

Edge Cable Holdings USA, LLC
Jupiter Cable Project
Beach Void Monitoring and Response Plan
November 2021

I. Purpose of Plan

This Beach Void Hole Monitoring and Response Plan establishes measures that will be implemented by Edge Cable Holdings USA, LLC (“Edge”) to monitor and respond to the presence of voids in the sand that have been detected in the beach area west of the property owned by Edge, known as Tax Lot 3200, Tierra Del Mar, Tillamook County, Oregon (“Lot 3200”). Any corrective action will be performed under the existing Oregon Parks and Recreation District Ocean Shore Permit 2900-18 (“OPRD Ocean Shore Permit”) and a standing OPRD Drive on Beach Permit, as discussed further below.

II. Observed Conditions

Voids in the sand west of Lot 3200 have been observed in April and September 2021. These voids may be the result of sand collapsing into the space created by the removal of a 16-inch diameter guide casing that was used during the installation of the permanent borepipe that houses the Jupiter subsea telecommunications cable (the “Jupiter Cable”). An overview of the permanent casing used for the Jupiter Cable from Lot 3200 is reflected in Figure 1.

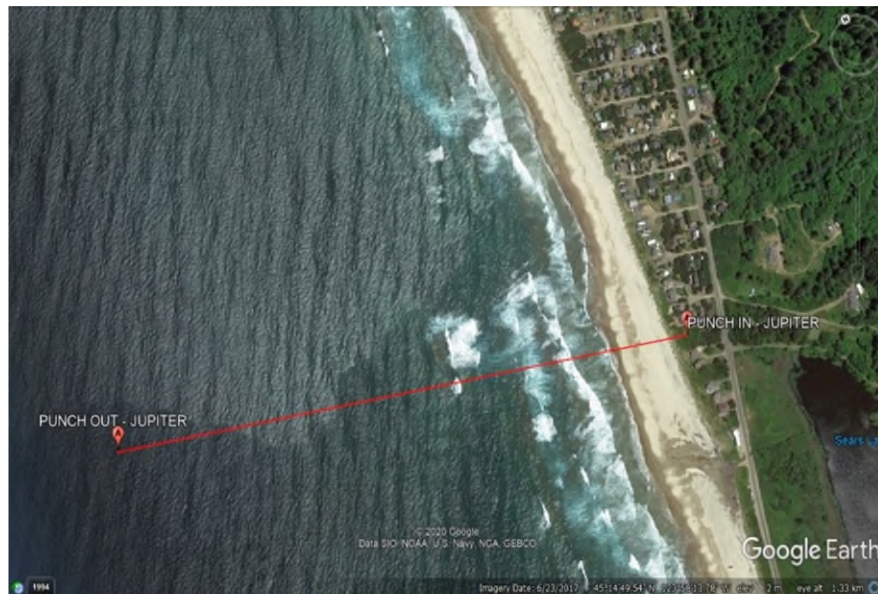


Figure 1: Map of Permanent Borepipe used for the Jupiter Cable

The initial step in drilling the borepipe for the Jupiter Cable was to install approximately 537 feet of 16-inch guide casing. The guide casing was installed to ensure the drill pipe was properly aligned (in direction and depth). As the guide casing was drilled, sand was removed to onshore tanks by drilling out the sand using the permanent borepipe (nominally 6.63 inches in diameter); this process removed sand just inside the tip of the guide casing. After completion of the drilling of the permanent borepipe, the 16-inch

guide casing was removed. The permanent borepipe was left in place and used as a conduit for the Jupiter Cable to be pulled to Lot 3200.

During high tides, seawater saturates the sand causing the sand to flow into any spaces created during removal of the 16-inch guide casing. This could lead to the collapse of the sand above the former casing location and potentially create surface voids. The 16-inch guide casing was mostly located in the area where tidal surge was constantly present, ensuring saturation. However, it is possible that small pockets remain higher up the beach area where the sand is not continually saturated.

The geophysical survey of the beach area west of Lot 3200 conducted in May 2021 did not detect any voids around the borepipe (potentially because they were not significant in size and the metal borepipe interfered with the geophysical results). The voids may have developed slowly as late summer and fall (2021) high tides reached this area and began saturating the sand, collapsing it around the borepipe.

III. Response to Observed Conditions

In response to the observed voids, Edge engaged its landscape contractor to immediately fill the voids and monitor the area. In addition, Edge engaged ERM to research relevant technologies and compare the options for mitigation of surface voids observed in the beach area west of Lot 3200. Rather than additional surveys, ERM recommended a method that directly accelerates closure of any spaces around the borepipe that cause the voids by compacting the sand immediately following high tide. Attachment 1 contains the ERM memo specifying the details of the work (“Compaction Work”).

IV. Ongoing Monitoring

Following completion of the Compaction Work described in Section III above, Edge will engage its landscape contractor to visually inspect the beach area west of Lot 3200 at least twice per week through March 31, 2022. The contractor will access the beach area by foot from Lot 3200. Edge will maintain a standing contract with its landscape contractor through March 31, 2022. Edge will communicate to the Tierra Del Mar community the reporting hotline number and email in case members of the public observe any voids in the future.

V. Future Discovery and Reporting

If the landscape contractor or a member of the public reports that any additional voids have formed in the sand west of Lot 3200, Edge (or its designated representative, contractor, or subcontractor) will immediately secure the area with cones, signage, temporary fencing or tape to protect the public from entering the area (“Safety Warning”). These actions will be coordinated with OPRD as a part of the Initial Notification process described below.

In the event of a discovery, Edge (or its designated representative, contractor, or subcontractor) will notify OPRD staff Trevor Tayler, Central Park Resource Manager (trevor.taylor@oregon.gov) and Jason Elkins, Park Manager (jason.elkins@oregon.gov) by email within 24 hours of the discovery ("Initial Notification"). Following the Initial Notification, Edge will submit a written report regarding the discovery to OPRD within 3 business days of the discovery ("Preliminary Report"). The Preliminary Report will provide at least the following information: (i) description of observed sink hole including size, diameter, and location on the beach; (ii) immediate responsive action taken on-site; and (iii) any further corrective action to be undertaken.

In the event of a discovery, and concurrent with the Initial Notification above, Edge will provide an update to the Tierra del Mar Community via email to notify the Community of the discovery and inform the Community that OPRD has been notified.

VI. Response to Future Discovery

After installation of the Safety Warning described in Section V, Edge (or its designated representative, contractor, or subcontractor) in coordination with OPRD will decide on the appropriate corrective action. The corrective action will depend on the size and nature of the observed sink hole(s).

If a void is less than three feet in diameter at its widest point, the void will be filled by hand upon discovery.

If a void is three or more feet in diameter at its widest point, Edge will fill in the void by hand and then follow up with additional sand compaction in the beach area west of Lot 3200, consistent with the methodology described under Section III above and in Attachment 1.

The corrective action may be performed under the OPRD Ocean Shore Permit and the OPRD Drive on Beach Permit. Edge (or its designated representative, contractor, or subcontractor) will have emergency access at will to install the Safety Warning and quickly implement corrective actions. See Attachment 2 for the OPRD Drive on Beach Permit.

Following completion of any corrective action, Edge will submit a written report to OPRD ("Response Report") within three days describing the results of the corrective action and any modification to the resumed monitoring schedule under Section IV above. Concurrent with the filing of the Response Report to OPRD, Edge will provide an update to the Tierra del Mar Community via email to notify the Community the beach work has completed and Edge has resumed the regular monitoring.

VII. Duration of Plan

This plan expires on March 31, 2022, if no discoveries or events occur following the completion of the Compaction Work. If there are continued discoveries or events, Edge and OPRD agree to coordinate on an appropriate extension of this plan.

Technical Memo

To	Oregon Parks and Recreation Department (OPRD)
From	Kim Marcus Justin Dauphinais Nikki Payne ERM 1050 SW 6th Avenue Suite 1650 Portland, OR 97204
Date	17 November 2021
Reference	Lot 3200 Tierra Del Mar Oregon (Jupiter Project)
Subject	Upland Beach Compaction

Background

This *Technical Memo for Upland Beach Compaction* is prepared in response to detected voids in the sand along the borepipe route shoreward of Lot 3200 in Tierra Del Mar. A few (2 to 4) small voids were noted by nearby residents, that appear to be from 1 to 2 feet in length and up to 1-foot wide based on photos provided.

Observed Conditions

These voids may be the result of sand collapsing into the space created by the removal of a 16-inch diameter guide casing. The guide casing was used during the installation of the permanent borepipe that houses the offshore cable. The initial step in drilling the borepipe for eventual landing of a subsea cable was to install approximately 537 feet of 16-inch guide casing. The guide casing was installed to ensure the permanent drill pipe was properly aligned (in direction and depth). As the guide casing was drilled, sand was removed to onshore tanks by drilling out the sand using the permanent borepipe (nominally 6.63 inches in diameter); this process removed sand just inside the tip of the guide casing. Once the driller determined that material being drilled through no longer needed the guide casing, the inner borepipe advanced without it.

After completion of the drilling to the exit point, the guide casing was removed as it was no longer needed. The borepipe cable housing was left in place and used to run the cable through to the shore. The 16-inch guide casing was mostly located in the area where tidal surge was constantly present, ensuring saturation. However, it is possible that small pockets remain high up on the shore where the sand is not continually saturated.

During high tides, seawater saturates the sand causing the sand to flow into the space created during removal of the guide casing. As extreme high tides periodically saturate the area, the infiltrating seawater could carry sand into the space where the guide casing was located, propagating the collapse of the sand above the former casing location, creating the surface voids.

Response to Observed Beach Voids

ERM researched relevant technologies to compare and contrast options for mitigation of surface voids observed in the upland area. The geophysical survey in May 2021 did not detect the approximate 5-inch space around the borepipe because they were not significant in size and the metal borepipe interfered with the geophysical results. The observed voids may have developed slowly as late summer and fall high tides reached this area and began saturating the sand, collapsing it around the borepipe. Rather than additional surveys, ERM recommends a method that directly addresses closure of any spaces around the borepipe. This remedy involves the compaction of upland beach sand immediately following high tides, when the sand is saturated. ERM believes using a vibratory compactor method, while the sand is saturated, will accelerate the filling of the space left by the guide casing removal and eliminate the propagation of voids to the surface. The process will involve using a hand held compactor (such as a "Jumping Jack") or a skid steer with a vibratory roller immediately following a tide event that covers this area. This process will be conducted following two daylight high water tidal cycles to enhance compaction success. The process is estimated to take 2 to 3 hours per day and may need to be repeated if necessary.

Gasoline powered equipment will be used for this project. The gasoline powered equipment used for the project will be filled at the shop or rental company prior to mobilizing to the beach. The equipment will not be fueled on the beach and a spill kit will be available at the site. A local vendor will conduct compaction activities with oversight and technical field direction provided by ERM.

The sand compaction will follow two high tide saturations. These will be scheduled according to the highest tide cycles in December and will involve being onsite for one full daylight tidal cycle (~24 hours). The shorter days in December will limit the number of high tides during daylight hours. The void area would be engaged following both (daylight) high tides. No in-water work will be conducted. The area above the pipe or where the voids were/are noted will first be filled in with wet sand using hand tools. After voids are initially filled in, the compacter will be run back and forth over the area and as the sand compacts more sand will be added to the area to be compacted. That process will continue until the compacted area becomes level with the surrounding area. The following day, the site will be revisited to see if there has been anymore settlement after the next high tide. If any settlement is noted, the compaction process will be repeated.

Prior to the start of sand compaction work, the work team will create a clearly defined perimeter around the work area using safety cones, wooden stakes, and/or caution tape. No other section of the ocean shore will be cordoned off, thereby allowing a free-flow of public traffic along the beach. The work area will be split into two or more sections so that a two-way pedestrian corridor will be maintained throughout the work period. Each pathway within the corridor will be at least 10 feet wide. The directions of each pathway will be clearly identified at both the north and south entrances. The creation of a two-way pedestrian corridor will avoid possible wait times for public to move in the north-south direction along the beach.

If a vehicle approaches the work area when the compaction activities are underway, onsite personnel will move traffic cones and/or caution flagging to allow the vehicle access through the area. Once the vehicle has passed through the area, the temporary barriers will be reinstalled. When there is no active work underway on the beach, all equipment will be consolidated into one area of the beach and the beach will be opened up to the greatest extent possible, allowing unrestricted public north-south access.

At the completion of activities each day, the work team will gather all equipment, safety cones, caution tape, and any other materials brought onto the beach, and will remove it from the beach area (including the fore dune area west of Lot 3200).

Response to Future Observed Beach Voids

Following the completion of sand compaction work, the local vendor will perform ongoing monitoring to visually inspect the beach area west of Lot 3200 at least twice per week through March 31, 2022. During this monitoring period, if a void is less than three feet in diameter at its widest point, the void will be filled by hand upon discovery. If a void is three or more feet in diameter at its widest point, the vendor will fill in the void by hand and an additional 2-day compaction event will be scheduled based on the highest tide cycles of the month discovered.