ADDENDUM NO. 2

TO: **All Prospective Bidders**

PROJECT: **CHARLIE'S PASTURE SHORELINE TEMPORARY BULKHEAD REPAIR**
FEMA PROJECT #46842

DATE: **September 16, 2020**

BID DATE: **September 22, 2020**

Prospective bidders are hereby notified of the following modifications to the contract documents. These modifications shall become a part of the Contract Documents. All provisions of the Contract Documents not specifically affected by the Addenda shall remain unchanged.

I. CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS:

A. APPENDICES

1. APPENDIX A – ESSENTIAL FISH HABITAT ASSESSMENT

   ADD THE ATTACHED APPENDIX A – ESSENTIAL FISH HABITAT ASSESSMENT

   Proposed conservation measures and guidelines for EFH protection are described in Section 6.0. Conservation measures for EFH shall be subsidiary to Bid Item 3 Install Temporary Sheet Piling and Supports.

2. APPENDIX B – GEOTECHNICAL DATA REPORT FOR PORT ARANSAS PRESERVE WASHOUT REPAIR, PORT ARANSAS, TEXAS

   ADD THE ATTACHED APPENDIX B - GEOTECHNICAL DATA REPORT FOR PORT ARANSAS PRESERVE WASHOUT REPAIR, PORT ARANSAS, TEXAS

II. QUESTIONS AND ANSWERS

1. Ship Wake Impact. *ANSWER: Ship wakes may overtop existing bulkhead up to 3.5-ft.*
2. Does native material need to be locally supplied? *ANSWER: See attached APPENDIX B for geotechnical data report for soil characteristics. Native fill material will need to be supplied by a certified site. Material sites can be pre-certified or certified by approved Submittal.*
3. Length of coating? *ANSWER: Coating shall be full length.*
4. Can we stage on the east side of the temporary bulkhead? *ANSWER: Yes. There is a gate to provide access. Staging are shall be restored with native vegetation to original condition when complete.*
5. Can we use 18-24" rock instead of the 8-12" rock? *ANSWER: Rock backfill shall have a gradation of 8" to 12".*

ACKNOWLEDGEMENT: It is the Bidder's responsibility to acknowledge receipt of this Addendum in the appropriate location in Section 1A3 - Proposal.

END OF ADDENDUM NO. 2

URBAN ENGINEERING

STATE OF TEXAS
WILLIAM C. CAUSEY, JR.
87662
LICENSED
PROFESSIONAL ENGINEER

William C. Causey, Jr., P. E.
Project Engineer

9/16/20

Attachments
APPENDIX A – ESSENTIAL FISH HABITAT ASSESSMENT
APPENDIX B – GEOTECNICAL DATA REPORT

APPENDIX A –
ESSENTIAL FISH HABITAT ASSESSMENT

ESSENTIAL FISH HABITAT ASSESSMENT

CHARLIE'S PASTURE UPLAND BULKHEAD REPAIR PROJECT

Nueces County, Texas

SUBMITTED BY:

City of Port Aransas

PREPARED BY:

Perennial Environmental Services, LLC

September 2020

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Attachment 1: Project Mapping

- Vicinity Map
- ~~Aerial Plan View Maps~~
- ~~Cross Section Details~~

ACRONYMS

City	The City of Port Aransas
EFH	Essential Fish Habitat
FEMA	Federal Emergency Management Agency
FMP	Fishery Management Plan
GOM	Gulf of Mexico
GOMFMC	Gulf of Mexico Fishery Management Council
HMS	Highly Migratory Species
HTL	Mean High Tide Line
NMFS	National Marine Fisheries Service
Project	Charlie's Pasture Upland Bulkhead Repair Project
SAFMC	South Atlantic Fishery Management Council
USACE	U.S. Army Corps of Engineers

1.0 INTRODUCTION

1.1 Purpose and Need of the Essential Fish Habitat Assessment

The purpose of this Essential Fish Habitat (EFH) Assessment is to evaluate the effects of construction of the proposed Charlie's Pasture Upland Bulkhead Repair Project (Project) on areas designated as EFH for fisheries managed under the Magnuson-Stevens Fisheries Conservation and Management Act. An amendment to the Magnuson-Stevens Fishery Conservation and Management Act of 1976 strengthened the ability of the National Marine Fisheries Service (NMFS) and associated councils to protect and conserve the habitat of certain marine, estuarine, and anadromous finfish, mollusks, and crustaceans. These specific habitats have been deemed EFH. EFH can be broadly defined as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity."

This assessment provides a description of the Project, an alternatives analysis, a description of the EFH and managed fish species in the Project area, the environmental impacts of the Project, and proposed conservation measures to minimize potential impacts. The Federal Emergency Management Agency (FEMA) is the lead federal agency for the Project.

2.0 PROJECT DESCRIPTION

2.1 Project Description

The City of Port Aransas (City) proposes to repair a section of bulkhead and adjacent upland area that separates the Charlie's Pasture Nature Preserve from the Corpus Christi Ship Channel. The bulkhead, which was constructed entirely within uplands in 2005, was partially washed away as a result of the storm surge associated with Hurricane Harvey in August 2017. As a result, sensitive aquatic resource habitats (e.g., wetlands and sandflats) have become exposed to continual wake action generated from large vessels traveling down the ship channel, which in return has degraded these resources through erosion and deepening.

The City proposes to construct the Project in two phases as described in Section 2.2.

2.2 Construction and Installation

Phase I – Temporary Bulkhead Installation

Phase I of the Project will consist of the installation of a temporary bulkhead immediately waterward (approximately 5 feet to the north) of the section of bulkhead and upland area proposed for repair. The temporary bulkhead would be installed approximately nine months prior to initiation of Phase II of the Project (described below). Once installed, the temporary bulkhead would be located approximately 1,075 feet from the federal channel limits of the Corpus Christi Ship Channel. Installation of this temporary structure is necessary to shield workers and materials from wakes generated from passing ships during construction of the Project. To install the temporary bulkhead, approximately 15 straight steel I-beam columns measuring 22 feet in length will be hammered a minimum of 10 feet below the current mudline of the waterbody. Once in place, 15 I-beam supports measuring 27 feet in length will be hammered in at 30-degree angles to reinforce each I-beam column. Next, I-beam whalers will be installed across the I-beam columns to complete the framework of the temporary bulkhead. Approximately 300 linear feet of steel sheet piling will then be jetted a minimum of 10 feet below the current mudline of the waterbody and secured to the whalers.

Once complete, approximately 200 cubic yards of rock rip-rap would be temporarily installed within 5 feet of the temporary bulkhead to provide reinforcement.

Phase II – Permanent Bulkhead Installation

Phase II of the Project will consist of the permanent installation of 240 linear feet of steel sheet piling along the same alignment path of the damaged bulkhead. Each panel of sheet pile would measure 20 feet in length and 6 feet in width and be jetted approximately 10 feet below the mudline of the washed-out area. Once in place, an additional 275 linear feet of permanent sheet piling would be installed 40 feet to the south. In total, approximately 86 panels of sheet pile would be jetted during Phase II of the Project. Neither vibratory nor impact driving would occur during sheet pile installation.

Once complete, the temporary bulkhead will be removed in its entirety from the waterbody along with the 200 cubic yards of temporary rip-rap installed during Phase I of the Project. Next, approximately 5,695 cubic yards (4,145 cubic yards below the Mean High Tide Line [HTL]) of native backfill would be placed between each linear section of sheet pile along with the bulkhead anchoring system. A total of 410 cubic yards of cement stabilized backfill would then been added on top of the native backfill, followed by an 8-inch-thick concrete cap. Once the concrete cap is in place, 370 cubic yards of rock revetment measuring 20 feet in width and 275 feet in length would be installed along the shoreward side of the repaired bulkhead. Upon completion of bulkhead installation, an approximate 100-foot by 430-foot washed out area that existed as uplands prior to the storm would be reestablished via placement of approximately 10,795 cubic yards (10,405 cubic yards below the HTL) of native backfill material (**Attachment 1**).

The following list of heavy machinery will be required throughout construction of the Project:

- Komatsu 380 Loader / John Deere 644 Loader/ Caterpillar 950 Loader / or equivalent size;
- Komatsu 360 Excavator / John Deere 380 Excavator / Caterpillar 336 Excavator / or equivalent size;
- D6 Bulldozer;
- 24 Cubic Yard Belly Dump Truck;
- Standard Concrete Truck;
- 60 Ton Lattice Boom Crawler Crane (80' Maximum Boom Height); and
- Water Jetting Equipment to Install Sheet Pilings.

Machinery and equipment would access and operate at the Project site via barge from within the Corpus Christi Ship Channel or from land off of Port Street. Barge mounted equipment would be staged approximately 1,000 feet south of the federally maintained limits of the Corpus Christi Ship Channel as depicted on the Project plan view mapping exhibits provided in (**Attachment 1**). Barges would only be utilized in areas containing sufficient draft depths. As such, no dredging would occur during ingress/egress or construction of the Project.

3.0 ALTERNATIVES ANALYSIS

Under the no-action alternative, the City would not construct the proposed Project. If the proposed Project is not constructed, the sensitive aquatic resource habitats (e.g., wetlands and sandflats) that have been exposed to continual wake action generated from large vessels traveling down the ship channel, and degraded through erosion and deepening, would not be protected, and the degradation of these resources would continue. Additionally, adjacently located upland areas would also be subject to further erosion, which would eventually result in the loss of an existing pavilion currently utilized by the public while visiting the Charlie's Pasture Nature Preserve. The Project is crucial to ensure the City is able to protect these resources. The no-action alternative would not meet the purpose and need of the Project; therefore, this alternative was dismissed from further consideration.

Site alternatives were not evaluated, as the purpose of the Project is to repair a damaged bulkhead and protect sensitive aquatic resources that are degrading. Therefore, the purpose of the project cannot be met by constructing in a different location.

4.0 ESSENTIAL FISH HABITAT IN THE PROJECT AREA

Within the Project region, all waterbodies and wetlands that are tidally-influenced and are accessible to federally-managed species are considered EFH (NMFS, 2017). In addition, the City utilized the NMFS EFH Mapper (2019) to determine if any designated Habitat Areas of Particular Concern or EFH Areas Protected from Fishing are present in the Project area. No Habitat Areas of Particular Concern or EFH Areas Protected from Fishing would be impacted by the Project; however, the entirety of the Project occurs in areas designated as EFH for many species, including shrimp, various reef fish, red drum, and various sharks. Table 1 below identifies the species and associated life stages for which EFH is present within the Project area. Habitat types present within the Project workspaces were determined based on field surveys and aerial imagery and consist of estuarine mud/soft bottoms and estuarine pelagic. No submerged aquatic vegetation, reef habitats, or mangroves are present within the Project area.

Table 1
Life Stage Occurrence for Species with Essential Fish Habitat in the Project Area

Managed Species	Habitat type in the Project Area	Life Stages Occurrence
Shrimp		
Brown shrimp *Penaeus aztecus*	Estuarine mud/soft bottom	Early juvenile
White shrimp *Penaeus setiferus*	Estuarine mud/soft bottom	Early juvenile
Reef Fish		
Gray (mangrove) snapper *Lutjanus griseus*	Estuarine mud/soft bottom	Adult
Lane snapper *Lutjanus synagris*	Estuarine mud/soft bottom	Early juvenile and late juvenile
Red Drum		
Red drum *Sciaenops ocellatus*	Estuarine mud/soft bottom	Larvae, post larvae, early juvenile, and adult
Gulf Highly Migratory Species		
Great Hammerhead shark *Sphyrna mokarran*	N/A [a]	Neonate, juvenile, and adult
Scalloped hammerhead shark *Sphyrna lewini*	N/A [a]	Neonate and juvenile
Blacktip shark *Carcharhinus limbatus*	N/A [a]	Neonate, juvenile, and adult
Bull shark *Carcharhinus leucas*	N/A [a]	Neonate, juvenile, and adult
Lemon shark *Negaprion brevirostris*	N/A [a]	Neonate and adult
Spinner shark *Carcharhinus brevipinna*	N/A [a]	Neonate and juvenile

Table 1
Life Stage Occurrence for Species with Essential Fish Habitat in the Project Area

Managed Species	Habitat type in the Project Area	Life Stages Occurrence
Bonnethead shark *Sphyrna tiburo*	N/A [a]	Neonate, juvenile, and adult
Atlantic sharpnose shark *Rhizoprionodon terraenovae*	N/A [a]	Neonate, juvenile, and adult
Finetooth shark *Carcharhinus isodon*	N/A [a]	Neonate

Source: National Marine Fisheries Service, 2009; Gulf of Mexico Fishery Management Council, 2004

[a] Highly migratory species, which includes apex predators whose removal may induce cascading changes in the ecosystem, are not characterized by particular habitats due to their migratory behavior.

4.1 Shrimp

EFH for the Shrimp Fishery Management Plan (FMP) consists of all Gulf of Mexico (GOM) estuaries; GOM waters and substrates extending from the US/Mexico border to Fort Walton Beach, Florida from estuarine waters out to depths of 100 fathoms; waters and substrates extending from Grand Isle, Louisiana to Pensacola Bay, Florida between depths of 100 and 325 fathoms; waters and substrates extending from Pensacola Bay, Florida to the boundary of areas covered by the Gulf of Mexico Fishery Management Council (GOMFMC) and the South Atlantic Fishery Management Council (SAFMC) out to depths of 35 fathoms, with the exceptions of waters extending from Crystal River, Florida to Naples, Florida between depths of 10 and 25 fathoms and in Florida Bay between depths of 5 and 10 fathoms (GOMFMC, 2004).

Brown shrimp and white shrimp have similar life histories, occurring in estuarine environments as early juveniles where they feed on plankton. Adults spawn in deep water in the GOM, with newly hatched shrimp carried into estuaries by tides (NMFS, 2020a, 2020b).

4.2 Reef Fish

EFH for the Reef Fish FMP consists of all GOM estuaries, as well as GOM waters and substrates extending from the US/Mexico border to the boundary between the areas covered by the GOMFMC and the SAFMC from estuarine waters out to depths of 100 fathoms (GOMFMC, 2004).

Gray snapper occur in estuarine environments as juveniles and adults, and gradually move into offshore environments as they grow larger (GOMFMC, 2020a). Juvenile lane snapper are commonly found in shallow, protected estuarine environments. Adults also occur in these environments, as well as in coral reefs (GOMFMC, 2020b).

4.3 Red Drum

EFH for the Red Drum FMP consists of all GOM estuaries; GOM waters and substrates from Vermilion Bay, Louisiana to the eastern edge of Mobile Bay, Alabama out to depths of 25 fathoms; waters and substrates extending from Crystal River, Florida, to Naples, Florida between depths of 5 and 10 fathoms; waters and substrates extending from Cape Sable, Florida to the boundary between the areas covered by the GOMFMC and the SAFMC between depths of 5 and 10 fathoms (GOMFMC, 2004).

Red drum occur in estuarine environments in all life stages, preferring shallow water in bays and the surf zone with mud bottoms and submerged aquatic vegetation. Red drum are also commonly found around oyster reefs. Spawning occurs in open waters in the GOM, around the mouths of passes and shorelines,

and the larvae are carried into tidal bays by the current. Red drum are typically bottom feeders, feeding on crabs, shrimp and marine worms (Texas Parks and Wildlife Department, 2020).

4.4 Highly Migratory Species

Estuarine waters found in the Project area provide EFH for nine highly migratory species (HMS) at various life stages, potentially entering the Project area to forage. Details of EFH for these species in eco-region 5, where the Project is located, are provided in Table 1.

5.0 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

The Project would permanently impact approximately 1.20 acres of EFH. However, the purpose of the Project is to replace a bulkhead and reestablish uplands that were destroyed by hurricane Harvey. Therefore, the EFH that would be impacted by the Project did not exist before the discrete event. EFH impacted by the temporary bulkhead will be allowed to return to pre-construction conditions after the bulkhead has been removed.

Temporary impacts from Project construction activities would include increases in turbidity and disturbance of the water bottom within open water habitat; however, these impacts would be short-term and negligible, as areas of disturbance would quickly return to pre-construction conditions. Minor increases in turbidity and sedimentation during Project activities could result in a temporary decrease in water quality. Due to the minor amount and duration of disturbance proposed for the Project it is anticipated that turbidity associated with the Project will remain within a localized area, quickly returning to ambient conditions following the completion of Project activities. Foraging individuals and their prey may be temporarily disturbed and displaced by Project construction activities.

While the Project will reduce tidal flow to the area south of the replacement bulkhead and reestablished uplands, damage to a second bulkhead to the west of the Project area will ensure that the area will still be tidally influenced; therefore, the Project will not indirectly impact EFH south of the replacement bulkhead.

6.0 PROPOSED CONSERVATION MEASURES AND GUIDELINES FOR EFH PROTECTION

No compensatory mitigation is proposed for the Project as the purpose of the Project is to replace a bulkhead and reestablish uplands that were destroyed by hurricane Harvey, and is therefore impacting EFH that did not exist before the discrete event. To minimize impacts to EFH during construction, the City will implement the use of silt fences and turbidity barriers (as necessary), installed in a manner to reduce the risk of entanglement, in the Project area. Where needed, silt fence and turbidity barriers will minimize disturbance to the water bottom by preventing movement of sediment outside of the Project area. Further, these measures will minimize short-term impacts to water quality in the areas surrounding the Project by containing turbid waters to the Project area until construction activities cease and the water returns to pre-construction conditions.

7.0 CONCLUSION

The Project will permanently impact 1.20 acres of EFH, however; as stated above, the purpose of the Project is to replace a previously existing bulkhead and uplands, and will therefore impact EFH that did not exist before the bulkhead was destroyed. Impacts associated with Project construction activities will be temporary and localized. Further, the City will implement best management practices such as the use of silt fences and turbidity barriers to minimize impacts to EFH. Based on the discussion above, the Project will have minor impacts on EFH.

8.0 REFERENCES

Gulf of Mexico Fishery Management Council. 2020a. Gray Snapper. https://gulfcouncil.org/fishing-regulations/gray-snapper-lutjanus-griseus/. Accessed August 2020.

Gulf of Mexico Fishery Management Council. 2020b. Lane Snapper. https://gulfcouncil.org/fishing-regulations/lane-snapper-lutjanus-synagris/. Accessed August 2020.

Gulf of Mexico Fishery Management Council. 2004. Final Environmental Impact Statement for the Generic Essential Fish Habitat Amendment to the following fishery management plans of the Gulf of Mexico: Shrimp Fishery of the Gulf of Mexico, Red Drum Fishery of the Gulf of Mexico, Reef Fish Fishery of the Gulf of Mexico, Stone Crab Fishery of the Gulf of Mexico, Coral and Coral Reef Fishery of the Gulf of Mexico, Spiny Lobster Fishery of the Gulf of Mexico and South Atlantic; Coastal Migratory Pelagic Resources of the Gulf of Mexico and South Atlantic. https://gulfcouncil.org/wp-content/uploads/March-2004-Final-EFH-EIS.pdf. Accessed August 2020.

National Marine Fisheries Service. 2020a. Brown Shrimp. https://www.fisheries.noaa.gov/species/brown-shrimp#:~:text=Brown%20shrimp%20are%20crustaceans%20with,outer%20edge%20of%20the%20eyes. Accessed August 2020.

National Marine Fisheries Service 2020b. White Shrimp. https://www.fisheries.noaa.gov/species/white-shrimp. Accessed August 2020.

National Marine Fisheries Service. 2019. Essential Fish Habitat Mapper. http://www.habitat.noaa.gov/protection/efh/efhmapper/. Accessed August 2020.

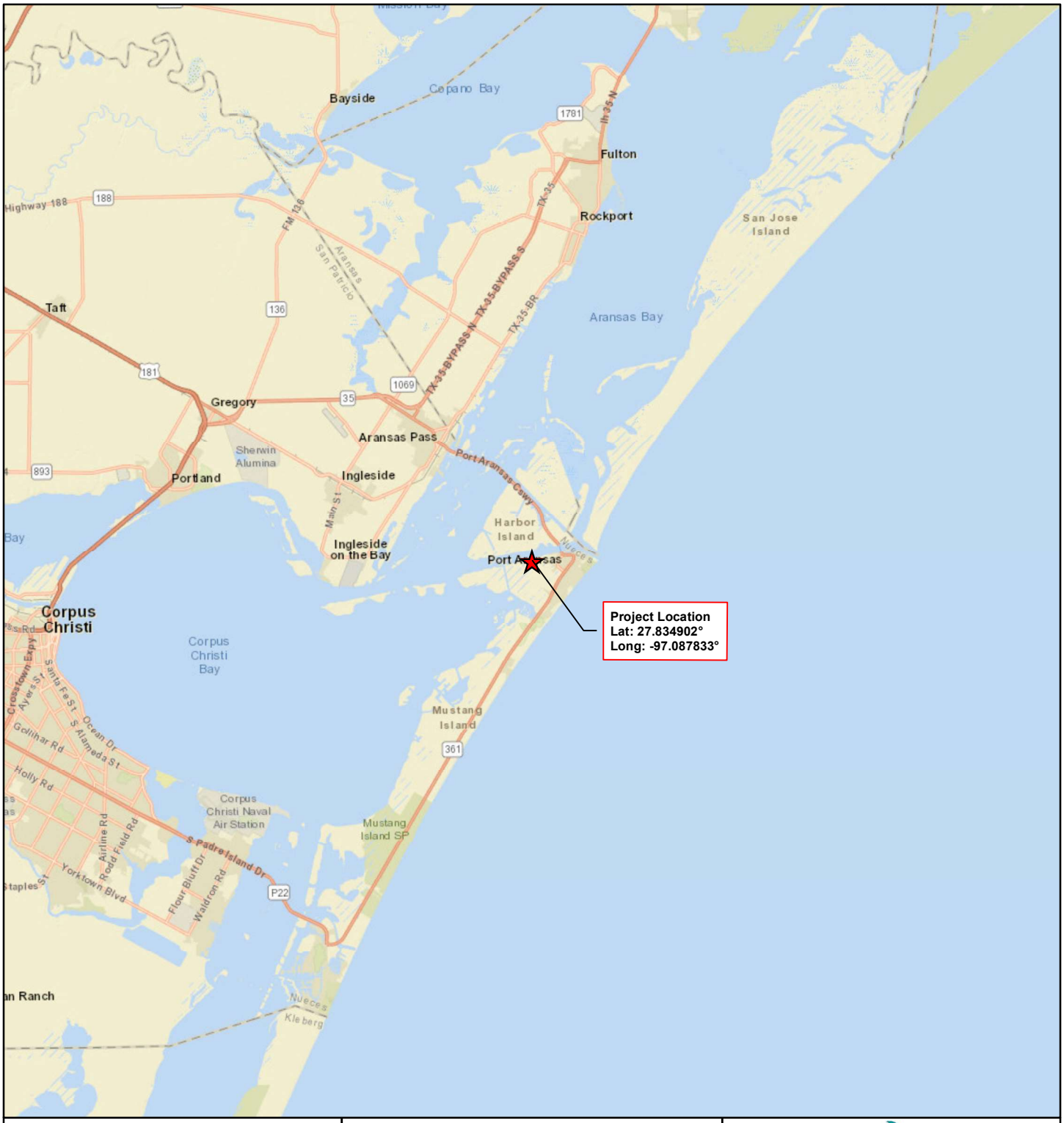
National Marine Fisheries Service. 2017. Understanding Essential Fish Habitat. https://www.fisheries.noaa.gov/insight/understanding-essential-fish-habitat. Accessed August 2020.

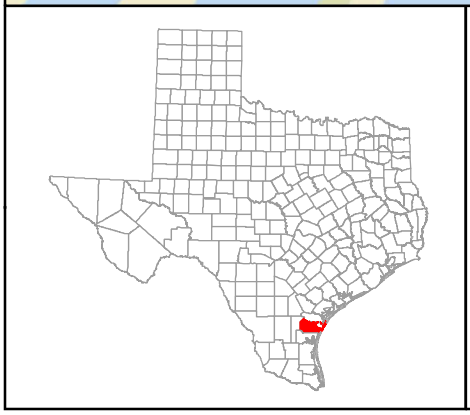
National Marine Fisheries Service. 2009. Amendment 1 to the Consolidated Atlantic Highly Migratory Species Fishery Management Plan: Essential Fish Habitat. https://www.fisheries.noaa.gov/action/amendment-1-2006-consolidated-hms-fishery-management-plan-essential-fish-habitat. Accessed August 2020.

Texas Parks and Wildlife. 2020. Red Drum. https://tpwd.texas.gov/huntwild/wild/species/reddrum/#:~:text=Red%20drum%20is%20a%20fast,is%2059%201%2F2%20pounds. Accessed August 2020.

Attachment 1

Project Mapping





Project Location

0 2.5 5 Miles

PERENNIAL

Vicinity Map
Charlie's Pasture Upland
Bulkhead Repair Project
City of Port Aransas
Nueces County, Texas

Page 1 of 1	Scale: 1:350,000
NAD83 TX-S ft.	Date: April, 2019

Path: P:\GIS\Client\Urban_Engineering\ParkBounds\Maps\ENV\Other\20190408_Vicinity\MXD\1_Vicinity.mxd

Author: AB

APPENDIX B – GEOTECHNICAL DATA REPORT FOR PORT ARANSAS PRESERVE WASHOUT REPAIR, PORT ARANSAS, TEXAS

• GEOTECHNICAL ENGINEERING
• MATERIALS ENGINEERING & TESTING
• SOILS • ASPHALT • CONCRETE

GEOTECHNICAL DATA REPORT
FOR THE PROPOSED
PORT ARANSAS NATURE PRESERVE WASHOUT REPAIR
PORT ARANSAS, TEXAS

RETL REPORT NUMBER: G120151

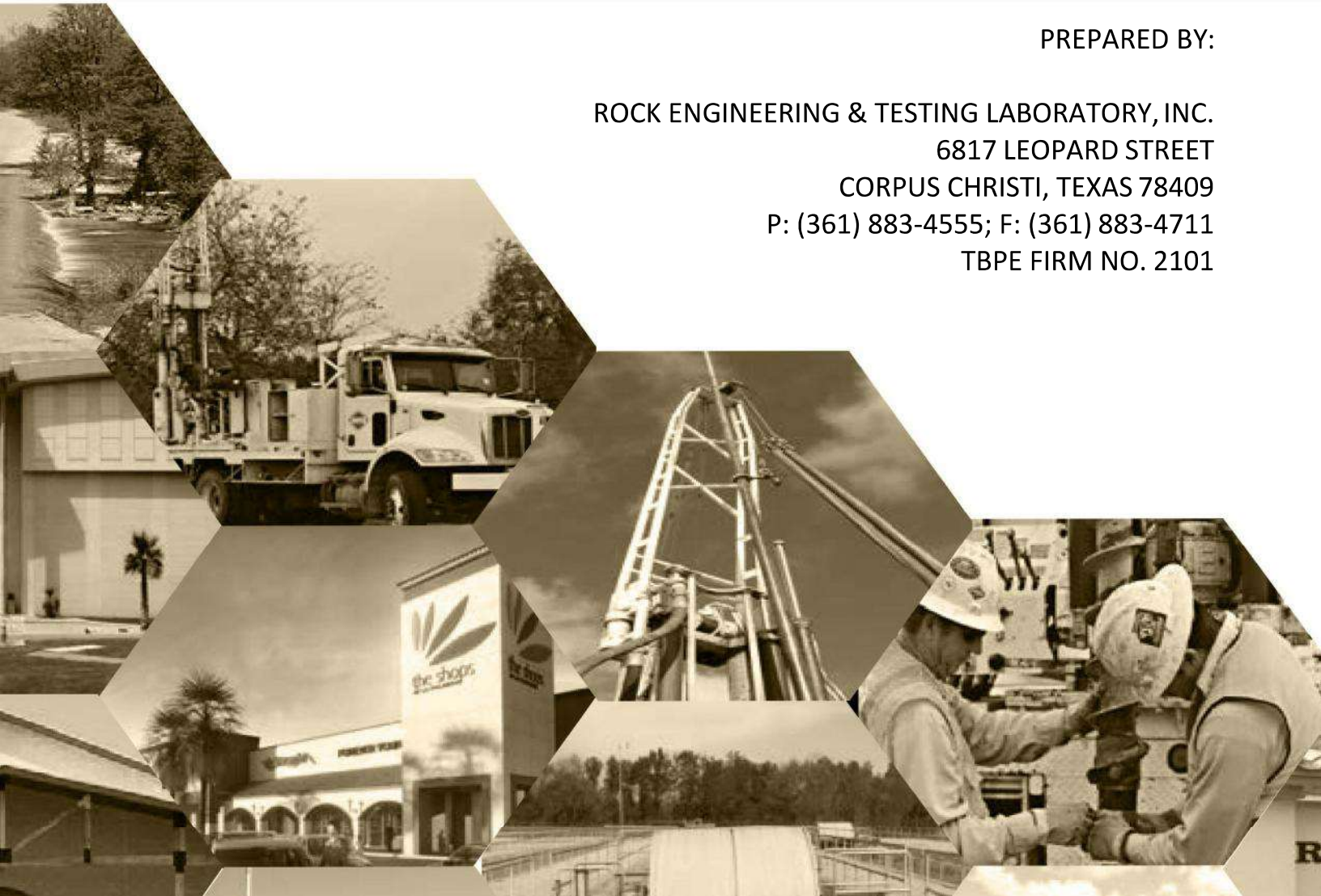
PREPARED FOR:

URBAN ENGINEERING
2725 SWANTNER AVENUE
CORPUS CHRISTI, TEXAS 78404

APRIL 13, 2020

PREPARED BY:

ROCK ENGINEERING & TESTING LABORATORY, INC.
6817 LEOPARD STREET
CORPUS CHRISTI, TEXAS 78409
P: (361) 883-4555; F: (361) 883-4711
TBPE FIRM NO. 2101



- GEOTECHNICAL ENGINEERING
- CONSTRUCTION MATERIALS ENGINEERING & TESTING
- SOILS • ASPHALT • CONCRETE

April 13, 2020

Urban Engineering
2725 Swantner Avenue
Corpus Christi, Texas 78404

Attention: Mr. William C. Causey, Jr. P.E.

SUBJECT: **SUBSURFACE INVESTIGATION, LABORATORY TESTING PROGRAM, AND GEOTECHNICAL DATA REPORT**
FOR THE PROPOSED
PORT ARANSAS NATURE PRESERVE WASHOUT REPAIR
Port Aransas, Texas
RETL Job No. – G120151

Dear Mr. Causey,

In accordance with our agreement, we have conducted a subsurface investigation and laboratory testing program for the above referenced project. The results of this investigation are to be found in the accompanying data report, one electronic copy of which is being transmitted for your records.

Often, because of design and construction details that occur on a project, questions arise concerning soil conditions and Rock Engineering and Testing Laboratory, Inc. (RETL) (TBPE Firm No. 2101), would be pleased to continue its role as the Geotechnical Engineer during project implementation.

RETL also has great interest in providing materials testing and observation services during the construction/repair phase of this project. If you will advise us of the appropriate time to discuss these engineering services, we will be pleased to meet with you at your convenience.

Sincerely,

STATE OF TEXAS
JAMES P. BAUER
129201
LICENSED
PROFESSIONAL ENGINEER

James P. Bauer, P.E.
Corpus Christi Branch Manager

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www.rocktesting.com

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APPENDIX

Boring Location Plan

Boring Log B-1

Key to Soil Classification and Symbols

INTRODUCTION

This geotechnical data report presents the results of a soils exploration and laboratory testing to be used for the Port Aransas Nature Preserve Washout Repair project located in Port Aransas, Texas. This study was conducted for Urban Engineering.

Authorization

The scope of work for this project was performed in accordance with a Rock Engineering and Testing Laboratory, Inc. (RETL) Proposal No. P031120A dated March 11, 2020. The scope of the proposal was approved, and our services were authorized on March 11, 2020 by Mr. William Causey representing Urban Engineering and returned to RETL via email.

Purpose and Scope

The purpose of this exploration was to evaluate the soil and groundwater conditions at the site and to provide a discussion of the subsurface materials encountered. The scope of work included the subsurface exploration and laboratory testing. The scope of work for this project was determined by the client. The scope of work for this project did not include an environmental assessment. Any statements in this report, or on the boring logs, regarding odors, colors, unusual or suspicious items or conditions are strictly for the information of the client.

General

The information submitted in this report are based on our understanding of the necessary information requested by Urban Engineering and the soil information obtained at the boring location. If the designers require additional soil parameters to complete the design of the washout repair, and this information can be obtained from the soil data and laboratory tests performed within the scope of work included in our proposal for this project, then RETL will provide the additional information requested as a supplement to this report.

The Geotechnical Engineer states that the findings contained herein have been presented after being prepared in a manner consistent with that level of care and skill ordinarily exercised by reputable members of the Geotechnical Engineer's profession practicing contemporaneously under similar conditions in the locality of the project. RETL operates in general accordance with, "*Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction*, (ASTM D3740)." No other representations are expressed or implied, and no warranty or guarantee is included or intended. The scope of work for this project did not include engineering analyses and provisions of design or construction recommendations for the proposed project.

This study was conducted for Urban Engineering for the specific application to the proposed Port Aransas Nature Preserve Washout Repair project located at Port Aransas, Texas.

SITE LOCATION AND DESCRIPTION

The site of the Port Aransas Nature Preserve Washout Repair project is located within the existing Port Aransas Nature Preserve and approximately 1,300 feet east of the intersection of Ross Avenue and Clark Parkway in Port Aransas, Texas. The site was relatively level and grass covered, behind fence and gated areas, and required owner coordination to access the site. At the time of our field investigation the condition of the ground surface was firm and did not pose any significant difficulties to the drill crew moving their equipment.

FIELD EXPLORATION

Scope

The field exploration, to evaluate the subsurface materials, included reconnaissance of the project site, performing the test boring operations and obtaining disturbed split-spoon samples. During the sample recovery operations, the soils encountered were classified and recorded on the boring log in accordance with "*Standard Guide for Field Logging of Subsurface Exploration of Soil and Rock*, (ASTM D5434)."

One boring was performed for the purpose of providing subsurface soil and groundwater information. The table below provides the boring identification, boring depth and the GPS coordinates.

Summary of Boring Information		
Boring Identification	**Boring Depth (ft)**	**GPS Coordinates**
B-1	35	N 27.83252° W 97.07708°

Urban Engineering determined the number, general location and depth of the boring, and RETL performed the drilling operations. The GPS coordinates were obtained at the boring location using a Garmin GPS model eTrex and are provided in this report and on the boring log.

Upon completion of the drilling operations and obtaining the groundwater observations, the boring was backfilled with excess soils obtained during drilling operations. A Boring Location Plan is provided in the Appendix of this report.

The boring performed for this project was used to determine the classification and strengths of the subsurface soils. The information provided on the boring log includes boring location, boring depth, soil classification, soil strengths, and laboratory test results. The boring log is included in the Appendix.

Drilling and Sampling Procedures

The test boring was performed using a drilling rig equipped with a rotary head turning hollow stem augers to advance the borehole. Disturbed soil samples were obtained employing split-barrel sampling procedures in general accordance with the procedures for, "*Penetration Test and Split-Barrel Sampling of Soils,* (ASTM D1586)."

The samples were visually classified, placed in plastic bags, marked according to boring number, depth and any other pertinent field data, stored in special containers and delivered to the laboratory for testing.

Field Tests Observations

Penetration Tests – During the sampling procedures, standard penetration tests (SPT) were performed to obtain the standard penetration value of the soil at selected intervals. The standard penetration value (N) is defined as the number of blows of a 140-pound hammer, falling 30 inches, required to advance the split-barrel sampler 1 foot into the soil. The sampler is lowered to the bottom of the previously cleaned drill hole and advanced by blows from the hammer. The number of blows is recorded for each of three successive 6-inch penetrations. The "N" value is obtained by adding the second and third 6-inch increment number of blows. An automatic hammer was utilized when performing SPT. An automatic hammer is usually taken as having an efficiency of one. The results of standard penetration tests indicate the relative density of cohesionless soils and comparative consistency of cohesive soils, thereby providing a basis for estimating the relative strength and compressibility of the soil profile components.

Water Level Observations – Water level observations were obtained during the test boring operations. Water level observations are noted on the boring log provided in the Appendix. In relatively pervious soils, such as sandy soils, the indicated depths are usually reliable groundwater levels. In relatively impervious soils, a suitable estimate of the groundwater depth may not be possible, even after several days of observation. Seasonal variations, temperature, land-use, proximity to a creek, river or lake and recent rainfall conditions may influence the depth to the groundwater. The amount of water in an open borehole largely depends on the permeability of the soils encountered at the boring location.

Ground Surface Elevations – The ground surface elevation at the boring location was not provided, therefore, depths referred to in this report are from the ground surface at the boring location during the time of our field investigation.

LABORATORY TESTING PROGRAM

In addition to the field investigation, a laboratory testing program was conducted to determine additional pertinent engineering characteristics of the subsurface materials. The laboratory testing program included supplementary visual classification (ASTM D2487) and water content tests (ASTM D2216) on the samples. In addition, selected samples were subjected to Atterberg limits tests (ASTM D4318) and percent material finer than the #200 sieve tests (ASTM D1140).

The laboratory testing program was conducted in general accordance with applicable ASTM Specifications. The results of these tests are to be found on the accompanying boring log provided in the Appendix.

SUBSURFACE CONDITIONS

General

The soils encountered in the test boring have been visually classified and are described in detail on the boring log. The results of the field tests, water level observations, and other laboratory tests are presented on the boring log. Representative samples of the soils were placed in polyethylene bags and are now stored in the laboratory for further analysis, if desired. Unless notified to the contrary, the samples will be disposed of three months after issuance of this report.

The stratification of the soil, as shown on the boring log, represents the soil conditions at the actual boring location. Variations may occur away from the boring location. Lines of demarcation represent the approximate boundary between different soil types, but the transition may be gradual, or not clearly defined.

It should be noted that, whereas the test boring was drilled and sampled by experienced drillers, it is sometimes difficult to record changes in stratification within narrow limits. In the absence of foreign substances, it is also difficult to distinguish between discolored soils and clean soil fill.

Soil Conditions

The soil conditions encountered at the project site have been summarized and soil properties including soil classification, plasticity index, undrained shear strength, angle of internal friction, effective unit weight, percent finer than the No. 200 sieve and range of N-values are provided in the following table.

Soil Profile

D	Generalized Soil Description	PI	C	ϕ	γ_e	-#200	N
0 - 6	Silty **SAND**	NP	0	28	50	26	1 - 2
6 - 8	Poorly Graded **SAND**	NP	0	29	55	4	8
8 - 13	Poorly Graded **SAND**	--	0	31	55	--	13 - 22
13 - 18	Poorly Graded **SAND**	--	0	28	50	5	4
18 - 23	**CLAYEY** Sand	16	150	0	55	30	0
23 - 28	Poorly Graded **SAND**	--	0	28	50	--	3
28 - 35	**CLAYEY** SAND	30	200	0	55	30	2

Where:

PI = Plasticity Index
D = Depth in feet below existing grade
C = Soil Cohesion, psf (undrained)
ϕ = Angle of Internal Friction, deg. (undrained)
γ_e = Effective soil unit weight, pcf
-#200 = Percent passing the No. 200 sieve (%)
N = Standard Penetration Test (blows per foot)

Detailed descriptions of the soils encountered at the boring location, including soil classification, index properties and laboratory test results, are provided on the boring log included in the Appendix.

Groundwater Observations

Groundwater (GW) observations and the depth the boring caved are provided in the following table.

Groundwater Observations		
Boring	**During Drilling**	**Upon Completion of Drilling**
B-1	1 foot	GW at 1 foot and caved at 2 feet

It should be noted that the water level in open boreholes may require several hours to several days to stabilize depending on the permeability of the soils and that groundwater levels at this site may be subject to seasonal conditions, recent rainfall, drought or temperature effects.

GENERAL COMMENTS

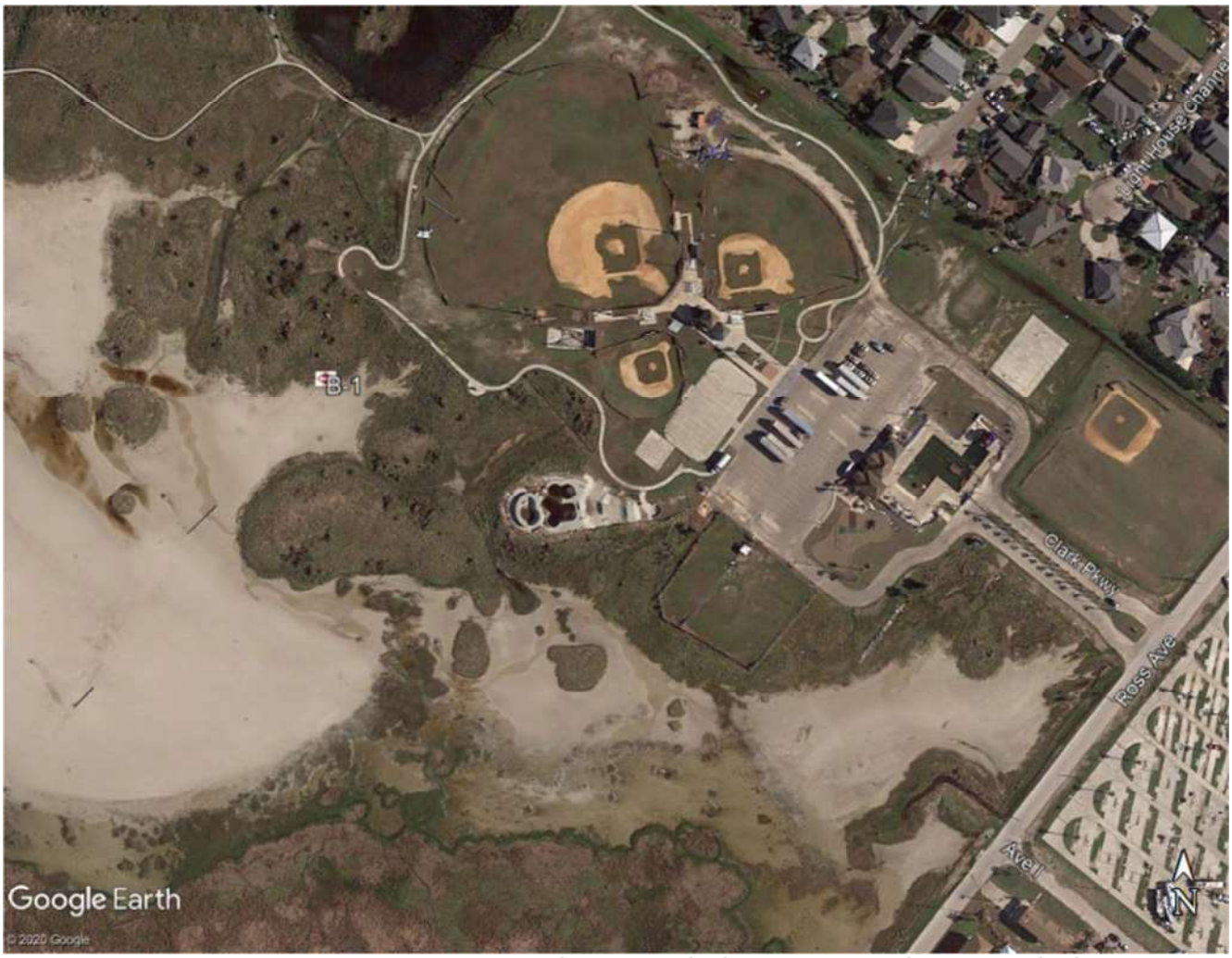
RETL cannot accept any responsibility for any conditions that deviate from those described in this report, nor for the performance of repaired washout area if not engaged to also provide construction observation and testing for this project. If it is required for RETL to accept any liability, then RETL must agree with the plans and perform such observation during construction as we recommend.

All sheeting, shoring and bracing of trenches, pits and excavations should be made the responsibility of the contractor and should comply with all current and applicable local, state and federal safety codes, regulations and practices, including the Occupational Safety and Health Administration.

APPENDIX

- GEOTECHNICAL ENGINEERING
- CONSTRUCTION MATERIALS ENGINEERING & TESTING
- SOILS • ASPHALT • CONCRETE

BORING LOCATION PLAN



April 13, 2020
Attn: Mr. William C. Causley, Jr., P.E.
RETL Job Number: G120151

PORT ARANSAS NATURE PRESERVE WASHOUT REPAIR
Port Aransas, Texas

ROCK ENGINEERING & TESTING LABORATORY, INC.

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www.rocktesting.com

LOG OF BORING B-1

Rock Engineering & Testing Lab. Inc
6817 Leopard Street
Corpus Christi, Texas 78409
Telephone:
Fax:

CLIENT: Urban Engineering
PROJECT: Port Aransas Nature Preserve Washout Repair
LOCATION: Port Aransas, Texas
NUMBER: G120151
DATE(S) DRILLED: 3/20/2020

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater (GW) was encountered at a depth of 1 foot during drilling.
GW at 1 foot and caved at 2 feet upon completion.

SURFACE ELEVATION: N/A

FIELD DATA					LABORATORY DATA							
SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT LL	ATTERBERG LIMITS: PLASTIC LIMIT PL	ATTERBERG LIMITS: PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		SS S-1		N= 2	31	26	NP	NP			26	**SILTY SAND**, brown, moist, very loose. (SC)
	5	SS S-2		N= 1	28							Same as above, greenish gray.
		SS S-3		N= 8	30	NP	NP	NP			4	**POORLY GRADED SAND**, moist, loose. (SP)
	10	SS S-4		N= 22	24							Same as above, medium.
		SS S-5		N= 13	25							Same as above.
	15	SS S-6		N= 4	26						5	Same as above, loose.
	20	SS S-7		N= 0	27	31	15	16			30	**CLAYEY SAND**, greenish gray, moist, very soft. (SC)
	25	SS S-8		N= 3	24							**POORLY GRADED SAND**, greenish gray, moist, very loose.
	30	SS S-9		N= 2	31	29	15	14			30	**CLAYEY SAND**, greenish gray, moist, very soft. (SC)
	35	SS S-10		N= 2	28							Same as above.
												Boring was terminated at a depth of 35 feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Drilling operations were performed by RETL at GPS Coordinates
N° 27.83252 W° 97.07708

Engineering & Testing
Laboratory, Inc.

Rock Engineering & Testing Laboratory
6817 Leopard Street
Corpus Christi, TX 78409-1703
Telephone: 361-883-4555
Fax: 361-883-4711

KEY TO SOIL CLASSIFICATION AND SYMBOLS

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		SYMBOL	NAME
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well Graded Gravels or Gravel-Sand mixtures, little or no fines
		GP	Poorly Graded Gravels or Gravel-Sand mixtures, little or no fines
		GM	Silty Gravels, Gravel-Sand-Silt mixtures
		GC	Clayey Gravels, Gravel-Sand-Clay Mixtures
	SAND AND SANDY SOILS	SW	Well Graded Sands or Gravelly Sands, little or no fines
		SP	Poorly Graded Sands or Gravelly Sands, little or no fines
		SM	Silty Sands, Sand-Silt Mixtures
		SC	Clayey Sands, Sand-Clay mixtures
FINE GRAINED SOILS	SILTS AND CLAYS LL < 50	ML	Inorganic Silts and very fine Sands, Rock Flour, Silty or Clayey fine Sands or Clayey Silts
		CL	Inorganic Clays of low to medium plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
		OL	Organic Silts and Organic Silt-Clays of low plasticity
	SILTS AND CLAYS LL > 50	MH	Inorganic Silts, Micaceous or Diatomaceous fine Sandy or Silty soils, Elastic Silts
		CH	Inorganic Clays of high plasticity, Fat Clays
		OH	Organic Clays of medium to high plasticity, Organic Silts
HIGHLY ORGANIC SOILS		PT	Peat and other Highly Organic soils

TERMS CHARACTERIZING SOIL STRUCTURE

SLICKENSIDED - having inclined planes of weakness that are slick and glossy in appearance

FISSURED - containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical

LAMINATED (VARVED) - composed of thin layers of varying color and texture, usually grading from sand or silt at the bottom to clay at the top

CRUMBLY - cohesive soils which break into small blocks or crumbs on drying

CALCAREOUS - containing appreciable quantities of calcium carbonate, generally nodular

WELL GRADED - having wide range in grain sizes and substantial amounts of all intermediate particle sizes

POORLY GRADED - predominantly of one grain size uniformly graded) or having a range of sizes with some intermediate size missing (gap or skip graded)

SYMBOLS FOR TEST DATA

- Groundwater Level (Initial Reading)
- Groundwater Level (Final Reading)
- Shelby Tube Sample
- SPT Samples
- Auger Sample
- Rock Core

TERMS DESCRIBING CONSISTENCY OF SOIL

COARSE GRAINED SOILS		FINE GRAINED SOILS		
DESCRIPTIVE TERM	NO. BLOWS/FT. STANDARD PEN. TEST	DESCRIPTIVE TERM	NO. BLOWS/FT. STANDARD PEN. TEST	UNCONFINED COMPRESSION TONS PER SQ. FT.
Very Loose	0 - 4	Very Soft	< 2	< 0.25
Loose	4 - 10	Soft	2 - 4	0.25 - 0.50
Medium	10 - 30	Firm	4 - 8	0.50 - 1.00
Dense	30 - 50	Stiff	8 - 15	1.00 - 2.00
Very Dense	over 50	Very Stiff	15 - 30	2.00 - 4.00
		Hard	over 30	over 4.00

Field Classification for "Consistency" is determined with a 0.25" diameter penetrometer