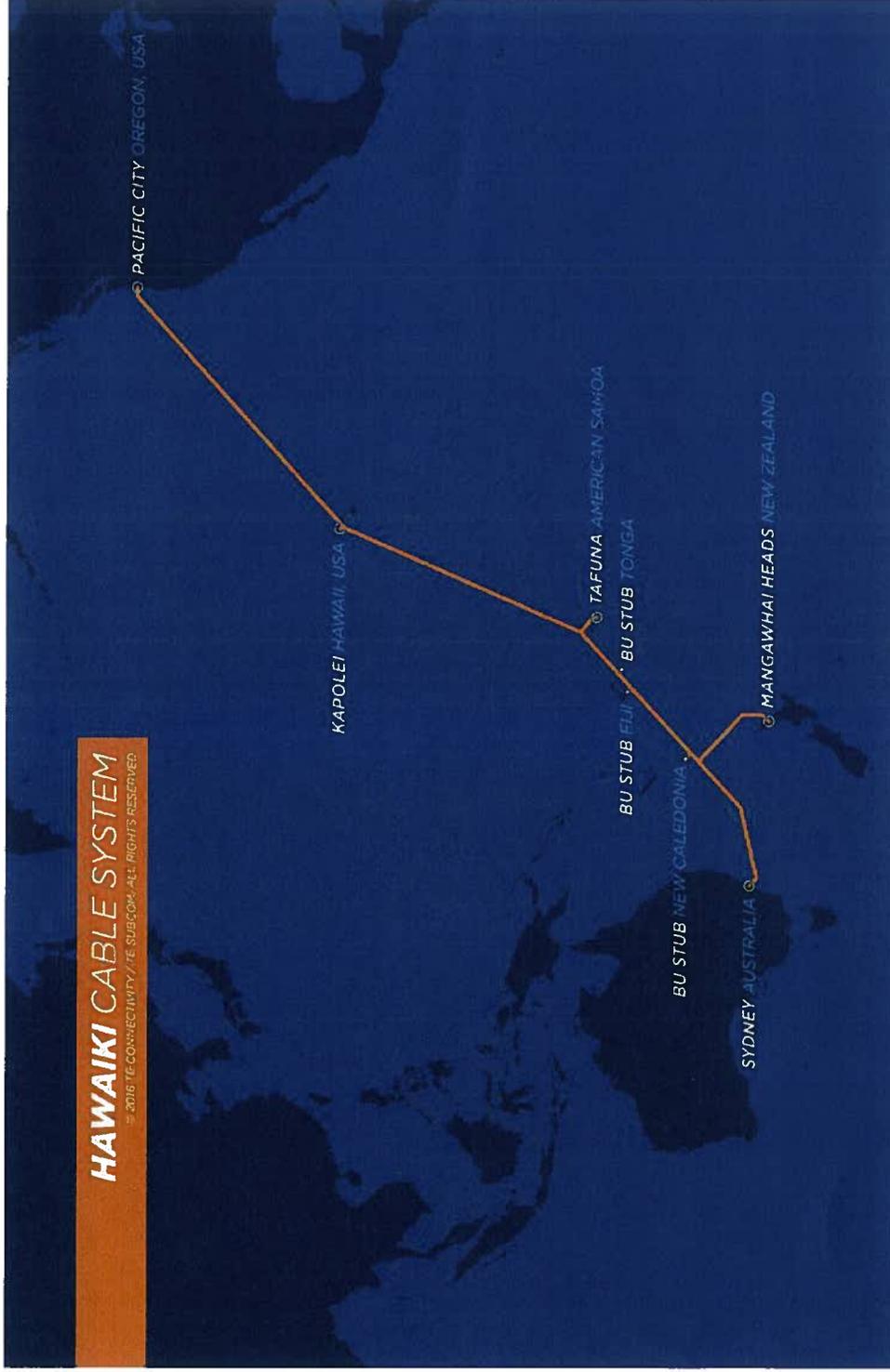
Offshore Geophysical Data.

EXHIBIT



Submarine portion of APE, showing route under near-shore reef environment.

Hawaiiki Submarine Cable Kapolei Landing CDUA



Hawaiiki Submarine Cable System Overview Map (Note: BU = Branching Unit).