LINDA LINGLE GOVERNOR

Revised
May, 2005

SSBN Cat II
General Application

Category II General Application
Small-Scale Beach Nourishment Projects (SSBN)

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

Before completing this form, read the Guidelines and Instructions for SSBN application.

DLNR USE ONLY
Permit No.: _____ Planner: _____

Start date of proposed work: April 2023

PROJECT NAME: Pāhonu Beach Restoration

Proposed volume: Up to approximately 10,000 cubic yards of beach quality sand, including 5,000 cubic yards for initial nourishment, plus 5,000 cubic yards for up to two (2) future renourishment events over a 10-year period, which will occur once 50% (2,500 cubic yards) of the nourished sand volume is eroded

For Category II beach nourishment projects less than 10,000 yd^3 total volume.
Attach additional sheets as necessary.

1) Property Owner(s) Information (see Guidelines for SSBN Application - Note 1)

Is this a community association or partnership project? Yes X No ____
Attach additional owner's information as needed.

Legal Name: Pāhonu Beach Community Restoration Foundation, Inc.

Street Address: 41-473 Kalaniana'ole Highway

City, State and Zip+4 Code: Waimānalo, HI 96795-1817

Mailing Address: 41-473 Kalaniana'ole Highway

City, State and Zip+4 Code: Waimānalo, HI 96795-1817

Contact Person & Title: John Dean, President

Phone No.: (808) 291-6029 **Fax No.:** N/A

2) Primary Contractor Information (see Guidelines - Note 2)

Name: To be provided by the Pāhonu Beach Community Restoration Foundation, Inc. at least 30 days before project begins

Scope of Work: Provide long-term shoreline protection by placing approximately 5,000 cubic yards of beach quality sand on the eroded beach as beach nourishment and constructing five (5) precast concrete "reef finger" structures to stabilize the beach. In addition to initial nourishment, it is anticipated that up to two (2) future renourishment events will occur, once 50% (2,500 cubic yards) of the nourished sand volume is eroded, over a 10-year period. In total, up to approximately 10,000 cubic yards of beach quality sand will be placed for beach restoration as part of this project.

Street Address: To be provided

Contact Person & Title: To be provided

Phone No.: To be provided **Fax No.:** To be provided

Name: Oceanit

Scope of Work: Coastal Engineering Designer and Consultant, Construction Management

Street Address: 828 Fort Street Mall, Suite 600, Honolulu, HI 96813-4314

Contact Person & Title: Michael Foley, Ph.D., P.E., Sr. Coastal Engineer

Phone No.: (808) 807-3880 **Fax No.:** (808) 531-3177

3) Emergency Contact Information (see Guidelines - Note 3)

Company/Organization Name: Pāhonu Beach Community Restoration Foundation, Inc.

Contact Person & Title: John Dean, President

Phone No.: (808) 291-6029 **Email:** jdean@startupcv.com

Company/Organization Name: Pāhonu Beach Community Restoration Foundation, Inc.

Contact Person & Title: Mark Webb, Treasurer

Phone No.: (646) 770-5573 **Email:** mkwebb58@yahoo.com

4) Project Site Information (see Guidelines - Note 4)

Project/Community Association Name: Pāhonu Beach Community Restoration Foundation, Inc.

Government Project/Job No. (As Applicable): N/A

State/County Zoning (As Applicable): State Land Use District (SLUD): Urban; County Zoning: Residential

Street Address: 41-473, 41-477, 41-479, 41-459, 41-463, 41-467, 41-471 & 41-457 Kalaniana‘ole Highway

Tax Map Keys (TMKs): (1) 4-1-001:002, (1) 4-1-001:003, (1) 4-1-001:004, (1) 4-1-001:006, (1) 4-1-001:007, (1) 4-1-001:008, (1) 4-1-001:009 & (1) 4-1-001:012 respectively

City, State and Zip+4 Code: Waimānalo, HI, 96795-1817

Contact Person & Title: John Dean, President

Phone No.: (808) 291-6029 **Fax No.:** N/A

Tax Map Key Number(s)							
Zone	**Section**	**Plat**	**Parcel(s)**	**Ownership**	**Total Area (sq. ft.)**	**Eroded Area (sq. ft.)**	**Zoning**
4	1	001	002	Mark K. Webb, Kokua Trust #19	20,001	N/A	Residential
4	1	001	003	BWL Associates LP	16,324	N/A	Residential
4	1	001	004	Patricia Y. Lee, Trustee	14,278	N/A	Residential
4	1	001	006	Sam & Sandra Sarkissian	12,624	N/A	Residential
4	1	001	007	Laura Lum Family Trust, Catherine H.W. Yee Trust, Wong Family 2012 Trust, Carolyn L. Fortune Trust, et al.	14,171	N/A	Residential
4	1	001	008	Hale Makapu’u	20,001	N/A	Residential
4	1	001	009	Kokua Trust #19	20,001	N/A	Residential
4	1	001	012	Chang Family Trust	10,360	N/A	Residential

5) Location Map and Shoreline Survey (see Guidelines - Note 5)

Provide and attach a regional, vicinity and parcel map of project area and include recent photograph(s) of relevant coast and shoreline:

a. Maps Submitted: See Attachment A, Figure 1

b. Photos Submitted: See Attachment B, Photos 1 – 18

c. Shoreline Survey (Date & Contractor):

Shoreline Delineation: A certified shoreline survey exemption is respectfully requested. Refer to Attachment G for a recent professional shoreline survey of the project site.

State Certification Map (If Applicable): N/A

d. Other Surveys: None

6) Receiving State Water Information (see Guidelines - Note 6)

a. Regional Name: Waimānalo Bay, Pacific Ocean

b. Classification (Check and Explain Appropriately):

1. Marine Waters:	Class A X	Type: Open Coastal
2. Marine Bottom Ecosystem:	Class II X	Type: Sand
3. Water-Quality-Limited Segment:	Yes	No X

c. Explain any "other" classifications:

7) Project Description (see Guidelines - Note 7)

Project Classification (Category I or II)

Note: Category II projects may require a seal from a certified civil engineer.
(Attach separate sheets as needed):

Primary Contractor and Type: Contractor information to be provided by the Pāhonu Beach Community Restoration Foundation, Inc. to the Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) at least 30 days before project begins. Scope of work is intended to provide long-term shoreline protection by placing up to approximately 10,000 cubic yards of beach quality sand on the eroded beach as beach nourishment (5,000 cubic yards for initial nourishment, 5,000 cubic yards for future renourishments) and constructing five (5) precast concrete “reef finger” structures to stabilize the beach.

Attached Documents (If Applicable):

a. Project Category (I or II): Category II

b. Extraction Site Street Address: Offshore of project area (see Attachment A, Figure 3), at Locations 3 and/or 5

City, State and Zip+4 Code: Waimānalo, HI, 96795-1817

Tax Map Key (TMK): N/A

Terrestrial extraction site is a permitted commercial quarry: N/A

Location 3 Coordinates: Lat: 21 º 19 ' 47.67 " N Long: 157 º 40 ' 27.51 " W

UTM: North: 2,359,238 m (4Q) East: 637,481 m (4Q)

Location 5 Coordinates: Lat: 21 º 19 ' 30.11 " N Long: 157 º 40 ' 0.34 " W

UTM: North: 2,358,705 m (4Q) East: 638,268 m (4Q)

Note: Coordinates refer to approximate centroid of offshore Location 3 and 5 areas.

c. Nourishment Site Street Address: Beach abutting land parcels 41-473, 41-477, 41-479, 41-459, 41-463, 41-467, 41-471 & 41-457 Kalaniana‘ole Highway

City, State and Zip+4 Code: Waimānalo, HI, 96795-1817

Beach abutting Tax Map Keys (TMKs): (1) 4-1-001:002, (1) 4-1-001:003, (1) 4-1-001:004, (1) 4-1-001:006, (1) 4-1-001:007, (1) 4-1-001:008, (1) 4-1-001:009 & (1) 4-1-001:012 respectively

d. Describe the overall project scope and purpose and evidence of need for proposed activities. (Attach separate sheets as needed):

The overall project scope is to nourish the beach with approximately 5,000 cubic yards (cu. yd.) of compatible sand dredged and delivered from a nearshore offshore sand source and to construct five (5) beach stabilization structures. The purpose of the proposed activities is to address current erosion and to restore width and elevation to the stretch of sand commonly referred to as Pāhonu Beach.

Subsequent to the initial nourishment event, up to two (2) renourishment events are anticipated at this location over a 10-year period. Subsequent renourishment event(s) will address future erosion. Combined, the nourishment events will not exceed 10,000 cu. yd. of sand, with initial nourishment of 5,000 cu. yd. and future renourishments calling for 2,500 cu. yd. each.

Pāhonu Beach rests on a convex-shaped stretch of coastline that is nestled between the historic Pāhonu Pond to the northwest and a rocky coastal bluff to the southeast. A timber pier, herein referred to as Muller’s Pier, protrudes near the eastern end of the beach. The beach is adjacent to residential properties. The Kalaniana‘ole Highway is situated mauka of these properties.

Pāhonu Beach erodes and accretes seasonally. Anecdotally, the middle portion of the beach generally loses sand in the summer months when northeasterly trade winds are prevalent. In

winter and spring, sand returns when north swells and Kona winds are more frequent. In addition to short-term seasonal changes, Pāhonu Beach experiences chronic erosion. A study by the University of Hawai'i at Mānoa of topographic survey charts dating back to 1911 and historic aerial images dating back to 1928 determined the average rate of the erosion is 0.5 feet per year (ft/yr) at the project site (Attachment A, Figure 7). The beach is shown to be most stable at the northwestern end, where it abuts the wall of Pāhonu Pond.

To address the risks of shoreline erosion and other worsening coastal hazards, several property owners have installed temporary sand-filled geotextile erosion control barriers along the shoreline. These structures were authorized by the DLNR to remain in place for some time while the property owners worked to develop long-term solutions. The proposed SSBN project is intended as a long-term solution.

Property owners formed the Pāhonu Beach Community Restoration Foundation, Inc., a 501(c)(3) organization, to work toward restoring the public beach area fronting their community. The Pāhonu Beach restoration project would return the beach to a historical width (i.e., around 1975 conditions; see Attachment B, Photograph #5). In addition to many other benefits, the restored beach profile may help reduce the risks of natural hazard exposure in the area. Beach restoration is a proven technique to address erosion in coastal areas worldwide and would allow continued lateral public access along the shoreline. Recent projects in Hawai'i include Stable Road Beach on Maui, and Iroquois Point Beach and Waikīkī Beach on O'ahu.

Beach restoration may involve sand nourishment with or without the addition of coastal structrues designed to stabilize the sand fill. Stabilizing structures may include groins, breakwaters, sills or submerged reefs designed to modify the background erosion forces. The structures change the dynamics of the littoral system by altering the wave and current patterns.

The proposed project includes the construction of five (5) temporary "reef finger" stabilization structures. The structures are constructed of interlocking precast concrete blocks. The concrete modules are formed off-site with a finish texture, color and shape inspired by natural reef formations at the project site. The unique finish is intended to provide opportunities for marine animals to establish habitat within the structures. The design is intended to be modular for ease of deployment, modification, and removal, should that ever be necessary. Alternatively, the proposed temporary stabilization structures may be constructed using other techniques such as sand-filled geotextile containers or rock rubble mounds (Figure 7D-1).

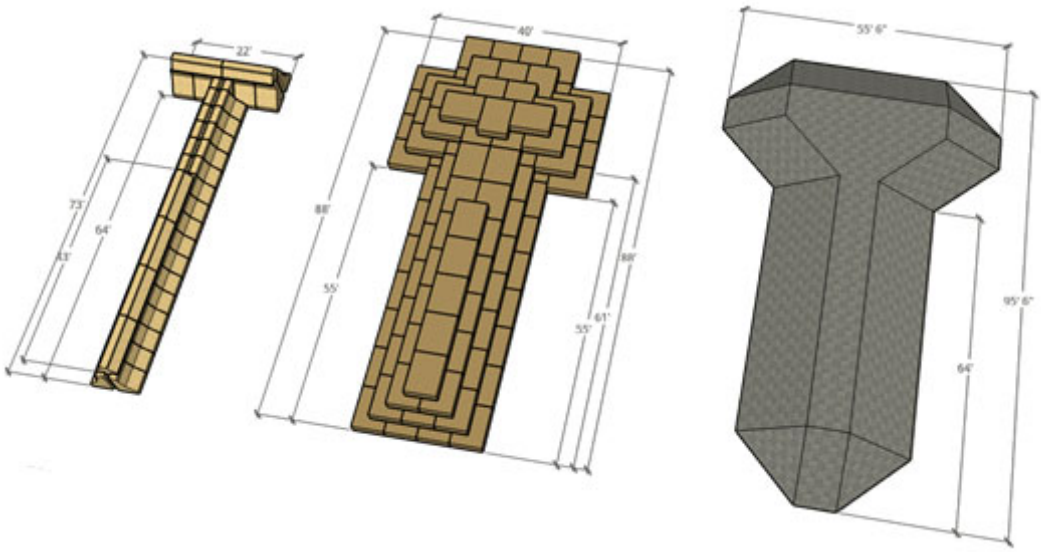

Figure 7D-1. Stabilization structure construction options include: the proposd precast concrete blocks (left), sand-filled geotextile containers (middle), or a rubble mound of stone (right)

The draft construction plans, shown in Attachment C, provide details on the proposed restoration actions for the Pāhonu Beach. This project involves placing approximately 5,000 cubic yards of beach quality sand to restore the beach width to the extent shown, as initial nourishment. To stabilize the sand fill, the plans show the placement of five (5) stabilization structures in the nearshore environment. The number, size, and orientation of the structures were designed to alter the existing nearshore wave-driven current patterns to help prevent beach erosion. The structures would extend from the shoreline or erosion escarpment to a maximum of roughly 75 ft offshore. The proposed lengths may vary slightly depending on site geometry and the profile of the proposed beach fill. The northwestern-most structure is shorter, at about 57 ft. A conceptual rendering of a typical section showing the proposed beach fill, vegetated berm and "reef finger" is shown in Figure 7D-2 (below).

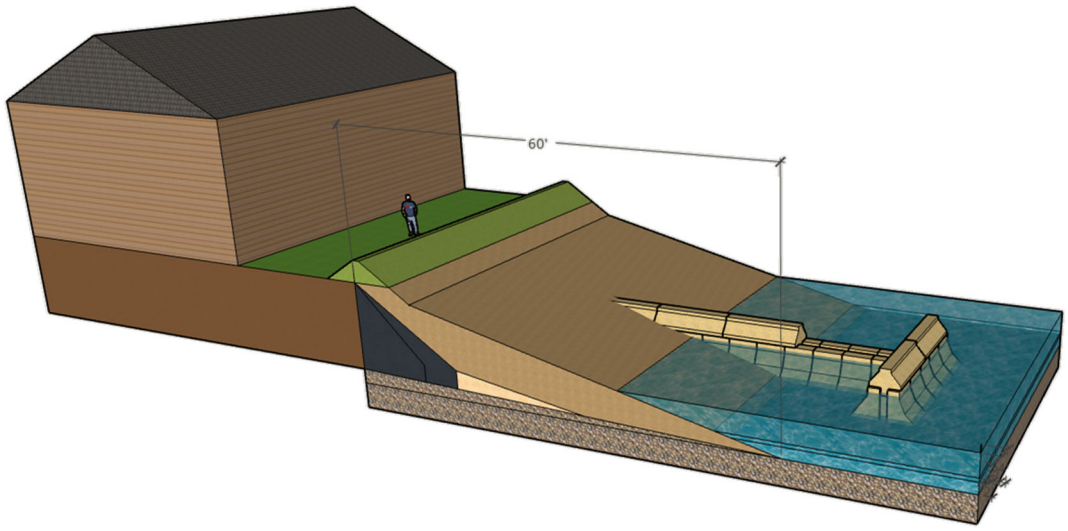

Figure 7D-2. Conceptual rendering of typical proposed project section

The stabilization structures shown in the draft construction plans are individual pre-cast concrete "reef finger" structures. A typical "reef finger" layout is shown in Figure 7D-3, and will comprise several interlocking blocks. The concrete "reef finger" blocks will be cast off-site and assembled on-site. Approximately 575 cu. yd. of concrete will be needed in total for all five (5) "reef fingers," which will sit on top of roughly 5,675 square feet (sq. ft.) of foundation geotextile fabric. Marine mattresses will be used to fill voids in the foundation, as required. When combined with a beach monitoring plan, the proposed project allows for evaluation of the long-term effectiveness and impacts of the project. The modular blocks allow the "reef fingers" to be modified and removed, as needed.

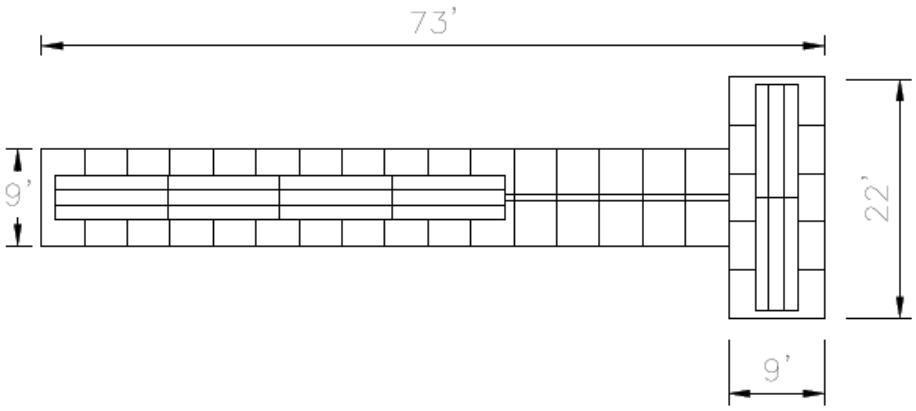

Figure 7D-3. Typical "reef finger" layout

After placement of the project BMPs, we propose to remove the existing sand-filled geotextile erosion control structures in the project area. Geotextile fabric will be cut and the sand inside will be used as the core of the beach nourishment fill. All manmade materials, including fabric, soil anchors, and ties, will be hauled off-site for disposal in accordance with applicable rules and regulations. The equipment mobilized for the beach nourishment work may be used to assist in the removal process. The expected duration for removal activity is one (1) to two (2) weeks.

As part of this application, we are respectfully requesting authorization for the existing emergency shoreline structures to remain in-place until the start of construction to protect the safety and wellbeing of the public. Without such safeguard, coastal erosion will likely continue to advance mauka, thereby increasing the risks of coastal hazards on public safety and on natural resources.

e. Provide a brief assessment of the primary causes of beach erosion or sand loss for the project site and describe the ability of the proposed project to correct or mitigate the problem. Provide an estimate of the designed residence time of the nourishment project and any anticipated follow up nourishment(s).

Currently, the shoreline fronting the subject properties either show distinct erosion escarpment or are protected by seawalls or temporary shoreline structures (e.g., erosion control blankets, geotextile sandbags), as the properties have experienced considerable shoreline erosion acceleration since 2008. The historical trend of shoreline erosion at the site was previously documented by the Coastal Geology Group at the University of Hawai'i at Mānoa. Using orthorectified and georeferenced aerial photographs dating to 1928 and a National Ocean Survey topographic survey chart dating to 1911, the University determined that the shoreline position at the site is moving inland at an average rate of about 0.5 feet per year (Attachment A, Figure 7).[1]

Based on monthly mean sea level data from 1955-2022 from the nearby tidal station in Moku o Lo'e (Station No. 1612480), the relative sea level trend around the project area is rising at about 1.69 millimeters per year (Attachment A, Figure 8).

The State of Hawai'i Sea Level Rise Vulnerability and Adaptation Report predicted that a few of the inhabited structures on the properties would be severely impacted by shoreline erosion due to a 0.5 ft ocean level increase.[2] The report predicts that we will observe this level of sea rise by about 2030, accounting for global warming assuming no reduction in greenhouse gas emissions from current levels. More recent studies by National Oceanic and Atmospheric Administration (NOAA) suggest that up to 3.2 ft of sea level rise could occur as early as the year 2060 under extreme global warming scenarios.[3] With uncertainties on the exact projections of sea level rise associated with greenhouse gas emission trajectories and the behavior of Earth's cryosphere, the State of Hawai'i Sea Level Rise Vulnerability and Adaptation Report recommends the State to begin planning now for 3.2 ft of rise. See Attachment A, Figure 9 for the Sea Level Rise Exposure Area (SLR-XA) at the project site, assuming a 3.2 ft SLR scenario.

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[1] *Coastal Geology Group in the School of Ocean and Earth Science and Technology (SOEST) at the University of Hawai'i. 2021. Hawai'i Shoreline Study. Available online at: https://www.soest.hawaii.edu/coasts/index.php/hawaii-shoreline-study-web-map*

[2] *Hawai'i Climate Change Mitigation and Adaption Commission. 2017. Hawaii Sea Level Rise Vulnerability and Adaption Report. Prepared by Tetra Tech, Inc. and the State of Hawaii Department of Land and Natural Resources, Office of Conservation and Coastal Lands, under the State of Hawaii Department of Land and Natural Resources Contract No.: 64064.*

[3] *Sweet et al. 2017. Global and Regional Sea Level Rise Scenarios for the United States. NOAA Technical Report NOS CO-OPS 083. Prepared for the National Ocean Service Center for Operational Oceanographic Products and Services. Available online at: https://repository.library.noaa.gov/view/noaa/18399.*

The SLR-XA is a combination of three (3) hazards including passive flooding, annual high wave flooding, and coastal erosion. Passive flooding modeling evaluates low-lying areas susceptible to flooding through elevation of ocean water level or groundwater level by SLR. Annual high wave flooding captures the distance wave runup and overwash will travel across the shoreline under high wave conditions. With SLR and higher water levels, offshore reefs will be less effective at dissipating incoming wave energy, which in turn results in greater wave size and energy impacts on the shoreline. Finally, coastal erosion modeling depicts the areas threatened by landward recession of the shoreline based on historical shoreline data.

High-resolution numerical wave modeling was conducted to facilitate coastal assessment studies and the development of erosion control designs at the project site. The phase-resolving nature of the model resolves local nonlinear wave processes such as shoaling, refraction, diffraction, wave breaking, wave run-up, and wave-driven circulation over irregular bathymetry on the order of a wave scale. The modeling effort focused on two characteristic swell conditions (a trade wind swell and a north swell) with two different water levels (mean sea level and a high tide), i.e., four wave conditions in total, to determine a range of commonly encountered wave-driven flow fields over the reef. The results show the nearshore reef around the project site experiences a distinct wave-driven current. The site is exposed to an alongshore recirculation current predominantly from the SE to NW with intensified flow speed in the immediate vicinity to the shoreline, which is consistently shown in the results from all four wave conditions. This northernly longshore current likely contributes to the sand loss at the project site and the continuously-widening beach at the fishpond to the north of the project site.

It is unlikely the existing erosion hazard at the project site will dissipate naturally. The proposed project is a long-term regional erosion management strategy. The “reef finger” stabilization structures are intended to reduce the frequency of follow-up nourishments. The initial nourishment will encompass 5,000 cu. yd.; up to two (2) renourishment events will each occur once 50% (2,500 cu. yd.) of the nourished sand volume is eroded. Monitoring data will reveal how frequent nourishments will be required, if at all, during the project life.

f. Describe the method of sediment extraction and delivery, type of equipment to be utilized and construction methods.

Several potential offshore borrow areas are in the proximity of the project site. Two (2) sand borrow locations are proposed, which are shown as Locations 3 and 5 in Attachment A, Figure 3. Grab samples from these borrow areas were obtained and analyzed for grain size distribution and composition. The results show that the sand may meet DLNR requirements for beach quality sand.

Both mechanical dredging and hydraulic dredging methods may be suitable for sand recovery based on the oceanographic conditions, operational time frame, potential impacts on spawning corals, impacts from the transportation route, dewatering needs, and potential nearshore water quality impacts.

Mechanical dredging involves using equipment staged on a barge to scoop and lift sand from the seafloor with an excavator bucket or a clamshell bucket. Bucket sizes can vary from 1 to 20 cubic yards (cu. yd.) and are left open to dewater as the bucket is lifted out of the water. Environmental buckets, attached to a crane or excavator, may also be used for scooping and lifting sand. Environmental buckets can be used to decrease the turbidity impact when compared to a typical clamshell bucket by allowing water to escape the bucket while it is lifted through the water column. Silt curtains will be installed within the boundary of the sand source(s) to isolate the water column in the dredging area from surface to the seafloor. A barge would be used to transport the dewatered sand to the shore along the most feasible route. Once the sand is delivered to the shore, it will be transported to the site for placement.

In hydraulic suction dredging, a pump is lowered from the barge and suspended on the seafloor. A crane or excavator arm are used to position the dredge pump. The barge can be positioned

using mooring lines and spuds. The sand delivery pipeline and hydraulic lines must be maneuvered with each positioning. A water jet ring may be attached to the pump inlet to increase the proportion of sand in the pumped slurry. The sand slurry is delivered to the shore typically through a high-density polyethylene (HDPE) pipeline. The pipeline may be designed in a floating or submerged configuration depending on site characteristics. The sand slurry may be pumped directly to the nourishment beach area that is bounded by the proposed sandbag barrier BMP, where it will be allowed to dewater while the turbidity is contained. Alternatively, the sand slurry may be dewatered in a basin constructed along the shoreline. Once dewatered, sand would be stockpiled and transported along the beach to the placement site.

Each dredging option has unique technical, economic, environmental and regulatory aspects, and further evaluation is needed to finalize a sand recovery plan in consultation with the contractor that will do the work should this SSBN application obtain conditional approval. Once a marine contractor is selected, we will work with them to determine the most feasible option given their experience and available equipment. A final sand recovery plan will be submitted to OCCL for approval before the construction begins.

Construction equipment and vehicles, such as dump trucks, backhoes, excavators, or similar machines, will access the beach from the roadway through private accessways. Construction will be phased and sequenced to optimize beach nourishment and "reef finger" construction, while minimizing ecological and public disturbance.

A temporary wave barrier will be placed along the seaward perimeter of the nourishment area as a BMP to contain sediments and reduce risks from waves entering the work zone. The temporary wave barrier will be constructed by stacking triple-walled geotextile bulk lift bags filled with dredged sand. The geotextile bags will be removed from the site and the sand contents will be used as part of the nourishment when the BMP is no longer needed.

g. Provide scale drawings or photographs (with scale bar) of area to be excavated and filled. Include an estimate of the area (sq. ft.) to be nourished. Delineate property boundaries, certified shoreline (if available), location and cross-section of beach profiles, existing and proposed temporary structures with cross-sectional views of any proposed temporary structures. Provide an estimate of the elevations and dimensions of the project area and a range of water depths of proposed activities.

See Attachment C for scaled drawings detailing proposed work.

- Areas to be excavated: Approximately 771,560 sq. ft. offshore during dredging operations at Locations 3 and 5 and 2,340 sq. ft. at the shoreline for "reef finger" installation
- Areas to be restored: Approximately 35,476 sq. ft. total restoration area (combined beach nourishment and "reef finger" footprints)
- Length of beach restoration: Approximately 585 ln. ft. of shoreline

h. Provide photographs of area to be excavated and filled before, during and after the nourishment project.

See Attachment B for photographs of existing project site conditions. Photographs during construction and of post-nourishment activities will be provided to DLNR OCCL after completion of construction, as part of a completion report. No additional survey work is planned at this time.

i. Provide a description and engineering design of any proposed temporary structures including all retention or offshore structures. Include a design analysis of any offshore sand extraction.

Five (5) "reef finger" structures, consisting of concrete blocks with interlocking mechanism, will be placed perpendicular to the shoreline at a spacing of approximately 150 ft to stabilize the

sand nourishment. The structures extend approximately 75 ft from the shoreline or erosion escarpment fronting the properties to nearshore reef and have a crest elevation of about 6 ft above Mean Lower-Low Water (MLLW). See Section 7d for further details of the structure dimensions. The structures are designed to have short head at the seaward end to help retain sand inside each individual cell while minimizing footprint impact. The layout of the "reef fingers" as counter-measure to the local erosion were evaluated through the numerical wave modeling. The results show that the array of short and low-crested "reef finger" structures noticeably reduce the longshore current and flow regime that likely contributed to beach erosion at the project site. Combined with sand nourishment, the designed "reef fingers" can contribute to the stabilization of the beach.

Offshore sand extraction sites (herein referred to as Locations 3 and 5 or Offshore Sites #3 and #5) are 0.3 to 0.65 miles away from the shoreline and are seaward of the nearshore fringing reef crest. Water depth at the two (2) sites is approximately 20 ft. Offshore sand extraction is not expected to change the wave field or have a significant effect on the dynamics along the coastline.

j. Provide a temporary construction plan. If temporary retention structures are proposed provide the following:

See Attachment C for draft construction plans and details, with temporary BMPs included on sheets C-5 and C-6. As mentioned in the response to item 7D (above), existing sand-filled geotextile erosion control structures in the project area will be removed as part of the proposed beach restoration project, after placement of the project BMPs.

1. Describe the potential effects to the marine substrate and local littoral processes.

Temporary BMPs include the use of a fiber roll barrier around the construction access and staging areas as well as a temporary wave barrier in nearshore waters. The fiber roll is intended to prevent any construction runoff from entering terrestrial drainageways, while the wave barrier is intended to act as a protection barrier between construction activities and waterways. The five (5) "reef fingers" are intended to intercept water flow and help retain sand along the shoreline, helping to restore the beach and improve habitat for marine animals.

2. Location, type and dimensions of proposed structure(s) (noted on drawings in section 7g).

The five (5) "reef finger" structures fronting the residential properties will be perpendicular to the shoreline berm and extend roughly 75 ft seaward. The crest elevation of the structure is approximately +5.0' Mean Sea Level (MSL) (i.e., +6.0' MLLW). A typical "reef finger" footprint is shown in Figure 7D-3 (see page 7).

Approximately 674 linear feet of temporary fiber roll will be installed upland around the staging and access areas. The fiber roll will be a minimum of 8 inches in diameter and will be anchored with 2 in x 2 in wood or metal stakes spaced 4 ft on center. Up to approximately 716 linear feet of temporary wave barrier will be installed in-water around the work area. The contractor may choose to install the wave barrier around individual cells (as opposed to the entire shoreline work area) and relocate it as needed as work progresses. All temporary BMPs will be removed after completion of construction.

3. Length of time retention structures will remain in place including a timeline of installation and removal efforts.

The components of the five (5) proposed "reef fingers" will be cast of concrete off-site. The structures may be assembled onsite relatively quickly. Once the BMPs including the temporary wave barrier is in-place, nourished sand may be used for fill above the

seafloor. The contractor may then prep the foundation and install the concrete units to form the retention structures. Once all the preparations are complete, each structure may take about a week to install. All temporary BMPs will be removed after completion of construction.

As part of this application, we are respectfully requesting authorization for the proposed sand retention structures to remain in-place for three (3) years, during which time we will monitor the project to assess the efficacy and potential impacts of the proposed structures. The proposed monitoring plan includes:

- At least three (3) cameras will be installed to record beach changes during the 3-year monitoring period. Cameras will be installed at locations with vantage points that allow for observation of the majority of the project beach area along with the adjacent beach areas at each end of the project. Camera monitoring will begin prior to initiating construction of the beach nourishment project.
- The camera network will provide a high-resolution record of the beach area throughout the monitoring period. Software will be applied to the image dataset to quantify possible changes in beach area over time.
- In addition, periodic site visits will be conducted by coastal professionals to assess and document the conditions of the beach, structures, shoreline, and nearshore benthic environment since the completion of the construction.

A report that documents the monitoring effort and findings will be provided to DLNR OCCL at the end of the three (3) year monitoring period.

We anticipate that within three (3) years, the efficacy and any potential impacts of the structures (i.e., reef fingers) will be apparent. If these impacts prove to be effective, we plan to apply for permits to extend the approved timeline for the structures. If the findings from the monitoring work show negative impacts of the structures on the surrounding environment, the structures can be promptly removed or modified. The precast concrete units are designed with features that allow for relativity easy handling to minimize risk of potential disturbance to the marine environment.

4. **Proof of general liability insurance ($1,000,000 minimum).**

   Proof of general liability insurance will be provided to DLNR OCCL after a contractor is retained by the Owner to perform the construction work.

k. Describe existing physical, chemical and biological environment of project site and any other pertinent characteristics of site. Include a description of major topographic/hydrographic features such as slope, ledges, holes, reefs. Provide a relevant hydrographic chart with site highlighted.

The project site is located in Waimānalo on the southeast side of the island of Oʻahu, State of Hawaiʻi. The beach fronts eight (8) residential properties and is located east of the Pāhonu Pond. The climate in Waimānalo has an average annual temperature of about 72.14 degrees Fahrenheit (°F), and ranges between about 75.8°F in the summer and 68.7°F in the winter.[4] The annual mean average rainfall of Waimānalo is approximately 30.9 inches per year, with the majority of the precipitation occurring between the months of November through March.[5] Land uses around the project site include residential uses and recreational uses along the shoreline and nearby parks.

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[4] Giambelluca et al. (2014.) Evapotranspiration of Hawai'i Final Report.

[5] Giambelluca et al. (2013.) Online rainfall atlas of Hawai'i. Bulletin of the American Meteorological Society 94: 313-316, doi:10.1175/BAMS-D-11-00228.1.

Northeasterly tradewinds prevail in the area throughout the year, especially during the summer season. In the winter, westerly or Kona winds occur more frequently, generated from low-pressure systems formed by tropical storms.

Soils specific to the project site are Jaucus sand, 0-15% slopes, MLRA 163 (JaC). JaC soils consist of sand sized coral and seashells sandy marine deposits derived from sedimentary rock. JaC sand are excessively drained with low runoff and are comprised mainly of calcium carbonate.[6]

Elevations at the site range from approximately 2 ft below MSL at the nearshore area to 10 ft above MSL at the yard areas. See sheet C-1 in Attachment C for an existing conditions plan, showing topographic and bathymetric contours. Contours from NOAA are also included in Attachment A, Figure 10, for reference. According to NOAA maps, benthic cover is mostly unknown and turf algae (Attachment A, Figure 4), while the benthic structure is unknown, coral reef and hardbottom (Attachment A, Figure 5). The reef structure fronting the project site is mostly unknown with reef pavement (Attachment A, Figure 6).

A preliminary benthic survey of the site was conducted in January 2022. This survey included investigation of offshore sand source locations, Pāhonu Beach, and initial characterization of marine bottom and initial marine benthic fauna in the nearshore area. In the nearshore area, Oceanit personnel found abundant and ecologically rich coral and algae. There were several large (greater than 4 ft in diameter) live large *Porites* coral heads less than 20 ft offshore. Large live coral heads of *Montipora patula, Leptastrea purpureea, Pocillopora meandrina, Pocillopora damicornis, Porites compressa, Porites evermanni, Sarcothelia edmondsoni* were seen in the nearshore area (see photos in Attachment E, a report describing field activities conducted on January 21, 2022, including the collection of sand samples from offshore sand source locations and Pāhonu Beach and a marine benthic assessment of the nearshore area). In addition, algae was abundant including large covers of *Halimeda discoidea, Dictyota spp., Padina spp., Dictospaeria versluysii.* Fish observed included *Thalassoma duperrey, Acanthurus triostegus, Rhinecanthus rectangulus,* and other reef species. Although there was not a lot of topographic relief, the majority of fish observed was where the reef shelf met the sand.

Sand studies included sand sampling of Pāhonu Beach and three (3) identified offshore sand sources (Locations 2, 3 and 5) (Attachment A, Figure 3). Composite sand samples were collected and analyzed for standard grain size and calcium carbonate composition to ensure compliance with DLNR standards for beach quality sand. Marine bottom type of the nearshore area and three (3) offshore sand sources was explored, as well as a preliminary marine benthos investigation of the nearshore area, mainly to see if live corals exist in the nearshore area. The three (3) offshore locations are summarized as follows:

- Location 2 (~5 ft water depth) (0.03 – 0.2 miles offshore)
- Location 3 (~20 ft water depth) (0.4 – 0.5 miles offshore)
- Location 5 (~25 ft water depth) (0.3 – 0.65 miles offshore)

Four (4) total sand samples were collected from 1) Pāhonu Beach (representative of "native sand"), 2) Offshore Site #2, 3) Offshore Site #3, and 4) Offshore Site #5. All offshore samples are suitable for beach nourishment. All sand sources are generally topographic relief and live corals. Offshore Site #2, just outside of Pāhonu Pond, is littered with some turf algae and small coral and rock pieces. The presence of these elements within the patch makes Offshore Site #2 less ideal as a sand source. Offshore Site #3, located farther offshore of Offshore Site #2, appears to be the most ideal sand source, as no rocks or coral were present, and the sand appears to have very few fines and is homogenous. Offshore Site #5 is the farthest offshore and looks better as a sand source as Offshore Site #2, but some large, scattered rock and the presence of an underwater cable would need to be avoided during sourcing activities. Based

[6] *NRCS. (2017.) Web Soil Survey. United States Department of Agriculture. Available online at: http://websoilsurvey.nrcs.usda.gov/*

on surveys of the potential borrow sand areas and results from laboratory testing, Offshore Sites #3 and #5 are the preferred borrow sand sources.

Project construction will span across TMKs (1) 4-1-001:002, (1) 4-1-001:003, (1) 4-1-001:004, (1) 4-1-001:006, (1) 4-1-001:007, (1) 4-1-001:008, (1) 4-1-001:009 & (1) 4-1-001:012. The interface between property 41-479 Kalaniana‘ole Highway (TMK (1) 4-1-001:004) and the beach is characterized by a thick naupaka shrub, mature coconut trees, and a false Kamani tree on the western boundary of the property (Figure 7K-1).

Figure 7K-1. Shoreline in front of 41-479 Kalaniana‘ole Highway, TMK (1) 4-1-001:004

The interface between property 41-477 Kalaniana‘ole Highway (TMK (1) 4-1-001:003) and the beach is characterized by thick naupaka shrubs that cover some boulder stones along the shoreline. There is an active erosion escarpment exposing unconsolidated sand, which is roughly a 3 ft drop-off between the top of the beach and backyard. Vegetation consists of naupaka shrubs, mature coconut trees, and a false kamani tree on western boundary (Figure 7K-2).

Figure 7K-2. Shoreline in front of 41-477 Kalaniana‘ole Highway, TMK (1) 4-1-001:003

The interface between property 41-473 Kalaniana‘ole Highway (TMK(1) 4-1-001:002) and the shoreline consists of a sloping beach. A vertical concrete rubble masonry (CRM) wall, roughly 3 to 4 ft tall, abuts the beach. A shrub of hau helps cover the signs of an active erosion escarpment roughly 3 ft before the yard erosion. Vegetation includes coconut trees and naupaka shrubs (Figure 7K-3).

Figure 7K-3. Shoreline in front of 41-473 Kalaniana‘ole Highway, TMK (1) 4-1-001:002

The interface between property 41-471 Kalaniana‘ole Highway (TMK (1) 4-1-001:009) and the shoreline consists of some rubble stones mixed in with a veneer of beach sand. A fabric

revetment abuts the beach and rises approximately 10 ft to the backyard elevation. At the crest of the revetment is a hedge of naupaka (Figure 7K-4).

Figure 7K-4. Shoreline in front of 41-471 Kalaniana‘ole Highway, TMK (1) 4-1-001:009

The interface between property 41-467 Kalaniana‘ole Highway (TMK (1) 4-1-001:008) and the shoreline consists of some rubble stones mixed in with a veneer of beach sand. A fabric revetment abuts the beach and rises approximately 10 to 12 ft to the backyard elevation. At the crest of the revetment are coconut trees and a hedge of naupaka (Figure 7K-5).

Figure 7K-5. Shoreline in front of 41-467 Kalaniana‘ole Highway, TMK (1) 4-1-001:008

The interface between property 41-463 Kalaniana‘ole Highway (TMK (1) 4-1-001:007) consists of rubble stone and a thin layer of sand. The shoreline abuts a vertical CRM wall that rises 8 to 10 ft above the beach elevation. A grassed backyard resides at the top of the CRM wall (Figure 7K-6). A dying iron wood tree protrudes from the east corner of the CRM structure.

Figure 7K-6. Shoreline in front of 41-463 Kalaniana‘ole Highway, TMK (1) 4-1-001:007

The interface between property 41-459 Kalaniana‘ole Highway (TMK (1) 4-1-001:006) consists of a sandy beach that abuts a vertical CRM wall which rises roughly 6 to 8 ft above the beach elevation. At the crest sits a naupaka shrub and mature coconut trees (Figure 7K-7).

Figure 7K-7. Shoreline in front of 41-459 Kalaniana‘ole Highway, TMK (1) 4-1-001:006

The interface between property 41-457 Kalaniana‘ole Highway (TMK (1) 4-1-001:012) and the beach consists of a sloping sandy beach. At the top is an active erosion escarpment that cuts into the backyard vegetation along the shoreline, which is approximately 4 ft tall. Vegetation consists of false kamani trees, a naupaka hedge, and a row of vetiver grass (Figure 7K-8).

Figure 7K-8. Shoreline in front of 41-457 Kalaniana‘ole Highway, TMK (1) 4-1-001:012

The shore fronting the properties and nearshore area consists of reef flats with a thin layer of sand on top.

I. Describe the existing bottom type of the extraction and nourishment site. Include percent coverage and type.

Sand located approximately 0.5 miles and 0.65 miles offshore of Pāhonu Beach (herein referred to as Locations 3 and 5 respectively) will be extracted for the project. No rocks or corals are present within Location 3, and the sand appears to have very few fines and is homogenous. At Location 5, some large, scattered rock and the presence of an underwater cable would need to be avoided during sourcing activities. The sand at both these locations likely originated from the adjacent beach and is suitable for nourishment at the project site.

The NOAA National Centers for Coastal Ocean Science (NCCOS) maps for benthic cover, benthic zone, and reef structures are summarized in Table 1 (see page 19) and in Figures 4 through 6 of Attachment A.

Table 1. Summary of NOAA NCCOS benthic cover, benthic zone, and reef structure

Area	Benthic Cover	Benthic Zone	Reef Structure
Nearshore Project Area	Unknown *	Reef Flat	Unknown *
Offshore Sand Source #2	Unknown *, Turf 50% - <90%	Reef Flat	Unknown *, Scattered Coral/Rock
Offshore Sand Source #3	Uncolonized 90% - 100%	Fore Reef	Sand
Offshore Sand Source #5	Uncolonized 90% - 100%, Turf 50% - <90%	Fore Reef, Channel	Sand, Pavement

* *"Unknown" per NOAA NCCOS. See additional details of marine benthic assessment of the nearshore area provided in Attachment E.*

m. Describe potential adverse environmental effects of proposed activity.

Construction activities to erect the proposed structures may result in temporary turbidity in the nearshore waters; however, no long-term degradation of physical chemical environments is expected. Strict adherence to construction BMPs and established sand quality will be critical mitigation measures. Work will be conducted during low tide and low wave conditions.

Sand recovery by hydraulic dredging will need to be conducted with care. The delivery pipe will need to be submerged so as not to impact navigation in waters, which means the pipeline will need to follow a route that avoids impacting existing corals to the maximum extent practicable. To help mitigate for impacts, the pipeline will be anchored to prevent lateral movement, marked with buoys and lighted for waterway traffic. Prior to laying out the pipe, a diver will be required to perform a thorough coral survey to help determine the optimal pipe route. Construction work shall not be conducted during the coral spawning season.

The "reef fingers" work to stabilize the beach by changing the local littoral drift at the nearshore water immediately fronting the beach. The structures act as a groin field, addressing longshore drift along the area of the beach that has shown a chronic trend. Hydrodynamic assessment indicates that the design will not significantly change the existing dynamics on either end of the field. No significant adverse environmental effects are expected to the area.

n. Describe the current recreational use of the project site and describe the potential impacts the proposed project might have. (i.e., Impacts on swimming, surfing, canoe clubs, diving, fishing, tourism, etc.) Briefly identify the development style and land use of the project area, (undeveloped, urban, residential, condominium, agricultural, commercial, etc.)

The Pāhonu Beach stretch is a dry sandy beach area that is used for recreation by local families and visitors who swim in the nearshore area and at the nearby Pāhonu Pond. During high tide, waves and currents produce unsafe conditions for walking and swimming, especially along the existing temporary sandbag structures on the southeast end of the project site, which are slick with algal growth. Restoring the beach will provide a broader opportunity for lateral public access and recreation, create safer conditions for beach activities, and provide habitat for marine animals. "Reef fingers" offer structural complexity and topographical relief as opposed to the existing shallow reef habitat for fish and other marine species. The surrounding land use is urban and consists of residential areas of single family homes and condominiums.

o. Identify and describe any known historic properties within or near the proposed project area and any mitigation commitments made to protect, restore, or data recover any of the identified properties. This could include properties such as stone features, fishponds, burial sites, cultural deposits, and traditional places.

The nourishment site is an area disturbed by earlier development activities. No known historic properties exist within the extraction or nourishment areas. However, *iwi kupuna* has been previously documented at the shoreline of TMK (1) 4-1-001:012. An archaeological monitoring plan will be prepared, which will include monitoring during ground disturbing activities. If any burial sites or cultural sensitive resources are encountered during construction, the Engineer and SHPD shall be informed of the suspected artifact(s). Work will continue only when the Engineer and SHPD declare that the work may continue.

p. Check Yes or No for the following items. Provide a detailed explanation for any "yes" answers. (see Instructional Guidelines)	**Yes**	**No**	**Contacted?**
Is any proposed work within the shoreline setback area?[1]	X		
Is any portion of this project within a Special Management Area?[1]	X		
Is any portion of this project within an endangered species habitat? [2,3]	X		
Is any portion of this project within a wetlands or estuary? [2,3]	X		
Is any portion of this project within a Marine Life Conservation District? [4]		X	
Is any portion of this project within a historical or cultural site? [5]		X	
Letter of Public Notice of Proposed Action submitted to the Office of Environmental Quality Control (OEQC)? [6]		X	
Date OEQC Contacted: N/A **Authorizations attached:**		X	

Explanation/Agencies Contacted: Work is being proposed along and seaward of the shoreline, and therefore, lies within the shoreline setback area as well as a Special Management Area (SMA).

The project site is located in a critical habitat for the United States Fish and Wildlife Service (USFWS) Rare, Threatened and Endangered (RTE) Species for the Hawaiian monk seal (known to frequent any sandy beach along the coast). If endangered Hawaiian monk seals, green sea turtles, or any other RTE species are within the project site or vicinity, construction will be stopped immediately. Construction may continue when the RTE animal(s) leaves the site on its own accord. There will be no attempt to remove or force the animal to leave the site. The long-term impact of the proposed action will restore and enhance this critical habitat by restoring the sandy beach area.

The project site is located within an Estuarine and Marine Wetland Area (M2USN) and Estuarine and Marine Deepwater (M1RF1L) according to the USFWS National Wetlands Mapper. The USFWS will be contacted in the event that additional permits are needed.

8) Description of the Existing Sedimentary Environment and Compatibility of Proposed Nourishment Sediment. (see Guidelines - Note 8)

a. Describe the *existing* sediment type including size, composition and quality. Include grain size distribution, percent fines and color.

Existing sediment at the Pāhonu Beach site consists mainly of calcareous materials (92%) from coral and shell detritus. Grain size varies from 0.1 millimeters (mm) to 4.0 mm. Less than 1 percent of the sand passed through the 0.1 mm sieve. The sand is light tan in color and shows a texture of typical beach material. Full grain size distribution results for the existing sand at Pāhonu is included as Attachment D.

b. Describe the *proposed fill* sediment type including size, composition and quality. Include grain size distribution, percent fines and color.

The proposed fill sand from Locations 3 and 5 are currently located offshore of Pāhonu Beach. At Location 3, no rocks or coral were observed, and grain size varies from 0.3 mm to 2.0 mm. The fraction passing through the 0.1 mm sieve is less than 1 percent. At Location 5, grain size varies from 0.1 mm to 4.0 mm and matches a little more closely with existing native sand than Location 3. Grain size distribution show that the proposed fill sands are consistently coarser than the native Pāhonu Beach sand, making it more difficult to move by wave action. This is favorable because no over nourishment is expected. Full grain size distribution results for the proposed borrow sand at Locations 3 and 5 are included as Attachment D.

c. Give an estimate of compatibility to fill site and evidence that proposed fill sediment meets the requirements for grain size ranges as specified in the Guidelines Section 8c. Indicate an overfill ratio and method of calculation (if applicable).

The proposed fill sand of Locations 3 and 5 meet applicable DLNR grain size requirements. No more than 50 percent of the sands are less than 0.125 mm, as measured by the #120 standard mesh sieve, and the percentage of fine sediment (less than 0.075 mm) is also less than 2 percent. In addition, both sands are 98 percent calcium carbonate ($CaCO_3$). See Attachment D for more details.

d. Provide one separate, bagged and labeled (~0.5 lb) sediment sample of both the extraction site and nourishment site to the DLNR Lands Division. (see Guidelines - Note 8)

Sample sent or delivered (date): Two (2) bagged, composite samples of sand from the proposed extraction sites (Locations 3 and 5) and one (1) bagged, composite sample of sand from the nourishment site (fill/native sand) was delivered to OCCL on October 31, 2022.

e. List name and contact numbers for laboratory to be used for sediment analysis:

Lab name, contact name and phone number: AECOS Inc., Snookie Mello, (808) 234-7770

9) Project Schedule (see Guidelines - Note 9)

a. Provide the estimated date or dates on which the activity will begin and end:[1]

[1] See Article V.22 TERMS of the Guidelines

Total project construction will span approximately four (4) to six (6) months, depending on surf, tide, coral spawning, and the presence of RTE in the project area. The commencement of the construction will depend on the concurrence from regulatory agencies, with an April 2023 earliest start date.

b. Provide the date or dates that the excavation and or nourishment(s) will take place:

As mentioned in the response to item 9A (above), dates of excavation and nourishment activities will be dependent on permit approvals.

10) Site-Specific Best Management Practices (BMP) Plan (see Guidelines - Note 10)

a. Separate maps are attached Yes (Attachment C) **Using existing map** N/A

b. Project monitoring and oversight responsibility (If different than Section 3 Emergency Contact).

Contact person, title and contact number(s): Same as Section 3 Emergency Contact

c. Construction sequence and duration.

1) The contractor will mobilize equipment to the site and establish the staging and access areas, both at the shoreline and offshore. This will include implementation of BMPs per plan, the placement of temporary construction ramps as needed to track equipment from the yard area down to the beach, and the installation of perimeter fencing to restrict unauthorized access to the construction area. The contractor shall also prep the site by removing any obstacles and obstructions that inhibit proper access and completion of the work per plan. Duration: 1-2 weeks

2) The contractor will remove existing sand-filled geotextile erosion control structures in the project area. Geotextile fabric will be cut and the sand inside will be used as the core of the beach nourishment fill. All manmade materials, including fabric, soil anchors, and ties, will be hauled off-site for disposal in accordance with applicable rules and regulations. Duration: 1-2 weeks

3) The contractor will start at either the western- or eastern-most end, tracking toward the middle of the project site, where construction access is situated, on a cell-by-cell basis (one cell is between two “reef fingers”), utilizing sliding work zones and BMPs. (After reaching the middle of the project site from one end, the contractor will repeat the process at the other end.) The contractor will start by constructing a “reef finger.” This will include excavating of foundation material and foundation preparation to place the structure, per plan. Chunks of natural stone excavated from the foundation pad will be placed at the most landward portion of the beach. Duration: 3-5 weeks for 1 cell

4) Concurrent to construction sequence #2 (above), the contractor will source sand from the offshore Locations 3 and/or 5 and replenish the beach. Sand will be transported to the nourishment site by barge (in the case of mechanical dredging) or pipeline (in the case of hydraulic dredging) and stockpiled and graded within the cell being actively constructed at the time. Duration: 3-5 weeks for 1 cell

5) At the end of construction of 4 total cells, the contractor shall remove all temporary BMPs and fully restore staging and access sites to pre-construction conditions. Indigenous plants shall be cultivated on the berm. (No naupaka shall be planted.) Demobilize from the site. Duration: 1-2 weeks

The total duration of the project will take approximately four (4) to six (6) months.

d. Construction or nourishment materials and equipment to be used and the anticipated dates of installation/mobilization and removal.

Construction equipment will be located on barge and/or on land, with staging on and access via Kalaniana‘ole Highway and TMK (1) 4-1-001:007. Land- and water-based equipment may generally include the following: barge, excavator, hopper scow, hydraulic pump system, front-end loader, dump trucks, dumpsters for any debris, work boat, temporary aluminum ramps or timber mats, geotextile fabric, sand, transit level, as well as any hand tools necessary for the work. Either an excavator or hydraulic pump system will be situated on a barge to extract sand from offshore Locations 3 and 5. A front-end loader and dump trucks may be used to move the

beach material from temporary storage stockpile(s) to intended placement sites, and the same equipment will be used to grade and contour the beach material to the desired configuration. Dates of construction will be set according to need caused by erosional stressors and with respect to low tide and mild surf conditions to minimize construction-caused turbidity, with an April 2023 earliest start date.

e. Characteristics of potential pollutants associated with the proposed nourishment or construction activity.

Source	Potential Pollutant	Quantity	Duration
Trucks, excavator, and loader	Diesel fuel leak (no potential to pollute state waters as equipment will be on land)	Limited	4-6 months
Trucks, excavator, and loader	Hydraulic fuel leak (no potential to pollute state waters as equipment will be on land)	Limited	4-6 months
Trucks, excavator, and loader	Oil leak (no potential to pollute state waters as equipment will be on land)	Limited	4-6 months
Land erosion and fill transport	Sediment and water turbidity	Limited	4-6 months

f. Proposed pollution control measures and/or treatment(s).

The contractor shall implement standard BMPs. A preconstruction meeting will be conducted with the trucking and bulldozer operators to review BMPs, construction sequence, and safety measures. Work along the shoreline will be conducted, to the maximum extent practicable, during periods of expected low tide and small or favorable wave condition. Any loose soil, debris or other foreign material that falls onto the beach during construction must be immediately contained and removed. Construction debris and other waste material shall be disposed offsite in compliance with all applicable laws and regulations. Trucks hauling fine materials (e.g., sand) and debris shall be covered.

All equipment will be pre-fueled prior to staging at the site and checked to ensure that there are no leaks of any pollutants (i.e., fuels or oils). In order to mitigate the potential for toxic or chemical spills into the coastal environment, all fueling and servicing of heavy machinery and equipment will be completed offsite at the farthest *mauka* area of the ingress/egress lot (at least 100 ft away from the ocean). A temporary stabilized construction access will be installed within TMK (1) 4-1-001:007, off Kalaniana‘ole Highway, to reduce the tracking of mud and dirt onto public roads by construction vehicles. Whenever vehicles leave the site and enter surrounding paved streets, the contractor shall prevent any material from being carried onto the pavement. All sediment spilled, dropped, washed or tracked onto public rights-of-way will be removed immediately.

A temporary wave barrier will be created between the active work area and the ocean (e.g., using bulk lift bags or AquaDam). The lift bags shall be stacked side-by-side and secured to each other with a line that passes through each lift strap, while the AquaDam shall be adequately anchored into place temporarily to prevent flotation or lateral movement. A temporary fiber roll will be installed as a pollution control measure around construction access and staging areas. Please see sheets C-5 and C-6 of Attachment C for more details on BMPs and temporary construction access.

In addition, BMPs will be utilized during construction activities in order to mitigate the potential for adverse effects to air quality and noise levels. Such BMPs include the use of emission control devices and noise attenuating devices.

g. Describe the onsite public safety measures (i.e., Warning signs, barriers, cordon off area, safety personnel, etc.)

Every effort will be made to notify residents and neighbors of the date and scope of work. Notification signs will be posted during construction activities, and either lateral beach access will be maintained or an alternate beach access route will be provided during construction when lateral beach access is not accessible. Areas where heavy equipment will be operated will be cordoned off, and appropriate warning signs will be posted by the contractor. Temporary high visibility safety fencing will be installed to restrict access of all non-authorized personnel around the active work and staging areas. The project manager or applicant's agent will be onsite during all construction activities. The project shall be completed in accordance with all applicable State and County health and safety regulations.

11) Monitoring and Assessment Plan (see Guidelines - Note 11)

The Monitoring and Assessment Plan shall, at a minimum, including the following:

a. Description of the methods and means being used or proposed to monitor the quality of the surrounding near shore waters. (Describe the planned monitoring program frequency.)

Act 162 enacted by the legislature of the State of Hawai'i waives the requirement of a Section 401 Water Quality Certification (WQC) for beach restoration and management projects that have received notice of authorization to proceed from the DLNR's new Small-Scale Beach Restoration (SSBR) Program. Our project intends to follow the general construction practices and water quality protection measures specified in this SSBR program[7], established to streamline the regulatory process. The following measures will be employed to avoid any impacts and minimize negative effects to water quality:

1. Only beach compatible fill should be placed on the beach or in any associated dune system. Beach compatible fill should maintain the general character and functionality of the beach and the adjacent dune and coastal system. Beach fill should be similar in composition, grain size distribution (sand grain frequency, mean and median grain size, and sorting coefficient), color, and texture, and should not contain:

    a. Greater than two percent (2%) by weight, silt, clay, or colloids passing the #230 sieve (4.0φ);
    b. Greater than fifty percent (50%) by weight, very fine sand passing the #120 sieve (3.0φ);
    c. Greater than ten percent (10%) by weight, fine gravel retained on the #4 sieve (-2.25φ);
    d. Coarse gravel, cobbles or material retained on the 3/4 inch sieve (-4.25φ) in a percentage or size greater than that found on the native or existing beach;
    e. Construction debris, toxic material or other foreign matter; and
    f. Material that results in cementation of the beach.

    If the native or existing beach exceeds any of the limiting parameters listed above, then the beach fill should not exceed the measured level for that parameter. More restrictive values for the sediment parameters may be considered on a project specific basis to ensure that the placed beach fill is similar in composition, grain size distribution, color, and texture to

[7] *SLNR OCCL. (2019). Conservation District Use Application for Programmatic Statewide Small-Scale Beach Restoration Program. Retrieved from https://dlnr.hawaii.gov/occl/files/2022/06/SSBR-Report.pdf.*

the sediment in the coastal system at the placement site. Beach fill that falls outside of these limits should be considered unacceptable and may be subject to remediation.

2. Drainage outlets at the shoreline should be maintained to minimize erosion and pollution of waterways during construction. Surface runoff should be controlled to minimize silt and other contaminants entering the water. Should excessive siltation or turbidity result from the contractor's method of operation, the contractor must implement turbidity control measures as necessary to correct the problem.

3. Visual monitoring should be conducted during construction and include ongoing inspections for turbidity outside the project area, which is to be identified in the project permit application. In the event that excessive turbidity is observed outside the project area, work should be suspended or modified to the extent necessary to mitigate any adverse effects.

4. The applicant should demonstrate that the beach fill was obtained from an approved source.

5. All placed beach fill should be free of contaminants of any kind including: excessive silt, sludge, anoxic or decaying organic matter, turbidity, temperature or abnormal water chemistry, clay, dirt, organic material, oil, floating debris, grease or foam or any other pollutant that would produce an undesirable condition to the beach or water quality. Should the OCCL determine the beach fill quality inferior, the applicant may be asked to provide better quality fill or screen the existing fill for contaminants at their own expense.

6. Geotechnical investigations that provide adequate data to define the character of the native or existing (if native sand is not available) and fill sediments should be conducted. An analysis of the native or existing beach sediment and the sediment within the proposed fill source must demonstrate compatibility. Beach fill compatibility should be determined as follows:

    a. Grain size distributions of proposed and constructed projects should be analyzed by a standard laboratory wet sieve technique (ASTM D-1140-92) and tested at a qualified facility. Grain size distributions of proposed projects should include an analysis of fill source (i.e., borrow area) and native beach, when available, or existing beach (i.e., if the beach has been previously nourished) to define beach fill compatibility specifications. Grain size distributions of constructed projects should include an analysis of placed beach fill to document as-built conditions and confirm placed beach fill complies with compatibility specifications. The survey method, layout and sampling distribution should be sufficient to adequately describe and map the character of the existing beach, fill source, and restored/nourished beach sediments.

        i. Nearshore borrow areas and offshore borrow areas with a shallow cut depth may be characterized using surface grab samples and jet probes, while offshore borrow areas with a deep cut depth should be characterized using an appropriate sub-bottom profiler and rigid vibracores. Sub-bottom profile surveys may be necessary for nearshore borrow areas and offshore borrow areas with a shallow cut depth that are located near headlands, hardground areas, or bottom structures. The survey method, layout, and sampling distribution should be sufficient to adequately map the character of the sediment within the borrow area and design the borrow area cuts so the beach fill meets compatibility specifications.

        ii. Fill area sediment samples of the existing (i.e., pre-construction) and restored/nourished (i.e., post-construction) beach should be spaces uniformly alongshore, though tighter spaced samples may be necessary to appropriately characterize smaller stretches of beach or beaches that are cellularized by natural or man-made features. The existing beach composite sediment samples should be surface grab samples collected along the active profile at the following cross-shore morphodynamic zones when present: dry beach (i.e., berm crest, 1 foot

below surface), beach face (i.e., swash zone), and beach toe (i.e., base of foreshore near the low tide level). The restored/nourished beach sediment samples should be surface grab samples collected along the constructed beach (i.e., berm crest, 1 foot below surface). The survey method, layout, and sampling distribution should be sufficient to adequately map the character of the sediment within the fill area to appropriately define beach fill compatibility specifications and verify compliance.

b. All samples should be evaluated visually for color, composition, and texture and sieved in accordance with the applicable sections of ASTM D422-63 (Standard Test Method for Particle-Size Analysis of Soils), ASTM D1140-54 (Standard Test Method for Amount of Material in Soils Finer than No. 230 Sieve), and ASTM D2487-17 (Classification of Soils for Engineering Purposes). The samples should be sieved using the following U.S. Standard Sieve Numbers: 3/4", 5/8", 7/16", 5/16", 3.5, 4, 5, 7, 10, 14, 18, 25, 35, 45, 60, 80, 120, 170, 200, and 230. The range of sieve openings must plan the range of sediment sizes to be sieved. All sediment statistics should be calculated using the moment method as detailed in Folk (1974).

c. Beach fill compatibility specifications should take into account the variability of the sediment on the native or existing beach. Compatibility may be demonstrated when the grain size distribution of the proposed beach fill is within twenty percent (20%) of the native or existing beach sediment, as measured by a percent finer than or coarser than value. For example, if 45% of the existing beach sediment is finer than the #100 sieve, the proposed beach fill could contain between 25% and 65% sediment finer than the #120 sieve.

7. An appropriate sediment quality assurance/quality control (QA/QC) plan should be prepared to ensure beach fill placed meets compatibility specifications. This plan should outline the responsibilities of each stakeholder in the project as they relate to the placement of beach fill. The plan should specify the minimum construction oversight, inspection, and reporting requirements to be undertaken to observe, sample and test the placed fill to verify that it meets compliance specifications. The plan should describe the methods and means to monitor and control the quality and characteristics of the fill material.

8. An appropriate turbidity control plan, which includes turbidity control measures and monitoring methods, should be prepared to ensure turbidity is controlled and limited during construction. This plan should outline the responsibilities of each stakeholder in the project as they relate to the control of turbidity within and outside the project area. The plan should specify the minimum construction oversight, inspection, and reporting requirements to be undertaken to observe, sample and test turbidity to verify turbidity remains within acceptable limits. The plan should describe the methods and means to monitor and control turbidity.

9. Other measures as agreed to in any future permits or agreements.

It is our understanding that by following these requirements, the SSBN permit can be accompanied by a 401 WQC. See Attachment C for project area identification. See Attachment D for beach-compatibility, grain size and composition analysis results. See Attachment E for a report describing field activities conducted on January 21, 2022, including the collection of sand samples from offshore sand source locations and Pāhonu Beach and a marine benthic assessment of the nearshore area. See Attachment F for an Applicable Monitoring and Assessment Plan (AMAP) describing turbidity control and monitoring measures for the project.

Five (5) offshore sand sources, Locations 1 through 5, were initially considered as potential borrow sand sources for this project (Attachment A, Figure 2). After further evaluations related to estimated sand availability and sourcing feasibility, Locations 1 and 4 were eliminated from the list. The list's remaining Locations 2, 3 and 5 (Attachment A, Figure 3) were surveyed, and sand samples collected and sent to AECOS, Inc. laboratory for grain size distribution and

composition analysis. (No contaminant testing was conducted due to all locations being sourced from the Pacific Ocean.) All sand sources are generally topographic relief and live corals. Location 2, just outside of Pāhonu Pond, is littered with some turf algae and small coral and rock pieces. The presence of these elements within the patch makes Location 2 less ideal as a sand source. Location 3, located farther offshore of Location 2, appears to be the most ideal sand source, as no rocks or coral were present, and the sand appears to have very few fines and is homogenous. Location 5 is the farthest offshore and looks better as a sand source as Location 2, but some large, scattered rock and the presence of an underwater cable would need to be avoided during sourcing activities. Based on surveys of the potential borrow sand areas and results from laboratory testing, Locations 3 and 5 are the preferred borrow sand sources.

b. Acknowledge of required final compliance report to be submitted to the DLNR OCCL within two (2) months of completion of authorized project. (see Guidelines - Note 11)

Authorized Signature: _____ **Date:** 3/13/23 SIGN HERE

Printed Name & Title: John Dean, President

12) Summary of Supporting Documents (see Guidelines - Note 12)

List and submit applicable maps, photos, plans, specifications, copies of associated permits or licenses, federal applications, Environmental Assessments or Environmental Impact Statements, as applicable, etc.

	Document Title	Pages	Page(s) Referenced	Document Date
a)	Attachment A – Figures	6	4, 5, 6, 8, 9, 13, 18, 26	Mar. 2023
b)	Attachment B – Site Photos	3	4, 6, 10	Mar. 2023
c)	Attachment C – Permit Drawings	10	7, 10, 11, 13, 22, 23, 26	Mar. 2023
d)	Attachment D – Grain Size Analysis Results	6	21, 26	June 2022
e)	Attachment E – Field Report	25	13, 19, 26	Feb. 2022
f)	Attachment F – AMAP	28	26	Oct. 2022
g)	Attachment G – Professional Shoreline Survey	2	4	Mar. 2023

13) Additional Information (see Guidelines - Note 13)

14) **Authorization of Representative** (see Guidelines - Note 14)

Check one and complete the appropriate space(s). Alteration of this item will result in the invalidation of the authorization statement(s).

a. This statement authorizes the named individual (s) or any individual occupying the named position of the company/organization listed below to act as our representative to process the following General Application for Small-Scale Beach Nourishment for the subject project. The Owner hereby agrees to comply with and be responsible for all permit terms and conditions.

Said representative is further authorized to fulfill all terms and conditions of this application: Yes X No _____

b. Company/Organization Name: Pāhonu Beach Community Restoration Foundation, Inc.

Street Address: 41-473 Kalanianʻaole Highway

City, State and Zip Code+4: Waimānalo, HI 96795-1817

Authorized Person & Title: John Dean, President

Phone No.: (808) 291-6029 **Fax No.:** N/A

Effective date(s): _____

c. A separate statement is attached. Yes _____ No X

15) **Certification** (see Guidelines - Note 15)

Alteration of this item will result in the invalidation of this application.

____ I certify that for a municipal agency, I am a principal executive officer or ranking elected official.

_____ I certify that for a state agency, I am a principal executive officer or ranking elected official.

_____ I certify that for a federal or other non-federal public agency, I am a principal executive officer or ranking elected official.

_____ I certify that for a federal agency, I am the chief executive officer of the agency, or I am the senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

_____ I certify that I am a general partner for a partnership or association.

_____ I certify that I am the proprietor for a sole proprietorship.

_____ I certify that I am the legal owner of a private residence or property.

__X__ I certify that for a corporation or association, I am the President, Vice President, Secretary, or Treasurer of the corporation or association and in charge of a principal business function, or I perform similar policy or decision-making functions for the corporation or association:

_____ I certify that for a corporation, I am the Manager of one or more operating facilities and have the authority to sign documents has been assigned or delegated to me in accordance with corporate procedures.

_____ I certify that for a trust, I am a trustee.

In accordance with all applicable State of Hawai'i and federal statues there is reasonable assurance that the proposed activity will be conducted in such a manner which will not violate basic water quality criteria applicable to all waters and in a manner consistent with the DLNR, COE, DOH and CZM programs where the proposed nourishment would take place.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Authorized Signature: _____ **Date:** 8/17/23 SIGN HERE

Printed Name & Title: John Dean, President

Company/Organization Name: Pāhonu Beach Community Restoration Foundation, Inc.

Phone No.: (808) 291-6029 **Fax No.:** N/A

16) **Filing Fee** (see Guidelines - Note 18)

Check one and complete the appropriate space(s). Non-refundable filing fee.

Check # 62124 *Note: Check was delivered to OCCL on October 31, 2022.*

_____ Category I Project ($50)
_X_ Category II Project ($250)
_____ Attached to application

Payable to: *State of Hawai'i*

Inquiries and Submittals:

Contact Information

SSBN inquiries and submittals shall be directed to the street or mailing address listed below:

1. *Street Address*

State of Hawaii
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
1151 Punchbowl Street
Honolulu, Hawaii 96809
(808) 587-0377
(808) 587-0322 Fax
http://www.hawaii.gov/dlnr/occl/index.php

2. *Mailing Address*

State of Hawaii
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
P.O. Box 621
Honolulu, Hawaii 96809

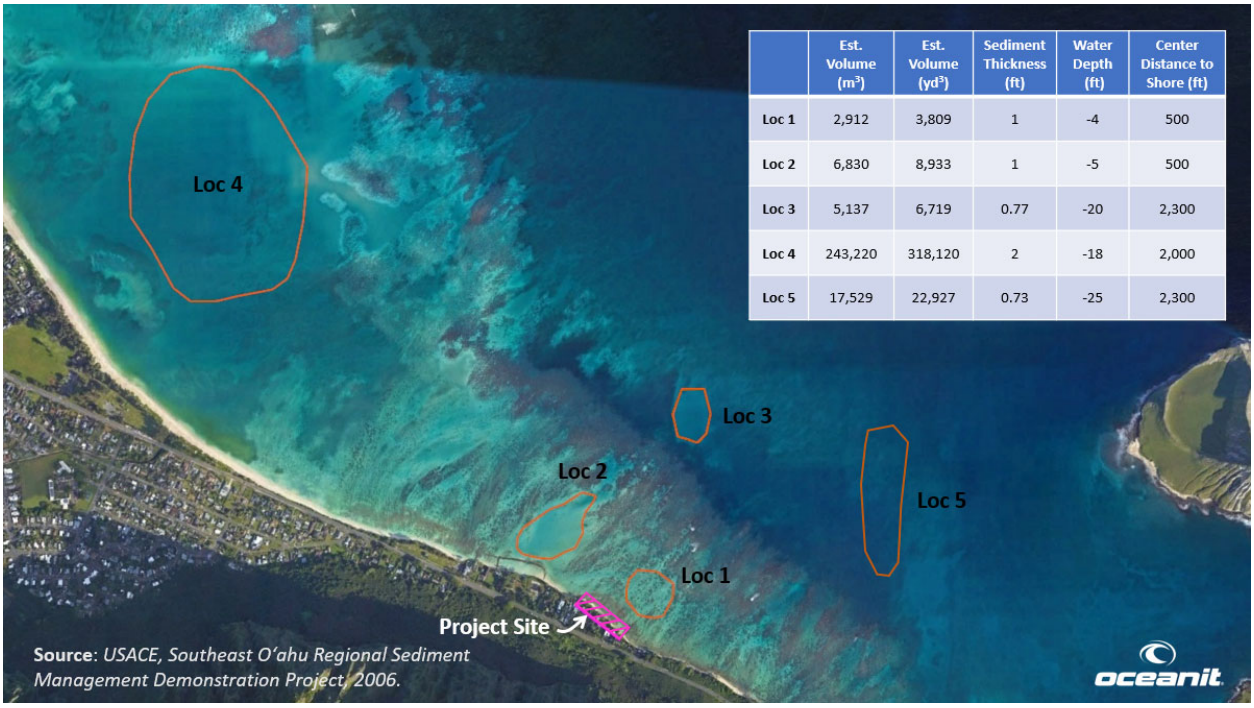
Questions should be directed to the DLNR OCCL.

Note: The length of time required to process this permit will be directly related to the complexity of the project and the adequacy and completeness of the information submitted by the applicant (see Section V.4 of the Guidelines manual).

SSBN Application Checklist		
If any item is listed as "no," attach a sheet with the reason for its exclusion from the application. Sections 10g, 12, 14 and 15 may be omitted (with a "N/A" answer) if applicable.		
Item Number	**Description**	**Item Addressed? (yes/no)**
1.	Owner Information	yes
2.	General Contractor Information	to be provided
3.	Emergency Contact Information	yes
4.	Project Site Information	yes
5.	Location Map and Survey Information	yes
6.	Receiving State Water Information	yes
7.	Project Description	yes
	Proof of $1,000,000 Liability Insurance (attached)	to be provided
8.	Description of the Existing Sedimentary Environment and Compatibility of Proposed Nourishment Sediment	yes
9.	Project Schedule	yes
10.	Site-Specific BMP Plan	yes
	10.g Letter to Environmental Notice (draft attached)	N/A
11.	Monitoring and Assessment Plan	yes
12.	Supporting Documents	yes
13.	Additional Information	N/A
14.	Authorization of Representative	yes
15.	Certification	yes
16.	Filing Fee ($50 Category I; $250 Category II) is attached	yes
17.	Number of copies with supporting documents submitted	
	b. One (1) copy for projects on Oahu with owner's original signature	yes
	c. Two (2) copies for projects on islands other than Oahu (one with owner's original signature)	N/A

Attachment A
Figures

Figure 1. Site location map



	Est. Volume (m^3)	Est. Volume (yd^3)	Sediment Thickness (ft)	Water Depth (ft)	Center Distance to Shore (ft)
Loc 1	2,912	3,809	1	-4	500
Loc 2	6,830	8,933	1	-5	500
Loc 3	5,137	6,719	0.77	-20	2,300
Loc 4	243,220	318,120	2	-18	2,000
Loc 5	17,529	22,927	0.73	-25	2,300

Figure 2. Potential offshore sand source locations initially identified

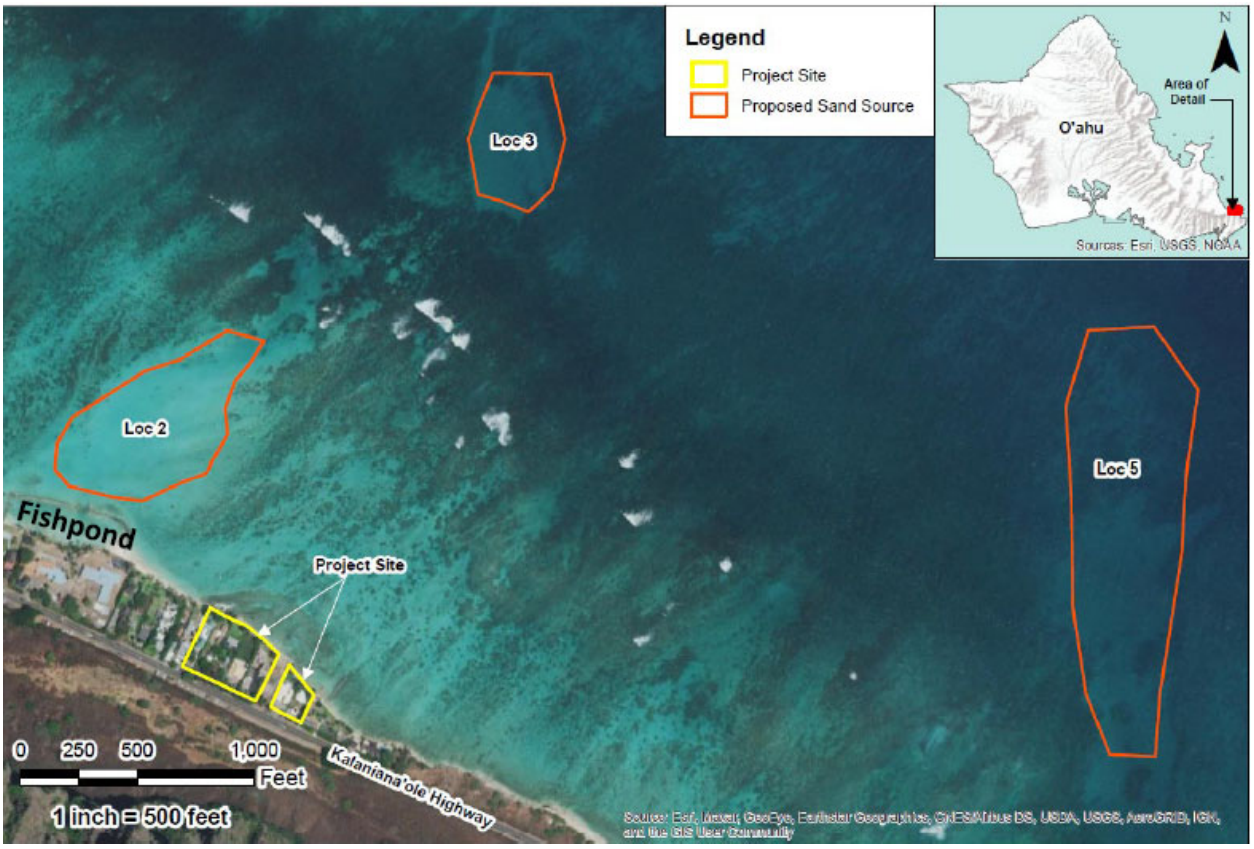


Figure 3. Offshore sand source locations explored further, with Locations 3 and 5 preferred

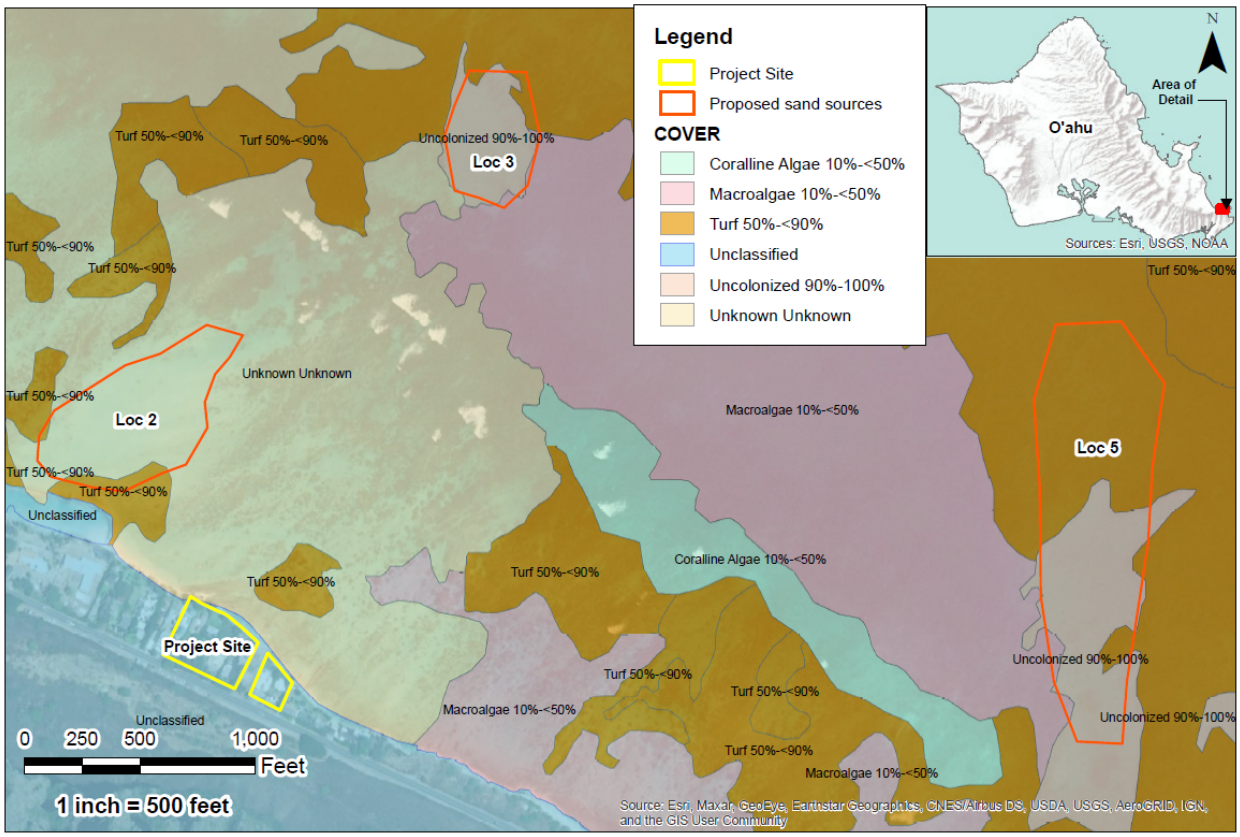


Figure 4. NOAA benthic cover

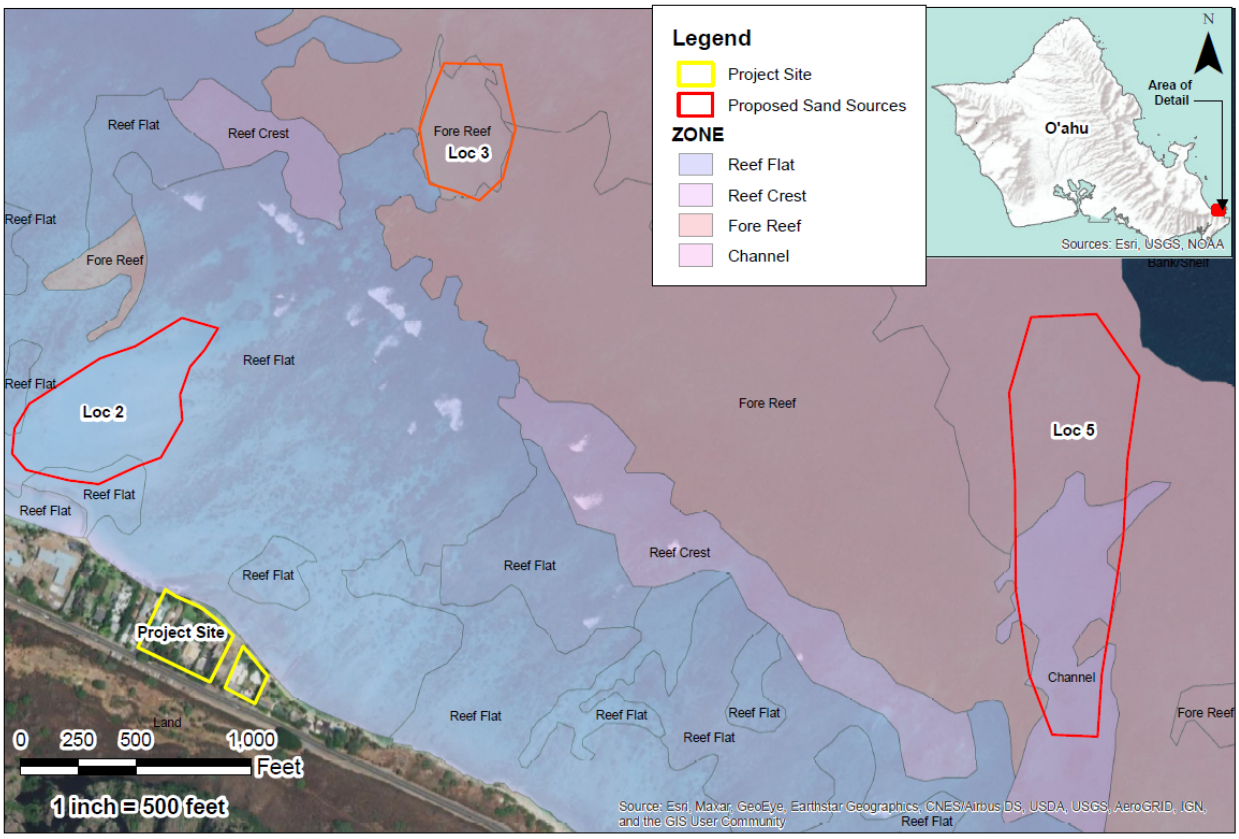


Figure 5. NOAA benthic zone

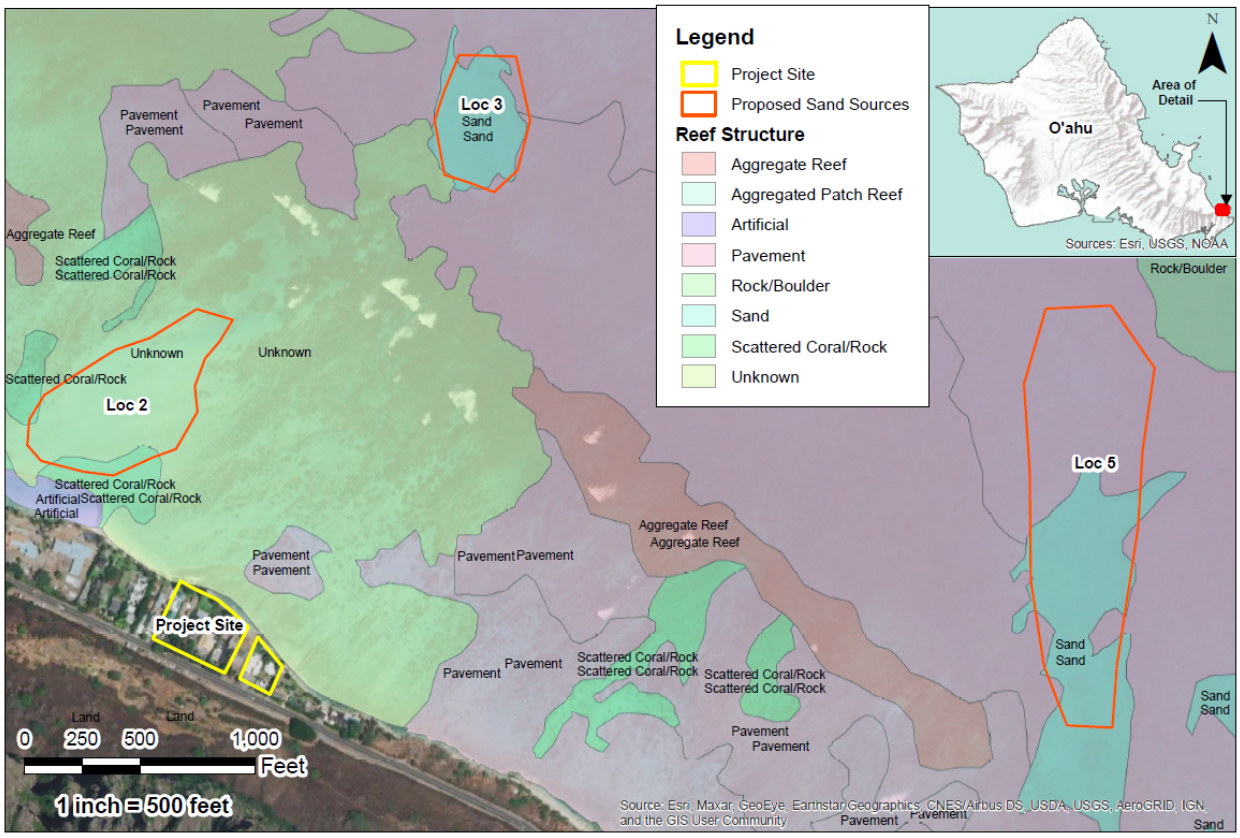
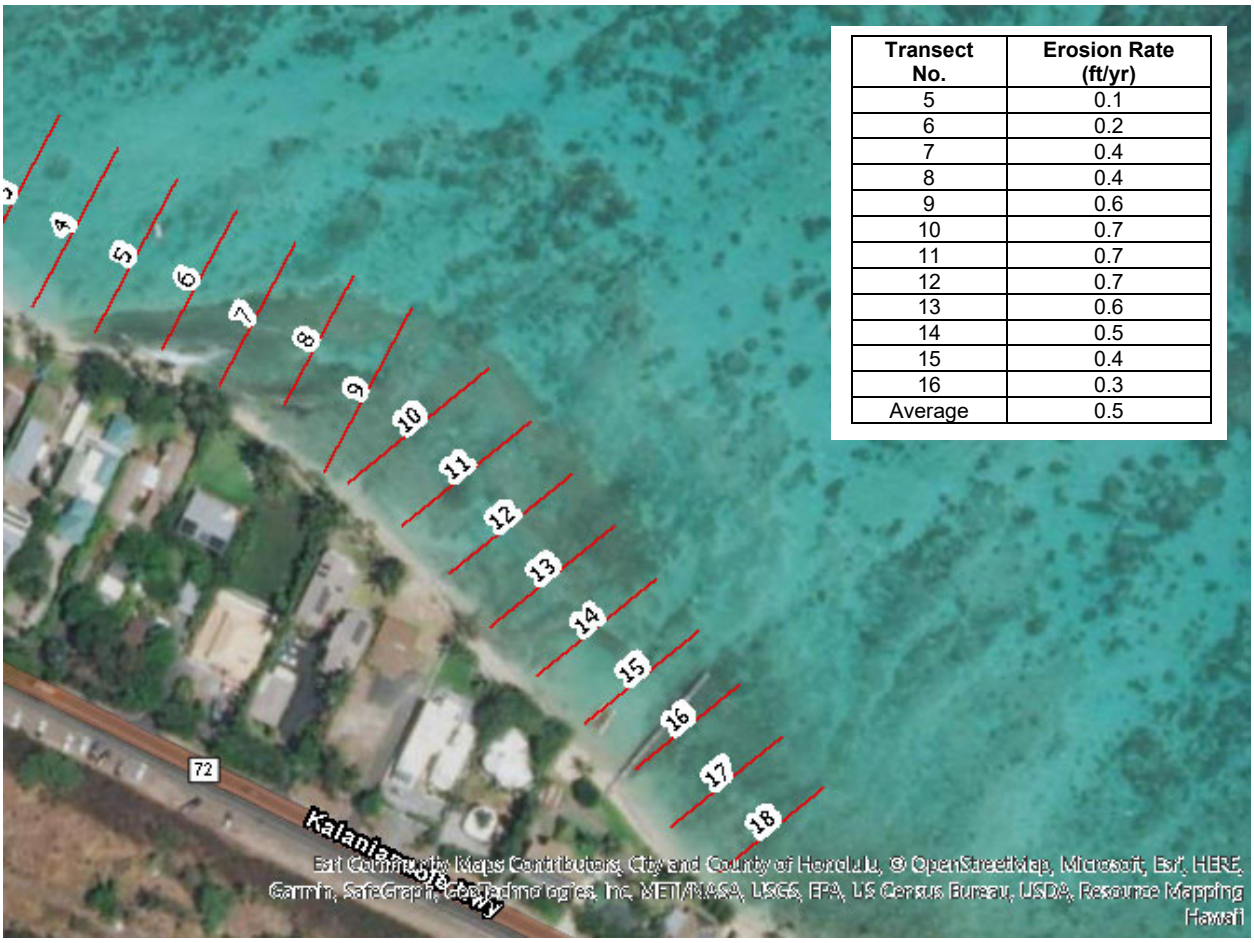


Figure 6. NOAA reef structure



Transect No.	Erosion Rate (ft/yr)
5	0.1
6	0.2
7	0.4
8	0.4
9	0.6
10	0.7
11	0.7
12	0.7
13	0.6
14	0.5
15	0.4
16	0.3
Average	0.5

Figure 7. Historic shoreline erosion rates (U.H. SOEST Coastal Geology Group, 2021)

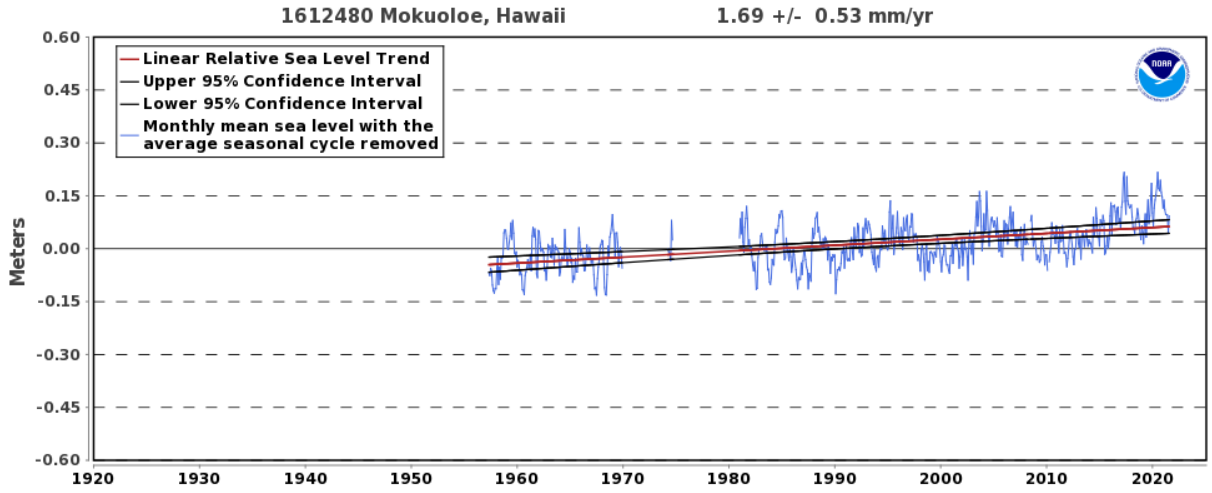


Figure 8. Relative sea level rise trend at Mokuoloe, Oʻahu, Hawaiʻi (NOAA, 2022)

Figure 9. Sea level rise exposure area, assuming 3.2 ft sea level rise scenario (Hawai'i Climate Change Mitigation and Adaption Commission, 2017)

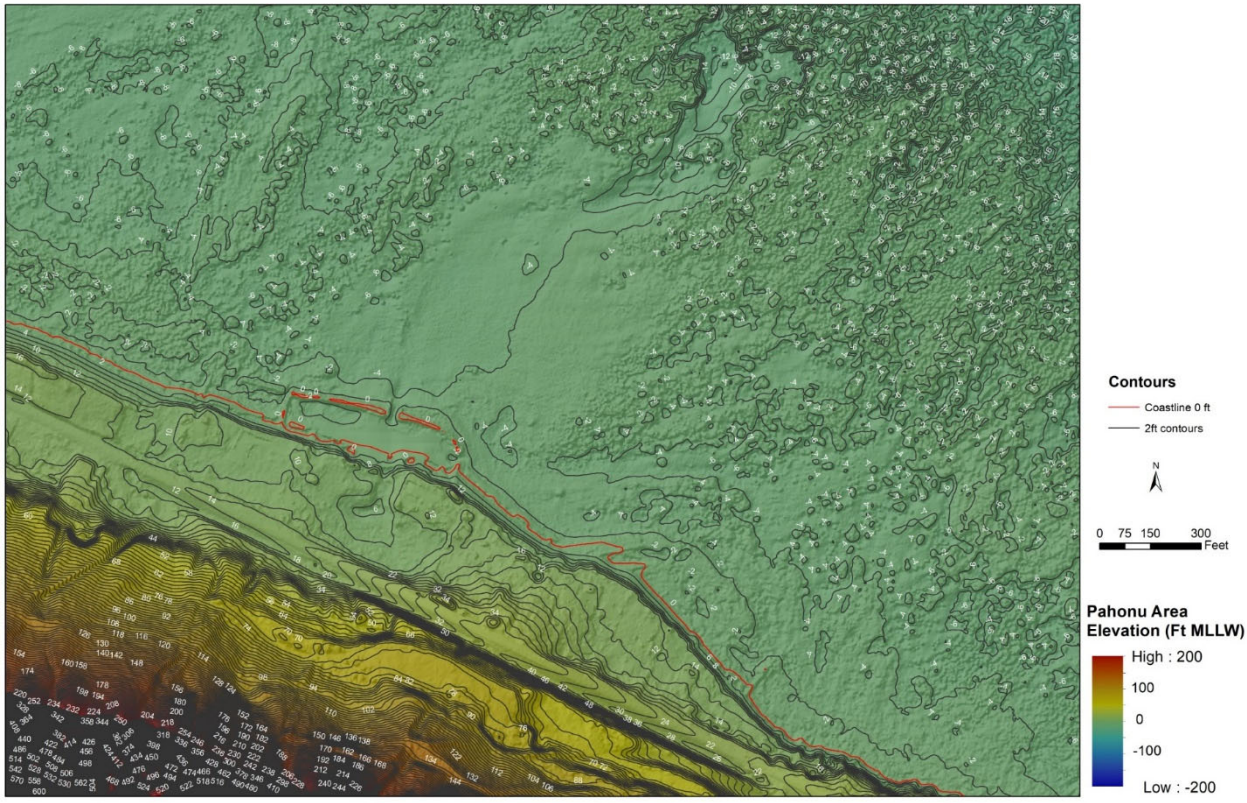


Figure 10. Topography and bathymetry data from NOAA Bathymetric Data Viewer

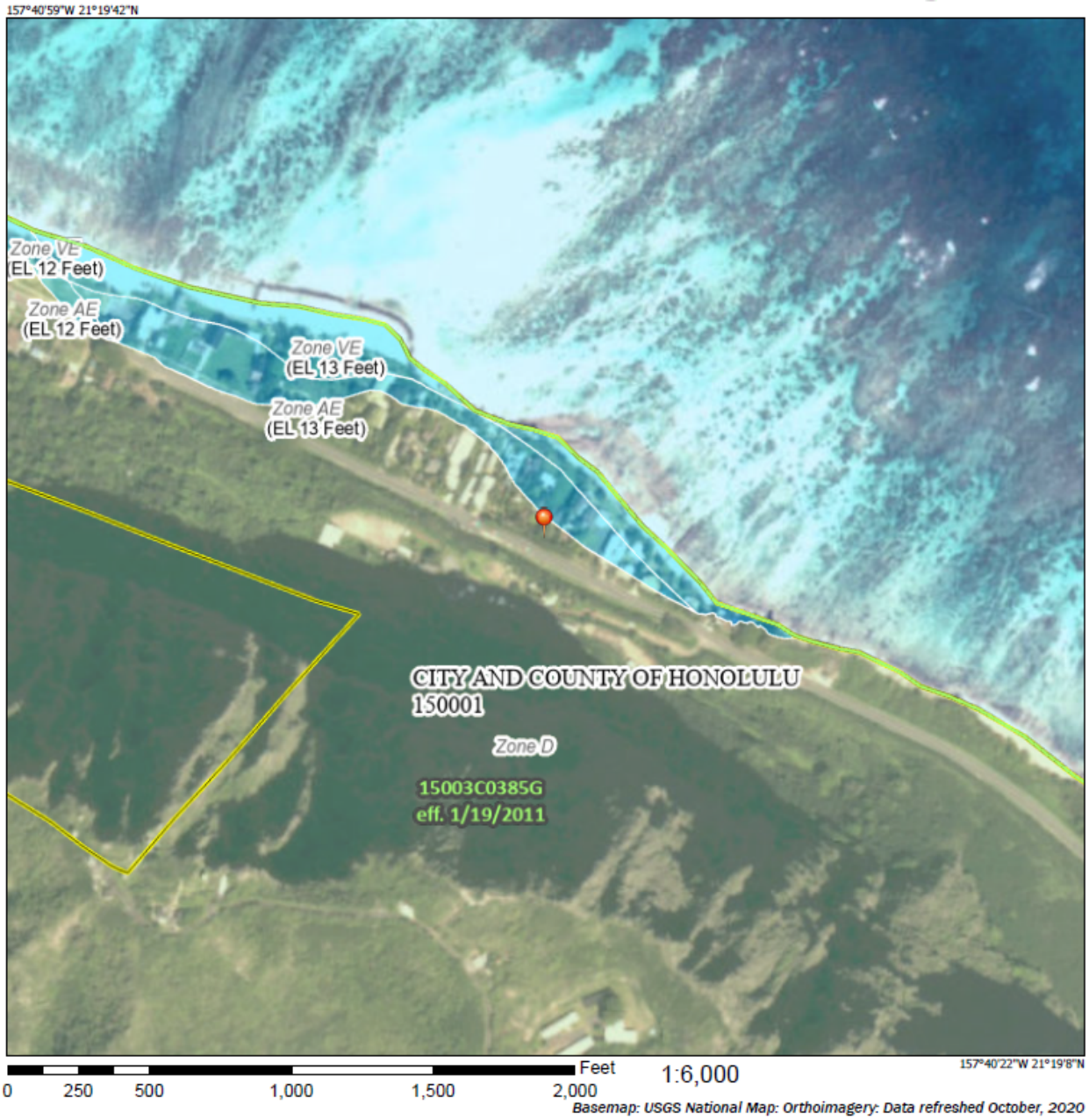


Figure 11. FEMA FIRMette for the project site

Attachment B
Site Photos

Photograph #1: Historical Aerial Photograph from 1949

Photograph #2: Historical Aerial Photograph from 1963

Photograph #3: Historical Aerial Photograph from 1963

Photograph #4: Historical Aerial Photograph from 1967

Photograph #5: Historical Aerial Photograph from 1975

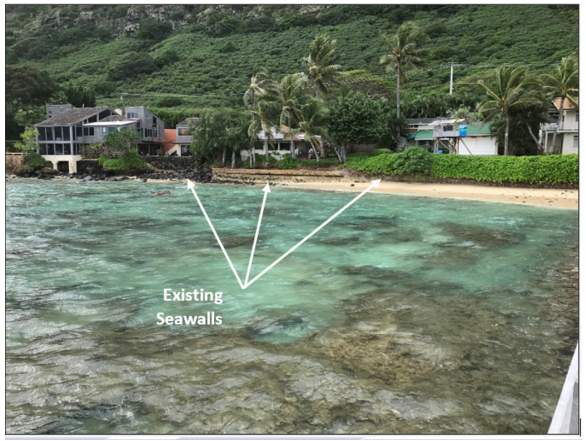
Photograph #6: Historical Aerial Photograph from 1988

Photograph #7: Historical Aerial Photograph from 1996

Photograph #8: Historical Aerial Photograph from 2005

Photograph #9: Historical Aerial Photograph from 2015

Photograph #10 (Jan 2018): Photograph taken looking at the north end of Pāhonu Beach



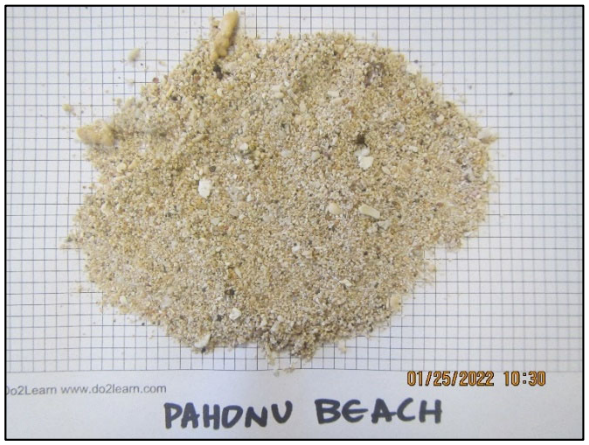
Photograph #11 (Jan 2018): Photograph taken from Muller's Pier looking at existing seawalls at the southern end of Pāhonu Beach

Photograph #12 (Nov 2021): Photograph of temporary emergency erosion control structure fronting TMK (1) 4-1-001:008

Photograph #13 (Nov 2021): Photograph of deflated temporary emergency erosion control structure and collected debris fronting TMK (1) 4-1-001:012

Photograph #14 (Nov 2021): Photograph of stairs and temporary emergency erosion control structure seaward of TMK (1) 4-1-001:009

Photograph #15 (Nov 2021): Photograph of seawall seaward of TMK (1) 4-1-001:002



Photograph #16: Photograph of the existing Pāhonu Beach native sand

Photograph #17: Photograph of the preferred borrow sand at Offshore Site #3

Photograph #18: Photograph of the preferred borrow sand at Offshore Site #5

Attachment C
Permit Drawings

DRAFT CONSTRUCTION PLANS FOR:

PAHONU BEACH RESTORATION

41-467 KALANIANAOLE HWY
WAIMANALO, HI 96795

LOCATED SEAWARD OF AND WITHIN BELOW TMKs:

TMK: 4-1-001:012
TMK: 4-1-001:006
TMK: 4-1-001:007
TMK: 4-1-001:008
TMK: 4-1-001:009
TMK: 4-1-001:002
TMK: 4-1-001:003
TMK: 4-1-001:004

PREPARED FOR:

PAHONU BEACH COMMUNITY RESTORATION FOUNDATION, INC.

41-473 KALANIANAOLE HWY
WAIMANALO, HAWAII 96795

PREPARED BY:

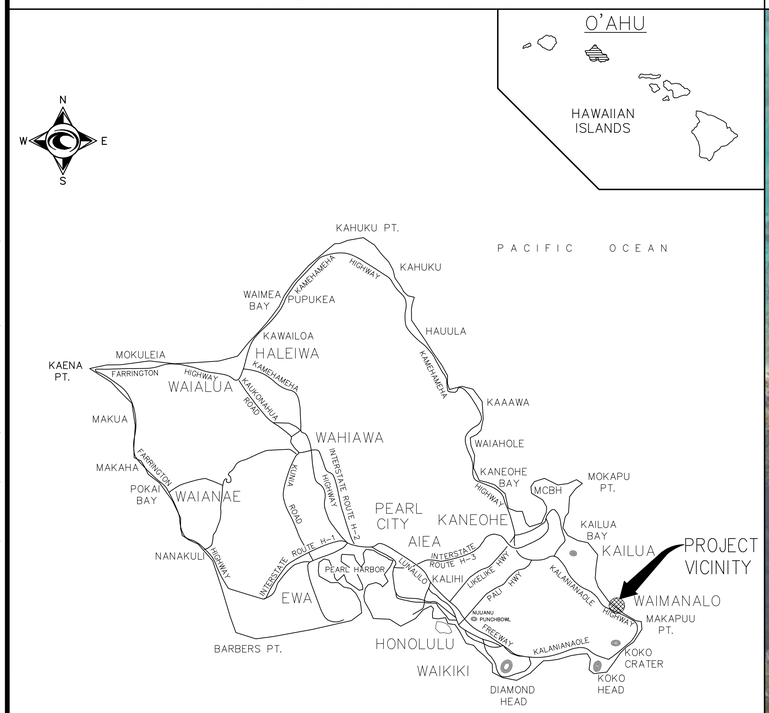
oceanit

828 FORT STREET MALL, SUITE 600
HONOLULU, HAWAII 96813

NOTE:

THE CONTRACTOR SHALL NOT COMMENCE CONSTRUCTION UNTIL NOTIFIED BY THE OWNER.

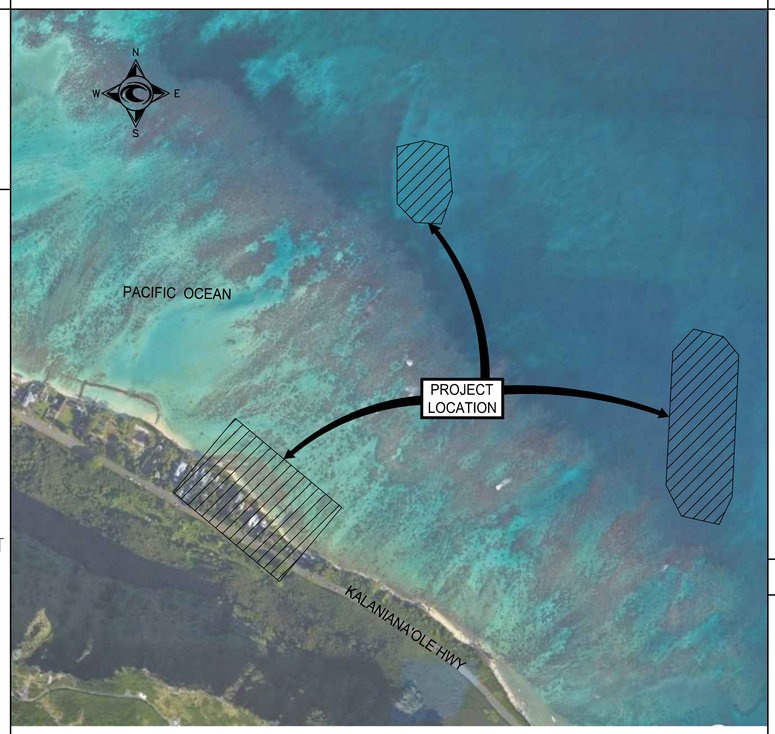
VICINITY MAP



ISLAND OF OAHU

VICINITY MAP
NOT TO SCALE

LOCATION MAP



LOCATION MAP
NOT TO SCALE

SHEET INDEX

DRAWING NUMBER	SHEET	DESCRIPTION OF DRAWINGS
T-1	1	TITLE SHEET
T-2	2	NOTES
T-3	3	NOTES (CONT)
C-1	4	EXISTING PLAN
C-2	5	DEMOLITION PLAN
C-3	6	PROPOSED PLAN
C-4	7	GROIN AND BEACH SECTIONS
C-5	8	BEST MANAGEMENT PRACTICES / ACCESS PLAN
C-6	9	BEST MANAGEMENT PRACTICES DETAILS
C-7	10	SAND RECOVERY PLAN

APPROVALS

PERMIT DRAWINGS

oceanit

REVISION	DATE	DESCRIPTION	MADE BY	APPROVED

PAHONU BEACH COMMUNITY RESTORATION FOUNDATION, INC.
41-473 KALANIANAOLE HWY
WAIMANALO, HAWAII 96795

PAHONU BEACH RESTORATION
ISLAND OF O'AHU
TMK: 4-1-001:012
TMK: 4-1-001:006
TMK: 4-1-001:007
TMK: 4-1-001:008
TMK: 4-1-001:009
TMK: 4-1-001:002
TMK: 4-1-001:003
TMK: 4-1-001:004

TITLE SHEET

APPROVED BY:

DATE

DESIGNED BY: MF
DRAWN BY: AP
CHECKED BY:
SURVEYED BY:
DRAWING NO. T-1
DATE: MAR. 2023
SHEET NO. 1 OF 10

PAHONU BEACH RESTORATION

DRAWING NAME: I:\202135-PAHONU_BEACH_RESTORATION\0_GRAPHICS\DRAWINGS\CONTRACT DOCUMENTS\PERMIT DRAWINGS\01_T01_REV1.DWG EDIT TIME: 03-09-23, 6:42 PM EDITED BY: CHANNA

PROJECT NOTES

1. THE PURPOSE OF THIS PROJECT IS TO RESTORE THE BEACH TO A HISTORICAL BEACH WIDTH TO ENHANCE THE NATURAL RESOURCES.
2. THE PROJECT COMPRISES SAND RECOVERY FROM OFFSHORE DEPOSITS, SAND PLACEMENT OR FILL ON THE BEACH, AND INSTALLATION OF STABILIZATION STRUCTURES (ALSO CALLED REEF FINGERS).
3. EXISTING UTILITY LINES TO BE PROTECTED DURING CONSTRUCTION.
4. WORK ALONG THE SHORELINE SHALL BE DURING PERIODS OF EXPECTED SMALL OR FAVORABLE WAVE CONDITIONS.
5. ANY LOOSE SOIL, DEBRIS, OR OTHER FOREIGN MATERIAL THAT FALLS ONTO THE BEACH DURING CONSTRUCTION MUST BE IMMEDIATELY CONTAINED AND REMOVED.
6. CONSTRUCTION MUST BE STOPPED IMMEDIATELY IF A SEA TURTLE, MONK SEAL, OR ANY OTHER ENDANGERED OR PROTECTED SPECIES ENTERS THE CONSTRUCTION SITE OR NEARBY VICINITY. CONSTRUCTION MAY CONTINUE WHEN THE ANIMAL(S) LEAVES THE SITE ON ITS OWN ACCORD. THERE SHOULD BE NO ATTEMPT TO REMOVE OR FORCE THE ANIMAL TO LEAVE THE SITE.
7. SHOULD HISTORIC REMAINS SUCH AS ARTIFACTS, BURIALS, OR CONCENTRATION OF CHARCOAL BE ENCOUNTERED DURING CONSTRUCTION ACTIVITIES, WORK SHALL CEASE IMMEDIATELY IN THE VICINITY OF THE FIND, AND THE FIND SHALL BE PROTECTED FROM FURTHER DAMAGE. THE CONTRACTOR SHALL IMMEDIATELY CONTACT SHPD AT (808) 692-8015, WHO WILL ASSESS THE SIGNIFICANCE OF THE FIND AND RECOMMEND AN APPROPRIATE MITIGATION MEASURE, IF NECESSARY.
8. ALL CONSTRUCTION MATERIALS MUST BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.
9. THE CONTRACTOR SHOULD PERFORM DAILY INSPECTIONS OF EQUIPMENT FOR CONDITIONS THAT COULD CAUSE SPILLS OR LEAKS; CLEAN EQUIPMENT PRIOR TO OPERATION NEAR THE WATER; DETERMINE APPROPRIATE REFUELING AND SERVICING SITES; IMPLEMENT ADEQUATE SPILL RESPONSE PROCEDURES; DEVELOP STORMY WEATHER PREPARATION PLANS; AND IMPLEMENT ADEQUATE TURBIDITY CONTROL MEASURES.
10. IN THE EVENT OF ANY PETROLEUM SPILL ON THE BEACH OR IN THE WATER, THE OPERATOR MUST TAKE IMMEDIATE STEPS TO CONTAIN AND REMOVE THE CONTAMINANT.
11. ANY CONSTRUCTION RELATED DEBRIS THAT MAY POSE AN ENTANGLEMENT HAZARD TO MARINE PROTECTED SPECIES MUST BE REMOVED FROM THE PROJECT SITE IF NOT ACTIVELY BEING USED AND/OR AT THE CONCLUSION OF THE CONSTRUCTION WORK.
12. BEACH COMPATIBLE SAND SHOULD NOT BE REMOVED FROM THE LITTORAL CELL (EITHER ABOVE OR BELOW MEAN HIGH WATER) DURING CONSTRUCTION ACTIVITY.

GENERAL NOTES

1. THE CONTRACTOR, AT HIS OWN EXPENSE, SHALL RESPOND TO COMPLAINTS MADE BY THE PUBLIC AND NEARBY RESIDENTS REGARDING DUST AND NOISE POLLUTION RESULTING FROM HIS WORK.
2. NO WORK SHALL BE DONE ON SATURDAYS, SUNDAYS AND HOLIDAYS AT ANY TIME WITHOUT PRIOR NOTICE TO THE AUTHORIZED REPRESENTATIVE, PAHONU BEACH COMMUNITY RESTORATION FOUNDATION, INC., PROVIDED SUCH WORK IS ALSO IN CONFORMANCE WITH THE COMMUNITY NOISE CONTROL STANDARDS CONTAINED IN THE HAWAII ADMINISTRATIVE RULES, TITLE 11, CHAPTER 46, "COMMUNITY NOISE CONTROL".
3. THE CONTRACTOR SHALL PROVIDE SAFE ACCESS TO AND FROM ALL DRIVEWAYS AND WALKWAYS AT ALL TIMES.
4. THE CONTRACTOR SHALL PROVIDE FOR ACCESS TO AND FROM ALL EXISTING DRIVEWAYS AT ALL TIMES UNLESS THE OWNERS OF THE PROPERTY USING THE RIGHT-OF-WAY ARE OTHERWISE PROVIDED FOR SATISFACTORILY. FURTHER, THE PERMITTEE SHALL CONTROL TRAFFIC GOING IN AND OUT OF DRIVEWAYS.
5. THE EXISTING IMPROVEMENTS ON THE PREMISES AND IN ADJACENT AREAS THAT ARE NOT TO BE REMOVED SHALL BE PRESERVED AND PROTECTED. ANY AND ALL DAMAGES RESULTING FROM THE CONTRACTOR'S CONSTRUCTION ACTIVITIES SHALL BE REPLACED AND REPAIRED TO ORIGINAL CONDITION OR BETTER, TO THE SATISFACTION OF THE OWNER AT THE EXPENSE OF THE CONTRACTOR.
6. THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES AND STRUCTURES AS SHOWN ON THE PLANS ARE FROM THE LATEST AVAILABLE DATA BUT IS NOT GUARANTEED AS TO THE ACCURACY OF ENCOUNTERING OF OTHER OBSTACLES DURING THE COURSE OF THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE AND PAY FOR ALL DAMAGES TO EXISTING UTILITIES.
7. RE-APPROVAL FROM THE ENGINEER SHALL BE REQUIRED IF THIS PROJECT IS NOT UNDER CONSTRUCTION WITHIN A PERIOD OF TWO (2) YEARS.
8. PRIOR TO ANY EXCAVATING, THE CONTRACTOR SHALL VERIFY IN THE FIELD THE LOCATION OF EXISTING WATER MAINS AND APPURTENANCES.
9. ALL EXISTING UTILITIES TO REMAIN IN USE, WHETHER OR NOT SHOWN ON THESE DRAWINGS, SHALL BE PROTECTED AT ALL TIMES BY THE CONTRACTOR DURING CONSTRUCTION UNLESS SPECIFIED ON THE DRAWINGS TO BE ABANDONED OR DEMOLISHED. ANY DAMAGE TO THE EXISTING UTILITIES SHALL BE REPAIRED AND PAID FOR BY THE CONTRACTOR.
10. UNLESS RELOCATION IS CALLED FOR ON THESE DRAWINGS, EXISTING UTILITIES SHALL REMAIN IN SERVICE AND IN PLACE. IF RELOCATION OF EXISTING UTILITIES IS REQUIRED FOR THE CONTRACTOR'S CONVENIENCE, INTERRUPTION OF SERVICE SHALL BE KEPT TO A MINIMUM AND SHALL BE DONE AT THE CONTRACTOR'S EXPENSE AND ONLY WITH THE APPROVAL OF THE ENGINEER.

GENERAL NOTES (CONT)

11. EXISTING DRAINAGE SYSTEM WITHIN PROJECT LIMITS SHALL BE KEPT FUNCTIONAL AT ALL TIMES DURING CONSTRUCTION, THE CONTRACTOR IS REQUIRED TO FURNISH MATERIALS, EQUIPMENT, LABOR, TOOLS AND INCIDENTALS NECESSARY TO MAINTAIN FLOW. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO VARIOUS CONTRACT ITEMS.
12. CONTRACTOR SHALL VERIFY AND CHECK ALL DIMENSIONS AND DETAILS SHOWN ON THESE DRAWINGS PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCY SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER FOR CLARIFICATION.
13. PERMITS SHALL BE OBTAINED BY THE CONTRACTOR.
14. DIMENSIONS TAKE PRECEDENCE OVER SCALE.
15. ALL MATERIALS SHALL CONFORM TO THE DRAWINGS AND SPECIFICATIONS.
16. ALL WORK CALLED FOR ON THE PLANS AND NOT ITEMIZED IN THE PROPOSAL AND ALL WORK NOT CALLED FOR BUT REQUIRED FOR THE CONSTRUCTION OF THIS PROJECT, SHALL BE CONSIDERED INCIDENTAL.
17. ELEVATIONS ARE REFERRED TO IN MEAN LOWER LOW WATER (MLLW) AND ARE DERIVED FROM MULTIPLE RETURN LIGHT DETECTION AND RANGING (LiDAR) MEASURMENTS ON THE ISLAND OF OAHU IN HAWAII.
18. LAYING OUT: LAYING OUT OF BASE LINES FOR THE ENTIRE WORK SHALL BE DONE BY THE CONTRACTOR AND THEY SHALL BE SOLELY RESPONSIBLE FOR THE ACCURACY OF THE WORK CARRIED OUT.
19. THE CONTRACTOR SHALL VERIFY LOAD LIMITATIONS OF BOX CULVERTS/BRIDGES ALONG THE HAUL ROUTE WITH THE CONTRACTING OFFICER. LOAD CAPACITIES OF EXISTING BOX CULVERTS/BRIDGES SHALL NOT BE EXCEEDED DURING DELIVERY OF CONSTRUCTION MATERIALS AND EQUIPMENT.
20. CONTRACTOR SHALL ENSURE HEAVY EQUIPMENT AND MATERIALS ARE KEPT AT A SUFFICIENT OFFSET FROM THE EXISTING SHORELINE STRUCTURES AND ESCARPMENT TO AVOID DAMAGE CAUSED BY CONSTRUCTION ACTIVITIES.
21. THE CONSTRUCTION DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE DURING CONSTRUCTION. SUCH MEASURES INCLUDE, BUT ARE NOT LIMITED TO, BRACING, SHORING FOR LOADS DUE TO CONSTRUCTION EQUIPMENT, WIND, SEISMIC, ETC.
22. THE CONTRACTOR SHALL COORDINATE THE STORAGE OF HIS MATERIAL WITH THE OWNER.
23. RESTRICT ALL VEHICLES, MATERIAL STOCKPILES AND EQUIPMENT TO WITHIN THE CONTRACT LIMIT LINES. ANY TOOLS, MATERIALS, EQUIPMENT, FENCING, ETC. THAT THE CONTRACTOR KEEPS IN THIS AREA ARE STORED AT THE CONTRACTOR'S RISK. IF OTHER SHORT TERM STORAGE AREAS ARE NEEDED, THE SELECTION AND USE SHOULD BE COORDINATED WITH THE CONTRACTING OFFICE.
24. NO STOCKPILING OF MATERIAL WILL BE PERMITTED ON CITY AND COUNTY OF HONOLULU STREETS.
25. DAMAGE OUTSIDE THE CONTRACT ZONE LIMITS AS A RESULT OF CONSTRUCTION OPERATIONS SHALL BE RESTORED TO ITS ORIGINAL OR BETTER CONDITION. SUCH RESTORATION SHALL BE TO THE SATISFACTION OF THE OWNER.

CONSTRUCTION NOTES

1. ALL CONSTRUCTION WORK SHALL BE DONE IN ACCORDANCE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, SEPTEMBER 1986, AND STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION, SEPTEMBER 1984, AS AMENDED, OF THE DEPARTMENTS OF PUBLIC WORKS, CITY & COUNTY OF HONOLULU, AND THE COUNTIES OF KAUAI, MAUI, AND HAWAII.
2. THE CONTRACTOR SHALL COORDINATE HIS HAUL ROUTE, STAGING AREA, AND ALL ASSOCIATED REQUIREMENTS WITH THE AFFECTED LANDOWNERS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEARING AND REMOVAL OF ALL SILT AND DEBRIS GENERATED BY HIS GRADING AND CONSTRUCTION WORK AND DEPOSITED AND ACCUMULATED ON ROADWAYS AND OTHER AREAS.
4. THE CONTRACTOR SHALL PROVIDE ALL LAND SURVEY CONSTRUCTION STAKEOUT SERVICES, SOIL AGGREGATE AND CONCRETE MONITORING, AND SAMPLING AND TESTING SERVICES. SURVEYS SHALL BE DONE UNDER THE SUPERVISION OF A LICENSED SURVEYOR. SAMPLING AND TESTING SERVICES FOR QUALITY CONTROL SHALL BE PERFORMED BY AMERICAN CONCRETE INSTITUTE (ACI) CERTIFIED PERSONNEL USING CALIBRATED EQUIPMENT BY CAL-CERT. FIELD TECHNICIANS MAKING AND CURING SPECIMENS FOR ACCEPTANCE TESTING SHALL BE CERTIFIED ACI FIELD TESTING TECHNICIANS, GRADE 1 OR EQUIVALENT.
5. WASTE MATERIAL WILL BE DISPOSED OF AT AN APPROVED, OFF-SITE DISPOSAL AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR UTILIZING A PROPER DISPOSAL AREA.
6. THE CONTRACTOR SHALL COORDINATE INSPECTIONAL SERVICES WITH THE RESPONSIBLE CITY AGENCY.
7. CONFINED SPACE

   FOR ENTRY BY PERSONNEL, INCLUDING INSPECTORS, INTO A PERMIT REQUIRED CONFINED SPACE AS DEFINED IN 29 CFR PART 1910.146(b), THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING:

   A. ALL SAFETY EQUIPMENT REQUIRED BY THE CONFINED SPACE REGULATIONS APPLICABLE TO ALL PARTIES OTHER THAN THE CONSTRUCTION INDUSTRY, TO INCLUDE, BUT NOT LIMITED TO, THE FOLLOWING:
      1) FULL BODY HARNESS FOR UP TO TWO PERSONNEL.
      2) LIFELINE AND ASSOCIATED CLIPS.
      3) INGRESS/EGRESS AND FALL PROTECTION.
      4) TWO-WAY RADIOS (WALKIE-TALKIES) IF OUT OF LINE-OF-SIGHT.
      5) EMERGENCY (ESCAPE) RESPIRATOR (10 MINUTE DURATION).
      6) CELLULAR TELEPHONE TO CALL FOR EMERGENCY ASSISTANCE.
      7) CONTINUOUS GAS DETECTOR (CALIBRATED) TO MEASURE OXYGEN, HYDROGEN SULFIDE, CARBON MONOXIDE AND FLAMMABLES (CAPABLE OF MONITORING AT A DISTANCE AT LEAST 20 FEET AWAY).
      8) PERSONAL MULTI-GAS DETECTOR TO BE CARRIED BY INSPECTOR.
   B. CONTINUOUS FORCED AIR VENTILATION ADEQUATE TO PROVIDE SAFE ENTRY CONDITIONS.
   C. ONE ATTENDANT/RESCUE PERSONNEL TOPSIDE (TWO, IF CONDITIONS WARRANT IT).
8. PURSUANT TO CHAPTER 6E, HRS, IN THE EVENT ANY ARTIFACTS OR HUMAN REMAINS ARE UNCOVERED DURING CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL IMMEDIATELY SUSPEND WORK AND NOTIFY THE HONOLULU POLICE DEPARTMENT AND THE STATE DEPARTMENT OF LAND AND NATURAL RESOURCES – HISTORIC PRESERVATION DIVISION (692-8015). IN ADDITION, NOTIFY THE RESPONSIBLE CITY AGENCY.
9. THE CONTRACTOR MUST CONDUCT PHOTOGRAPHIC DOCUMENTATION OF ALL PRIVATE AND PUBLIC PROPERTY AND INFRASTRUCTURE IN THE PROJECT AREA PRIOR TO ANY HEAVY EQUIPMENT BEING BROUGHT ON SITE. THIS INCLUDES, BUT IS NOT LIMITED TO THE PRIVATE ASPHALT AND BRICK DRIVEWAY, FENCING, GATE, POOL DECKING, LANDSCAPING, AND SEAWALL
10. FOR BENCHMARK, OBTAIN TOPOGRAPHIC SURVEY.

WATER POLLUTION CONTROL NOTES

GENERAL:

1. THE CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF SECTION 209 – WATER POLLUTION AND EROSION CONTROL, IN THE "HAWAII STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND PUBLIC WORKS CONSTRUCTION". SECTION 209 DESCRIBES BUT IS NOT LIMITED TO: SUBMITTAL REQUIREMENTS; SCHEDULING OF A WATER POLLUTION AND EROSION CONTROL CONFERENCE; CONSTRUCTION REQUIREMENTS; METHOD OF MEASUREMENT; AND BASIS OF PAYMENT.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONFORMANCE WITH THE APPLICABLE PROVISIONS OF THE WATER QUALITY AND WATER POLLUTION CONTROL STANDARDS CONTAINED IN HAWAII ADMINISTRATIVE RULES, TITLE 11, CHAPTER 54, "WATER QUALITY STANDARDS" AND TITLE 11, CHAPTER 55, "WATER POLLUTION CONTROL", AS WELL AS CHAPTER 14 OF THE REVISED ORDINANCES OF HONOLULU, AS AMENDED. BEST MANAGEMENT PRACTICES SHALL BE EMPLOYED AT ALL TIMES DURING CONSTRUCTION.
3. THE CONTRACTOR SHALL FOLLOW THE GUIDELINES IN THE "BEST MANAGEMENT PRACTICES MANUAL FOR CONSTRUCTION SITES IN HONOLULU", DATED MAY 1999 IN DEVELOPING, INSTALLING AND MAINTAINING THE BEST MANAGEMENT PRACTICES (BMP) FOR THE PROJECT.
   HTTP://WWW.CLEANWATERHONOLULU.COM/REPORTS/BMP_MANUAL.PDF

GOOD HOUSEKEEPING BEST MANAGEMENT PRACTICES:

1. MATERIALS POLLUTION PREVENTION PLAN
   A. APPLICABLE MATERIALS OR SUBSTANCES LISTED BELOW ARE EXPECTED TO BE PRESENT ONSITE DURING CONSTRUCTION. OTHER MATERIALS AND SUBSTANCES NOT LISTED BELOW SHALL BE ADDED TO THE INVENTORY AND APPROVED BY THE ENGINEER.

DETERGENTS	SOIL	PETROLEUM BASED PRODUCTS
WOOD	SAND	CLEANING SOLVENTS
CONCRETE	STONE	GEOTEXTILE FABRIC

   B. MATERIAL MANAGEMENT PRACTICES SHALL BE USED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL EXPOSURE OF MATERIALS AND SUBSTANCES TO STORM WATER RUNOFF. STORE ONLY ENOUGH PRODUCT AS IS REQUIRED TO DO THE JOB.
   C. ALL MATERIALS STORED ONSITE SHALL BE STORED IN A NEAT, ORDERLY MANNER IN THEIR APPROPRIATE CONTAINERS AND IF POSSIBLE UNDER A ROOF OR OTHER ENCLOSURE.
   D. PRODUCTS SHALL BE KEPT IN THEIR ORIGINAL CONTAINERS WITH THE ORIGINAL MANUFACTURER'S LABEL.
   E. SUBSTANCES SHALL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER.
   F. WHENEVER POSSIBLE, A PRODUCT SHALL BE USED UP COMPLETELY BEFORE DISPOSING OF THE CONTAINER.
   G. MANUFACTURER'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL SHALL BE FOLLOWED.
   H. THE CONTRACTOR SHALL CONDUCT A DAILY INSPECTION TO ENSURE PROPER USE AND DISPOSAL OF MATERIALS ON SITE.
2. HAZARDOUS MATERIAL POLLUTION PREVENTION PLAN
   A. PRODUCTS SHALL BE KEPT IN ORIGINAL CONTAINERS UNLESS THEY ARE NOT RESEALABLE.
   B. ORIGINAL LABELS AND MATERIAL SAFETY DATA SHEETS (MSDS) SHALL BE RETAINED.
   C. SURPLUS PRODUCTS SHALL BE DISPOSED OF ACCORDING TO MANUFACTURERS' INSTRUCTIONS OR LOCAL AND STATE RECOMMENDED METHODS.
3. ONSITE AND OFF-SITE PRODUCT SPECIFIC PLAN
   A. THE FOLLOWING PRODUCT SPECIFIC PRACTICES SHALL BE FOLLOWED ONSITE:
      1) PETROLEUM BASED PRODUCTS – ALL ONSITE VEHICLES SHALL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTIVE MAINTENANCE TO REDUCE THE CHANCE OF LEAKAGE. PETROLEUM PRODUCTS SHALL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED.
      2) CONCRETE TRUCKS – CONCRETE TRUCKS SHALL NOT BE ALLOWED TO WASH OUT OR DISCHARGE DRUM WASH WATER AT THE SITE.
4. SPILL CONTROL PLAN
   A. A SPILL PREVENTION PLAN SHALL BE POSTED AND ADJUSTED TO INCLUDE A DESCRIPTION AND CAUSE OF EACH SPILL, AND MEASURES TO PREVENT AND CLEAN UP EACH SPILL.
   B. THE CONTRACTOR SHALL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR. THE CONTRACTOR SHALL DESIGNATE AT LEAST THREE (3) SITE PERSONNEL WHO SHALL RECEIVE SPILL PREVENTION AND CLEANUP TRAINING. THESE INDIVIDUALS SHALL EACH BECOME RESPONSIBLE FOR A PARTICULAR PHASE OF PREVENTION AND CLEANUP. THE NAMES OF RESPONSIBLE SPILL PERSONNEL SHALL BE POSTED IN THE MATERIAL STORAGE AREA AND IN THE OFFICE TRAILER ONSITE.
   C. MANUFACTURERS' RECOMMENDED METHODS FOR SPILL CLEANUP SHALL BE CLEARLY POSTED AND SITE PERSONNEL SHALL BE MADE AWARE OF THE PROCEDURES AND THE LOCATION OF THE INFORMATION AND CLEANUP SUPPLIES.
   D. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP SHALL BE KEPT IN THE MATERIAL STORAGE AREA ONSITE.
   E. ALL SPILLS SHALL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY. NOTIFY THE ENGINEER IMMEDIATELY OF ALL SPILLS.
   F. THE SPILL AREA SHALL BE KEPT WELL VENTILATED AND PERSONNEL SHALL WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT INJURY FROM CONTACT WITH A HAZARDOUS SUBSTANCE.
   G. SPILLS OF TOXIC HAZARDOUS MATERIAL SHALL BE REPORTED TO THE APPROPRIATE STATE OR LOCAL GOVERNMENT AGENCY, REGARDLESS OF THE SIZE.

PERMIT DRAWINGS

oceanit

REVISION	DATE	DESCRIPTION	MADE BY	APPROVED

PAHONU BEACH COMMUNITY RESTORATION FOUNDATION, INC.
41-473 KALANIANAOLE HWY
WAIMANALO, HAWAII 96795

PAHONU BEACH RESTORATION
ISLAND OF O'AHU
TMK: 4-1-001:012
TMK: 4-1-001:006
TMK: 4-1-001:007
TMK: 4-1-001:008
TMK: 4-1-001:009
TMK: 4-1-001:002
TMK: 4-1-001:003
TMK: 4-1-001:004

NOTES

APPROVED BY:

DATE

DESIGNED BY: MF
DRAWN BY: AP
CHECKED BY:
SURVEYED BY:
DRAWING NO. T-2
DATE: MAR. 2023
SHEET NO. 2 OF 10

PAHONU BEACH RESTORATION

DRAWING NAME: \\WAS-SERVER.OCEANIT.LOCAL\SERVICES\202135-PAHONU_BEACH_RESTORATION\0_GRAPHICS\DRAWINGS\CONTRACT DOCUMENTS\PERMIT DRAWINGS\02_T02_REVI.DWG EDIT TIME: 03-09-23, 9:28 AM EDITED BY: APARK

DEMOLITION AND CONSTRUCTION NOTES

1. ALL DEMOLITION AND CONSTRUCTION WORK SHALL BE DONE IN ACCORDANCE WITH APPLICABLE FEDERAL AND LOCAL LAWS AND REGULATIONS, AND ALL APPLICABLE PERMITS.
2. ALL SITE WORK SHALL BE DONE IN ACCORDANCE WITH CHAPTER 14, ARTICLES 13, 14, 15 AND 16, AS RELATED TO SOIL EROSION AND SEDIMENT CONTROL OF THE REVISED ORDINANCES OF HONOLULU, 1990, AS AMENDED.
3. THE CONTRACTOR, AT HIS OWN EXPENSE, SHALL KEEP THE PROJECT AREA AND SURROUNDING AREA FREE FROM DUST NUISANCE. THE WORK SHALL BE IN CONFORMANCE WITH THE AIR POLLUTION CONTROL STANDARDS CONTAINED IN THE HAWAII ADMINISTRATIVE RULES, TITLE 11, CHAPTER 60.1, "AIR POLLUTION CONTROL".
4. ALL SITE WORK OPERATIONS SHALL BE PERFORMED IN CONFORMANCE WITH THE APPLICABLE PROVISIONS OF THE WATER QUALITY AND WATER POLLUTION CONTROL STANDARDS CONTAINED IN HAWAII ADMINISTRATIVE RULES, TITLE 11, CHAPTER 54, "WATER QUALITY STANDARDS", AND TITLE 11, CHAPTER 55, "WATER POLLUTION CONTROL", AND IF APPLICABLE, THE NPDES PERMIT FOR THE PROJECT.
5. WHERE APPLICABLE AND FEASIBLE THE MEASURES TO CONTROL EROSION AND OTHER POLLUTANTS SHALL BE IN PLACE BEFORE ANY DEMOLITION OR CONSTRUCTION PHASE OF THE PROJECT IS INITIATED.
6. ADEQUATE PROVISIONS SHALL BE MADE TO PREVENT SEDIMENT-LADEN RUNOFF FROM LEAVING THE SITE.
7. ALL DEMOLITION, AND CONSTRUCTION WORK SHALL IMPLEMENT MEASURES TO ENSURE THAT THE DISCHARGE OF POLLUTANTS FROM THE CONSTRUCTION SITE WILL BE REDUCED TO THE MAXIMUM EXTENT PRACTICABLE AND WILL NOT CAUSE OR CONTRIBUTE TO AN EXCEEDANCE OF WATER QUALITY STANDARDS.
8. THE CONTRACTOR SHALL USE ALL MEANS NECESSARY TO PROTECT ADJACENT STRUCTURES AND WORK TO REMAIN. IN THE EVENT OF ANY DAMAGE TO EXISTING WORK TO REMAIN, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CONTRACTING OFFICER OF THE SITUATION. THE CONTRACTOR SHALL MAKE REPAIRS OR REPLACEMENT ACCEPTABLE TO THE OWNER.
9. ALL EXISTING TREES, SHRUBS AND SURROUNDING VEGETATION SHALL BE PRESERVED AND PROTECTED UNLESS OTHERWISE INDICATED TO BE REMOVED.
10. THE CONTRACTOR SHALL PROTECT AND MINIMIZE DAMAGE TO ALL EXISTING PLANTS AND SIGNIFICANT ROOTS OVER 1" IN DIAMETER. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ALL PLANT MATERIAL AND ROOTS THAT AFFECT CONSTRUCTION.
11. ALL ITEMS TO BE REMOVED SHALL BE VERIFIED WITH THE ENGINEER BEFORE THE COMMENCEMENT OF DEMOLITION WORK.
12. ITEMS INDICATED TO BE DEMOLISHED AND REMOVED SHALL BE REMOVED TO THEIR FULL EXTENT UNDERGROUND, UNLESS OTHERWISE ACCEPTED BY THE CONTRACTING OFFICER.
13. TEMPORARY EROSION CONTROL PROCEDURES SHALL BE SUBMITTED FOR APPROVAL.
14. TEMPORARY EROSION CONTROLS SHALL NOT BE REMOVED BEFORE PERMANENT EROSION CONTROLS ARE IN-PLACE AND ESTABLISHED.
15. ALL EXPOSED AREAS SHALL BE SODDED OR PLANTED AS SOON AS FINAL SITE WORK AND CONSTRUCTION HAS BEEN COMPLETED.
16. ALL DISTURBED AREAS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AND PLANTED WITH NATIVE GRASS OR VEGETATION.
17. THE PROJECT SPECIFICATIONS SHALL BE REFERENCED FOR ADDITIONAL REQUIREMENTS.
18. NON-COMPLIANCE TO ANY OF THE ABOVE REQUIREMENTS SHALL MEAN IMMEDIATE SUSPENSION OF ALL WORK, AND REMEDIAL WORK SHALL COMMENCE IMMEDIATELY. ALL COSTS INCURRED SHALL BE BILLED TO THE VIOLATOR. FURTHERMORE, VIOLATORS SHALL BE SUBJECTED TO ADMINISTRATIVE, CIVIL AND/OR CRIMINAL PENALTIES.

PUBLIC HEALTH SAFETY AND CONVENIENCE NOTES

1. CONTRACTOR SHALL OBSERVE AND COMPLY WITH ALL FEDERAL, STATE, AND LOCAL LAWS REQUIRED FOR THE PROTECTION OF PUBLIC HEALTH, SAFETY AND ENVIRONMENTAL QUALITY.
2. THE CONTRACTOR AT HIS/HER EXPENSE, SHALL KEEP THE PROJECT AREA AND SURROUNDING AREA FREE FROM RUBBISH, DUST, NOISE, EROSION, ETC. THE WORK SHALL BE DONE IN CONFORMANCE WITH THE AIR AND WATER POLLUTION CONTROL STANDARDS AND REGULATIONS OF THE STATE DEPARTMENT OF HEALTH.
3. THE CONTRACTOR SHALL PROVIDE, INSTALL AND MAINTAIN ALL NECESSARY SIGNS, LIGHTS, FLARES, BARRICADES, MARKERS, CONES, AND OTHER PROTECTIVE FACILITIES AND SHALL TAKE ALL NECESSARY PRECAUTIONS FOR THE PROTECTION, CONVENIENCE AND SAFETY OF THE PUBLIC.
4. THE CONTRACTOR SHALL CONTROL ACCESS TO ALL OPENINGS TO PREVENT UNAUTHORIZED ENTRY UNDERGROUND. UNUSED CHUTES, MANWAYS, OR OTHER OPENINGS SHALL BE TIGHTLY COVERED, BULKHEADED, OR FENCED OFF, AND SHALL BE POSTED WITH WARNING SIGNS INDICATING "KEEP OUT" OR SIMILAR LANGUAGE. COMPLETED OR UNUSED SECTIONS OF THE UNDERGROUND FACILITY SHALL BE BARRICADED.
5. NOISE SHOULD BE KEPT WITHIN ACCEPTABLE LEVELS AT ALL TIMES IN CONFORMANCE WITH HAR TITLE 11 & 46 COMMUNITY NOISE CONTROL, STATE DEPARTMENT OF HEALTH, PUBLIC HEALTH REGULATIONS. CONSTRUCTION EQUIPMENT SHOULD BE EQUIPPED WITH SUITABLE MUFFLERS TO MAINTAIN NOISE WITHIN LEVELS COMPLYING WITH APPLICABLE REGULATIONS. STARTING OF CONSTRUCTION EQUIPMENT MEETING ALLOWABLE NOISE LIMITS SHOULD NOT BE DONE PRIOR TO 7:00 AM. EQUIPMENT EXCEEDING ALLOWABLE NOISE LIMITS SHOULD NOT BE STARTED PRIOR TO 7:30 AM.

PUBLIC HEALTH SAFETY AND CONVENIENCE NOTES (CONT)

6. PUBLIC ACCESS ALONG THE SHORELINE DURING CONSTRUCTION SHOULD BE MAINTAINED SO FAR AS PRACTICABLE AND WITHIN THE LIMITATIONS NECESSARY TO ENSURE SAFETY.

EROSION AND SEDIMENT CONTROL NOTES:

1. THE CONTRACTOR SHALL FOLLOW THE GUIDELINES IN THE CITY & COUNTY OF HONOLULU'S "RULES RELATING TO WATER QUALITY".
2. MEASURES TO CONTROL EROSION AND OTHER POLLUTANTS SHALL BE IN PLACE BEFORE ANY EARTHWORK IS INITIATED.
3. TEMPORARY STABILIZATION: TEMPORARY STABILZATION IS REQUIRED ON DISTURBED AREAS WHICH ARE AT FINAL GRADE OR WHEN THE DISTURBED AREA WILL NOT BE WORKED FOR 14 CONSECUTIVE DAYS OR MORE.
4. PERMANENT STABILIZATION: ALL DISTURBED AREAS SHALL BE PERMANENTLY STABILIZED USING VEGETATIVE COVERING, PAVEMENT, OR EQUIVALENT, PRIOR TO REMOVING EROSION AND SEDIMENT MEASURES. TRAPPED SEDIMENT AND AREAS OF DISTURBED SOIL WHICH RESULT FROM THE REMOVAL OF THE TEMPORARY MEASURES SHALL BE IMMEDIATELY AND PERMANENTLY STABILIZED.
5. PRESERVE EXISTING VEGETATION: CLEARLY MARK THE AREAS TO BE PRESERVED WITH FLAGS OR TEMPORARY FENCING. WHERE TEMPORARY FENCING IS USED, FENCING MUST BE ADEQUATELY SUPPORTED BY POSTS AND MAINTAINED IN A UPRIGHT POSITION.
6. PERIMETER CONTROLS: PERIMETER CONTROLS ARE REQUIRED DOWNSLOPE OF ALL DISTURBED AREAS. MAINTAIN DOWNSTREAM BUFFER AREA.
7. SEDIMENT BARRIERS: SEDIMENT BARRIERS SHALL BE USED TO PROTECT DISTURBED OR DENUDED AREAS THAT ARE NOT SCHEDULED FOR ACTIVE GRADING WORK WITHIN 24 HOURS. THE SEDIMENT BARRIERS SHALL BE INSTALLED AT THE TOE OF THE SLOPE AND ON CONTOURS AT THE FOLLOWING SPACING:
   A. SLOPE GREATER THAN OR EQUAL TO 2:1 – 10 FEET SPACING
   B. SLOPE GREATER THAN OR EQUAL TO 4:1 AND LESS THAN 2:1 – 15 FEET SPACING
   C. SLOPE LESS THAN 4:1 – 20 FEET SPACING
8. THE FOLLOWING BMPS WERE DETERMINED NOT TO BE APPLICABLE BASED ON THE SPECIFIC SITE CONDITIONS. AS CONSTRUCTION PROGRESSES, REVISIONS MAY BENECESSARY AND WILL BE PROVIDED TO INSPECTORS.
   A. HAZARDOUS WASTE MANAGEMENT BMPS DO NOT APPLY. HAZARDOUS MATERIALS ARE NOT USED ON THIS PROJECT.
   B. CONCRETE WASTE MANAGEMENT BMPS DO NO APPLY. NO OPERATIONS ON THIS PROJECT INVOLVE LIQUID CONCRETE.
   C. SANITARY/SEPTIC WASTE MANAGEMENT BMPS DO NOT APPLY TO THIS PROJECT AS TEMPORARY OR PORTABLE SANITARY AND SEPTIC WASTE SYSTEMS ARE NOT NEEDED AT THIS JOB SITE.

GOOD HOUSEKEEPING BMPS:

1. INSPECT BMPS AND SITE WEEKLY. MAINTAIN BMPS AND SITE AS REQUIRED TO ENSURE CONTINUED PERFORMANCE.
2. DUST CONTROL: DUST SHOULD BE PREVENTED FROM BECOMING AIRBORNE AT ALL TIMES INCLUDING NON-WORKING HOURS, WEEKENDS, AND HOLIDAYS. TYPICAL DUST-PREVENTING MEASURES INCLUDE SPRINKLING. DUST FROM THE PROJECT SHALL NOT BE TRANSPORTED OR DISCHARGED TO OFF-SITE AREAS. WORK SHALL BE IN CONFORMANCE WITH THE AIR POLLUTION STANDARDS CONTAINED IN THE "HAWAII ADMINISTRATIVE RULES", TITLE 11, CHAPTER 60.1 "AIR QUALITY CONTROL".
3. MATERIALS DELIVERY, STORAGE AND USE MANAGEMENT: PREVENT, REDUCE, OR ELIMINATE THE DISCHARGE OF POLLUTANTS FROM MATERIAL DELIVERY, STORAGE, AND USE TO THE STORM WATER SYSTEM OR WATERCOURSES BY MINIMIZING THE STORAGE OF HAZARDOUS MATERIALS ONSITE, STORING MATERIALS IN A DESIGNATED AREA, INSTALLING SECONDARY CONTAINMENT. CONSTRUCTION MATERIALS, WASTE, TOXIC AND HAZARDOUS SUBSTANCES, STOCKPILES AND OTHER SOURCES OF POLLUTION SHALL NOT BE STORED IN BUFFER AREAS, NEAR AREAS OF CONCENTRATED FLOW, OR AREAS ABUTTING THE MS4, RECEIVING WATERS, OR DRAINAGE IMPROVEMENTS THAT DISCHARGE OFF-SITE. PRIMARY AND SECONDARY CONTAINMENT CONTROLS AND COVERS SHALL BE IMPLEMENTED TO THE MAXIMUM EXTENT PRACTICABLE.
4. STOCKPILE MANAGEMENT: STOCKPILES SHALL BE LOCATED WITHIN THE STAGING AREA A MINIMUM OF 50' FROM THE OCEAN, WHEN FEASIBLE. SEDIMENT BARRIERS OR SILT FENCES SHALL BE USED AROUND THE BASE OF ALL STOCKPILES. STOCKPILES SHALL NOT EXCEED 15 FEET IN HEIGHT. STOCKPILES MUST BE COVERED WITH PLASTIC SHEETING OR A COMPARABLE MATERIAL IF THEY WILL NOT BE ACTIVELY USED WITHIN 7 DAYS.
5. SPILL PREVENTION AND CONTROL: CREATE AND IMPLEMENT SPILL PREVENTION AND RESPONSE PLANS TO ELIMINATE AND MINIMIZE THE DISCHARGE OF POLLUTANTS TO THE MS4 AND RECEIVING WATERS FROM LEAKS AND SPILLS BY REDUCING THE CHANCE FOR SPILLS, ABSORBING, CONTAINING, AND CLEANING UP SPILLS AND PROPERLY DISPOSING OF SPILL MATERIALS. AT A MINIMUM, ALL PROJECTS SHALL CLEANUP ALL LEAKS AND SPILLS IMMEDIATELY.
6. SOLID WASTE MANAGEMENT: PREVENT OR REDUCE DISCHARGE OF POLLUTANTS TO THE LAND, GROUNDWATER, AND IN STORM WATER FROM SOLID WASTE OR CONSTRUCTION AND DEMOLITION WASTE BY PROVIDING DESIGNATED WASTE COLLECTION AREAS, COLLECT SITE TRASH DAILY, AND ENSURING THAT CONSTRUCTION WASTE IS COLLECTED, REMOVED, AND DISPOSED OF ONLY AT AUTHORIZED DISPOSAL AREAS.
7. CONTAMINATED SOIL MANAGEMENT: AT MINIMUM CONTAIN CONTAMINATED SOIL BY SURROUNDING WITH IMPERMEABLE LINE BERMS OR COVER EXPOSED CONTAMINATED MATERIAL WITH PLASTIC SHEETING. CONTAMINATED SOIL SHOULD BE DISPOSED OF PROPERLY IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.
8. LIQUID WASTE MANAGEMENT: LIQUID WASTE SHALL BE CONTAINED IN A CONTROLLED AREA SUCH AS A HOLDING PIT, SEDIMENT BASIN, ROLL-OFF BIN, OR PORTABLE TANK OF SUFFICIENT VOLUME AND TO CONTAIN THE LIQUID WASTES GENERATED. CONTAINMENT AREAS OR DEVICES MUST BE IMPERMEABLE AND LEAK FREE AND SHOULD NOT BE LOCATED WHERE ACCIDENTAL RELEASE OF THE CONTAINED LIQUID CAN DISCHARGE TO WATER BODIES, CHANNELS, OR STORM DRAINS.

GOOD HOUSEKEEPING BMPS (CONT):

9. VEHICLE AND EQUIPMENT CLEANING: ELIMINATE AND MINIMIZE THE DISCHARGE OF POLLUTANTS TO STORM WATER FROM VEHICLE AND EQUIPMENT CLEANING OPERATIONS BY USING OFF-SITE FACILITIES WHEN FEASIBLE, WASHING IN DESIGNATED, CONTAINED AREAS ONLY, AND ELIMINATING DISCHARGES TO THE STORM DRAIN SYSTEM BY EVAPORATING AND/OR TREATING WASH WATER AS APPROPRIATE OR INFILTRATING WASH WATER FOR EXTERIOR CLEANING ACTIVITIES THAT USE WATER ONLY.
10. VEHICLE AND EQUIPMENT MAINTENANCE: ELIMINATE AND MINIMIZE THE DISCHARGE OF POLLUTANTS TO STORM WATER FROM VEHICLE AND EQUIPMENT MAINTENANCE OPERATIONS BY USING OFF-SITE FACILITIES WHEN FEASIBLE, PERFORMING WORK IN DESIGNATED AREAS ONLY, USING SPILL PADS UNDER VEHICLES AND EQUIPMENT, CHECKING FOR LEAKS AND SPILLS, AND CONTAINING AND CLEANING UP SPILLS IMMEDIATELY.
11. TRACKING CONTROL: MINIMIZE SEDIMENT TRACK-OUT ONTO OFF-SITE STREETS, OTHER PAVED AREAS, AND SIDEWALKS FROM VEHICLES EXITING THE CONSTRUCTION SITE BY RESTRICTING VEHICLE TRAFFIC TO PROPERLY DESIGNATED AREAS AND USING ADDITIONAL CONTROLS TO REMOVE SEDIMENT FROM VEHICLE TIRES PRIOR TO EXITING THE SITE.

    VEHICULAR PARKING AND MOVEMENTS ON PROJECT SITES MUST BE CONFINED TO PAVED SURFACES OR PREDEFINED PARKING AREAS AND VEHICLE PATHS, WHICH SHALL BE MARKED WITH FLAGS OR BOUNDARY FENCING.

    ALL POLLUTANTS AND MATERIALS THAT ARE DROPPED, WASHED, TRACKED, SPILLED, OR OTHERWISE DISCHARGED FROM A PROJECT SITE TO OFF-SITE STREETS, OTHER PAVED AREAS, SIDEWALKS OR THE MS4 MUST BE CLEANED BY USING DRY METHODS SUCH AS SWEEPING OR VACUUMING.

    WASHING POLLUTANTS AND MATERIALS THAT ARE DISCHARGED FROM THE PROJECT SITE INTO DRAIN INLETS OR CATCH BASINS IS PROHIBITED UNLESS THE MATERIAL IS SEDIMENT AND THE INLETS ARE DIRECTED TO A SEDIMENT BASIN OR SEDIMENT TRAP.
12. STABILIZED CONSTRUCTION ENTRANCE AND EXIT: A STABILIZED CONSTRUCTION ENTRANCE AND EXIT SHALL BE PROVIDED BASED ON EROSION AND SEDIMENT CONTROL PLAN DETAILS AND SHALL BE REGULARLY INSPECTED/MAINTAINED TO ENSURE CONTINUED PERFORMANCE.

RAIN RESPONSE PLAN:

1. THE FOLLOWING WILL BE PERFORMED WHEN RAIN IS IMMINENT OR IS FORECASTED IN THE NEXT 48 HOURS:
   A. TEMPORARY SUSPENSION OF ACTIVE CLEARING, GRADING, GRUBBING, AND TRENCHING. INSPECT ALL PERIMETER CONTROLS AND INLET PROTECTION DEVICES AND MAINTAIN AS NEEDED.
   B. REINSTALL ANY PERIMETER CONTROLS THAT WERE REMOVED DUE TO ACTIVE WORK IN THE AREA.
   C. COVER OR RELOCATE MATERIAL STOCKPILES TO AVOID CONTACT WITH RAINWATER.
   D. PLACE SPILL PANS OR OIL-ONLY SPILL PADS UNDER CONSTRUCTION VEHICLES TO PREVENT RUNOFF FROM CONTACTING ANY SPILLED PETROLEUM PRODUCTS.
   E. PROPERLY DISPOSE OF AN ACCUMULATED OILY WATER AFTER THE RAIN EVENT.
   F. RE-INSPECT AFTER THE RAIN EVENT AND REPLACE OR MAINTAIN BMPS AS NEEDED.

WATER QUALITY NOTES:

1. ONLY BEACH COMPATIBLE FILL SHOULD BE PLACED ON THE BEACH OR IN ANY ASSOCIATED DUNE SYSTEM. BEACH COMPATIBLE FILL SHOULD MAINTAIN THE GENERAL CHARACTER AND FUNCTIONALITY OF THE BEACH AND THE ADJACENT DUNE AND COASTAL SYSTEM. BEACH FILL SHOULD BE SIMILAR IN COMPOSITION, GRAIN SIZE DISTRIBUTION (SAND GRAIN FREQUENCY, MEAN AND MEDIAN GRAIN SIZE, AND SORTING COEFFICIENT), COLOR, AND TEXTURE, AND SHOULD NOT CONTAIN:
   A. GREATER THAN TWO PERCENT BY WEIGHT, SILT, CLAY, OR COLLOIDS PASSING THE #230 SIEVE;
   B. GREATER THAN FIFTY PERCENT BY WEIGHT, VERY FINE SAND PASSING THE #120 SIEVE;
   C. GREATER THAN TEN PERCENT BY WEIGHT, FINE GRAVEL RETAINED ON THE #4 SIEVE;
   D. COARSE GRAVEL, COBBLES OR MATERIAL RETAINED ON THE ¾ INCH SIEVE IN A PERCENTAGE OR SIZE GREATER THAN THAT FOUND ON THE NATIVE OR EXISTING BEACH;
   E. CONSTRUCTION DEBRIS, TOXIC MATERIAL OR OTHER FOREIGN MATTER; AND
   F. MATERIAL THAT RESULTS IN CEMENTATION OF THE BEACH.

   IF THE NATIVE OR EXISTING BEACH EXCEEDS ANY OF THE LIMITING PARAMETERS LISTED ABOVE, THEN THE BEACH FILL SHOULD NOT EXCEED THE MEASURED LEVEL FOR THAT PARAMETER. BEACH FILL THAT FALLS OUTSIDE OF THESE LIMITS SHOULD BE CONSIDERED UNACCEPTABLE AND MAY BE SUBJECT TO REMEDIATION.
2. DRAINAGE OUTLETS AT THE SHORELINE SHOULD BE MAINTAINED TO MINIMIZE EROSION AND POLLUTION OF WATERWAYS DURING CONSTRUCTION. SURFACE RUNOFF SHOULD BE CONTROLLED TO MINIMIZE SILT AND OTHER CONTAMINANTS ENTERING THE WATER. SHOULD EXCESSIVE SILTATION OR TURBIDITY RESULT FROM THE CONTRACTOR'S METHOD OF OPERATION, THE CONTRACTOR MUST IMPLEMENT TURBIDITY CONTROL MEASURES AS NECESSARY TO CORRECT THE PROBLEM.

WATER QUALITY NOTES (CONT):

3. VISUAL MONITORING SHOULD BE CONDUCTED DURING CONSTRUCTION AND INCLUDE ONGOING INSPECTIONS FOR TURBIDITY OUTSIDE THE PROJECT AREA, WHICH IS TO BE IDENTIFIED IN THE PROJECT PERMIT APPLICATION. IN THE EVENT THAT EXCESSIVE TURBIDITY IS OBSERVED OUTSIDE THE PROJECT AREA, WORK SHOULD BE SUSPENDED OR MITIGATE TO THE EXTENT NECESSARY TO MITIGATE ANY ADVERSE EFFECTS.
4. THE BEACH FILL SHOULD BE OBTAINED FROM AN APPROVED SOURCE AND HAS BEEN REVIEWED AND AUTHORIZED BY THE APPROPRIATE AUTHORITY INCLUDING BUT NOT LIMITED TO THE SHPD.
5. ALL PLACED BEACH FILL SHOULD BE FREE OF CONTAMINANTS OF ANY KIND INCLUDING: EXCESSIVE SILT, SLUDGE, ANOXIC OR DECAYING ORGANIC MATTER, TURBIDITY, CLAY, DIRT, ORGANIC MATERIAL, OIL, FLOATING DEBRIS, GREASE OR FOAM OR ANY OTHER POLLUTANT THAT WOULD PRODUCE AN UNDESIRABLE CONDITION TO THE BEACH OR WATER QUALITY.
6. GEOTECHNICAL INVESTIGATIONS THAT PROVIDE ADEQUATE DATA TO DEFINE THE CHARACTER OF THE NATIVE OR EXISTING AND FILL SEDIMENTS SHOULD BE CONDUCTED. AN ANALYSIS OF THE NATIVE BEACH SEDIMENT AND THE SEDIMENT WITHIN THE PROPOSED FILL SOURCE MUST DEMONSTRATE COMPATIBILITY. BEACH FILL COMPATIBILITY SHOULD BE DETERMINED AS FOLLOWS:
   A. GRAIN SIZE DISTRIBUTIONS OF PROPOSED AND CONSTRUCTED PROJECTS SHOULD BE ANALYZED BY A STANDARD LABORATORY WET SIEVE TECHNIQUE (ASTM D-1140-92) AND TESTED AT A QUALIFIED FACILITY. GRAIN SIZE DISTRIBUTIONS OF PROPOSED PROJECTS SHOULD INCLUDE AN ANALYSIS OF FILL SOURCE AND NATIVE BEACH TO DEFINE BEACH FILL COMPATIBILITY SPECIFICATIONS. GRAIN SIZE DISTRIBUTIONS OF CONSTRUCTED PROJECTS SHOULD INCLUDE AN ANALYSIS OF PLACED BEACH FILL TO DOCUMENT AS-BUILT CONDITIONS AND CONFIRM PLACED BEACH FILL COMPLIES WITH COMPATIBILITY SPECIFICATIONS. THE SURVEY METHOD, LAYOUT AND SAMPLING DISTRIBUTION SHOULD BE SUFFICIENT TO ADEQUATELY DESCRIBE AND MAP THE CHARACTER OF THE EXISTING BEACH, FILL SOURCE, AND RESTORED BEACH SEDIMENTS.
   B. ALL SAMPLES SHOULD BE EVALUATED VISUALLY FOR COLOR, COMPOSITION, AND TEXTURE AND SIEVED IN ACCORDANCE WITH THE APPLICABLE SECTIONS OF ASTM D422-63 (STANDARD TEST METHOD FOR PARTICLE-SIZE ANALYSIS OF SOILS), ASTM D1140-54 (STANDARD TEST METHOD FOR AMOUNT OF MATERIAL IN SOILS FINER THAN NO. 230 SIEVE), AND ASTM D2487-17 (CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES).
   C. BEACH FILL COMPATIBILITY SPECIFICATIONS SHOULD TAKE INTO ACCOUNT THE VARIABILITY OF THE SEDIMENT ON THE NATIVE BEACH. COMPATIBILITY MAY BE DEMONSTRATED WHEN THE GRAIN SIZE DISTRIBUTION OF THE PROPOSED BEACH FILL IS WITHIN TWENTY PERCENT (20%) OF THE NATIVE BEACH SEDIMENT, AS MEASURED BY A PERCENT FINER THAN OR COARSER THAN VALUE.
7. AN APPROPRIATE SEDIMENT QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PLAN SHOULD BE PREPARED TO ENSURE BEACH FILL PLACED MEETS COMPATIBILITY SPECIFICATIONS. THIS PLAN SHOULD OUTLINE THE RESPONSIBILITIES OF EACH STAKEHOLDER IN THE PROJECT AS THEY RELATE TO THE PLACEMENT OF BEACH FILL. THE PLAN SHOULD SPECIFY THE MINIMUM CONSTRUCTION OVERSIGHT, INSPECTION, AND REPORTING REQUIREMENTS TO BE UNDERTAKEN TO OBSERVE, SAMPLE, AND TEST THE PLACED FILL TO VERIFY THAT IT MEETS COMPLIANCE SPECIFICATIONS. THE PLAN SHOULD DESCRIBE THE METHODS AND MEANS TO MONITOR AND CONTROL THE QUALITY AND CHARACTERISTICS OF THE FILL MATERIAL.
8. AN APPROPRIATE TURBIDITY CONTROL PLAN, WHICH INCLUDES TURBIDITY CONTROL MEASURES AND MONITORING METHODS, SHOULD BE PREPARED TO ENSURE TURBIDITY IS CONTROLLED AND LIMITED DURING CONSTRUCTION. THIS PLAN SHOULD OUTLINE THE RESPONSIBILITIES OF EACH STAKEHOLDER IN THE PROJECT AS THEY RELATE TO THE CONTROL OF TURBIDITY WITHIN AND OUTSIDE THE PROJECT AREA. THE PLAN SHOULD SPECIFY THE MINIMUM CONSTRUCTION OVERSIGHT, INSPECTION, AND REPORTING REQUIREMENTS TO BE UNDERTAKEN TO OBSERVE, SAMPLE, AND TEST TURBIDITY TO VERIFY TURBIDITY REMAINS WITHIN ACCEPTABLE LIMITS. THIS PLAN SHOULD DESCRIBE THE METHODS AND MEANS TO MONITOR AND CONTROL TURBIDITY.

PERMIT DRAWINGS

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DESCRIPTION	DATE	REVISION	MADE BY	APPROVED

PAHONU BEACH COMMUNITY RESTORATION FOUNDATION, INC.

41-473 KALANIANAOLE HWY
WAIMANALO, HAWAII 96795

PAHONU BEACH RESTORATION

ISLAND OF O'AHU

TMK: 4-1-001:012
TMK: 4-1-001:006
TMK: 4-1-001:007
TMK: 4-1-001:008
TMK: 4-1-001:009
TMK: 4-1-001:002
TMK: 4-1-001:003
TMK: 4-1-001:004

NOTES (CONT)

APPROVED BY:

DATE

DESIGNED BY: MF
DRAWN BY: AP
CHECKED BY:
SURVEYED BY:

DRAWING NO. T-3

DATE: MAR. 2023

SHEET NO. 3 OF 10

PAHONU BEACH RESTORATION

DRAWING NAME: \\WAS-SERVER.OCEANIT.LOCAL\SERVICES\202135-PAHONU_BEACH_RESTORATION\0_GRAPHICS\DRAWINGS\CONTRACT DOCUMENTS\PERMIT DRAWINGS\02_T03_REVI.DWG EDIT TIME: 03-09-23, 9:28 AM EDITED BY: APARK

EXISTING PLAN

SCALE: 1" = 30'-0"

LEGEND:

- EXISTING INTERMEDIATE CONTOUR
- EXISTING INDEX CONTOUR
- EXISTING PROPERTY LINE
- MEAN HIGHER-HIGH WATER
- SHORELINE AS SURVEYED BY 'AILANA SURVEYING & GEOMATIC LLC ON JANUARY 27, 2023

NOTES:

1. BACKGROUND AERIAL FROM HAWAII GIS PORTAL, DATED 07/05/2022.
2. PROPERTY LINES TAKEN FROM HAWAII GIS PORTAL, DATED 08/2021.
3. ELEVATION CONTOURS ARE APPROXIMATE AND REFERENCE TOPOGRAPHY/BATHYMETRY DATA FROM 2013 USACE LIDAR. MEAN LOWER-LOW WATER (MLLW) IS REFERNCED AS ZERO BY CONVERTING THE VERTICAL DATUM FROM MEAN SEA LEVEL (MSL) TO MLLW (1.05 FEET BELOW MSL). MEAN HIGHER-HIGH WATER (MHHW) IS 2.12 FEET ABOVE MLLW ACCORDING TO TIDAL DATUMS FOR NOAA STATION 1612480, MOKUOLOE, HI.

IF THIS SHEET IS LESS THAN 36"X24", IT IS A REDUCED PRINT. SCALE REDUCED ACCORDINGLY.

GRAPHIC SCALE:

30' 15' 0 30' 60'

SCALE: 1" = 30'

PERMIT DRAWINGS

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PAHONU BEACH COMMUNITY RESTORATION FOUNDATION, INC.

41-473 KALANIANAOLE HWY
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PAHONU BEACH RESTORATION

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TMK: 4-1-001:002
TMK: 4-1-001:003
TMK: 4-1-001:004

EXISTING PLAN

APPROVED BY:

DATE

DESIGNED BY: MF
DRAWN BY: AP
CHECKED BY:
SURVEYED BY:

DRAWING NO. C-1

DATE: MAR. 2023

SHEET NO. 4 OF 10

PAHONU BEACH RESTORATION

DEMOLITION PLAN

SCALE: 1" = 30'-0"

LEGEND:

- EXISTING INTERMEDIATE CONTOUR
- 10 EXISTING INDEX CONTOUR
- PL EXISTING PROPERTY LINE
- MHHW MEAN HIGHER-HIGH WATER
- SHORELINE AS SURVEYED BY 'AILANA SURVEYING & GEOMATIC LLC ON JANUARY 27, 2023

NOTES:

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SCALE: 1" = 30'

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PAHONU BEACH COMMUNITY RESTORATION FOUNDATION, INC.

41-473 KALANIANAOLE HWY
WAIMANALO, HAWAII 96795

PAHONU BEACH RESTORATION

ISLAND OF O'AHU

TMK: 4-1-001:012
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TMK: 4-1-001:009
TMK: 4-1-001:002
TMK: 4-1-001:003
TMK: 4-1-001:004

DEMOLITION PLAN

APPROVED BY:

DATE:

DESIGNED BY: MF
DRAWN BY: AP
CHECKED BY:
SURVEYED BY:

DRAWING NO. C-2

DATE: MAR. 2023

SHEET NO. 5 OF 10

PERMIT DRAWINGS

PAHONU BEACH RESTORATION

DRAWING NAME: \\WAS-SERVER.OCEANIT.LOCAL\SERVICES\207135-PAHONU_BEACH_RESTORATION\0_GRAPHICS\DRAWINGS\CONTRACT DOCUMENTS\PERMIT DRAWINGS\PAHONU SMALL SCALE BEACH RESTORATION PLANS_NEW SECTIONS_REV3.DWG EDIT TIME: 03-09-23, 9:28 AM EDITED BY: APARK

1 C-3 TYPICAL REEF FINGER LAYOUT
NOT TO SCALE

PROPOSED PLAN
SCALE: 1" = 30'-0"

ESTIMATED QUANTITIES AND EARTHWORK SUMMARY:

REEF FINGERS
231 CU.YDS. EXCAVATION
3,921 SQ.FT. FOOTPRINT

BERM
585 LN.FT. BERM WITH NATIVE DUNE VEGETATION
358 CU.YDS. SAND
5,954 SQ.FT. FOOTPRINT

BEACH
4,858 CU.YDS. SAND
25,601 SQ.FT.

PROJECT TOTALS
35,476 SQ.FT.
4,985 CU.YDS. SAND FILL

LEGEND:
- EXISTING INTERMEDIATE CONTOUR
- 10 EXISTING INDEX CONTOUR
- PL EXISTING PROPERTY LINE
- MHHW MEAN HIGHER-HIGH WATER
- SHORELINE AS SURVEYED BY 'AILANA SURVEYING & GEOMATIC LLC ON JANUARY 27, 2023

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SCALE: 1" = 30'

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PERMIT DRAWINGS

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PAHONU BEACH COMMUNITY RESTORATION FOUNDATION, INC.
41-473 KALANIANAOLE HWY
WAIMANALO, HAWAII 96795

PAHONU BEACH RESTORATION
ISLAND OF O'AHU
TMK: 4-1-001:012
TMK: 4-1-001:006
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TMK: 4-1-001:003
TMK: 4-1-001:004

PROPOSED PLAN

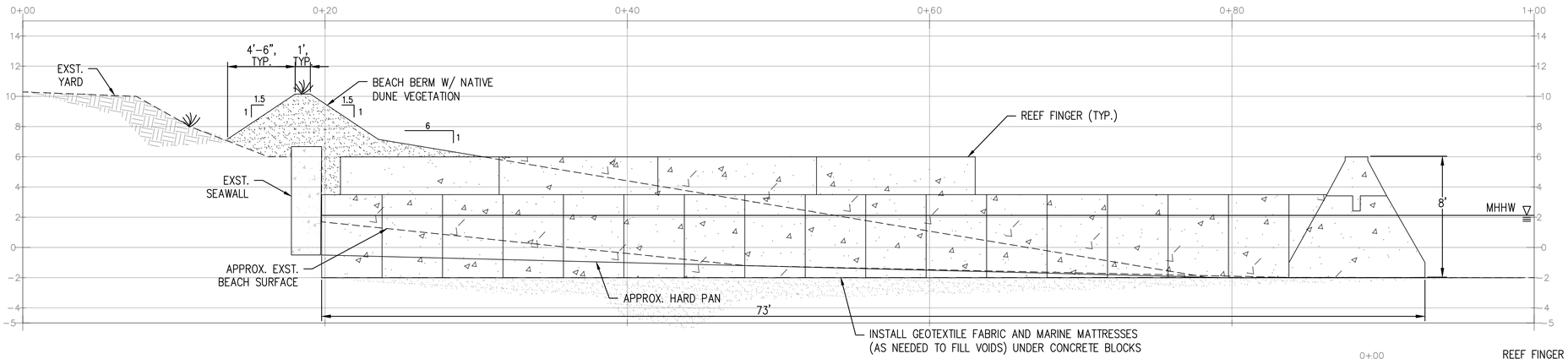
APPROVED BY:

DATE

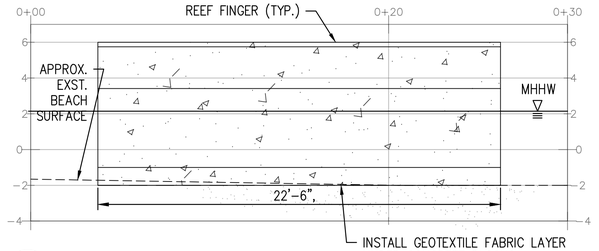
DESIGNED BY: MF
DRAWN BY: AP
CHECKED BY:
SURVEYED BY:
DRAWING NO. C-3
DATE: MAR. 2023
SHEET NO. 6 OF 10

PAHONU BEACH RESTORATION

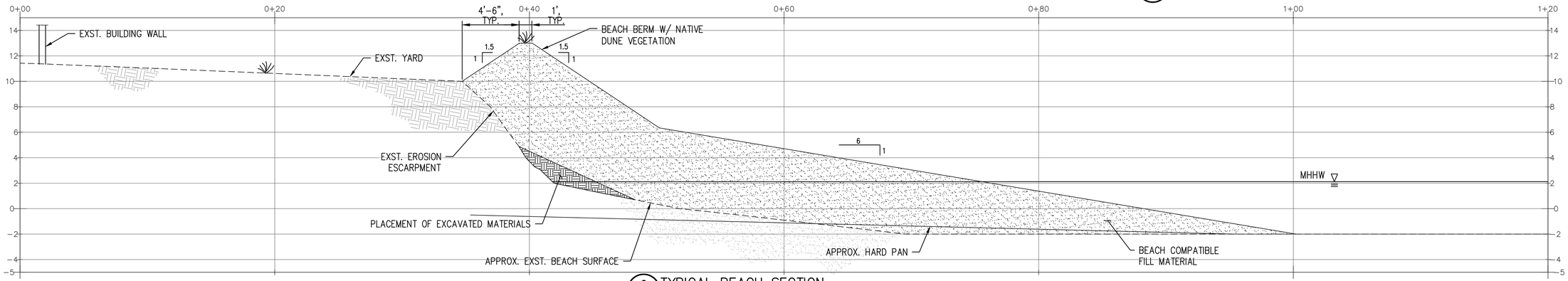
DRAWING NAME: \\WAS-SERVER-OCEANIT.LOCAL\SERVICES\202135-PAHONU_BEACH_RESTORATION\0_GRAPHICS\DRAWINGS\CONTRACT DOCUMENTS\PERMIT DRAWINGS\PAHONU SMALL SCALE BEACH RESTORATION PLANS_NEW SECTIONS_REV3.DWG EDIT TIME: 03-09-23, 9:28 AM EDITED BY: APARK



A C-4 TYPICAL REEF FINGER ACROSS REEF SHELF
NOT TO SCALE



B C-4 TYPICAL REEF FINGER SECTION
NOT TO SCALE



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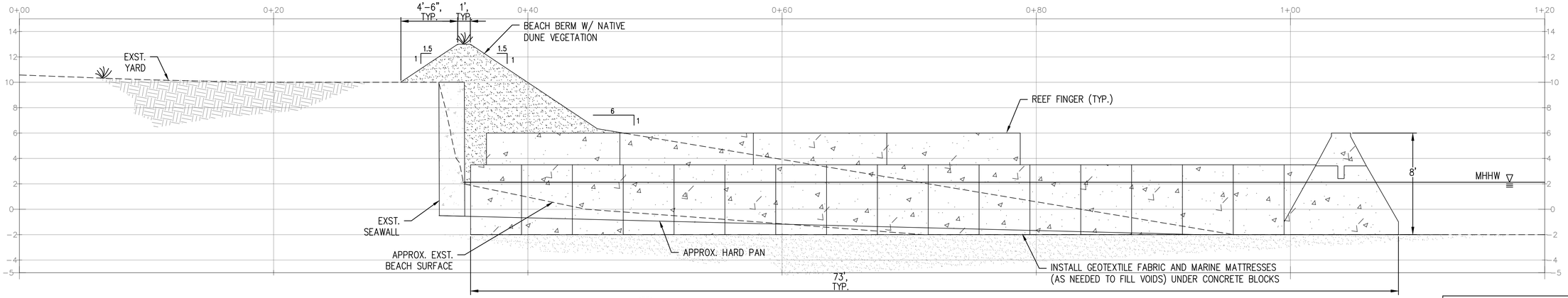

D C-4 TYPICAL REEF FINGER
NOT TO SCALE

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WAIMANALO, HAWAII 96795

PAHONU BEACH RESTORATION

ISLAND OF O'AHU
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TMK: 4-1-001:002
TMK: 4-1-001:003
TMK: 4-1-001:004

GROIN AND BEACH SECTIONS

APPROVED BY:

DATE

DESIGNED BY: MF
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CHECKED BY:
SURVEYED BY:
DRAWING NO. C-4
DATE: MAR. 2023
SHEET NO. 7 OF 10

PAHONU BEACH RESTORATION

DRAWING NAME: I:\220135-PAHONU_BEACH_RESTORATION\0 GRAPHICS\DRAWINGS\CONTRACT DOCUMENTS\PERMIT DRAWINGS\PAHONU SMALL SCALE BEACH RESTORATION PLANS_NEW SECTIONS_REV4.DWG EDIT TIME: 03-10-23, 3:43 PM EDITED BY: CHANNA

BEST MANAGEMENT PRACTICES/ACCESS PLAN

SCALE: 1" = 30'-0"

NOTES:

1. BACKGROUND AERIAL FROM HAWAII GIS PORTAL, DATED 07/05/2022.
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SCALE: 1" = 30'

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TMK: 4-1-001:002
TMK: 4-1-001:003
TMK: 4-1-001:004

BEST MANAGEMENT PRACTICES / ACCESS PLAN

APPROVED BY:

DATE

DESIGNED BY: MF
DRAWN BY: AP
CHECKED BY:
SURVEYED BY:

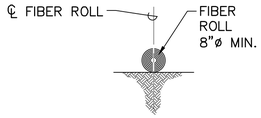
DRAWING NO. C-5

DATE: MAR. 2023

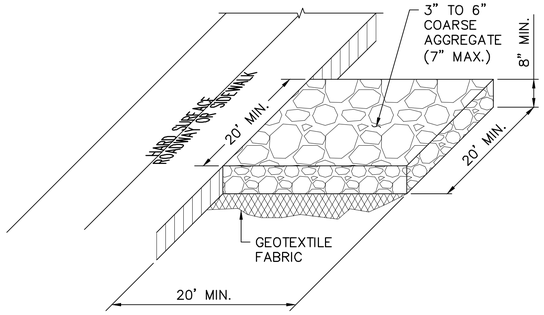
SHEET NO. 8 OF 10

PAHONU BEACH RESTORATION

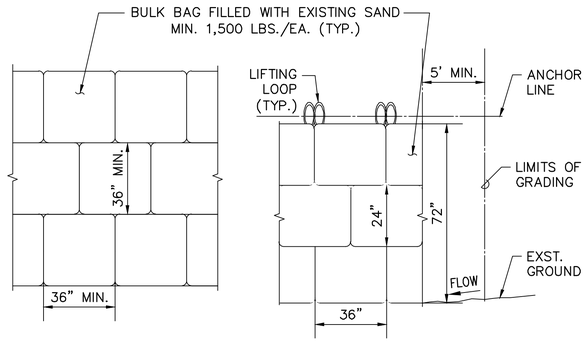
DRAWING NAME: \\WAS-SERVER.OCEANIT.LOCAL\SERVICES\202135-PAHONU_BEACH_RESTORATION\0_GRAPHICS\DRAWINGS\PERMIT DRAWINGS\PAHONU SMALL SCALE BEACH RESTORATION PLANS_NEW SECTIONS_REV3.DWG EDIT TIME: 03-09-23, 9:29 AM EDITED BY: APARK



1 C-6 FIBER ROLL DETAIL
NOT TO SCALE



2 C-6 STABILIZED CONSTRUCTION ENTRANCE/EXIT
NOT TO SCALE



3 C-6 WAVE BARRIER DETAIL
NOT TO SCALE

BEST MANAGEMENT PRACTICES (BMPS) NOTES:

1. WORK SHALL BE CONDUCTED AT LOW TIDE TO THE MOST PRACTICAL EXTENT POSSIBLE AND NO WORK SHALL OCCUR DURING HIGH SURF OR OCEAN CONDITIONS THAT WILL CREATE UNSAFE CONDITIONS.
2. MEASURES TO CONTROL RUNOFF AND OTHER POLLUTANTS SHALL BE IN PLACE BEFORE ANY WORK IS INITIATED. THESE MEASURES SHALL BE PROPERLY CONSTRUCTED AND MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL REMAIN IN PLACE UNTIL THE PERMANENT GROUND COVER IS FULLY ESTABLISHED.
3. THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN TEMPORARY FIBER ROLL BARRIER AS INDICATED ON PLAN. FIBER ROLL ALIGNMENT AND LENGTH SHOWN ARE APPROXIMATE. CONTRACTOR SHALL ADJUST ACTUAL LOCATIONS TO ACCOMMODATE HIS/HER CONSTRUCTION METHODS AND RETAIN SILT ON-SITE.
4. THE CONTRACTOR SHALL CONDUCT THE CONCRETE WORK OPERATION IN A MANNER THAT WILL PREVENT DISCHARGE OF GROUT OR CEMENT INTO STATE WATERS. CONCRETE WORK SHALL BE PERFORMED IN A MANNER THAT WILL AVOID SPILLS OUTSIDE THE INTENDED FORM WORK.
5. TEMPORARY STOCKPILING OF CLEARED SITE DEBRIS MATERIAL SHALL NOT BE PERMITTED AT THE PROJECT SITE. ALL DEBRIS MATERIAL SHALL BE REMOVED FROM THE SITE DAILY.
6. GOOD HOUSEKEEPING SHALL BE UTILIZED TO ENSURE PROTECTION OF ROADWAYS AND WALKWAYS FROM MUD, DIRT AND DEBRIS.
7. THE CONTRACTOR SHALL ENSURE THAT ALL TIRES OF CONSTRUCTION VEHICLES ARE SUFFICIENTLY CLEANED OFF SO THAT DIRT OR DEBRIS IS NOT TRACKED OFF THE CONSTRUCTION SITE. WASHING OFF TIRES WILL NOT BE ACCEPTABLE UNLESS THE RUNOFF IS CONTAINED AND DOES NOT ENTER THE STORM DRAIN SYSTEM OR ONTO THE COUNTY ROADWAY. REMOVE ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS WITHIN 24 HOURS.
8. AT THE COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL INSPECT ALL CATCH BASINS, DRAIN INLETS AND DRAIN MANHOLES SURROUNDING THE PROJECT SITE. ANY ACCUMULATED SEDIMENT AND DEBRIS FOUND IN THE STORM DRAIN STRUCTURES SHALL BE REMOVED. FLUSHING INTO THE DRAIN STRUCTURES IS PROHIBITED.
9. ANY DIRT OR GRASSED AREA DISTURBED SHALL BE RESTORED BY RE-GRASSING THE AREA OR BY SEEDED HYDROMULCH. THE GRASS SHALL BE FULLY ESTABLISHED AT COMPLETION OF THE PROJECT. ANY DISTURBED OR DAMAGED LANDSCAPING AREAS SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION TO THE SATISFACTION OF THE OWNER.
10. STORM WATER FLOWING TOWARD THE CONTRACTOR'S STAGING AREA SHALL BE DIVERTED BY USING APPROPRIATE CONTROL MEASURES AS PRACTICAL.
11. BMPS PROVIDED HEREIN ARE MINIMUM REQUIREMENTS, DURING BIDDING AND CONSTRUCTION. THE CONTRACTOR SHALL RETAIN A CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC) TO ESTABLISH THE BMPS NECESSARY TO MEET FEDERAL AND LOCAL LAWS AND REGULATIONS REGARDING WATER QUALITY AND WATER POLLUTION CONTROL.
12. AT ALL TIMES, THE CONTRACTOR SHALL KEEP THE BEACH AREA IN THE VICINITY OF THE PROJECT SITE CLEAR OF TRASH, DEBRIS AND ANY OTHER UNNECESSARY MATERIALS RELATED TO CONSTRUCTION.
13. ANY SAND EXCAVATED DURING CONSTRUCTION SHALL BE KEPT CLEAN AND RESTORED TO THE BEACH UPON COMPLETION OF CONSTRUCTION ACTIVITIES.

BMP MAINTENANCE NOTES:

1. CHECK BMPS AND EMBANKMENTS FOR EROSION DAMAGE AND SEDIMENT BUILDUP. MAKE ALL NECESSARY REPAIRS IMMEDIATELY. REMOVE ALL TRASH AND OTHER DEBRIS.
2. SHOULD THE FABRIC OF A SEDIMENT BMP COLLAPSE, TEAR, DECOMPOSE OR BECOME INEFFECTIVE, REPLACE IT PROMPTLY. REPLACE BURLAP EVERY 60 DAYS.
3. REMOVE SEDIMENT DEPOSITS AS NECESSARY TO PROVIDE ADEQUATE STORAGE VOLUME FOR THE NEXT RAIN AND TO REDUCE PRESSURE ON BMPS. AVOID UNDERMINING OF BMPS DURING CLEANING.
4. INSPECT BMPS DAILY AND IMMEDIATELY AFTER EACH RAINFALL AND HIGH WAVE EVENT. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.
5. SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT. SEDIMENT SHALL BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY ONE-THIRD THE HEIGHT OF THE BARRIER.
6. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE BMP IS NO LONGER REQUIRED SHALL BE REMOVED BY THE CONTRACTOR.

FIBER ROLL NOTES:

1. FIBER ROLLS SHALL BE PLACED AROUND THE CONTRACTORS STAGING AND STOCKPILE AREAS AS SHOWN IN THE PLAN.
2. FIBER ROLLS SHALL CONSIST OF STRAW, FLAX, MULCH OR OTHER SIMILAR MATERIAL BOUND IN A TIGHT TUBULAR ROLL A MINIMUM OF 8" IN DIAMETER.
3. BIND ROLL AT EACH END AND EVERY 4 FEET ALONG LENGTH OF ROLL WITH JUTE-TYPE TWINE.
4. TURN THE ENDS OF THE FIBER ROLL UP SLOPE TO PREVENT RUNOFF FROM GOING AROUND THE ROLL.
5. STAKE FIBER ROLLS ON-GRADE AS NECESSARY.
   A. DRIVE STAKES AT THE END OF EACH FIBER ROLL AND SPACED 4 FEETT MAXIMUM ON CENTER.
   B. USE STAKES WITH A MINIMUM LENGTH OF 24 INCHES.
6. IF MORE THAN ONE FIBER ROLL IS PLACED IN A ROW, THE ROLLS SHOULD BE OVERLAPPED, NOT ABUTTED.
7. INSPECT FIBER ROLL DAILY AND IMMEDIATELY AFTER EACH RAINFALL EVENT. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.
8. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE FIBER ROLL IS NO LONGER REQUIRED SHALL BE REMOVED BY THE CONTRACTOR.

WAVE BARRIER NOTES:

1. INDIVIDUAL BULK FILL BAGS SHALL BE SECURED TO EACH OTHER WITH SYNTHETIC ANCHOR LINE THAT PASSES THROUGH THE LIFT STRAPS.
2. WAVE BARRIER SHALL BE INSPECTED DAILY AND ANY DAMAGED MATERIAL SHALL BE IMMEDIATELY REMOVED AND REPLACED.
3. ALL BEACH SAND USED TO FILL BULK BAGS SHALL BE RETURNED TO THE BEACH.
4. BULK BAG BARRIER SHALL ONLY BE INSTALLED WHEN WORK IS IN PROGRESS ALONG THE BEACH. THE BMP SHALL BE REMOVED IF UNNECESSARY TO PROTECT THE ACTIVE WORK ZONE ALONG THE BEACH.

PERMIT DRAWINGS

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REVISION	DATE	DESCRIPTION	MADE BY	APPROVED

PAHONU BEACH COMMUNITY RESTORATION FOUNDATION, INC.
41-473 KALANIANAOLE HWY
WAIMANALO, HAWAII 96795

PAHONU BEACH RESTORATION
ISLAND OF O'AHU
TMK: 4-1-001:012
TMK: 4-1-001:006
TMK: 4-1-001:007
TMK: 4-1-001:008
TMK: 4-1-001:009
TMK: 4-1-001:002
TMK: 4-1-001:003
TMK: 4-1-001:004

BEST MANAGEMENT PRACTICES DETAILS

APPROVED BY:

DATE

DESIGNED BY: MF
DRAWN BY: AP
CHECKED BY:
SURVEYED BY:
DRAWING NO. C-6
DATE: MAR. 2023
SHEET NO. 9 OF 10

PAHONU BEACH RESTORATION

DRAWING NAME: \\WAS-SERVER.OCEANIT.LOCAL\SERVICES\202135-PAHONU_BEACH_RESTORATION\0_GRAPHICS\DRAWINGS\CONTRACT DOCUMENTS\PERMIT DRAWINGS\PAHONU_SMALL SCALE BEACH RESTORATION PLANS_NEW SECTIONS_REV3.DWG EDIT TIME: 03-09-23, 9:29 AM EDITED BY: APARK

SAND RECOVERY NOTES:

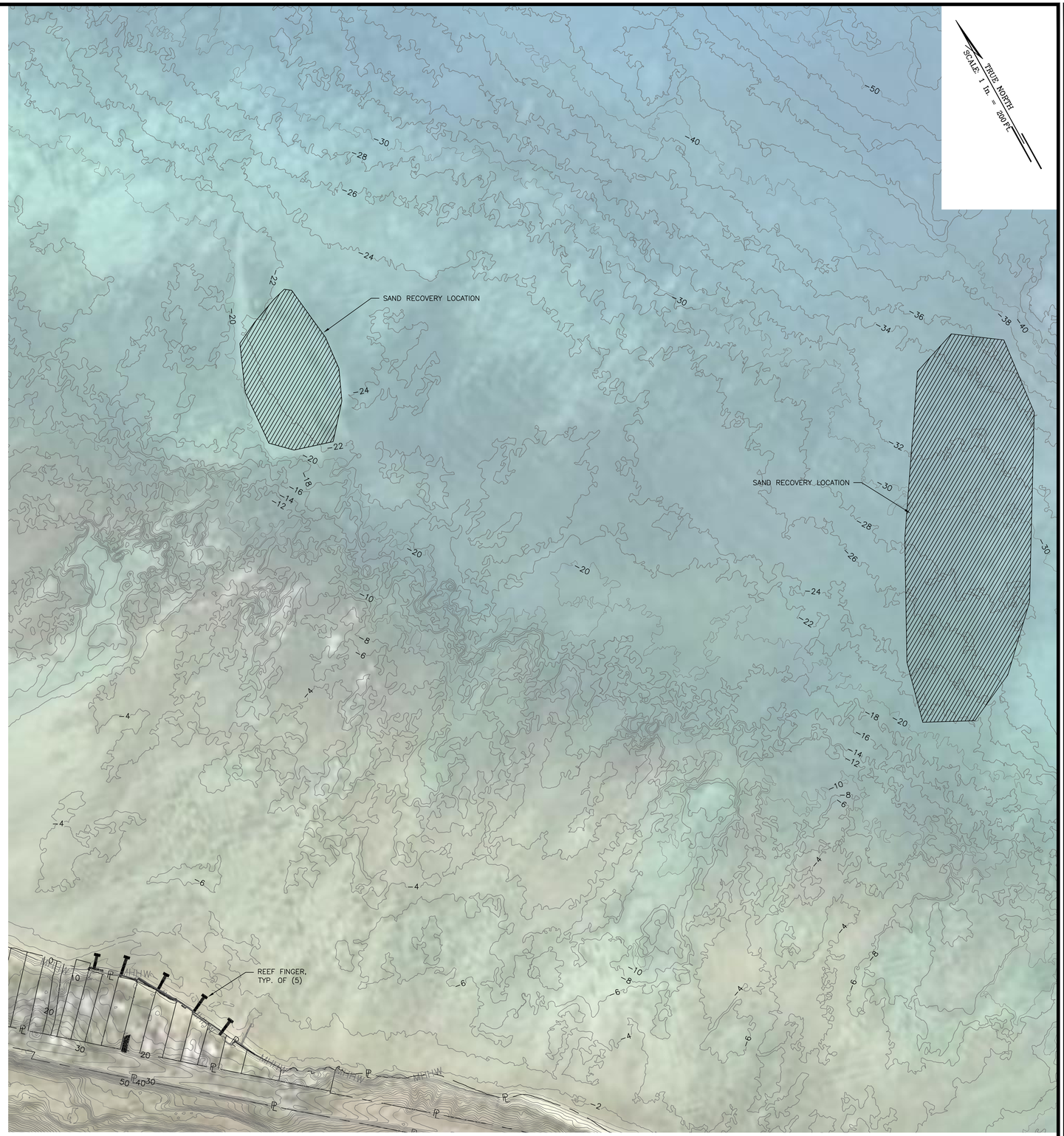
1. SAND SOURCE FOR THE BEACH NOURISHMENT IS FROM RECOVERY OF APPROXIMATELY 6,000 CUBIC YARDS (CU.YDS.) OF SAND FROM DEPOSITS LOCATED ABOUT 2,300 FEET OFFSHORE OF THE PROJECT AREA IN A WATER DEPTH OF ABOUT 20 FEET, AS SHOWN IN THE HATCHED AREA.
2. SAND RECOVERY MAY USE EITHER SUCTION DREDGING OR MECHANICAL DREDGING TECHNIQUES. BOTH OPTIONS WILL BE EVALUATED REGARDING CONSTRUCTION FEASIBILITY, COST, AND THEIR POTENTIAL ENVIRONMENTAL IMPACT. THE OPTIMAL METHOD WILL BE DETERMINED BASED ON THE EVALUATION STUDIES AND DISCUSSIONS WITH CLIENT AND CONTRACTOR.
3. DESIGNATED RECOVERY AREA BOUNDARIES SHALL BE DELINEATED PRIOR TO THE CONSTRUCTION TO MINIMIZE ENVIRONMENTAL IMPACT. ALL SAND RECOVERY WORK, INCLUDING DREDGING AND MOORING OF VESSELS AND EQUIPMENT, SHALL BE CONTAINED WITHIN THE DESIGNATED RECOVERY AREA BOUNDARIES. NO DREDGING OR ANCHORING SHALL BE CONDUCTED OUTSIDE OF THE DESIGNATED AREA.
4. A TURBIDITY CONTAINMENT DEVICE SHALL BE DEPLOYED COMPLETELY AROUND THE AREA OF ACTIVE SAND RECOVERY. THE TURBIDITY CONTAINMENT DEVICE MAY ATTACH TO THE DREDGE SUPPORT VESSEL. THE DEVICE ANCHORS SHALL BE PLACED COMPLETELY WITH THE DESIGNATED SAND RECOVERY AREA BOUNDARIES.

OPTION 1 – SUCTION DREDGING:

1. DREDGED SAND WILL BE TRANSPORTED TO SHORELINE THROUGH SUBMERGED AND/OR FLOATING PIPELINE AND THEN TO THE PROJECT SITE.
2. SUBMERGED PIPELINE IS PREFERRED IF THE ANCHORING SYSTEM DOES NOT IMPOSE NEGATIVE ENVIRONMENTAL IMPACT. A DETAILED BENTHIC STUDY SHALL BE CONDUCTED FOR DELINEATION OF PIPELINE PATH THAT SHALL NOT IMPOSE DANGER TO CORALS OR OTHER MARINE SPECIES.
3. IF SUBMERGED, THE PIPELINE SHALL BE SECURELY ANCHORED TO THE BOTTOM TO PREVENT ITS MOVEMENT UNDER ALL REASONABLE EXPECTED WAVE CONDITIONS. ANCHORS MAY CONSIST OF MASS GRAVITY WEIGHTS (E.G., PRECAST CONCRETE COLLARS OR SADDLES, STEEL WEIGHTS), OR ANCHORS INSERTED OR DRILLED INTO THE BOTTOM (E.G., SCREW PILES OR TOGGLE ANCHORS, MOORING PINS DRILLED AND CEMENTED INTO THE BOTTOM). ALL PIPELINE MATERIALS AND ANCHORS SHALL BE COMPLETELY REMOVED AT THE COMPLETION OF THE WORK. ANCHORS CEMENTED INTO THE BOTTOM MAY BE CUT OFF FLUSH WITH THE BOTTOM SURFACE.
4. FLOATING PIPELINE MAY BE USED, OR PARTIALLY USED TO COMBINE WITH SUBMERGED PIPELINE, WHEN IT IS NOT FEASIBLE TO ANCHOR THE PIPELINE TO SEAFLOOR DUE TO ENVIRONMENTAL CONSTRAINS.
5. THE PIPELINE LOCATIONS SHALL BE MARKED WITH BUOYS AND LIGHTED FOR TRAFFIC.
6. A BERM-ENCLOSED SAND DEWATERING BASIN SHALL BE CONSTRUCTED ON THE SHORELINE TO CONTAIN THE DREDGED SAND AND WATER SLURRY. WATER OUTFLOW FROM THE BASIN SHALL BE CONTROLLED BY AN ADJUSTABLE WEIR OR EQUIVALENT DEVICE TO REGULATE THE OUTFLOW AND MAXIMIZE WATER RETENTION TIME IN THE BASIN AND PREVENT SAND SLURRY OVERTOPPING OF THE BERM CREST.
7. THE DEWATERING BASIN SHALL BE COMPLETELY ENCLOSED BY A FULL DEPTH TURBIDITY CONTAINMENT DEVICE BELOW THE WATER LINE AND BY A SILT FENCE ABOVE THE WATER LINE.
8. ALTERNATIVELY, SAND MAY BE DIRECTLY PUMPED TO EACH CELL OF THE BEACH THAT IS BOUNDED BY PROPOSED BEACH STABILIZATION STRUCTURES. DEWATERING MECHANISM AND TURBIDITY CONTAINMENT DEVICE SHALL BE APPROPRIATELY DESIGNED TO MINIMIZE IMPACTS TO THE NEARSHORE WATER ENVIRONMENT.

OPTION 2 – MECHANICAL DREDGING:

1. DREDGED SAND WILL BE TRANSPORTED TO SHORELINE THROUGH A BARGE AND THEN TO PROJECT SITE THROUGH TRUCK.
2. A HYDROGRAPHIC SURVEY SHALL BE CONDUCTED AND OR EXISTING HYDROGRAPHIC DATA SHALL BE REVIEWED TO DETERMINE FEASIBLE BARGE ROUTE AND LANDING LOCATION.
3. SAND STAGING AREA SHALL BE ENCLOSED ENTIRELY WITH BMPS.
4. SPECIFIC BARGE ROUTE, LANDING LOCATION, STAGING AREA, AND SAND PLACEMENT TECHNIQUES ARE YET TO BE DETERMINED. MEANS AND METHODS SHALL BE CONSIDERED TO MINIMIZE CONSTRUCTION FOOTPRINT AND ENVIRONMENTAL IMPACT.



SAND RECOVERY PLAN
SCALE: 1" = 200'-0"

GRAPHIC SCALE:
200' 100' 0 200' 400'
SCALE: 1" = 200'

PERMIT DRAWINGS

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NO.	DESCRIPTION	DATE	MADE BY	APPROVED

PAHONU BEACH COMMUNITY RESTORATION FOUNDATION, INC.

41-473 KALANIANAOLE HWY
WAIMANALO, HAWAII 96795

PAHONU BEACH RESTORATION

ISLAND OF O'AHU
TMK: 4-1-001:012
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TMK: 4-1-001:007
TMK: 4-1-001:008
TMK: 4-1-001:009
TMK: 4-1-001:002
TMK: 4-1-001:003
TMK: 4-1-001:004

SAND RECOVERY PLAN

APPROVED BY:

DATE

DESIGNED BY: MF
DRAWN BY: AP
CHECKED BY:
SURVEYED BY:

DRAWING NO. C-7

DATE: MAR. 2023

SHEET NO. 10 OF 10

PAHONU BEACH RESTORATION

DRAWING NAME: \\WAS-SERVER.OCEANIT.LOCAL\SERVICES\202135-PAHONU_BEACH_RESTORATION\0_GRAPHICS\DRAWINGS\CONTRACT DOCUMENTS\PERMIT DRAWINGS\PAHONU SMALL SCALE BEACH RESTORATION PLANS_NEW SECTIONS_REV3.DWG EDIT TIME: 03-09-23, 9:29 AM EDITED BY: APARK

Attachment D
Grain Size Analysis Results

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innovation through engineering & scientific excellence

M E M O R A N D U M

DATE:	June 23, 2022
TO:	Pāhonu Beach Community Restoration Foundation, Inc.
LOCATION:	41-457 through 41-479 Kalaniana'ole Highway Waimānalo, Hawai'i 96795
PROJECT:	Pāhonu Beach Restoration (Project No. 202135)
SUBJECT:	Sand Source Analysis

According to the "Instructions for General Application, Category II, SSBN," the State's standards for beach quality sand are, generally:

1. The proposed fill sand shall not contain more than 6% fines, defined as the #200 sieve (0.075mm).
2. The proposed fill sand shall not contain more than 10% coarse sediment, defined as the #4 sieve (4.75mm).
3. Compatibility of the existing and proposed fill beach sands shall be demonstrated by the grain size distribution of the fill sand and shall fall within 20% of the existing sand, as measured by a percent finer than or percent coarser than value.
4. No more than 50% of the fill sand shall have a grain diameter less than 0.125mm as measured by the #120 sieve.
5. Beach fill shall be dominantly composed of naturally occurring carbonate beach or dune sand. Crushed limestone or other manmade or non-carbonate sands are not allowable.

In addition, the new SSBR Program's "Water Quality Terms and Conditions" includes the two (2) following standards:

a. The proposed fill sand shall not contain greater than 2% by weight, silt, clay, or colloids passing the #230 sieve (4.0ϕ).
b. Coarse gravel, cobbles or material retained on the 3/4 inch sieve (-4.25ϕ) in a percentage or size greater than that found on the native or existing beach.

Several potential offshore borrow areas exist in the vicinity of the site. Sand studies included sand sampling of Pāhonu Beach and three (3) identified offshore sand sources (Locations 2, 3 and 5) (Figure 1). The three (3) offshore locations are summarized in Table 1.

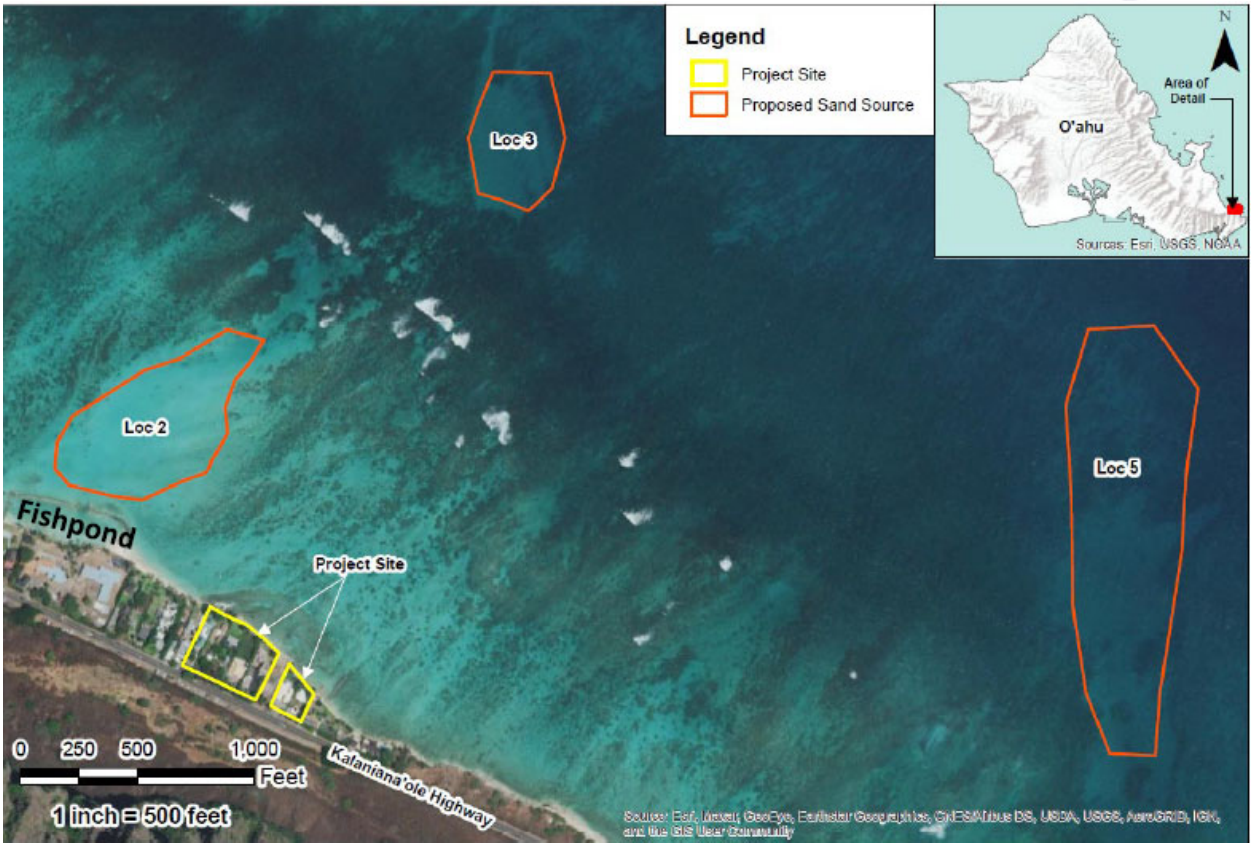


Figure 1. Offshore sand source locations explored, with Locations 3 and 5 preferred

Table 1. Summary of offshore Locations 2, 3, and 5

Location	Approximate Water Depth	Miles Offshore
2	5 ft	0.03 – 0.2
3	20 ft	0.4 – 0.5
5	25 ft	0.3 – 0.65

Four (4) total composite sand samples were collected from 1) Pāhonu Beach (representative of "native sand"), 2) Location 2, 3) Location 3, and 4) Location 5 (Figure 2). The samples were analyzed for standard grain size and calcium carbonate composition to ensure compliance with DLNR standards for beach quality sand. All sand sources are generally topographic relief and live corals. Location 2, just outside of Pāhonu Pond, is littered with some turf algae and small coral and rock pieces. The presence of these elements within the patch makes Location 2 less ideal as a sand source. Location 3, located farther offshore of Location 2, appears to be the most ideal sand source, as no rocks or coral were present, and the sand appears to have very few fines and is homogenous. Location 5 is the farthest offshore and looks better as a sand source as Location 2, but some large, scattered rock and the presence of an underwater cable would need to be avoided during sourcing activities. Based on surveys of the potential borrow sand areas and results from laboratory testing, Locations 3 and 5 are the preferred borrow sand sources.

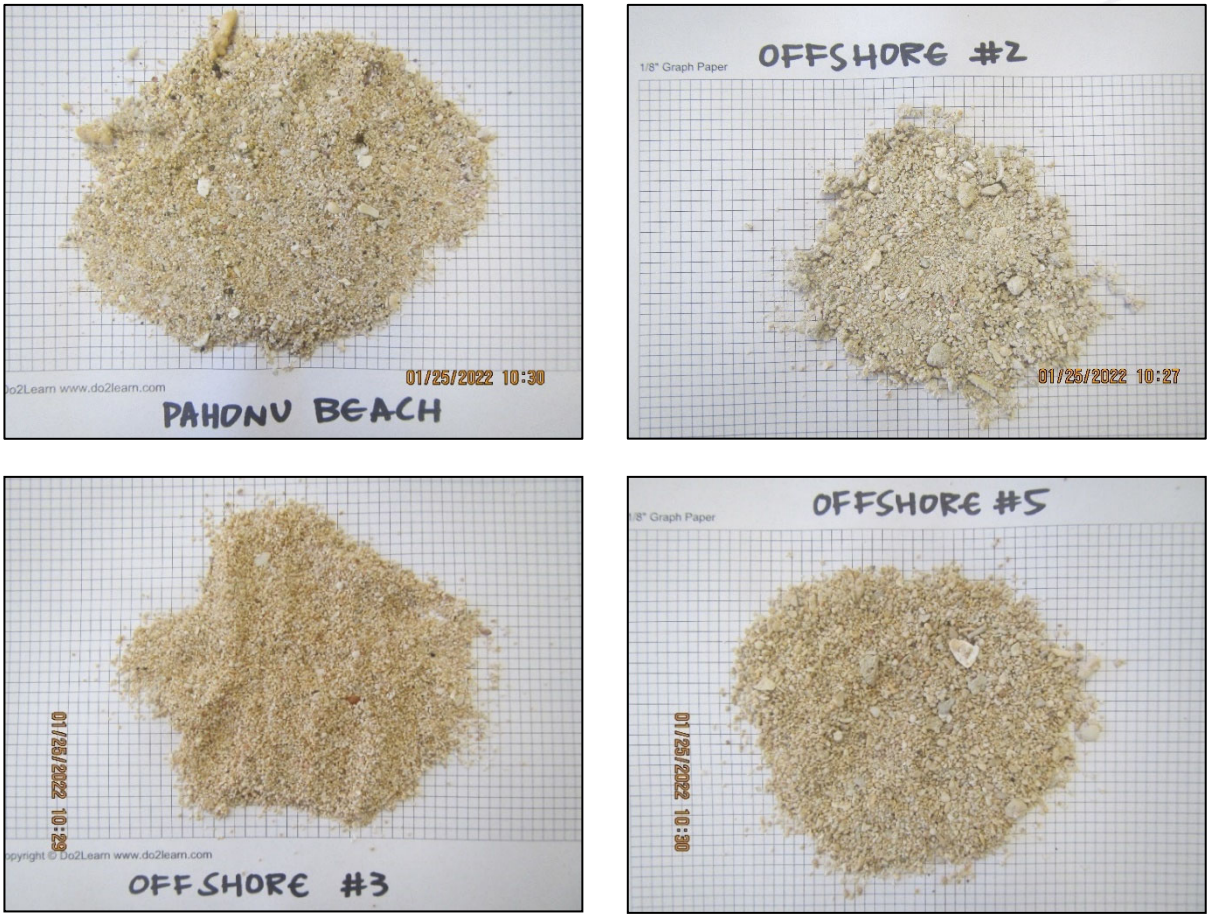


Figure 2. Photographs of the grab sand samples collected at the Pāhonu Beach (top, left), Location 2 (top, right), Location 3 (bottom, left) and Location 5 (bottom, right)

According to laboratory test results prepared by AECOS, Inc., the material at Locations 3 and 5 generally meets the criteria for beach quality sand. The proposed sand at both Locations 3 and 5 is predominantly (98%) calcium carbonate, while the Pāhonu Beach sand is 92% carbonate. The grain size distribution meets the criteria since both Locations 3 and 5 contain no more than 6% fines passing the #200 sieve (0.075mm), no more than 2% fines passing the #230 (0.063mm) sieve, no more than 10% coarse sediment, and no more than 50% of the sand has a diameter less than 0.125 (Table 2). When compared to the existing Pāhonu Beach sand, the proposed sand at both Locations 3 and 5 contain a smaller fraction of fines. Location 3 sand falls out of the 20% coarser than value at sieve size 1.00mm, while Locations 3 and 5 fall out of the 20% coarser than value at sieve size 0.50mm. Laboratory analysis data sheets for the proposed and existing sands are attached.

The proposed sand fill is predominantly calcium carbonate, so it matches the composition of the existing beach. Even though the sand contains a larger portion of coarse material, it still falls within the acceptable range. Sand fill with a slightly smaller fraction of fines compared to existing native sand is preferable, since it won't be as prone to washout and won't contribute to an

increase in turbidity in nearshore waters. Sand shall be screened prior to placement on the beach to remove larger gravel, cobbles or organic material retained on the ¾" sieve.

Table 2. Summary of the laboratory results of sand grain size distributions

Percent of Material Finer by Weight (%) than:

	4.75 mm	4.00 mm	2.00 mm	1.00 mm	0.500 mm	0.355 mm	0.250 mm	0.125 mm	0.075 mm	0.063 mm
Offshore #2 Sand (For Reference Only)	93.70	90.06	75.42	50.96	26.18	24.85	19.55	3.75	1.65	1.54
Prop. Offshore #3 Sand	99.92	99.92	99.75	94.55	1.87	1.02	0.98	0.95	0.95	0.95
Prop. Offshore #5 Sand	95.30	94.51	88.22	50.94	5.03	2.81	1.77	0.87	0.80	0.80
Exst. Pāhonu Beach Sand	96.10	95.64	91.58	83.46	34.84	13.18	4.25	0.85	0.80	0.80

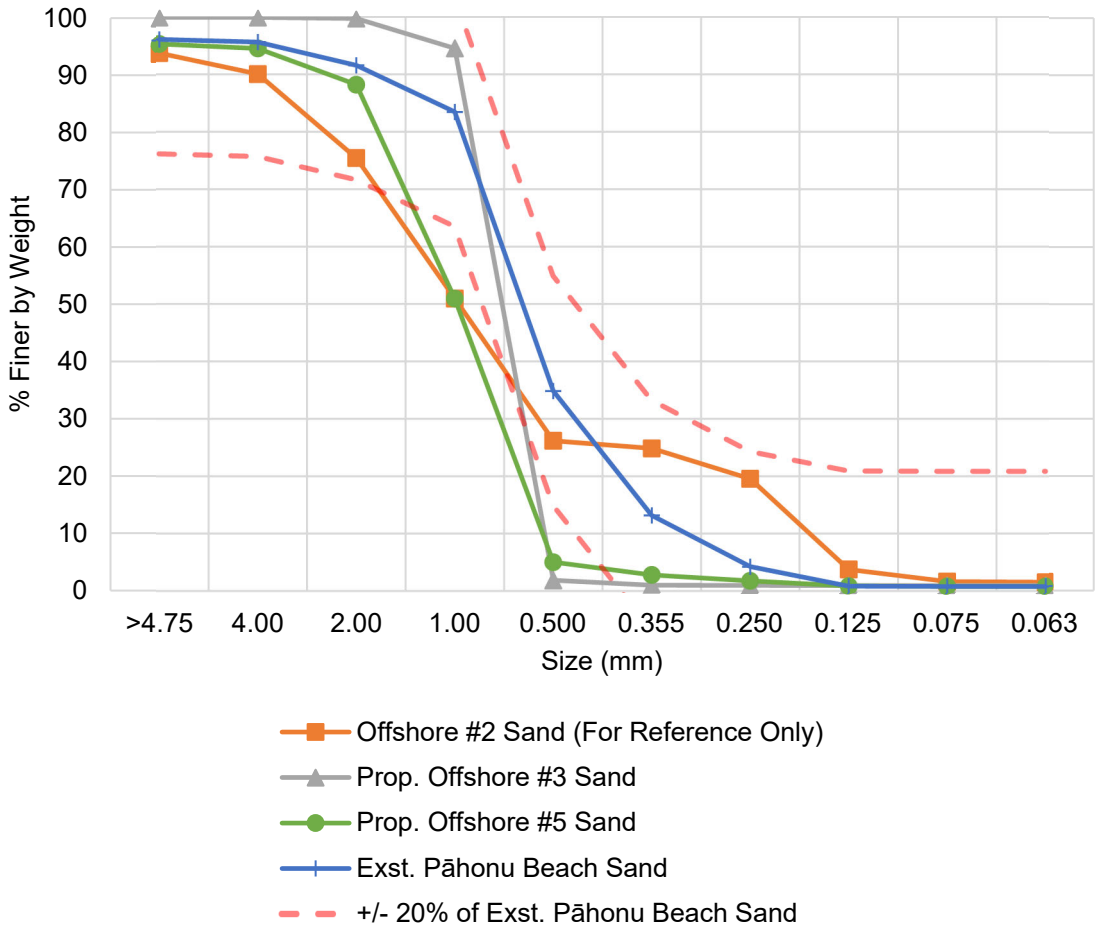


Figure 3. Chart showing a comparison of Locations 2, 3 and 5 sand and native sand samples' grain size distributions

For additional informaiton, or should you have any questions or comments, please contact Dr. Mike Foley, P.E. by telephone at (808) 531-3017 or by email at mfoley@oceanit.com.

AECOS, Inc.
45-939 Kamehameha Highway, Suite 104

CLIENT: Oceanit
828 Fort Street Mall, Ste 600
Honolulu HI 96813
ATTN: Taylor Chock tchock@oceanit.com

AECOS Job No.:	**631**
REPORT DATE:	2/7/2022

GRAIN SIZE ANALYSIS RESULTS

Date Sampled: 1/21/2022 Analyzed by: rk, dc AECOS Log No.: **44599**
Date Received: 1/24/2022 Sample Type: sediment

Fraction dry weight (g)

size (mm) / phi	>4.75	4.75 - 4.00 -2	4.00 - 2.00 -1	2.00 - 1.00 0	1.00 - 0.500 1	0.500 - 0.355	0.355 - 0.250	0.250 - 0.125	0.125 - 0.075	0.075 - 0.063	<0.063 pan	TOTAL
Offshore #2	8.30	4.80	19.30	32.26	32.67	1.75	6.98	20.83	2.77	0.15	2.03	131.84
Offshore #3	0.12	0.00	0.27	8.26	147.07	1.35	0.07	0.05	0.00	0.00	1.50	158.69
Offshore #5	6.44	1.08	8.63	51.11	62.94	3.05	1.42	1.24	0.09	0.00	1.10	137.10
Pahonu Beach	5.86	0.69	6.10	12.20	73.07	32.55	13.42	5.11	0.07	0.00	1.20	150.27

Fraction Percent (%) - calculated

size (mm) / phi	>4.75	4.75 - 4.00 -2	4.00 - 2.00 -1	2.00 - 1.00 0	1.00 - 0.500 1	0.500 - 0.355	0.355 - 0.250	0.250 - 0.125	0.125 - 0.075	0.075 - 0.063	<0.063 pan	TOTAL
Offshore #2	6.30	3.64	14.64	24.47	24.78	1.33	5.29	15.80	2.10	0.11	1.54	100.0
Offshore #3	0.08	0.00	0.17	5.21	92.68	0.85	0.04	0.03	0.00	0.00	0.95	100.0
Offshore #5	4.70	0.79	6.29	37.28	45.91	2.22	1.04	0.90	0.07	0.00	0.80	100.0
Pahonu Beach	3.90	0.46	4.06	8.12	48.63	21.66	8.93	3.40	0.05	0.00	0.80	100.0

Percent Finer by Weight (%)

size (mm)	>4.75	4.00	2.00	1.00	0.500	0.355	0.250	0.125	0.075	0.063
Offshore #2	93.70	90.06	75.42	50.96	26.18	24.85	19.55	3.75	1.65	1.54
Offshore #3	99.92	99.92	99.75	94.55	1.87	1.02	0.98	0.95	0.95	0.95
Offshore #5	95.30	94.51	88.22	50.94	5.03	2.81	1.77	0.87	0.80	0.80
Pahonu Beach	96.10	95.64	91.58	83.46	34.84	13.18	4.25	0.85	0.80	0.80

Grain size analyzed by Method 47.4; Carter 1993. Soil sampling and Methods of Analysis. CSSC Press. 823pp. and ASTM D1140-17, D2217-85 (1998)

Calcium Carbonate (%)	
Offshore #2	**94%**
Offshore #3	**98%**
Offshore #5	**98%**
Pahonu Beach	**92%**

CaCO3 analyzed by method described in Carver, 1971. Procedures in sedimentary petrology. Wiley Interscience. 653 pp.

A. Mello
For AECOS, Inc.

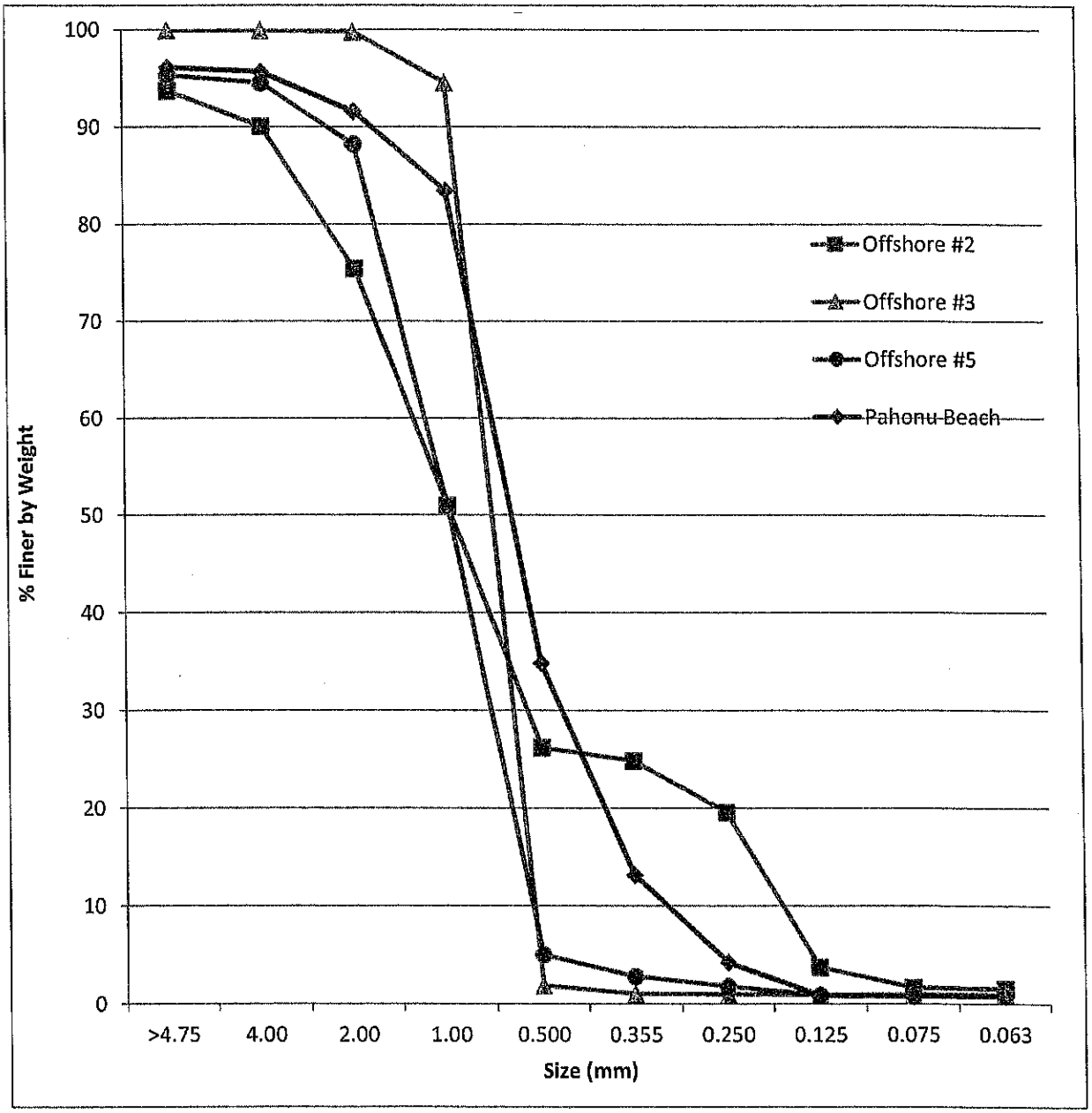
AECOS, Inc.
45-939 Kamehameha Highway, Suite 104

CLIENT: Oceanit
828 Fort Street Mall, Ste 600
Honolulu HI 96813
ATTN: Taylor Chock tchock@oceanit.com

AECOS Job No.:	**631**
REPORT DATE:	2/7/2022

GRAIN SIZE ANALYSIS RESULTS

Date Sampled: 1/21/2022
Date Received: 1/24/2022
Analyzed by: rk, dc
Sample Type: sediment
AECOS Log No.: **44599**



Attachment E
Field Report

DRAFT

FIELD REPORT

January 21, 2022

Pāhonu Beach Restoration
Waimānalo, Oʻahu, Hawaiʻi

Prepared for:

Pāhonu Beach Community Restoration Foundation, Inc.
41-473 Kalanianaʻole Highway
Waimānalo, HI 96795

Prepared by:

Oceanit Laboratories, Inc.
828 Fort Street Mall, Suite 600
Honolulu, HI 96813

February 2022

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APPENDICIES

Appendix A: AECOS Sand Analysis Laboratory Report

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1. INTRODUCTION

This report describes field activities that were conducted by Oceanit Laboratories, Inc. (Oceanit) on January 21, 2022, to provide supplemental information for the Pāhonu Beach Restoration Project in support of a small-scale beach nourishment (SSBN) application to the State of Hawai'i Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL). The proposed project is to use an offshore sand source to restore and nourish the Pāhonu Beach area fronting eight residential properties (Figure 1-1), located east of the Pāhonu Fishpond. The Pāhonu Beach project area is located in Waimānalo, on the southeast coast of O'ahu.

1.1 Objectives

The objectives of the field activities were to assess and collect sand samples from offshore sand source locations and Pāhonu Beach and provide an initial marine benthic assessment of the nearshore area. The project is designed to restore the beach to its former width and provide natural erosion protection.

Figure 1-1: Site Location Map

1.2 Field Conditions

Field conditions from January 21, 2022, the day of the site visit, are described below. The weather was sunny and clear (Figure 1-2), with winds 10 miles per hour (mph) ENE/NE throughout the day. There was excellent water visibility for snorkeling and underwater assessment. The NOAA tide chart for Station No. 1612376, Waimānalo, HI is shown in Figure 1-3. Tides ranged between 0.5 feet (ft) – 1 ft throughout the site visit. Sunrise on January 21, 2022 occurred at 7:10 am and sunset at 6:13 pm.

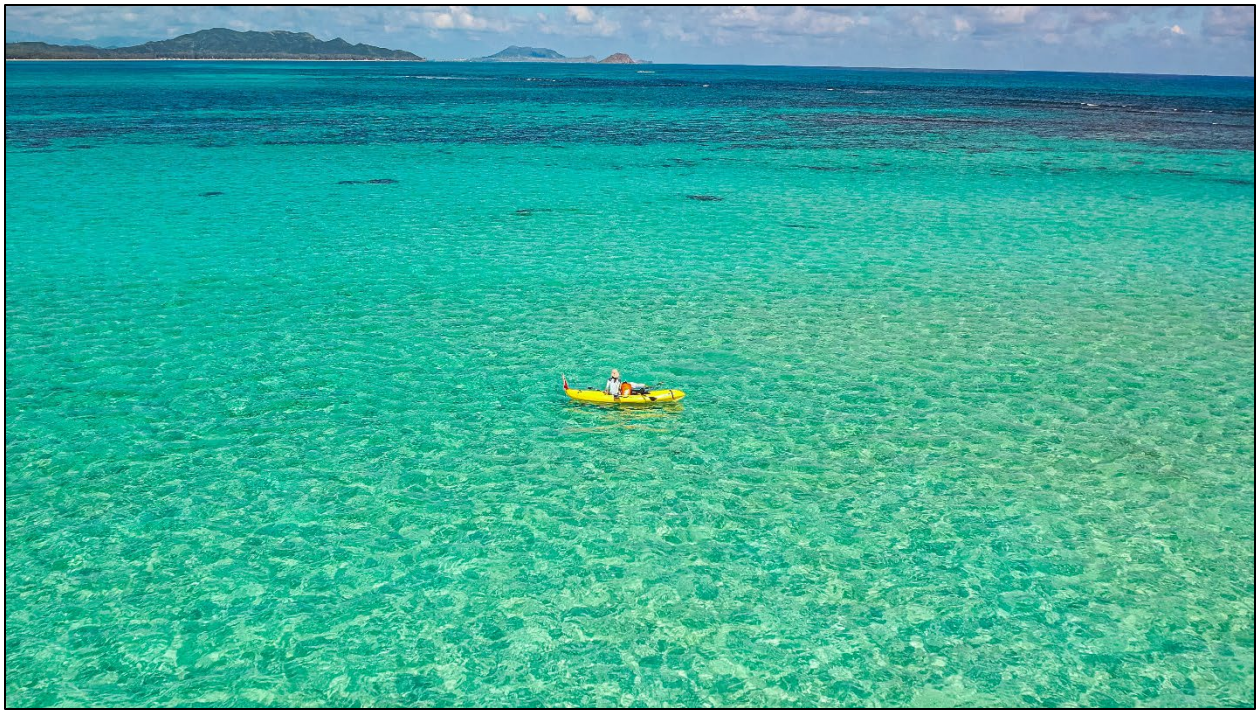
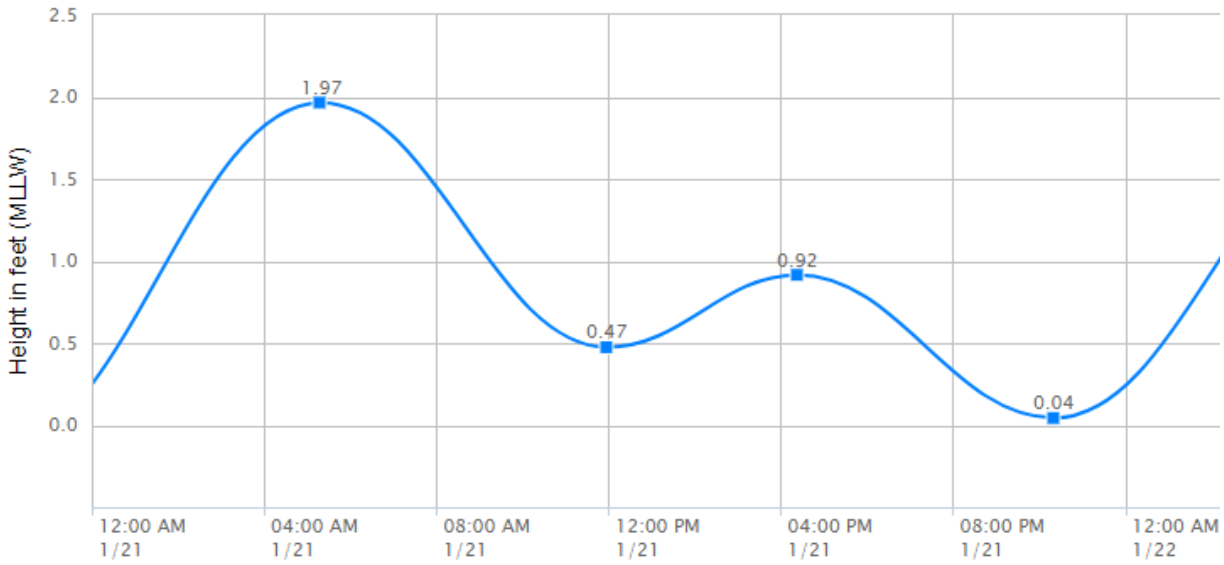


Figure 1-2: Drone Photograph of Field Conditions on January 21, 2022



Source: NOAA Tides and Currents

Figure 1-3: NOAA Tide Chart for 1/21/22 - 1/22/22

2. FIELD TASKS

The field tasks performed to support the SSBN application included investigation of offshore sand source locations and Pāhonu Beach and initial characterization of marine bottom and initial marine benthic fauna in the nearshore area.

2.1 Sand Studies

Sand studies included sand sampling of Pāhonu Beach and three identified offshore sand sources. Composite sand samples were collected and analyzed for standard grain size and calcium carbonate composition to ensure compliance with DLNR standards for beach quality sand. Marine bottom type of the nearshore area and three offshore sand sources was explored, as well as a preliminary marine benthos investigation of the nearshore area, mainly to see if live corals exist in the nearshore area.

2.1.1 Composite Sand Sampling

A composite sand sample of Pāhonu Beach was collected using transects fronting each project property (Figure 2-1). The composite sand sample was collected as follows:

1. Starting at one transect, take three subsamples (i.e., scoops of sand) along the beach profile from a) beach berm (above high water line, but if high water line hits at escarpment, then take sample at base of escarpment); b) middle of the beach; and c) beach toe (at water line). Each scoop should be about 4 ounces (oz) (i.e., ½ cup).
2. Minimize the amount of water collected; pour out as much water as possible.
3. Collected samples should not contain soil/dirt or surface stones. Try to collect representative samples of natural beach sand.
4. Repeat directions #1-3 above at the other eight transects identified (one per TMK property). Results in a total of 27 subsamples taken across nine transects. By the end of sampling, the gallon Ziploc bag should be half full.

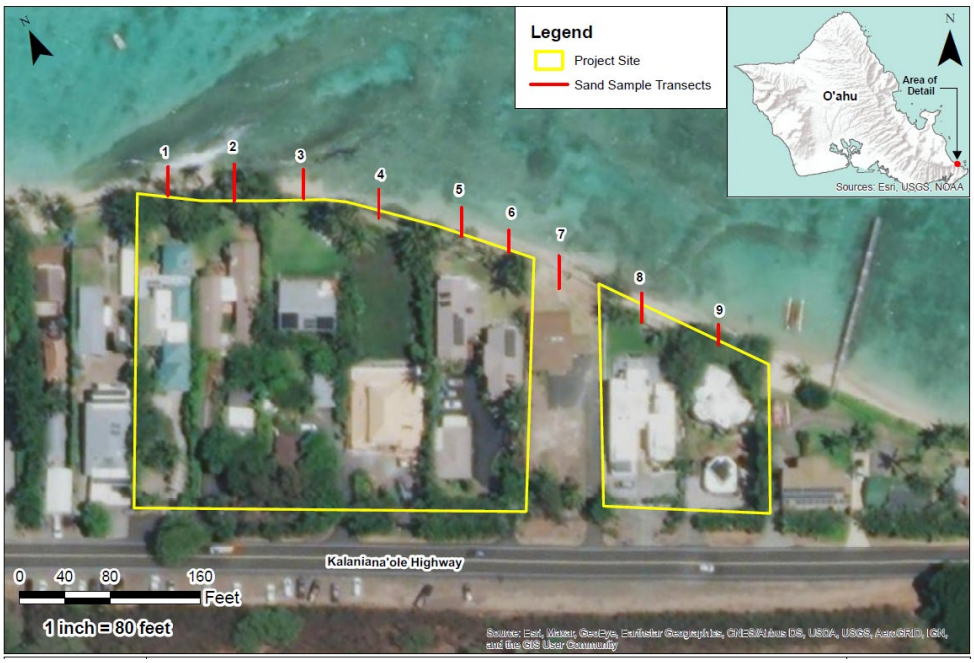


Figure 2-1: Sand Transects Collected from Pāhonu Beach

Three offshore sand patches from Pāhonu Beach were identified from aerial imagery. Oceanit personnel explored each sand patch by taking photographs and collecting underwater composite (at least three grab samples for each location) sand samples. The three offshore locations are summarized below and shown in Figure 2-2:

- Location 2 **(~5 ft water depth) (0.03 – 0.2 miles offshore)**
- Location 3 **(~20 ft water depth) (0.4 – 0.5 miles offshore)**
- Location 5 **(~25 ft water depth) (0.3 – 0.65 miles offshore)**

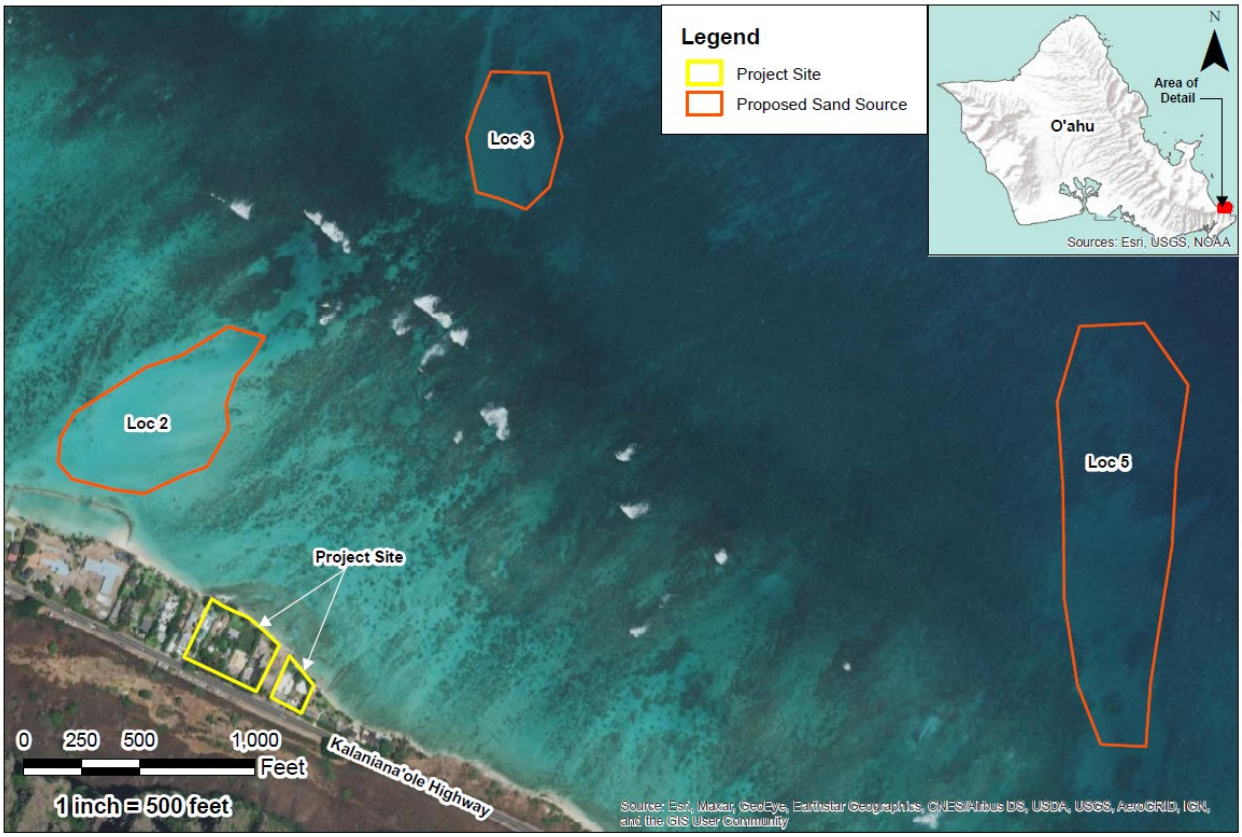


Figure 2-2: Offshore Sand Source Locations Explored

2.2 Results

2.2.1 Sand Grain Size and Calcium Carbonate Analyses

Sand grain size was analyzed to comply with DLNR OCCL SSBN standards for beach quality sand, summarized as:

i. Grain size distribution of at least one typical sample of the beach fill and existing sand shall be analyzed by a standard laboratory wet sieve technique (ASTM standard D-1140-92).

ii. The proposed fill sand shall not contain more than six (6) percent fines, defined as the #200 sieve (0.075 mm).

iii. The proposed beach fill sand shall not contain more than ten (10) percent coarse sediment, defined as the #4 sieve (4.75 mm).

iv. No more than 50 (fifty) percent of the fill sand shall have a grain diameter less than 0.125 mm as measured by #120 Standard Sieve Mesh.

v. Beach fill shall be dominantly composed of naturally occurring carbonate beach or dune sand.

Four total sand samples were collected from 1) Pāhonu beach (representative of "native sand"); 2) Offshore Site #2, 3) Offshore Site #3, and 4) Offshore Site #5. All offshore samples may be suitable for beach nourishment. Laboratory results are summarized in Table 2-1 below and reproduced in full in Appendix A.

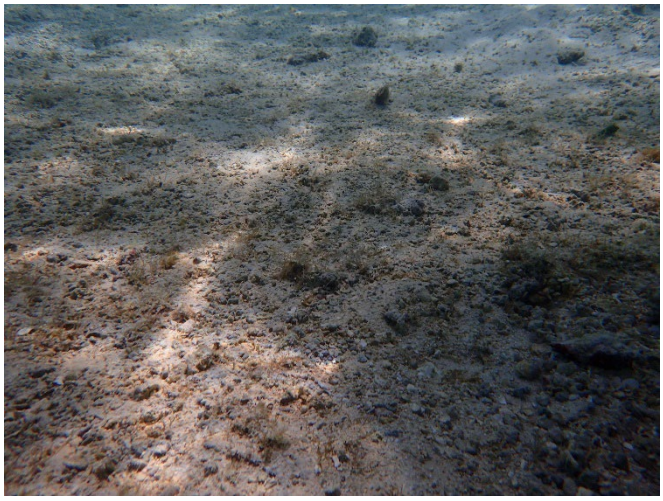
Table 2-1: Percent Sand Grain Size Parameters Of Sand Samples Collected

Sample	< 6% fines (%)	< 10% coarse sediment (%)	< 50% < 0.125mm (%)	$CaCO_3$ (%)	Beach Quality Sand?
Pāhonu Beach	0.80	3.90	0.85	92	*(native)*
Offshore #2	1.65	6.30	3.75	94	*Yes*
Offshore #3	0.95	0.08	0.95	98	*Yes*
Offshore #5	0.80	4.70	0.87	98	*Yes*

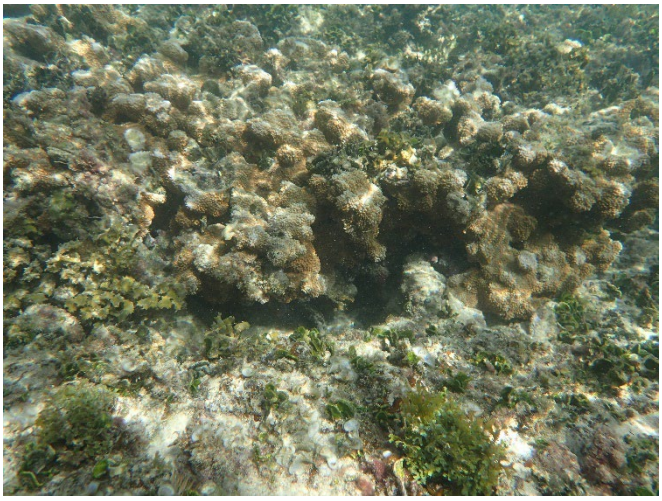
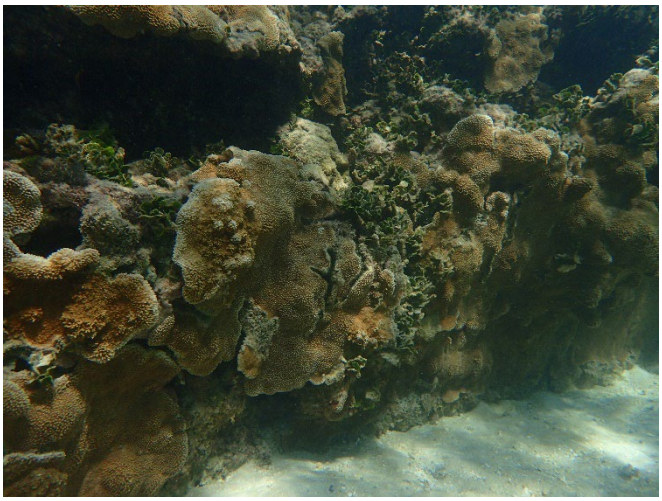
2.3 Photographs of Bottom Types of Project Area

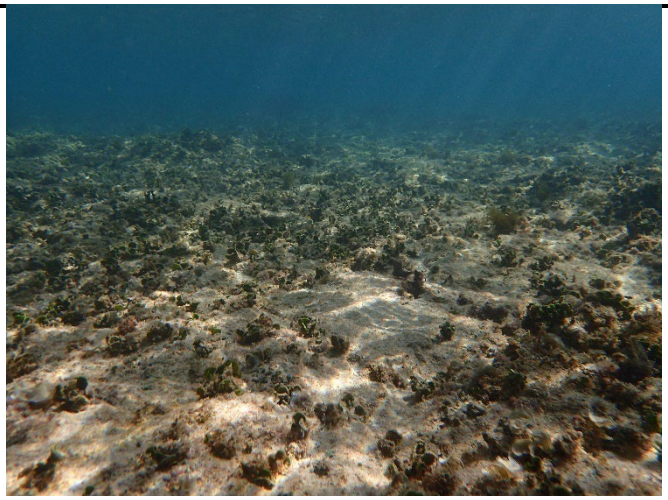
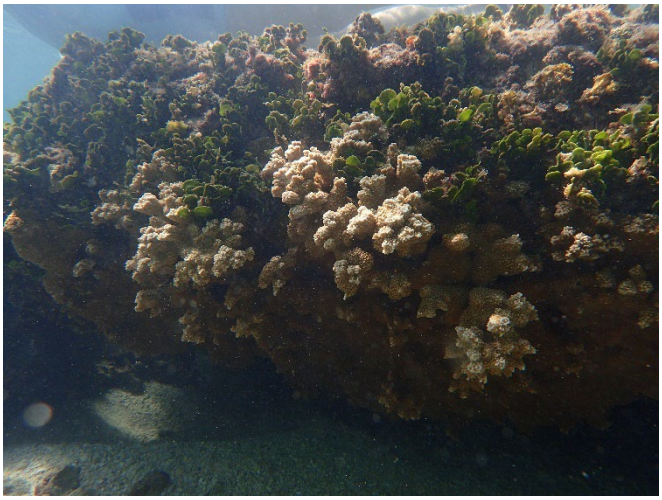
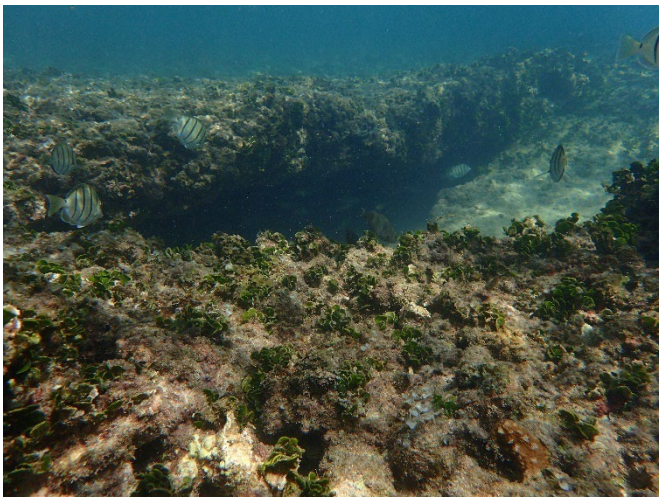
Three offshore sand patches (#2, #3, and #5) were briefly surveyed and sand samples were collected. All sand sources are generally topographic relief and live corals. Offshore Sand Source #2 is located just outside of Pāhonu Fishpond (Figure 2-2). The sand source at Location #2 was littered with some turf algae and small coral and rock pieces (Photographs 1 and 2). The presence of these elements within the patch makes Location #2 less ideal as a sand source. Offshore Sand Source #3, located farther offshore of Location #2, appears to be the most ideal sand source, as no rocks or coral were present, and the sand appears to have very few fines and is homogenous (Photographs 3 and 4). The sand patch at Offshore Sand Source #5 is the farthest offshore and looks better as a sand source as Location #2, but some large, scattered rock and the presence of an underwater cable (Photographs 5 and 6) would need to be avoided during dredging and therefore Location #3 looks to be better than Location #5.

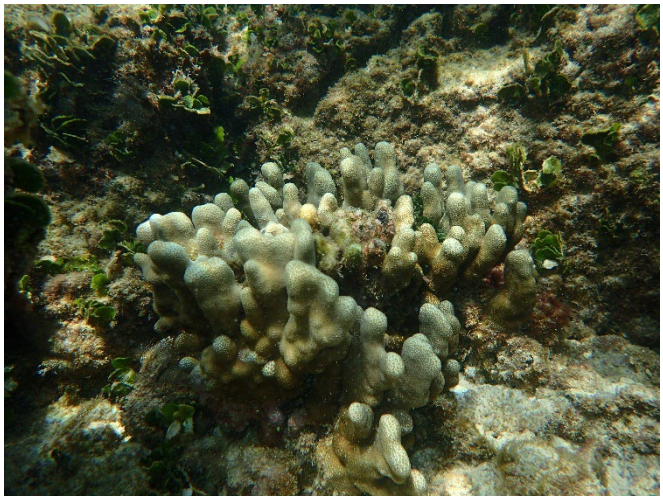
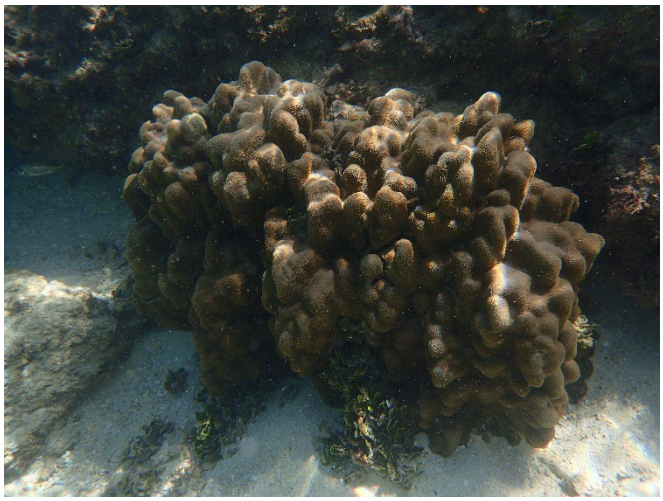
Oceanit personnel inspected the nearshore area of the project site and found abundant and ecologically rich coral and algae in the nearshore area. There were several large (greater than 4 ft in diameter) live *Porites* coral heads less than 20 ft offshore. Large live coral heads of *Montipora patula, Leptastrea purpureea, Pocillopora meandrina, Pocillopora damicornis, Porites compressa, Porites evermanni, Sarcothelia edmondsoni* were seen in the nearshore area (see photos). In addition, algae were abundant including large covers of *Halimeda discoidea, Dictyota spp., Padina spp., Dictospaeria versluysii.* Fish observed included *Thalassoma duperrey, Acanthurus triostegus, Rhinecanthus rectangulus,* and other reef species. Although there was not a lot of topographic relief, the majority of fish observed was where the reef shelf met the sand.

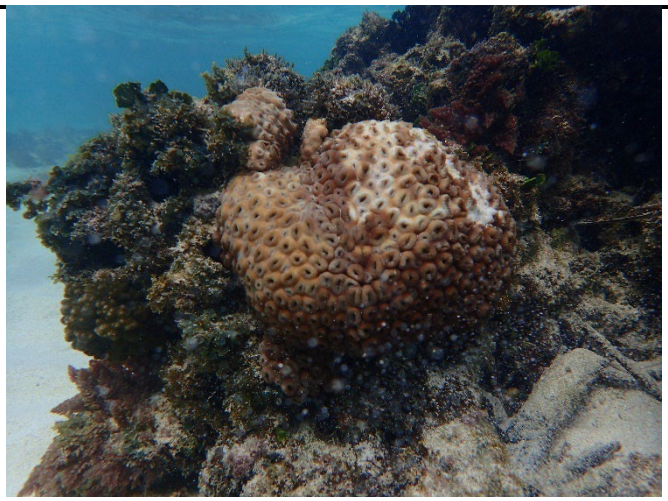
No.	Photograph	Description
1		Photograph of Offshore Sand Source #2.
2		Close-up photograph of bottom of Offshore Sand Source #2. The site is mixed with turf algae and small coral and rock pieces, making the site less suitable as a sand source.
3		Photograph of Offshore Sand Source #3.

No.	Photograph	Description
4		Photograph of Offshore Sand Source #3. Most promising sand source, no rocks or coral were observed, and sand is homogenous and well-mixed.
5		Photograph of Offshore Sand Source #5. Few large coral heads were observed in the area.
6		Photograph of Offshore Sand Source #5. Some scattered large rock and coral pieces are present, making this site less suitable as a sand source. An underwater cable runs through the site.

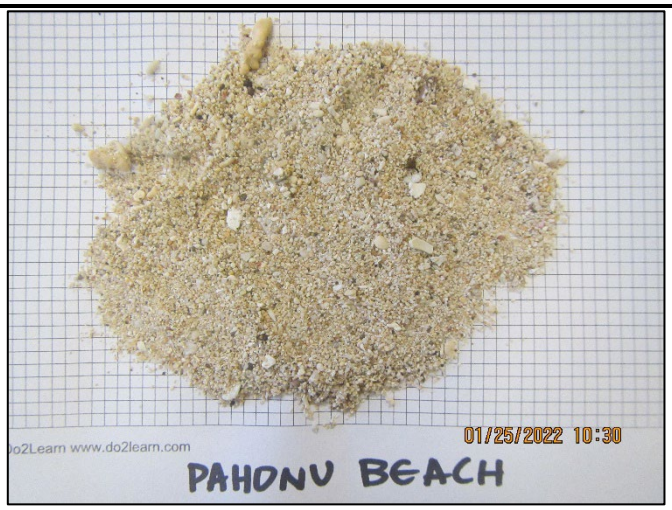
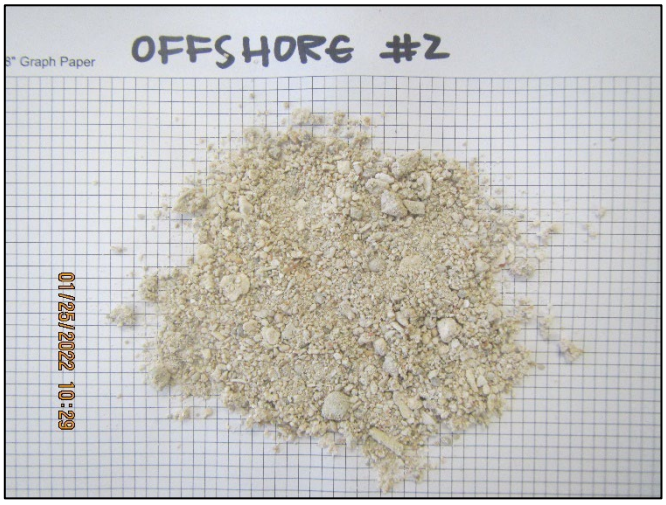
No.	Photograph	Description
7		Photograph of west side of the nearshore project area. Large *Montipora spp.* coral heads amidst mostly sand. *Halimeda discoidea* is abundant in the nearshore area.
8		Live *Montipora capitata* reef with abundant algal species cover including *Halimeda discoida, Turbinaria ornata, Padina spp., Dictyota spp.*
9		Live coral (including the endemic *Montipora patula)* and *Halimeda discoidea* are abundant in shallow water in the nearshore area where the reef shelf meets sand.

No.	Photograph	Description
10		*Halimeda discoidea* appears to be the dominant algal cover in the shallow reef flat area.
11		Large *Monitpora capitata* coral head with *Halimeda discoida* algae in the middle of the nearshore project area.
12		Several fish (*Acanthurus triostegus*), or manini, were seen where the reef flat meets sand where crevices and topographic relief were present.

No.	Photograph	Description
13		Several buried tires and other debris were seen in the nearshore area.
14		*Porites compressa* in the nearshore area.
15		*Porites evermanni* in the nearshore area. *Halimeda discoidea* present on the bottom of the coral head.

No.	Photograph	Description
16		*Palythoa tuberculosa* "pillow zoanthid" in the nearshore area.
17		Some large *Porites evermanni* coral heads exist in the nearshore area.

2.4 Photographs of Composite Sand Samples

No.	Photograph	Description
1		Photograph of composite sand sample taken from Pāhonu Beach.
2		Photograph of composite sand sample taken from Offshore Sand Source #2. Sand has a range of grain sizes, including fines and large pieces of coral, and the color is slightly grey, making this sand source not ideal as beach sand.
3		Photograph of composite sand sample taken from Offshore Sand Source #3. The sand appears to be consistent in grain size with little fines. This sand source appears to be the best sand source of the three sand patches surveyed.

No.	Photograph	Description
4		Photograph of composite sand sample taken from Offshore Sand Source #5. Sand is mostly uniformly sized with some larger shell fragments and pieces. This is the second best sand patch identified out of the three sources explored.

2.4.1 NOAA Benthic Maps

The NOAA National Centers for Coastal Ocean Science (NCCOS) maps for benthic cover, benthic zone, and reef structure are summarized in Table 2-2 and shown in the figures below (Figures 2-3 through 2-5).

Table 2-2: Summary of Benthic Cover, Benthic Zone, and Reef Structure

Area	Benthic Cover	Benthic Zone	Reef Structure
Nearshore Project Area	Unknown	Reef Flat	Unknown
Offshore Sand Source #2	Unknown, Turf 50% - <90%	Reef Flat	Unknown, Scattered Coral/Rock
Offshore Sand Source #3	Uncolonized 90% - 100%	Fore Reef	Sand
Offshore Sand Source #5	Uncolonized 90% - 100%, Turf 50% - <90%	Fore Reef, Channel	Sand, Pavement

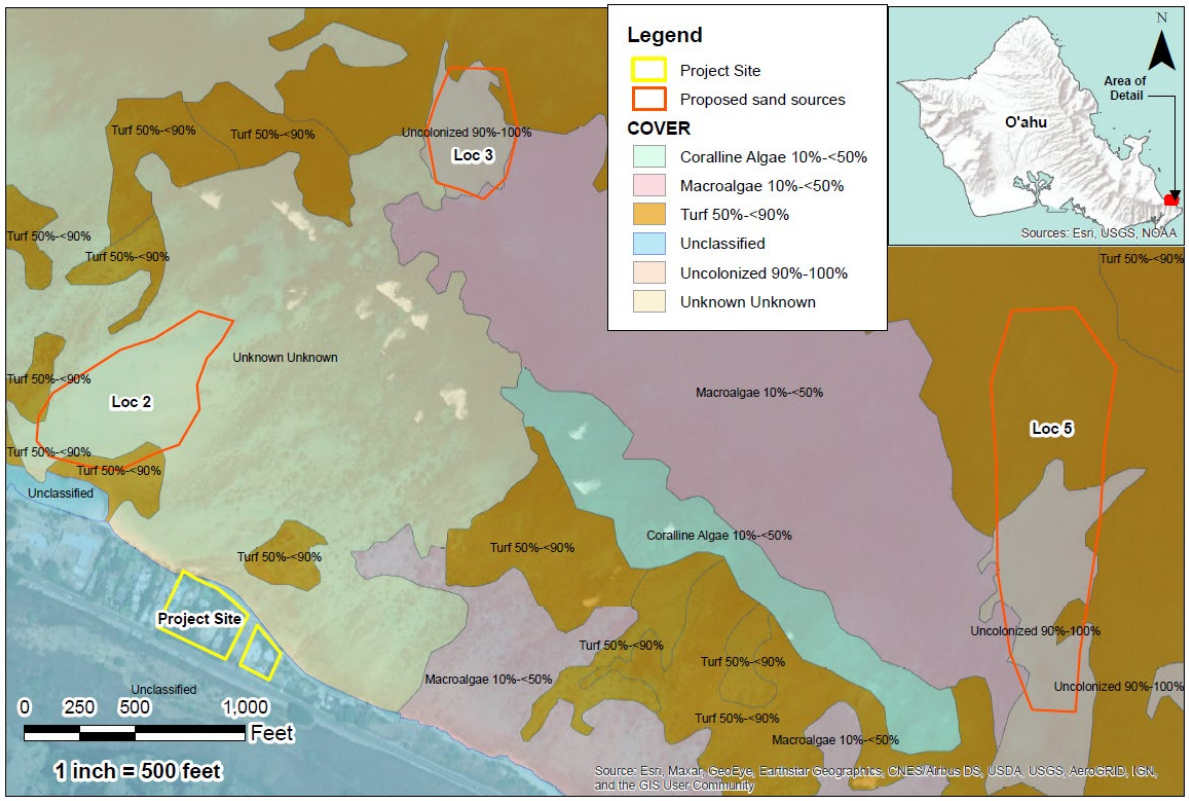


Figure 2-3: NOAA Benthic Cover

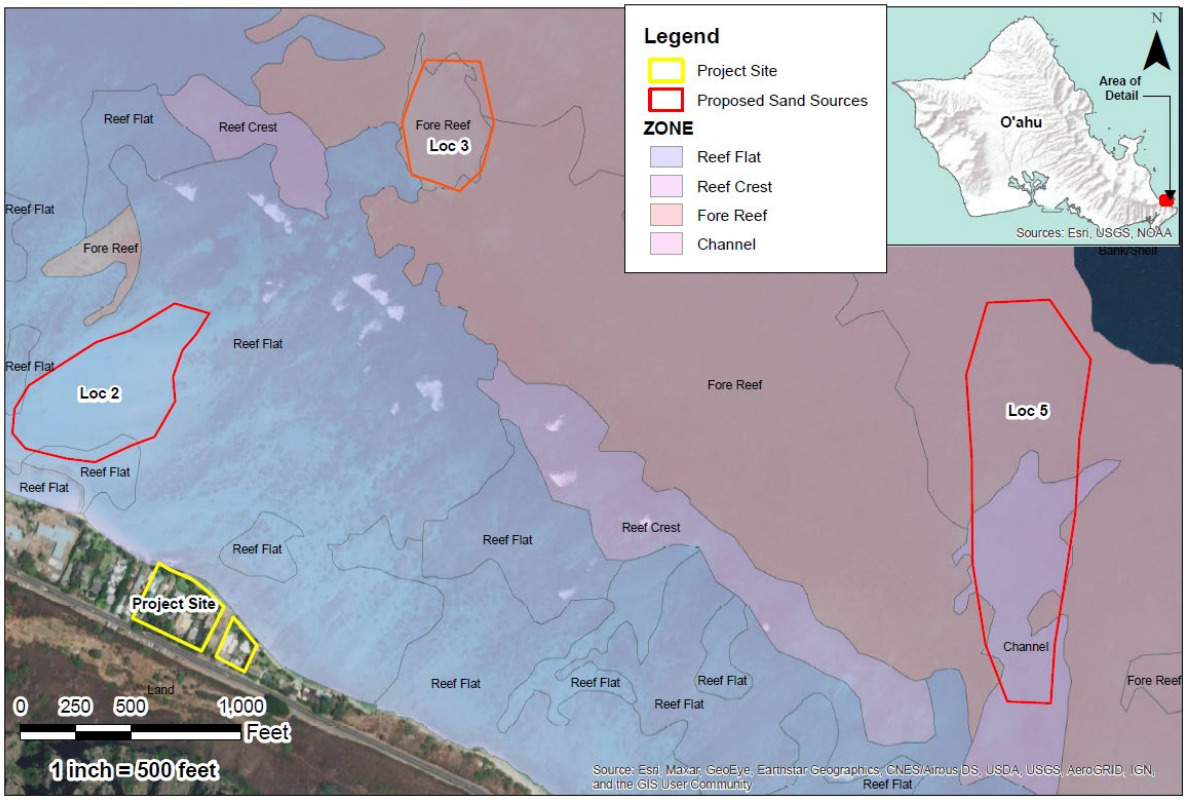


Figure 2-4: NOAA Benthic Zone

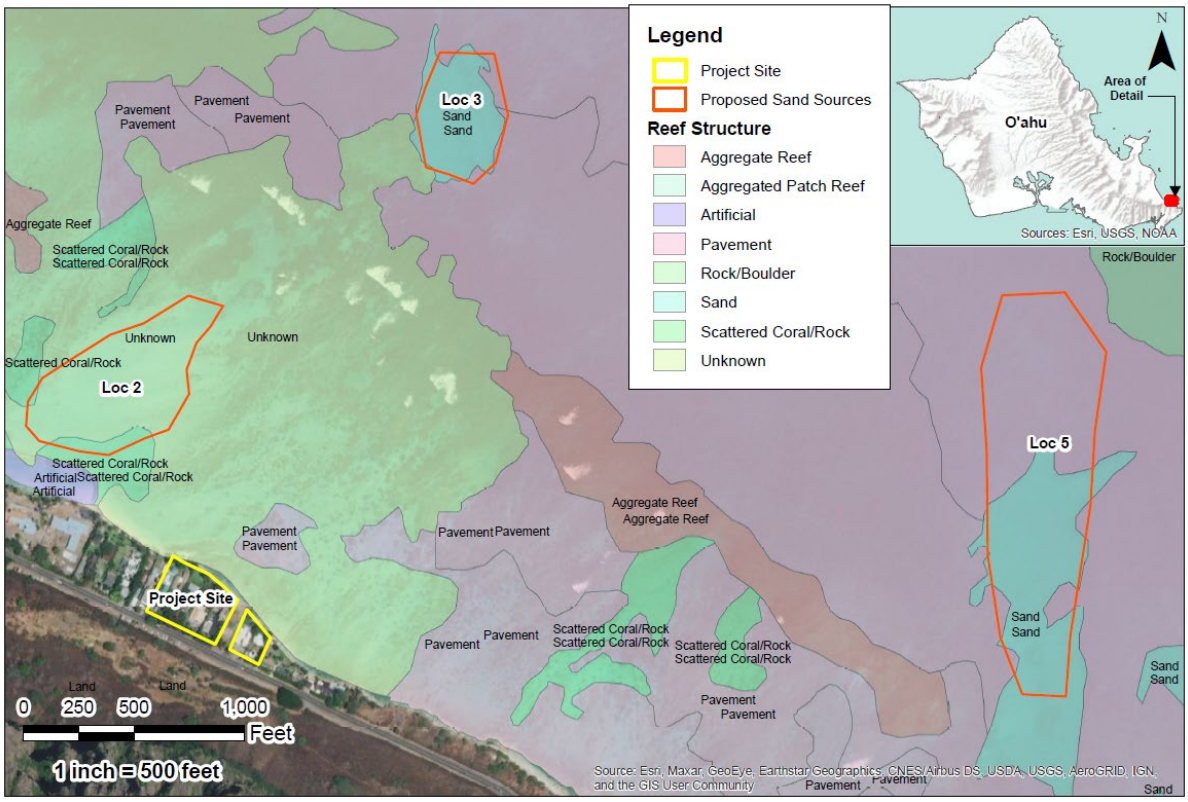


Figure 2-5: NOAA Reef Structure

3. CONCLUSIONS

The most ideal offshore sand patch, according to most uniform composition and the least rocks and obstructions at the site is Offshore Sand Source #3.

The nearshore area contains high diversity and abundance of corals and algae. These sensitive biological resources should be considered and carefully catalogued to ensure that a beach restoration concept should minimally disturb them. A beach restoration concept with limited disturbance to these sensitive biological resources may include several small stub groins and beach nourishment that does not cover live corals. Mitigation may include transplanting corals prior to construction.

4. REFERENCES

AECOS, 2022. Grain Size Analysis Results.

Battista et. al., 2007. Shallow-Water Benthic Habitats of the Main Eight Hawaiian Islands. NOAA Technical Memorandum NOS NCCOS 61, Biogeography Branch. Silver Spring, MD.

NOAA, 2007. Benthic Mapping of Main Hawaiian Islands. National Centers for Coastal Data Science.

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APPENDIX A
AECOS Sand Analysis Laboratory Report

AECOS, Inc.
45-939 Kamehameha Highway, Suite 104

CLIENT: Oceanit
828 Fort Street Mall, Ste 600
Honolulu HI 96813
ATTN: Taylor Chock tchock@oceanit.com

AECOS Job No.:	**631**
REPORT DATE:	2/7/2022

GRAIN SIZE ANALYSIS RESULTS

Date Sampled: 1/21/2022 Analyzed by: rk, dc AECOS Log No.: **44599**
Date Received: 1/24/2022 Sample Type: sediment

Fraction dry weight (g)

size (mm) / phi	>4.75	4.75 - 4.00 -2	4.00 - 2.00 -1	2.00 - 1.00 0	1.00 - 0.500 1	0.500 - 0.355	0.355 - 0.250	0.250 - 0.125	0.125 - 0.075	0.075 - 0.063	<0.063 pan	TOTAL
Offshore #2	8.30	4.80	19.30	32.26	32.67	1.75	6.98	20.83	2.77	0.15	2.03	131.84
Offshore #3	0.12	0.00	0.27	8.26	147.07	1.35	0.07	0.05	0.00	0.00	1.50	158.69
Offshore #5	6.44	1.08	8.63	51.11	62.94	3.05	1.42	1.24	0.09	0.00	1.10	137.10
Pahonu Beach	5.86	0.69	6.10	12.20	73.07	32.55	13.42	5.11	0.07	0.00	1.20	150.27

Fraction Percent (%) - calculated

size (mm) / phi	>4.75	4.75 - 4.00 -2	4.00 - 2.00 -1	2.00 - 1.00 0	1.00 - 0.500 1	0.500 - 0.355	0.355 - 0.250	0.250 - 0.125	0.125 - 0.075	0.075 - 0.063	<0.063 pan	TOTAL
Offshore #2	6.30	3.64	14.64	24.47	24.78	1.33	5.29	15.80	2.10	0.11	1.54	100.0
Offshore #3	0.08	0.00	0.17	5.21	92.68	0.85	0.04	0.03	0.00	0.00	0.95	100.0
Offshore #5	4.70	0.79	6.29	37.28	45.91	2.22	1.04	0.90	0.07	0.00	0.80	100.0
Pahonu Beach	3.90	0.46	4.06	8.12	48.63	21.66	8.93	3.40	0.05	0.00	0.80	100.0

Percent Finer by Weight (%)

size (mm)	>4.75	4.00	2.00	1.00	0.500	0.355	0.250	0.125	0.075	0.063
Offshore #2	93.70	90.06	75.42	50.96	26.18	24.85	19.55	3.75	1.65	1.54
Offshore #3	99.92	99.92	99.75	94.55	1.87	1.02	0.98	0.95	0.95	0.95
Offshore #5	95.30	94.51	88.22	50.94	5.03	2.81	1.77	0.87	0.80	0.80
Pahonu Beach	96.10	95.64	91.58	83.46	34.84	13.18	4.25	0.85	0.80	0.80

Grain size analyzed by Method 47.4; Carter 1993. Soil sampling and Methods of Analysis. CSSC Press. 823pp. and ASTM D1140-17, D2217-85 (1998)

Calcium Carbonate (%)	
Offshore #2	**94%**
Offshore #3	**98%**
Offshore #5	**98%**
Pahonu Beach	**92%**

CaCO3 analyzed by method described in Carver, 1971. Procedures in sedimentary petrology. Wiley Interscience. 653 pp.

A Mello
For AECOS, Inc.

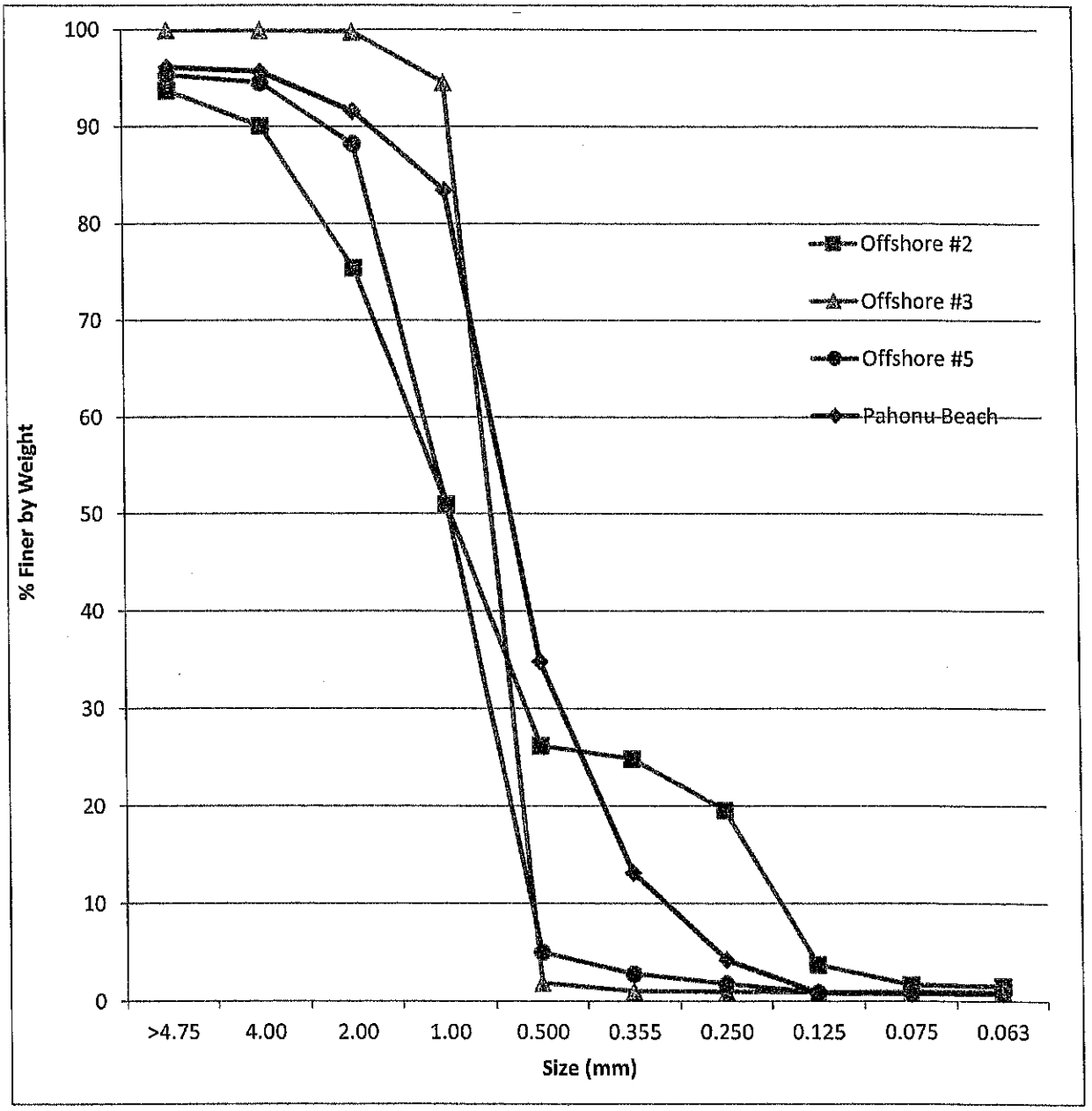
AECOS, Inc.
45-939 Kamehameha Highway, Suite 104

CLIENT: Oceanit
828 Fort Street Mall, Ste 600
Honolulu HI 96813
ATTN: Taylor Chock tchock@oceanit.com

AECOS Job No.:	**631**
REPORT DATE:	2/7/2022

GRAIN SIZE ANALYSIS RESULTS

Date Sampled: 1/21/2022 Analyzed by: rk, dc AECOS Log No.: **44599**
Date Received: 1/24/2022 Sample Type: sediment



Attachment F
AMAP

Applicable Monitoring and Assessment Plan for Small Scale Beach Nourishment Application

Pāhonu Beach Restoration

Waimānalo, Oʻahu, Hawaiʻi

Prepared for:

State of Hawaiʻi Department of Land and Natural Resources
Office of Conservation and Coastal Lands
P.O. Box 621
Honolulu, HI 96809

Prepared by:

Oceanit Laboratories, Inc.
828 Fort Street Mall, Suite 600
Honolulu, HI 96813

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innovation through engineering & scientific excellence

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APPENDICES

Appendix A: Field Sample Log Sheet
Appendix B: Sample Chain-of-Custody

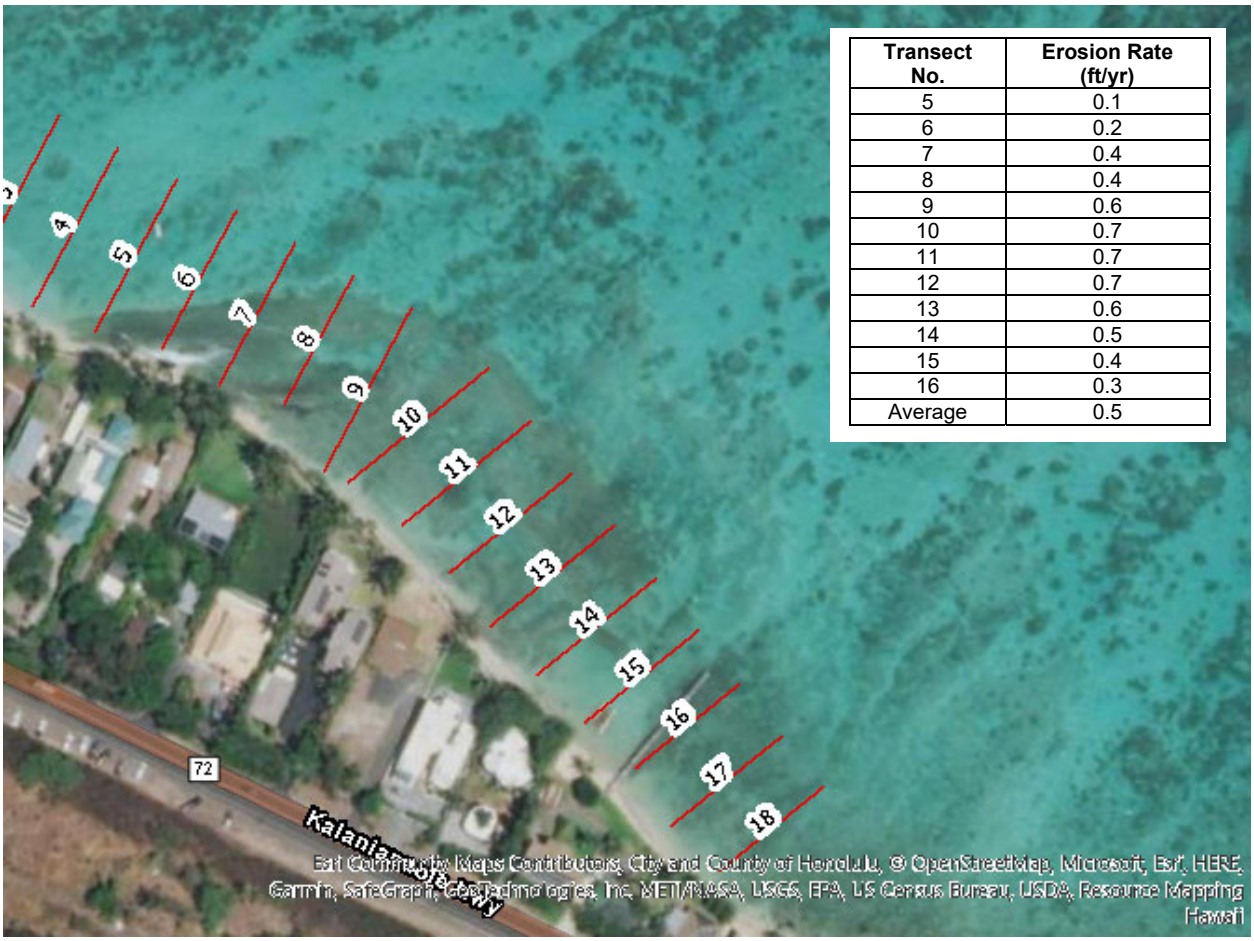
1. Introduction

This Applicable Monitoring and Assessment Plan (AMAP) is part of the Small Scale Beach Nourishment (SSBN) application for the beach nourishment and stabilization structure (i.e., "reef finger") construction at the Pāhonu Beach shoreline. The intent of the AMAP is to identify and prevent potential impacts to water quality from construction activities. Data collected as part of the AMAP will be used to determine the adequacy of the Best Management Practices (BMPs) applied during construction and help assess impacts of the project on the nearshore waters. If monitoring data show water quality impacts from construction, BMPs will be modified to protect water quality. The SSBN also includes up to two (2) renourishment events over the course of ten (10) years after initial nourishment. This AMAP is only prepared for the initial beach nourishment and "reef finger" construction and will be amended as needed over the duration of the activities specified in the SSBN.

1.1 Project Background

The project site is located seaward of eight (8) properties spanning 41-457 through 41-479 Kalaniana‘ole Highway in Waimānalo on the windward shoreline of the island of O’ahu, Hawai‘i. The site is situated where the terrain narrows to a natural pinch point between the Pacific Ocean and sheer vertical slopes of Ko’olau mountain range. The strip of Kalaniana‘ole Highway that extends through this narrow corridor serves as a major thoroughfare servicing the windward side of O‘ahu.

Currently, the shoreline fronting the subject properties either show distinct erosion escarpment or are protected by seawalls or temporary shoreline structures (e.g., erosion control blankets, geotextile sandbags), as the properties have experienced considerable shoreline erosion acceleration since 2008. The historical trend of shoreline erosion at the site was previously documented by the Coastal Geology Group at the University of Hawai'i at Mānoa. Using orthorectified and georeferenced aerial photographs dating to 1928 and a National Ocean Survey topographic survey chart dating to 1911, the University determined that the shoreline position at the site is moving inland at an average rate of about 0.5 feet per year (ft/yr) (Figure 1).



Transect No.	Erosion Rate (ft/yr)
5	0.1
6	0.2
7	0.4
8	0.4
9	0.6
10	0.7
11	0.7
12	0.7
13	0.6
14	0.5
15	0.4
16	0.3
Average	0.5

Figure 1. Historic shoreline erosion rates at project site (U.H. SOEST Coastal Geology Group, 2021)

Based on monthly mean sea level (MSL) data from 1955-2022 from the nearby tidal station in Moku o Loʻe (Station No. 1612480), the relative sea level trend around the project area is rising at about 1.69 millimeters per year. The Hawaiʻi State Sea Level Rise Vulnerability and Adaptation Report predicted that a few of the inhabited structures on the properties would be severely impacted by shoreline erosion due to a 0.5 ft ocean level increase (Hawaiʻi Climate Change Mitigation and Adaption Commission, 2017). The report predicts that we will observe this level of sea rise by about 2030, accounting for global warming assuming no reduction in greenhouse gas emissions from current levels. More recent studies by National Oceanic and Atmospheric Administration (NOAA) suggest that up to 3.2 ft of sea level rise could occur as early as the year 2060 under extreme global warming scenarios (Sweet et al., 2017).

It is unlikely the existing erosion hazard will dissipate naturally. This SSBN application proposes a long-term, regional solution to manage the coastal hazards and help minimize risks to public safety by restoring the beach area and constructing five (5) "reef fingers" to stabilize the sand nourishment.

1.2 Project Description

Severe erosion to the Pāhonu shoreline has occurred as a result of natural conditions at the site. Temporary erosion control measures have been implemented; however, a more permanent solution is needed. The project involves nourishing the existing Pāhonu Beach with compatible, beach-quality sand as well as installing five (5) "reef fingers" to stabilize the beach fill. The "reef fingers" will be composed of pre-fabricated concrete blocks with inter-locking mechanism design. This SSBN proposal covers the beach nourishment and "reef fingers" installation. The initial beach nourishment event includes recovering approximately 5,000 cubic yards (cu. yd.) of beach quality sand offshore of Pāhonu Beach (see Figure 2 for the sand recovery sites). However, if the sand source is not sufficient or feasible, an additional sand source will be submitted to OCCL for approval. The time for the proposed sand placement and "reef finger" construction, including mobilization and demobilization, will be approximately four (4) to six (6) months.

Figure 2. Sand recovery sites

1.3 Water Quality BMPs

Water quality BMPs will be performed to ensure no leakages of pollutants are released into open ocean waters. Water qulaity BMPs will consist of a temporary wave barrier (e.g., using bulk lift

bags or AquaDam) placed along the seaward perimeter of the nourishment area to contain sediments and reduce risks from waves entering the work zone as well as fiber roll containment structures around the construction access and staging areas (Figure 3) to prevent any sediment from entering the surrounding waters. A turbidity containment device will be deployed completely around the sand recovery site(s). See the BMP plan in the draft construction drawings (Attachment C of the SSBN Permit Application) for more details.

Figure 3. Construction access and staging area

1.4 Discharge Characteristics

Permanent discharge materials will consist of beach material transferred from sand sources that will be added to the nourishment site as well as five (5) "reef finger" stabilization structures. The structures are intended to be constructed of interlocking precast concrete blocks. Alternatively, they may be constructed using other techniques such as sand-filled geotextile containers or rock rubble mounds.

Temporary discharge materials may consist of the temporary wave barrier, constructed by stacking triple-walled geotextile bulk lift bags filled with dredged sand. The geotextile bags will be removed from the site and the sand contents will be used as part of the nourishment when the BMP

is no longer needed. No equipment will be allowed to drive in the water; all construction will be carried out with shore-based equipment.

1.5 Environmental Description

The project site is located in Waimānalo on the southeast side of the island of Oʻahu, State of Hawaiʻi. The climate in Waimānalo has an average annual temperature of about 72.14 degrees Fahrenheit (°F), and ranges between about 75.8°F in the summer and 68.7°F in the winter (Giambelluca et al., 2014). The annual mean average rainfall of Waimānalo is approximately 30.9 inches per year, with the majority of the precipitation occurring between the months of November through March (Giambelluca et al., 2013). Elevations at the site range from approximately 2 ft below MSL at the nearshore area to 10 ft above MSL at the yard areas. Land use around the project site is residential and used for recreation.

The Pāhonu Beach fronts eight (8) residential properties and is located east of the Pāhonu Fishpond. The bottom type of the project site is comprised of approximately 92% carbonate sand across the reef flat zone. The elevation of the hard stratum varies, but is estimated between 1 ft to 3 ft below MSL at the nearshore area. The waters of Pāhonu Beach are designated Class AA by the State of Hawaiʻi, Chapter 11-54, Water Quality Standards for open coastal waters.

Soils specific to the project site are Jaucus sand, 0-15% slopes, MLRA 163 (JaC). JaC soils consist of sand sized coral and seashells sandy marine deposits derived from sedimentary rock. JaC sand are excessively drained with low runoff and are comprised mainly of calcium carbonate (NRCS, 2017).

2. Monitoring Program

The monitoring program follows the general monitoring Guidelines for the Section 401 Water Quality Certification (WQC) projects (DOH, 2009). Construction will take approximately four (4) to six (6) months and work will be timed for low tide, low wave conditions. Photo documentation of the site during construction will be conducted. A qualified field technician will be present during in-water construction to visually monitor and photo-document for permit compliance.

2.1 Organization and Responsibilities

Table 1 provides the names, responsibilities and qualifications of the personnel involved with this AMAP. *In situ* measurements will be performed by a qualified field technician. The contractor will perform the visual observations for the entire duration of in-water work to ensure that the activities do not result in adverse impacts to nearshore waters.

Qualified field technicians will conduct *in situ* water quality monitoring for pre-construction, during construction and post-construction monitoring. Site conditions will be noted and photographs will be taken during each field monitoring event. Photographs will be made at each sampling site and in the work area during construction and will be accompanied by detailed descriptions and time and date stamps. Geographic Position System (GPS) coordinates of the monitoring sites will be recorded during monitoring.

Field tehnicians will document at a minimum, the name of technician, date, time, tidal stage, wave conditions, current, weather conditions, location and condition of BMPs, and construction activity.

2.2 Project Personnel

The roles and responsibilities of key project personnel will be further defined at the beginning of the project and implemented by the monitoring contractor. The organizational structure will ensure that all project personnel will receive proper and accurate information and instructions on quality assurance and quality control (QA/QC) procedures to be followed throughout the monitoring process.

Table 1. Project personnel responsibilities and qualifications

Personnel	Responsibilities Relating To Water Quality	Qualifications
Contractor's Construction Site Manager To Be Determined *	Responsible for overall management of construction site, daily inspection of site and BMPs, taking photographs from predetermined positions and entering observations in site log	Designated by the contractor
Monitoring Personnel Qualified Technician	Conducts field visits, obtains photographs and work descriptions, and obtains samples for water quality analysis	Trained and experienced in site safety, water sampling methodology, and application of BMPs on construction sites
Design Consultant Oceanit	Assists with design and construction issues for the project	College degree in Coastal/Civil Engineering; licensed Professional Engineer

* *Information will be provided within thirty (30) days after contract award.*

2.3 Project Schedule

Total project construction will span approximately four (4) to six (6) months. Commencement of the construction will depend on concurrence from regulatory agencies.

3. Sampling and Analysis Plan

3.1 Introduction

This section presents a plan for the implementation of the sampling and analysis activities for the project before, during, and after the construction phase. The applicable requirements are given below.

The procedures described in this section are developed to provide sufficiently detailed instructions to consistently conduct water quality monitoring and assessment activities and ensure a high level of quality assurance independent of the sampling personnel.

3.2 Objectives and Scope

The objectives of this AMAP will abide with those of the Clean Water Act (CWA), one of which is to minimize pollution of waters of the United States from construction activities. Section 401 of the CWA (33 USC 1341) provides a process for states to ensure that federally permitted activities comply with State Water Quality Standards. The permit holder is responsible for developing and implementing BMPs to avoid or minimize discharge of pollutants from the permitted activity. The purpose of this AMAP is to create an environmental awareness by photo documentation and to describe a water sampling and analysis process that will determine the effectiveness of the BMPs proposed for the project. The plan is developed to verify whether average concentrations of contaminants/parameters of potential concern measured in waters adjacent to the project site during construction activities indicate the adequacy and effectiveness of the BMPs installed and whether modifications to BMPs are necessary. Comparing the results of monitoring during construction with respective pre-construction monitoring data will show impacts on water quality and direct correction of any problems with the BMPs as well as identify whether adjustments to construction activities are necessitated. The proposed monitoring will be conducted pre-, during, and post-construction.

As discussed in Section 1.3 of this AMAP (above), temporary water quality BMPs will be performed to ensure no leakages of pollutants are released into open ocean waters. As discussed in Section 1.4 of this AMAP (above), permanent materials associated with the project are the beach fill as part of beach nourishment and five (5) precast concrete "reef fingers."

Any water contamination event shall be reported by telephone, e-mail, or facsimile to the State of Hawai‘i Department of Health (DOH) Clean Water Branch (CWB) and Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) within twenty-four (24) hours or by the end of the next business day.

In addition to the above precautions, a comprehensive water quality monitoring program will be implemented to avoid, minimize, and mitigate any potential water pollution, and modify BMPs or work procedures if contamination from work activities is detected.

3.3 Monitoring Approach

The following process serves as the framework for this AMAP. The monitoring will cover a period before, during, and after construction ends. Monitoring parameters are decided by the type of

construction and the possible contaminants the activity may release into coastal waters. For the proposed project, pH, turbidity, total suspended solids (TSS), salinity, dissolved oxygen (DO), and temperature will be monitored to establish background conditions, conditions during construction, and conditions after construction is completed. *In situ* monitoring and measurements will be conducted by personnel who are trained and experienced in performing all operations, maintenance, calibration and secondary checking activities in accordance with manufacturer guidelines.

Parameters at each monitoring site will be measured in the field with appropriate field instruments for pH, turbidity, TSS, salinity, DO, and temperature. Monitoring personnel will also perform visual inspections during monitoring and document the date, time, weather conditions, construction activities, location, condition of the BMPs and any other activities related or unrelated to construction that may impact water quality. These observations will be submitted as a part of the monitoring report. All monitoring activities shall also include photographic documentation of site conditions. All photographs related to this monitoring effort will be date- and time-stamped. The locations for photo documentation points will be marked with GPS coordinates.

The construction contractor will designate a representative to perform daily visual inspections of the construction site, including the condition of any BMPs to ensure no adverse impacts occur to coastal waters. The information recorded by the contractor's representative will also include all information provided by the monitoring personnel. A written monitoring report will be submitted to DOH CWB and DLNR OCCL within twenty-four (24) hours or by the end of the next business day.

A copy of the contractor's daily observations will be used to prepare the final monitoring report. Due to the variability associated with sample collection methodology and equipment and variability within each of the Decision Units (DUs), the monitoring consultant shall use a *MULTI-INCREMENT*® sampling approach for each of the DUs. *MULTI-INCREMENT*® is a registered trademark of EnviroStat, Inc. and all *MULTI-INCREMENT*® samples must be collected in accordance with the trademark requirements.

3.4 Sampling Decision Units

There will be three (3) DUs where water quality monitoring will be conducted. These are selected to represent baseline water quality in the vicinity of the project site (i.e., Baseline DU), water quality condition at the worksite within the area protected by the BMPs (i.e., Work Zone DU), and the area immediately outside the BMPs where the most severe impacts are expected (i.e., Impact DU). Each of the locations for the suggested DUs are shown in Figure 4.

Baseline DU will be located in the nearshore area that will be similar in character to the project site and exposed to similar environmental changes. This site should be located outside the potential area of impacts from construction activities.

Work Zone DU will be located between the temporary wave barrier BMP and the proposed construction area.

Impact DU will be located immediately outside the temporary wave barrier BMP. This monitoring area will be the most probable area contaminated if the BMP does not function as expected. The area within the Impact DU will be visually inspected.

Other areas will include any area located within the project area, but outside the DUs, where the water quality is obviously being impacted by construction activities. The monitoring consultant shall inspect the impacted area(s) and determine the sampling locations.

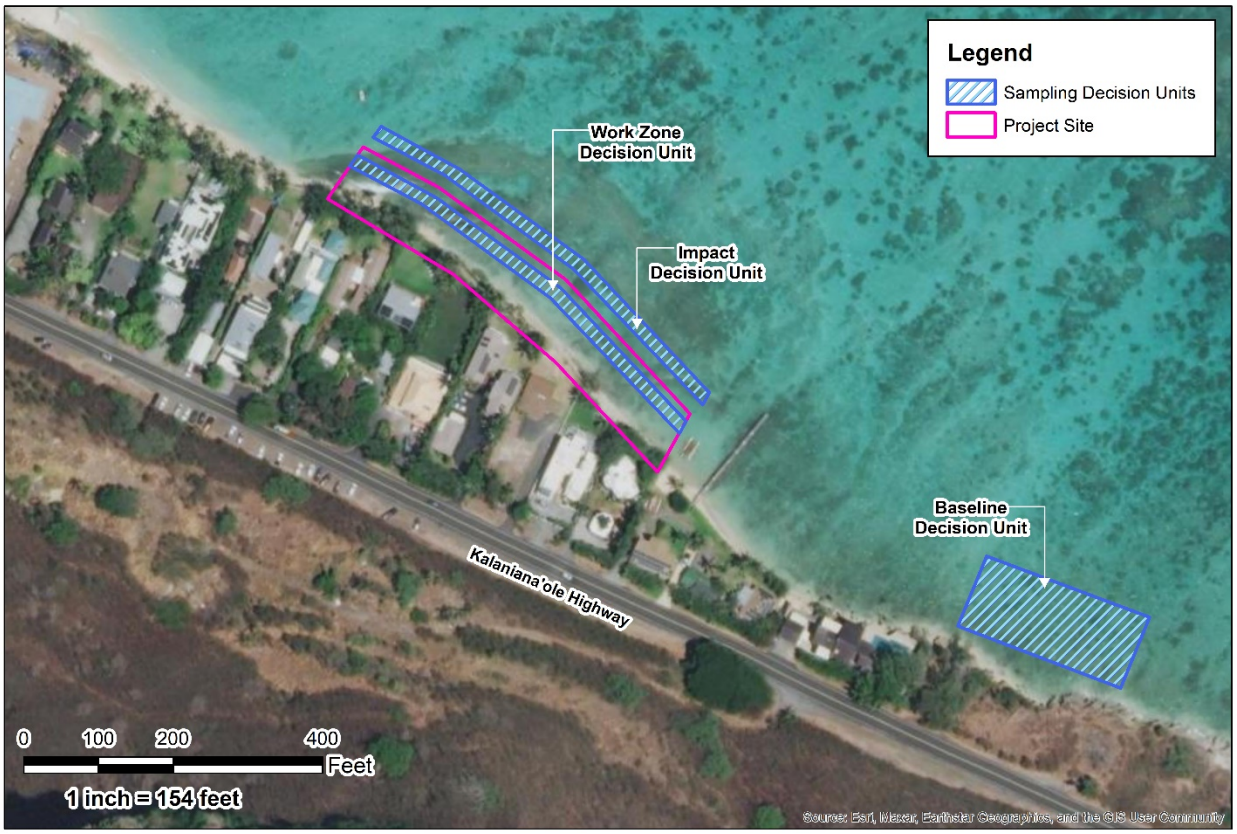


Figure 4. Sampling decision unit map

3.5 Monitoring Procedures

Monitored parameters are shown in Table 2. All water samples will be collected using a *MULTI INCREMENT*® sampling approach with an appropriate water quality probe that can measure turbidity, salinity, pH, DO, and temperature. Measurements will be made before, during, and after construction for evaluation of any changes in water quality as a result of construction.

3.5.1 Pre-Construction Monitoring

Prior to construction, average background water quality characteristics in the three (3) DUs shall be monitored before construction begins to determine existing water quality conditions. At least ten (10) samples will be collected over a two-week period prior to the start of construction. Pre-construction samples shall be collected to represent the entire Impact DU so that meaningful decisions can be made on actionable events during construction.

3.5.2 During Construction Monitoring

During in water work, average values of the water quality parameters within the project area isolated from the nearshore waters by BMPs (i.e., Work Zone DU), the Baseline DU and Impact DU will be monitored daily. A qualified observer will also be present during construction to ensure that areas outside the BMP are not impacted by turbidity. If a plume is observed, the size and location of the plume will be described in an accompanying narrative and documented photographically. If a turbidity plume is observed outside the area isolated by the BMP, the work should stop immediately. Monitoring, including photo documentation, will be conducted daily during the entire construction period. All photographs related to this sampling effort will be date- and time-stamped.

3.5.3 Post-Construction Monitoring

Following construction, water quality will be measured twenty-four (24) hours after construction is completed and the BMPs are removed from the Baseline and Impact DUs. The monitoring will also include photo documentation and is aimed at establishing whether nearshore water quality has been impacted permanently by construction activities.

3.6 Decision Statement

The objectives of sampling, as defined by the decision statement, are 1) to determine whether concentrations of potential pollutants detected in the Impact DU during construction indicate conditions that require changes to installed BMPs to minimize further pollution discharge into the ocean and 2) to document and report site conditions to the DOH CWB and DLNR OCCL. To achieve these objectives, the quality and spatial spread of the water quality data should provide adequate and reliable information on the average concentrations of the identified pollutants.

Pre-construction sampling data will be analyzed to establish the range, geometric mean and standard deviations of the parameters measured. This will provide a baseline for average and natural spread of water quality parameters in the area. Decision values (values indicating an actionable event) are defined as the value for each parameter obtained from all data collected during pre-construction and Baseline DU sampling events. The pH should be within the range measured during pre-construction. The other parameters should not exceed the pre-construction mean plus one (1) standard deviation. An actionable event occurs when the measured value of any of the parameters of concern exceeds the above defined value.

The following sections provide guidance to develop a field sampling plan for this project. The sampling consultant will follow the guidelines as close as possible and document any deviations due to specific site conditions.

3.7 Sampling Parameters

Rationale for developing sampling parameters was discussed in Section 3.6 of this AMAP (above). Monitoring parameters and the relevant criteria are summarized in Table 2 (on the following page).

A 6-Series, model 6600 V2 Multiparameter Water Quality Sonde made by Yellow Spring Instruments (YSI) or equivalent is the recommended instrument for all parameters except TSS, which is analyzed in a laboratory.

Table 2. Water quality monitoring parameters

Parameter	Units	Accuracy	Min. Detectable Level	Sensi-tivity	Container Type	Holding Time	Min. Vol., mL
Turbidity	NTU	0.5 NTU	0 NTU	0.1 NTU	P,G	ASAP	100
pH	pH units	±0.2 units	0 units	0.01 units	P,G	ASAP	100
Temp.	Deg. C	±0.15º C	-5 ºC	0.01 ºC	P,G	ASAP	
Salinity	ppt	±1.0% or 0.1 ppt	0 ppt	0.01 ppt	P,G	7 days	500
DO	mg/L	0.01 mg/L or 0.1%	0 mg/L	0 mg/L	P,G	ASAP	100
TSS	mg/L				P,G	7 days	1,000

°C = degrees Celsius
ASAP = as soon as possible
DO = dissolved oxygen
G = glass
mg/L = milligrams per liter
NTU = nephelometric turbidity units
P = plastic
ppt = parts per thousand
TSS = total suspended solids

3.8 Field Methods

This section provides general field methods that may be employed by the monitoring consultant to conduct water quality monitoring. The sampling operations shall comply with established sampling protocols to ensure quality assurance and monitoring goals. All samples shall be collected using a *MULTI INCREMENT*® approach.

Water Sampling and Analysis – New or pre-cleaned sampling equipment and/or containers shall be used to receive the water samples collected from each DU (Table 2). The sample containers shall be appropriately labeled with the project name, sample identification information, and the date/time of sample collection. A new pair of disposable gloves shall be used for collecting each sample.

Parameters with a holding time of 'ASAP' shall be collected in the specified container type and measured in the field using portable instruments such as YSI Sondes or equivalent. Salinity will

also be measured with a portable instrument. TSS samples shall be delivered to an analytical laboratory in accordance with sample storage and holding time requirements. The Chain-of-Custody (COC) procedures shall be used to ensure possession and handling of samples to be traced from collection to the final destination. A sample COC form is shown in Appendix B. The laboratory shall be instructed to analyze the samples on a 48-hour turnaround time basis.

Sample Control – Sample control includes the methods used to identify, label, transport, and maintain the integrity of samples: sample identification, sample labeling, COC procedures and sample transport. The industry standard criteria for sample control are described in Section 4 of this AMAP (below).

Sample Handling – After sample collection, proper sample handling will ensure that changes in the constituents of interest are minimized and will guard against errors when shipping and analyzing samples. Samples for field measurement will be transferred to a glass or plastic container (such as a beaker) where parameters will be measured with field equipment. Samples for TSS to be delivered to the analytical laboratory shall be kept in insulated coolers packed with frozen gel packs or wet ice. Sample containers will be capped, placed into re-sealable plastic bags, and then placed on ice in a cooler for transport to a laboratory. Samples will be delivered to the laboratory immediately after collection. COC forms shall be placed inside sealable plastic storage bags and placed inside the sample cooler and kept below 4^{o} C. COC copies shall be maintained on-site. The monitoring consultant shall alert the laboratory personnel early to be available to receive the samples to avoid misunderstandings that might compromise the samples.

Investigation-Derived Waste – Investigation-derived waste includes disposable personal protective equipment (PPE) (e.g., gloves), disposable sampling equipment, and any other material generated that came in contact with potentially contaminated materials.

Record Keeping and Reporting – Date- and time-stamped photographs, documents, and field logs shall be maintained as necessary for implementing and recording the above-described procedures. The logbook shall contain pertinent information including location, time on site, personnel and equipment present, downtime, materials used, samples collected, measurement(s) taken, unusual incidents, and any other observations or information necessary to reconstruct field activities at that time. A Field Sample Log Sheet is shown in Appendix A.

4. Sampling Quality Assurance and Quality Control (QA/QC)

4.1 Introduction

The procedures outlined in this QA/QC section are to ensure that:

- Samples are collected, processed, stored, shipped, and analyzed using acceptable standardized procedures;
- Quality of generated data is documented adequately;
- Results are reported completely and accurately; and
- Security and integrity of samples and data are maintained at all times.

4.2 Applicable Requirements

The applicable requirements for this project shall be the current State of Hawai‘i Water Quality Standards for discharge into Class A Waters. The “wet” water quality criterion for coastal waters at the project area will be used for determining water quality standards. Monitoring parameters and the relevant criteria to be followed are summarized in Table 2.

Procedures covered in this AMAP are specific to this individual project site. This section addresses the QA/QC plan elements described in “Guidance for Preparation of Combined Work/Quality Assurance Project Plans for Environmental Monitoring” (U.S. EPA, 1996). Elements of QA/QC related to environmental sampling are identified below and discussed in Sections 4.3 and 4.4 of this AMAP (below).

- Decision units;
- Sampling methods;
- Sampling frequency;
- Sampling preparation;
- Sample size;
- Sample containers;
- Sample preservation;
- Sample holding times;
- Sample handling;
- Sample labeling;
- Field instrumentation;
- General maintenance and calibration;
- Log keeping;
- COC record; and

- Sample shipping.

4.2.1 Sampling Preparation

Sampling activities in this AMAP will be discussed and/or reviewed by all personnel involved in the sampling activity. Deviation from this AMAP due to any unforeseen site conditions or changes in construction methods must be discussed with and accepted by DOH and DLNR before implementation. Preparation for sampling includes the following activities:

- The contractor will be responsible for contracting and coordinating with a third-party water quality monitoring consultant to execute this AMAP. The consultant will create a Field Sampling Plan to incorporate the information included in this section;
- Obtain written approval for this AMAP from DOH and DLNR.
- Calibrate field measurement instruments according to Standard Operating Procedures (SOPs);
- Obtain properly cleaned containers of appropriate sample size;
- Prepare sample bottles with labels, coolers, ice, and other necessary materials;
- Set-up field documenting forms, COC, etc.;
- Prepare instruments and safety gear specific to the job site;
- If necessary, make arrangements for a boat for sampling at the baseline and impact decision units;
- Review of all pertinent QA/QC procedures; and
- Inform laboratory of possible TSS sample delivery.

Planning should ensure that study objectives and their relative importance and priority are understood by all field personnel. This planning will ensure adequate evaluation of impacts of any field deviation from the plan on overall project goals. An equipment checklist should be prepared to ensure availability of all tools and supplies. All equipment should be cleaned and stored in working condition after each sampling episode.

4.2.2 Field Instruments

Parameters frequently measured with field instruments are turbidity, pH, temperature, DO, and salinity. All field measurements will be made with portable measurement devices such as those produced by YSI or their equivalents. These instruments should be operated by trained personnel in accordance with their respective SOPs. The following precautions should be taken when transporting and using the equipment in the field:

- Ensure that cables are sufficiently long for operation at sites;
- Electrical cables should not be excessively strained;
- Electrical connectors should be waterproof;

- Ensure that the instrument operating range and accuracy are within acceptable limits for the project;
- Instruments should be allowed to warm-up before calibration or field use;
- Sensors should be calibrated before use;
- Instruments should be field checked at the beginning of each day's measurements and before and after monitoring;
- Sensors should be rinsed with distilled water after each measurement;
- Optical surfaces should be cleaned with alcohol and lens tissue between measurements;
- Instruments should be transported in boxes designed for this purpose;
- Instruments should be protected from heating and direct sunlight; and
- External sensors should be covered and adequately protected whenever the instrument is not being used.

4.2.3 General Maintenance and Calibration

Routine maintenance inspection of field instruments should follow the manufacturer's recommendations. General procedures include:

- All rubber parts that may get immersed should be coated with silicone grease;
- Connectors should be inspected for bent or broken pins, which may cause faulty connections and flooded cables;
- Cables should be inspected for nicks, cuts, abrasions, or other signs of physical damage;
- Seals should be inspected and periodically cleaned and greased to ensure a waterproof fit;
- Desiccant should be inspected and replaced with fresh or reactivated desiccant when necessary; and
- Replace batteries regularly and also whenever low power is indicated.

Factory servicing and calibration should be made annually or when instrument malfunctions cannot be corrected by following the operations manual. Factory calibrations may also be required when certain major components of the system are replaced. Calibration log sheets shall accompany a report that uses data from the instrument. All field check results should be entered in the field log sheet. A Field Sample Log Sheet is shown in Appendix A.

4.2.4 Log Keeping

A field sample log sheet (see Appendix A) will be used each time the site is visited. This log sheet can be combined with the COC form (see Appendix B) where convenient. However, all the following information should be entered:

- Project title;

- Date and time;
- Contractor's work-in-progress;
- Sampling location/DU;
- Sample number;
- Replicate number if applicable;
- Weather conditions;
- Comments on sample condition;
- Comments on sample quality;
- Names of members of the sampling crew;
- General site conditions; and
- Photo log.

4.3 Sampling and Analysis

4.3.1 Sample Container Preparation

Sample containers will be cleaned and prepared using industry accepted cleaning and preservation procedures. The recommended sample sizes, type of containers, preservation, and holding times for samples are listed in Table 2.

Sample labels must be waterproof and must be securely fastened to the outside of each sample container to prevent misidentification of samples. Labels must contain at least the project name, sample number, preservation technique, date and time of collection, sample location, and name of sample collector. Labels should be marked with indelible ink.

4.3.2 Sample Handling

Containers for TSS samples will be capped, placed into re-sealable plastic bags, and then placed on ice in a cooler for transport to a laboratory. After sample collection, proper sample handling will ensure that changes in the constituents of interest are minimized and will guard against errors when shipping and analyzing samples. Recommended sample sizes, type of containers, sample preservation, and storage requirements for each variable will be followed (see Table 2).

4.3.3 Field Documentation

It is important throughout a sampling and analysis program to maintain the integrity of the sample from time of collection to the point of data reporting. This integrity should be achieved by using COC procedures that ensure sampling, storing and handling of samples to be traced from collection to the final destination. Proper sampling procedure documentation includes:

- Field data logbook;
- Sample labels;

- COC records;
- Field conducted measurements; and
- Sample shipment method.

4.4 Reporting

The pre-construction monitoring will assess the baseline conditions and compare them with the State Water Quality Standards. These values will be used to make a preliminary assessment of a water quality violation. Statistical methods will be used to analyze measurements and trends.

During construction, data (date- and time-stamped photographs, monitored data and field observations) will be forwarded to DOH CWB and DLNR OCCL by the close of the business day following the day of sampling if possible. The report will include field notes and site photographs.

A final report will include field notes and site photographs and will be prepared upon completion of the monitoring program. The final report will describe descriptions of construction and nourishment activities, discussion of any deviations from the proposed project design and the cause of these deviations, results from any additional environmental monitoring including sediment analyses, water quality parameters, and discussion of any necessary corrective action(s), and photographs. This report will be submitted to the DLNR within two (2) months of completion of post-construction monitoring.

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Appendix A: Field Sample Log Sheet

Field Sample Log Sheet

Date: _____ Collected By: _____

_____

Project Title: ……..

☐ Pre	☐ During	☐ Post	Construction Monitoring

Project No./File No.: _____

WQC File No.: _____

Contractor's Work in Progress: _____

_____

Rainfall Present: _____ Past 24 Hrs: _____ % Clouds: _____ Wind mph: _____

In Situ Meter Calibration Date Last		Standard	Reading		Reading
pH ___/___/20___	Field Calibrated? →	pH=7		pH=10	
Turbidity ___/___/20___		NTU=0		NTU=100	

Sample No.	Time	Location	Type	Size	Description

Samples Held In: ☐ Ice ☐ Refrigerator ☐ Air ☐ Other: _____

Samples to Laboratory (name): _____

On (date/time) ___/___/20___ at ___:___ ☐ AM ☐ PM Lab Chain of Custody No.: _____

Notes: _____

_____

Appendix B: Sample Chain of Custody

CHAIN OF CUSTODY

Please Print Legibly.

Client: _____ Acct. #: _____

Project Name / #: _____ Phone #: _____

Contact Person: _____ Email: _____

Sampler: _____ Quote #: _____

Sample Identification	Date Collected	Time Collected	Grab.	Comp.	Matrix: Soil	Matrix: Water	Matrix: Air	Matrix: Other	Total # of Containers	Remarks / Analyses Requested

Turnaround time requested *(please check one)*: ☐ Normal ☐ Rush

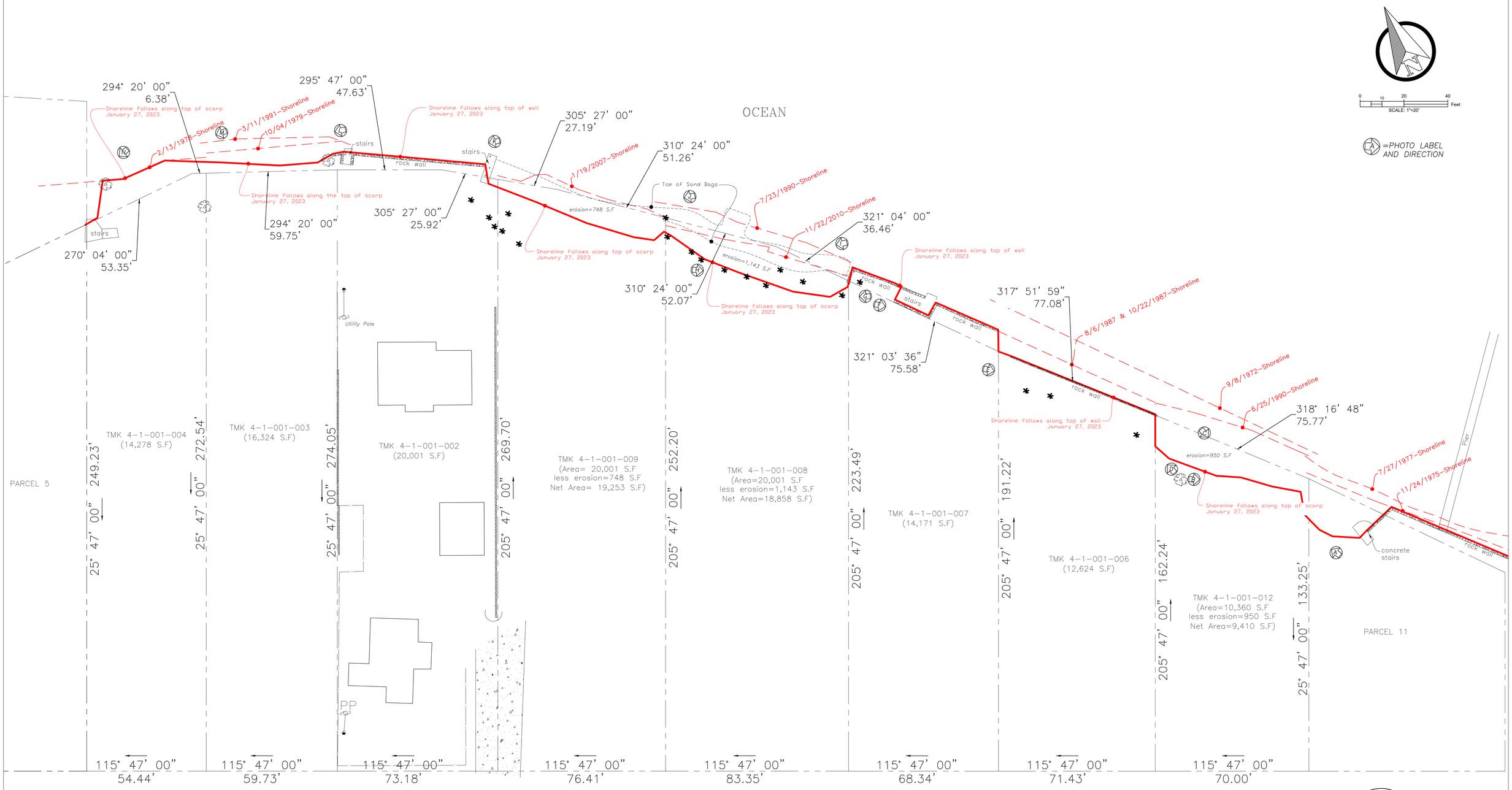
Rush results requested by *(please check one)*: ☐ Fax ☐ Phone

Fax #: _____

Phone #: _____

Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time

Attachment G
Professional Shoreline Survey



AILANA SURVEYING & GEOMATICS LLC
PHONE (808)346-1818
INFO@AILANASURVEYING.COM

SHORELINE MAP

TMK 4-1-001 PARCELS 002, 003, 004, 006, 007, 008, 009, & 012

AT WAIMANALO, CITY AND COUNTY OF HONOLULU, STATE OF HAWAII

ANTHONY D. CROOK
LICENSED PROFESSIONAL LAND SURVEYOR
No. 12094
HAWAII U.S.A.

THIS MAP WAS PREPARED BY ME OR UNDER MY SUPERVISION.
MY LICENSE EXPIRES : APRIL 30, 2023

ANTHONY D. CROOK
LICENSED PROFESSIONAL LAND SURVEYOR
CERTIFICATE No. 12094

G:\Ailana Surveying Dropbox\Anthony Crook\Projects\2023\Oceanit\Kalanianaole Hwy.dwg

MAP DATED: March 9, 2023

TMK(1) 4-1-001 Parcels 002, 003, 004, 006, 007, 008, 009 & 012

PHOTO "A" - TAKEN 1/27/2023 AT 11AM

PHOTO "B" - TAKEN 1/27/2023 AT 11AM

PHOTO "C" - TAKEN 1/27/2023 AT 11AM

PHOTO "D" - TAKEN 1/27/2023 AT 11AM

PHOTO "E" - TAKEN 1/27/2023 AT 11AM

PHOTO "F" - TAKEN 1/27/2023 AT 11AM

PHOTO "G" - TAKEN 1/27/2023 AT 11AM

PHOTO "H" - TAKEN 1/27/2023 AT 11AM

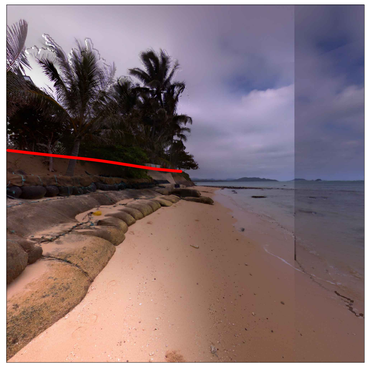


PHOTO "I" - TAKEN 1/27/2023 AT 11AM

PHOTO "J" - TAKEN 1/27/2023 AT 11AM

PHOTO "K" - TAKEN 1/27/2023 AT 11AM

PHOTO "L" - TAKEN 1/27/2023 AT 11AM

PHOTO "M" - TAKEN 1/27/2023 AT 11AM

PHOTO "N" - TAKEN 1/27/2023 AT 11AM

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MAP DATED: March 9, 2023

TMK(1) 4-1-001 Parcels 002, 003, 004, 006, 007, 008, 009 & 012