# FOR BID DOCUMENTS
# FOR

# LABRANCHE SHORELINE PROTECTION PROJECT
# (PO-0194)

# ST CHARLES PARISH, LOUISIANA

## STATE OF LOUISIANA
## COASTAL PROTECTION AND RESTORATION AUTHORITY

## JULY 2023

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**ADVERTISEMENT FOR BIDS**

Sealed bids will be received for the State of Louisiana by the Coastal Protection and Restoration Authority, 150 Terrace Avenue, 4th Floor Conference Center, Baton Rouge, Louisiana 70802 until 2:00 P.M., **Tuesday, October 3, 2023.**

ANY PERSON REQUIRING SPECIAL ACCOMMODATIONS SHALL NOTIFY THE COASTAL PROTECTION AND RESTORATION AUTHORITY OF THE TYPE(S) OF ACCOMMODATION REQUIRED NOT LESS THAN SEVEN (7) DAYS BEFORE THE BID OPENING.

FOR: **LaBranche Shoreline Protection Project**
**St. Charles Parish, Louisiana**

PROJECT NUMBER: **PO-0194**

Complete Bid Documents for this project are available in electronic form. They may be obtained without charge and without deposit from http://coastal.la.gov/resources/rfps-rsiqs-contracts/bids/. Printed copies can also be obtained from:

COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA)
150 Terrace Avenue
Baton Rouge, LA 70802
Attn: Sharissa Felder
E-mail: cpra.bidding@la.gov Phone: (225) 342-0811 Fax: (225) 800-5599

All bids shall be accompanied by bid security in an amount of five percent (5.0%) of the sum of the base bid and all alternates. The form of this security shall be as stated in the Instructions to Bidders included in the Bid Documents for this project.

The successful Bidder shall be required to furnish a Performance and Payment Bond written as described in the Instructions to Bidders included in the Bid Documents for this project.

**A NON-MANDATORY PRE-BID CONFERENCE WILL BE HELD at**
**10:00 AM on Tuesday, September 19, 2023 at 150 Terrace Avenue, Baton Rouge, LA 70802**
**and via Zoom webinar at: https://us06web.zoom.us/j/89392818782**
Meeting audio may be accessed through your computer/device. If your computer/device does not have audio, meeting audio can be accessed via phone with the following call-in information:
Conference Line Phone Number: (636) 651-3142; Conference code: 763667

Contact Travis Moore at (225)342-4737 with any questions or issues related to the webinar link.

It is the responsibility of all potential bidders to visit the jobsite to access the location, logistics, and site conditions prior to bidding.

Bids shall be accepted from Contractors who are licensed under LA. R.S. 37:2150-2192 for the classification of **Heavy Construction**. In accordance with LA. R.S. 37:2163(D), anyone objecting to the classification must send a certified letter to both the Louisiana State Licensing Board for Contractors and the CPRA at the address listed above. The letter must be received no later than ten (10) working days prior to the day on which bids are to be opened.

Bidder is required to comply with provisions and requirements of LA R.S.38:2212(B)(5). No bid may be withdrawn for a period of forty-five (45) calendar days after receipt of bids, except under the provisions of LA. R.S. 38:2214.

The Owner reserves the right to reject any and all bids for just cause. In accordance with La. R.S. 38:2212(B)(1), the provisions and requirements of this Section; and those stated in the bidding documents shall not be waived by any entity.

When this project is financed either partially or entirely with State Bonds or financed in whole or in part by federal or other funds which are not readily available at the time bids are received, the award of this Contract is contingent upon the granting of lines of credit, or the sale of bonds by the Bond Commission or the availability of federal or other funds. The State shall incur no obligation to the Contractor until the Contract between Owner and Contractor is fully executed.

Coastal Protection and Restoration Authority is a participant in the Small Entrepreneurship (SE) Program (the Hudson Initiative) and the Veteran-Owned and Service-Connected Disabled Veteran-Owned (LaVet) Small Entrepreneurships Program. Bidders are encouraged to consider participation. Information is available from Coastal Protection and Restoration Authority or on its website at http://www.coastal.la.gov/.

STATE OF LOUISIANA, COASTAL PROTECTION AND RESTORATION AUTHORITY
GREGORY M. GRANDY, DEPUTY EXECUTIVE DIRECTOR

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# INSTRUCTIONS TO BIDDERS

**COMPLETION TIME:**

The Bidder shall agree to fully complete the contract within **Five Hundred (500)** consecutive calendar days for the Base Bid, an additional **Fifty (50)** consecutive calendar days for Alternate No. 1, an additional **Fifty (50)** consecutive calendar days for Alternate No. 2, subject to such extensions as may be granted under Section GP-44 of the General Provisions and acknowledges that this construction time will start on or before the date specified in the written "Notice to Proceed" from the Owner.

**LIQUIDATED DAMAGES:**

The Bidder shall agree to pay as Liquidated Damages the amount of **Three Thousand, Eight Hundred Thirty-Five Dollars ($3,835.00)** for each consecutive calendar day for which the work is not complete, beginning with the first day beyond the contract completion date stated on the "Notice to Proceed" or as amended by change order.

## ARTICLE 1

DEFINITIONS

1.1 The Bid Documents include the following:

Advertisement for Bids
Instructions to Bidders
Bid Form
Bid Bond
General Provisions
Special Provisions
Technical Specifications
Construction Drawings
Contract Between Owner and Contractor and Performance and Payment Bond
Affidavit
User Agency Documents (if applicable)
Change Order Form
Recommendation of Acceptance
Other Documents (if applicable)
Addenda issued during the bid period and acknowledged in the Bid Form

1.2 All definitions set forth in the General Provisions and the Special Provisions are applicable to the Bid Documents, unless otherwise specifically stated or written.

1.3 Addenda are written and/or graphic instruments issued by the Engineer prior to the opening of bids
which modify or interpret the Bid Documents by additions, deletions, clarifications, corrections and prior approvals.

1.4 A bid is a complete and properly signed proposal to do the work or designated portion thereof for the sums stipulated therein supported by data called for by the Bid Documents.

1.5 Base bid is the sum stated in the bid for which the Bidder offers to perform the work described as the base, to which work may be added, or deleted for sums stated in alternate bids.

1.6 An alternate bid (or alternate) is an amount stated in the bid to be added to the amount of the base bid if the corresponding change in project scope or materials or methods of construction described in the Bid Documents is accepted.

1.7 A Bidder is one who submits a bid for a prime Contract with the Owner for the work described in the Bid Documents.

1.8 A Sub-bidder is one who submits a bid to a Bidder for materials and/or labor for a portion of the work.

1.9 Where the word "Engineer" is used in any of the documents, it shall refer to the Prime Designer of the project, regardless of discipline.

## ARTICLE 2

PRE-BID CONFERENCE

2.1 A Pre-Bid Conference may be held at the time and location described in the Advertisement for Bids. The purpose of the Pre-Bid Conference is to familiarize Bidders with the requirements of the Project and the intent of the Bid Documents, and to receive comments and information from interested Bidders. If the Pre-Bid Conference and/or Job Site Visit is stated in the Advertisement for Bids to be a Mandatory Pre-Bid Conference and/or Mandatory Job Site Visit, bids shall be accepted only from those bidders who attend the Pre-Bid Conference and/or Job Site Visit. Contractors who are not in attendance for the entire Pre-Bid Conference and/or Job Site Visit will be considered to have not attended.

2.2 Any revision of the Bid Documents made as a result of the Pre-Bid Conference shall not be valid unless included in an addendum.

## ARTICLE 3

## BIDDER'S REPRESENTATION

3.1 Each Bidder by making his bid represents that:

3.1.1 He has read and understands the Bid Documents and his bid is made in accordance therewith.

3.1.2 He has visited the site and has familiarized himself with the local conditions under which the work is to be performed.

3.1.3 His bid is based solely upon the materials, systems and equipment described in the Bid Documents as advertised and as modified by addenda.

3.1.4 His bid is not based on any verbal instructions contrary to the Bid Documents and addenda.

3.1.5 He is familiar with the Code of Governmental Ethics requirement that prohibits public servants and/or their immediate family members from bidding on or entering into contracts; he is aware that the Designer and its principal owners are considered Public Servants under the Code of Governmental Ethics for the limited purposes and scope of the Design Contract with the State on this Project (see Ethics Board Advisory Opinion, No. 2009-378 and 2010-128); and neither he nor any principal of the Bidder with a controlling interest therein has an immediate family relationship with the Designer or any principal within the Designer's firm. (see La. R.S. 42:1113). Any Bidder submitting a bid in violation of this clause shall be disqualified and any contract entered into in violation of this clause shall be null and void.

3.2 The Bidder must be fully qualified under any State or local licensing law for Contractors in effect at the time and at the location of the work before submitting his bid. In the State of Louisiana, Revised Statutes 37:2150, et seq. will be considered, if applicable.

The Contractor shall be responsible for determining that all of his Sub-bidders or prospective Subcontractors are duly licensed in accordance with law.

## ARTICLE 4

## BID DOCUMENTS

4.1 Copies

4.1.1 Bid Documents may be obtained from the Coastal Protection and Restoration Authority as stated in the Advertisement for Bids.

4.1.1.2 In addition to the availability of printed Bid Documents, the Coastal Protection and Restoration Authority will provide the Bid Documents in electronic format. They may be obtained without charge and without deposit as stated in the Advertisement for Bids.

4.1.1.2.2 Where electronic distribution is provided, all other plan holders are responsible for their own reproduction costs.

4.1.2 Complete sets of Bid Documents shall be used in preparing bids; neither the Owner nor the Engineer assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bid Documents.

4.1.3 The Owner or Engineer in making copies of the Bid Documents available on the above terms, do so only for the purpose of obtaining bids on the

work and do not confer a license or grant for any other use.

4.2 Interpretation or Correction of Bid Documents

4.2.1 Bidders shall promptly notify the Coastal Protection and Restoration Authority contact person listed in the Advertisement for Bids of any ambiguity, inconsistency or error which they may discover upon examination of the Bid Documents or of the site and local conditions.

4.2.2 Bidders requiring clarification or interpretation of the Bid Documents shall make a written request to the Coastal Protection and Restoration Authority contact person listed in the Advertisement for Bids, to reach him/her at least seven days prior to the date for receipt of bids.

4.2.3 Any interpretation, correction or change of the Bid Documents will be made by addendum. Interpretations, corrections or changes of the Bid Documents made in any other manner will not be binding and Bidders shall not rely upon such interpretations, corrections and changes.

4.3 Substitutions

4.3.1 The materials, products and equipment described in the Bid Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution. No substitutions shall be allowed after bids are received.

4.3.2 No substitution will be considered unless written request for approval has been submitted by the Proposer and has been received by the Engineer at least seven (7) working days prior to the opening of bids. (La. R.S. 38:2295(C)) Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including model numbers, drawings, cuts, performance and test data and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or work that incorporation of the substitute would require shall be included. It shall be the responsibility of the proposer to include in his proposal all changes required of the Bid Documents if the proposed product is used. Prior approval is given contingent upon supplier being responsible for any costs which may be necessary to modify the space or facilities needed to accommodate the materials and equipment approved.

4.3.3 If the Engineer approves any proposed substitution, such approval will be set forth in an addendum. Bidders shall not rely upon approvals made in any other manner.

4.4 Addenda

4.4.1 Addenda will be mailed or delivered to all who are known by the Coastal Protection and Restoration Authority to have received a complete set of Bid Documents.

4.4.2 Copies of addenda will be made available for inspection wherever Bid Documents are on file for that purpose.

4.4.3 Except as described herein, addenda shall not be issued within a period of seventy-two (72) hours prior to the advertised time for the opening of bids, excluding Saturdays, Sundays, and any other legal holidays. If the necessity arises of issuing an addendum modifying the Bid Documents within the seventy-two (72) hour period prior to the advertised time for the opening of bids, then the opening of bids shall be extended at least seven but no more than twenty-one (21) working days, without the requirement of re-advertising. The revised time and date for the opening of bids shall be stated in the addendum.

4.4.4 Each Bidder shall ascertain from the Coastal Protection and Restoration Authority prior to submitting his bid that he has received all addenda issued, and he shall acknowledge their receipt on the Bid Form.

4.4.5 The Owner shall have the right to extend the bid date by up to (30) thirty days without the requirement of re-advertising. Any such extension shall be made by addendum issued by the Coastal Protection and Restoration Authority.

## ARTICLE 5

## BID PROCEDURE

5.1 Form and Style of Bids

5.1.1 Bids shall be submitted on the Louisiana Uniform Public Work Bid Form provided by the Engineer.

5.1.2 The Bidder shall ensure that all applicable blanks on the Bid Form are completely and accurately filled in.

5.1.3 Bid sums shall be expressed in both words and figures, and in case of discrepancy between the two, the written words shall govern.

5.1.4 Any interlineation, alteration or erasure must be initialed by the signer of the bid or his authorized representative.

5.1.5 Bidders are cautioned to complete all alternates should such be required in the Bid Form. Failure to submit alternate prices will render the bid non responsive and shall cause its rejection.

5.1.6 Bidders are cautioned to complete all unit prices should such be required in the Bid Form. Unit prices represent a price proposal to do a specified quantity and quality of work. Unit prices are incorporated into the base bid or alternates, as indicated on the Unit Price Form, but are not the sole components thereof.

5.1.7 Bidder shall make no additional stipulations on the Bid Form nor qualify his bid in any other manner.

5.1.8 Written evidence of the authority of the person signing the bid for the public work shall be submitted in accordance with La. R.S. 38:2212(B)(5).

5.1.9 On any bid in excess of fifty thousand dollars ($50,000.00), the Contractor shall certify that he is licensed under R.S. 37: 2150-2173 and show his license number on the bid above his signature or his duly authorized representative.

5.2 Bid Security

5.2.1 No bid shall be considered or accepted unless the bid is accompanied by bid security in an amount of five percent (5.0%) of the base bid and all alternates.

The bid security shall be in the form of a certified check or cashier's check drawn on a bank insured by the Federal Deposit Insurance Corporation, or a Bid Bond written by a surety company licensed to do business in Louisiana and signed by the surety's agent or attorney-in-fact. The Bid Bond shall be written on the Coastal Protection and Restoration Authority Bid Bond Form, and the surety for the bond must meet the qualifications stated thereon. The Bid Bond shall include the legal name of the bidder be in favor of the State of Louisiana, Coastal Protection and Restoration Authority, and shall be accompanied by appropriate power of attorney. The Bid Bond must be signed by both the bidder/principal and the surety in the space provided on the Coastal Protection and Restoration Authority Bid Bond Form. Failure by the bidder/principal or the surety to sign the bid bond shall result in the rejection of the bid.

Bid security furnished by the Contractor shall guarantee that the Contractor will, if awarded the work according to the terms of his proposal, enter into the Contract and furnish Performance and Payment Bonds as required by these Bid Documents, within fifteen (15) days after written notice that the instrument is ready for his signature.

Should the Bidder refuse to enter into such Contract or fail to furnish such bonds, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as penalty.

5.2.2 The Owner will have the right to retain the bid security of Bidders until either (a) the Contract has been executed and bonds have been furnished, or (b) the specified time has elapsed so that bids may be withdrawn, or (c) all bids have been rejected.

5.3 Submission of Bids

5.3.1 The Bid shall be sealed in an opaque envelope. The bid envelope shall be identified on the outside with the name of the project, and the name, address, <u>and license number</u> of the Bidder. The envelope shall not contain multiple bid forms, and will be received until the time specified and at the place specified in the Advertisement for Bids. It shall be the specific responsibility of the Bidder to deliver his sealed bid to the Coastal Protection

and Restoration Authority at the appointed place and prior to the announced time for the opening of bids. Late delivery of a bid for any reason, including late delivery by United States Mail, or express delivery, shall disqualify the bid.

If the bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "Bid Enclosed" on the face thereof. Such bids shall be sent by Registered or Certified Mail, Return Receipt Requested, addressed to:

Coastal Protection and Restoration Authority
P. 0. Box 44027
Baton Rouge, Louisiana, 70804-4027.

Bids sent by express delivery shall be delivered to:
Coastal Protection and Restoration Authority
150 Terrace Avenue
Suite 100
Baton Rouge, Louisiana 70802

5.3.2 Bids shall be deposited at the designated location prior to the time on the date for receipt of bids indicated in the Advertisement for Bids, or any extension thereof made by addendum. Bids received after the time and date for receipt of bids will be returned unopened.

5.3.3 Bidder shall assume full responsibility for timely delivery at location designated for receipt of bids.

5.3.4 Oral, telephonic or telegraphic bids are invalid and shall not receive consideration. Owner shall not consider notations written on outside of bid envelope which have the effect of amending the bid. Written modifications enclosed in the bid envelope, and signed or initialed by the Contractor or his representative, shall be accepted.

5.4 Modification or Withdrawal of Bid

5.4.1 A bid may not be modified, withdrawn or canceled by the Bidder during the time stipulated in the Advertisement for Bids, for the period following the time and bid date designated for the receipt of bids, and Bidder so agrees in submitting his bid, except in accordance with R.S. 38:2214 which states, in part, "Bids containing patently obvious, unintentional, and substantial mechanical, clerical or mathematical errors, or errors of unintentional omission of a substantial quantity of work, labor, material, or services made directly in the compilation of the bid, may be withdrawn by the Contractor if clear and convincing sworn, written evidence of such errors is furnished to the public entity within forty eight hours of the Bid Opening excluding Saturdays, Sundays and legal holidays".

5.4.2 Prior to the time and date designated for receipt of bids, bids submitted early may be modified or withdrawn only by notice to the party receiving bids at the place and prior to the time designated for receipt of bids.

5.4.3 Withdrawn bids may be resubmitted up to the time designated for the receipt of bids provided that they are then fully in conformance with these Instructions to Bidders.

5.4.4 Bid Security shall be in an amount sufficient for the bid as modified or resubmitted.

5.5 Prohibition of Discriminatory Boycotts of Israel

By submitting its bid, the bidder certifies and agrees that the following information is correct:

In preparing its bid, the bidder has considered all proposals submitted from qualified, potential subcontractors and suppliers, and has not, in the solicitation, selection, or commercial treatment of any subcontractor or supplier, refused to transact or terminated business activities, or taken other actions intended to limit commercial relations, with a person or entity that is engaging in commercial transactions in Israel or Israel-controlled territories, with the specific intent to accomplish a boycott or divestment of Israel. The bidder has also not retaliated against any person or other entity for reporting such refusal, termination, or commercially limiting actions. The state reserves the right to reject any bids if this certification is subsequently determined to be false and to terminate any contract awarded based on such a false response.

**ARTICLE 6**

CONSIDERATION OF BIDS

6.1 Opening of Bids

6.1.1 The properly identified Bids received on time will be opened publicly and will be read aloud, and a tabulation abstract of the amounts of the base bids and alternates, if any, will be made available to Bidders.

6.2 Rejection of Bids

6.2.1 The Owner shall have the right to reject any or all bids and in particular to reject a bid not accompanied by any required bid security or data required by the Bid Documents or a bid in any way incomplete or irregular.

6.3 Acceptance of Bid

6.3.2 It is the intent of the Owner, if he accepts any alternates, to accept them in the order in which they are listed in the Bid Form. Determination of the Low Bidder shall be on the basis of the sum of the base bid and the alternates accepted. However, the Owner shall reserve the right to accept alternates in any order which does not affect determination of the Low Bidder.

**ARTICLE 7**

POST-BID INFORMATION

7.1 Submissions

7.1.1 The Contractor shall submit a Work Plan and Progress Schedule prior to the Pre-Construction Conference in conformance with applicable sections of the General and Special Provisions.

It is the preference of the Owner that, to the greatest extent possible or practical, the Contractor utilize Louisiana Subcontractors, manufacturers, suppliers and labor.

7.1.2 The General Contractor shall be responsible for actions or inactions of Subcontractors and/or material suppliers.

The General Contractor is totally responsible for any lost time or extra expense incurred due to a Subcontractor's/or Material Supplier's failure to perform. Failure to perform includes, but is not limited to, a Subcontractor's financial failure, abandonment of the project, failure to make prompt delivery, or failure to do work up to standard. Under no circumstances shall the Owner mitigate the General Contractor's losses or reimburse the General Contractor for losses caused by these events.

7.1.3
In accordance with La. R.S. 38:2227 [references La. R.S. 38:2212(A)(3)(c)(ii), which has since been renumbered as La. R.S. 38:2212(B)(3)], La. R.S. 38:2212.10 and La. R.S. 23:1726(B) the apparent low bidder on this project shall submit the completed Attestations Affidavit (Past Criminal Convictions of Bidders, Verification of Employees and Certification Regarding Unpaid Workers Compensation Insurance) form found within this bid package to the Coastal Protection and Restoration Authority contact person listed in the Advertisement For Bids within 10 days after the opening of bids**.**

**ARTICLE 8**

PERFORMANCE AND PAYMENT BOND

8.1 Bond Required

8.1.1 The Contractor shall furnish and pay for a Performance and Payment Bond written by a company licensed to do business in Louisiana, which shall be signed by the surety's agent or attorney-in-fact, in an amount equal to 100% of the Contract amount. Surety must be listed currently on the U. S. Department of Treasury Financial Management Service List (Treasury List) as approved for an amount equal to or greater than the contract amount, or must be an insurance company domiciled in Louisiana or owned by Louisiana residents. If surety is qualified other than by listing on the Treasury list, the contract amount may not exceed fifteen percent of policyholders' surplus as shown by surety's most recent financial statements filed with the Louisiana Department of Insurance and may not exceed the amount of $500,000. However, a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A. M. Best's Key Rating Guide shall not be subject to the $500,000 limitation, provided

that the contract amount does not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide nor fifteen percent of policyholders' surplus as shown by surety's most recent financial statements filed with the Louisiana Department of Insurance. The Bond shall be signed by the surety's agent or attorney-in-fact. The Bond shall be in favor of the Coastal Protection and Restoration Authority.

8.2 Time of Delivery and Form of Bond

8.2.1 The Bidder shall deliver the required bond to the Owner simultaneous with the execution of the Contract.

8.2.2 Bond shall be in the form furnished by the Coastal Protection and Restoration Authority, entitled CONTRACT BETWEEN OWNER AND CONTRACTOR AND PERFORMANCE AND PAYMENT BOND, a copy of which is included in the Bid Documents.

8.2.3 The Bidder shall require the Attorney-in-Fact who executes the required bond on behalf of the surety to affix thereto a certified and current copy of his power of Attorney.

## ARTICLE 9

FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

9.1 Form to be Used

9.1.1 Form of the Contract to be used shall be furnished by the Coastal Protection and Restoration Authority, an example of which is bound in the Bid Documents.

9.2 Award

9.2.1 After award of the Contract, the successful Bidder, if a corporation, shall furnish to the Owner the most current copy of a Disclosure of Ownership Affidavit on file with the Secretary of State.

9.2.2 In accordance with Louisiana Law, when the Contract is awarded, the successful Bidder shall, at the time of the signing of the Contract, execute the Non-Collusion Affidavit included in the Contract Documents.

9.2.3 When this project is financed either partially or entirely with State Bonds, the award of this Contract is contingent upon the sale of bonds by the State Bond Commission. The State shall incur no obligation to the Contractor until the Contract between Owner and Contractor is duly executed.

# LOUISIANA UNIFORM PUBLIC WORK BID FORM

**TO:** Coastal Protection and Restoration Authority
150 Terrace Avenue
Suite 100
Baton Rouge, LA 70802
*(Owner to provide name and address of owner)*

**BID FOR:** LaBranche Shoreline Protection Project (PO-0194)
_____
_____
_____
(*Owner to provide name of project and other identifying information)*

The undersigned bidder hereby declares and represents that she/he: a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: Coastal Protection and Restoration Authority and dated: July 2023.
*(Owner to provide name of entity preparing bidding documents.)*

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA:** (Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging) _____ .

**TOTAL BASE BID**: For all work required by the Bidding Documents (including any and all unit prices designated "Base Bid" * but not alternates) the sum of:

_____Dollars ($ _____)

**ALTERNATES:** For any and all work required by the Bidding Documents for Alternates including any and all unit prices designated as alternates in the unit price description.

**Alternate No. 1** *(Additional 1,075 ft of shoreline protection)* for the lump sum of:

_____Dollars ($ _____)

**Alternate No. 2** *(Additional 1,100 ft of shoreline protection)* for the lump sum of:

_____Dollars ($ _____)

**Alternate No. 3** *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

Not Applicable_____Dollars ($ Not Applicable )

**NAME OF BIDDER:** _____

**ADDRESS OF BIDDER:** _____

_____

**LOUISIANA CONTRACTOR'S LICENSE NUMBER:** _____

**NAME OF AUTHORIZED SIGNATORY OF BIDDER:** _____

**TITLE OF AUTHORIZED SIGNATORY OF BIDDER:** _____

**SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **:** _____

**DATE:** _____

**THE FOLLOWING ITEMS ARE TO BE INCLUDED WITH THE SUBMISSION OF THIS LOUISIANA UNIFORM PUBLIC WORK BID FORM**:

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

**** A CORPORATE RESOLUTION OR WRITTEN EVIDENCE** of the authority of the person signing the bid for the public work as prescribed by LA R.S. 38:2212(B)(5).

**BID SECURITY** in the form of a bid bond, certified check or cashier's check as prescribed by LA R.S. 38:2218(A) attached to and made a part of this bid.

# LOUISIANA UNIFORM PUBLIC WORK BID FORM
# UNIT PRICE FORM

**TO:** Coastal Protection and Restoration Authority
150 Terrace Avenue
Suite 100
Baton Rouge, LA 70802
*(Owner to provide name and address of owner)*

**BID FOR:** Labranche Shoreline Protection Project (PO-0194)
*(Owner to provide name of project and other identifying information)*

**UNIT PRICES:** This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amounts shall be stated in figures and only in figures.

| DESCRIPTION: | ☒ Base Bid or ❑ Alt.# Mobilization and Demobilization (TS-100) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 1 | 1 | Lump Sum | | |

| DESCRIPTION: | ☒ Base Bid or ❑ Alt.# Construction Surveying (TS-200) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 2 | 1 | Lump Sum | | |

| DESCRIPTION: | ☒ Base Bid or ❑ Alt.# Access and Flotation Channel Excavation (TS-360) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 3 | 1 | Lump Sum | | |

| DESCRIPTION: | ☒ Base Bid or ❑ Alt.# Geogrid Composite (TS-500) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 4 | 62,250 | Square Yard | | |

| DESCRIPTION: | ☒ Base Bid or ❑ Alt.# Encapsulated Lightweight Aggregate (TS-600) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 5 | 11,700 | Cubic Yard | | |

| DESCRIPTION: | ☒ Base Bid or ❑ Alt.# Rock Armor Layer (LA DOTD 440 lb Class Rock) (TS-700) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 6 | 94,600 | Ton | | |

| DESCRIPTION: | ☒ Base Bid or ❑ Alt.# Temporary Warning Signs (TS-820) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 7 | 21 | Each | | |

| DESCRIPTION: | ❑ Base Bid or ☒ Alt.# 1 Construction Surveying (TS-200) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 2A | 1 | Lump Sum | | |

**Wording for "DESCRIPTION" is to be provided by the Owner.**
**All quantities are estimated. The contractor will be paid based upon actual quantities as verified by the Owner.**

# LOUISIANA UNIFORM PUBLIC WORK BID FORM
# UNIT PRICE FORM

**TO:** Coastal Protection and Restoration Authority
150 Terrace Avenue
Suite 100
Baton Rouge, LA 70802
*(Owner to provide name and address of owner)*

**BID FOR:** Labranche Shoreline Protection Project (PO-0194)
*(Owner to provide name of project and other identifying information)*

**UNIT PRICES:** This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amounts shall be stated in figures and only in figures.

| DESCRIPTION: | ❑ Base Bid or ☒ Alt.# 1 Access and Flotation Channel Excavation (TS-360) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 3A | 1 | Lump Sum | | |

| DESCRIPTION: | ❑ Base Bid or ☒ Alt.# 1 Geogrid Composite (TS-500) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 4A | 6,000 | Square Yard | | |

| DESCRIPTION: | ❑ Base Bid or ☒ Alt.# 1 Encapsulated Lightweight Aggregate (TS-600) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 5A | 1,100 | Cubic Yard | | |

| DESCRIPTION: | ❑ Base Bid or ☒ Alt.# 1 Rock Armor Layer (LA DOTD 440 LB Class Rock) (TS-700) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 6A | 2,700 | Ton | | |

| DESCRIPTION: | ❑ Base Bid or ☒ Alt.# 1 Temporary Warning Signs (TS-820) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 7A | 2 | Each | | |

| DESCRIPTION: | ❑ Base Bid or ☒ Alt.# 2 Construction Surveying (TS-200) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 2B | 1 | Lump Sum | | |

| DESCRIPTION: | ❑ Base Bid or ☒ Alt.# 2 Access and Flotation Channel Excavation (TS-360) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 3B | 1 | Lump Sum | | |

| DESCRIPTION: | ❑ Base Bid or ☒ Alt.# 2 Geogrid Composite (TS-500) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 4B | 6,750 | Square Yard | | |

**Wording for "DESCRIPTION" is to be provided by the Owner.**
**All quantities are estimated. The contractor will be paid based upon actual quantities as verified by the Owner.**

# LOUISIANA UNIFORM PUBLIC WORK BID FORM

# UNIT PRICE FORM

**TO:** Coastal Protection and Restoration Authority
150 Terrace Avenue
Suite 100
Baton Rouge, LA 70802
*(Owner to provide name and address of owner)*

**BID FOR:** Labranche Shoreline Protection Project (PO-0194)
*(Owner to provide name of project and other identifying information)*

**UNIT PRICES:** This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amounts shall be stated in figures and only in figures.

| DESCRIPTION: | ❑ Base Bid or ☒ Alt.# 2 Encapsulated Lightweight Aggregate (TS-600) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 5B | 900 | Cubic Yard | | |

| DESCRIPTION: | ❑ Base Bid or ☒ Alt.# 2 Rock Armor Layer (LA DOTD 440 LB Class Rock) (TS-700) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 6B | 7,700 | Ton | | |

| DESCRIPTION: | ❑ Base Bid or ☒ Alt.# 2 Temporary Warning Signs (TS-820) | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| 7B | 1 | Each | | |

| DESCRIPTION: | ❑ Base Bid or ❑ Alt.# Not Applicable | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| Not Applicable | Not Applicable | Not Applicable | Not Applicable | Not Applicable |

| DESCRIPTION: | ❑ Base Bid or ❑ Alt.# Not Applicable | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| Not Applicable | Not Applicable | Not Applicable | Not Applicable | Not Applicable |

| DESCRIPTION: | ❑ Base Bid or ❑ Alt.# Not Applicable | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| Not Applicable | Not Applicable | Not Applicable | Not Applicable | Not Applicable |

| DESCRIPTION: | ❑ Base Bid or ❑ Alt.# Not Applicable | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| Not Applicable | Not Applicable | Not Applicable | Not Applicable | Not Applicable |

| DESCRIPTION: | ❑ Base Bid or ❑ Alt.# Not Applicable | | | |
|---|---|---|---|---|
| REF. NO. | QUANTITY: | UNIT OF MEASURE: | UNIT PRICE | UNIT PRICE EXTENSION *(Quantity times Unit Price)* |
| Not Applicable | Not Applicable | Not Applicable | Not Applicable | Not Applicable |

**Wording for "DESCRIPTION" is to be provided by the Owner.**
**All quantities are estimated. The contractor will be paid based upon actual quantities as verified by the Owner.**

# BID BOND

FOR
**COASTAL PROTECTION AND RESTORATION AUTHORITY PROJECTS**

Date: _____

KNOW ALL MEN BY THESE PRESENTS:

That_____of_____, as Principal, and_____, as Surety, are held and firmly bound unto the State of Louisiana, Coastal Protection and Restoration Authority (Obligee), in the full and just sum of five (5%) percent of the total amount of this proposal, including all alternates, lawful money of the United States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

Surety represents that it is listed on the current U. S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater that the amount for which it obligates itself in this instrument or that it is a Louisiana domiciled insurance company with at least an A - rating in the latest printing of the A. M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the Bond amount may not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide.

Surety further represents that it is licensed to do business in the State of Louisiana and that this Bond is signed by surety's agent or attorney-in-fact. This Bid Bond is accompanied by appropriate power of attorney.

THE CONDITION OF THIS OBLIGATION IS SUCH that, whereas said Principal is herewith submitting its proposal to the Obligee on a Contract for:

_____

NOW, THEREFORE, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing and give a good and sufficient bond to secure the performance of the terms and conditions of the Contract with surety acceptable to the Obligee, then this obligation shall be void; otherwise this obligation shall become due and payable.

| _____ | _____ |
|---|---|
| PRINCIPAL (BIDDER) | SURETY |
| BY: _____ | BY:_____ |
| AUTHORIZED OFFICER-OWNER-PARTNER | AGENT OR ATTORNEY-IN-FACT(SEAL) |

**LABRANCHE SHORELINE PROTECTION**

**Name of Project**

**PO-0194**

**Project No.**

**STATE OF LOUISIANA**

**PARISH OF ST. CHARLES**

# ATTESTATIONS AFFIDAVIT

**Before me**, the undersigned notary public, duly commissioned and qualified in and for the parish and state aforesaid, personally came and appeared Affiant, who after being duly sworn, attested as follows:

## LA. R.S. 38:2227 PAST CRIMINAL CONVICTIONS OF BIDDERS

A. No sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes:

(a) Public bribery (R.S. 14:118)
(b) Corrupt influencing (R.S. 14:120)
(c) Extortion (R.S. 14:66)
(d) Money laundering (R.S. 14:230)

B. Within the past five years from the project bid date, no sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes, during the solicitation or execution of a contract or bid awarded pursuant to the provisions of Chapter 10 of Title 38 of the Louisiana Revised Statutes:

(a) Theft (R.S. 14:67)
(b) Identity Theft (R.S. 14:67.16)
(c) False accounting (R.S. 14:70)
(d) Issuing worthless checks (R.S. 14:71)
(e) Bank fraud (R.S. 14:71.1)
(f) Forgery (R.S. 14:72)
(g) Contractors; misapplication of payments (R.S. 14:202)
(h) Malfeasance in office (R.S. 14:134)

## LA. R.S. 38:2212.10 Verification of Employees

A. At the time of bidding, Appearer is registered and participates in a status verification system to verify that all new employees in the state of Louisiana are legal citizens of the United States or are legal aliens.

B. If awarded the contract, Appearer shall continue, during the term of the contract, to utilize a status verification system to verify the legal status of all new employees in the state of Louisiana.

C. If awarded the contract, Appearer shall require all subcontractors to submit to it a sworn affidavit verifying compliance with Paragraphs (A) and (B) of this Subsection.

**LABRANCHE SHORELINE PROTECTION**

**Name of Project**

**PO-0194___**

**Project No.**

**LA. R.S. 23:1726(B) Certification Regarding Unpaid Workers Compensation Insurance**

A. R.S. 23:1726 prohibits any entity against whom an assessment under Part X of Chapter 11 of Title 23 of the Louisiana Revised Statutes of 1950 (Alternative Collection Procedures & Assessments) is in effect, and whose right to appeal that assessment is exhausted, from submitting a bid or proposal for or obtaining any contract pursuant to Chapter 10 of Title 38 of the Louisiana Revised Statutes of 1950 and Chapters 16 and 17 of Title 39 of the Louisiana Revised Statutes of 1950.

B. By signing this bid /proposal, Affiant certifies that no such assessment is in effect against the bidding / proposing entity.

| | |
|---|---|
| **NAME OF BIDDER** | **NAME OF AUTHORIZED SIGNATORY OF BIDDER** |
| **DATE** | **TITLE OF AUTHORIZED SIGNATORY OF BIDDER** |

**SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER/AFFIANT**

**Sworn to and subscribed** before me by Affiant on the _____ day of _____ , 20___ .

Notary Public

FOR INFORMATION ONLY

This document will be prepared by the Coastal Protection and Restoration Authority in the form appropriate for the project.

CONTRACT BETWEEN OWNER AND CONTRACTOR
AND PERFORMANCE AND PAYMENT BOND

This agreement entered into this _____ day of _____ , 2023, by (CONTRACTOR NAME) hereinafter called the "Contractor", whose business address is_____, and the State of Louisiana Coastal Protection and Restoration Authority, herein represented by its Executive Director executing this contract, and hereinafter called the "Owner".

Witnesseth that the Contractor and the Owner, in consideration of premises and the mutual covenants; consideration and agreement herein contained, agree as follows:

Statement of Work: The Contractor shall furnish all labor and materials and perform all of the work required to build, construct and complete in a thorough and workmanlike manner:

Project No.: __PO-0194_____
Project Name: LaBranche Shoreline Protection Project_____

in strict accordance with Contract Documents prepared by Owner.

It is recognized by the parties herein that said Contract Documents, including by way of example and not of limitation, the Plans, Specifications (including General Provisions, Special Provisions, and Technical Specifications), Any Addenda thereto, Instructions To Bidders, this Contract, Advertisement For Bids, Affidavit, Bid Form, Bonds (Bid, Performance, and Payment),any Submitted Post-Bid Documentation, Notice of Award, Notice to Proceed, Change Orders, and Claims, if any, impose duties and obligations upon the parties herein, and said parties thereby agree that they shall be bound by said duties and obligations. For these purposes, all of the provisions contained in the aforementioned Contract Documents are incorporated herein by reference with the same force and effect as though said Contract Documents were herein set out in full.

Time for Completion: The work shall be commenced on a date to be specified in a written order of the Owner and shall be completed within _____ consecutive calendar days from and after the said date.

Liquidated Damages: Contractor shall be assessed Liquidated Damages in the amount of **$_____** per day for each consecutive calendar day which work is not complete beginning with the first day beyond the completion time.

Compensation to be paid to the Contractor: The Owner will pay and the Contractor will accept in full consideration for the performance of the Contract the sum of **_____Dollars ($)** which sum represents the Contract Price.

Performance and Payment Bond: To these presents personally came and intervened _____, herein acting for _____, a corporation organized and existing under the laws of the State of _____, and duly authorized to transact business in the State of Louisiana, as surety, who declared that having taken cognizance of this Contract and of the Construction Documents mentioned herein, he hereby in his capacity as its Attorney in Fact obligates his said company, as Surety for the said Contractor, unto the said Owner, up to the sum of _____**Dollars ($)**. By issuance of this bond, the surety acknowledges they are in compliance with R.S. 38:2219.

The condition of this performance and payment bond shall be that should the Contractor herein not perform the Contract in accordance with the terms and conditions hereof, or should said Contractor not fully indemnify and save harmless the Owner, from all cost and damages which he may suffer by said Contractor's non-performance or should said Contractor not pay all persons who have and fulfill obligations to perform labor and/or furnish materials in the prosecution of the work provided for herein, including by way of example workmen, laborers, mechanics, and furnishers of materials, machinery, equipment and fixtures, then said Surety agrees and is bound to so perform the Contract and make said payment(s).

Provided, that any alterations which may be made in the terms of the Contract or in the work to be done under it, or the giving by the Owner of any extensions of time for the performance of the Contract, or any other forbearance on the part of either the Owner or the Contractor to the other shall not in any way release the Contractor or the Surety from their liability hereunder, notice to the Surety of any such alterations, extensions or other forbearance being hereby waived.

The Contractor agrees to abide by the requirements of the following as applicable: Title VI of the Civil Rights Act of 1964 and Title VII of the Civil Rights Act of 1964, as amended by the Equal Opportunity Act of 1972, Federal Executive Order 11246 as amended, the Federal Rehabilitation Act of 1973, as amended, the Vietnam Era Veteran's Readjustment Assistance Act of 1974, Title IX of the Education Amendments of 1972, the Age Discrimination Act of 1975, the Fair Housing Act of 1968 as amended, and Contractor agrees to abide by the requirements of the Americans with Disabilities Act of 1990.

Contractor agrees not to discriminate in its employment practices, and will render services under this Contract without regard to race, color, religion, sex, sexual orientation, national origin, veteran status, political affiliation, disability, or age in any matter relating to employment. Any act of discrimination committed by Contractor, or failure to comply with these statutory obligations when applicable shall be grounds for termination of this Contract.

In Witness whereof, the parties hereto on the day and year first above written have executed this agreement in __seven (7)__ counterparts, each of which shall, without proof or accountancy for the other counterparts, be deemed an original thereof.

**WITNESSES:**

_____

_____

_____

_____

_____

_____

**STATE OF LOUISIANA**
**COASTAL PROTECTION AND**
**RESTORATION AUTHORITY**

BY: _____
Greg Grandy, Executive Director

BY: _____

SURETY: _____

BY:_____
ATTORNEY IN FACT

_____

_____
ADDRESS

_____
TELEPHONE NUMBER

STATE OF LOUISIANA
PARISH OF ST. CHARLES

PROJECT NO.: PO-0194
NAME: LaBranche Shoreline Protection Project
LOCATION: St. Charles Parish

**A F F I D A V I T**

Before me, the undersigned authority, duly commissioned and qualified within and for the State and Parish aforesaid, personally came and appeared_____representing who, being by me first duly sworn deposed and said that he has read this affidavit and does hereby agree under oath to comply with all provisions herein as follows:

PART I.

Section 2224 of Part II of Chapter 10 of Title 38 of the Louisiana Revised Statutes, as amended.

(1) That affiant employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project or in securing the public contract were in the regular course of their duties for affiant; and

(2) That no part of the Contract price received by affiant was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the Contract, other than the payment of their normal compensation to persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project were in the regular course of their duties for affiant.

PART II.

Section 2190 of Part I of Chapter 10 of Title 38 of the Louisiana Revised Statutes, as amended.

That affiant, if an architect or engineer, or representative thereof, does not own a substantial financial interest, either directly or indirectly, in any corporation, firm, partnership, or other organization which supplies materials for the construction of a public work when the architect or engineer has performed architectural or engineering services, either directly or indirectly, in connection with the public work for which the materials are being supplied.

For the purposes of this Section, a "substantial financial interest" shall exclude any interest in stock being traded on the American Stock Exchange or the New York Stock Exchange.

That affiant, if subject to the provisions of this section, does hereby agree to be subject to the penalties involved for the violation of this section.

_____

AFFIANT

SWORN TO AND SUBSCRIBED BEFORE ME THIS _____ DAY OF _____, 2023.

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NOTARY

# PART I GENERAL PROVISIONS

## GP-1 DEFINITION OF TERMS

Whenever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to the singular or plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs and the titles of other documents or forms.

Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

a. Acceptance: A written approval from the Engineer which certifies that specific items of work in the Contract have been completed and/or obligations have been fulfilled by the Contractor.

b. Addenda: Those written or graphic documents which are issued prior to opening of Bids in accordance with the Bidding Requirements and clarify or change the bidding requirements or the proposed Contract Documents.

c. Application of Payment: That form which is used by the Contractor to request partial and final payment and is deemed acceptable to the Owner. It shall be accompanied by any supporting documentation required by the Contract Documents.

d. A.S.T.M.: American Society for Testing and Materials.

e. Bid: An offer or proposal submitted on the prescribed form setting forth the prices for the Work.

f. Bidder: The person, association of persons, firm, or corporation submitting a proposal for the Work.

g. Bidding Requirements: The Advertisement for Bids, Instructions to Bidders, Form of Bid Security, if any, and Bid Form with any supplements.

h. Change Order: A written order which is submitted to the Contractor, signed by the Owner, and authorizes an addition, deletion, or revision in the Work, or an adjustment in the contract price or the contract time issued after the effective date of the Contract.

i. Claim: A written demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both or other relief with respect to the terms of the Contract.

j. Contract: The written agreement between the Owner and the Contractor which defines the work to be completed and shall be understood to also include all Contract Documents.

k. Contract Documents: The Contract, all addenda which pertains to the Contract Documents, Bid Documents and specified Attachments accompanying the Bid and any post-bid documentation submitted prior to the Notice of Award, Contractor's Bid when attached as an exhibit to the Agreement, the Bonds (Bid and Performance/Payment), General Provisions, Special Provisions, Technical Specifications, Plans, and all Field or Change Orders issued after the execution of the Agreement. Shop Drawings and other submittals by the Contractor are not Contract Documents.

l. Contract Price: The moneys payable by the Owner to the Contractor for the Work in accordance with the Contract Documents as stated in the Contract.

m. Contract Time: The number of calendar days specified in the Contract for completion of the Work, together with any extensions authorized through change orders.

n. Contractor: The person, association of persons, firm, or corporation entering into the duly awarded Contract.

o. Contracting Agency: The State of Louisiana, Coastal Protection and Restoration Authority (CPRA).

p. Day: When any period of time is referred to in the Contract Documents using days, it will be computed to exclude the first day and include the last day of such period. If the last day of any such period falls on a Saturday, Sunday, or a legal holiday, that day will be omitted from the computation. A calendar day is measured as twenty-four (24) hour period starting at midnight and ending the following midnight.

q. Design Report: A written report by the Engineer which provides the design methodology for the Work.

r. Effective Date of the Contract: The date indicated in the Contract on which it becomes effective.

s. Engineer: The State of Louisiana, Coastal Protection and Restoration Authority, or its designee.

t. Equipment: All machinery, implements, and power-tools, in conjunction with the necessary supplies for the operation, upkeep, maintenance, and all other tools and apparatuses necessary for the proper construction and acceptable completion of the Work.

u. Extension of Contract: Any extension of time for completion of Work beyond the Contract Time which is granted by the Owner, recommended by the Engineer and approved by the Coastal Protection and Restoration Authority in the form of a Change Order.

v. Federal Sponsor: The federal agency which has been tasked, if applicable, to manage the implementation of the project.

w. Field Order: A written order issued by the Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or Contract Time.

x. Laboratory: The firm, company, or corporation which is used to test materials and is approved for use by the Engineer.

y. Laws and Regulations; Laws or Regulations: Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

z. Materials: Any substance used in the Work to build structures, but does not include material used in false work or other temporary structures not incorporated in the Work.

aa. Milestone: A principal event specified in the Contract Documents relating to an intermediated completion date or time prior to the Contract Times.

bb. Notice of Award: A written notice to the successful Bidder stating that the Bid has been accepted by the Owner and that the successful Bidder is required to execute the Contract and furnish the Payment and Performance Bond and Non-Collusion Affidavit.

cc. Notice to Proceed: The written notice to the Contractor by the Owner which provides the starting date for the Contract Time.

dd. Owner: The Owner is the State of Louisiana (State) which acts through the Contracting Agency.

ee. Performance and Payment Bond: The approved form of security furnished by the Contractor and Surety for the faithful performance of the Work, and the payment for all labor, materials, and/or obligations incurred by the Contractor in the prosecution thereof.

ff. Plans: That part of the Contract Documents prepared or approved by the Engineer which graphically shows the scope, intent, and character of the Work to be completed by the Contractor.

gg. Project Site: The location where the Work is to be performed as stated in the Contract Documents.

hh. Resident Project Representative: An authorized representative of the Engineer who is responsible to inspect the Work and materials furnished by the Contractor.

ii. Right-of-way: That entire area reserved for constructing, maintaining, and protecting the proposed improvement, structures, and appurtenances of the Work.

jj. Samples: Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portions of the Work will be judged.

kk. Shop Drawings: All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for the Contractor and submitted by the Contractor to illustrate some portion of the Work to be performed.

ll. Specifications: That part of the Contract Documents consisting of written technical descriptions of materials, equipment, systems, standards, and workmanship as applied to the work to be performed and certain administrative details applicable thereto.

mm. State: The State of Louisiana.

nn. Structures: Bridges, plugs, weirs, bulkheads, berms, dams, levees, and other miscellaneous construction encountered during the Work and not otherwise classified herein.

oo. Subcontractor: Any person, association of persons, firm, or corporation who contracts with the Contractor to perform any part of the project covered by the Contract.

pp. Submittals: Certificates, samples, shop drawings, and all other project data which are submitted to the Engineer in order to verify that the correct products will be installed on the project.

qq. Successful Bidder: The lowest responsive and responsible Bidder whom the Owner makes an award.

rr. Special Provisions: That part of the Contract Documents which amends or supplements these General Provisions.

ss. Surety: The corporate body, licensed to do business in Louisiana, bound with and for the Contractor's primary liability, and engages to be responsible for payment of all obligations pertaining to acceptable performance of the Work contracted.

tt. Temporary Structures: Any non-permanent structure required while engaged in the prosecution of the Contract.

uu. Work: All work specified herein or indicated on the Plans.

vv. Work Plan: A written plan by the Contractor that details how the Work will be provided including layout drawings, projected schedule (Initial Progress Schedule), and a list of labor hours, materials, and equipment.

## GP-2 BID REQUIREMENTS

The Contract and Bonds which govern the Work shall be performed in accordance with the Plans, Specifications, and the Louisiana Standard Specifications for Roads and Bridges, 2016 edition. The Bidder understands that all quantities for performing the Work have been estimated by the Engineer, and that the Bid shall be the sum of the quantities multiplied by their respective unit rates. The Contract shall be awarded by the Owner through a comparison of all bids. It is the responsibility of each Bidder before submitting a Bid to:

a. Examine the Bidding Documents including the Plans and Specifications and any Addenda or related data identified in the Bidding Documents;

b. Visit the Project Site to become familiar with the local conditions if they are believed to affect cost, progress, or the completion of the Work;

c. Become familiar and satisfied with all federal, state, and local Laws and Regulations that may affect cost, progress, or the completion of the Work;

d. Study and correlate all information known to the Bidder including observations obtained from Bidder's visits, if any, to the Project Site, with the Bidding Documents;

e. Submit a written notice to the Engineer within three (3) days regarding any conflicts, errors, ambiguities, or discrepancies discovered in the Bidding Documents and confirm that the written resolution thereof by the Engineer is acceptable to the Bidder; and

f. Determine that the Bidding Documents are generally sufficient to convey an understanding of all terms and conditions for completing the required Work.

The submission of a Bid will constitute an incontrovertible representation that the Bidder has complied with every requirement of these Specifications. The Bidder shall comply with all other requirements specified in the Advertisement For Bids and the Instruction To Bidders.

## GP-3 AVAILABILITY OF PLANS AND SPECIFICATIONS

One (1) set of Plans and Specifications shall be furnished to each Bidder. Three (3) sets of the Plans and Specifications shall be furnished to the Contractor upon award of the Contract. Additional sets may be furnished to the Contractor upon request from the Coastal Protection and Restoration Authority, 150 Terrace Avenue, Suite 100, Baton Rouge, Louisiana 70802.

## GP-4 LAWS, REGULATIONS, STANDARDS, SPECIFICATIONS, AND CODES

Bidders are required to become familiar and remain in compliance with all Federal, State, and local laws, ordinances, and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority which may affect those employed for the execution of the Work or which may affect the conduct of the Work. The Contractor shall indemnify the Owner and its representatives against any claim or liability arising from all violations of any laws, bylaws, ordinances, codes, regulations, orders, or decrees, whether by the Contractor or by the Contractor's employees. The filing of a bid will be presumptive evidence that the Bidder has complied with this requirement. The Owner will not be responsible for any inaccurate interpretations or conclusions drawn by the Contractor from information and documentation provided by the Owner.

References to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws and Regulations, whether such reference be specific or by implication, may not be in effect at the time of opening the Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents. No provision of any such standard, specification, manual, or code, or any instruction of a supplier shall be effective to change the duties or responsibilities of the Owner or Engineer, or any of their Subcontractors, consultants, agents, or employees from those set forth in the Bid Documents. No such provision shall be effective to assign to the Owner or Engineer, or any of their consultants, agents, or employees any duty or authority to supervise or direct the performance of the Contractor's obligations or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

The obligations imposed by these specifications are in addition to and are not to be construed in any way as a limitation of any rights available to the Engineer or Owner which are otherwise imposed by any laws or regulations or other provisions within the Contract Documents.

The Contractor shall abide by laws set forth in the Davis-Bacon Act of 1931 which states that all laborers and mechanics employed by recipients, the recipient's contractors, or subcontractors on this project shall be paid wages at rates no less than those prevailing on projects of a character similar in the locality as determined by the Secretary of Labor in accordance with Subchapter IV of Chapter 31 of Title 40 United States Code. Additionally, with respect to the labor standards specified in this section, the Secretary of Labor shall have the authority and functions set forth in Reorganization Plan Number 14 of 1950 (64 Stat. 1267; 5 U.S.C. App.) and The Copeland Act of Title 40 (40 U.S.C. § 3145). Prevailing Wage Determination Schedules, as determined by the United States Department of Labor, are provided in the Appendix. Prevailing Wage Determination Schedules are subject to modification by the United States Department of Labor. The Contractor is responsible for utilizing the most current Prevailing Wage Determination Schedule. These documents can be downloaded from the following link: http://www.wdol.gov/dba.aspx#3. Modifications to Prevailing Wage Determination Schedules shall be effective if received (or posted) no less than 10 days prior to bid opening.

## GP-5 PRE-BID CONFERENCE AND SITE VISIT

A Pre-Bid Conference and/or Job Site Visit may be held at the location and on the date provided in the Advertisement For Bids. If the Pre-Bid Conference and/or Job Site Visit is stated in the Advertisement for Bids to be a MANDATORY Pre-Bid Conference and/or MANDATORY Job Site Visit, bids shall be accepted only from those bidders who attend the Pre-Bid Conference and/or Job Site Visit in its entirety. Failure to attend a mandatory Pre-Bid Conference and/or mandatory Job Site Visit in its entirety will result in a null or void Bid.

All questions shall be in writing and faxed or emailed to the Coastal Protection and Restoration Authority contact person listed in the Advertisement For Bids after the Pre-Bid Conference and by the due date announced at the Pre-Bid conference. In order to ensure adequate response time, all questions and/or requests for clarification or interpretation of the Bid Documents should be received by the Coastal Protection and Restoration Authority at least seven days prior to the date for receipt of bids. Oral statements will not be binding or legally effective. The Coastal Protection and Restoration Authority will issue addenda in response to all questions arising at the Pre-Bid Conference and site visit to all prospective Bidders on record. All prospective Bidders on record may contact the Coastal Protection and Restoration Authority contact person for any additional information.

## GP-6 NOTICE OF AWARD

The Owner, or its designated bidding agent, shall provide written notice to the Successful Bidder stating that the Owner will sign and deliver the Contract upon compliance with the conditions enumerated therein and within the time specified.

## GP-7 NOTICE TO PROCEED AND CONTRACT TIME

The Contractor shall start the Work and begin the Contract Time on the dates provided in the Notice to

Proceed. The Work shall be conducted using sufficient labor, materials, and equipment as necessary to ensure completion within the Contract Time. The Contract Time for completion of the Base Bid for the Work is provided in the Instructions To Bidders, unless an extension is granted to the Contract Time as specified in GP-44. If the Bid contains an Alternate Bid(s), and the Alternate Bid(s) is awarded and included in the Contract, the Contract Time associated with the Alternate Bid(s) will be as provided in the Instructions To Bidders.
Unless otherwise noted in the Contract Documents, Contract Time will be on a calendar day basis. Contract Time shall consist of the number of calendar days stated in the Instructions To Bidders and the Contract beginning with the date noted in the written Notice to Proceed, including Saturdays, Sundays, holidays and non-work days.

The following table defines the monthly anticipated adverse weather days that are expected to occur during the Contract Time and will constitute the baseline monthly weather time for evaluations. The schedule is based upon National Oceanic and Atmospheric Administration (NOAA) or similar data for the regional geographic area.

| Monthly Anticipated Adverse Weather Calendar Days | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan. | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. |
| 5 | 5 | 4 | 4 | 4 | 5 | 7 | 7 | 5 | 3 | 3 | 4 |

Adverse weather days must prevent Work for fifty percent (50%) or more of the work day and delay work critical to the timely completion of the project. The number of actual adverse weather days shall be calculated chronologically from the first to the last day of each month.

If adverse weather conditions are the basis for a claim for additional time, the Contractor shall document that weather conditions had an adverse effect on the scheduled construction. An increase in Contract Time due to weather due to weather shall not be cause for an increase in the contract sum.

## GP-8 WORK PLAN

The Contractor shall develop a written Work Plan which accounts for all of the construction activities required by the Contract Documents. The Work Plan shall include a list of the individual construction tasks to be completed and the estimated dates for beginning and completing the tasks. It shall also include all other items which are applicable to completing the Work such as, but not limited to, the following:

a. Typical report form for the Bi-Weekly Progress Meeting;

b. Typical form for Daily Progress Report;

c. Hurricane and Severe Storm Plan;

d. Site-specific Health and Safety Plan;

e. The delivery method and source(s) of all construction materials (company or producer name, mailing and physical address, phone number, and name of contact person).

f. The personnel, material, subcontractors, fabricators, suppliers, types of equipment, and equipment staging areas the Contractor proposes to use for construction;

g. Shop drawings, test results, and sample submittals;

h. Survey layout and stakeout;

i. All supplemental items specified in the Special Provisions.

The Work Plan shall be submitted to the Engineer prior to the Pre-Construction Conference by the date provided in the Special Provisions. The Engineer shall review the Work Plan and have the Contractor make any necessary revisions prior to acceptance of the plan. **No payment for mobilization will be made until the Work Plan has been accepted by the Engineer.**

## GP-9 PROGRESS SCHEDULE

The Contractor shall develop a written Progress Schedule which provides for an orderly progression of the Work, submittals, tests, and deliveries in order to complete the Work within the specified Milestones and Contract Time. All of the items listed in the Work Plan shall be integrated into the Progress Schedule. The format of the schedule shall be composed using Microsoft Project®, or any other software deemed acceptable by the Engineer. It shall be updated weekly by the Contractor, at a minimum. The Progress Schedule shall also include, but not be limited to the following:

a. All of the elements in the Work Plan, including updates;

b. A work order issued from Louisiana One Call ordering all their subscribers in the project area to mark their utilities;

c. A telephone log verifying that all property owners and utilities have been contacted. This log should list the time, date, and names of the personnel representing the property owners, utilities, and Contractor;

The Progress schedule must reflect the anticipated adverse weather delays described in GP-7 on all weather dependent activities.

The Progress Schedule shall be submitted to the Engineer prior to the Pre-Construction Conference by the date provided in the Special Provisions. The Engineer shall perform a review and have the Contractor make any necessary revisions prior to acceptance of the schedule. Acceptance will not impose responsibility on the Owner or Engineer for the sequencing, scheduling, or progression of the Work. The Contractor is fully responsible for progression of the Work in order to maintain compliance with the Progress Schedule and Contract Time.

## GP-10 DAILY PROGRESS REPORTS

The Contractor shall record the following daily information on Daily Progress Reports:

a. Date and signature of the author of the report;

b. Dollar amount of all bid items that are fabricated, installed, backfilled, pumped, constructed, damaged, replaced, etc. The amount of material shall be expressed in the units stated in the bid;

c. Field notes of all surveys;

d. Notes on all inspections;

e. Details of Health and Safety meetings;

f. A brief description of any Change Orders, Field Orders, Claims, Clarifications, or Amendments;

g. Condition of all navigation aids (i.e., warning signs, lighted marker buoys) and any repairs performed on them;

h. Weather conditions (adverse weather day, wind speed and direction, temperature, wave height, precipitation, etc.);

i. The amount of time lost to severe weather or personnel injury, etc;

j. Notes regarding compliance with the Progress Schedule;

k. Visitor log (Instructions for format will be furnished by the Field Engineer).

The daily progress reports shall be submitted to the Engineer at the Bi-Weekly Progress Meetings specified in GP-13 in both hard copy and digital format (Adobe Acrobat® Format, or approved equal). The typical form for Daily Progress Reports shall be developed by the Contractor and incorporated into the Work Plan.

## GP-11 HURRICANE AND SEVERE STORM PLAN

The Contractor shall develop and maintain a written Hurricane and Severe Storm Plan. The Plan shall include, but not be limited to, the following:

a. What type of actions will be taken before storm strikes at the Project Site. The plan should specify what weather conditions or wave heights will require shutdown of the Work and removal of equipment, personnel, etc.

b. Notes from continuous monitoring of NOAA marine weather broadcasts and other local commercial weather forecasts.

c. Equipment list with details on their ability to handle adverse weather and wave conditions.

d. List of safe harbors or ports and the distance and travel time required to transfer equipment from the Project Site.

e. Hard copies of any written approvals or operations schedules associated with the use of the safe harbors or ports.

f. Method of securing equipment at the safe harbors or ports.

g. List of tug boats and work boats and their respective length, horsepower, etc. which will adequately transfer the equipment to safe harbor or port under adverse weather conditions.

h. Methods which will be used to secure equipment left onsite during adverse weather conditions.

i. Evacuation or immediate reaction plans to be taken by personnel for sudden storm occurrences.

j. Operations procedures which will be used to secure critical dredging equipment such as spuds, swing wires, anchor wires, or tugs during adverse weather conditions.

k. Communications protocol with local law enforcement and fire and rescue agencies.

The Contractor shall incorporate the Hurricane and Severe Storm Plan into the Work Plan. The Owner and Engineer are not responsible for the adequacy of this plan.

## GP-12 HEALTH AND SAFETY PLAN AND INSPECTIONS

The Contractor shall develop and maintain a written Health and Safety Plan which allows the Work to be performed in compliance with all applicable laws, ordinances, rules, and regulations of any government agency having jurisdiction over the safety of personnel or property. This includes maintaining compliance with the Code of Federal Regulations, Title 29, Occupational Safety and Health Administration (OSHA) and all applicable Health and Safety Provisions of the State of Louisiana.

The Contractor shall institute a daily inspection program to assure that the requirements of the Health and Safety Plan are being fulfilled. Inspections shall include the nature of deficiencies observed, corrective action taken or to be taken, location of inspection, date, and signature of the person responsible for its contents. The results of the inspections shall be recorded on Daily Progress Reports and kept at the Project Site during the Work.

The Contractor shall incorporate the Health and Safety Plan into the Work Plan. The Owner and Engineer are not responsible for the adequacy of this plan.

## GP-13 PROGRESS MEETINGS AND REPORTS

The Engineer shall schedule meetings to review the progress of the Work, coordinate future efforts, discuss compliance with the Progress Schedule and resolve miscellaneous problems. The Engineer or

Resident Project Representative, Contractor, and all Subcontractors actively working at the Project Site shall attend each meeting. Representatives of suppliers, manufacturers, and other Subcontractors may also attend at the discretion of the Contractor. The Contractor shall record the details of each meeting in a Progress Report. The format of this report shall be developed by the Contractor, approved by the Engineer, and included in the Work Plan. The progress meetings and reports shall be scheduled according to the Special Provisions.

## GP-14 PRE-CONSTRUCTION CONFERENCE

A Pre-Construction Conference shall be held by the Contractor, Owner, Engineer, local stakeholders, and other appropriate personnel prior to starting construction on the date specified in the Special Provisions. This conference shall serve to establish a mutual understanding of the Work to be performed, the elements of the Progress Schedule and Work Plan, expectations for bi-weekly progress meetings, the Plans and Specifications, processing Applications for Payment, and any other items of concern. If any subcontractors are not present, another pre-construction conference will be required.

## GP-15 CONTRACT INTENT

The Bid Documents are complementary; what is called for by one is as binding as if called for by all. Clarifications and interpretations or notifications of minor variations and deviations of the Contract Documents will be issued by Engineer as provided in these Specifications. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Bid Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided at no additional cost to the Owner.

## GP-16 ENGINEER AND AUTHORITY OF ENGINEER

The Engineer will be the designated representative of the Owner, the initial interpreter of the Contract Documents and the judge over acceptability of all the Work. Claims, disputes, and other matters relating to the acceptability of the Work, performance by the Contractor or the interpretation of the requirements of the Contract Documents must be submitted to the Engineer in writing. Upon written request from the Contractor, the Engineer shall issue written clarifications or interpretations which are consistent with the overall intent of the Contract Documents. Such written clarifications and interpretations will be binding on the Owner and the Contractor. Either the Owner or the Contractor may make a Claim if a written clarification or interpretation justifies an adjustment in the Contract Price or Contract Times.

The Engineer has the authority to suspend the Work in whole or in part due to failure of the Contractor to correct conditions unsafe for workmen or the general public, carry out provisions of the Contract, perform conformance work, or to carry out orders. The Engineer shall submit a written order to the Contractor for work which must be suspended or resumed. Nothing in this provision shall be construed as establishing responsibility on the part of the Engineer for safety which is the responsibility of the Contractor.

The Engineer or Resident Project Representative shall keep a daily record of weather and flood conditions and may suspend the Work as deemed necessary due to periods of unsuitable weather, conditions considered unsuitable for execution of the Work, or for any other condition or reason deemed to be in the public interest.

## GP-17 CONFORMITY WITH PLANS AND SPECIFICATIONS

All work and materials involved with the Work shall conform with the lines, grades, cross sections, dimensions, and other requirements shown on the Plans or indicated in these Specifications unless otherwise approved by the Engineer.

## GP-18 CLARIFICATIONS AND AMENDMENTS TO CONTRACT DOCUMENTS

The Contract Documents may be clarified or amended by the Engineer to account for additions, deletions, and revisions to the Work after the Effective Date of the Contract. The clarifications and amendments shall be addressed by either a Change Order or a written clarification by the Engineer. The Contractor shall not proceed with the Work until the Change Order or clarification has been issued by the Engineer. The Contractor shall not be liable to the Owner or Engineer for failure to report any such discrepancy unless the Contractor had reasonable knowledge.

The Contractor may request a clarification or amendment for the following:

a. Any conflict, error, ambiguity, or discrepancy within the Contract Documents; or

b. Any conflict, error, ambiguity, or discrepancy between the Bid Documents and the provision of any Law or Regulation applicable to the performance of the Bid; or

c. Any standard, specification, manual, or code (whether or not specifically incorporated by reference in the Bid Documents); or

d. Instructions by a supplier.

The official form for a written clarification is provided in the appendices of the Contract Documents. This form shall be filled out appropriately by the Contractor and submitted to the Engineer. The Engineer shall clarify the issue in writing on either the clarification form, Field Order or a Change Order and submit it to the Contractor.

## GP-19 SUBCONTRACTS

The Contractor shall provide the names of all Subcontractors to the Engineer in writing before awarding any Subcontracts. The Contractor shall be responsible for the coordination of the trades and Subcontractors engaged in the Work. The Contractor is fully responsible to the Owner for the acts and omissions of all the Subcontractors. The Owner and Engineer will not settle any differences between the Contractor and Subcontractors or between Subcontractors. The Contractor shall have appropriate provisions in all Subcontracts to bind Subcontractors to the Contractor by the terms of the General Provisions and other Contract Documents, as applicable to the Work of Subcontractors. The provisions should provide the Contractor the same power regarding termination of Subcontracts that the Owner may exercise over the Contractor under any provisions of the Contract Documents.

## GP-20 WORKERS, METHODS, AND EQUIPMENT

The Contractor shall provide competent, qualified, and trained personnel to perform the Work. The Contractor shall not employ any person found objectionable by the Engineer. Any person employed by the Contractor or any Subcontractor who, in the opinion of the Engineer, does not perform the Work in a proper, skillful, and orderly manner shall be immediately removed upon receiving a written order by the Engineer. The Engineer may also suspend the Work until the Contractor removes the employee or provides a suitable replacement. Such an employee shall not be re-employed in any portion of the Work without written approval from the Engineer.

The on-site superintendent for the Contractor shall be competent, English-speaking, and qualified to receive orders, supervise, and coordinate all Work for the Contractor and any Subcontractors. The qualifications of the superintendent must be established and approved by the Engineer prior to commencement of the Work. The superintendent shall be furnished by the Contractor regardless of how much Work may be sublet. In the performance of the Work under this Contract, the Contractor shall conduct operations to avoid interference with any other Contractors.

All equipment, products, and material incorporated into the Work shall be as specified, or if not specified, shall be new, of good quality, and protected, assembled, used, connected, applied, cleaned, and conditioned in accordance with the manufacturer's instructions, except as otherwise may be provided in the Bid Documents. All equipment shall be of sufficient size and mechanical condition to meet the requirements of the Work and produce a satisfactory quality of work. Equipment shall not damage adjacent property throughout the performance of the Work. The Plant and Equipment Schedule should be completed by the Contractor.

The Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures used to complete the Work in conformance with the Contract Documents.

The Contractor shall obtain permission from the Engineer if a method or type of equipment other than specified in the Contract is desired. The request shall be in writing and shall include a full description of the methods, equipment proposed, and reasons for the modification. A proposed item of material or equipment may be considered by the Engineer to be functionally equal to an item specified in the Contract if:

a. It is at least equal in quality, durability, appearance, strength, and design characteristics;

b. There is no increase in any cost including capital, installation, or operating to the Owner;

c. The proposed item will conform substantially, even with deviations, to the detailed requirements of the item named in the Bid Documents.

If, after trial use of the substituted methods or equipment, the Engineer determines that the Work produced does not meet Contract requirements, the Contractor shall discontinue use of the substituted methods or equipment and shall complete the Work with the specified methods and equipment. The Contractor shall remove the deficient Work and replace it with Work of specified quality or take other corrective action as directed. No change will be made in basis of payment for construction items involved or in Contract Time as a result of authorizing a change in methods or equipment.

## GP-21 ACCIDENT PREVENTION, INVESTIGATIONS, AND REPORTING

The Contractor shall be responsible to develop and maintain all safeguards and safety precautions necessary to prevent damage, injury, or loss throughout the performance of the Work. All accidents at the Project Site shall be investigated by the immediate supervisor of employee(s) involved and reported to the Engineer or Resident Project Representative within one (1) working day. A complete and accurate written report of the accident including estimated lost time days shall be submitted to the Engineer within four (4) calendar days. A follow-up report shall be submitted to the Engineer if the estimated lost time days differ from the actual lost time days.

## GP-22 PRESERVATION AND RESTORATION OF PROPERTY, MONUMENTS, ETC.

The Contractor shall comply with all applicable laws, ordinances, rules, and regulations of any government agency having jurisdiction over the preservation and protection of public and private property. The Contractor shall install and maintain suitable safeguards and safety precautions during the Work as necessary to prevent damage, injury, or loss to property. This responsibility shall remain with the Contractor until the Work has been completed and accepted. Any damage, injury, or loss to property which is caused by the Contractor or Subcontractors shall be repaired or replaced at the expense of the Contractor.

The Contractor shall protect all land monuments, State and United States bench marks, geodetic and geological survey monuments, and property markers from disturbance or damage until an authorized agent has witnessed or otherwise referenced their location. The Contractor shall also provide protection for all public and private property including trees, utilities, pipes, conduits, structures, etc. These items shall not be removed unless directed by the Engineer.

The Contractor shall be responsible to completely repair all damages to public or private property due to any act, omission, neglect, or misconduct in the execution of the Work unless it is due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God, public enemies, or governmental authorities. The damage must be repaired at the expense of the Contractor before final acceptance of the Work can be granted by the Engineer. If the Contractor fails to repair the damage within forty-eight (48) hours, the Owner may independently proceed with the repairs at the expense of the Contractor by deducting the cost from the Contract. If the Contractor cannot provide for the cost of repairs, the Surety of the Contractor shall be held until all damages, suits, or claims have been settled.

## GP-23 PROTECTION OF THE WORK, MATERIALS, AND EQUIPMENT

It shall be the responsibility of the Contractor to protect the Work, materials, and equipment from damages or delays due to inflows, tidal rise, and storm water runoff which may occur at the Project Site. The Owner shall not be held liable or responsible for these types of delays or damages.

## GP-24 LAND RIGHTS

The Owner has been granted all of the temporary easements, servitudes, and right-of-way agreements from public and private landowners in order to perform the Work. A land rights memorandum which lists

all known responsible contacts and required stipulations is provided in the appendices of the Contract Documents. The Contractor is responsible to notify all of the contacts and abide by stipulations listed in that memorandum.

## GP-25 UTILITIES

The Owner has been granted all of the temporary easements, servitudes, and right-of-way agreements from known public and private utilities in order to perform the Work. The utilities include, but are not limited to telephone, telegraph, power poles or lines, water or fire hydrants, water or gas mains and pipelines, sewers, conduits, and other accessories or appurtenances of a similar nature which are fixed or controlled by a city, public utility company or corporation.

The Contractor shall conduct the Work in such a manner as to cooperate and minimize inconveniences with utilities. Prior to commencement of the Work, the Contractor is responsible to notify all of the utilities and abide by stipulations required by the utility company(s). The Contractor shall also call Louisiana One Call at 811 or (800) 272-3020 a minimum of 5 working days prior to construction to locate existing utilities at the Project Site.

Any damage to utilities that is caused by the Contractor within the Project Site shall be repaired at the expense of the Contractor. The Owner will not be responsible for any delay or damage incurred by the Contractor due to working around or joining the Work to utilities left in place or for making adjustments.

Any unidentified pipes or structures which may be discovered within the limits of the Project Site shall not be disturbed and shall be reported to the Engineer as soon as possible. Construction or excavation shall not be performed around unidentified utilities without prior approval from the Engineer.

## GP-26 PERMITS

Federal and State permits that are required to perform the Work, such as the Department of the Army Permit, Coastal Use Permit, LDEQ Clean Water Permit, LDWF Fill Material License, and LADOTD highway crossing permit have been secured by the Owner. Permit conditions affecting the construction processes have been included in these Specifications. Copies of these permits will be provided to the Contractor at the pre-construction conference. These permits will not relieve the responsibility of the Contractor from obtaining any additional permits which may be needed to complete the Work. Copies of any special permits that are obtained by the Contractor must be submitted to the Owner. The Contractor shall conform to the requirements therein and display copies of the permits in a public setting at the Project Site at all times.

## GP-27 PROJECT SITE CLEAN-UP

The Contractor shall keep the Project Site free from accumulations of waste material or trash at all times. All trash and waste materials shall be removed by the Contractor and disposed off-site in an approved waste disposal facility. In addition, all equipment, tools, and non-conforming work shall also be removed prior to the Work being accepted. No materials shall be placed outside of the Project Site.

## GP-28 OWNER INSPECTION

The Owner, Resident Project Representative, and Federal Sponsor shall have the right to perform reasonable inspections and testing of the Work at the Project Site. Access shall be granted to the entire Project Site including all materials intended for use in the Work. The Contractor shall allow reasonable time for these inspections and tests to be performed. The inspections shall not relieve the Contractor from any obligation in accordance with the requirements of the Contract.

The Owner shall notify the Contractor prior to all tests, inspections, and approvals of the Work which are to be conducted at the Project Site. The Owner shall also provide the Contractor with the written results of all inspections and tests. Inspections, tests, or Payments made by the Owner shall not constitute acceptance of non-conforming Work or prejudice the Owner's rights under the Contract.

## GP-29 DUTIES OF RESIDENT PROJECT REPRESENTATIVE

A Resident Project Representative may be assigned by the Engineer to the Project Site to observe the Contractor and monitor the progress and manner in which the Work is being performed. The Resident Project Representative will also report to the Engineer and Contractor whenever materials or Work fail to comply with the Contract. The Resident Project Representative is authorized to reject any materials or suspend work which does not comply with the Contract until the issue is resolved by the Engineer.

However, the Resident Project Representative is not authorized to revoke, alter, enlarge, relax, or release any requirements of the Contract, or to approve or accept any portion of the Work, or to issue instructions contrary to the Plans and Specifications. The Resident Project Representative shall not manage or perform duties for the Contractor.

## GP-30 CONSTRUCTION STAKES, LINES, AND GRADES

The Engineer shall direct the Contractor to all control points necessary for setting stakes and establishing lines and grades as shown on the Plans. The Contractor shall be responsible for laying out all of the Work. All layouts shall be witnessed and verified by the Engineer or Resident Project Representative prior to beginning the Work. The Contractor shall be responsible for proper execution of the Work according to the layouts after receiving verification from the Engineer.

The Contractor shall be responsible for furnishing and maintaining stakes such that the Work can be verified for acceptance. The Engineer may suspend the Work at any time if it cannot be adequately verified due to the number, quality, or condition of the stakes.

## GP-31 CONTRACTOR'S RESPONSIBILITY FOR WORK

The Contractor shall execute all items covered by the Contract, and shall furnish, unless otherwise definitely provided in the Contract, all materials, implements, machinery, equipment, tools, supplies, transportation, and labor necessary to complete the Work. The Contractor shall pay constant attention to the progress of the Work and shall cooperate with the Engineer in every way possible. The Contractor shall maintain a complete copy of the Contract at all times, including the Plans, Specifications, and any authorized modifications.

## GP-32 ENVIRONMENTAL PROTECTION

The Contractor shall comply with and abide by all federal, state, and local laws and regulations controlling pollution of the environment, including air, water, and noise. The Contractor shall take precautions to prevent pollution of waters and wetlands with fuels, oils, bituminous materials, chemicals, sewage, or other harmful materials and contaminants, and to prevent pollution of the atmosphere from particulate and gaseous matter, in accordance with all terms and conditions of federal, state, and local air and water pollution control laws and programs and their rules and regulations, including the federal Clean Air Act and the federal Clean Water Act.

The Contractor shall adhere to the provisions which require compliance with all standards, orders, or requirements contained under Section 306 of the Clean Air Act and Section 508 of the Clean Water Act, which prohibit the use under non-exempt Federal contracts, grants, or loans, of facilities included on the Environmental Protection Agency (EPA) list of Violating Facilities.

Construction operations in rivers, streams, lakes, tidal or coastal waters, reservoirs, canals, wetlands, and any other impoundments shall be restricted to areas where it is necessary to accomplish the Work and performed in accordance with any applicable federal, state, and local laws, regulations, permit requirements, and guidelines, and the Contractor shall conduct the Work in a manner that will not cause damaging concentrations of silt or pollution to water.

Contractor shall maintain and operate equipment to minimize noise, dust, and vibration near noise, dust and vibration-sensitive areas such as churches, hospitals, schools, and residential areas, and assure that any activities conducted near such areas are not unduly disruptive. Contractor shall maintain all equipment with properly functioning mufflers.

The Contractor shall be responsible for determining and utilizing any erosion and pollution control features or methods that may be necessary to comply with all federal, state, and local laws and regulations.

## GP-33 SANITARY PROVISION

The Contractor shall provide and maintain sanitary accommodations for use by all employees and Subcontractors. Facilities shall comply with the requirements of the Louisiana State Board of Health and Hospitals and other authorities having jurisdiction. Committing public nuisance on the Project Site is prohibited.

## GP-34 PAYMENT OF TAXES

The Contractor shall be responsible for all taxes and duties that maybe levied under existing State, Federal, and local laws during the completion of the Work. The Owner will presume that the amount of such taxes is included in the unit prices bid by the Contractor and will not provide additional reimbursement.

## GP-35 RADIO AND TELEPHONES

The Contractor shall furnish and maintain radio and telephone equipment throughout the Contract Time which will allow communication between the Contractor and the Engineer or Resident Project Representative.

## GP-36 NAVIGATION

All marine vessels shall comply with the following Federal Laws and Regulations:

a. The International Navigational Rules Act of 1977 (Public Law 95-75, 91 Stat. 308, or 33 U.S.C. 1601-1608); and

b. The Inland Navigation Rules Act of 1980 (Public Law 96-591, 94 Stat. 3415, 33 U.S.C. 2001-2038).

These rules can be found on the Internet at:
http://www.navcen.uscg.gov/?pageName=navRulesContent.

All marine vessels shall display the lights and day shapes required by Part C- Lights and Shapes of the Inland Navigation Rules. The location, type, color, and size of the lights and day shape shall be in accordance with Annex I - Positioning and Technical Details of Lights and Shapes. Any vessel engaged in dredging is considered a "Vessel restricted in her ability to maneuver" and shall display all the lights and shapes required in Rule 27, "Vessel Not Under Control."

## GP-37 OBSTRUCTION TO NAVIGATION

The Contractor shall minimize all obstructions to navigation in compliance with pertinent U. S. Coast Guard regulations while conducting the Work. The Contractor shall promptly move any floating equipment or marine vessels which obstruct safe passage of other marine vessels. Upon completion of the Work, the Contractor shall remove all marine vessels and other floating equipment such as temporary ranges, buoys, piles, and other marks or objects that are not permanent features of the Work.

## GP-38 MARINE VESSELS AND MARINE ACTIVITIES

All marine vessels regulated by the USCG shall have the required USCG documentation that is current before being placed in service. A copy of any USCG Form 835 issued to the vessel in the preceding year shall be made available to the Owner and Engineer and a copy shall be on board the vessel. All officers

and crew shall possess valid USCG licenses as required by USCG regulations. These certificates, classifications, and licenses shall be posted in a public area on board each vessel.

All dredges and quarter boats not subject to USCG inspection and certification or not having a current ABS classification shall be inspected in the working mode annually by a marine surveyor accredited by the National Association of Marine Surveyors (NAMS) or the Society of Accredited Marine Surveyors (SAMS) and having at least 5 years' experience in commercial marine plant and equipment. The inspection certificate shall be posted in a public area on board each dredge and/or quarter boat.

All other plant and support vessels shall be inspected before being placed in service and at least annually by a qualified person. The inspection certificate shall be posted in a public area on board each plant and/or vessel.

## GP-39 RECORD KEEPING

The Contractor shall maintain orderly records of the Progress Schedule, Daily Progress Reports, Progress Meetings, correspondence, submittals, reproductions of original Contract Documents, Change Orders, Field Orders, certificates, additional drawings issued subsequent to the executed Contract, clarifications and interpretations of the Contract Documents by the Engineer, and other related documents at the Project Site until all of the Work is accepted by the Engineer.

## GP-40 CERTIFICATES OF COMPLIANCE

Any certificates required for demonstrating proof of compliance of materials with specification requirements shall be executed in three (3) copies. Each certificate shall be certified by an authorized agent of the supplying company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date of shipment. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the testing date. The Contractor shall also certify that all materials and test reports conform to the requirements of the Contract. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material if the material is tested and determined to be in nonconformance.

## GP-41 SUBMITTALS

The Contractor shall review all Submittals for compliance with the requirements of the Contract prior to delivery to the Engineer. Each Submittal shall contain a signed statement by the Contractor that it complies with the Contract requirements with any exceptions explicitly listed. The Contractor shall comply with these requirements for Submittals from Subcontractors, manufacturers, and suppliers.

All Submittals shall include sufficient data to demonstrate that the requirements of the Contract are met or exceeded. All submittals shall be legible and marked with the project title and clearly identify the item submitted. Each submittal package shall include an itemized list of the items submitted.

All Submittals will be reviewed within fourteen (14) days after being received by the Engineer. The Contractor shall allow the Engineer sufficient time for review, corrections, and resubmission of all Submittals prior to beginning the associated Work. The Contract Time shall not be extended based

on incorrect or incomplete Submittals.

## GP-42 CLAIMS FOR EXTRA COST

The Contractor is expected to complete the Work according to the Contract Price specified in the Bid Documents. If the Contractor deems additional compensation is due for work, materials, delays or other additional costs/or expenses not covered in the Contract or not ordered as extra work, the Contractor shall give the Engineer written notice thereof within fourteen (14) calendar days after the receipt of such instructions and, in any event, before commencing the procedure. The Contractor shall justify the claim for extra cost by providing supporting data and calculations. The Engineer shall determine whether the Contractor is entitled to be compensated for such extra cost and shall make any required adjustments of the Contract in accordance with GP-43. If no written claim is made within this fourteen (14) calendar-day period, the Contractor will be deemed to have waived any claim for extra cost for such work.

Claim for damages or delays of the Work shall not be made by the Contractor for a relocation of the construction operation or portions thereof to other locations within the geographical scope of the project, when in the opinion of the Engineer, such relocation is necessary for the most effective prosecution of the Work and may be accomplished without undue hardship.

## GP-43 ALTERATION OF THE CONTRACT AND COMPENSATION

Using Change Orders, Field Orders, or Written Amendments, the Owner may order extra work or make changes by altering the details of construction, add to or deduct from the Work. The requirements and stipulations of these documents shall be binding on the Owner and Contractor throughout the remainder of the Contract. Any claim for an extension of Contract Time caused thereby shall be adjusted at the time of ordering such change.

The value of any such extra work or change shall be determined in one or more of the following ways and in the following priority:

a. By application of the unit prices in the Contract to the quantities of the items involved or subsequently agreed upon; or

b. By mutual acceptance between the Owner and Contractor of a lump sum.

If none of the above methods is agreed upon, the Contractor, provided he is so ordered by the Owner in writing, shall proceed with the Work on a “force account” basis. In such a case, the Contractor shall keep and preserve in such form as the Engineer may direct, a correct itemized account of the direct cost of labor, materials, equipment, together with vouchers bearing written certification by the Contractor. In any case, the Engineer shall certify to the amount, including an allowance of fifteen percent (15%) for jobsite and home office overhead indirect expenses and profit due to the Contractor. Where such change involves a subcontractor, an allowance of fifteen percent (15%) for overhead and profit shall be due the subcontractor and an allowance of ten percent (10%) shall be due the Contractor. Pending final determination of value, payments on account of changes shall be made on the Engineer’s estimate and as approved in an executed Change Order.

If the Contractor is prevented from completing the Work according to the Contract Price due to the Owner, the Contractor may be entitled to any reasonable and necessary addition of cost as determined by the Engineer. Neither the Owner nor the Contractor shall be entitled to any damages arising from events or occurrences which are beyond their control, including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, acts of war, and other like matters. The provisions of this section exclude recovery for damages caused by the Contractor and compensation for additional professional services by either party.

## GP-44 EXTENSION OF CONTRACT TIME

The Contractor is expected to complete the Work within the Contract Time specified in the Bid Documents. A legitimate increase of the Contract time may be requested by the Contractor throughout the course of the Work. This Claim must be submitted to the Engineer in writing within fourteen (14) days of the event which caused the time delay to the Contractor. If an extension of Contract Time involves an increase in Contract Price, both claims shall be submitted together. The Contractor shall justify the increase of the Contract Time in the Claim using supporting data and calculations. The Engineer may deny the claim if there is insufficient information to make a determination. If the Claim is approved, the Engineer shall issue a Change Order within thirty (30) days of the Claim. The Contract Time shall be increased on a basis that is commensurate with the amount of additional or remaining Work. For example, the Contract Time can be increased where the number of actual adverse weather days exceeds the number of days estimated in the Contract.

## GP-45 OWNER'S RIGHT TO TERMINATE CONTRACT FOR CAUSE OR CONVENIENCE

### 45.1 TERMINATION FOR CAUSE

The Owner shall submit a written notice to the Contractor and Surety which justifies placement of the Contractor in default if:

a. The Work is not begun within the time specified in the Notice to Proceed; or

b. The Work is performed with insufficient workmen, equipment, or materials to assure prompt completion; or

c. The Contractor performs unsuitable, neglected or rejected work, refuses to remove materials; or

d. The Work is discontinued; or

e. The Work is not completed within the Contract Time or time extension; or

f. Work is not resumed within a reasonable time after receiving a notice to continue; or

g. The Contractor becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency; or

h. The Contractor allows any final judgment to stand unsatisfied for a period of ten (10) days; or

i. The Contractor makes an assignment for the benefit of creditors; or

j. The Work is not performed in an acceptable manner.

If the Contractor or Surety does not remedy all conditions cited in the written notice within ten (10) days after receiving such a notice, the Contractor will be in default and the Owner shall remove the Contractor from the Work. If the Contractor is placed into default, the Owner may obtain the necessary labor, materials, and equipment or enter into a new Contract in order to complete the Work. All costs incurred by the Owner for completing the Work under the new Contract will be deducted from the payment due the Contractor. If the expense exceeds the sum payable under the Contract, the Contractor and Surety shall be liable to pay the Owner the difference.

### 45.2 TERMINATION FOR CONVENIENCE

Owner may, at any time, terminate this Contract or any portion thereof, for Owner's convenience, upon providing written notice to the Contractor. In such case, Contractor shall be paid for all work completed through the date notice was provided (less payments already received) and reasonable demobilization and restocking charges incurred and reasonable overhead and profit based upon industry standards on the work performed. In no event shall the Contractor be entitled to payment of overhead and profit on work not performed. In the event it is determined that the Contractor was wrongfully terminated for cause, pursuant to Section GP 45.1 above, such termination shall be automatically converted to a termination for convenience under and payment made as provided under this Section.

## GP-46 TEMPORARY SUSPENSION OF WORK

The Engineer shall have the authority to temporarily suspend the Work in whole or in part. A Field Order shall be issued to the Contractor for any of the Work that is suspended for periods exceeding one (1) calendar day. The Field Order shall include the specific reasons and details for the suspension. The Contract Time shall not be extended if the Work is suspended due to failure by the Contractor to comply with a Field Order or with the Plans and Specifications. If the Work is suspended in the interest of the Owner, the Contractor shall make due allowances for the lost time.

## GP-47 NON-CONFORMING AND UNAUTHORIZED WORK

Work not conforming to the Plans, Specifications, Field Orders, or Change Orders shall not be accepted for payment. Unacceptable or unauthorized work shall be removed and replaced in an acceptable manner at the expense of the Contractor in order to obtain final acceptance of the Work.

If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this Contract, the Owner after seven (7) calendar days written notice to the Contractor, may correct such deficiencies itself or by use of other contractors without prejudice to any other remedy it may have, and may deduct the cost thereof from the payment then or thereafter due to the Contractor.

## GP-48 CONTRACTOR'S RIGHT TO TERMINATE CONTRACT

The Contractor may terminate the Contract or Work and recover payment from the Owner for labor and materials if the Work is stopped through no act or fault of the Contractor for more than three (3) months. For example, such an occurrence could be caused by a court order or other public authority. In any case, the Contractor shall submit a written notice to the Engineer at the beginning of the occurrence, and a written Claim to the Owner at the end of the occurrence.

## GP-49 BREACH OF CONTRACT

The Owner shall submit a written Claim to the Contractor regarding any breach of the Contract. The Contractor must provide a written response to the Owner regarding the breach of Contract within ten (10) days after the Claim. This response must provide either an admission to the Claim or a detailed denial based on relevant data and calculations. The failure of the Contractor to provide a proper response within ten (10) days shall result in justification of the Claim by default.

## GP-50 NO WAIVER OF LEGAL RIGHTS

The Owner shall not be prevented from recovering costs from the Contractor, Surety, or both due to failure of the Contractor to fulfill all of the obligations under the Contract. If a waiver is provided to the Contractor for a breach of Contract by the Owner, it shall not apply to any other breach of Contract. Final acceptance of the Work shall not prevent the Owner from correcting any measurement, estimate, or certificate. The Contractor shall be liable to the Owner without prejudice to the terms of the Contract or any warranty for latent defects, fraud, or gross negligence.

## GP-51 LIABILITY FOR DAMAGES AND INJURIES

To the fullest extent permitted by Laws and Regulations, the Contractor shall indemnify and hold harmless the Owner, Engineer, and their officers, employees, representatives, and/or agents from all suits, actions, claims, costs, losses, demands, and judgments (including but not limited to fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) brought because of injuries or damage sustained by a person or property due to the operations of Contractor; due to negligence in safeguarding the Work, or use of unacceptable materials in constructing the Work; or any negligent act, omission, or misconduct of the Contractor; or claims or amounts recovered under the Workmen's Compensation Act or other law, ordinance, order, or decree; any money due the Contractor as considered necessary by the Owner for such purpose may be retained for use of the State or in case no money is due, the performance and payment bond may be held until such suits, actions, claims for injuries or damages have been settled and suitable evidence to that effect furnished to the Owner; except that money due the Contractor will not be withheld when the Contractor produces satisfactory evidence that adequate Workman's Compensation, Public Liability, and Property Damage Insurance are in effect.

The indemnification obligations of the Contractor shall not extend to the liability of the Owner, Engineer, and their affiliates arising out of the preparation or approval of the Plans, Specifications, maps, opinions, reports, surveys, or Change Orders, or for providing directions or instructions which are the primary cause of the injury or damage.

Should the Owner or Contractor suffer from any injury or damage due to an error, omission, or act of the other party or their legally liable affiliates, a written Claim shall be submitted to the other party within ten (10) days. The Claim shall provide all details regarding the injury or damage, the results of any investigations, and the action to be taken to prevent any reoccurrence.

## GP-52 LIABILITY FOR LOSSES BY ACTS OF THE GOVERNMENT

The Owner shall not be liable for any loss or damage suffered by the Contractor arising out of a cessation of Work under this Contract due to any act or order of any local, state, or federal government agency. If this cessation occurs, the Contractor may request an extension of the Contract Time according to the provisions in GP-44.

## GP-53 FINAL INSPECTION AND ACCEPTANCE

Whenever the Work provided for, or contemplated by the contract, has been satisfactorily completed, all punch list items completed and the final cleaning up is performed, the Engineer shall be notified in writing that said work is completed and ready for final inspection. The Engineer shall, unless otherwise provided, make the final inspection within a reasonable length of time after the receipt of such notification.

If all construction provided for in the contract is found completed to the Engineer's satisfaction, the inspection shall constitute the final inspection and the Engineer will make recommendation to the Owner for final acceptance and notify the Contractor in writing of this recommendation of acceptance.

The Owner will record the Notice of Acceptance with the Clerk of Court in the Parish(s) in which the Work has been performed. The recording of the Notice of Acceptance shall commence a lien period of not less than forty-five (45) consecutive calendar days, during which period the retainage will be withheld by the Owner. The Owner will provide the Contractor with a copy of the Certificate of Recordation.

## GP-54 AS-BUILT DRAWINGS

The Contractor shall submit all originals and copies of the As-Built Drawings to the Engineer for review and acceptance in accordance with the Special Provisions. The As-Built Drawings shall provide complete data for quantities, dimensions, specified performance and design criteria, and similar items which clearly represent the services, materials, and equipment the Contractor has provided. All revision sheets shall be clearly stamped with the words "As-Built".

## GP-55 COMPLETION OF CONTRACT

Notwithstanding any other provision of this Contract and all applicable and necessary time delays under Louisiana law, completion of the Contract requires all of the Work to be complete, inspected by the Engineer, accepted by the Owner as recommended by the Engineer, and after final payment is made. After the Contract is complete, the Contractor will then be released from further obligation except as set forth in the Contract Bond and Contractor's Guarantee.

## GP-56 CONTRACTOR'S GUARANTEE

The Contractor is obligated to provide a written guarantee to the Owner that all of the Work conforms to the Contract Documents. The Work shall be guaranteed to survive for a minimum period of 1 year after final acceptance, unless otherwise specified in the Technical Specifications.

a. The guarantee shall include:

1. A written warranty by the manufacturer for each piece of installed project equipment or apparatus furnished under the Contract.

2. Any necessary repair of replacement of the warranted equipment during the guarantee period at no cost to the Owner.

3. Satisfactory operation of installed equipment including, but not limited to, any mechanical and electrical systems furnished and constructed under the Contract during the guarantee period. The Contractor shall repair all equipment which fails due to defective materials or faulty workmanship during the guarantee period. The Contractor shall also be liable for all other ancillary expenses incurred by the Owner due to the failure.

b. The guarantee shall exclude defects or damage caused by:

1. Abuse or improper modification, maintenance, or operation by anyone other than the Contractor; or

2. Wear and tear under normal usage.

c. This obligation by the Contractor shall be absolute. The following actions will not constitute acceptance of non-conformance Work or release the Contractor from obligation to furnish the Work in accordance with the Contract Documents:

1. Observations by the Owner or Engineer; or

2. Recommendations by the Engineer or payment by the Owner; or

3. Use of the Work by the Owner; or

4. Issuance of a notice of acceptance by the Owner pursuant to the provisions of GP-53, or failure to do so; or

5. Any inspection, test, or approval by others; or

6. Any correction to non-conforming work by the Owner.

## GP-57 DISPUTE RESOLUTION

The parties shall use their best efforts to resolve all disputes in an amicable fashion. Prior to filing suit by either party with respect to any claims, or disputes arising between the parties, the disputes shall be submitted first to non-binding mediation. The mediation shall be conducted in accordance with the Construction Industry Mediation Rules of the American Arbitration Association. If the parties cannot agree to a private mediator, then the mediator shall be selected by the American Arbitration Association, upon the filing of a demand for mediation.

If the dispute is not resolved by mediation within 60 days from the request for mediation, then either party may institute legal proceedings. Any litigation involving the Owner and arising under or related to the Contract or the bidding or award thereof shall be instituted exclusively in the 19th Judicial District Court in and for the Parish of East Baton Rouge, State of Louisiana.

## GP-58 PAYMENT

The Owner hereby agrees to pay to the Contractor as full compensation for all work performed under the contract, and/or supplemental agreements thereto, the monetary value of the actual quantities in the completed work according to the schedule of unit prices and/or lump sum

prices set forth in attached bid proposal and/or duly authorized supplements thereto, and made a part of the Contract.

Partial payments under the Contract shall be made at the request of the Contractor not more than once each month, based upon partial estimates agreed to by the Contractor and Engineer and shall be furnished to the Engineer and approved by the Engineer prior to transmittal to the Owner for approval and payment.

A Subcontractor Report (included in the appendices of the Contract Documents) should be submitted by the Contractor with each request for partial payment, to be used for informational purposes only by CPRA.

The partial estimates will be approximately stated, and all partial estimates and payments shall be subject to corrections in the estimate rendered following the discovery of any error in any previous estimates.

The payment of the partial estimate shall be taken as verification that the work has been performed and that its quality is satisfactory, however it will in no way serve as a release to the Contractor for the responsibility of any portions thereof. The work and any particulars relating thereto shall be subject to revision and adjustment by the Engineer and/or the Owner at any time prior to final payment, regardless of any previous action taken.

There shall be reserved from the payments provided for the Contract ten percent (10%) for contracts less than $500,000 or five percent (5%) for contracts of $500,000 or more, of the estimates submitted, said sum to constitute a trust fund for the protection of and payment to any person or persons, mechanic, subcontractor or materialmen who shall perform any labor upon such contract, or the doing of

said work, and all persons who shall supply such person or persons or subcontractors with provisions and supplies for the carrying on of such work, and shall be withheld for a minimum of forty-five (45) calendar days after final acceptance of the completed contract and filing of the Notice of Acceptance as described in GP-53.

After the expiration of the forty-five (45) calendar day period, the reserve in excess of a sum sufficient to discharge the claims of materialmen and laborers who have filed their claims, together with a sum sufficient to defray the cost of such action and to pay attorneys' fees, shall be paid to the Contractor.

The Contractor shall be responsible for obtaining and furnishing a clear lien and privilege certificate to the Owner at the expiration of the retainage period, and prior to payment of any reserve withheld.

## GP-59 PAYMENTS WITHHELD

In addition to the percentage provided for in Section GP-58 of these General Provisions and in accordance with any other provision of this Contract, the Owner may withhold such amounts from any payment as may be necessary to protect himself from loss on account of:

a) Defective work not remedied;

b) Claims filed or reasonable evidence indicating probable filing of claims;

c) Failure of the Contractor to make payments properly to subcontractors or for material or labor;

d) Reasonable evidence that the Work will not be completed within the Contract time and that the unpaid balance would not be adequate to cover damages for the anticipated delay;

e) A reasonable doubt that the contract can be completed within the time period remaining under the contract;

f) Damage to another contractor;

g) Failure to submit required reports; or

h) Modifications of the contract which necessitate the execution of change orders prior to payment of funds.

Furthermore, nothing contained in this Section shall be deemed to limit the right of the Owner to withhold liquidated damages, as stated in the Instructions to Bidders, from any amounts which may be due and owed the Contractor for work performed under the contract.

## GP-60 LIENS

Neither the final payment nor any part of the retained percentage shall come due until the Contractor shall deliver to the Owner a complete release of all liens arising out of this contract, or receipts in full

in lieu thereof, and, if required by the Owner, an affidavit that so far as he has knowledge or information, the releases and receipts include all labor and material for which a lien could be filed; but if any subcontractor refuses to furnish a release or receipt in full, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against any lien, construction cost, or attorney's fees.

## GP-61 EQUAL EMPLOYMENT OPPORTUNITY

The State of Louisiana is an equal opportunity employer, and looks to its Contractor, subcontractors, vendors and suppliers to take affirmative action to effect this commitment in its operations.

By submitting the bid proposal and executing the Contract, the Contractor agrees to abide by the requirements of the following as applicable: Title VI and VII of the Civil Rights Act of 1964, as amended by the Equal Opportunity Act of 1972, Federal Executive Order 11246, the Federal Rehabilitation Act of 1973, as amended, the Vietnam Era Veterans Readjustment Assistance Act of 1974, Title IX of the Education Amendments of 1972, and the Age Act of 1975, and the Contractor agrees to abide by the requirements of the Americans with Disabilities Act of 1990.

The Contractor agrees not to discriminate in its employment practices, and will render services the Contract, without regard to their race, age, color, religion, sex, national origin, veteran status, political affiliation or disabilities. Any act of discrimination committed by the Contractor, or failure to comply with these statutory obligations when applicable, shall be grounds for termination of the Contract.

## GP-62 ANTI-KICKBACK CLAUSE

The Contractor agrees to adhere to the mandate dictated by the Copeland “Anti-Kickback” Act which provides that each contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the completion of the work, to give up any part of the compensation to which he is otherwise entitled.

## GP-63 SUSPENSION/DEBARMENT

Contractor certifies, by signing and submitting any bid, that their company, any subcontractors, or principals are not suspended, debarred, or ineligible from entering into contracts with any department or agency of the Federal Government or of the State of Louisiana, or in receipt of notice of proposed debarment or suspension.

Contractor agrees to secure from any contractor(s) and subcontractor(s) for the captioned project, certification that such contractor(s) and subcontractor(s) are not suspended, debarred or declared ineligible from entering into contracts with any department or agency of the Federal Government or of the State of Louisiana, or in receipt of a notice of proposed debarment or suspension.

Contractor shall provide immediate notice to Owner in the event of it or its contractor(s) or any subcontractor(s) being suspended, debarred or declared ineligible by any department or agency of the Federal Government or of the State of Louisiana, or upon receipt of a notice of a proposed debarment or suspension, either prior to or after execution of this Contract.

Upon receipt of notice of suspension, debarment, or declaration that Contractor or its contractor(s) or any subcontractor(s) is/are ineligible to enter into contracts with any department or agency of the Federal Government or of the State of Louisiana, either prior to or after execution of this Contract, Owner reserves the right to review cause for said debarment, suspension, or declaration of ineligibility, and to terminate this Contract pursuant to the terms of GP-45 OWNER'S RIGHT TO TERMINATE CONTRACT FOR CAUSE OR CONVENIENCE, or take such other action it deems appropriate under this Contract.

## GP-64 LOUISIANA FIRST HIRING ACT

Contractor shall comply with the Louisiana First Hiring Act (La. R.S. 39:2201-2204), which requires that within ten (10) days of executing the Contract, Contractor shall submit the following information to the Louisiana Workforce Commission:

1. The number and types of jobs anticipated for the Work.

2. The skill level of the jobs anticipated for the Work.

3. The wage or salary range for each job anticipated for the Work.

4. Methods, if any, that the Contractor will use to recruit unemployed persons or person employed in low wage jobs to fill job openings for the Work.

**END OF PART I - GENERAL PROVISIONS**

## PART II SPECIAL PROVISIONS

### SP-1 LOCATION OF WORK

The Work to be performed is located in St. Charles Parish, Louisiana, on the southern shoreline of Lake Pontchartrain and approximately 2 miles north of I-10. The Project Site is only accessible by boat from Lake Pontchartrain. The nearest boat launch is the Williams Boat Launch, located at Laketown Park, 5050 Williams Blvd., Kenner, LA 70065. See Plans for vicinity map and overall site plan.

### SP-2 WORK TO BE DONE

The Contractor shall provide all labor, materials and equipment necessary to perform the Work. The Work shall include mobilization and demobilization to and from the Project Site, dredge access and flotation channels (as required, with optional beneficial use component), construction of a shoreline protection structure, and installation of temporary warning signs. The Work shall be performed in accordance with these Specifications and in conformity to lines, grades, and elevations shown on the Plans or as directed by Engineer. This shoreline protection project includes one, continuous reach of unprotected shoreline that will require all shoreline protection components be constructed. Sheet 2 of the Contract Plans provides a breakdown of the bid items and estimated quantities associated with each component required to complete the Work.

The Work to be performed by the Contractor is further described as follows:

2.1 Mobilization and Demobilization – Mobilization and demobilization consist of the importing to and removal from the project site all personnel, equipment, materials, supplies, and incidentals including temporary facilities and utility services required to safely and proficiently perform the Work as required for the construction of the project. Additionally, mobilization and demobilization include obtaining permits, bonds and other required insurances.

2.2 Construction Surveying – Prior to construction, the transects that were established in the design survey shall be resurveyed for bathymetry and topography. The existing temporary benchmarks shall be verified or reinstalled if damaged. All the access routes to the Project Site, access and flotation channels, and the alignment of the shoreline protection structure shall be surveyed by magnetometer. During construction, surveys for partial payment and quality control shall be performed as deemed necessary by the Contractor and as requested by the Engineer. After construction is complete, an As-Built Survey shall be performed for acceptance of all the Work.

2.3 Access and Flotation Channel Excavation – Access and Flotation channels shall be dredged (as required) to the Project Site to allow for delivery of construction materials by marine vessels. Additionally, flotation channels shall be dredged along the southern shoreline of Lake Pontchartrain to allow marine vessels to construct the shoreline protection structure. Material excavated from within the flotation channel may be used beneficially and placed on the landward side of the shoreline protection alignment (single-handle) or placed within the temporary dredge material stockpile areas and backfilled (double-handle) upon demobilization.

2.4 Geogrid Composite – A geogrid and geotextile fabric component sewn together and combined prior to placement directly on the Lake Pontchartrain bottom within the shoreline protection structure extents and prior to construction and installation of the shoreline protection structure.

2.5 Shoreline Protection Structure - A hybrid structure consisting of: geogrid composite, encapsulated lightweight aggregate core layer, and a rock armor layer shall be constructed along the entire length of the existing 12,815 linear feet of unprotected shoreline. The core layer of the shoreline protection structure will consist of a lightweight aggregate blend placed into sewn geotextile bags and placed along the shoreline protection alignment prior to rock armor layer placement. The shoreline protection structure shall be constructed parallel to the shoreline according to the cross sections shown on the Plans, or as directed by the Engineer. Fish gaps are to be formed according to the locations and lines and grades shown on the Plans.

2.6 Warning Signs – Temporary warning signs shall be installed along the exterior of the Temporary Dredge Material Stockpile areas as shown on the Plans and/or as directed by USCG.

2.7 Should funding be available, alternate bid items will be added to the Project and the Contractor will be notified upon receipt of the Notice of Award. Alternate #1 or #2 Bids cannot be awarded without Base Bid being awarded as well. Alternate Bid Items will be awarded in accordance with Louisiana Rev Stat §38:2212.1. Description for each Alternate bid item is recognized to be abbreviated, but requires that each change shall be complete for scope of work affected. Contractor will be responsible for: (1) Coordinate related requirements among sections of Specifications as required that relate to the alternate bid items, (2) Include as part of each alternate bid item; miscellaneous devices, appurtenances, materials and similar items incidental to or necessary for complete installation, and (3) Coordinate alternate bid item work with adjacent Work and modify or adjust as necessary to ensure all work is integrated. Bid Summary:

Base Bid includes approximately 10,700 linear feet of Shoreline Protection Structure as shown on the Plans.

Alternate #1 Bid places approximately 1,075 linear feet of additional Shoreline Protection Structure as shown on the Plans.

Alternate #2 Bid places approximately 1,100 linear feet of additional Shoreline Protection Structure as shown on the Plans.

## SP-3 CONTRACT MILESTONES

| Milestone | Location or Recipient | Date Due |
|---|---|---|
| Bid Advertisement | Publications | As advertised |
| Pre-Bid Conference and Pre-Bid Site Visit (GP-5) | Location provided in Advertisement for Bids | Provided in Advertisement for Bids |
| Questions on Bid Documents (GP-5 and SP-5) | Submit to CPRA* | Provided in Instructions to Bidders |
| Effective Date of Contract | Contractor and Owner | Stated in Contract |
| Start of Contract Time | Contractor and Owner | Stated in Notice to Proceed |
| List of all Subcontractors (GP-19) | Engineer | Prior to awarding any Subcontracts |
| Work Plan (GP-8 and SP-7) | Engineer | 14 days prior to Pre-Construction Conference |
| Progress Schedule (GP-9) | Engineer | 14 days prior to starting construction, monthly thereafter. |
| Daily Progress Report (GP-10) | Submit to Construction Manager, Resident Project Representative, Engineer, and Owner | 12:00 pm each day from mobilization to demobilization |
| USCG Notice to Mariners (SP-16) | Engineer | 30 days prior to mobilization |
| Pre-Construction Conference (GP-14) | Contractor, Engineer, and Resident Project Representative | Scheduled by the Engineer after the Notice to Proceed is issued. |
| Progress Meetings and Reports (GP-13, GP-39) | Submit to Owner, Engineer, and Resident Project Representative | Bi-weekly. |
| Pre-Construction Survey (TS-200) | Engineer | 14 working Days prior to anticipated start of Construction. |
| Process Surveys (TS-200) | Engineer | 5 working Days after notification that field data collection for each process survey is complete. |
| As-Built Survey (TS-200) | Engineer | Draft due five (5) working Days prior to Final Inspection. Final due 14 working Days after Final Inspection. |
| As-Built Drawings | Engineer | 5 working days prior to Final Inspection. Final due 14 working days after Final Inspection. |
| Written Notice of Completion of Work (GP-53) | Engineer | Provided in GP-53 Final Inspection and Acceptance. |
| End of Contract Time | Contractor and Owner | Provided in Instructions to Bidders. |

*Official questions shall be submitted in writing by the Bidder to CPRA, in conformance with the terms as specified by the Engineer at the Pre-Bid Conference. What is stated in verbal correspondence during the Pre-Bid Conference is not binding. Official clarifications may be

provided by the Engineer via formal issuance of Addenda.

## SP-4 DELVERABLES

4.1 Prior to Pre-Construction Conference: The Contractor shall submit the following documents to the Engineer two weeks prior to the Pre-Construction Conference specified in GP-14:

4.1.1 Work Plan as specified in GP-8 and SP-8;

4.1.2 Progress Schedule as specified in GP-9; and

4.1.3 Health and Safety Plan as Specified in GP-12.

4.2 During Construction: The Contractor shall provide the following information to the Engineer during construction:

4.2.1 The results of all surveys and calculations as specified in TS-200, including but not limited to the three (3) digital and three (3) hard copies of all Deliverables required in TS-200.10;

4.2.2 Progress Schedule as specified in GP-9;

4.2.3 Daily Progress Reports as specified in GP-10;

4.2.4 Copies of all inspection and monitoring reports;

4.2.5 All Change Orders, Field Orders, Claims, Clarifications, and Amendments;

4.2.6 Results of any Materials testing;

4.2.7 Copies of all delivery slips, which shall include the source of construction materials, date of delivery, exact quantity, and size of materials delivered with each shipment to the Project Site;

4.2.8 The Contractor shall contact the Engineer a minimum of five (5) working days prior to the anticipated completion of the Work in order to schedule the final inspection.

4.3 Post Construction: The following documents shall also be submitted to the Engineer after completion of the Work:

4.3.1 As-Built Survey Data (Final submittal) due after Final Inspection.

4.3.2 As-Built Drawings with revisions such as field or change orders shown in red such that revisions are easily distinguishable from the original design.

## SP-5 CONTACT INFORMATION

Prior to the Bid opening date, the Contractor shall send all questions and requests for clarification or interpretation of the Bid Documents in writing to the attention of Jordan DeLaune of the Coastal Protection and Restoration Authority. The address and contact information is as follows:

Coastal Protection and Restoration Authority (CPRA)
150 Terrace Avenue
Baton Rouge, LA 70802
Attn: Jordan DeLaune
Phone: (225) 342-1150
Email: Cpra.Bidding@LA.GOV

After execution of the contract between Owner and Contractor, the successful Contractor shall contact the Construction Manager concerning bid documentation or questions. The addresses and contact information for the Construction Manager and Project Engineer are listed as follows:

**CPRA Construction Engineer**
David Chambers, P.E.
2045 Lakeshore Dr.
New Orleans, LA 70122
Phone: (504) 280-4069
Email: David.Chambers@LA.GOV

The Owner and Engineer shall deliver all written Claims, notices, submittals, Plans and other documents to the Contractor at the address indicated on the Bid.

## SP-6 INSURANCE AND BONDS

The Contractor shall purchase and maintain without interruption, for the duration of the contract, insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the Work hereunder by the Contractor, its agents, representatives, employees or subcontractors. The duration of the contract shall be from the inception of the contract until the date of final payment.

### 6.1 Minimum Scope and Limits of Insurance

#### 6.2.1 Worker's Compensation

Worker's Compensation insurance shall be in compliance with the Worker's Compensation law of the State of Louisiana. Employers Liability is included with a minimum limit of $500,000 per accident/per disease/per employee. If Work is to be performed over water and involves maritime exposure, applicable LHWCA, Jones Act or other maritime law coverage shall be included and the Employers Liability limit increased to a minimum of $1,000,000. A.M. Best's insurance company rating requirement may be waived for Worker's compensation coverage only.

#### 6.2.2 Commercial General Liability

Commercial General Liability insurance, including Personal and Advertising Injury Liability and Products and Completed Operations Liability, shall have a minimum limit per occurrence based on the project value. The Insurance Services Office (ISO) Commercial General Liability occurrence coverage form CG 00 01 (current form approved for use in Louisiana), or equivalent, is to be used in the policy. Claims-made form is unacceptable.

The aggregate loss limit must apply to each project. ISO form CG 25 03 (current form approved for use in Louisiana), or equivalent, shall also be submitted. The State project number, including part number, and project name shall be included on this endorsement.

**COMBINED SINGLE LIMIT (CSL) PER OCCURRENCE**

The required minimum combined single limit amount of insurance shall be as provided below:

| **Initial Contract Amount** | **Minimum Insurance** |
|---|---|
| **Up to $1,000,000** | **$1,000,000** |
| **From $1,000,001 to $2,000,000** | **$2,000,000** |
| **Over $2,000,000** | **$5,000,000** |

6.2.3 Automobile and Watercraft Liability

Automobile Liability Insurance and Watercraft Liability Insurance shall have a minimum combined single limit per occurrence of $1,000,000. ISO form number CA 00 01 (current form approved for use in Louisiana), or equivalent, is to be used in the policy. This insurance shall include third-party bodily injury and property damage liability for owned, hired and non-owned automobiles and/or watercraft. If any non-licensed motor vehicles and/or watercraft are engaged in operations within the terms of the contract on the site of the work to be performed thereunder, such insurance shall cover the use of any such vehicles.

NOTE: If the Contractor does not own an automobile and/or watercraft and such vehicles are utilized in the execution of the contract, then hired and non-owned coverage is acceptable. If an automobile and/or watercraft is not utilized in the execution of the contract, then automobile and/or watercraft coverage is not required.

6.2.4 Excess Umbrella

Excess Umbrella Insurance may be used to meet the minimum requirements for General Liability, Automobile Liability, and Watercraft Liability only.

6.2.5 Pollution Liability (required when asbestos or other hazardous material abatement is included in the contract)

Pollution Liability insurance, including gradual release as well as sudden and accidental, shall have a minimum limit of not less than $1,000,000 per claim. A claims-made form will be acceptable. A policy period inception date of no later than the first day of anticipated Work under this contract and an expiration date of no earlier than 30 days after anticipated completion of all Work under the contract shall be provided. There shall be an extended reporting period of at least 24 months, with full reinstatement of limits, from the expiration date of the policy. The policy shall not be cancelled for any reason, except non-payment of premium.

6.2.6 Deductibles and Self-Insured Retentions

Any deductibles or self-insured retentions must be declared to and accepted by the Owner. The Contractor shall be responsible for all deductibles and self-insured retentions.

6.2 Other Insurance Provisions

The policies are to contain, or be endorsed to contain, the following provisions:

### 6.2.1 Worker's Compensation and Employers Liability Coverage

The insurer shall agree to waive all rights of subrogation against the Owner, its officers, agents, employees and volunteers for losses arising from Work performed by the Contractor for the Owner.

### 6.2.2 General Liability Coverage

The Owner, its officers, agents, employees and volunteers are to be added as additional insureds as respects liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor, premises owned, occupied or used by the Contractor. ISO Form CG 20 10 (current form approved for use in Louisiana), or equivalent, is to be used.

The Contractor's insurance shall be primary as respects the Owner, its officers, agents, employees and volunteers. The coverage shall contain no special limitations on the scope of protection afforded to the Owner, its officers, officials, employees or volunteers. Any insurance or self-insurance maintained by the Owner shall be excess and non-contributory of the Contractor's insurance.

The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the policy limits.

### 6.2.3 All Coverages

Coverage shall not be canceled, suspended, or voided by either party (the Contractor or the insurer) or reduced in coverage or in limits except after 30 days written notice has been given to the Owner. Ten-day written notice of cancellation is acceptable for non-payment of premium. Notifications shall comply with the standard cancellation provisions in the Contractor's policy.

Neither the acceptance of the completed Work nor the payment thereof shall release the Contractor from the obligations of the insurance requirements or indemnification agreement.

The insurance companies issuing the policies shall have no recourse against the Owner for payment of premiums or for assessments under any form of the policies.

Any failure of the Contractor to comply with reporting provisions of the policy shall not affect coverage provided to the Owner, its officers, agents, employees and volunteers.

### 6.2.4 Acceptability of Insurers

All required insurance shall be provided by a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located. Insurance shall placed with insurers with an A.M. Best's rating of A-:VI or higher. This rating requirement may be waived for Worker's compensation coverage only.

If at any time an insurer issuing any such policy does not meet the minimum A.M. Best rating, the Contractor shall obtain a policy with an insurer that meets the A.M. Best rating and shall submit another certificate of insurance as required in the contract.

### 6.2.5 Verification of Coverage

Contractor shall furnish the Owner with Certificates of Insurance reflecting proof of required coverage. The Certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The Certificates are to be received and approved by the Owner before Work commences and upon any contract renewal thereafter.

The Certificate Holder must be listed as follows:

State of Louisiana
Coastal Protection and Restoration Authority
150 Terrace Avenue
Baton Rouge, LA 70802
Attn: Project # PO-0194

In addition to the Certificates, Contractor shall submit the declarations page and the cancellation provision endorsement for each insurance policy. The Owner reserves the right to request complete certified copies of all required insurance policies at any time.

Upon failure of the Contractor to furnish, deliver and maintain such insurance as above provided, this contract, at the election of the Owner, may be suspended, discontinued or terminated. Failure of the Contractor to purchase and/or maintain any required insurance shall not relieve the Contractor from any liability or indemnification under the contract.

If the Contractor does not meet the insurance requirements at policy renewal, at the option of the Owner, payment to the Contractor may be withheld until the requirements have been met, OR the Owner may pay the renewal premium and withhold such payment from any monies due the Contractor, OR the contract may be suspended or terminated for cause.

### 6.2.6 Subcontractors

Contractor shall include all subcontractors as insureds under its policies OR shall be responsible for verifying and maintaining the certificates provided by each subcontractor. Subcontractors shall be subject to all of the requirements stated herein. The Owner reserves the right to request copies of subcontractor's certificates at any time.

If Contractor does not verify subcontractors' insurance as described above, Owner has the right to withhold payments to the Contractor until the requirements have been met.

### 6.2.7 Worker's Compensation Indemnity

In the event Contractor is not required to provide or elects not to provide Worker's compensation coverage, the parties hereby agree the Contractor, its Owners, agents and employees will have no cause of action against, and will not assert a claim against, the State of Louisiana, its departments, agencies, agents and employees as an employer, whether pursuant to the Louisiana Worker's Compensation Act or otherwise, under any circumstance. The parties also hereby agree that the State of Louisiana, its departments, agencies, agents and employees shall in no circumstance be, or considered as, the employer or statutory employer of Contractor, its Owners, agents and employees. The parties further agree that Contractor is a wholly independent Contractor and is exclusively responsible for its employees, Owners, and agents. Contractor hereby agrees to protect, defend, indemnify and hold the State of Louisiana, its departments, agencies, agents and employees harmless from any such assertion or claim that may arise from the performance of this contract.

### 6.2.8 Indemnification/Hold Harmless Agreement

Contractor agrees to protect, defend, indemnify, save, and hold harmless, the State of Louisiana, all State Departments, Agencies, Boards and Commissions, its officers, agents, servants, employees and volunteers, from and against any and all claims, damages, expenses and liability arising out of injury or death to any person or the damage, loss or destruction of any property which may occur, or in any way grow out of, any act or omission of Contractor, its agents, servants and employees, or any and all costs, expenses and/or attorney fees incurred by Contractor as a result of any claims, demands, suits or causes of action, except those claims, demands, suits or causes of action arising out of the negligence of the State of Louisiana, all State Departments, Agencies, Boards, Commissions, its officers, agents, servants, employees and volunteers.

Contractor agrees to investigate, handle, respond to, provide defense for and defend any such claims, demands, suits or causes of action at its sole expense and agrees to bear all other costs and expenses related thereto, even if the claims, demands, suits, or causes of action are groundless, false or fraudulent.

## SP-7 WORK PLAN SUPPLEMENTAL

The following items shall be included in the Work Plan in addition to those required in the General Provisions.

7.1 The field Equipment, methodology, labor, Materials, and incidentals to be used for Mobilization and Demobilization of all Equipment required as part of TS-100, including the Equipment Access and Flotation Channels, which shall be notated on the surveys specified in TS-200 and as required by SP-4;

7.2 The layout of all staging area(s) required for any and all other Work items;

7.3 Layout and construction schedule for the access and flotation channel excavation, geogrid composite, encapsulated Lightweight Aggregate (LWA), and rock armor layer to construct the shoreline protection structure;

7.4 The Equipment Data Sheet for all Equipment in **APPENDIX H**;

7.5 The field Equipment, methodology, labor, Materials, incidentals, and any software to be used for

survey data collection, post-processing, and calculations of quantities required as part of TS-200;

7.6 Layout and schedule for temporary access and flotation channels;

7.7 Barge displacement tables;

7.8 The field Equipment, methodology, labor, Materials, and incidentals to be used for Grade Stakes required as part of TS-200;

## SP-8 FAILURE TO COMPLETE ON TIME

For each Day the Work remains incomplete beyond the Contract Time, as specified in SP-3, or Extension of Contract Time, as specified in GP-44, the sum of three thousand eight hundred thirty-five dollars ($3,835) per calendar Day will be deducted from any money due to the Contractor as liquidated damages. The Contractor and Surety shall be liable for any liquidated damages that are in excess of the amount due to the Contractor.

## SP-9 TRANSPORTATION

During construction layout, construction, and until final inspection and Acceptance, the Contractor shall provide a safe and reasonable means of transportation to and from dock, staging area(s), and construction areas for Owner, Engineer, Resident Project Representative, and Federal Sponsor. The schedule for dates, times, and pickup location shall be arranged by the Owner with the Contractor prior to mobilization.

During mobilization, construction layout, construction, demobilization, and until final inspection and Acceptance, should the Contractor utilize a boat, quarters barge, or quarters and stay at the project area overnight, then the Contractor shall provide room and board for the Resident Project Representative(s). In the event the Contractor is required to provide room and board for the Resident Project Representative(s), the Contractor shall also be responsible for providing the Resident Project Representative(s) with access to adequate cellular telephone service, access to electricity and utilities, and access to a high-speed internet connection capable of transmitting messages, files, data, and other Submittals indicative of the Work performed as part of this Contract.

The Contractor shall provide the Engineer, Resident Project Representative(s), Federal Sponsor, and other representatives from the State daily access to a boat and an air boat, or approved alternative vessel, as necessary, to properly inspect the various project features during the duration of construction activities. The Contractor shall supply an operator and fuel and shall maintain the boat and air boat. All mechanical malfunctions of the boat and airboat shall be repaired within twelve (12) hours.

The boat shall have the following features:

- An enclosed cabin space;
- Capable of maintaining 25 knots (29 mph);
- Minimum of six (6) passenger capacity;
- Coast Guard Certified;
- Operable marine radio;
- All safety equipment required by the Coast Guard for the size and type of that boat.
- Draft of two (2) feet or less.

The airboat shall have the following features:

- Minimum of four (4) passenger capacity;
- Capable of maintaining 25 knots (29 mph);
- Coast Guard Certified;
- Operable marine radio;
- All safety equipment required by the Coast Guard for the size and type of that boat.

In the event that the Contractor refuses, neglects, or delays compliance with the requirements of this provision, the Owner may obtain and use other necessary boats at the expense of the Contractor. The costs associated with providing the boats shall be included in the lump sum price for Bid Item No. 1, "Mobilization and Demobilization (TS-100)".

## SP-10 OFFICE SPACE FOR OWNER

The Contractor shall provide an office space/desk space for the Resident Project Representative at the Project Site. This office shall be for the sole use of the Resident Project Representative, suitably sized, and provided with lighting, heat, air conditioning, sufficient electrical outlets for a computer workstation, and a high-speed internet connection. The office furnishings shall include a work table or desk, one (1) chair, and locking doors for security purposes.

In the event that the Contractor refuses, neglects, or delays compliance with the requirements of this provision, the Owner may obtain and use another necessary office space at the expense of the Contractor. The cost for providing and furnishing this office shall be included in the Contract lump sum price for Bid Item No. 1, "Mobilization and Demobilization (TS-100)".

## SP-11 LANDOWNER AND PIPELINE INFORMATION

The Owner has executed temporary easement, servitude, or right-of-way agreements required to perform the Work at the Project Site from the landowners, utilities and pipeline operators (Grantors) listed below. The Contractor shall abide by the stipulations set forth by the executed agreements. The Contractor shall notify all grantors at least fourteen (14) working days prior to initiation of access to the said lands for the purpose of work planning, implementing, constructing, operating, modifying, monitoring and maintaining the Project Site or as otherwise stipulated in the executed agreements. The Contractor shall abide by the stipulations set forth by the respective landowners below:

St. Charles Land Co. II, LLC

| | |
|---|---|
| Contact: | Charles Lacinak Jr. |
| Phone: | (504) 523-3341 |
| Email: | clacinak@hotelmonteleone.com |

The Contractor shall add all grantors as additional insured. It is also agreed and understood that the Contractor will at all times indemnify and hold harmless all landowners from and against any and all Claims, demands, causes of action, judgments, liabilities, and expense of every nature, including attorney's fees, by reason of personal injury, death (including but not limited to injuries to and death of employees of the landowners and the Contractor's employees) or damage to property, (including environmental) which arises out of, results from, or is in any manner related to, directly or indirectly, any

operations or acts hereunder, or to the exercise of your rights hereunder, or to your presence upon or use of the landowners' premises above referred to, or to the use or existence of your facilities on such premises. The indemnity provisions of this paragraph shall not apply if any such injury, death, damage, liability claim, or cause of action is caused by the negligence of the landowners, their employees, agents, or representatives.

The Contractor shall notify Louisiana One Call at least fourteen (14) working days in advanced of any construction work. Based on surveys conducted during PO-0194 engineering and design, a pipeline is located approximately 100 feet (at its closest point) from the edge of the Flotation Channel, Shoreline Protection Structure, and Beneficial Use Area as shown on the Plans. This pipeline is still active according to the latest online NPMS records. Notice of Construction has been provided to the current operator: Gulf South Pipeline Company, LLC. Contact information for this company is also provided. This area is notated as "NO DREDGE ZONE" as shown on sheet 4 on the Plans. **No dredging, anchoring, spudding, or deep-drafting vessel passage is allowed in this area.** The Contractor shall follow the provisions stated in SP-16 as well as the warnings shown on the Plans when performing Work near this pipeline. The boundary of the "NO DREDGE ZONE" shall be demarcated with buoys or flagged stakes as part of the Pre-Construction Survey (TS-200) and prior to any excavation activities performed as part of the Work, for the duration of construction activities. The Contractor shall maintain all buoys and flagged stakes during construction. The Contractor shall abide by the stipulations set forth by the respective pipeline owners or operators below:

Gulf South Pipeline Company, LLC

| | |
|---|---|
| Contact: | Brent Dhuet |
| Phone: | (985) 804-2524 |
| Email: | Brent.Dhuet@bwpipelines.com |

The Contractor shall adhere to the most current publications of "Recommended Best Practices Guide for Safe Dredging Near Underwater Gas & Hazardous Liquid Pipelines", www.cdmcs.org, and "Working Safely Near Underwater Pipelines, www.camogroup.org.

No access, excavation, anchors or spuds shall be permitted within one-hundred feet (100') of the right-of-way of any pipeline or utility unless specified otherwise in the Contract Documents.

## SP-12 OYSTER LEASE AND SEED GROUND RESTRICTIONS

There are no known existing oyster leases or seed grounds near or within the boundaries of the Project Site. The Contractor shall keep all Equipment contained to the permitted project features and extents. In addition, the Contractor shall avoid impacts to oyster seed grounds outside the boundaries of the Project Site.

## SP-13 THREATENED AND ENDANGERED SPECIES

The Environmental and Biological Assessments for this project identifies Gulf Sturgeon and West Indian Manatees as threatened and endangered species which have the potential to exist within the boundaries of the Project Site. The Contractor shall review and comply with the restrictions in the Environmental and Biological Assessments regarding dredging and backfilling of the access and flotation channels, and the restrictions described in the Technical Specifications section.

Manatee

During in-water work in areas that potentially support manatees, all personnel associated with the project shall be instructed and aware of the potential presence of manatees, manatee speed zones, and the need to avoid collisions with, and injury to, manatee. All personnel shall be advised that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973. Additionally, personnel shall be instructed not to attempt to feed or otherwise interact with the animal.

All on-site personnel are responsible for observing water-related activities for the presence of manatee(s). To minimize potential impacts to manatees in areas of their potential presence, the Contractor shall insure the following are adhered to:

- All work, equipment, and vessel operation should cease if a manatee is spotted within a 50-foot radius (buffer zone) of the active work area. Once the manatee has left the buffer zone on its own accord (manatees must not be herded or harassed into leaving), or after 30 minutes have passed without additional sightings or manatee(s) in the buffer zone, in-water work can resume under careful observation for manatee(s).

- If a manatee(s) is sighted in or near the project area, all vessels associated with the project shall operate at "no wake/idle" speeds within the construction area and at all times while in waters where the draft of the vessel provides less than a four-foot clearance from the bottom. Vessels shall follow routes of deep water whenever possible.

- If used, siltation or turbidity barriers shall be properly secured, made of material in which manatees cannot become entangled, and be monitored to avoid manatee entrapment or impeding their movement.

- Temporary signs concerning manatees shall be posted prior to and during all in-water project activities and removed upon completion. Each vessel involved in construction activities shall display at the vessel control station or in a prominent location, visible to all employees operating the vessel, a temporary sign at least 8 ½" × 11" reading language similar to the following: "CAUTION BOATERS: MANATEE AREA/ IDLE SPEED IS REQUIRED IN CONSTRUCTION AREA AND WHERE THERE IS LESS THAN FOUR FOOT BOTTOM CLEARANCE WHEN MANATEE IS PRESENT". A second temporary sign measuring 8 ½" × 11" shall be posted at a location prominently visible to all personnel engaged in water-related activities and shall read language similar to the following: "CAUTION: MANATEE AREA/ EQUIPMENT MUST BE SHUTDOWN IMMEIDATELY IF A MANATEE COMES WITHIN 50 FEET OF OPERATION".

- Collisions with, injury to, or sightings of manatees shall be immediately reported to the U. S. Fish and Wildlife Service's Louisiana Ecological Services Office (337/291-3100) and the Louisiana Department of Wildlife and Fisheries, Natural Heritage Program (225/765-2821). Please provide the nature of the call (i.e., report of an incident, manatee sighting, etc.); time of incident/sighting; and the approximate location, including the latitude and longitude coordinates, if possible.

## SP-14 NOTIFICATION OF DISCOVERY OF HISTORICAL OR CULTURAL SITES

If during construction activities the Contractor observes items that may have prehistoric, historical, archeological, or cultural value, the Contractor shall immediately cease all activities that may result in the destruction of these resources and shall prevent his employees from trespassing on, removing, or otherwise damaging such resources. Such observations shall be reported immediately to the Owner and Engineer so that the appropriate authorities may be notified and a determination made as to their

significance and what, if any, special dispositions of the finds should be made. The Contractor shall report any observed unauthorized removal or destruction of such resources by any person to the Owner and Engineer so the appropriate State of Louisiana authorities can be notified. The Contractor shall not resume Work at the site in question until State authorities have determined the significance of resource(s) of interest.

## SP-15 NAVIGATION

Navigable waterways shall not be impaired except as allowed by applicable laws or regulations. Dredging of access channels shall not be permitted unless otherwise specified in the Contract Documents. It is the responsibility of the Contractor to select Equipment that can navigate from a maintained navigation channel to the Project Site without deepening or widening existing water bottoms unless otherwise specified in the Contract Documents. All Equipment shall remain floating at all times during transit to the Project Site. The Contractor shall obtain NOAA Nautical Charts and/or other charts to become familiar with the water bottom depths in the vicinity of the Project Site.

## SP-16 NOTICE TO MARINERS

The Contractor shall contact the Eighth Coastal Region District of the United States Coast Guard (USCG) at least 30 days prior to mobilization of the hydraulic dredge and installation of the dredge pipeline and provide all necessary information regarding the layout and schedule for the entire dredging operation. This notification must be given in sufficient time so that it appears in the Notice to Mariners at least seven (7) days prior to the commencement of this dredging operation. The USCG shall publish this information in the local notice to mariners. A copy of the original notice and all updates shall be provided to the Engineer.

## SP-17 VESSEL-SHORE TRANSFERS

For shore-to-vessel and vessel-to-shore transfers of personnel and supplies, the Contractor may utilize any commercial, public, or private facility for shallow draft vessels. It is the responsibility of the Contractor to obtain the required permission from the facility owner and to pay any costs associated with the use of the sites. The Contractor shall be responsible for any damages caused by the use of any site for landing and transfers, and shall maintain navigation through all navigation channels and boat ramps. The Contractor shall use any landing site, transfer area, or staging area at their own risk. For informational purposes, the Contractor will be required to inform the Engineer of the site that the Contractor will be using for vessel-shore transfers. Temporary docks and landing facilities may be used. Details on these features shall be included in the Work Plan for review by the Engineer.

## SP-18 AIDS TO NAVIGATION

The Contractor shall contact the Eighth Coastal Region District of the USCG and determine the type and location of aids to navigation that are required to be installed or removed in order to safely perform the Work. The types of aids to navigation may include warning signs, buoys, beacons or lights. The USCG typically requires that aids to navigation be installed along dredge pipelines, temporary spoil banks and access channels. The Contractor shall also submit a permit application and obtain a permit from the USCG prior to installation or removal of any aids to navigation. The permit application shall include the type, position, color, and dates for installation or removal of all aids to navigation. New aids to navigation shall not be installed in a manner which conflicts with existing aids to navigation. The Contractor shall not otherwise remove, modify, obstruct, willfully damage, make fast to or interfere with any existing aids to navigation. The Contractor shall provide a copy of the permit and permit application to the Engineer at least seven (7) days prior to performing any excavation.

## SP-19 ADJUSTMENT OF QUANTITIES

Where the quantity of Work with respect to any item is covered by a unit price, such quantities are estimated quantities to be used when comparing Bids and the right is reserved by the Owner to increase/decrease such quantities up to 25% without adjustment of the unit price as may be necessary to complete the Work as described in these Plans and Specifications and/or remain within funding limits.

## SP-20 AERIAL PHOTOGRAPHY

Aerial Photography shall be obtained to illustrate pre-construction conditions, verify the progress of Work, and for Final Acceptance.

Prior to commencing construction, monthly thereafter, and upon completion of all construction activities, low-elevation color, digital, oblique aerial photography shall be acquired and submitted that shows the progress of the Work. Best efforts shall be made to repeat monthly photographs at the same locations, altitude and viewpoints. Best efforts shall also be made to acquire imagery during good weather for adequate lighting. The pre-construction and post-construction photography shall obtain a project view(s) of the entire Project Site, with best efforts to repeat at the same locations, altitude and viewpoints. Submittals shall include high-resolution aerial photograph(s) in digital (TIF or JPG) format. Each photograph submitted shall include documentation of the horizontal limits displayed.

Contractor shall provide notice to the Engineer and name/contact information for aerial photography Subcontractor a minimum of one (1) week prior to execution of aerial photography.

There will be no direct payment for providing the Aerial Photography as described herein. Payment for Aerial Photography shall be included in the lump sum price for Bid Item No. 1, "Mobilization and Demobilization (TS-100)". Unrestricted rights to use of the photos shall be conveyed to the Owner.

## SP-21 FINAL CLEAN-UP

Final clean-up shall include the removal of the Contractor's plant, all Equipment, and materials either for disposal or reuse. The Contractor shall remove all non-perishable debris, trash, and garbage from the Project Site prior to final Acceptance. Unless otherwise approved in writing by the Engineer, the Contractor is not permitted to abandon pipelines, cables, pipeline supports, pontoons, or other equipment or materials in the disposal area, pipeline access areas, and water areas, or in any harbors, passes, or inlets, or other areas adjacent to the Project Site. Any stakes or other markers placed by the Contractor shall be removed as a part of the final clean-up. All stakes, including grade stakes, placed as part of the Work, shall be completely removed and not be left buried in the fill.

## SP-22 MISPLACED MATERIAL AND EQUIPMENT

The Contractor should at all times be aware of the location and/or position of the any slurry, dredged sediment, Equipment, or other Materials. Should the Contractor, during the progress of the Work misplace excavated material, Equipment, or other Materials outside of what is authorized and permitted without the approval of the Owner or Engineer, the Contractor shall give immediate notice, with description and location of such misplaced Materials to the Owner and Engineer. Following coordination

with the Engineer, the Contractor shall immediately recover and remove the misplaced Material. This may require redeposit or redistribution of misplaced material as directed by the Owner or Engineer. Misplaced Materials shall be removed at the Contractor's expense. Additionally, the Contractor will be responsible for restoring unauthorized disposal areas to pre-construction conditions at his/her own expense.

In the event of refusal, neglect, or delay in compliance with the above requirements, such misplaced Materials may be removed by the Owner, and the cost of such removal may be deducted from any money due or to become due to the Contractor or may be recovered under his/he bond.

## SP-23 PROHIBITION OF DISCRIMINATORY BOYCOTTS OF ISREAL IN STATE PROCUREMENT

By submitting a response to this solicitation, the Bidder or proposer certifies and agrees that the following information is correct:

In preparing its response, the Bidder or proposer has considered all proposals submitted from qualified, potential Subcontractors and suppliers, and has not, in the solicitation, selection, or commercial treatment of any Subcontractor or supplier, refused to transact or terminated business activities, or taken other actions intended to limit commercial relations, with a person or entity that is engaging in commercial transactions in Israel or Israeli-controlled territories, with the specific intent to accomplish a boycott or divestment of Israel. The Bidder also has not retaliated against any person or other entity for reporting such refusal, termination, or commercially limiting actions. The State reserves the right to reject the response of the Bidder or proposer if this certification is subsequently determined to be false, and to terminate any Contract awarded based on such a false response.

## SP-24 COMPLIANCE WITH STATE AND FEDERAL LAW

The Contractor and any subcontractors must comply with applicable Federal labor laws covering non-Federal construction, including but not limited to, the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 et seq.) and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c) and to the extent if applicable 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change to the provisions of the Davis-Bacon Act) (formerly 40 U.S.C. 276a et seq). Contractor further agrees, in the case of any equipment and/or product authorized to be purchased under this Contract, to comply with the Buy American Act 41 U.S.C. 8301-8305 (formerly 41 U.S.C. 10a-10c).

Further, the Contractor and its employees, subcontractors and agents shall agree to comply with all applicable Federal, State, and Local laws, policies, and ordinances, in carrying out all provisions of this Contract.

## SP-25 BARGE DISPLACEMENT TABLE

The Contractor shall develop a barge displacement table for measurement and payment of rock and include it in the Work Plan. The table shall be developed and stamped by an Engineer licensed in the state of Louisiana. It shall show the name and/or number, dimensions, name of owner, and name of fabricator for each barge. The Contractor shall furnish a dimensioned drawing or sketch of each barge that is sufficient enough to verify the barge displacement table. The drawings shall show, at a minimum, the length, width, and depth of the barge, and dimensions of rake(s). All new or modified barges shall be field checked for current dimensions by the Contractor in the presence of the Engineer or the Inspector. Each table shall contain the freeboard of the barge in feet and tenths from zero (0) to the full depth of the barge and the corresponding gross displacement to the nearest ton.

Each barge shall be suitably marked with two displacement gaging lines along each side of the barge. Each gaging line shall be painted perpendicular to the edge of the barge and be no less than four (4) inches wide and one (1) foot long on both the deck and side of the barge. Barges with rakes shall have the displacement gaging lines placed at each corner of the box section between the rakes. If a barge has a box end or ends, the gaging lines shall be placed approximately four (4) feet from the box end. The freeboard will be measured at the four (4) gaging locations and the displacement determined by the use of the "CELMV Standard Barge Tables" from the average of these measurements. The displacement shall be determined before and after the barge is unloaded and the difference between these values shall be the quantity delivered.

Densities shall be tested by a certified testing laboratory according to ASTM D 1429 (Method D-Hydrometer Method). After review and approval of the test results by the Engineer, the average of the densities will be used to adjust the measurements. A unit weight of 62.45 pounds/cubic foot is standard for fresh water. If the Contractor does not obtain water samples and densities, then no adjustments will be applied to the displacement table and rock quantities.

**END OF PART II - SPECIAL PROVISIONS**

# PART III TECHNICAL SPECIFICATIONS

## TS-100 MOBILIZATION AND DEMOBILIZATION

100.1 Description: The Contractor shall provide all labor and equipment costs necessary to move personnel, equipment, supplies and incidentals to and from the Project Site, establish offices, buildings, and other facilities necessary for the Work, obtain bonds, required insurance and any other pre-construction expenses necessary to perform the Work. Additionally, the cost to remove and dispose of the existing timber structure shall be included in this line item (as noted on Sheet 6 of the Plans). This section shall exclude the cost of construction materials.

100.2 Arbitrary Mobilization by Contractor: The Owner shall pay for only one mobilization and demobilization effort. Should the Contractor demobilize prior to completing the Work, subsequent remobilization shall be performed at no cost to the Owner.

100.3 Ratio of Mobilization and Demobilization Effort: Sixty percent (60%) of the mobilization/demobilization lump sum price will be paid to the Contractor upon complete mobilization to the Project Site. The remaining forty percent (40%) will be paid to the Contractor upon final acceptance of the Work.

100.4 Justification of Costs: The Contractor will be required to submit a written Claim to the Engineer if the cost of installation mobilization and demobilization is in unreasonable relation to the cost of the Work. The Engineer shall make a determination on the justification of the Claim. Failure to adequately justify this relation in the Claim shall result in payment of actual mobilization and demobilization costs as stated in this Section. The determination by the Engineer is not subject to appeal.

100.5 Measurement and Payment: The Contractor shall submit an Application for Payment for the costs incurred to mobilize and demobilize all equipment, personnel, and other such costs as denoted in the Contract Documents. No invoices shall be paid for at the contract lump sum price for Bid Item No. 1, "Mobilization and Demobilization (TS-100)", until complete mobilization to the Project Site has been executed. No invoice will be paid for demobilization until completion of Demobilization.

## TS-200 CONSTRUCTION SURVEYING

200.1 Scope: The Contractor shall furnish all of the materials, labor and equipment necessary to perform pre-construction magnetometer, pre-construction bathymetric and topographic, process and as-built Surveys of the baseline, transects, shoreline protection structure, and access and flotation channels as shown on the Plans. Contractor shall provide the details for the survey layout and stakeout in the Work Plan. All surveys shall be performed by personnel who are approved by the Engineer under the direct supervision of a professional land surveyor licensed in the state of Louisiana. Survey data shall reference the North American Datum of 1983 (NAD 83), Louisiana South Zone, U. S. Survey Feet for horizontal control, and the North American Vertical Datum of 1988 (NAVD 88) Geoid 12A, U. S. Survey Feet for vertical control. Horizontal and vertical control shall be established by using the CPRA secondary monument specified on the Plans and provided in **APPENDIX E**.

200.2 Pre-Construction Survey: The baseline (centerline of flotation and access channels) and temporary benchmarks shown on the Plans shall be re-surveyed and staked by the Contractor after the Pre-Construction Conference and prior to construction. This survey shall be used to verify the alignment of the various project features and to make modifications or adjustments as deemed necessary by the Engineer. Drawings of the plan views and cross sections and calculations of the projected quantities of materials shall be developed from this survey by the Contractor.

200.2.1 Temporary Benchmarks (TBM) and Secondary Monuments (SM): The location of the TBM and SM available for this project is provided on Sheet 2 of the Plans. The Contractor shall maintain the TBM for the duration of the Work. If the TBM or SM is disturbed and/or destroyed, the TBM or SM may be reinstalled by qualified personnel as approved by the Engineer. If multiple TBMs are destroyed, the Engineer may require the TBMs to be reinstalled by a professional surveyor licensed in State of Louisiana. The TBM and SM shall be shown on the plan view drawings.

200.2.2 Baseline: The baseline shall be surveyed and staked at all points of inflection and intersections with the transects. The baseline shall be shown on the plan view drawings.

200.2.3 Transects: The transects shall be surveyed from the baseline (centerline of the Flotation Channel) to a minimum of:

150 feet onshore (or to the landward toe of beneficial use area template if it extends past 150') and 250 feet offshore at 500-foot intervals and at every fish dip or significant change in direction.

The transects shall also be surveyed and staked at all intersections with the alignment of the shoreline protection structure, with the existing shoreline, with the inside and outside toes of the access and flotation channels, and with the baseline. The inflection points of the alignment of the shoreline protection structure shall also be surveyed and staked. Survey shots along the transects shall be taken at all significant grade breaks and a maximum horizontal spacing of 10 feet. All shoreline protection structure and excavation details shall be captured in the survey data (e.g., shoreline protection structure crest, top and bottom of slopes, etc.).

The Contractor shall develop drawings which show the cross sections and plan views of all project features. Elevations, coordinates, lines and grades for each of these features shall all be shown on the drawings. Contours at elevations every foot, between +1.0'and -6.0' NAVD 88 shall also be shown on all plan view drawings.

The Contractor shall also determine the projected quantities for rock required to complete the shoreline protection structure. The quantities of rock shall be calculated using a method that is approved by the Engineer, such as the average end area or AutoCAD. The projected quantities of rock shall be calculated in tons and account for an in-place unit weight of rock equal to 1.6 tons per cubic yard.

200.2.4 Stakes: Contruction stakes shall be untreated wood of sufficient diameter (or approved equal) and length such that they are embedded at least three feet into the soil and protrude 5 feet above existing grade if onshore, or 5 feet above mean water elevation if offshore.

200.2.5 Magnetometer Survey: A magnetometer survey shall be performed along the centerline of the access route(s) to the Project Site, access channels, flotation channels, and known existing pipelines. Perpendicular track lines shall be run at 500 foot intervals and extend 25 feet beyond the outside edge of each of these proposed features, where possible. Probing will be required at all known pipelines and magnetometer hits to verify pipeline location and determine depth of cover. All pipelines within 200 feet of the project work areas shall also be probed and appropriately marked throughout construction. The magnetometer survey shall show all track lines, coordinates, amplitudes, signature types, and signature widths of all hits. The survey shall also show the coordinates, top elevation and ground cover for all pipelines. Magnetometer survey equipment shall have a minimum accuracy of three (3) gammas throughout its operational range.

200.2.6 If Contractor elects to excavate the access and flotation channel (instead of light-loading barges), a magnetometer survey shall be performed prior to the start of any excavation. If any new anomalies are discovered within the extents of the flotation and access channels shown on the plans, the Contractor shall notify the Engineer and Owner immediately.

200.2.7 Significant Magnetometer Detections: For all anomalies that exhibit amplitudes greater than fifty (50) gammas, the anomaly elevation, mudline elevation, and source of the anomalies shall be determined by running a thirty-foot (30') closed-loop path using a probing technique. The Contractor shall determine if the sources of any anomalies will interfere with the performance of the Work and provide proposed corrective measures in the Progress Schedule. Failure by the Contractor to identify the sources of anomalies and provide corrective measures shall not provide grounds for any Claims against the Owner.

200.3 Method: Surveys shall follow CPRA's *Contractor's Guide to the Standard Practice – Surveying* (*http://coastal.la.gov/engineering-and-design-standards/*) and utilize conventional Real-Time Kinematic (RTK) surveying methods or an appropriate Global Navigation Satellite System (GNSS) or Global Positioning System (GPS) Real Time Network such as the Gulfnet Virtual Real-Time Network (VRS).

200.4 Process Surveys: The project features shall be surveyed during construction as follows:

200.4.1 Access and Flotation Channels: The centerline of all access and flotation and flotation channels shall be surveyed at 500 foot intervals and at all transects and points of inflection along the alignment. The survey shall also extend 25 feet beyond the outside edge of the access and flotation channels and temporary dredge material stockpile areas.

200.4.2 Encapsulated Lightweight Aggregate Core: A process survey shall be performed prior to rock armor layer placement to document that the LWA core was placed reasonably within the template shown on the Plans and the vertical and horizontal tolerances listed in TS-700. This feature shall be surveyed along transects spaced every 500 feet in addition to supplementary photographic documentation and specific location of the photographs if taken on the ground (i.e., stationing), or the use of aerial or drone footage may be submitted instead. Partial surveying of this feature may be submitted for approval.

200.4.3 Rock Armor Layer: The crest (each edge and center point) and both toes of the rock shall be surveyed at 500 foot intervals and at all survey transects and points of inflection along the alignment. The Engineer shall determine if the rock armor layer is to be accepted or modified based on these surveys. The portions of armor layer which are modified must also be resurveyed.

Additionally, the centerline of the rock armor layer crest shall be surveyed to create a profile along the entire length of the shoreline protection structure.

200.5 As-Built Surveys: The project features shall be surveyed during construction as follows:

All project features listed below shall be surveyed by the Contractor after construction is complete. Final payment will not be received until the As-Built Survey and Work have been accepted by the Engineer. The Process surveys submitted for the Encapsulated Lightweight Aggregate Core may be used for the As-Built submittal, and must be included in the PDF submittals along with the data for the other project features.

200.5.1 Access and Flotation Channels: The centerline of all access and flotation and flotation channels shall be surveyed at 500 foot intervals and at all transects and points of inflection along the alignment. The survey shall also extend 25 feet beyond the outside edge of the access and flotation channels and temporary dredge material stockpile areas.

200.5.2 Rock Armor Layer: The final approved process surveys for the shoreline protection structure on those Reaches that are accepted by the Engineer shall be incorporated into the As-Built Survey.

200.6 Deliverables: The pre-construction, process and As-Built Surveys shall be stamped by a professional surveyor licensed in the State of Louisiana. The Contractor shall provide the details for the survey layout and stakeout in the Work Plan.

The pre-construction survey drawings and projected material quantities shall be submitted to the Engineer for review and approval prior to construction. Three copies shall be provided on 11" X 17" paper and one digital copy provided in AutoCAD or an approved equal.

The process survey drawings, in-place material quantities and supporting calculations shall be submitted to the Engineer for review immediately after they are performed in order to receive acceptance and payment. Three copies shall be provided on 11" X 17" paper and one digital copy provided in AutoCAD or an approved equal.

The As-Built Survey and in-place material quantities shall be submitted to the Engineer after construction is complete in order to receive acceptance and final payment. Three copies shall be provided on 11" X 17" paper and one digital copy provided in AutoCAD or an approved equal. The survey shall incorporate all field changes, change orders, and quantities of materials placed. All revisions shall be shown in red and be easily distinguishable from the original design.

Point files of the pre-construction, process and As-Built Surveys shall be included in the digital copies and shall contain the following information:

1. Point number;
2. Northing (NAD 83 US. FT.);
3. Easting (NAD 83 US. FT.);
4. Elevation (NAVD 88 FT. – Geoid 12A);

5. Description.

200.7 Aerial Photography: See section SP-20 for Aerial Photogrpahy requirements.

200.8 Ratio of Effort/Payment: Fifty percent (50%) of the Contract cost for this bid item will be paid to the Contractor upon Acceptance of the Pre-Construction Surveys. Thirty percent (30%) will be paid to the Contractor upon Acceptance of all Process Surveys, and the remaining twenty percent (20%) will be paid to the Contractor upon Acceptance of the complete As-Built Survey.

200.9 Measurement and Payment: The Contractor shall submit an Application for Payment for the costs incurred to perform the pre-construction, process and As-Built Surveys and other such costs as denoted in the Contract Documents. Upon acceptance by the Engineer, an invoice shall be paid for at the contract lump sum price for Bid Item No. 2, "Construction Surveying (TS-200)", Bid Item No. 2A (Alt. #1) (if awarded), and Bid Item No. 2B (Alt. #2) (if awarded).

## TS-360 ACCESS AND FLOTATION CHANNELS

360.1 Scope: The Contractor shall furnish all of the materials, labor and equipment necessary to construct the access and flotation channels through removal and temporary stockpile of the dredge material. The channels shall be maintained in a useable configuration throughout the duration of the Work at the expense of the Contractor. **Contractor may elect to light-load rock barges to minimize or eliminate the need for excavation during construction**. Boring logs for the Project Site are provided in **APPENDIX F**.

360.2 Excavation Method: The access and flotation channels shall be mechanically excavated using a bucket dredge, barge mounted track hoe or approved equal. The Contractor shall use any environmentally acceptable method that will complete the Work in accordance with the drawings. The proposed dredging method must be provided in the Work Plan.

360.3 Excavation Limits: Access and flotation channels shall not be excavated beyond the limits and coordinates shown on the Plans without written approval from the Engineer. The bottom elevation of the channels shall not be lower than -6.0' NAVD 88. The maximum turning radius for transitions between access and flotation channels is 250 feet. The locations of the permitted channels are shown on the Plans. It shall be the responsibility of the Contractor to obtain a permit modification and prior approval from the Engineer in order to enlarge or relocate the channels. The Contractor shall not excavate within any pipeline right-of-way and only excavate within the areas shown on the Plans. If the Contractor believes it is necessary to do so, Engineer's approval would first be required then the Contractor shall also obtain and submit to the Engineer a letter of no objection from any pipeline company for the proposed excavation inside their right-of-way.

360.4 Temporary Dredge Material Stockpile: Dredged material shall be temporarily deposited lake ward of the access and flotation channels and conform to the elevations, grades, and lines specified on the Plans. It shall not be deposited outside of the limits shown on the Plans without written approval from the Engineer. The temporary spoil shall be backfilled into the flotation channel after the shoreline protection structure is accepted by the Engineer. The soils underneath the temporary spoil placement areas shall be reworked to ±0.5' of the original bottoms. Any material that is deposited elsewhere than indicated on the Plans or as authorized by the Engineer shall be removed and deposited in an approved location at the expense of the Contractor.

360.5 Beneficial Use of Excavated Material: Contractor may elect to excavate the material from within the access channel template and place it immediately landward of the shoreline protection structure alignment as beneficial use material. The material must not be placed on any existing marsh and must not migrate into the shoreline protection structure alignment prior to geogrid composite or rock placement. Once placed, this material is intended to stay in-place, and the Contractor **will not** be: required to backfill this material upon demobilization, required to survey this area, or maintain a specific construction template (e.g., specific side slopes and crest elevation). The Contractor must make an effort to uniformly side cast this material along the project alignment to prevent inconsistent placement, or large material stockpiles reaching crest elevations over +5.0' NAVD88. Visual inspections will be performed of this feature throughout construction, and Engineer reserves the right to request spot checks in this area throughout construction.

360.6 Maintenance: The access and flotation channels shall be maintained according to the dimensions shown on the Plans in order to transport equipment and materials to the Project Site throughout construction. Maintenance excavation shall be performed at the expense of the Contractor.

360.7 Measurement and Payment: The Contractor shall submit an Application for Payment for the costs incurred to construct and maintain the flotation and access channels as required but not outside the permitted excavation template shown in the Contract Documents. The Engineer shall review the final elevation of the backfilled channels on the As-Built Survey in order to determine acceptance. Upon acceptance by the Engineer, an invoice shall be paid for at the contract lump sum price for Bid Item No. 3, "Access and Flotation Channel Excavation (TS-360)", Bid Item No. 3A (Alt. #1) (if awarded), and Bid Item No. 3B (Alt. #2) (if awarded). No invoice will be paid until the temporary dredge material stockpile is successfully backfilled into the access and flotation channels and the bottom depth of the temporary disposal area is restored to within ±0.5' of the original bottom depth.

If excavated material from within the Flotation Channel is placed within the Beneficial Use Area, Contractor may request payment for Bid Item No. 3 once survey data has been submitted and if the data documents that the material and excavation extents are within the construction templates.

## TS-500 GEOTEXTILES

500.1 Scope: The Work includes furnishing materials, labor, and equipment for the installation of geogrid composite materials (geotextile fabric sewn to geogrid) beneath the rock armor layer and the encapsulated lightweight aggregate core, in accordance with these Specifications and applicable Plans.

500.2 References: Publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only.

American Society for Testing and Materials (ASTM) Publications

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|---|---|
| D 1388 | Standard Test Method for Stiffness of Fabrics |
| D 3786 | Standard Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics - Diaphragm Bursting Strength Tester Method |
| D 4354 | Standard Practice for Sampling Geosynthetics for Testing |
| D 4355 | Standard Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light (Xenon-Arc Type Apparatus) |

| | |
|---|---|
| D 4533 | Standard Test Method for Trapezoidal Tearing Strength of Geotextiles D 4595 Standard Test Method for Tensile Properties of Geotextiles by Wide-Width Strip Method |
| D4595 | Standard Test Method for Tensile Properties of Geotextiles by Wide-Width Strip Method. |
| D 4632 | Standard Test Method for Grab Breaking Load and Elongation of Geotextiles |
| D 4751 | Standard Test Method for Determining Apparent Opening Size of a Geotextile |
| D 4759 | Standard Practice for Determining the Specification Conformance of Geosynthetics |
| D 4833 | Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products |
| D 4884 | Standard Test Method for Seam Strength of Sewn Geotextiles |
| D 5261 | Standard Test Method for Measuring Mass per Unit Area of Geotextiles |
| D 5818 | Practice for Obtaining Samples of Geosynthetics from a Test Section for Assessment of Installation Damage. |
| D 6637 | Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method |

Geosynthetic Research Institute (GRI) Publications
GRI-GG2-87 Standard Test for Geogrid Junction Strength

U.S. Army Corps of Engineers (USACE) Publications
CW 02215 Civil Works Construction Guide, November 1977

U.S. Environmental Protection Agency (EPA) Publications
EPA 9090 Compatibility Test for Wastes and Membrane Liners

500.3 Submittals: Submittals required under this section include the following:

1. Manufacturer's Product Data and Installation Instructions for Geotextile Fabric and Geogrid (For Information Only)
2. Certified Test Reports for Geotextile Fabric and Geogrid
3. Sewn Seam Details and Laboratory Test Reports
4. Geotextile samples (For Information Only)
5. Manufacturing Work Plan
6. Surveys (Section TS-200, "Construction Surveying")

500.4 Delivery, Storage, and Handling of Materials: Materials delivered to the site shall be inspected for damage, unloaded, and stored with the minimum of handling. Materials shall not be stored directly on the ground without a fabric or plastic liner beneath and shall be kept free of dirt and debris.

500.5 Geotextile Fabric: Geotextile fabric shall be pervious sheets consisting of long- chain synthetic polymers composed of at least 85 percent by weight polyolefins, polyesters, polypropylenes, or polyamides. Sheets shall be formed into a stable network such that filaments or yarns retain their relative position to each other. Sheets shall be inert to chemicals commonly encountered in natural seawater and the soil conditions encountered at the site, and be UV stabi-

lized. The edges of sheets shall be bound or finished to prevent outer filaments or yarns from pulling away from the sheet.

500.5.1 Physical Properties: Conformance of geotextile fabric shall be in accordance with ASTM D 4759. Fabric shall be sampled in accordance with ASTM D 4354 and tested to verify the following minimum physical properties and requirements:

| **Type I Geotextile**<br>Application: Exterior Shell of LWA Bag | | | |
|---|---|---|---|
| **Physical Property** | **Unit** | **Test Method** | **Measure** |
| Fabric Type | --- | --- | Woven Polypropylene or Stable Woven/Non- woven Network |
| Apparent Opening Size (max.) (1) | U.S. Sieve | ASTM D 4751 | #30 |
| Wide-Width Tensile Strength (MD & CD) (min.) | lb/ft | ASTM D 4595 | 4,800 |
| Wide-Width Tensile Elongation (MD & CD) (max.) | % | ASTM D 4595 | 15 (max.) |
| Seam Strength (min.) | lb/in | ASTM D 4884 | 250 |
| Ultraviolet Resistance (500 Hours) (min.) | % | ASTM D 4355 | 70 |
| Notes:<br>1. Apparent opening size specified is maximum (actual opening size) allowed. | | | |

| **Type II Geotextile**<br>Application: Encapsulated LWA Bag Liner and Geotextile Shroud; Component of Geogrid Composite | | | |
|---|---|---|---|
| **Physical Property** | **Unit** | **Test Method** | **Measure** |
| Fabric Type | --- | --- | Non-woven |
| Apparent Opening Size (max.)(1) | U.S. Sieve | ASTM D 4751 | #100 |
| Grab Tensile Strength (min.) | lb | ASTM D 4632 | 250 |
| Tensile Elongation (MARV)(2) | % | ASTM D 4632 | 50 |
| CBR Puncture (min.) | lb | ASTM D 6241 | 650 |
| Trapezoid Tear Strength (min.) | lb | ASTM D 4533 | 100 |
| Ultraviolet Resistance (500 Hours) (min.) | % | ASTM D 4355 | 70 |
| Notes:<br>1. Apparent opening size specified is maximum (actual opening) allowed.<br>2. MARV is the Minimum Average Roll Value. | | | |

Note:

1. It is the responsibility of the CONTRACTOR to verify with the LWA

supplier that the Type I and Type II Geotextiles will properly encapsulate and contain the LWA material and result in minimal losses (<10%).

500.5.2 Certified Test Reports: Submit manufacturer's certified test results to Engineer showing actual test values of the geotextile fabric physical properties. The certificate shall contain the signer's title and affiliation, test date(s), the name and address of Contractor, the contract number, and project name and location. The mill certificate or affidavit shall list test results and attest that the materials meet the chemical, physical, and manufacturing requirements in this Specification. Accompanying the certificate/affidavit, Contractor shall submit a one (1) foot by one (1) foot sample to Engineer. Provide manufacturer's recommendations for installation and protection instructions for the project considering the foundation soil conditions.

500.5.3 Sewn Seams:

1. In addition to sewn seams required for LWA containers, Contractor may apply sewn seams or laps for Type I geotextile joints. Thread for seams shall be multi-ply polyester. Nylon thread shall not be used.
2. Written details and drawings shall be submitted for sewn seams. Details shall address, but not be limited to, thread type, thread tension (sewing device), stitch density and type, overlap, and number of rows and type of chainstitch. Also submit laboratory test reports evaluating the load-transfer capability of the proposed seams in accordance with ASTM D 4884. For LWA bags, two seams should be applied. One for interior non-woven liner and one for exterior shell.

500.6 Geogrid: Geogrid for placement beneath the shoreline protection structure armor and core layer (rock and encapsulated lightweight aggregate core) shall be an integrally formed grid structure manufactured of a stress-resistant polypropylene material, or Engineer approved alternate, and possess complete continuity of all properties throughout its structure. Geogrid shall accept applied force in use by positive mechanical interlock (i.e., by direct mechanical keying) with (a) compacted soil or fill materials, (b) contiguous sections of itself when overlapped and embedded in compacted soil or fill materials, and (c) rigid mechanical connectors such as bodkins, pins, or hooks.

500.6.1 Physical Properties: Conformance of geogrid shall be in accordance with ASTM D 4759. Geogrid shall be sampled in accordance with ASTM D 4354 and tested to verify the following minimum physical properties and requirements:

| Physical Property | Unit | Test Method | Measure |
|---|---|---|---|
| Aperture Nominal Dimensions (MD & CD) (max.) | in | I.D. Callipered(1) | 2.0 |
| Junction Strength | lb/ft | GRI-GG2 | 1,700 |
| Tensile Strength @2% Strain (MD & CD) (min.) | lb/ft | ASTM D 6637 | 580 |
| Tensile Strength @5% Strain (MD & CD) (min.) | lb/ft | ASTM D 6637 | 1,200 |
| Resistance to Installation Damage (3) (min.) | %GP | ASTM D 5818 | 70 |

Notes:
1. Maximum inside dimension in each principle direction measured by calipers.
2. Resistance to bending force measured via ASTM D 1388, Option A, using specimen dimensions of 864 mm in length by 1 aperture in width.
3. Resistance to loss of load capacity of structural integrity when subjected to mechanical stress in installation measured via ASTM D 5818 in crushed stone classified as poorly graded gravel with a maximum 2 inch particle size (GP).

500.6.2 Certified Test Reports: Submit manufacturer's certified test results to Engineer showing actual test values of the geogrid physical properties. The certificate shall contain the signer's title and affiliation, test date(s), the name and address of Contractor, the contract number, and project name and location. The mill certificate or affidavit shall list test results and attest that the materials meet the chemical, physical, and manufacturing requirements in this Specification. Accompanying the certificate, Contractor shall submit a one (1) foot by one (1) foot sample to Engineer. Provide manufacturer's recommendations for installation and protection instructions for the project considering the foundation soil conditions.

500.7 Lightweight Aggregate Bag: To ensure proper encapsulation of LWA, bags are to be manufactured of both, Type I and Type II, Geotextile fabrics. Bag sizes and fabrication are to be approved by Manufacturers work plan and Contractors Work Plan. Type I Geotextile Fabric is to be a sewn in liner fully encompassed by the Type II Geotextile Fabric exterior shell. Manufacturer must ensure that bags can be filled according to the contractors work plan and that both the liner and exterior shell can be sealed separately. See additional specification for LWA material.

500.8 Subgrade Preparation: The surface to receive geotextiles shall be prepared as needed to provide a relatively smooth surface free of ruts and erosion rills, obstructions, abrupt depressions, and debris.

500.9 Surveying: Refer to Section TS-200, "Construction Surveying."

500.10 Shroud Installation: The Shroud is referred to as the project layer between the Encapsulated LWA core and the Rock Armor Layer. The purpose is to ensure protection of the core from rock placement. The Shroud should be placed immediately following placement of the encapsulated core; however, it should not be placed ahead of the rock armor layer by any more than 500' along the centerline of the shoreline protection structure nor be exposed for more than three (3) days prior to rock armor layer placement.

500.11 Protection: Materials shall always be protected to ensure the original chemical and physical properties. Work shall be sequenced so that geotextile materials are not exposed more than 7 days from the time materials are removed from their protective covering and sheets are fully covered by the rock armor layer and/or opaque temporary coverings. During periods of shipment and storage, geotextile materials shall be protected from direct sunlight, ultra-violet rays, and high temperatures and in accordance with any other instructions of the manufacturer. Unpackaged rolls and/or sheets shall be protected with temporary opaque coverings. Damaged materials shall be either removed and replaced or covered with a second layer of geotextiles extending three (3) feet in each direction from the damaged area. Any material that is rejected or damaged due to the fault or negligence of Contractor shall be repaired or replaced at no additional cost to Owner.

500.12 Placement Beneath Rock Armor Layer: Type II geotextile fabric and geogrid (Geogrid Com-

posite) shall be placed in accordance with the manufacturer's instructions, but placement method shall meet, as a minimum, the following criteria:

1. Geotextile fabric may be placed simultaneously with the geogrid by pre- attaching or bonding the fabric to the bottom of each sheet of geogrid with provision for sufficient overlaps to form the geogrid composite. Pre- attaching or bonding geogrid to underlying geotextile fabric is at Contractor's option. Composite shall be placed with geotextile fabric beneath geogrid. Method of pre-attachment shall be provided for concurrence by Engineer. Care shall be taken to ensure that geogrid composite sections do not separate during construction.
2. Geogrid composite shall be placed to completely cover subgrade at locations shown on Plans and shall be relatively free of wrinkles, creases and sags before overlying rock is placed.
3. Adjacent sheets of geogrid composite shall overlap a minimum of 3 feet unless shown otherwise on the Plans.
4. Sheets shall not be staked down to the extent that they are taut and subject to significant puncture or tearing during subsequent rock placement.
5. Method of rock placement shall be such that sheets are not pulled apart at connections/ laps or significantly punctured or torn.
6. Geogrid composite placed on a slope shall be oriented so that the strongest material axis bears the majority of the anticipated load.
7. The geogrid composite shall be protected from damage during placement of stone. This shall be accomplished by limiting the height of drop to less than one (1) foot.
8. Construction equipment and/or vehicles shall not operate directly on sheets unless otherwise permitted by Engineer.
9. The Work shall be scheduled so that all installed geogrid composite is completely covered with a layer of rock by the end of each workday.

500.13 Encapsulation of LWA: Refer to Section TS-600, "Lightweight Aggregate"

500.14 Measurement and Payment: All costs associated with the geotextile composite (Type I geotextile fabric and geogrid) shall be paid for at the Contract unit prices stated on the Bid Form for the following bid items:

1. Bid Item No. 4, "Geogrid Composite (TS-500)", Bid Item No. 4A (Alt. #1), and Bid Item No. 4B (Alt. #2) (if awarded).

See Section TS-600 for measurement and payment associated with geotextile bags fabrication, encapsulation of lightweight aggregate, and placement of lightweight aggregate.

## TS-600 LIGHTWEIGHT AGGREGATE

600.1 Scope: The Work includes furnishing materials, labor, and equipment for construction of lightweight aggregate (LWA) core for the Shoreline Protection Structure in accordance with these Specifications and applicable Plans.

600.2 References: Publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only.

American Society for Testing and Materials (ASTM) Publications

C 29 Standard Test Method for Bulk Density (Unit Weight) and Voids in Aggregate
C 88 Standard Test Method for Soundness of Aggregates by use of Sodium Sulfate or Magnesium Sulfate
C 117 Standard Test Method for Materials Finer Than 75-µm (No. 200) sieve in Mineral Aggregates by Washing
C 131 Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion in the Los Angeles Machine
C 136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates C 330 Standard Specification for Lightweight Aggregates for Structural Concrete
C 535 Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
C 702 Standard Practice for Reducing Samples of Aggregate to Testing Size
D 75 Standard Practice for Sampling Aggregates
D 4833 Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
D 4884 Standard Test Method for Seam Strength of Sewn Geotextiles
D 6473 Standard Test Method for Specific Gravity and Absorption of Rock for Erosion Control

600.3 Submittals: Submittals required under this section include the following:

1. Name, Location, and Owner of Material Source (information only)
2. LWA Quality Test Reports
3. LWA Gradation Test Reports
4. Daily Progress Reports (Section GP-10)
5. LWA Core Construction Plan
6. Surveys (Section TS-200, "Construction Surveying")

600.4 Materials Testing:

600.4.1 Contractor/Supplier shall provide all equipment and facilities for testing construction materials.

600.4.2 Prior to commencing LWA core production, Contractor shall provide the name, location, and owner of the LWA source for the project. Suitable test reports and service records are required to determine the acceptability of the LWA from the proposed source. Acceptable LWA shall meet the quality acceptance criteria in paragraph 600.6 when tested in accordance with the procedures listed below:

1. Sampling of the LWA shall be performed in accordance with ASTM D 75 and ASTM C 702.
2. The bulk density and void ratio of LWA shall be determined in accordance with ASTM C 29 based on a saturated surface dry condition and application of the shoveling procedure. Test report shall clearly state the measured value for bulk density and void ratio. Void ratio is for informational purposes only.
3. The soundness of the LWA shall be determined using a 5-cycle

magnesium sulfate test in accordance with ASTM C 88. Test report shall clearly state the measured value for soundness.

4. The loss by abrasion of LWA shall be determined in accordance with ASTM C 535/ASTM C 131. Test report shall clearly state the measured value for the loss by abrasion.

5. The gradation of the LWA shall be determined in accordance with ASTM C 136 and ASTM C 117. Test report shall clearly state the measured gradation.

600.4.3 Throughout the duration of the Work, Contractor/supplier shall inspect, sample, and test construction materials for compliance with the specified requirements and record the inspection of all operations. All sampling and testing shall be performed by a qualified testing laboratory. A copy of the records of inspection, as well as the records of corrective action taken, shall be provided to Engineer. As a minimum, prior to construction and for every 2,500 LF of Shoreline Protection Structure constructed thereafter, Contractor/supplier shall perform and submit documentation of quality control inspection and testing to verify compliance with the gradation and quality requirements of paragraph 600.6.

600.4.4 Summary of Test Standards:

| **Test Method** | **Typical Specification Requirements** |
|---|---|
| Bulk Density (ASTM C 29) | Less than 50 lb./ft$^3$ |
| Minimum Dry Unit Weight (ASTM D 4253/4254 – Dry Method) | Less than 50 lb./ft$^3$ |
| Maximum Dry Unit Weight (ASTM D 4253/4254 – Dry Method) | Less than 65 lb./ft$^3$ |
| Angle of Internal Friction (Φ) | 40° Minimum |
| Soundness Loss (Magnesium Sulfate) AASHTO T 104 | 15% Maximum |
| LA Abrasion (ASTM C 131) | 40% Maximum |
| Permeability Rate K | N/A |
| Electrical and Chemical Properties | |
| Chloride (AASHTO T 291) | 100 ppm Maximum |
| Sulfate (AASHTO T 290) | 200 ppm Maximum |
| Resistivity (AASHTO T 288) | 3000 ohms-cm Minimum |
| pH (AASHTO T289) | 5 – 10 |

600.5 Geotextiles: Refer to Section TS-500, "Geotextiles."

600.6 Lightweight Aggregate (LWA) Material: The LWA shall consist of an aggregate mixture which satisfies the specifications and testing standards provided within this section of the technical specifications. LWA shall satisfy the chemical composition and physical properties defined in ASTM C 330, unless specified otherwise herein. Waste materials and byproduct shall not be included. LWA shall have a maximum bulk density of 75 lb/ft$^3$, a maximum soundness loss of 15%, and a maximum loss by abrasion of 40%.

LWA gradation shall conform to the requirements specified below. The gradation provided below and test standards provided above is based on a 20-40-40 blend distributed by Arcosa.

**Table 1: LWA Material Gradation**

| U.S. Sieve | Percent Passing (% by weight) |
|---|---|
| 3/8 inch | 90 - 100 |
| No. 4 | 40 - 80 |
| No. 8 | 20 - 50 |
| No.16 | 10 - 40 |
| No. 50 | 0 - 15 |
| No. 200 | 0 - 10 |

600.7 LWA Placement: Prior to placement, LWA shall be completely encapsulated within bags or containers fabricated from connecting/sewing Type II and Type III geotextile fabric (refer to Section TS-500, "Geotextiles"). Bags/containers shall be limited to a fill volume of 5 cy (max.), or limited based on the manufacturers recommended maximum fill volume if smaller bags are used alongside the 5 cy capacity bag to fill voids within the neatline LWA Core template. Alternative materials or methods for LWA and/or LWA encapsulation may be utilized with prior written concurrence by Engineer. Alternative methods and/or container size may require higher strength geotextile material, subject to Engineer's concurrence. Sketches and a written description of the method of LWA encapsulation and placement as well as any proposed alternative encapsulation materials shall be provided in the Work Plan as scheduled in SP-3. Encapsulated LWA is susceptible to displacement from waves and other forces due to the lightweight nature of the material. Contractor shall cover encapsulated LWA with armor stone as soon as practicable once installed. Refer to the Plans for LWA core geometry requirements.

600.8 Misplaced Materials: Should the Contractor, during progress of the Work misplace any material, plant, Equipment, or other Materials outside of what is authorized within the Work Area without approval of the Owner or Engineer, the Contractor shall recover and remove the same as soon as possible. The Contractor shall give immediate notice, with description and location of such misplaced materials to the Owner and Engineer.

600.9 Surveying: Refer to Specification Section TS-200, "Surveying".

600.10 Acceptance: Acceptance of Encapsulated LWA core shall be based on review of progress surveys and the requirements of paragraph 600.6.

600.11 Measurement and Payment: All costs associated with encapsulation of lightweight aggregate and geotextile bag (Type II or Type III geotextile fabric) shall be included in the Contract unit prices stated on the Bid Form for the following bid items:

1. Bid Item No. 5, "Encapsulated Lightweight Aggregate (TS-600)", Bid Item No. 5A (Alt. #1) (if awarded), and Bid Item No. 5B (Alt. #2) (if awarded).

Payment will be based on the quantity of material placed in the LWA bags.

Measurement for this item will be based on the number of bags placed (within the LWA core template shown on the Plans). Price and payment shall constitute full compensation for all labor, material, lightweight aggregate, geotextile, and equipment and performing all operations necessary for the complete and satisfactory installation of the LWA bags. No Payment shall be made for Lightweight Aggregate or Lightweight Aggregate bags that are rejected or damaged due to Contractor fault or negligence. Payment shall not be made until the shoreline protection in each section has been constructed to the lines and grades of the plans and specifications and section has been accepted by the Engineer.

## TS-700 ROCK ARMOR LAYER (LADOTD 440 LB CLASS ROCK)

700.1 Scope: The Contractor shall furnish all of the materials, labor and equipment necessary to construct the rock armor layer in conformity to the lines, grades and thicknesses provided on the Plans and in these Specifications, or as directed by the Engineer.

700.2 References: Publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only.

American Society for Testing and Materials (ASTM) Publications

| | |
|---|---|
| C 535 | Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine |
| D 75 | Standard Practice for Sampling Aggregates |
| D 3740 | 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 |
| D 5519 | Standard Test Method for Particle Size Analysis of Natural and Man-Made Riprap Materials |
| D 6092 | Standard Practice for Specifying Standard Sizes of Stone for Erosion Control |
| D 6473 | Standard Test Method For Specific Gravity And Absorption of Rock For Erosion Control |
| E 329 | Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction |

Louisiana Department of Transportation and Development (DOTD) Publications

DOTD Louisiana Standard Specifications for Roads and Bridges (2016)

700.3 Submittals: Submittal required under this section include the following:

1. Name and Location of Quarry (For Information Only)
2. Daily Progress Reports (Section GP-10)
3. Barge Displacement Tables and Hydrometer (Water Density) Test Reports (Section SP-25)
4. Rock Quality Test Reports
5. Rock Gradation Test Reports
6. Surveys (Section TS-200, "Construction Surveying")

700.4 Materials: All rock shall conform to the "Louisiana Standard Specifications for Roads and Bridges" 2016 Edition, Section 711 Riprap. The rock shall not disintegrate upon exposure to the elements or be easily broken from handling, and shall be reasonably free from earth and other foreign materials. When tested in accordance with AASHTO T 85, the solid weight of the rock shall be at least 155 pounds per cubic foot (2490 kg/ cu m) (based on bulk specific gravity). The least dimension of any individual rock shall be at least 1/3 its maximum dimension. Each shipment of rock shall be reasonably well-graded within. The rock faces shall be roughly angular, not rounded in shape. Field rock, rectangular block rock, slabs, and rounded boulders will not be accepted.

700.5 Quarries: Based on information and data available to the Engineer, rock which meets the quality requirements of this specification is produced by the sources listed in the following table (or other Engineer-approved source).

| Materials: The rock shall not | **Nearest Town to** | **Pit Designation** |
|---|---|---|
| APAC | Bloomsdale, MO | Brickeys Quarry |
| Arkansas Aggregates (3M | Little Rock, AR | Big Rock Quarry |
| B.E. Construction Co. | Murfreesboro, AR | Murfreesboro Quarry |
| Base Rock Minerals | Girarddeau County, MO | Fruitland Quarry |
| Base Rock Minerals | Farmington, MO | Bonne Terre Quarry |
| Boorhem Fields, Inc. | Black Rock, AR | Valley Stone Quarry |
| Bradley Contracting | Cord, AR | Bradley/Batesville |
| Bussen Quarries, Inc. | Mehlville, MO | Bussen Quarry |
| Cane Creek Stone, LLC | Butler County, MO | Cane Creek Stone, LLC Ledge #1 |
| Capital Quarries Co., Inc. | Powatan, AR | Black Rock Quarry (Powhatan Quarry) |
| Capital Quarries Co., Inc. | Pocahontas, AR | Pocahontas Quarry |
| Central Stone Co. | Withers Mill, MO | Pitt No. 1 |
| Central Stone Co. | Perry, MO | Pitt No. 9 |
| Central Stone Co. | Danby, MO | Plattin Quarry |
| Delta Companies, Inc. | Goreville, IL | Buncombe Quarry |
| Delta Companies, Inc. | Jackson, MO | Heartland Materials |
| Delta Companies, Inc. | Cape Girardeau, MO | Cape Girardeau Quarry |
| Delta Companies, Inc. | Shook, MO | Shook Quarry |
| Delta Companies, Inc. | Poplar Bluff, MO | Williamsville Stone Co. Quarry |
| Dravo Basic Material Co., Inc. | Smithland, KY | Three Rivers Quarry |
| Farmer's Limestone Co. | Uniontown, MO | Farmer's Limestone |
| Fischer Quarry & Hauling, | Zalma, MO | Arab Aggregates, LLC |
| Graysonia Quarries, Inc. | Delight, AR | Delight Quarry |
| H.M.B. Construction | Dequeen, AR | H.M.B. Quarry |
| Hoover Incorporated | Iuka, MS | Allsboro Quarry |
| Industrial Mineral Products Div/3M | Little Rock, AR | 3M Arch Street Quarry |
| Lafarge Holcim | Cave-In-Rock, IL | Cave-In-Rock Quarry |
| Lafarge Holcim | Fredonia, KY | Fredonia Quarry |
| Lafarge of North America | Smithland, KY | Three Rivers Quarry |
| Little Rock Quarry Co., Inc. | Caddo Valley, AR | DeRock Creek Quarry |
| Little Rock Quarry Co., Inc. | Little Rock, AR | Little Rock Quarry |
| Madison Materials | Guntersville, AL | Guntersville Quarry |
| Madison Materials | Brooksville, AL | Summit Quarry |
| Madison Materials | Graysville, AL | Flat Top Quarry |

| Materials: The rock shall not | **Nearest Town to** | **Pit Designation** |
|---|---|---|
| Magruder Limestone Co., Inc. | Foley, MO | Foley Quarry |
| McGeorge Contracting Co., | Hollywood, AR | Hollywood Quarry |
| McGeorge Corp. | Sweet Home, AR | Granite Mountain Quarry #1 |
| McGeorge Corp. | Sweet Home, AR | Granite Mountain Quarry #2 |
| McGeorge Corp. | Bryant, AR | Granite Mountain Quarry #3 |
| North Montgomery Materials | Wallasboro, AL | Hard Rock Hill Quarry |
| Pine Bluff Sand and Gravel Co. | Delaware, Ark. | River Mountain Quarry |
| Pine Bluff Sand and Gravel Co. | Salem, KY | Cumberland River |
| Reed Crushed Stone Co. | Lake City, KY | Givertsville Quarry |
| Rigsby-Barnard Quarry, Inc. | Cave-In-Rock, IL | Rigsby-Barnard Quarry |
| Rogers Group, Inc. | Lacey Spring, AL | Lacey Spring Quarry |
| Rogers Group, Inc. | Tuscumbia, AL | Tuscumbia Quarry |
| Rogers Group, Inc. | Cabot, AR | Cabot Quarry |
| Seminole Ag Lime | Scott City, MO | Seminole Ag-Lime |
| Shakespeare Aggregates, Inc. | Cairo, IL | Shawnee Stone, LLC-Cypress Plant Quarry |
| Strack Stone Lodi, LLC | Cape Girardeau, MO | Lodi Quarry |
| The Concrete Company | Fortson, GA | Columbus Quarry |
| The Olen Corporation | Sandusky County, OH | Woodville Quarry |
| Tower Rock Stone Co. | St. Genevieve, | Tower Rock Stone |
| Tower Rock Stone Co. | St. Genevieve, | Bussen Quarry |
| Vulcan Materials Co. | Tuscumbia, AL | Pride Quarry |
| Vulcan Materials Co. | Cherokee, AL | Cherokee Quarry |
| Vulcan Materials Co. | Judsonia, AR | Searcy Quarry |
| Vulcan Materials Co. | Black Rock, AR | Verkler Quarry |
| Vulcan Materials Co. | Grand Rivers, KY | Grand Rivers Quarry |
| Warren Paving Co. | Pinkneyville, KY | Slats Lucas Quarry |
| West Lake Quarry Materials | Scott City, MO | Gray's Point Quarry |
| West Lake Quarry Materials | Neely's Landing, | Neely's Landing Quarry |
| West Lake Quarry Materials | Barnhart, MO | Barnhart Quarry |
| West Lake Quarry No. 2 | Musicks Ferry, | West Lake Quarry |
| Winn Material of Kentucky, | Grand Rivers, KY | Grand Rivers Quarry |

Other rock suppliers may be accepted prior to construction by the Engineer. To gain acceptance, the Contractor shall obtain and test samples of the rock for gradation under the supervision of the Engineer. The Engineer shall accept the rock if the test results comply with this specification.

700.6 Gradation: All rock shall be LADOTD Class 440 lb. graded rip-rap as specified by Section 711.02.1 of the Louisiana Standard Specifications For Roads and Bridges (2016 edition), latest Edition or Owner approved equivalent. The rock shall meet the following gradation:

| Stone Size (lbs.) | Spherical Diameter (ft) | % of Stone Smaller |
|---|---|---|
| 2200 | 3.00 | 100 |
| 900 | 2.23 | 40-100 |
| 440 | 1.76 | 14-50 |
| 130 | 1.17 | 0-15 |

Control of gradation will be by visual inspection either at the source, or Project Site or both. The Engineer reserves the right to verify the gradation of any shipment by testing two uniform size random samples. The equipment, labor and cost for testing the samples shall be provided by the Contractor.

700.7 Free Fall: The rock used for the shoreline protection structure shall be placed carefully onto the Encapsulated LWA Core Layer and Geogrid Composite Layer to prevent cracking or damage of any rocks and to prevent rupturing or tearing of the LWA bags situated in the core layer.

700.8 Losses: The Contractor is responsible to reclaim and utilize all rock that is lost during shipment or construction.

700.9 Placement of the Material to Construct the Rock Armor Layer:
The rock placed within the spatial extents shown on the Plans and is to be placed directly on the Geogrid Composite and/or the Encapsulated Lightweight Aggregate Core within the shoreline protection structure layout according to the lines, grades and elevations specified on the Plans and these Specifications. Special care shall be taken while placing the rock as to not to damage or tear the geotextile material used to encapsulate the lightweight aggregate material. The rock shall be constructed to an elevation of +5.0' (see tolerances in subsection below) NAVD 88 – Geoid 12A. The stone surface shall be shaped with proper equipment to achieve a uniform surface.

700.10 Equipment: The Contractor shall provide a proposed list of equipment in the Work Plan which will be used to construct the shoreline protection structure. This list shall include the type (Drag Bucket, etc.), number of each type, and capacity (Cubic Yards, etc.) of the equipment.

700.11 Staging Area: The Contractor is responsible for locating a staging area with adequate depth to light load the rock barges. The Contractor shall include the proposed location of the staging area in the Work Plan. If the Staging area is within 150 feet of a well head or pipeline, they shall be probed and appropriately marked by the Contractor. The Contractor shall also submit any letters of no objection or agreements for temporary easements from the landowner, well owner, or pipeline owner to the Engineer.

700.12 Tolerances:
The shoreline protection structure shall be constructed according to the cross sections (Elevations, slopes, dimensions, etc.) shown on the Plans.

A maximum vertical tolerance of plus one half-foot and minus one quarter of a foot (+0.5'/-0.25') is allowed for the armor stone layer and the LWA core layer. The maximum tolerance shall not be continuous along the alignment over a distance greater than 500 feet along the centerline of the shoreline protection structure. Despite the constructed elevation of the LWA core, a minimum 3.5' layer of rock shall be placed over the LWA core to form the rock armor layer.

A maximum horizontal tolerance of three feet (3') is allowed for the armor layer.

A maximum horizontal tolerance of one and a half feet (1.5') is allowed for the LWA core layer.

700.13 Acceptance: Acceptance of the shoreline protection structure shall be achieved as follows:

1.13.1 Rock Armor Layer: The rock shall be accepted by the Engineer if it achieves compliance with the lines, grades, elevations, and tolerances on the Plans and these Specifications. Compliance shall be based upon the surveys performed no earlier than fourteen (14) days after placement of the rock armor layer. The Engineer may require the Contractor to remove rock or place additional rock as necessary in order to achieve compliance.

700.14 Measurement and Payment: The Contractor shall submit an Application for Payment on a monthly basis provided that those reaches of the shoreline protection structure have been completed within the acceptable tolerances and gained acceptance from the Engineer. The unit of measurement for rock shall be the short ton (2,000 pounds). Quantities will be computed to the nearest whole ton using the Barge Displacement Table as specified in SP-25. The Contractor shall provide the Engineer with certified weight tickets issued by the rock quarry for each barge. The Contractor shall measure the weight of the rock by barge displacement prior to unloading any rock from the barge. The Engineer will verify this measurement prior to payment. Upon acceptance by the Engineer, an invoice shall be paid at the applicable contract unit price for Bid Item No. 6, "Rock Armor Layer (LA DOTD 440 lb Class Rock) (TS-700)", Bid Item No. 6A (Alt. #1) (if awarded), and Bid Item No. 6B (Alt. #2) (if awarded). No payment will be made for any unauthorized or non-conforming placement of the rock.

## TS-820 TEMPORARY WARNING SIGNS

820.1 Scope: If the contractor must excavate to provide the necessary access channels the contractor shall furnish all of the materials, labor and equipment necessary to construct and install the temporary warning signs in accordance with the Plans and these Specifications. The signs will only be required to border temporary dredge material stockpile areas where material has been temporarily placed. The signs shall also conform to the regulations in the United States Coast Guard (USCG) Commandant Directives Manuals No. 16500.3 (Series), "Aids to Navigation Manual – Technical" and No. 10360-3 (Series), "Coatings and Color Manual."

820.2 Fabrication: Contractor to provide shop drawings for approval for warning signs. Warning signs may be floating with an anchor as shown on the Plans or pile supported.

820.3 Installation: The warning signs shall be installed at 1,000' intervals and approximately 50 feet from the centerline of the Temporary Dredge Material Stockpile as shown on the Plans prior to excavating any access or flotation channels. If pile supported signs are to be used, each pile shall be driven to the depth shown on the Plans. If pile-supported signs are used, each sign shall be mounted within 5 degrees from vertical and leaning down towards Lake Pontchartrain. The face of each sign shall be parallel to the existing shoreline.

820.4 Measurement and Payment: The Contractor shall submit an Application for Payment for the costs incurred to provide all labor, material, and equipment necessary to construct, install, survey and maintain the temporary warning signs as denoted in the Contract Documents. Upon acceptance by the Engineer, an invoice shall be paid at the contract unit price for Bid Item No. 7, "Temporary Warning Signs (TS-820)"., Bid Item No. 7A (Alt. #1) (if awarded), and Bid Item No. 7B (Alt. #2) (if awarded). No payment shall be made for signs that are rejected or damaged due to fault or negligence by the Contractor.

# APPENDIX A: CLARIFICATION, CHANGE ORDERS, AND ACCEPTANCE

PO-0194 LaBranche Shoreline Protection Project
Request for Information

DATE:

RFI Number:

| Summary of RFI by Contractor |
| --- |
| |
| Signature: |

| Response to RFI by Engineer |
| --- |
| |
| Signature: |

# CHANGE ORDER NO. X

**OWNER:** State of Louisiana, Coastal Protection and Restoration Authority
**CONTRACTOR:**
**PROJECT:** PO-0194 LaBranche Shoreline Protection Project
**PURCHASE ORDER NO:**
**ENGINEER:** Moffatt & Nichol

---

You are directed to make the following changes in the Contract Documents:

- 

**Description:**

| Change in Contract Price | | Change in Contract Time | |
|---|---|---|---|
| Original Contract Price | | Original Contract Time (calendar days) | |
| Net Increase (Decrease) from previous Change Orders | | Net Increase (Decrease) from previous Change Orders (days) | |
| Contract Price prior to this Change Order | | Contract Time prior to this Change Order (calendar days) | |
| Net Increase (Decrease) of this Change Order | | Net Increase (Decrease) of this Change Order (days) | |
| Contract Price with this Change ORder | | Contract Time with this Change Order (calendar days) | |

**Attachments (list documents supporting change):**

- N/A

| **RECOMMENDED:** | **RECOMMENDED:** | **RECOMMENDED:** |
|---|---|---|
| By:_____ | By:_____ | By:_____ |
| Engineer | State of Louisiana CPRA | Contractor |
| Date:_____ | Date:_____ | Date:_____ |

**PO-0194 LaBranche Shoreline Protection Project**

**SUMMARY OF CHANGE ORDER NO. X**

| ITEM NO. | DESCRIPTION | UNIT | ORIGINAL QUANTITY | ADJUSTED QUANTITY | UNIT PRICE | AMOUNT OVERRUN | AMOUNT UNDERRUN |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| Total Amount Overrun | | | | | | | |
| Total Amount Underrun | | | | | | | |
| **Net Decrease of this Change Order** | | | | | | | |

**Justification:**

❖ **NOT FOR RECORDATION PURPOSES** ❖

# RECOMMENDATION OF ACCEPTANCE

TO: Coastal Protection and Restoration Authority
150 Terrace Avenue, Suite 100
Baton Rouge, LA 70802

FROM: _____
_____
_____
*Design Firm Name and Address*

DATE: _____

PROJECT NAME & NUMBER: _____

SITE CODE:_____ STATE ID:_____ CFMS:_____

CONTRACTOR:_____
_____

ORIGINAL CONTRACT AMOUNT: $ _____

FINAL CONTRACT AMOUNT: $ _____

DATE OF ACCEPTANCE:_____

CONTRACT DATE OF COMPLETION:_____

NUMBER OF DAYS (OVERRUN) (UNDERRUN) (As of Acceptance Date)_____

LIQUIDATED DAMAGES PER DAY STIPULATED IN CONTRACT $_____

VALUE OF PUNCH LIST $_____*(Attach punch list)*

Signed:_____
DESIGNER

***FOR USE OF PROJECT MANAGER:***

Signed:_____
PROJECT MANAGER

❖ **NOT FOR RECORDATION PURPOSES** ❖

# APPENDIX B: DAILY PROGRESS REPORT TEMPLATE

**DAILY PROGRESS REPORT**

Date:_____Report No._____By: _____
(Contractor)

(Report is due by 12:00 p.m. the following day.)

PROJECT: PO-0194 LaBranche Shoreline Protection Project

WEATHER: (clear) (cloudy) (partly cloudy) (fog) _____
Precipitation: _____
Temperature Range:_____
Wind Speed:_____Wind Direction: _____
Wave Height:_____Wave Direction: _____

CONSTRUCTION ACTIVITIES:

1. Work Performed Today: (Indicate location and description of work performed, including subcontractors.)

2. Results of Inspections: (include satisfactory work completed or deficiencies with action to be taken.)

3. Status of Aids to Navigation: Were all navigation aids checked today (Yes/No)?_____Did any navigation aids require resetting (Yes/No)?_____Did any navigation aids require repairs (Yes/No)? Provide details.

4. Endangered Species Monitoring: Were bird patrols performed today (Yes/No)?_____Append bird monitor report to this progress report. Were any endangered species observed today (Yes/No)?_____If yes, include details such as species, location, distance to equipment, actions taken, and similar. Were any endangered species observed to be stranded, trapped, or entangled? If yes, include details and actions taken.

5. Verbal Instructions Received: (List any instructions given by the Owner or Engineer, construction deficiencies, retesting required, etc. Include action to be taken.)

6. Remarks: (Cover delays and any conflicts in Plans, specifications, or instructions.)

7. Health and Safety Meeting Details: (Include topics discussed; actions to be taken.)

8. Safety Inspection: (Report violations noted; corrective instructions given; and corrective actions taken.)

9. Equipment: (Include items of construction equipment other than hand tools at the Project Site; approximate hours used; and operating status.)

10. Visitors: (Include names, titles, and nature of visit.)

11. Lost Time: (Include description of nature of time lost such as severe weather, personal injury, etc.)

12. Compliance with Progress Schedule: (Include description of work performed against baseline; and corrective actions taken.)

13. Notifications to the Engineer

| **Notifications to the Engineer** | |
|---|---|
| Pre-construction Survey | STA Started-Completed: |
| | Date Started-Completed: |
| Pre-construction Magnetometer Survey | STA Started-Completed: |
| | Date Started-Completed: |
| Pre-construction Probing Survey | Date Started-Completed: |
| Louisiana One-Call | |
| Landowner/Utility Contacted | |
| USCG Notice to Mariners | |
| Endangered Species/Cultural Resource | |
| Recordable Injury/Spill | |
| Pre-construction Aerial | |
| Supplemental Pre-construction Survey | STA Started-Completed: |
| | Date Started-Completed: |
| Progress Survey | STA Started-Completed: |
| | Date Started-Completed: |
| Post-Construction Survey | STA Started-Completed: |
| | Date Started-Completed: |

14. Progress Summary

| **Daily Breakwater Maintenance Lift Installation** | | |
|---|---|---|
| Breakwater Maintenance Lift | STA Start – End Today: | Qty Installed Today: |
| | Linear Feet Today: | Contract Value: $ |
| | Quantity Today: | Contract Value: $ |
| Navigation Aids | STA Start – End Today: | |
| | Quantity Today: | Contract Value: $ |

| Active Field Orders / Change Orders / Claims / Requests for Information / Payment Requests / Acceptance Requests | | |
|---|---|---|
| FO / CO / Claim / RFI / PR / AR | No.: | Status: |
| FO / CO / Claim / RFI / PR / AR | No.: | Status: |
| FO / CO / Claim / RFI / PR / AR | No.: | Status: |

Contractor's Verification: The above report is complete and correct. Equipment used and work performed during this reporting period are in compliance with the Plans and Specifications except as noted above.

_____ _____

Contractor's Approved Authorized Representative Title

# APPENDIX C: PERMITS OBTAINED BY OWNER

**DEPARTMENT OF NATURAL RESOURCES**
**OFFICE OF COASTAL MANAGEMENT**

P.O. BOX 44487
BATON ROUGE, LOUISIANA 70804-4487
(225)342-7591
1-800-267-4019

**COASTAL USE PERMIT/CONSISTENCY DETERMINATION**

**C.U.P. No.:** **P20220270**

**C.O.E. No.:**

**NAME:** **CPRA**
P.O. BOX 44027
BATON ROUGE, LA 70804
Attn: Sydney Dobson

**LOCATION:** **Saint Charles Parish, LA**
Lat. 30 03' 22"N, Long. -90 18' 57"W (see plats for additional project coordinates); Lake Ponchartrain; Norco, 70079.

**DESCRIPTION:** Proposed installation of rock breakwaters for shoreline protection as part of the PO-0194 LaBranche Shoreline Protection Project. Approx. 178,000 cys will be excavated and placed onsite, and approx. 56,974 cys of rock will be hauled in and placed onsite.

In accordance with the rules and regulations of the Louisiana Coastal Resources Program and Louisiana R.S. 49, Sections 214.21 to 214.41, the State and Local Coastal Resources Management Act of 1978, as amended, the permittee agrees to:

1. Carry out, perform, and/or operate the use in accordance with the permit conditions, plans and specifications approved by the Department of Natural Resources.
2. Comply with any permit conditions imposed by the Department of Natural Resources.
3. Adjust, alter or remove any structure or other physical evidence of the permitted use if, in the opinion of the Department of Natural Resources, it proves to be beyond the scope of the use as approved or is abandoned.
4. Provide, if required by the Department of Natural Resources, an acceptable surety bond in an appropriate amount to ensure adjustment, alteration, or removal should the Department of Natural Resources determine it necessary.
5. Hold and save the State of Louisiana, the local government, the department, and their officers and employees harmless from any damage to persons or property which might result from the use, including the work, activity, or structure permitted.
6. Certify that the use has been completed in an acceptable and satisfactory manner and in accordance with the plans and specifications approved by the Department of Natural Resources. The Department of Natural Resources may, when appropriate, require such certification to be given by a registered professional engineer.
7. All terms of the permit shall be subject to all applicable federal and state laws and regulations.
8. This permit, or a copy thereof, shall be available for inspection at the site of work at all times during operations.
9. The applicant will notify the Office of Coastal Management of the date on which initiation of the permitted activity described under the "Coastal Use Description" began. The applicant shall notify the Office of Coastal Management by entering a commencement date through the online system, or by mailing said information to OCM.
10. Unless specified elsewhere in this permit, this permit authorizes the initiation of the coastal use described under "Coastal Use Description" for two (2) years from the date of the signature of the Secretary or his designee on the original permit which was July 27, 2022. If the coastal use is not initiated within this two (2) year period, then this permit will expire and the applicant will be required to submit a new application. Initiation of the coastal use, for the purposes of this permit, means the actual physical beginning of the use of activity for which the permit is required. Initiation does not include preparatory activities, such as movement of equipment onto the coastal use site, expenditure of funds, contracting out of work, or performing activities which by themselves do not require a permit. In addition, the permittee must, in good faith, and with due diligence, reasonably progress toward completion of the project once the coastal use has been initiated.
11. The following special conditions must also be met in order for the use to meet the guidelines of the Coastal Resources Program:

a. All logs, stumps and other debris encountered during dredging activities shall be removed from the site during or immediately after the activity and disposed of in accordance with all applicable laws and regulations.

b. The area where the project is located is all part of the aboriginal homelands of the Chitimacha Tribe of Louisiana. As such, large villages, burial sites, and sacred sites were in place in that entire area. If at any time during the course of the work, any traditional cultural properties are discovered, Permittee shall immediately contact Kimberly S. Walden (Cultural Director) or Melanie Aymond (Research Coordinator) at (337) 923-9923 or (337) 923-4395. Office hours are Monday through Thursday from 7:30 A.M. - 5:00 P.M. and on Friday between 7:30 A.M. - 11:30 A.M. If traditional cultural properties are discovered on the weekend or after business hours, the notification shall be made the next

business morning.

c. All structures built under the authorization and conditions of this permit shall be removed from the site within 120 days of abandonment of the facilities for the herein permitted use, or when these structures fall into a state of disrepair such that they can no longer function as intended. This condition does not preclude the necessity for revising the current permit or obtaining a separate Coastal Use Permit, should one be required, for such removal activities.

d. Structures must be marked/lighted in accordance with U. S. Coast Guard regulations.

e. Ecological Studies: It is anticipated that this proposed Coastal Protection and Restoration Authority project will benefit wildlife resources; therefore, Ecological Studies has no objection Wildlife Diversity Program: The database indicates that the West Indian Manatee (Trichechus manatus) may occur in the surrounding waterbodies of the project area. The manatee is a large mammal that inhabits both fresh and salt water. Although the manatee is a year round resident of Florida and Central America, the species has been known to migrate to areas along the Atlantic and Gulf coasts during the summer months. The West Indian Manatee is a threatened species protected under the Endangered Species Act of 1973 and the Federal Marine Mammal Protection Act of 1972. In Louisiana, take or harassment of a manatee is a violation of state and federal laws. Critical habitat for the manatee includes beds of submerged aquatic vegetation (e.g., sea-grass beds). Areas with sea-grass beds should be avoided during project activities. Report all manatee sightings to the Louisiana Department of Wildlife and Fisheries at 504-286-4052 or 1-800-442-2511. No other impacts to rare, threatened or endangered species or critical habitats are anticipated from the proposed project. No state or federal parks, wildlife refuges, wildlife management areas or scenic rivers are known at the specified site or within ¼ mile of the proposed project. The Wildlife Diversity Program (WDP) reports summarize the existing information known at the time of the request regarding the location in question. WDP reports should not be considered final statements on the biological elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. If at any time WDP tracked species are encountered within the project area, please contact our biologist at 225-763-3554.

f. The applicant must submit for and receive a Levee Permit/Letter of No Objection from the CPRA, the United States Army Corps of Engineers and the Southeast Louisiana Flood Protection Authority - East prior to commencement of the activity.

g. Permittee shall, prior to commencement of the herein permitted activities, contact Billy Wall (phone: 225-342-9423, email: billy.wall@la.gov) to determine if a construction permit will be required from the local levee district.

h. This permit does not convey any property rights, mineral rights, or exclusive privileges; nor does it authorize injury to property.

i. All fill material shall be clean and free of contaminants and shall not contain hazardous materials such as asbestos or asbestos residue, shingles, tires, oil/grease residue, exposed rebar, protruding objects, etc.

j. This determination does not eliminate the need to obtain a permit from the United States Army, Corps of Engineers or any other Federal, state or local approval that may be required by law. The drawings submitted with your referenced application are attached hereto and made a part of the record.

k. The permittee shall insure that all sanitary sewage and/or related domestic wastes generated during the subject project activity and at the site, thereafter, as may become necessary shall not be discharged into any of the streams or adjacent waters of the area without authorization from DH and/or DEQ or, in the case of total containment, shall be disposed of in approved sewerage and sewage treatment facilities, as is required by the State Sanitary Code and DEQ

regulations. Such opinion as may be served by those comments offered herein shall not be construed to suffice as any more formal approval(s) which may be required of possible sanitary details (i.e. provisions) scheduled to be associated with the subject activity. Such shall generally require that appropriate plans and specifications be submitted to DH for purpose of review and approval prior to any utilization of such provisions.

l. In accordance with the Beneficial Use of Dredged Material guidelines, dredged material resulting from activities permitted under this authorization shall be used beneficially to create, enhance or protect coastal wetlands.

Beneficial use of dredged material projects located in open water shall be marked in accordance with USCG regulations until such time that the spoil is 6" or less above surrounding water bottom elevation, or has become 80% vegetated.

m. Permittee is subject to all applicable state laws related to damages which are demonstrated to have been caused by this action.

n. Permittee shall allow representatives of the Office of Coastal Management or authorized agents to make periodic, unannounced inspections to assure the activity being performed is in accordance with the conditions of this permit.

o. Permittee shall comply with all applicable state laws regarding the need to contact the Louisiana One Call (LOC) system (1-800-272-3020) to locate any buried cables and pipelines.

p. This permit authorizes the initiation of the Coastal Use described under "Coastal Use Description" for two (2) years from the date of the signature of the Secretary or his designee on the original permit which was July 27, 2022. Initiation of the Coastal Use, for purposes of this permit, means the actual physical beginning of the use or activity for which the permit is required. Initiation does not include preparatory activities, such as movement of equipment onto the Coastal Use site, expenditure of funds, contracting out of work, or performing activities which by themselves do not require a permit. In addition, Permittee must, in good faith and with due diligence, reasonably progress toward completion of the project once the Coastal Use has been initiated. If the Coastal Use is not initiated within this two (2) year period, an extension may be granted pursuant to the requirements contained in the Rules and Procedures for Coastal Use Permits (Title 43:I.723.D.). Please note that a request for permit extension MUST be made no sooner than one hundred eighty (180) days and no later than sixty (60) days prior to the expiration of the permit.

The expiration date of this permit is five (5) years from the date of the signature of the Secretary or his designee on the original permit which was July 27, 2022. If the Coastal Use is not completed within this five (5) year period, an extension may be granted pursuant to the requirements contained in the Rules and Procedures for Coastal Use Permits (LAC 43:I.723(D)).

Upon expiration of this permit, a new Coastal Use Permit will be required for completion of any unfinished or uncommenced work items and for any maintenance activities involving dredging or fill that may become necessary. Other types of maintenance activities may also require a new Coastal Use Permit.

q. This determination does not eliminate the need to obtain a permit from the United States Army, Corps of Engineers or any other Federal, state or local approval that may be required by law. The drawings submitted with your referenced application are attached hereto and made a part of the record.

********** End of Conditions **********

By accepting this permit the applicant agrees to its terms and conditions.

I affix my signature and issue this permit this 27th day of July, 2022.

THE DEPARTMENT OF NATURAL RESOURCES

Karl L. Morgan, Administrator
Office of Coastal Management

This agreement becomes binding when signed by Administrator of
the Office of Coastal Management Permits/Mitigation Division, Department of Natural Resources.

Attachments

**Final Plats:**

1) P20220270 Final Plats 06/29/2022

cc: Martin Mayer, COE w/attachments
Dave Butler, LDWF w/attachments
Orleans Levee District, LD w/attachments
Coastal Protection and Restoration Authority, CPRA w/attachments
Jordan Cobbs, OCM w/attachments
Brian Lash, OCM/FI w/attachments
Saint Charles Parish w/attachments

# APPENDIX D: DIRECTIONS TO BOAT LAUNCH

Google Maps

# New Orleans, LA to 5051 Williams Blvd, Kenner, LA 70065

Drive 13.8 miles, 22 min

New Orleans
Louisiana

**Get on I-10 W from Poydras St**

6 min (1.4 mi)

1. Head north on Carondelet St toward Union St

125 ft

2. Turn left onto Union St

404 ft

3. Turn left onto Baronne St

0.1 mi

4. Turn right onto Poydras St

0.7 mi

5. Take the ramp on the left onto I-10 W

0.5 mi

**Follow I-10 W to Power Blvd in Metairie. Take exit 224 from I-10 W**

10 min (9.7 mi)

6. Merge onto I-10 W

9.5 mi

7. Take exit 224 to merge onto Power Blvd

0.2 mi

**Continue on Power Blvd. Drive to Williams Blvd in Kenner**

6 min (2.7 mi)

8. Merge onto Power Blvd

1.4 mi

9. Use any lane to turn left onto Vintage Dr

0.5 mi

10. Turn right onto Williams Blvd

0.7 mi

5051 Williams Blvd
Kenner, LA 70065

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route

Google Maps

# Baton Rouge, LA to 5051 Williams Blvd, Kenner, LA 70065

Drive 71.3 miles, 1 hr 11 min

Baton Rouge
Louisiana

**Get on I-110 S from Florida St**

2 min (0.6 mi)

1. Head east toward N 4th St

98 ft

2. Turn left onto N 4th St

203 ft

3. Turn right at the 1st cross street onto Florida St

0.4 mi

4. Turn right to merge onto I-110 S

0.2 mi

**Follow I-10 E to LA-49 N/Williams Blvd in Kenner. Take exit 223A-B from I-10 E**

1 hr (68.5 mi)

5. Merge onto I-110 S

0.3 mi

6. Take exit 1K on the left for I-10 E toward New Orleans

0.3 mi

7. Keep right and merge onto I-10 E

4.0 mi

8. Keep right at the fork to stay on I-10 E, follow signs for New Orleans

63.7 mi

9. Take exit 223A-B for LA-49 N/Williams Blvd

0.3 mi

10. Turn left onto LA-49 N/Williams Blvd
Continue to follow Williams Blvd
Pass by Popeyes Louisiana Kitchen (on the right in 0.7 mi)

7 min (2.2 mi)

5051 Williams Blvd
Kenner, LA 70065

These directions are for planning purposes only. You may find that construction

# APPENDIX E: SURVEY MONUMENT DATA

## VICINITY MAP

1 inch = 3,000 feet

Reproduced from NAIP Louisiana 2013 1m Aerial Imagery

# Station Name: "PO28 SM 02"

**Location:** The station is located in the La Branche Wetlands, west of Kenner, Louisiana, between Interstate 10 and Lake Ponchartrain and is on the west bank of Walker Canal in Section 44, T11S-R9E, St. Charles Parish, Louisiana. To reach this station from the intersection of Interstate 10 and Williams Blvd in Kenner, go northerly along Williams Blvd for 2.2 miles to a boat launch on the south shore of Lake Ponchartrain; then proceed westerly, by boat, along the south shore of Lake Ponchartrain for 3.1 miles to the mouth of Duncan Canal on the western corporate boundary of the City of Kenner; then proceed southerly along Duncan Canal for 2.8 miles to the Borrow Canal between the eastbound and westbound lanes of Interstate 10; then proceed westerly in the borrow canal for 1.75 miles to the Walker Canal; then proceed northerly in the Walker Canal for 2.84 miles to the station on the left.

**Monument Description:** Monument is a 9/16 steel rod driven to 80 feet to refusal within a 6" PVC sleeve set in concrete with protective metal access cover stamped 'PO 80 LABRANCHE POINT 02'

**Stamping: PO 80 LABRANCHE POINT 02**

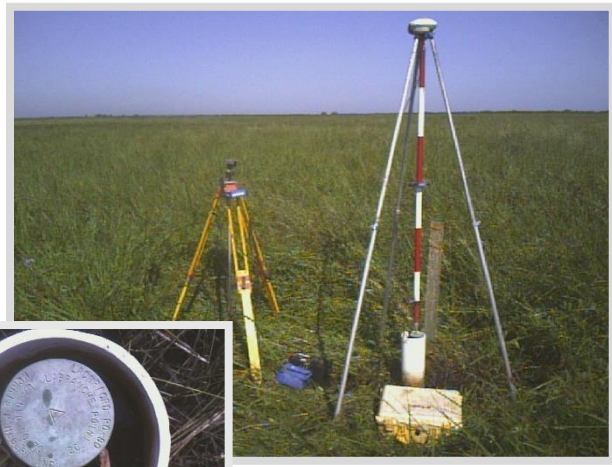
**Installation Date: 2000** **Date of Survey:** 08-03-2021

**Monument Established By:** Morris P. Hebert

**NAD83 (2011) Epoch 2010.00 Geodetic Position:**
*Lat:* 30°02'57.92412"N
*Long:* 90°18'36.92517"W
**NAD83 (2011) Epoch 2010.00 Datum LSZ (1702) Ft:**
*N:* 564910.75
*E:* 3604504.86
**NAD83 UTM (Zone 15 North) Meters:**
*N:* 3327311.50
*E:* 759338.68

**Adjusted NAVD88 Height:**
*Elevation* = 2.43 feet (0.740 mtrs)
*Ellipsoid Height (2011)* = -25.501 mtrs.
*Geoid12A Height* = -26.241 mtrs.

*FOR REFERENCE ONLY*
*LCZ Adjusted NAVD88 Height*
*Elevation (Geoid99)* = 3.03 feet (0.924 mtrs)
*Ellipsoid Height* = -25.438 mtrs



*Adjusted Position Established Fugro USA Land, Inc. for Costal Protection & Restoration Authority of Louisiana*

# APPENDIX F: GEOTECHNICAL INFORMATION

Oct 22, 2010 – 10:33am

NOT TO SCALE

Boring Plan for LaBranche East

REFERENCE:
PLAN BY GOOGLE.

NOTE:
BORING LOCATIONS ARE APPROXIMATE.

## VICINITY MAP

NOT TO SCALE

REFERENCE:
SITE IMAGE BY GOOGLE.

**ST. CHARLES PARISH**
**SHORELINE ENHANCEMENT PROJECT**
**SOUTH SHORE OF LAKE PONTCHARTRAIN**
**LABRANCHE EAST**
ST. CHARLES PARISH, LOUISIANA

for

**MOFFATT & NICHOL**
BATON ROUGE, LOUISIANA

AAI
Ardaman & Associates, Inc.
Baton Rouge, LA Jefferson, LA

| Project Engineer: | Drawn by: | Checked by: |
|---|---|---|
| C. POCHE | NMS | |
| File No.: 10-3006 | Date: 04-13-10 | Figure No.: 1 |

Title: **BORING PLAN**

P:\2010\10-3006\CADD\10-3006 Boring Plan.dwg

Oct 22, 2010 - 10:33am

NOT TO SCALE

Boring Plan for LaBranche West

**VICINITY MAP**
**NOT TO SCALE**

REFERENCE:
SITE IMAGE BY GOOGLE.

REFERENCE:
PLAN BY GOOGLE.

NOTE:
BORING LOCATIONS ARE APPROXIMATE.

**ST. CHARLES PARISH**
**SHORELINE ENHANCEMENT PROJECT**
**SOUTH SHORE OF LAKE PONTCHARTRAIN**
**LABRANCHE WEST**
ST. CHARLES PARISH, LOUISIANA

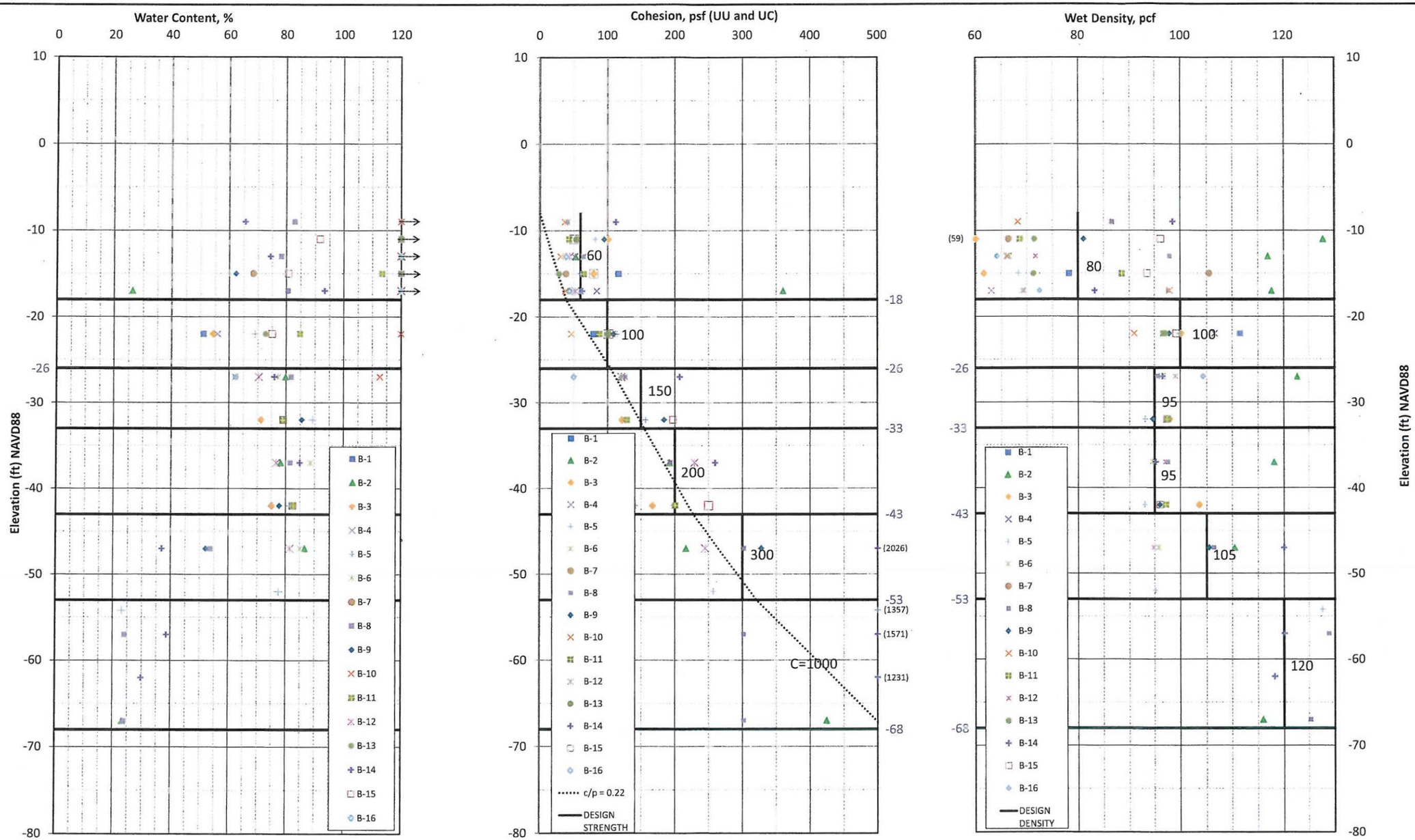
for
**MOFFATT & NICHOL**
BATON ROUGE, LOUISIANA

AAI
Ardaman & Associates, Inc.
Baton Rouge, LA Jefferson, LA

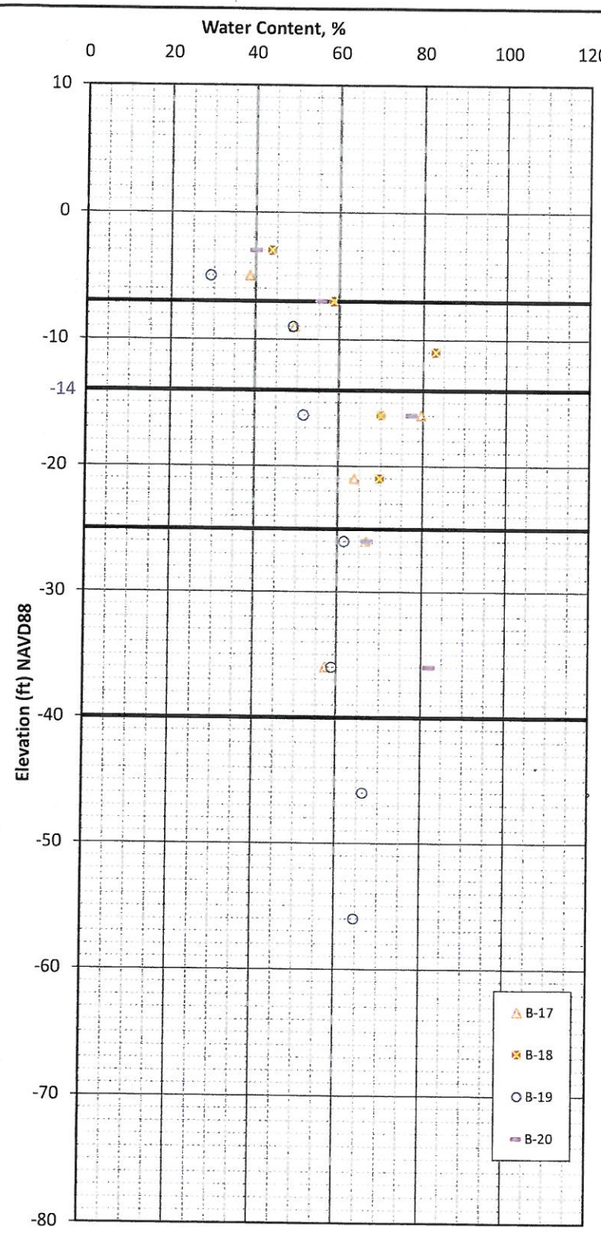
| Project Engineer: | Drawn by: | Checked by: |
|---|---|---|
| C. POCHE | NMS | |
| File No.: | Date: | Figure No.: |
| 10-3006 | 04-13-10 | 2 |

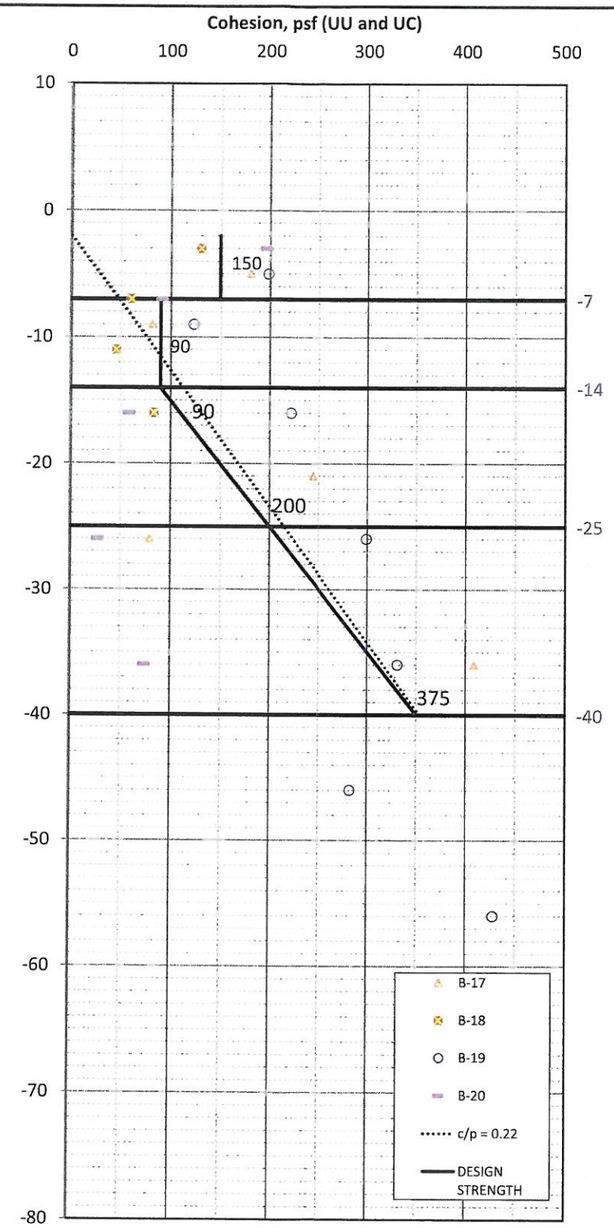
Title:
**BORING PLAN**

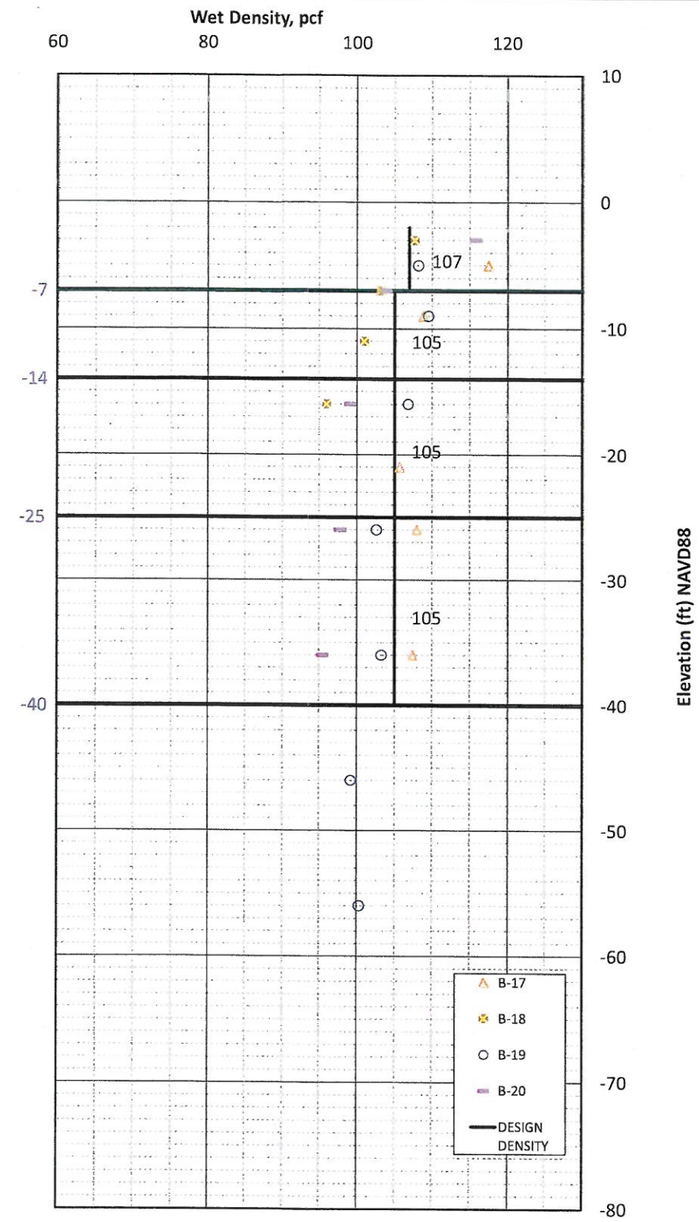
P:\2010\10-3006\CADD\10-3006 Boring Plan.dwg



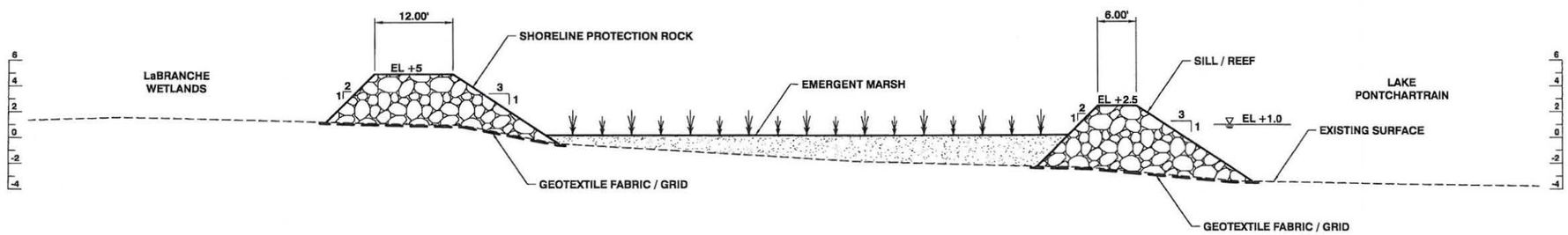

| | | | | |
|---|---|---|---|---|
| Ardaman & Associates, Inc. | St. Charles Parish<br>Shorline Enhancement Project<br>South of Lake Ponchartrain<br>St. Charles Parish, Louisiana | AAI Project No. 10-3006<br>DESIGN STRENGTH AND WET DENSITY PROFILES FOR LABRANCHE EAST | Borings B-1 thru B-16 | Figure No.<br>3 |




| | | | | |
|---|---|---|---|---|
| Ardaman & Associates, Inc. | St. Charles Parish<br>Shorline Enhancement Project<br>South of Lake Ponchartrain<br>St. Charles Parish, Louisiana | AAI Project No. 10-3006<br>DESIGN STRENGTH<br>AND WET DENSITY PROFILES<br>FOR LABRANCHE WEST | Borings B-17 thru B-20 | Figure No.<br>4 |




## SHORELINE PROTECTION AND ENHANCEMENT
## TYPICAL SECTION

5' 0' 5' 10'
GRAPHIC SCALE – VERTICAL

10' 0' 10' 20'
GRAPHIC SCALE – HORIZONTAL

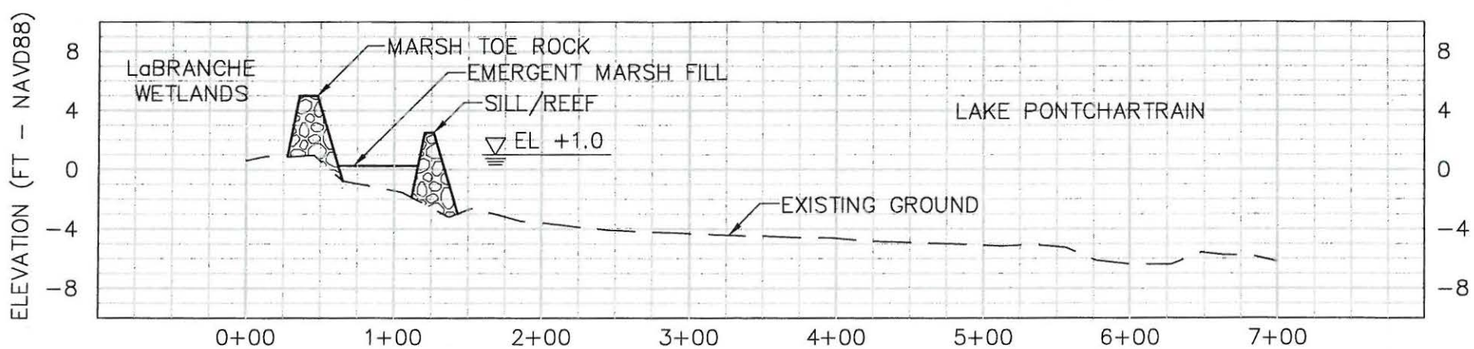
moffatt & nichol

**PRELIMINARY**
NOT TO BE USED FOR CONSTRUCTION

Figure 5

PLAN – PROFILE 3

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




PROFILE 3

5' 0' 5' 10'
VERTICAL SCALE: 1"=10'
50' 0' 50' 100'
HORIZONTAL SCALE: 1"=100'

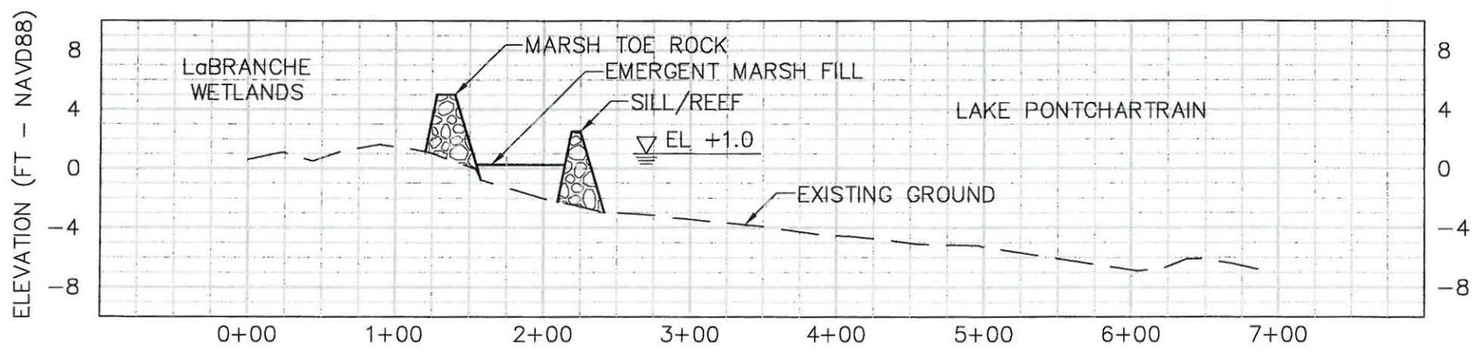
**PRELIMINARY**
NOT TO BE USED FOR CONSTRUCTION

moffatt & nichol

Figure 6

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

## PLAN – PROFILE 4




5' 0' 5' 10'
VERTICAL SCALE: 1"=10'
50' 0' 50' 100'
HORIZONTAL SCALE: 1"=100'

## PROFILE 4

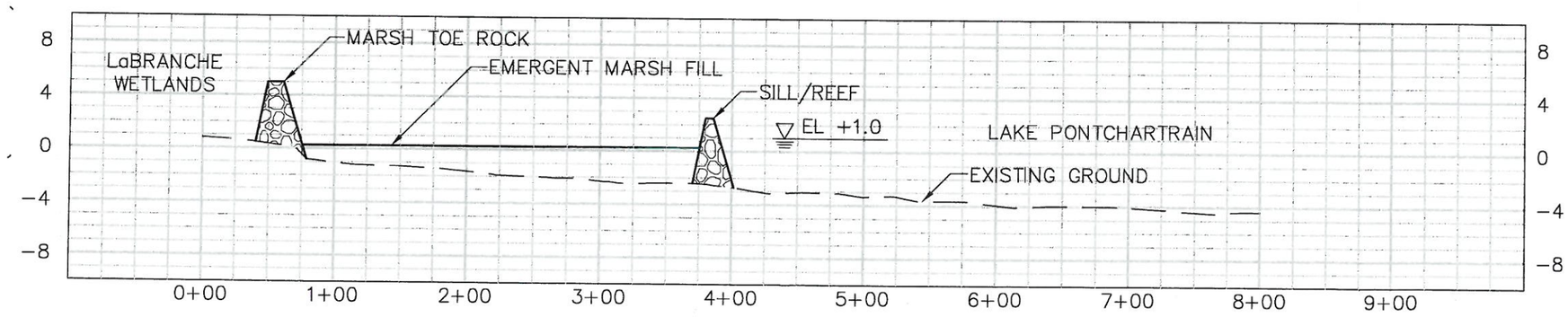
**PRELIMINARY**
NOT TO BE USED FOR CONSTRUCTION

moffatt & nichol

Figure 7

## PLAN – PROFILE 5

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




5' 0' 5' 10'
VERTICAL SCALE: 1"=10'

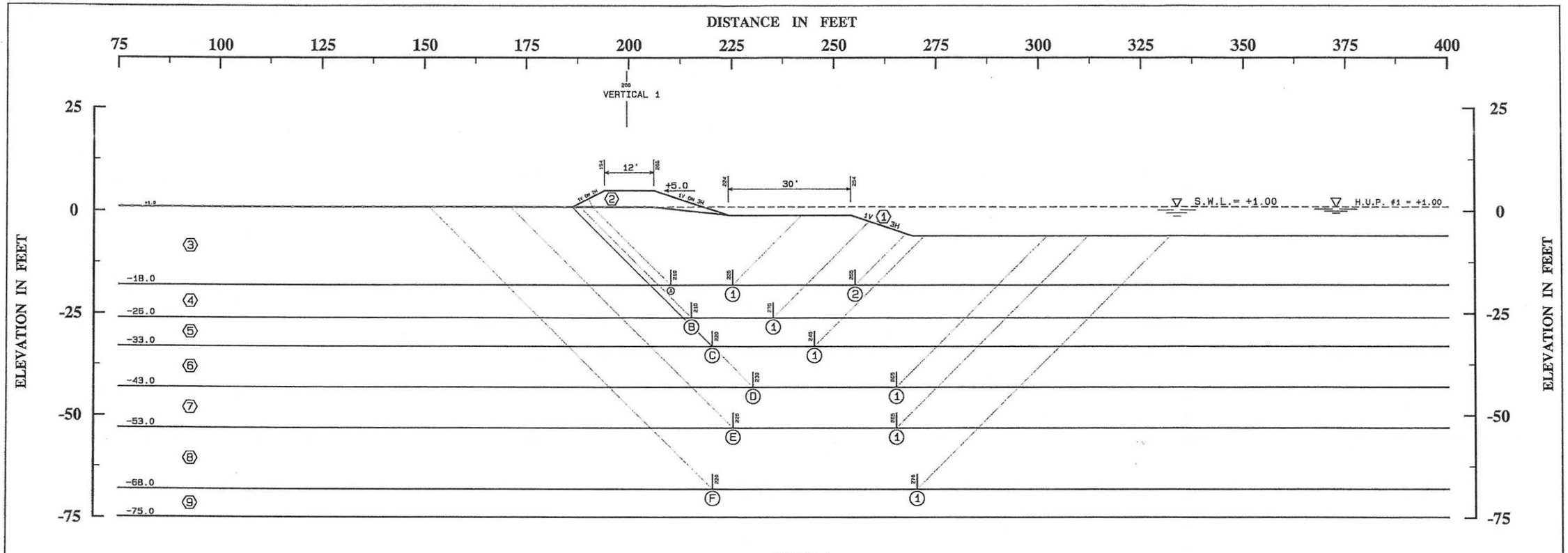
50' 0' 50' 100'
HORIZONTAL SCALE: 1"=100'

## PROFILE 5

**PRELIMINARY**
NOT TO BE USED FOR CONSTRUCTION

moffatt & nichol

Figure 8




CASE 1
LaBranche West
Shoreline Protection Dike
Top at Elev. +5.0
Typical Rock, unit weight of 132 pcf

| STRATUM NUMBER | SOIL TYPE | UNIT WEIGHT (POUNDS PER CUBIC FOOT) | UNIT COHESION (POUNDS PER SQUARE FOOT) | | FRICTION ANGLE (DEGREES) |
|---|---|---|---|---|---|
| | | | AVERAGE | BOTTOM OF STRATUM | |
| | | VERTICAL 1 | VERTICAL 1 | VERTICAL 1 | |
| 1 | water | 63.0 | 0.0 | 0.0 | 0.0 |
| 2 | rock | 132.0 | 0.0 | 0.0 | 40.0 |
| 3 | | 80.0 | 60.0 | 60.0 | 0.0 |
| 4 | | 100.0 | 100.0 | 100.0 | 0.0 |
| 5 | | 95.0 | 150.0 | 150.0 | 0.0 |
| 6 | | 95.0 | 200.0 | 200.0 | 0.0 |
| 7 | | 105.0 | 300.0 | 300.0 | 0.0 |
| 8 | | 120.0 | 1000.0 | 1000.0 | 0.0 |
| 9 | | 120.0 | 1000.0 | 1000.0 | 0.0 |

S.W.L. :: SURFACE WATER LEVEL  H.U.P. :: HYDROSTATIC UPLIFT PROFILE

| ASSUMED FAILURE SURFACE | | | RESISTING FORCES | | | DRIVING FORCES | | SUMMATION OF FORCES | | FACTOR OF SAFETY |
|---|---|---|---|---|---|---|---|---|---|---|
| NUMBER | | ELEVATION | $R_A$ | $R_B$ | $R_P$ | $D_A$ | $-D_P$ | RESISTING | DRIVING | |
| A | 1 | -18.00 | 2542 | 900 | 2040 | 24202 | 13827 | 5482 | 10375 | 0.53 |
| A | 2 | -18.00 | 2542 | 2700 | 1500 | 24202 | 13142 | 6742 | 11060 | 0.61 |
| B | 1 | -26.00 | 3922 | 2000 | 3460 | 41371 | 28838 | 9382 | 12533 | 0.75 |
| C | 1 | -33.00 | 5980 | 3750 | 5140 | 60500 | 46139 | 14870 | 14361 | 1.04 |
| D | 1 | -43.00 | 9980 | 7000 | 9140 | 94897 | 78191 | 26120 | 16706 | 1.56 |
| E | 1 | -53.00 | 15980 | 12000 | 15140 | 139673 | 121600 | 43120 | 18073 | 2.39 |
| F | 1 | -68.00 | 45980 | 50000 | 45140 | 227982 | 208043 | 141120 | 19939 | 7.08 |

$$\text{FACTOR OF SAFETY} = \frac{R_A + R_B + R_P}{D_A - D_P}$$

**ARDAMAN & ASSOCIATES, INC.**
Geotechnical, Environmental and Materials Consultants

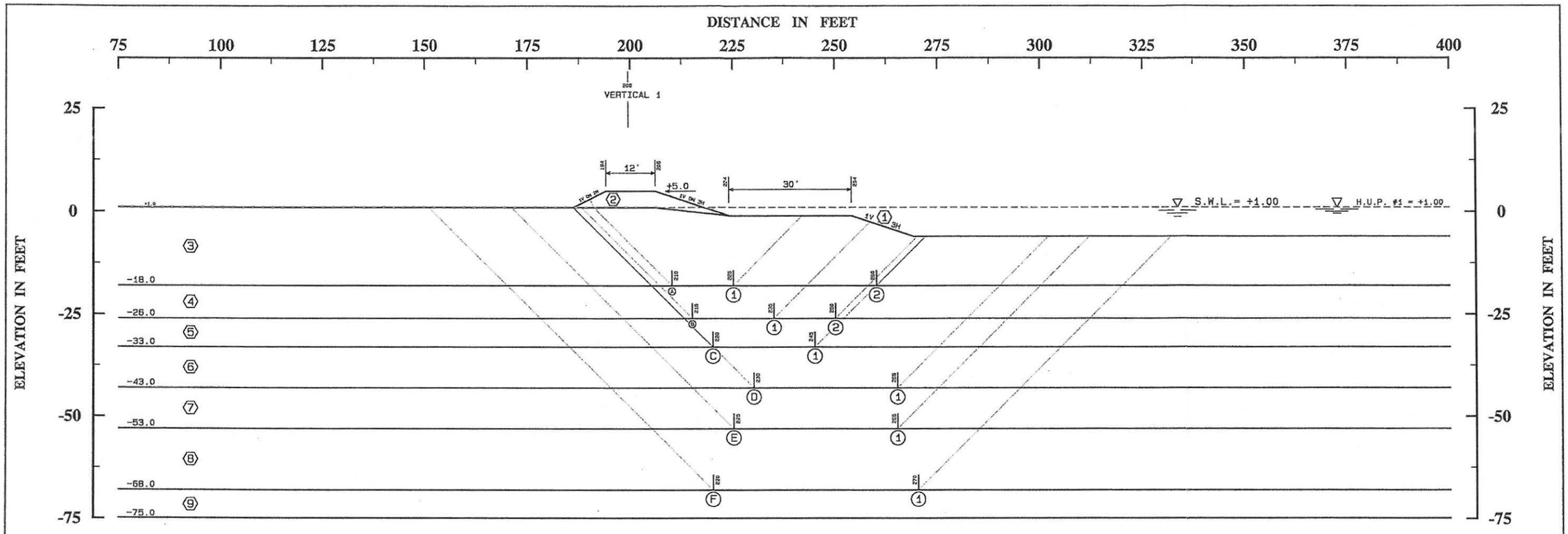
SLOPE STABILITY ANALYSIS

AAI PROJECT NO. 10-3006
ST. CHARLES PARISH
SHORELINE ENHANCEMENT PROJECT
SOUTH SHORE OF LAKE PONTCHARTRAIN
LABRANCHE EAST SHORELINE PROTECTION

TOP OF SILL DIKE AT +5.0 FT ELEVATION
ROCK USED FOR ROCK SILL
WITH 30 FT BERM

SCALE: 1 INCH = 25 FEET  GEOTECHNICAL DATA FILE: 10-3006.6B  PLOT DATA FILE: 10-3006.6B-PLT  DIRECTORY: C:\ULWEDGE

Figure 9




CASE 2
LaBranche West
Shoreline Protection Dike
Top at Elev. +5.0
Lightweight Rock, unit weight of 100 pcf

| STRATUM NUMBER | SOIL TYPE | UNIT WEIGHT (POUNDS PER CUBIC FOOT) | UNIT COHESION (POUNDS PER SQUARE FOOT) | | FRICTION ANGLE (DEGREES) |
|---|---|---|---|---|---|
| | | | AVERAGE | BOTTOM OF STRATUM | |
| | | VERTICAL 1 | VERTICAL 1 | VERTICAL 1 | |
| 1 | water | 63.0 | 0.0 | 0.0 | 0.0 |
| 2 | rock | 100.0 | 0.0 | 0.0 | 40.0 |
| 3 | | 80.0 | 60.0 | 60.0 | 0.0 |
| 4 | | 100.0 | 100.0 | 100.0 | 0.0 |
| 5 | | 95.0 | 150.0 | 150.0 | 0.0 |
| 6 | | 95.0 | 200.0 | 200.0 | 0.0 |
| 7 | | 105.0 | 300.0 | 300.0 | 0.0 |
| 8 | | 120.0 | 1000.0 | 1000.0 | 0.0 |
| 9 | | 120.0 | 1000.0 | 1000.0 | 0.0 |

S.W.L. :: SURFACE WATER LEVEL  H.U.P. :: HYDROSTATIC UPLIFT PROFILE

| ASSUMED FAILURE SURFACE | | | RESISTING FORCES | | | DRIVING FORCES | | SUMMATION OF FORCES | | FACTOR OF SAFETY |
|---|---|---|---|---|---|---|---|---|---|---|
| NUMBER | | ELEVATION | $R_A$ | $R_B$ | $R_P$ | $D_A$ | $-D_P$ | RESISTING | DRIVING | |
| A | 1 | -18.00 | 2479 | 900 | 2040 | 21818 | 13827 | 5419 | 7991 | 0.68 |
| A | 2 | -18.00 | 2479 | 3000 | 1440 | 21818 | 12824 | 6919 | 8994 | 0.77 |
| B | 1 | -26.00 | 3912 | 2000 | 3460 | 38478 | 28838 | 9372 | 9640 | 0.97 |
| B | 2 | -26.00 | 3912 | 3500 | 3040 | 38478 | 27980 | 10452 | 10498 | 1.00 |
| C | 1 | -33.00 | 5980 | 3750 | 5140 | 57358 | 46139 | 14870 | 11219 | 1.33 |
| D | 1 | -43.00 | 9980 | 7000 | 9140 | 91697 | 78191 | 26120 | 13506 | 1.93 |
| E | 1 | -53.00 | 15980 | 12000 | 15140 | 136472 | 121600 | 43120 | 14872 | 2.90 |
| F | 1 | -68.00 | 45980 | 50000 | 45140 | 224836 | 208043 | 141120 | 16793 | 8.40 |

$$\text{FACTOR OF SAFETY} = \frac{R_A + R_B + R_P}{D_A - D_P}$$

**ARDAMAN & ASSOCIATES, INC.**
Geotechnical, Environmental and Materials Consultants

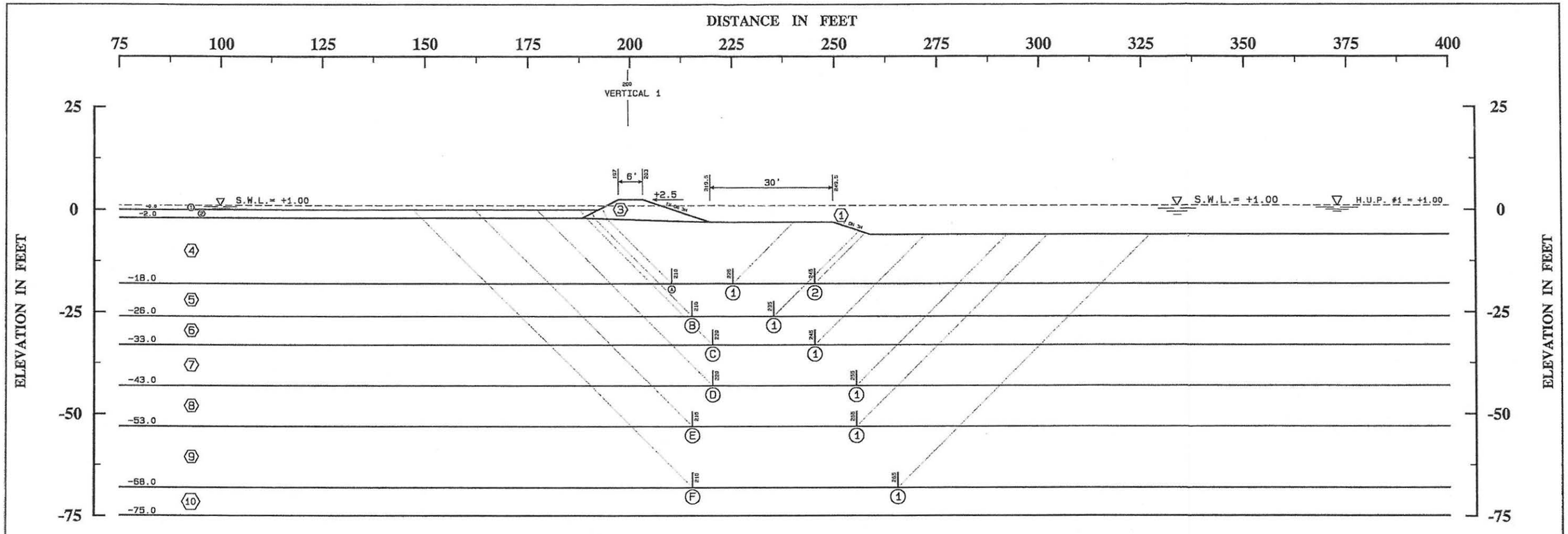
SLOPE STABILITY ANALYSIS

AAI PROJECT NO. 10-3006
ST. CHARLES PARISH
SHORELINE ENHANCEMENT PROJECT
SOUTH SHORE OF LAKE PONTCHARTRAIN
LABRANCHE EAST SHORELINE PROTECTION

TOP OF SILL DIKE AT +5.0 FT ELEVATION
LIGHT AGGREGATE USED FOR ROCK SILL
WITH 30 FT BERM

SCALE : 1 INCH = 25 FEET  GEOTECHNICAL DATA FILE : 10-3006.7B  PLOT DATA FILE : 10-3006.7B-PLT  DIRECTORY : C:\ULWEDGE

Figure 10




CASE 1
LaBranche West
Sill Dike
Top at Elev. +2.5
Typical Rock, unit weight of 132 pcf

| STRATUM NUMBER | SOIL TYPE | UNIT WEIGHT (POUNDS PER CUBIC FOOT) | UNIT COHESION (POUNDS PER SQUARE FOOT) | | FRICTION ANGLE (DEGREES) |
|---|---|---|---|---|---|
| | | | AVERAGE | BOTTOM OF STRATUM | |
| | | VERTICAL 1 | VERTICAL 1 | VERTICAL 1 | |
| 1 | water | 63.0 | 0.0 | 0.0 | 0.0 |
| 2 | | 90.0 | 50.0 | 50.0 | 0.0 |
| 3 | rock | 132.0 | 0.0 | 0.0 | 40.0 |
| 4 | | 80.0 | 60.0 | 60.0 | 0.0 |
| 5 | | 100.0 | 100.0 | 100.0 | 0.0 |
| 6 | | 95.0 | 150.0 | 150.0 | 0.0 |
| 7 | | 95.0 | 200.0 | 200.0 | 0.0 |
| 8 | | 105.0 | 300.0 | 300.0 | 0.0 |
| 9 | | 120.0 | 1000.0 | 1000.0 | 0.0 |
| 10 | | 120.0 | 1000.0 | 1000.0 | 0.0 |

S.W.L. = SURFACE WATER LEVEL  H.U.P. = HYDROSTATIC UPLIFT PROFILE

| ASSUMED FAILURE SURFACE | | | RESISTING FORCES | | | DRIVING FORCES | | SUMMATION OF FORCES | | FACTOR OF SAFETY |
|---|---|---|---|---|---|---|---|---|---|---|
| NUMBER | | ELEVATION | $R_A$ | $R_B$ | $R_P$ | $D_A$ | $-D_P$ | RESISTING | DRIVING | |
| A | 1 | -18.00 | 2138 | 900 | 1800 | 19348 | 13283 | 4838 | 6065 | 0.80 |
| A | 2 | -18.00 | 2138 | 2100 | 1485 | 19348 | 13049 | 5723 | 6299 | 0.91 |
| B | 1 | -26.00 | 3662 | 2000 | 3145 | 35289 | 27945 | 8807 | 7344 | 1.20 |
| C | 1 | -33.00 | 5796 | 3750 | 5140 | 53794 | 45195 | 14686 | 8599 | 1.71 |
| D | 1 | -43.00 | 9820 | 7000 | 9140 | 88433 | 78181 | 25960 | 10252 | 2.53 |
| E | 1 | -53.00 | 15820 | 12000 | 15140 | 133201 | 121590 | 42960 | 11611 | 3.70 |
| F | 1 | -68.00 | 45820 | 50000 | 45140 | 221520 | 208043 | 140960 | 13477 | 10.46 |

$$\text{FACTOR OF SAFETY} = \frac{R_A + R_B + R_P}{D_A - D_P}$$

**ARDAMAN & ASSOCIATES, INC.**
Geotechnical, Environmental and Materials Consultants

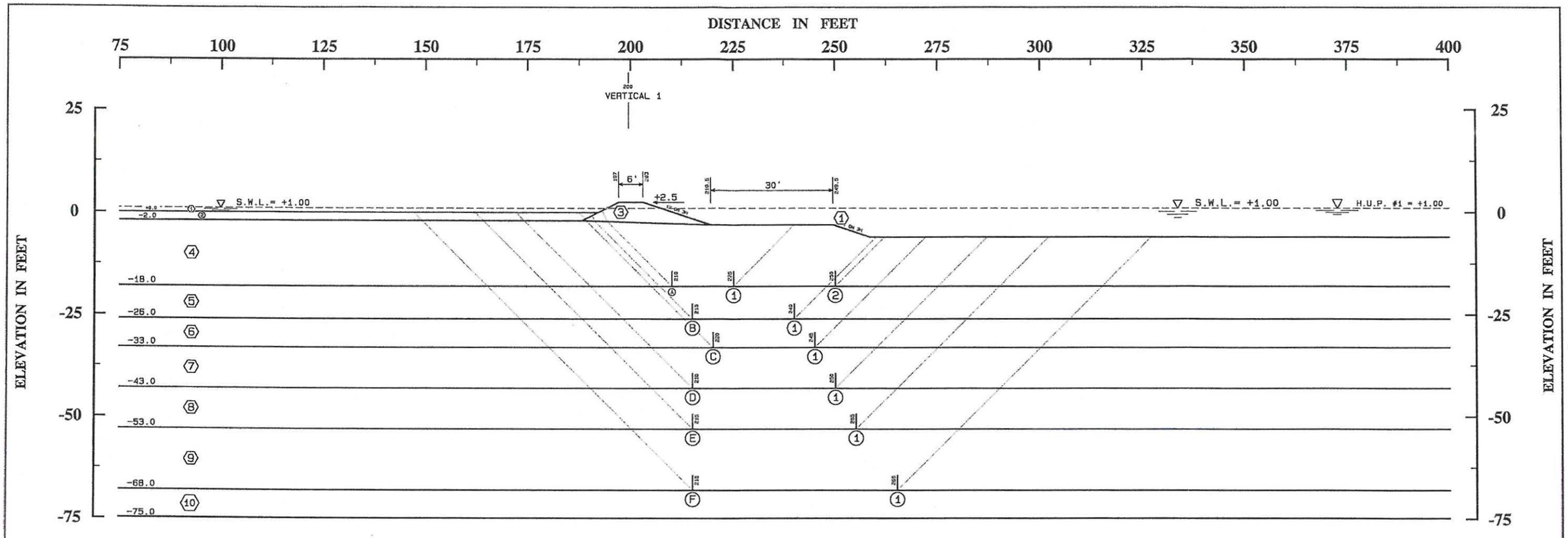
SLOPE STABILITY ANALYSIS

AAI PROJECT NO. 10-3006
ST. CHARLES PARISH
SHORELINE ENHANCEMENT PROJECT
SOUTH SHORE OF LAKE PONTCHARTRAIN
LABRANCHE EAST SHORELINE PROTECTION

TOP OF SILL DIKE AT +2.5 FT ELEVATION
ROCK USED FOR ROCK SILL
WITH 30 FT BERM

SCALE: 1 INCH = 25 FEET  GEOTECHNICAL DATA FILE: 10-3006.1C  PLOT DATA FILE: 10-3006.1C-PLT  DIRECTORY: CAULWEDGE

Figure 11




CASE 2
LaBranche West
Sill Dike
Top at Elev. +2.5
Lightweight Rock, unit weight of 100 pcf

| STRATUM NUMBER | SOIL TYPE | UNIT WEIGHT (POUNDS PER CUBIC FOOT) | UNIT COHESION (POUNDS PER SQUARE FOOT) AVERAGE | UNIT COHESION (POUNDS PER SQUARE FOOT) BOTTOM OF STRATUM | FRICTION ANGLE (DEGREES) |
|---|---|---|---|---|---|
| | | VERTICAL 1 | VERTICAL 1 | VERTICAL 1 | |
| 1 | water | 63.0 | 0.0 | 0.0 | 0.0 |
| 2 | | 90.0 | 50.0 | 50.0 | 0.0 |
| 3 | aggregate | 100.0 | 0.0 | 0.0 | 40.0 |
| 4 | | 80.0 | 60.0 | 60.0 | 0.0 |
| 5 | | 100.0 | 100.0 | 100.0 | 0.0 |
| 6 | | 95.0 | 150.0 | 150.0 | 0.0 |
| 7 | | 95.0 | 200.0 | 200.0 | 0.0 |
| 8 | | 105.0 | 300.0 | 300.0 | 0.0 |
| 9 | | 120.0 | 1000.0 | 1000.0 | 0.0 |
| 10 | | 120.0 | 1000.0 | 1000.0 | 0.0 |

S.W.L. :: SURFACE WATER LEVEL  H.U.P. :: HYDROSTATIC UPLIFT PROFILE

| ASSUMED FAILURE SURFACE | | | RESISTING FORCES | | | DRIVING FORCES | | SUMMATION OF FORCES | | FACTOR OF SAFETY |
|---|---|---|---|---|---|---|---|---|---|---|
| NUMBER | | ELEVATION | $R_A$ | $R_B$ | $R_P$ | $D_A$ | $-D_P$ | RESISTING | DRIVING | |
| A | 1 | -18.00 | 2028 | 900 | 1800 | 17030 | 13283 | 4728 | 3747 | 1.26 |
| A | 2 | -18.00 | 2028 | 2400 | 1440 | 17030 | 12800 | 5868 | 4230 | 1.39 |
| B | 1 | -26.00 | 3635 | 2500 | 3040 | 32493 | 27716 | 9175 | 4777 | 1.92 |
| C | 1 | -33.00 | 5793 | 3750 | 5140 | 50859 | 45195 | 14683 | 5664 | 2.59 |
| D | 1 | -43.00 | 9820 | 7000 | 9140 | 85728 | 78351 | 25960 | 7377 | 3.52 |
| E | 1 | -53.00 | 15820 | 12000 | 15140 | 130356 | 121590 | 42960 | 8766 | 4.90 |
| F | 1 | -68.00 | 45820 | 50000 | 45140 | 218674 | 208043 | 140960 | 10631 | 13.26 |

$$\text{FACTOR OF SAFETY} = \frac{R_A + R_B + R_P}{D_A - D_P}$$

**ARDAMAN & ASSOCIATES, INC.**
Geotechnical, Environmental and Materials Consultants

SLOPE STABILITY ANALYSIS

AAI PROJECT NO. 10-3006
ST. CHARLES PARISH
SHORELINE ENHANCEMENT PROJECT
SOUTH SHORE OF LAKE PONTCHARTRAIN
LABRANCHE EAST SHORELINE PROTECTION

TOP OF SILL DIKE AT +2.5 FT ELEVATION
LIGHT AGGREGATE USED FOR ROCK SILL
WITH 30 FT BERM

SCALE : 1 INCH = 25 FEET  GEOTECHNICAL DATA FILE : 10-3006.2A  PLOT DATA FILE : 10-3006.2A-PLT  DIRECTORY : C:\ULWEDGE

Figure 12

# APPENDIX

# BORING LOGS

# DESCRIPTION OF TERMS AND SYMBOLS USED ON SOIL BORING LOG

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Dry Unit Weight (pcf) | Atterberg Limits LL | PL | PI | Other | Soil Type | DESCRIPTION |

5

10

15

20

25

30

35

40

## Ground Water Levels

**Long-Term Depth**
Depth to water after boring is completed (time noted).

**Short-Term Depth**
Depth to water after initial water encountered prior to proceeding with boring (time noted).

**Initially Encountered**
Depth where free water was initially encountered during augering.

## Sampling/Field Data

3.5 (P) — **Undisturbed**
3" dia. Tube sample

**Pocket Penetrometer (P)**
Penetration resistance (tons/sq. ft.).

**Torvane (T)**
Shearing resistance (tons/sq. ft.)

13 b/f (3-7-6) — **Split Spoon**
Std. penetration test

**Std. Penetration**
No. of blows per foot (blows per each six inch increments).

**Auger**
Disturbed (auger) collected in accordance with ASTM D-1452.

**No Recovery**
Sampling attempted but no sample retrieved.

## DESCRIPTION

**Description**
Classifications are based on visual observations by field & lab representatives as well as results of laboratory data (when available).

### Laboratory Data

**Compressive Strength**
Value based on peak compressive strength. Determined by unconfined compression test unless otherwise noted.

**Dry Unit Weight**
As determined by method similar to ASTM D-2937.

**Water Content**
As determined by pertinent portions of ASTM D-2216.

**Atterberg Limits**
LL : Liquid Limit
PL : Plastic Limit
PI : Plasticity Index
(= Liquid Limit - Plastic Limit)

**Other**
Results of other tests such as consolidation, permeability, grain size or notes associated with testing program.

**Soil Type**
Graphical representation of soil type. In accordance with USCS Symbols.

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| | Boring Abandonment Method | |

Form LOGTERMS

Strata Boundaries May Not Be Exact

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-01

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/19/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

Location: Lat. 30° 2' 49.51"
Long. 90° 16' 48.17"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | Atterberg Limits PL | Atterberg Limits PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | | | | | | | | | | Very soft dark brown PEAT (Pt) |
| | | | 0.25 (P) | | 418 | | | | | | | | |
| | 5 | | 0.25 (P) | | | | | | | | | | |
| | | | 0.25 (P) | 0.12 | 290 | 78 | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 10 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.08 | 51 | 112 | | | | | | | Very soft gray CLAY (CH) with shell fragments |
| | 15 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 20 | | | | | | | | | | | | Boring completed at 20 ft. |
| | 25 | | | | | | | | | | | | |
| | 30 | | | | | | | | | | | | |
| | 35 | | | | | | | | | | | | |
| | 40 | | | | | | | | | | | | |
| | 45 | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 55 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 20 ft. | Boring drilled in Lake<br>Water depth =4.5 ft. |
| | **Boring Abandonment Method**<br>Borehole grouted with cement/ bentonite upon completion | |

Strata Boundaries May Not Be Exact

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-02

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/19/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

Location: Lat. 30° 2' 54"
Long. 90° 16' 56.45"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | PL | PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | | 837 | | | | | | | | Very soft dark brown PEAT (Pt) |
| | 5 | | 0.25 (P) | 0.05 | 719 | 70 | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 10 | | 0.25 (P) | 0.36 | 26 | 123 | 33 | 20 | 13 | | | | Soft gray SILTY CLAY (CL) |
| | 15 | | 0.25 (P) | | | | | | | | | | Very soft gray CLAY (CH) with some organic matter |
| | 20 | | 0.25 (P) | 0.12 | 80 | 96 | | | | | | | |
| | 25 | | 0.25 (P) | | | | | | | | | | |
| | 30 | | 0.25 (P) | 0.19 | 78 | 97 | 98 | 29 | 69 | | | | |
| | 35 | | 0.25 (P) | | | | | | | | | | |
| | 40 | | 0.25 (P) | 0.22 | 87 | 95 | | | | | | | |
| | 45 | | 2.0 (P) | | | | | | | | | | Stiff tan and gray CLAY (CH) |
| | 50 | | 2.0 (P) | | | | | | | | | | |
| | 55 | | 0.5 (P) | | | | | | | | | | Soft tan and gray SILTY CLAY (CL) with sand layers |
| | 60 | | 0.5 (P) | 0.42 | 23 | 124 | | | | | | | |

Boring completed at 60 ft.

**Ground Water Level Data**

Free water first encountered

**Boring Advancement Method**

3" Nom. Dia. Short Flight Auger: 0 to 10 ft.
3" Dia. Rotary Wash: 10 to 60 ft.

**Boring Abandonment Method**

Borehole grouted with cement/ bentonite upon completion

**Notes**

Boring drilled in Lake

Water depth = 4 ft.

Strata Boundaries May Not Be Exact

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-03

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/20/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

Location: Lat. 30° 2' 51.88" Long. 90° 17' 7.59"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | Atterberg Limits PL | Atterberg Limits PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | | | | | | | | | | Very soft dark brown PEAT (Pt) |
| | | | 0.25 (P) | 0.10 | 665 | 59 | | | | | | | |
| | 5 | | 0.25 (P) | | | | | | | | | | |
| | | | 0.25 (P) | 0.08 | 457 | 62 | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 10 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.10 | 54 | 100 | | | | | | | Very soft gray CLAY (CH) with some organic matter and silt |
| | 15 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 20 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.12 | 71 | 98 | 63 | 24 | 39 | | | | |
| | 25 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 30 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.17 | 75 | 104 | | | | | | | |
| | 35 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 40 | | | | | | | | | | | | Boring completed at 40 ft. |
| | 45 | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 55 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 40 ft. | Boring drilled in Lake<br>Water depth = 5.5 ft. |
| | **Boring Abandonment Method**<br>Borehole grouted with cement/ bentonite upon completion | |

Strata Boundaries May Not Be Exact

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-04

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/20/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

Location: Lat. 30° 2' 55.71"
Long. 90° 17' 17.07"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | Atterberg Limits PL | Atterberg Limits PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | | | | | | | | | | Very soft dark brown PEAT (Pt) |
| | | | 0.25 (P) | | 718 | | | | | | | | |
| | 5 | | 0.25 (P) | 0.05 | 761 | 66 | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | | | 0.25 (P) | 0.08 | 587 | 63 | | | | | | | |
| | 10 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.11 | 56 | 107 | | | | | | | Very soft gray CLAY (CH) |
| | 15 | | | | | | | | | | | | |
| | | | 0.25 (P) | | 62 | | | | | | | | |
| | 20 | | | | | | | | | | | | Boring completed at 20 ft. |
| | 25 | | | | | | | | | | | | |
| | 30 | | | | | | | | | | | | |
| | 35 | | | | | | | | | | | | |
| | 40 | | | | | | | | | | | | |
| | 45 | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 55 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 20 ft. | Boring drilled in Lake<br>Water depth = 4 ft. |
| | **Boring Abandonment Method**<br>Borehole grouted with cement/ bentonite upon completion | |

Strata Boundaries May Not Be Exact

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-05

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/22/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

Location: Lat. 30° 3' 0.72"
Long. 90° 17' 25.06"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | Atterberg Limits PL | Atterberg Limits PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | | | | | | | | | | Very soft dark brown PEAT (Pt) |
| | | | 0.25 (P) | 0.08 | 522 | 69 | | | | | | | |
| | 5 | | 0.25 (P) | | | | | | | | | | |
| | | | 0.25 (P) | 0.06 | 531 | 68 | | | | | | | |
| | 10 | | 0.25 (P) | | | | | | | | | | |
| | | | | | | | | | | | | | Very soft gray CLAY (CH) with some organic matter |
| | 15 | | 0.25 (P) | 0.11 | 69 | 100 | | | | | | | |
| | 20 | | 0.25 (P) | | | | | | | | | | |
| | 25 | | 0.25 (P) | 0.16 | 89 | 93 | 95 | 25 | 70 | | | | |
| | 30 | | 0.25 (P) | | | | | | | | | | |
| | 35 | | 0.25 (P) | 0.14 | 82 | 93 | | | | | | | |
| | 40 | | 0.25 (P) | | | | | | | | | | - with shell fragments |
| | 45 | | 0.5 (P) | 0.26 | 78 | 95 | 87 | 26 | 61 | | | | Soft gray CLAY (CH) with some organic matter and shell fragments |
| | 50 | | 0.5 (P) | | | | | | | | | | |
| | | | | | | | | | | | | | Stiff tan and gray CLAY (CH) |
| | 55 | | 1.25 (P) | 1.23 | 23 | 128 | | | | | | | |
| | 60 | | 1.5 (P) | | | | | | | | | | Boring completed at 60 ft. |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 60 ft. | Boring drilled in Lake<br>Water depth = 9 ft. |
| | **Boring Abandonment Method**<br>Borehole grouted with cement/ bentonite upon completion | |

Strata Boundaries May Not Be Exact

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-06

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/22/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

Location: Lat. 30° 3' 6.59"
Long. 90° 17' 33.02"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | PL | PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | 0.04 | 133 | 86 | | | | | | | Very soft dark brown PEAT (Pt) with shell fragments |
| | | | 0.25 (P) | | | | | | | | | | |
| | 5 | | 0.25 (P) | 0.06 | 383 | 67 | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | | | 0.25 (P) | 0.06 | 282 | 69 | | | | | | | |
| | 10 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | Very soft to soft gray CLAY (CH) with some organic matter |
| | 15 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.13 | 77 | 97 | | | | | | | |
| | 20 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 25 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.19 | 89 | 95 | | | | | | | |
| | 30 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | - with silt layer |
| | 35 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.30 | 85 | 96 | | | | | | | |
| | 40 | | | | | | | | | | | | - with shell fragments<br>Boring completed at 40 ft. |
| | 45 | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 55 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 40 ft. | Boring drilled in Lake<br>Water depth = 8 ft. |
| | **Boring Abandonment Method**<br>Borehole grouted with cement/ bentonite upon completion | |

Strata Boundaries May Not Be Exact

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-07

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/22/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

Location: Lat. 30° 3' 9.41"
Long. 90° 17' 42.86"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | PL | PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | | | | | | | | | | Very soft dark brown PEAT (Pt) |
| | | | 0.25 (P) | 0.05 | 582 | 66 | | | | | | | |
| | 5 | | 0.25 (P) | | | | | | | | | | Very soft gray CLAY (CH) with some organic matter and silt |
| | | | 0.25 (P) | 0.04 | 68 | 106 | | | | | | | |
| | 10 | | 0.25 (P) | | | | | | | | | | |
| | 15 | | 0.25 (P) | 0.11 | 75 | 98 | | | | | | | |
| | 20 | | 0.25 (P) | | | | | | | | | | Boring completed at 20 ft. |
| | 25 | | | | | | | | | | | | |
| | 30 | | | | | | | | | | | | |
| | 35 | | | | | | | | | | | | |
| | 40 | | | | | | | | | | | | |
| | 45 | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 55 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 20 ft. | Boring drilled in Lake<br>Water depth = 9 ft. |
| | **Boring Abandonment Method**<br>Borehole grouted with cement/ bentonite upon completion | |

Strata Boundaries May Not Be Exact

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-08

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/26/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

Location: Lat. 30° 3' 11.53"
Long. 90° 17' 53.73"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | Atterberg Limits PL | Atterberg Limits PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | 0.08 | 83 | 87 | | | | | | | Very soft dark brown CLAY (CH) with organic matter |
| | | | 0.25 (P) | | | | | | | | | | |
| | 5 | | 0.25 (P) | 0.06 | 78 | 98 | 76 | 42 | 34 | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | | | 0.25 (P) | 0.04 | 81 | 98 | | | | | | | Very soft gray CLAY (CH) |
| | 10 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 15 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.12 | 82 | 96 | 90 | 28 | 62 | | | | |
| | 20 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 25 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.19 | 82 | 98 | | | | | | | |
| | 30 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 35 | | | | | | | | | | | | |
| | | | 0.5 (P) | 0.44 | 54 | 106 | 70 | 19 | 51 | | | | Soft gray CLAY (CH) |
| | 40 | | | | | | | | | | | | |
| | | | 0.5 (P) | | | | | | | | | | |
| | 45 | | | | | | | | | | | | |
| | | | 1.0 (P) | 0.82 | 24 | 129 | | | | | | | Medium stiff to very sitff tan and gray CLAY (CH) |
| | 50 | | | | | | | | | | | | |
| | | | 1.5 (P) | | | | | | | | | | |
| | 55 | | | | | | | | | | | | |
| | | | 3.5 (P) | 4.19 | 24 | 125 | | | | | | | |
| | 60 | | | | | | | | | | | | Boring completed at 60 ft. |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 60 ft. | Boring drilled in Lake<br>Water depth = 8.5 ft. |
| | **Boring Abandonment Method**<br>Borehole grouted with cement/ bentonite upon completion | |

Strata Boundaries May Not Be Exact

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-09

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/26/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

Location: Lat. 30° 3' 13.68"
Long. 90° 18' 3.2"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | Atterberg Limits PL | Atterberg Limits PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | | | | | | | | | | Very soft dray gray ORGANIC CLAY (OH) with silt |
| | | | 0.25 (P) | 0.10 | 146 | 81 | | | | | | | |
| | 5 | | 0.25 (P) | | | | | | | | | | |
| | | | 0.25 (P) | | 62 | | | | | | | | Very soft gray CLAY (CH) with some organic matter |
| | | | 0.25 (P) | | | | | | | | | | |
| | 10 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.11 | 85 | 98 | | | | | | | |
| | 15 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | - with sand layers |
| | 20 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.18 | 85 | 95 | | | | | | | |
| | 25 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 30 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.20 | 78 | 96 | | | | | | | |
| | 35 | | | | | | | | | | | | |
| | | | 0.75 (P) | 0.33 | 52 | 105 | | | | | | | Soft gray CLAY (CH) |
| | 40 | | | | | | | | | | | | Boring completed at 40 ft. |
| | 45 | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 55 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 40 ft. | Boring drilled in Lake<br>Water depth = 8 ft. |
| | **Boring Abandonment Method**<br>Borehole grouted with cement/ bentonite upon completion | |

Strata Boundaries May Not Be Exact

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-10

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/26/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

Location: Lat. 30° 3' 15.61"
Long. 90° 18' 12.74"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | Atterberg Limits PL | Atterberg Limits PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | 0.04 | 632 | 68 | | | | | | | Very soft dark brown PEAT (Pt) |
| | | | 0.25 (P) | | | | | | | | | | |
| | 5 | | 0.25 (P) | 0.03 | 651 | 66 | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | Very soft dark gray ORGANIC CLAY (OH) |
| | 10 | | 0.25 (P) | 0.04 | 131 | 98 | | | | | | | |
| | 15 | | 0.25 (P) | 0.05 | 137 | 91 | | | | | | | |
| | 20 | | 0.25 (P) | | 113 | | | | | | | | |
| | | | | | | | | | | | | | Boring completed at 20 ft. |
| | 25 | | | | | | | | | | | | |
| | 30 | | | | | | | | | | | | |
| | 35 | | | | | | | | | | | | |
| | 40 | | | | | | | | | | | | |
| | 45 | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 55 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 20 ft. | Boring drilled in Lake<br>Water depth = 8 ft. |
| | **Boring Abandonment Method**<br>Borehole grouted with cement/ bentonite upon completion | |

Strata Boundaries May Not Be Exact

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-11

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/27/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

Location: Lat. 30° 3' 15.31"
Long. 90° 18' 22.02"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | Atterberg Limits PL | Atterberg Limits PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | | | | | | | | | | Very soft dark brown PEAT (Pt) |
| | | | 0.25 (P) | 0.04 | 677 | 69 | | | | | | | |
| | 5 | | 0.25 (P) | | | | | | | | | | |
| | | | 0.25 (P) | 0.07 | 113 | 89 | | | | | | | Very soft dark gray ORGANIC CLAY (OH) |
| | | | 0.25 (P) | | | | | | | | | | |
| | 10 | | | | | | | | | | | | |
| | | | | | | | | | | | | | Very soft gray CLAY (CH) with organic matter |
| | | | 0.25 (P) | 0.09 | 85 | 97 | | | | | | | |
| | 15 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 20 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.13 | 79 | 97 | | | | | | | |
| | 25 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 30 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.20 | 83 | 97 | | | | | | | |
| | 35 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 40 | | | | | | | | | | | | Boring completed at 40 ft. |
| | 45 | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 55 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 40 ft. | Boring drilled in Lake<br>Water depth = 9 ft. |
| | **Boring Abandonment Method** | |
| | Borehole grouted with cement/ bentonite upon completion | Strata Boundaries May Not Be Exact |

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-12

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/27/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

Location: Lat. 30° 3' 17.23"
Long. 90° 18' 31.2"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | Atterberg Limits PL | Atterberg Limits PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | | | | | | | | | | Very soft dark brown PEAT (Pt) |
| | | | 0.25 (P) | | | | | | | | | | |
| | 5 | | 0.25 (P) | 0.04 | 504 | 72 | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 10 | | 0.25 (P) | 0.05 | 389 | 69 | | | | | | | |
| | | | | | | | | | | | | | Very soft gray CLAY (CH) |
| | 15 | | 0.25 (P) | | | | | | | | | | |
| | 20 | | 0.25 (P) | 0.12 | 70 | 99 | | | | | | | |
| | 25 | | 0.25 (P) | | | | | | | | | | |
| | 30 | | 0.25 (P) | 0.23 | 77 | 97 | | | | | | | |
| | 35 | | 0.25 (P) | | | | | | | | | | |
| | 40 | | 0.25 (P) | 0.24 | 82 | 95 | | | | | | | |
| | | | | | | | | | | | | | Boring completed at 40 ft. |
| | 45 | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 55 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 40 ft. | Boring drilled in Lake<br>Water depth = 8 ft. |
| | **Boring Abandonment Method**<br>Borehole grouted with cement/ bentonite upon completion | |

Strata Boundaries May Not Be Exact

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-13

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/27/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

Location: Lat. 30° 3' 19.94"
Long. 90° 18' 41.27"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | Atterberg Limits PL | Atterberg Limits PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | | | | | | | | | | Very soft dark brown PEAT (Pt) |
| | | | 0.25 (P) | 0.05 | 427 | 71 | | | | | | | |
| | 5 | | 0.25 (P) | | | | | | | | | | |
| | | | 0.25 (P) | 0.03 | 234 | 71 | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | Very soft gray CLAY (CH) with some organic matter |
| | 10 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.10 | 73 | 97 | | | | | | | |
| | 15 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 20 | | | | | | | | | | | | Boring completed at 20 ft. |
| | 25 | | | | | | | | | | | | |
| | 30 | | | | | | | | | | | | |
| | 35 | | | | | | | | | | | | |
| | 40 | | | | | | | | | | | | |
| | 45 | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 55 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 20 ft. | Boring drilled in Lake<br>Water depth = 7.5 ft. |
| | **Boring Abandonment Method**<br>Borehole grouted with cement/ bentonite upon completion | |

Strata Boundaries May Not Be Exact

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-14

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/28/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

Location: Lat. 30° 3' 21.52"
Long. 90° 18' 50.79"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | PL | PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | 0.11 | 66 | 99 | | | | | | | Very soft gray CLAY (CH) with some organic matter |
| | | | 0.25 (P) | | | | | | | | | | |
| | 5 | | 0.25 (P) | | 74 | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | | | 0.25 (P) | 0.06 | 93 | 83 | 97 | 39 | 58 | | | | - with silt layers |
| | 10 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 15 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.21 | 76 | 97 | | | | | | | |
| | 20 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 25 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.26 | 85 | 95 | 100 | 29 | 71 | | | | - with shell fragments |
| | 30 | | | | | | | | | | | | |
| | | | 1.5 (P) | | | | | | | | | | Stiff tan and gray CLAY (CH) |
| | 35 | | | | | | | | | | | | |
| | | | 1.5 (P) | 2.03 | 37 | 120 | | | | | | | |
| | 40 | | | | | | | | | | | | |
| | | | 1.5 (P) | | | | | | | | | | |
| | 45 | | | | | | | | | | | | |
| | | | 1.5 (P) | 1.36 | 39 | 120 | | | | | | | - with sand seams |
| | 50 | | | | | | | | | | | | |
| | | | 1.5 (P) | 1.57 | 30 | 118 | | | | | | | - with sand seams |
| | 55 | | | | | | | | | | | | |
| | | | 1.5 (P) | | 32 | | | | | | | | |
| | 60 | | | | | | | | | | | | Boring completed at 60 ft. |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 60 ft. | Boring drilled in Lake<br>Water depth = 8 ft. |
| | **Boring Abandonment Method**<br>Borehole grouted with cement/ bentonite upon completion | |

Strata Boundaries May Not Be Exact

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-15

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/28/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

Location: Lat. 30° 3' 18.25"
Long. 90° 19' 6.58"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | PL | PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | | | | | | | | | | Very soft to soft gray CLAY (CH) with some organic matter |
| | | | 0.25 (P) | 0.05 | 92 | 96 | | | | | | | |
| | 5 | | 0.25 (P) | | | | | | | | | | - with silt layers |
| | | | 0.25 (P) | 0.08 | 81 | 94 | | | | | | | |
| | 10 | | 0.25 (P) | | | | | | | | | | |
| | 15 | | 0.25 (P) | 0.10 | 75 | 99 | | | | | | | |
| | 20 | | 0.25 (P) | | | | | | | | | | |
| | 25 | | 0.25 (P) | 0.20 | 79 | 97 | | | | | | | |
| | 30 | | 0.25 (P) | | | | | | | | | | |
| | 35 | | 0.25 (P) | 0.25 | 82 | 96 | | | | | | | |
| | 40 | | 0.25 (P) | | | | | | | | | | |
| | 45 | | | | | | | | | | | | Boring completed at 40 ft. |
| | 50 | | | | | | | | | | | | |
| | 55 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 40 ft. | Boring drilled in Lake<br>Water depth = 8 ft. |
| | **Boring Abandonment Method**<br>Borehole grouted with cement/ bentonite upon completion | |

Strata Boundaries May Not Be Exact

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-16

Ardaman & Associates, Inc.

Sheet 1 of 1

| | |
|---|---|
| File: | 10-3006 |
| Date: | 2/28/10 |
| Logged by: | P. Augustine |
| Driller: | Amdrill/Ardaman |
| Rig: | Barge |

Location: Lat. 30° 3' 15.77"
Long. 90° 19' 19.84"

Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | Atterberg Limits PL | Atterberg Limits PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | | | | | | | | | | Very soft dark brown PEAT (Pt) |
| | | | 0.25 (P) | | | | | | | | | | |
| | 5 | | 0.25 (P) | 0.04 | 663 | 64 | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 10 | | 0.25 (P) | 0.04 | 591 | 73 | | | | | | | |
| | | | | | | | | | | | | | Very soft gray clay with some organic matter |
| | 15 | | 0.25 (P) | | | | | | | | | | |
| | 20 | | 0.25 (P) | 0.05 | 62 | 104 | | | | | | | |
| | | | | | | | | | | | | | Boring completed at 20 ft. |
| | 25 | | | | | | | | | | | | |
| | 30 | | | | | | | | | | | | |
| | 35 | | | | | | | | | | | | |
| | 40 | | | | | | | | | | | | |
| | 45 | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 55 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 20 ft. | Boring drilled in Lake<br>Water depth = 8 ft. |
| | **Boring Abandonment Method**<br>Borehole grouted with cement/ bentonite upon completion | |

Strata Boundaries May Not Be Exact

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-17

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/25/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

Location: Lat. 30° 3' 26.25"
Long. 90° 21' 42.27"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | PL | PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | | | | | | | | | | Very soft gray CLAY (CH) with silt layers |
| | | | 0.25 (P) | 0.18 | 39 | 117 | 56 | 25 | 31 | | | | |
| | 5 | | 0.25 (P) | | | | | | | | | | |
| | | | 0.25 (P) | 0.08 | 49 | 109 | 44 | 27 | 17 | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 10 | | | | | | | | | | | | |
| | | | 0.25 (P) | | 79 | | | | | | | | Very soft to soft gray CLAY (CH) with some organic matter |
| | 15 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.24 | 64 | 106 | | | | | | | |
| | 20 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.08 | 67 | 108 | | | | | | | |
| | 25 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 30 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.41 | 57 | 108 | | | | | | | |
| | 35 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 40 | | | | | | | | | | | | Boring completed at 40 ft. |
| | 45 | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 55 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 40 ft. | Boring drilled in Lake<br>Water depth = 2 ft. |
| | **Boring Abandonment Method**<br>Borehole grouted with cement/ bentonite upon completion | |

Strata Boundaries May Not Be Exact

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-19

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/25/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

Location: Lat. 30° 3' 24.75"
Long. 90° 22' 1.69"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | PL | PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | | | | | | | | | | Very loose gray CLAYEY SILT (ML) |
| | | | 0.25 (P) | 0.20 | 29 | 108 | 36 | NP | 36 | | | | |
| | 5 | | 0.25 (P) | | | | | | | | | | Very soft gray SILTY CLAY (CH) |
| | | | 0.25 (P) | 0.12 | 49 | 110 | 48 | 27 | 21 | | | | |
| | | | 0.25 (P) | | | | | | | | | | Very soft gray CLAY (CH) with sand seams |
| | 10 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.22 | 52 | 107 | | | | | | | |
| | 15 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 20 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.30 | 62 | 103 | | | | | | | Soft gray CLAY (CH) with shell fragments |
| | 25 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 30 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.33 | 59 | 103 | 69 | 22 | 47 | | | | |
| | 35 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 40 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.28 | 66 | 99 | | | | | | | |
| | 45 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | | | 0.25 (P) | 0.43 | 65 | 100 | | | | | | | |
| | 55 | | | | | | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 60 | | | | | | | | | | | | Boring completed at 60 ft. |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 60 ft. | Boring drilled in Lake<br>Water depth = 2 ft. |
| | **Boring Abandonment Method** | |
| | Borehole grouted with cement/ bentonite upon completion | Strata Boundaries May Not Be Exact |

St. Charles Parish Shoreline Enhancement Project
South Shore of Lake Pontchartrain / Labranche West
St. Charles Parish, Louisiana
Moffatt & Nichol
Baton Rouge, LA

# LOG OF SOIL BORING B-20

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 10-3006
Date: 2/25/10
Logged by: P. Augustine
Driller: Amdrill/Ardaman
Rig: Barge

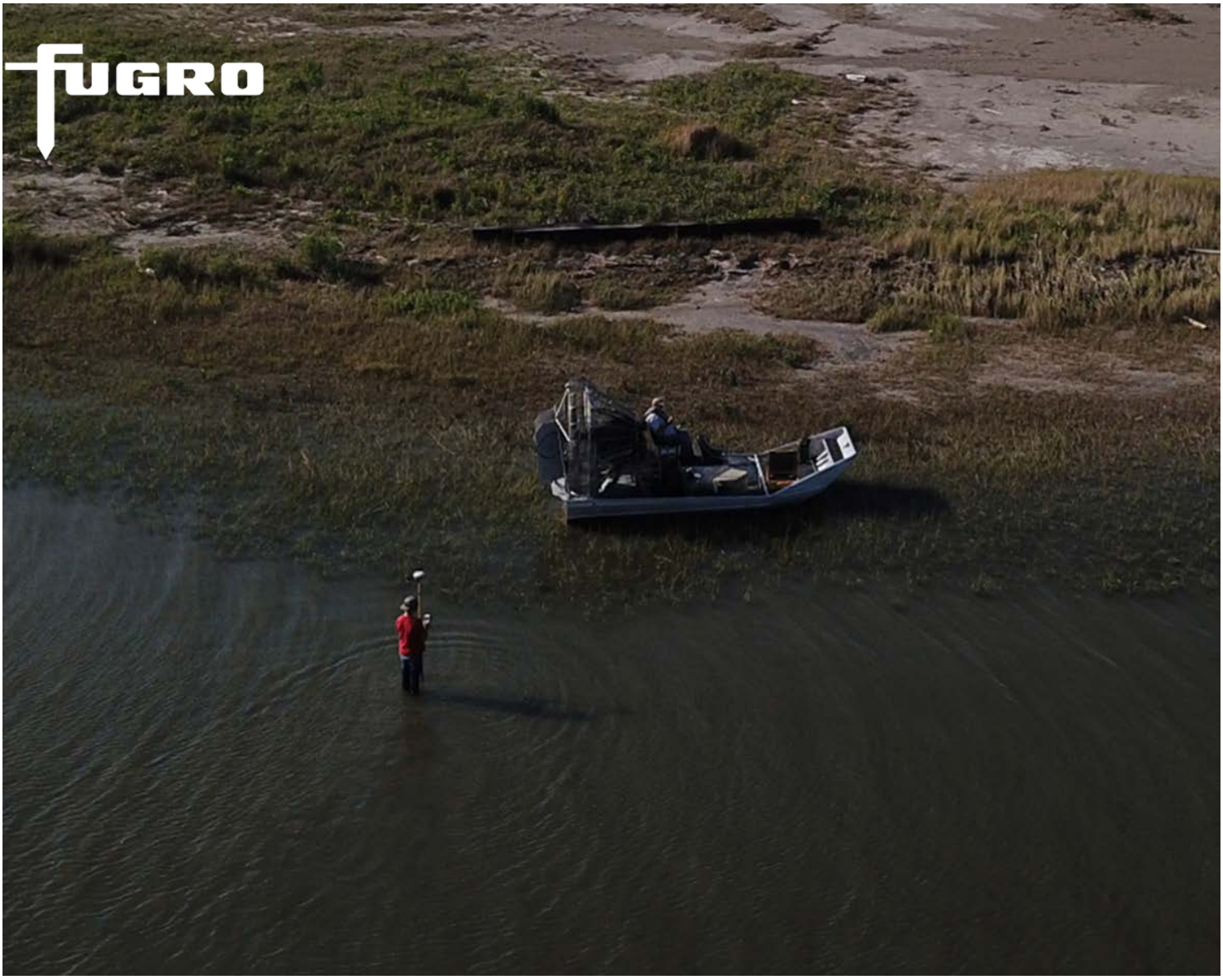
Location: Lat. 30° 3' 27.5"
Long. 90° 22' 11.11"
Surface Elevation:

| FIELD DATA | | | | LABORATORY DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water Level | Depth (feet) | Samples | Field Test Results | Compressive Strength (tsf) | Water Content (%) | Wet Unit Weight (pcf) | Atterberg Limits LL | PL | PI | Percent Passing #200 Sieve | Organic Content (%) | Soil Type | Description |
| | | | 0.25 (P) | 0.20 | 40 | 116 | | | | | | | Very soft gray SANDY CLAY (CL) |
| | | | 0.25 (P) | | | | | | | | | | Very soft gray CLAY (CH) with some organic matter |
| | 5 | | 0.25 (P) | 0.09 | 56 | 104 | | | | | | | |
| | | | 0.25 (P) | | | | | | | | | | |
| | 10 | | | | | | | | | | | | |
| | 15 | | 0.25 (P) | 0.06 | 77 | 99 | | | | | | | |
| | 20 | | 0.25 (P) | | | | | | | | | | |
| | 25 | | 0.25 (P) | 0.03 | 67 | 98 | | | | | | | |
| | 30 | | 0.25 (P) | | | | | | | | | | |
| | 35 | | 0.25 (P) | 0.07 | 82 | 95 | | | | | | | |
| | 40 | | 0.25 (P) | | | | | | | | | | Boring completed at 40 ft. |
| | 45 | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 55 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |

| Ground Water Level Data | Boring Advancement Method | Notes |
|---|---|---|
| Free water first encountered | 3" Nom. Dia. Short Flight Auger: 0 to 10 ft.<br>3" Dia. Rotary Wash: 10 to 40 ft. | Boring drilled in Lake<br>Water depth = 2 ft. |
| | **Boring Abandonment Method**<br>Borehole grouted with cement/ bentonite upon completion | |

Strata Boundaries May Not Be Exact

# APPENDIX G: DESIGN SURVEY INFORMATION




# LaBranche Shoreline Protection Survey

St. Charles Parish, Louisiana

21.00199193 02 | February 10, 2022

Report

**Moffatt and Nichol**

moffatt & nichol

## Document Information

| | |
|---|---|
| Project Title | CPRA CS-87 |
| Document Title | LaBranche Shoreline Protection Survey |
| Fugro Project No. | 04.00199193 |
| Fugro Document No. | 21.00199193 |
| Issue Number | 02 |
| Issue Status | Report |
| Fugro Legal Entity | Fugro USA Land, Inc. |
| Issuing Office Address | 226 Dulles Drive, Lafayette, LA 70506 |

## Client Information

| | |
|---|---|
| Client | Moffatt and Nichol |
| Client Address | 601 Poydras Street Suite 1860 New Orleans, LA 70130 |
| Client Contact | L. Chris Williams |

## Revision History

| Issue | Date | Status | Comments on Content | Prepared By | Checked By | Approved By |
|---|---|---|---|---|---|---|
| Draft | 02/10/2022 | For Review | Awaiting client comments | TJH | GS | GS |

## Project Team

| Initials | Name | Role |
|---|---|---|
| TJH | Tyler Hebert, PG | Geoscientist |
| JRG | Jason Granger | Project Surveyor |
| DLC | David Cormier, PLS | Professional Land Surveyor |
| GS | Greg Spiller, MBA, PE | Project Manager |
| FJO | Faron Olivier | QHSSE Advisor |

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# Abbreviations

| | |
|---|---|
| ARP | Antenna Reference Point |
| CORS | Continuously Operating Reference Stations |
| CPRA | Coastal Protection and Restoration Authority |
| Fugro | Fugro USA Land, Inc. |
| GNSS | Global Navigation Satellite System |
| GPS | Global Positioning System |
| LCZ | Louisiana Coastal Zone |
| PLS | Professional Land Surveyor |
| PNEZD | Point, Northing, Easting, Elevation, Description |
| PPE | Personal Protective Equipment |
| QHSSE | Quality, Health, Safety, Security, Environmental |
| RTK | Real-Time Kinematic |
| TBC | Trimble Business Center |

# 1. Executive Summary

Moffatt and Nichol has contracted Fugro for surveying services to support the LaBranche Shoreline Protection Project located in St. Charles Parish, Louisiana.

As an experienced contractor, Fugro provides integrated survey services and employs imaginative approaches to data acquisition, analysis, and project delivery.

Moffatt and Nichol required survey support for the RTK, LiDAR, magnetometer, and bathymetry survey to be used to inform the design of the shoreline protection features.

The survey commenced on October 12, 2021, and the data collection was completed on November 2, 2021. The following report details the methodology and results of the survey.

The topographic/bathymetric survey data has been processed and compiled for submission in the following formats.

- Bathymetric points file (.xyz format)
- Magnetometer Anomalies (.csv format)
- LiDAR points file (class two .las file)

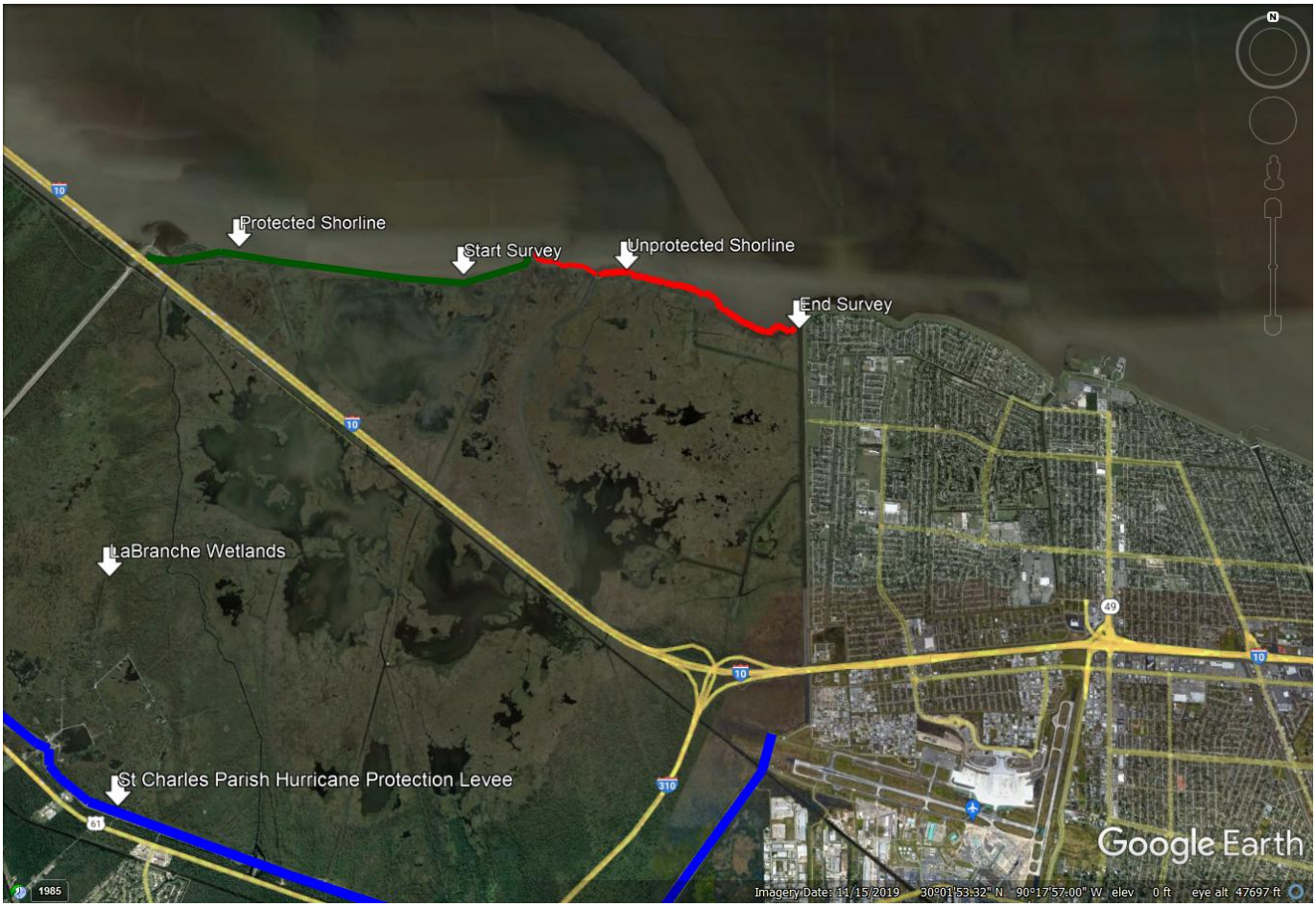
The following can be found in the appendix of this document.

- Appendix A: Drawings
- Appendix B: Field Notes
- Appendix C: GPS Logs
- Appendix D: OPUS Solutions
- Appendix E: JSA

# 2. Project Overview

## 2.1 Project Location

The project is located on the eastern edge of St. Charles Parish, Louisiana along the southern end of Lake Pontchartrain. This project covers the protected shoreline along the marsh edge.




The image above shows the survey area as indicated by the start and end survey arrows in the client provided image.

## 2.2 Project Tasks

Fugro was contracted to support the LaBranche Shoreline Protection Project. An RTK survey was conducted to get accurate horizontal and vertical measurements of the protection structure. A nearshore bathymetric and geophysical survey was also collected across the survey area to provide water depths across the survey area as well as to find any infrastructure/ferrous objects that could impact future operations at the site. Finally, a drone-based LiDAR system was also utilized to capture point cloud data in shoreline areas to supplement the bathymetric data collection, as well as to capture the top of the protection structure.

- RTK Survey: Fugro collected RTK data in open water environments as well as on top of the existing protection structure.
- Bathymetric and Magnetometer Survey: Provide accurate water depths across the survey and to find any ferrous infrastructure/debris in the area.
- LiDAR Survey: Capture the top of the protection structure and supplement the bathymetric dataset.

# 3. Survey Methodology

## 3.1 Survey Control

Fugro completed the RTK survey using the PM028-SM-02 and set a single local Temporary Benchmark (TBM) consisting of a MAG nail used as survey control. Upon arrival at the jobsite the crew established the temporary control point 100 using VRS CORS and further collecting static GNSS sessions over the TBM for verification. Data collected during the static sessions was processed using the OPUS system for confirmation of accuracy and data integrity. The coordinates for control point 100 and PM028-SM-02 used for this project are listed in Table 2.

Table 1: Project Coordinate System

| Horizontal Datum | Vertical Datum | Geoid Model(s) | Projection | Units |
|---|---|---|---|---|
| NAD83 | NAVD88 | Geoid12B | Louisiana South Zone 1702 | US Survey Feet |

Table 2: Project Control

| Control Point | Northing (Feet) | Easting (Feet) | Elevation (Feet) | Description |
|---|---|---|---|---|
| PM028-SM-02 | 564910.749 | 3604504.858 | 2.428 | DEEP ROD |
| 100 | 564412.739 | 3614392.550 | 3.368 | RE-BAR W/ CAP |

## 3.2 RTK Topographic and Ground Truthing Survey

The topographic survey data was collected between October 12th and November 2, 2021, in support of this project. These observations include water bottoms, natural grounds, and water surface shots. Detailed field notes from the topographic survey are available in Appendix A. Topographic data collected during the survey was post-processed, and these data points were assembled into various .xlsx files and deliverables.

## 3.3 Bathymetric Survey

A single-beam bathymetric survey was conducted along transects going from deeper water in the lake to the shoreline. Fugro had specific instructions to not touch the shoreline, therefore, the bathymetric survey was stopped before reaching the shoreline.

The crew used a 17-foot skiff for the bathymetric survey. The ODOM single-beam bathymetric surveying system was positioned using Real-Time Kinematic (RTK) solution determined using GNSS baselines held to the project TBM. The positioning system accounted for tidal fluctuations and vessel motion. A final, confident representation of the water bottom was exported in Easting, Northing, Elevation (XYZ) format.

## 3.4 Magnetometer Survey

Fugro performed a magnetometer survey to identify the locations of ferrous debris and plausible pipelines that may impact future project operations within the survey area. Magnetometer data was collected using a Geometrics G-858 land magnetometer. The surveying system was positioned using Real-Time Kinematic (RTK) solution determined using GNSS baselines held to the project TBM. All positioning and magnetometer data was recorded using the Hypack hydrographic and navigation software suite.

## 3.5 Drone Based LiDAR Survey

Fugro has developed an efficient and accurate method of collecting lidar data with the use of the Microdrones mdLidar1000. This fully integrated Drone, camera, and lidar system collects data along predetermined flight lines that are designed in the flight planning software (mdCockpit). mdCockpit is built specifically for this drone and sensor package to obtain maximum coverage and provide real time data analytics back to the remote pilot to maintain safety and efficiency in the field.

A GPS base station was set up at the beginning of the project each day and was set to collect GPS observations at 1 second intervals for the entire survey. This GPS base station data was then post-processed through a GPS network adjustment, this process ensures centimeter level accuracy of the base station position at precise time intervals throughout the survey. This precise survey data is a critical component in the processing of the Lidar data for maximum accuracy.

Fugro utilizes the Applanix PosPac software suite to process and analyse the collected flight position data. Fugro analyses the drone data for multiple X,Y,Z, Timing errors and anomalies as a QC check before post-processing the flight trajectory. The post-processing is accomplished by providing the software with the raw lidar data files and the precise GPS base station file. The base station GPS time, position “fix”, and the drone’s onboard Inertial Measurement Unit (IMU) provide the software with the information required to output a Smoothed Best Estimate of Trajectory (SBET) of the entire collection period of the drone flight. The SBET is the final product of the PosPac software.

Microdrones mdLIDAR processing software was used to create the final .las files of the lidar data processing. The mdLIDAR software requires the input of the SBET and raw lidar files along with precise measurements of the lidar sensor’s boresight angles and lever arms to accurately position point cloud data in digital environments designed for Lidar data.

## 3.6 Equipment/Survey Systems

### 3.6.1 Trimble R12 RTK Surveying System

The Trimble R12 GNSS receiver delivers reliable, precise positioning in the most challenging surveying environments through the exploitation of the proprietary R-Track™ technology. This feature compensates for intermittent signal loss and enables extended precision operation throughout brief RTK correction signal interruption. The R12 receiver boasts a horizontal accuracy of 1 cm and a vertical accuracy of 2 cm when operating in kinematic mode.

### 3.6.2 Trimble Business Center (TBC) Software

Trimble TBC is a comprehensive software solution that streamlines the workflows for surveying and GIS deliverables. The software enables the user to create projects with a wide range of coordinate systems, post-process static GNSS data, adjust traverses, and complete networks. The capabilities of the software also extend from the planning phase through deliverable generation, enabling a seamless workflow that optimizes project efficiency.

### 3.6.3 Odom Singlebeam Echosounder

This instrument operates by projecting a pulse of acoustic energy into the water column at a repeated interval of up to 20 Hz. The receiver component of the sensor then “listens” for the echo returning from the water bottom, and calculates the range based on the time required for the pulse to leave and return to the sensor.

Data was post-processed in Hypack SBMax hydrographic editing software. Post-processed positioning data were applied during import. Sound velocity profiles, measured in-situ by the sound velocity probes, were applied to account for density variations in the water column that could affect the accuracy of acoustic ranging calculations. Instrument offsets relative to the GNSS antenna were included in the final calculation of each data point, along with any motion measured by the inertial sensor. The digital signal record was scrutinized during post-processing to verify bottom-tracking algorithms. Noise was excluded, and a confident rendering of the water bottom was exported.

### 3.6.4 Geometrics 858 Magnetometer

The G-858 MagMapper Magnetometer is a high-sensitivity, fast-sampling ‘walking’ cesium vapor magnetometer. Its console includes a graphical interface that’s easy to learn and makes survey design and data review simple and efficient. The G-858 provides various modes of operation to allow the user to custom design a survey grid for their particular needs or skip the grid entirely and use GPS. G-858 data acquisition offers either continuous or discrete station recording. The high sampling rate of the instrument in continuous mode allows the operator to survey an area quickly. A lightweight data acquisition package enables you to survey large areas without having to stop for rest. A wider search zone and measurement of the magnetic field gradient can be achieved by adding a second sensor. The

G-858's internal firmware has been streamlined to include those features important for UXO, archaeological, environmental, utility, and mineral exploration.

### 3.6.5 MicroDrone mdlidar 1000

Microdrones mdLiDAR1000 is a fully integrated small Unmanned Aerial System (sUAS) system designed for producing 3D point clouds optimized for land surveying, construction, oil & gas, and mining applications. By utilizing sUAS technology, Fugro has managed to safely and effectively reduce overall costs and time in the field as compared to traditional land survey crews. Microdrones and Fugro have developed an end-to-end LiDAR solution combining a drone, LiDAR payload, Applanix APX-15 IMU, Camera, and fully integrated software workflow to provide final point cloud data in standard ASPRS LAS format usable in any GIS or CAD software environment.

- Fugro Pilots are fully trained and hold current FAA Part 107 Remote Pilot Certificates.
- mdLiDAR1000 consistently provides a horizontal and vertical accuracy of 6 cm.

# 4. QHSSE

Fugro adhered to the implemented Quality, Occupational Health & Safety, and Environmental Management System to satisfy the needs of its customers, employees, all the shareholders and the community at large to continually improve performance of the company in the areas of Quality, Health, Safety, Security and Environment (QHSSE).

The QHSSE Management Systems implemented by Fugro comply with the requirements of the following recognized international standards:

ISO 9001:2015 ▪ ISO 14001:2015 ▪ ISO 45001:2018

The QHSSE strategy of Fugro is based on the following principles:

- Take responsibility for our own and each other's safety
- Plan our work to prevent unsafe situation
- Improve by learning from our experiences
- Suppliers and Subcontractors support our vision and principles
- We are all empowered to stop unsafe acts

Fugro also strives to prevent wasteful and inefficient operations, avoid damage to property and equipment, show respect for the environment, and, foremost, to protect the safety and well-being of all employees. Fugro employees will acquire all safety training as specified in the contract.

- The schedule of safety meetings and drills for this project will include but is not limited to
- Pre-job safety meetings
- Pre-job vessel health, safety, and environmental orientation
- Job Hazard Analysis
- Daily tailgate safety meetings prior to each day's operations
- When a new procedure or piece of equipment is introduced, including a written Task Risk Assessment
- Document a Near Miss accident or Injury

Fugro ensures compliance with all applicable rules, regulations, orders, standards and interpretations promulgated under the Occupational Safety and Health Act (1997) and all other applicable laws, ordinances, rules, regulations and orders of anybody having jurisdiction over safety and health of persons or property or the protection of same to protect them from injury, illness, damage or loss.

Fugro ensures that Personal Protective Equipment (PPE) will be utilized and maintained in accordance with the written PPE program. Training in the proper use, maintenance and inspection of PPE is provided to all Fugro employees prior to beginning work. Fugro will supply all required PPE required at the work site.

# 5. Contact Information

By use of these specific contact points, Fugro ensures quality control and prompt action with respect to all project-related issues.

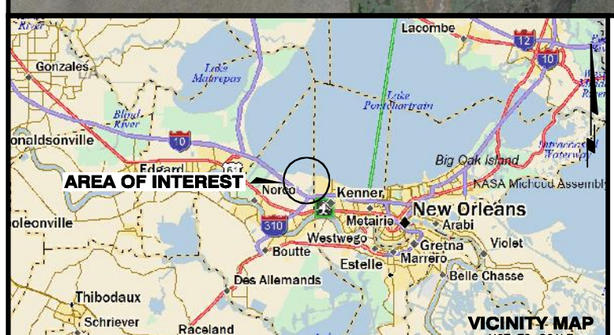
David Cormier, PLS: For all operational QA/QC issues related to positioning and land survey.

Table 2: Contact Information

| Fugro USA Land, Inc.<br>226 Dulles Drive<br>Lafayette, LA 70506 | | | |
|---|---|---|---|
| Project Manager | Greg Spiller, PE | 337.268.3336 | g.spiller@fugro.com |
| Technical and Business Development Manager | David Cormier, PLS | 337.268.3293 | d.cormier@fugro.com |

# Appendices

# Appendix A: Drawings




**LEGEND:**

- MAGNETOMETER TRACK LINE
- BATHYMETRY / MAGNETOMETER TRACK LINE

Proj. Mgr.: GS
Revised:
Printed: 2/10/22

# MOFFATT & NICHOL

## LABRANCHE SHORELINE PROTECTION PROJECT
## BATHYMETRY / MAGNETOMETER SURVEY

LAKE PONTCHARTRAIN

ST. CHARLES PARISH, LOUISIANA

FUGRO USA LAND, INC.
226 DULLES DR. SUITE 110 LAFAYETTE, LA 70506 (337) 237-1300 LA RPLS FIRM #VF.000079

GEODETIC DATUM: NAD83
PROJECTION: LOUISIANA SOUTH
GRID UNITS: US SURVEY FEET

SCALE IN FEET 0 1000'

Job No.: 04.00199193 | Date: 2/10/22 | Drwn: AXG | Chart: 1 Of: 4

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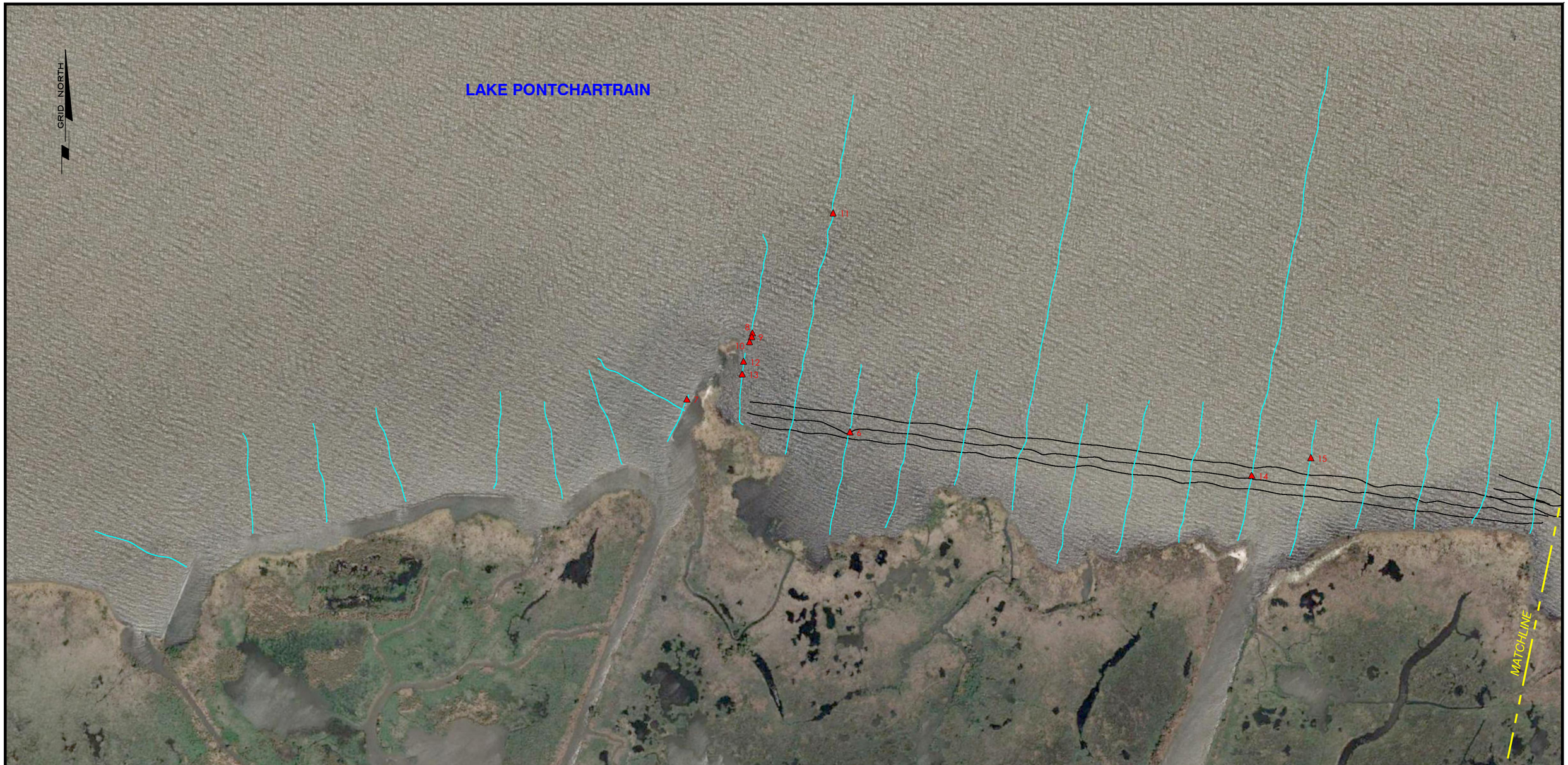


## UNIDENTIFIED MAGNETIC ANOMALIES

| ANOMALY NUMBER | X COORDINATE | Y COORDINATE | AMPLITUDE (GAMMAS) | DURATION (FEET) | SIGNATURE |
|---|---|---|---|---|---|
| 1 | 3,613,894.53' | 564,245.19' | 1002 | 21 | MONOPOLE |
| 2 | 3,614,275.96' | 564,140.60' | 2025 | 157 | MONOPOLE |
| 3 | 3,614,277.09' | 564,023.52' | 2559 | 252 | MONOPOLE |
| 4 | 3,613,665.91' | 563,936.74' | 478 | 50 | MONOPOLE |
| 5 | 3,614,034.07' | 563,935.04' | 473 | 17 | DIPOLE |
| 6 | 3,603,098.51' | 566,901.03' | 167 | 61 | MONOPOLE |
| 7 | 3,602,246.18' | 567,072.56' | 100 | 30 | MONOPOLE |
| 8 | 3,602,588.34' | 567,419.07' | 6398 | 47 | MONOPOLE |
| 9 | 3,602,584.72' | 567,398.61' | 1852 | 17 | MONOPOLE |
| 10 | 3,602,574.24' | 567,372.08' | 5806 | 17 | MONOPOLE |
| 11 | 3,603,010.39' | 568,045.99' | 4855 | 77 | MONOPOLE |
| 12 | 3,602,541.95' | 567,270.22' | 45334 | 45 | DIPOLE |
| 13 | 3,602,534.92' | 567,204.02' | 198 | 15 | DIPOLE |
| 14 | 3,605,199.54' | 566,673.63' | 67 | 56 | MONOPOLE |
| 15 | 3,605,508.57' | 566,766.52' | 265 | 89 | DIPOLE |
| 16 | 3,606,971.19' | 566,390.15' | 41 | 53 | MONOPOLE |
| 17 | 3,609,347.32' | 565,959.75' | 65 | 51 | MONOPOLE |
| 18 | 3,611,246.76' | 566,376.26' | 39 | 95 | MONOPOLE |
| 19 | 3,612,526.40' | 563,545.21' | 39 | 31 | MONOPOLE |
| 20 | 3,613,545.30' | 565,577.96' | 49 | 85 | MONOPOLE |
| 21 | 3,613,568.16' | 565,678.77' | 126 | 114 | MONOPOLE |
| 22 | 3,613,586.39' | 565,768.84' | 113 | 90 | MONOPOLE |
| 23 | 3,614,128.61' | 565,527.87' | 257 | 43 | MONOPOLE |
| 24 | 3,613,885.02' | 564,249.56' | 117 | 42 | MONOPOLE |
| 25 | 3,613,514.19' | 563,866.47' | 37 | 23 | DIPOLE |
| 26 | 3,613,555.53' | 564,121.03' | 17 | 46 | MONOPOLE |
| 27 | 3,613,565.96' | 564,165.62' | 16 | 47 | DIPOLE |
| 28 | 3,614,124.66' | 563,516.83' | 54 | 28 | MONOPOLE |
| 29 | 3,614,136.69' | 563,682.28' | 152 | 23 | MONOPOLE |
| 30 | 3,614,123.99' | 563,729.78' | 62 | 24 | DIPOLE |
| 31 | 3,614,120.68' | 563,751.87' | 48 | 18 | MONOPOLE |
| 32 | 3,614,119.97' | 563,775.87' | 57 | 29 | DIPOLE |
| 33 | 3,614,119.08' | 563,864.40' | 79 | 35 | MONOPOLE |
| 34 | 3,614,102.19' | 564,032.69' | 65 | 35 | MONOPOLE |
| 35 | 3,614,099.20' | 564,112.13' | 107 | 47 | DIPOLE |
| 36 | 3,614,192.09' | 563,813.87' | 331 | 119 | DIPOLE |
| 37 | 3,614,268.40' | 564,279.68' | 1476 | 209 | MONOPOLE |
| 38 | 3,614,271.94' | 563,796.62' | 1844 | 181 | MONOPOLE |
| 39 | 3,614,279.73' | 563,615.74' | 633 | 59 | DIPOLE |
| 40 | 3,614,279.20' | 563,502.71' | 1118 | 83 | MONOPOLE |

**LEGEND:**

- MAGNETOMETER TRACK LINE
- BATHYMETRY / MAGNETOMETER TRACK LINE
- ▲ 11 UNIDENTIFIED MAGNETIC ANOMALY

Proj. Mgr.: GS
Revised:
Printed: 2/10/22

**MOFFATT & NICHOL**

**LABRANCHE SHORELINE PROTECTION PROJECT**
**BATHYMETRY / MAGNETOMETER SURVEY**
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ST. CHARLES PARISH, LOUISIANA

FUGRO USA LAND, INC.
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GRID UNITS: US SURVEY FEET

SCALE IN FEET 0 500'

Job No.: 04.00199193 Date: 2/10/22 Drwn: AXG Chart: 2 Of: 4

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| 16 | 3,606,971.19' | 566,390.15' | 41 | 53 | MONOPOLE | 33 | 3,614,119.08' | 563,864.40' | 79 | 35 | MONOPOLE | | | | | | |
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Proj. Mgr.: GS
Revised:
Printed: 2/10/22

# MOFFATT & NICHOL

## LABRANCHE SHORELINE PROTECTION PROJECT
## BATHYMETRY / MAGNETOMETER SURVEY

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GEODETIC DATUM: NAD83
PROJECTION: LOUISIANA SOUTH
GRID UNITS: US SURVEY FEET

SCALE IN FEET 0 500'

Job No.: 04.00199193 | Date: 2/10/22 | Drwn: AXG | Chart: 3 Of: 4

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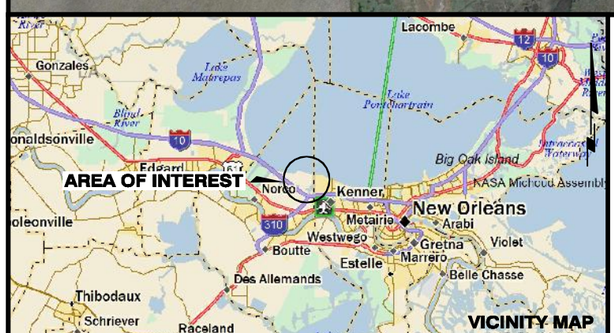


**LEGEND:**

LIDAR COVERAGE SURVEY

Proj. Mgr.: GS
Revised:
Printed: 2/10/22

# MOFFATT & NICHOL

## LABRANCHE SHORELINE PROTECTION PROJECT
## LIDAR COVERAGE SURVEY

LAKE PONTCHARTRAIN

ST. CHARLES PARISH, LOUISIANA

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GRID UNITS: US SURVEY FEET

SCALE IN FEET 0 1000'

Job No.: 04.00199193 | Date: 2/10/22 | Drwn: AXG | Chart: 4 Of: 4

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# Appendix B: Field Notes

T. Hebert
B. Wesh

10/12/202

Moffatt and Nichol
La Bourche Marsh Creation
04.00199193
Kenner, LA

NAD83
Geoid 12B
LA South 1702 ft

Rite in the Rain

| | |
|---|---|
| 0600 | Arrive @ office |
| | Troubleshoot equiptment |
| 0830 | Depart back shop |
| 1130 | Arrive @ boat Launch |
| 1300 | Launch boat |
| 1432 | START base @ Point 100 |
| 1443 | START base @ point 101 |
| 1518 | Begin magnetometer Survey |
| 1658 | End magnetometer Survey |
| 1800 | Arrive @ dock |
| 1830 | Arrive @ Lodging |

T. Hebert 10/13/2021

B. Wesh

Moffatt + Nichol

La Bourche Marsh Creation

04.00199193

Kenner, LA

NAD 83

Geoid 12B

LA South 1702 ft

Rite in the Rain.

| | |
|---|---|
| 0600 | Depart lodging |
| 0715 | Arrive @ Boat launch |
| 0925 | Start base @ point 100 |
| 0936 | Restart base @ point 100 |
| 0942 | Restart base @ point 100 |
| 0954 | Took 180 on point 101 |
| 1007 | Start magnetometer survey |
| 1601 | End magnetometer survey |
| 1610 | End base @ point 100 |
| 1700 | Arrive back @ boat launch |
| 1800 | Arrive @ lodging |

0600 Depart lodging
0715 Arrive @ boat launch
0900 waiting on Jason to arrive
waiting on weather
1112 Start base @ 100
Start SBE survey
1645 End SBE survey
1656 Shut down base @ 100



10-14-21

T. Hebert
J. Granger

Moffat + Nichol
La Bourche Marsh Creation
04.00199193
Kenner, LA
Jefferson Parish

π @ 100
N. 504412.74
E. 3614392.55
Elev 3.37
NAD 83 LA South Geoid 12B

Rite in the Rain

20,001 wB

20,000 wB

513,180 wB

↑ ↑

500,000 wB

↑

HR=6.562

T

4R=5.49



Rite in the Rain

0600 Depart lodging
0715 Arrive @ boat launch
0826 Start base @ 100
0838 begin survey
1018 end survey
1024 end base @ 100

10-15-21

T. Hebert
D. Granger

Moffat & Nichol
LaBourche Marsh Creation
04.00199193
Kenner, LA
St. Charles Parish

RC@100
N. 564412.74
E. 3614392.55
Elev 3.37
NAD 83 LA South Geoid 12B

Rite in the Rain

20,161 End video
↑ ↑
20,092 Begin video
20,091 Rock
↑ ↑
20,034 Rock
20,013 Gap
20,002 Gap
~~20,011~~
26,011 Rock
↑ ↑
20,004 Rock HR = 6.502
ΔN 0.07 ΔE 0.11 SD 0.13
20,003 Check @ P028 SM 02
20,002 ~~SKIPPED~~



Rite in the Rain

0600 ARRIVE AT OFFICE / LOAD EQUIP
0630 LEAVE OFFICE / E/R TO JOBSITE
0930 ARRIVE AT JOBSITE / JHA
0940 STANDBY - WAITING FOR BOAT
1045 BOAT ARRIVES / LOAD BOAT
1120 LAUNCH BOAT / E/R TO JOBSITE
1230 ARRIVE AT JOBSITE / SETUP BASE
1236 START STATIC - 15 INTERVAL
1730 END STATIC / TEAR DOWN
1735 LEAVE SITE / E/R TO DOCK
1800 ARRIVE AT DOCK / UNLOAD EQUIP
1820 LEAVE DOCK / E/R TO OFFICE
2100 ARRIVE AT OFFICE / DOWNLOAD

BASE @ 100- MON
N- 564412.739
E- 3614392.550
EL- 3.368



11/1/21
SUNNY 79°
MON

J. PATTON
R. BERTUCCI

MOFFAT & NICHOL
CCW MARSH CREATION
KENNER, LA
04.00199193

NAD83 / LA SOUTH
JPP-305. 2021-04.00199193

Rite in the Rain

1000 - CHK

H- 0.05

V- 0.04

0600 ARRIVE AT OFFICE/LOAD EQUIP
0620 LEAVE OFFICE/E/R TO JOBSITE
0845 ARRIVE AT JOBSITE/JHA
0900 LOAD BOAT AT DOCK
0910 LEAVE DOCK/E/R TO JOBSITE
0925 ARRIVE/SETUP BASE
0936 START STATIC
1313 END STATIC/TEAR DOWN BASE
1330 LEAVE JOBSITE/E/R TO DOCK
1400 ARRIVE AT DOCK/LOAD EQUIP
1430 LEAVE DOCK/E/R TO OFFICE
1600 ARRIVE AT OFFICE/DOWNLOAD

BASE@ 100 - MON
N- 564412.739
E- 3614392.550
EL- 3.368



11/2/21
SUNNY 70°
TUE

MOFFAT & NICHOL
KCW MARSH CREATION
KENNER, LA
04.0199193

NAD83/LA SOUTH
JPP_306-2021_04.00199193

# Appendix C: GPS Logs

USE THIS FORM IF USING FIXED HEIGHT TRIPODS TO DOCUMENT STATIC SURVEYS ON BASE POINTS FOR ALL RTK SURVEYS

# GPS LOG SHEET

| | | | | | |
|---|---|---|---|---|---|
| Job No. | 04.00197398 | Date | 10/13/2021 | Operator | T. Hebert |
| Client | Moffatt and Nichol | Job Description | TOPO/SBE/MAG | | |
| Location | Kenner, LA | | | Proj. Mgr. | G. Spiller |

## SESSION INFO

| | 4 Characters | | 3 Characters | | 1 Character |
|---|---|---|---|---|---|
| **File Name** | 1304 | **Julian Date** | 286 | **Session No.** | 4 |

| | | | |
|---|---|---|---|
| **Long Name** | 100 | | |
| **Mon. Description** | REBAR | | |
| **Rec. Base Type** | R12 | **Rec Serial #** | |
| **Base Ant Type** | R12i | **Base Ant Ser #** | |
| **Rover Ant Type** | | **Rover Ant Ser #** | |

Antenna Height Measurement is **TRUE VERTICAL** to the Bottom of Antenna Mount if Using Fixed Hgt Tripod

Fixed Hgt 2 Meter Tripod 6.562 **Mtrs or Ft**

Tripod Number

| | | | | | |
|---|---|---|---|---|---|
| Actual Start Time | 9:42 | Actual Stop Time | 16:10 | Session Time (Min 2:01 Hr) | 6:28 |

**BASE STATION INFORMATION**

| | *NAD 83 or NAD 27* | | ***Example**: LA South Zone or TX South Central Zone* |
|---|---|---|---|
| **DATUM** | NAD 83 | **ZONE** | **LA South** |
| Northing/Lat | | **Coordinate Origin**-*Where did you get your positions?* | |
| Easting/Long. | | here point | |
| Elevation | | | |

**Note any power problems, obstructions, weather issues, etc.**

N/A

ALL WHITE BOXES MUST BE FILLED IN WITH INFORMATION. A MINIMUM OBSERVATION OF 2 HOURS IS REQUIRED TO DETERMINE THE 3-D POSITION OF AN UNKNOWN POINT USING NGS-OPUS

**USE BACK OF THIS SHEET TO MAKE STATION SKETCH, REFERENCE TIES & DESCRIPTION**

USE THIS FORM IF USING FIXED HEIGHT TRIPODS TO DOCUMENT STATIC SURVEYS ON BASE POINTS FOR ALL RTK SURVEYS

# GPS LOG SHEET

| | | | | | |
|---|---|---|---|---|---|
| Job No. | 04.00197398 | Date | 10/14/2021 | Operator | T. Hebert |
| Client | Moffatt and Nichol | Job Description | TOPO/SBE/MAG | | |
| Location | Kenner, LA | | | Proj. Mgr. | G. Spiller |

## SESSION INFO

| | 4 Characters | | 3 Characters | | 1 Character |
|---|---|---|---|---|---|
| **File Name** | 1304 | **Julian Date** | 286 | **Session No.** | 0 |

| | | | |
|---|---|---|---|
| **Long Name** | 100 | | |
| **Mon. Description** | REBAR | | |
| **Rec. Base Type** | R12 | **Rec Serial #** | |
| **Base Ant Type** | R12i | **Base Ant Ser #** | |
| **Rover Ant Type** | | **Rover Ant Ser #** | |

Antenna Height Measurement is **TRUE VERTICAL** to the Bottom of Antenna Mount if Using Fixed Hgt Tripod

Fixed Hgt 2 Meter Tripod 6.562 **Mtrs or Ft**

Tripod Number

| | | | | | |
|---|---|---|---|---|---|
| Actual Start Time | 11:12 | Actual Stop Time | 16:56 | Session Time (Min 2:01 Hr) | 5:44 |

**BASE STATION INFORMATION**

| | *NAD 83 or NAD 27* | | ***Example**: LA South Zone or TX South Central Zone* |
|---|---|---|---|
| **DATUM** | NAD 83 | **ZONE** | **LA South** |
| Northing/Lat | 564412.74 | | |
| Easting/Long. | 3614392.55 | **Coordinate Origin**-*Where did you get your positions?* | PM |
| Elevation | 3.37 | | |

**Note any power problems, obstructions, weather issues, etc.**

N/A

ALL WHITE BOXES MUST BE FILLED IN WITH INFORMATION. A MINIMUM OBSERVATION OF 2 HOURS IS REQUIRED TO DETERMINE THE 3-D POSITION OF AN UNKNOWN POINT USING NGS-OPUS

**USE BACK OF THIS SHEET TO MAKE STATION SKETCH, REFERENCE TIES & DESCRIPTION**

USE THIS FORM IF USING FIXED HEIGHT TRIPODS TO DOCUMENT STATIC SURVEYS ON BASE POINTS FOR ALL RTK SURVEYS

# GPS LOG SHEET

| | | | | | |
|---|---|---|---|---|---|
| Job No. | 04.00199193 | Date | 10/15/2021 | Operator | T. Hebert |
| Client | Moffatt and Nichol | Job Description | TOPO/SBE/MAG | | |
| Location | Kenner, LA | | | Proj. Mgr. | G. Spiller |

## SESSION INFO

| | 4 Characters | | 3 Characters | | 1 Character |
|---|---|---|---|---|---|
| **File Name** | 1304 | **Julian Date** | 286 | **Session No.** | 0 |

| | | | |
|---|---|---|---|
| **Long Name** | 100 | | |
| **Mon. Description** | REBAR | | |
| **Rec. Base Type** | R12 | **Rec Serial #** | |
| **Base Ant Type** | R12i | **Base Ant Ser #** | |
| **Rover Ant Type** | | **Rover Ant Ser #** | |

Antenna Height Measurement is **TRUE VERTICAL** to the Bottom of Antenna Mount if Using Fixed Hgt Tripod

Fixed Hgt 2 Meter Tripod 6.562 **Mtrs or Ft**

Tripod Number

| | | | | | |
|---|---|---|---|---|---|
| Actual Start Time | 8:26 | Actual Stop Time | 10:26 | Session Time (Min 2:01 Hr) | 2:00 |

**BASE STATION INFORMATION**

| | *NAD 83 or NAD 27* | | ***Example**: LA South Zone or TX South Central Zone* |
|---|---|---|---|
| **DATUM** | NAD 83 | **ZONE** | **LA South** |
| Northing/Lat | 564412.74 | | |
| Easting/Long. | 3614392.55 | **Coordinate Origin**-*Where did you get your positions?* | PM |
| Elevation | 3.37 | | |

**Note any power problems, obstructions, weather issues, etc.**

N/A

ALL WHITE BOXES MUST BE FILLED IN WITH INFORMATION. A MINIMUM OBSERVATION OF 2 HOURS IS REQUIRED TO DETERMINE THE 3-D POSITION OF AN UNKNOWN POINT USING NGS-OPUS

**USE BACK OF THIS SHEET TO MAKE STATION SKETCH, REFERENCE TIES & DESCRIPTION**

USE THIS FORM IF USING FIXED HEIGHT TRIPODS TO DOCUMENT STATIC SURVEYS ON BASE POINTS FOR ALL RTK SURVEYS

# GPS LOG SHEET

| | | | | | |
|---|---|---|---|---|---|
| Job No. | 04.00198712 | Date | 11/1/2021 | Operator | Jeremy Patin |
| Client | MOFFAT & NICHOL | Job Description | DRONE SURVEY | | |
| Location | KENNER,LA | | | Proj. Mgr. | J.KIBODEAUX |

## SESSION INFO

| | | | | | |
|---|---|---|---|---|---|
| | 4 Characters | | 3 Characters | | 1 Character |
| **File Name** | 1378 | **Julian Date** | 305 | **Session No.** | 0 |

| | | | |
|---|---|---|---|
| **Long Name** | 100 | | |
| **Mon. Description** | 5/8"IR w/cap | | |
| **Rec. Base Type** | R12 | **Rec Serial #** | 6107F01378 |
| **Base Ant Type** | | **Base Ant Ser #** | |
| **Rover Ant Type** | | **Rover Ant Ser #** | |

Antenna Height Measurement is **TRUE VERTICAL** to the Bottom of Antenna Mount if Using Fixed Hgt Tripod

Fixed Hgt 2 Meter Tripod 2.005M **Mtrs or Ft**

Tripod Number RP28

| | | | | | |
|---|---|---|---|---|---|
| Actual Start Time | 12:36pm | Stop Time | 17:30pm | Session Time (Min 2:01 Hr) | 6:54 |

**BASE STATION INFORMATION**

| | | | |
|---|---|---|---|
| | *NAD 83 or NAD 27* | | ***Example** : LA South Zone or TX South Central Zone* |
| **DATUM** | NAD 83 | **ZONE** | **TX SOUTH CENTRAL** |
| Northing/Lat | 564412.739 | | |
| Easting/Long. | 3614392.55 | | |
| Elevation | 3.365 | | |

**Coordinate Origin**-*Where did you get your positions?*

CONTROL POINT

**Note any power problems, obstructions, weather issues, etc.**

ALL WHITE BOXES MUST BE FILLED IN WITH INFORMATION. A MINIMUM OBSERVATION OF 2 HOURS IS REQUIRED TO DETERMINE THE 3-D POSITION OF AN UNKNOWN POINT USING NGS-OPUS

**USE BACK OF THIS SHEET TO MAKE STATION SKETCH, REFERENCE TIES & DESCRIPTION**

USE THIS FORM IF USING FIXED HEIGHT TRIPODS TO DOCUMENT STATIC SURVEYS ON BASE POINTS FOR ALL RTK SURVEYS

# GPS LOG SHEET

| | | | | | |
|---|---|---|---|---|---|
| Job No. | 04.00198712 | Date | 11/2/2021 | Operator | Jeremy Patin |
| Client | MOFFAT & NICHOL | Job Description | DRONE SURVEY | | |
| Location | KENNER,LA | | | Proj. Mgr. | J.KIBODEAUX |

## SESSION INFO

| | | | | | |
|---|---|---|---|---|---|
| | 4 Characters | | 3 Characters | | 1 Character |
| **File Name** | 1378 | **Julian Date** | 306 | **Session No.** | 0 |

| | | | |
|---|---|---|---|
| **Long Name** | 100 | | |
| **Mon. Description** | 5/8"IR w/cap | | |
| **Rec. Base Type** | R12 | **Rec Serial #** | 6107F01378 |
| **Base Ant Type** | | **Base Ant Ser #** | |
| **Rover Ant Type** | | **Rover Ant Ser #** | |

Antenna Height Measurement is **TRUE VERTICAL** to the Bottom of Antenna Mount if Using Fixed Hgt Tripod

Fixed Hgt 2 Meter Tripod 2.005M **Mtrs or Ft**

Tripod Number RP28

| | | | | | |
|---|---|---|---|---|---|
| Actual Start Time | 09:36am | Stop Time | 13:16pm | Session Time (Min 2:01 Hr) | 3:40 |

**BASE STATION INFORMATION**

| | | | |
|---|---|---|---|
| | *NAD 83 or NAD 27* | | ***Example** : LA South Zone or TX South Central Zone* |
| **DATUM** | NAD 83 | **ZONE** | **LA SOUTH** |
| Northing/Lat | 564412.739 | | |
| Easting/Long. | 3614392.55 | | |
| Elevation | 3.365 | | |

**Coordinate Origin**-*Where did you get your positions?*

CONTROL POINT

**Note any power problems, obstructions, weather issues, etc.**

ALL WHITE BOXES MUST BE FILLED IN WITH INFORMATION. A MINIMUM OBSERVATION OF 2 HOURS IS REQUIRED TO DETERMINE THE 3-D POSITION OF AN UNKNOWN POINT USING NGS-OPUS

**USE BACK OF THIS SHEET TO MAKE STATION SKETCH, REFERENCE TIES & DESCRIPTION**

# Appendix D: OPUS Solutions

**From:** opus
**To:** Broussard, Danielle
**Subject:** OPUS solution : 100 TR8207532755116
**Date:** Thursday, October 14, 2021 11:24:25 AM
**Attachments:** 100_286o.21o.xml

---

FILE: 100 TR8207532755116

2005 NOTE: The IGS precise and IGS rapid orbits were not available
2005 at processing time. The IGS ultra-rapid orbit was/will be used to
2005 process the data.
2005

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: https://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: d.broussard@fugro.com DATE: October 14, 2021
RINEX FILE: 100_286o.21o TIME: 16:22:44 UTC

SOFTWARE: page5 2008.25 master255.pl 16032 START: 2021/10/13 14:42:00
EPHEMERIS: igu21793.eph [ultra-rapid] STOP: 2021/10/13 21:06:00
NAV FILE: brdc2860.21n OBS USED: 14486 / 15034 : 96%
ANT NAME: TRMR12 NONE # FIXED AMB: 85 / 92 : 92%
ARP HEIGHT: 2.05 OVERALL RMS: 0.018(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) ITRF2014 (EPOCH:2021.7829)

| | | | | |
|---|---|---|---|---|
| X: | -26908.443(m) | 0.012(m) | -26909.307(m) | 0.012(m) |
| Y: | -5525517.576(m) | 0.010(m) | -5525516.081(m) | 0.010(m) |
| Z: | 3174949.599(m) | 0.005(m) | 3174949.412(m) | 0.005(m) |

| | | | | |
|---|---|---|---|---|
| LAT: | 30 2 52.10732 | 0.005(m) | 30 2 52.12633 | 0.005(m) |
| E LON: | 269 43 15.52922 | 0.012(m) | 269 43 15.49672 | 0.012(m) |
| W LON: | 90 16 44.47078 | 0.012(m) | 90 16 44.50328 | 0.012(m) |
| EL HGT: | -25.214(m) | 0.009(m) | -26.598(m) | 0.009(m) |
| ORTHO HGT: | 0.980(m) | 0.071(m) [NAVD88 (Computed using GEOID18)] | | |

| | UTM COORDINATES UTM (Zone 15) | STATE PLANE COORDINATES SPC (1702 LA S) |
|---|---|---|
| Northing (Y) [meters] | 3327203.647 | 172033.352 |
| Easting (X) [meters] | 762355.900 | 1101669.059 |
| Convergence [degrees] | 1.36323611 | 0.52716944 |
| Point Scale | 1.00044929 | 0.99992608 |
| Combined Factor | 1.00045325 | 0.99993004 |

US NATIONAL GRID DESIGNATOR: 15RYP6235527203(NAD 83)

BASE STATIONS USED

| PID | DESIGNATION | LATITUDE | LONGITUDE | DISTANCE(m) |
|---|---|---|---|---|
| DP7419 | INRI LOYOLA UNIVERSITY CORS ARP | N295613.211 | W0900707.837 | 19742.2 |

DO8512 MARY MARY_289 LSU C4G CORS ARP N300122.709 W0895446.801 35410.3
DG6568 COVG COVINGTON CORS ARP N302833.269 W0900543.922 50636.0

NEAREST NGS PUBLISHED CONTROL POINT
BJ5293 NW CORNER N300250.523 W0901643.641 53.6

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

**From:** opus
**To:** Broussard, Danielle
**Subject:** OPUS solution : 100 TR8979917574157
**Date:** Friday, October 15, 2021 8:10:50 AM
**Attachments:** 100_287q.21o.xml

---

FILE: 100 TR8979917574157

2005 NOTE: The IGS precise and IGS rapid orbits were not available
2005 at processing time. The IGS ultra-rapid orbit was/will be used to
2005 process the data.
2005

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: https://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: d.broussard@fugro.com DATE: October 15, 2021
RINEX FILE: 100_287q.21o TIME: 13:08:27 UTC

SOFTWARE: page5 2008.25 master257.pl 16032 START: 2021/10/14 16:13:00
EPHEMERIS: igu21794.eph [ultra-rapid] STOP: 2021/10/14 21:56:00
NAV FILE: brdc2870.21n OBS USED: 13215 / 14370 : 92%
ANT NAME: TRMR12 NONE # FIXED AMB: 94 / 109 : 86%
ARP HEIGHT: 2.05 OVERALL RMS: 0.024(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) ITRF2014 (EPOCH:2021.7858)

| | | | | |
|---|---|---|---|---|
| X: | -26908.437(m) | 0.012(m) | -26909.301(m) | 0.012(m) |
| Y: | -5525517.588(m) | 0.020(m) | -5525516.093(m) | 0.020(m) |
| Z: | 3174949.608(m) | 0.002(m) | 3174949.421(m) | 0.002(m) |

| | | | | |
|---|---|---|---|---|
| LAT: | 30 2 52.10740 | 0.010(m) | 30 2 52.12637 | 0.010(m) |
| E LON: | 269 43 15.52944 | 0.012(m) | 269 43 15.49693 | 0.012(m) |
| W LON: | 90 16 44.47056 | 0.012(m) | 90 16 44.50307 | 0.012(m) |
| EL HGT: | -25.199(m) | 0.018(m) | -26.583(m) | 0.018(m) |
| ORTHO HGT: | 0.995(m) | 0.077(m) [NAVD88 (Computed using GEOID18)] | | |

| | UTM COORDINATES UTM (Zone 15) | STATE PLANE COORDINATES SPC (1702 LA S) |
|---|---|---|
| Northing (Y) [meters] | 3327203.649 | 172033.354 |
| Easting (X) [meters] | 762355.906 | 1101669.065 |
| Convergence [degrees] | 1.36323611 | 0.52716944 |
| Point Scale | 1.00044929 | 0.99992608 |
| Combined Factor | 1.00045325 | 0.99993004 |

US NATIONAL GRID DESIGNATOR: 15RYP6235527203(NAD 83)

BASE STATIONS USED

| PID | DESIGNATION | LATITUDE | LONGITUDE | DISTANCE(m) |
|---|---|---|---|---|
| DJ9603 | LWES LAKEWOOD ELMENTRY CORS ARP | N295401.295 | W0902057.833 | 17700.0 |

DO8512 MARY MARY_289 LSU C4G CORS ARP N300122.709 W0895446.801 35410.3
DH9596 DSTR DESTREHAN H.S. CORS ARP N295752.395 W0902256.006 13576.3

NEAREST NGS PUBLISHED CONTROL POINT
BJ5293 NW CORNER N300250.523 W0901643.641 53.6

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

**From:** opus
**To:** Broussard, Danielle
**Subject:** OPUS-RS solution : 100 TR1566247621377
**Date:** Monday, October 18, 2021 7:28:15 AM
**Attachments:** 100_288n.21o.xml

---

FILE: 100 TR1566247621377

NGS OPUS-RS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as 1-sigma RMS values.
For additional information: https://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: d.broussard@fugro.com DATE: October 18, 2021
RINEX FILE: 100_288n.21o TIME: 12:25:45 UTC

SOFTWARE: rsgps 1.38 RS251.prl 1.99.3 START: 2021/10/15 13:27:00
EPHEMERIS: igr21795.eph [rapid] STOP: 2021/10/15 15:26:30
NAV FILE: brdc2880.21n OBS USED: 9792 / 12832 : 76%
ANT NAME: TRMR12 NONE QUALITY IND. 18.15/ 22.11
ARP HEIGHT: 2.05 NORMALIZED RMS: 0.363

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) ITRF2014 (EPOCH:2021.78795)

| | | | | |
|---|---|---|---|---|
| X: | -26908.436(m) | 0.006(m) | -26909.300(m) | 0.006(m) |
| Y: | -5525517.587(m) | 0.021(m) | -5525516.092(m) | 0.021(m) |
| Z: | 3174949.611(m) | 0.014(m) | 3174949.424(m) | 0.014(m) |

| | | | | |
|---|---|---|---|---|
| LAT: | 30 2 52.10750 | 0.007(m) | 30 2 52.12648 | 0.007(m) |
| E LON: | 269 43 15.52948 | 0.006(m) | 269 43 15.49697 | 0.006(m) |
| W LON: | 90 16 44.47052 | 0.006(m) | 90 16 44.50303 | 0.006(m) |
| EL HGT: | -25.198(m) | 0.024(m) | -26.582(m) | 0.024(m) |
| ORTHO HGT: | 0.996(m) | 0.039(m) [NAVD88 (Computed using GEOID18)] | | |

| | UTM COORDINATES UTM (Zone 15) | STATE PLANE COORDINATES SPC (1702 LA S) |
|---|---|---|
| Northing (Y) [meters] | 3327203.652 | 172033.357 |
| Easting (X) [meters] | 762355.907 | 1101669.066 |
| Convergence [degrees] | 1.36323611 | 0.52716944 |
| Point Scale | 1.00044929 | 0.99992608 |
| Combined Factor | 1.00045325 | 0.99993004 |

US NATIONAL GRID DESIGNATOR: 15RYP6235527203(NAD 83)

BASE STATIONS USED

| PID | DESIGNATION | LATITUDE | LONGITUDE | DISTANCE(m) |
|---|---|---|---|---|
| DG6568 | COVG COVINGTON CORS ARP | N302833.269 | W0900543.922 | 50636.0 |
| DP7421 | SBCH SHELL BEACH CORS ARP | N295205.205 | W0894023.638 | 61773.9 |
| DG5315 | HOUM HOUMA CORS ARP | N293532.109 | W0904324.988 | 66307.7 |
| AJ7833 | HAMM HAMMOND CORS ARP | N303047.051 | W0902803.428 | 54676.3 |
| DN8737 | MSIN INFINITY CENTER CORS ARP | N301842.205 | W0893615.507 | 71264.3 |

DE8091 BVHS BOOTHVILLE CORS ARP N292012.489 W0892423.010 115514.0
DL8635 GVMS GALVEZ MIDDLE SCH CORS ARP N301851.796 W0905413.029 67021.8
DN7498 MSEV ELLISVILLE CORS ARP N313542.081 W0891213.274 200014.4

NEAREST NGS PUBLISHED CONTROL POINT
BJ5293 NW CORNER N300250.523 W0901643.641 53.6

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

**From:** opus
**To:** Broussard, Danielle
**Subject:** OPUS solution : 100 TR4584102405883
**Date:** Tuesday, November 2, 2021 9:12:33 AM
**Attachments:** 100_305r.21o.xml

---

FILE: 100 TR4584102405883

2005 NOTE: The IGS precise and IGS rapid orbits were not available
2005 at processing time. The IGS ultra-rapid orbit was/will be used to
2005 process the data.
2005

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: https://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: d.broussard@fugro.com DATE: November 02, 2021
RINEX FILE: 100_305r.21o TIME: 14:10:45 UTC

SOFTWARE: page5 2008.25 master294.pl 16032 START: 2021/11/01 17:37:00
EPHEMERIS: igu21821.eph [ultra-rapid] STOP: 2021/11/01 22:26:00
NAV FILE: brdc3050.21n OBS USED: 10900 / 11090 : 98%
ANT NAME: TRMR8_GNSS NONE # FIXED AMB: 49 / 50 : 98%
ARP HEIGHT: 2.0001 OVERALL RMS: 0.015(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) ITRF2014 (EPOCH:2021.8352)

| | | | | |
|---|---|---|---|---|
| X: | -26908.425(m) | 0.009(m) | -26909.290(m) | 0.009(m) |
| Y: | -5525517.583(m) | 0.002(m) | -5525516.088(m) | 0.002(m) |
| Z: | 3174949.591(m) | 0.006(m) | 3174949.404(m) | 0.006(m) |

| | | | | |
|---|---|---|---|---|
| LAT: | 30 2 52.10700 | 0.004(m) | 30 2 52.12597 | 0.004(m) |
| E LON: | 269 43 15.52991 | 0.009(m) | 269 43 15.49733 | 0.009(m) |
| W LON: | 90 16 44.47009 | 0.009(m) | 90 16 44.50267 | 0.009(m) |
| EL HGT: | -25.212(m) | 0.004(m) | -26.596(m) | 0.004(m) |
| ORTHO HGT: | 0.982(m) | 0.071(m) [NAVD88 (Computed using GEOID18)] | | |

| | UTM COORDINATES UTM (Zone 15) | STATE PLANE COORDINATES SPC (1702 LA S) |
|---|---|---|
| Northing (Y) [meters] | 3327203.637 | 172033.342 |
| Easting (X) [meters] | 762355.918 | 1101669.077 |
| Convergence [degrees] | 1.36323611 | 0.52716944 |
| Point Scale | 1.00044929 | 0.99992608 |
| Combined Factor | 1.00045325 | 0.99993004 |

US NATIONAL GRID DESIGNATOR: 15RYP6235527203(NAD 83)

BASE STATIONS USED

| PID | DESIGNATION | LATITUDE | LONGITUDE | DISTANCE(m) |
|---|---|---|---|---|
| DP7419 | INRI LOYOLA UNIVERSITY CORS ARP | N295613.211 | W0900707.837 | 19742.2 |

DJ9603 LWES LAKEWOOD ELMENTRY CORS ARP N295401.295 W0902057.833 17700.0
DG6568 COVG COVINGTON CORS ARP N302833.269 W0900543.922 50636.0

NEAREST NGS PUBLISHED CONTROL POINT
BJ5293 NW CORNER N300250.523 W0901643.641 53.6

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

**From:** opus
**To:** Broussard, Danielle
**Subject:** OPUS solution : 100 TR5493117381556
**Date:** Wednesday, November 3, 2021 10:18:18 AM
**Attachments:** 100_306o.21o.xml

---

FILE: 100 TR5493117381556

2005 NOTE: The IGS precise and IGS rapid orbits were not available
2005 at processing time. The IGS ultra-rapid orbit was/will be used to
2005 process the data.
2005

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: https://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: d.broussard@fugro.com DATE: November 03, 2021
RINEX FILE: 100_306o.21o TIME: 15:16:24 UTC

SOFTWARE: page5 2008.25 master272.pl 16032 START: 2021/11/02 14:37:00
EPHEMERIS: igu21822.eph [ultra-rapid] STOP: 2021/11/02 18:11:00
NAV FILE: brdc3060.21n OBS USED: 8096 / 8415 : 96%
ANT NAME: TRMR12 NONE # FIXED AMB: 45 / 48 : 94%
ARP HEIGHT: 2.05 OVERALL RMS: 0.015(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) ITRF2014 (EPOCH:2021.8375)

| | | | | |
|---|---|---|---|---|
| X: | -26908.431(m) | 0.010(m) | -26909.296(m) | 0.010(m) |
| Y: | -5525517.566(m) | 0.012(m) | -5525516.071(m) | 0.012(m) |
| Z: | 3174949.585(m) | 0.001(m) | 3174949.398(m) | 0.001(m) |

| | | | | |
|---|---|---|---|---|
| LAT: | 30 2 52.10711 | 0.005(m) | 30 2 52.12608 | 0.005(m) |
| E LON: | 269 43 15.52966 | 0.010(m) | 269 43 15.49711 | 0.010(m) |
| W LON: | 90 16 44.47034 | 0.010(m) | 90 16 44.50289 | 0.010(m) |
| EL HGT: | -25.230(m) | 0.011(m) | -26.614(m) | 0.011(m) |
| ORTHO HGT: | 0.964(m) | 0.075(m) [NAVD88 (Computed using GEOID18)] | | |

| | UTM COORDINATES UTM (Zone 15) | STATE PLANE COORDINATES SPC (1702 LA S) |
|---|---|---|
| Northing (Y) [meters] | 3327203.640 | 172033.345 |
| Easting (X) [meters] | 762355.912 | 1101669.071 |
| Convergence [degrees] | 1.36323611 | 0.52716944 |
| Point Scale | 1.00044929 | 0.99992608 |
| Combined Factor | 1.00045325 | 0.99993004 |

US NATIONAL GRID DESIGNATOR: 15RYP6235527203(NAD 83)

BASE STATIONS USED

| PID | DESIGNATION | LATITUDE | LONGITUDE | DISTANCE(m) |
|---|---|---|---|---|
| DP7419 | INRI LOYOLA UNIVERSITY CORS ARP | N295613.211 | W0900707.837 | 19742.2 |

DG6568 COVG COVINGTON CORS ARP N302833.269 W0900543.922 50636.0
DO8512 MARY MARY_289 LSU C4G CORS ARP N300122.709 W0895446.801 35410.2

NEAREST NGS PUBLISHED CONTROL POINT
BJ5293 NW CORNER N300250.523 W0901643.641 53.6

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

# Appendix E: JSA

| | | | |
|---|---|---|---|
| FUGRO | JOBSITE HAZARD ANALYSIS (JHA) | Reference No: | HS-F08 |
| | | Revision: | 0 |
| | | Revision Date: | June 2018 |

| | |
|---|---|
| Location: New Orleans<br>Site: Lake Ponchartrain | Emergency Response: 911<br>Phone #: 911<br>Emergency Meeting Point: Ochsner HC<br>Supervisor: Greg Spiller |

**Put a mark beside all that apply to your job. On the other side of this card, identify and list all hazards that may be present during each task and the plans to eliminate or control them.**

**Permits**

- ☑ Reviewed the TRA Risk Assessment(s)
- ☑ Read, reviewed and signed JHA
- ☑ Taken a site specific orientation
- ☐ Proper safety certification for this site (Confined space, H2S, fall protection etc.)
- ☐ Communicated work with others in area
- ☐ Reviewed applicable client permits
- ☐ Management of Change (discuss any processes that will differ from usual procedures)

**PPE**

- ☐ Hard hat
- ☐ Hearing protection
- ☐ Double Hearing protection
- ☐ Safety eye protection
- ☐ High visibility clothing or vest
- ☐ Appropriate gloves
- ☑ Safety footwear
- ☐ Fall restraint system
- ☐ Gas detector
- ☑ Personal Flotation Device
- ☐ Probe (Non-Conductive)
- ☐ Appropriate clothing for weather
- ☐ Other_____
- ☐ Other_____

**Ergonomics**

- ☐ Prolonged body position
- ☐ Tight area
- ☐ Parts of body in line of fire

**Work Environment**

- ☑ Slips, Trips and Falls
- ☐ Limited Access / Egress
- ☐ Ground conditions
- ☐ Lighting levels (too low or bright, glare)
- ☐ Other work in area (site congestion)
- ☑ Working Over Water
- ☐ Tools
- ☐ Delayed Response Time for Medical Service
- ☐ Excavations barricaded
- ☐ Hole cover in place
- ☑ Vehicle traffic
- ☑ Pinch points
- ☐ Equipment without guarding
- ☐ Communication
- ☐ Moving equipment
- ☐ Possible exposure to:
  - Heat / Cold
  - Noise
  - Chemicals
  - Dust
  - Steam
  - Other_____

**Personal Limitations**

- ☐ No training, procedure, risk analysis
- ☐ Confusing instructions, repeat back used
- ☐ Distractions
- ☐ Personal problems
- ☐ Physical limitations

| | | | |
|---|---|---|---|
| FUGRO | JOBSITE HAZARD ANALYSIS (JHA) | Reference No | HS-F08 |
| | | Revision | 0 |
| | | Revision Date | June 2018 |

Work to be done: TOPO + SBES

Prepared By: B. Wesh Date: 10/12

Identify the task and hazards then identify the plans to eliminate or control the hazards.

It is important that all hazards have plans to eliminate or control them, and that these plans are put in place prior to the start of task.

| TASK | HAZARD | CONTROL |
|---|---|---|
| Survey | weather, subaqueous Hazards | PPE, Small Boat safety |
| traffic/Driving | vehicular accident | Smith Driving |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

❑ All tools and garbage removed from the site.

Worker Name and Signature

Bryce Wesh Bryce Wesh

Tyler Hebert

Supervisor's Signature _ Reviewed _____

| | | | |
|---|---|---|---|
| FUGRO | **JOBSITE HAZARD ANALYSIS (JHA)** | Reference No.: | HS-F08 |
| | | Revision: | 0 |
| | | Revision Date: | June 2018 |

| | |
|---|---|
| **Location:** New Orleans<br>**Site:** lake Ponchartrain | **Emergency Response:** 911<br>**Phone #:** all<br>**Emergency Meeting Point:** Observer H/C<br>**Supervisor:** Greg Spiller |

**Put a mark beside all that apply to your job. On the other side of this card, identify and list all hazards that may be present during each task and the plans to eliminate or control them.**

**Permits**

- ☑ Reviewed the TRA Risk Assessment(s)
- ☑ Read, reviewed and signed JHA
- ☑ Taken a site specific orientation
- ❑ Proper safety certification for this site (Confined space, H2S, fall protection etc.)
- ❑ Communicated work with others in area
- ❑ Reviewed applicable client permits
- ❑ Management of Change (discuss any processes that will differ from usual procedures)

**PPE**

- ❑ Hard hat
- ❑ Hearing protection
- ❑ Double Hearing protection
- ❑ Safety eye protection
- ❑ High visibility clothing or vest
- ❑ Appropriate gloves
- ☑ Safety footwear
- ❑ Fall restraint system
- ❑ Gas detector
- ☑ Personal Flotation Device
- ❑ Probe (Non-Conductive)
- ❑ Appropriate clothing for weather
- ❑ Other_____
- ❑ Other_____

**Ergonomics**

- ❑ Prolonged body position
- ❑ Tight area
- ❑ Parts of body in line of fire

**Work Environment**

- ❑ Slips, Trips and Falls
- ❑ Limited Access / Egress
- ❑ Ground conditions
- ❑ Lighting levels (too low or bright, glare)
- ❑ Other work in area (site congestion)
- ☑ Working Over Water
- ❑ Tools
- ❑ Delayed Response Time for Medical Service
- ❑ Excavations barricaded
- ❑ Hole cover in place
- ☑ Vehicle traffic
- ☑ Pinch points
- ❑ Equipment without guarding
- ❑ Communication
- ❑ Moving equipment
- ❑ Possible exposure to:
  - Heat / Cold
  - Noise
  - Chemicals
  - Dust
  - Steam
  - Other_____

**Personal Limitations**

- ❑ No training, procedure, risk analysis
- ❑ Confusing instructions, repeat back used
- ❑ Distractions
- ❑ Personal problems
- ❑ Physical limitations

| | | | |
|---|---|---|---|
| FUGRO | JOBSITE HAZARD ANALYSIS (JHA) | Reference No.: | HS-F08 |
| | | Revision: | 0 |
| | | Revision Date: | June 2018 |

**Work to be done:** TOPO + JBES

**Prepared By:** B. Wash **Date:** 10/13

Identify the task and hazards then identify the plans to eliminate or control the hazards.

It is important that all hazards have plans to eliminate or control them, and that these plans are put in place prior to the start of task.

| TASK | HAZARD | CONTROL |
|---|---|---|
| Traffic / Driving | vehicular Accident | Smith Driving |
| Survey | weather, hidden hazards | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

❑ All tools and garbage removed from the site.

**Worker Name and Signature**

Bryce Wash Bryce Wash

Tylor Hebert

Supervisor's Signature _____ Reviewed _____

# Jobsite Hazard Analysis - JHA

| | | | |
|---|---|---|---|
| **Location:** | St. Charles Parish | **Site:** | Lake Pontchartrain |
| **Emergency Response:** | 911 | **Phone #:** | 911 |
| **Emergency Meeting Point:** | Ferner Boat Launch | **Supervisor:** | Greg Spiller |

**Put a mark beside all that apply to your job. On the other side of this document, identify and list all hazards that may be present during each task and the plans to eliminate or control them.**

### Permits

- ☑ Reviewed the TRA Risk Assessments(s)
- ☑ Read, reviewed and signed JHA
- ☐ Taken a site-specific orientation
- ☐ Proper safety certification for this site (confined space, H2S, fall protection, etc.)
- ☐ Communication work with others in the area
- ☐ Reviewed applicable client permits
- ☐ Management of Change (discuss any processes that will differ from usual procedures

### PPE

- ☐ Hard hat
- ☐ Hearing protection
- ☐ Double hearing protection
- ☐ Safety eye protection
- ☐ High visibility clothing or vest
- ☐ Appropriate gloves
- ☑ Safety footwear
- ☐ Fall restraint system
- ☐ Gas detector
- ☑ Personal Flotation Device
- ☐ Probe (non-conductive)
- ☑ Appropriate clothing for weather
- ☐ Other: _____
- ☐ Other: _____

### Ergonomics

- ☑ Prolonged body position
- ☐ Tight area
- ☐ Parts of body in line of fire
- ☐ Manual Handling

### Work Environment

- ☐ Uneven Surfaces or Housekeeping (Slips, Trips and Falls)
- ☐ Limited Access / Egress
- ☐ Ground Conditions
- ☐ Lighting levels (too low or bright, glare)
- ☐ Other work in area (site Congestion)
- ☑ Working over water
- ☐ Tools
- ☐ Delayed response time for medical services
- ☐ Excavations barricaded
- ☐ Hole cover in place
- ☑ Vehicle traffic
- ☐ Pinch Points
- ☐ Equipment without guarding
- ☐ Communication
- ☐ Moving Equipment
- ☑ Possible Exposure to:
  - ☑ Heat / Cold
  - ☐ Chemicals
  - ☐ Steam
  - ☐ Noise
  - ☐ Dust
  - ☐ Other: _____

### Personal Limitations

- ☐ No training, procedure, risk analysis
- ☐ Confusing instructions, repeat back use
- ☐ Distractions
- ☐ Personal Problems
- ☐ Physical limitations

### Behavioral Based Safety Tools

- ☐ Toolbox Talk Leader Rotations
- ☐ HSSE Observation (HOC)
- ☐ Task Observation (Co-worker observation)
- ☐ Crew Lead Kick-Off Meeting


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**Work to be done/Notes:**

Single Beam
Magnetometer
2TK

| Prepared by: | Tyler Hebert | Date: | 10/14/2021 |
|---|---|---|---|

**Identify the task and hazards then identify the plans to eliminate or control the hazards**

**It is important that all hazards have plans to eliminate or control them, and that these plans are put in place prior to the start of task.**

**Stop Work Authority can be used by any employee at any time during the operation**

| TASK | HAZARD | CONTROL |
|---|---|---|
| driving | accidents | Smith System |
| surveying | weather, submerged objects | dress appropriately take time |
| | | |
| | | |
| | | |
| | | |
| | | |

☐ All tools and garbage removed from the site.

| Worker's Name | Worker's Signature |
|---|---|
| Tyler Hebert | |
| Jason Granger | |
| | |

| Supervisor's Signature | Date Reviewed: |
|---|---|
| | |


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# Jobsite Hazard Analysis - JHA

| | | | |
|---|---|---|---|
| **Location:** | St. Charles Parish | **Site:** | Lake Pontchartrain |
| **Emergency Response:** | 911 | **Phone #:** | 911 |
| **Emergency Meeting Point:** | Kenner Boat Launch | **Supervisor:** | Greg Spiller |

**Put a mark beside all that apply to your job. On the other side of this document, identify and list all hazards that may be present during each task and the plans to eliminate or control them.**

### Permits

- ☑ Reviewed the TRA Risk Assessments(s)
- ☑ Read, reviewed and signed JHA
- ☐ Taken a site-specific orientation
- ☐ Proper safety certification for this site (confined space, H2S, fall protection, etc.)
- ☐ Communication work with others in the area
- ☐ Reviewed applicable client permits
- ☐ Management of Change (discuss any processes that will differ from usual procedures

### PPE

- ☐ Hard hat
- ☐ Hearing protection
- ☐ Double hearing protection
- ☐ Safety eye protection
- ☐ High visibility clothing or vest
- ☐ Appropriate gloves
- ☑ Safety footwear
- ☐ Fall restraint system
- ☐ Gas detector
- ☑ Personal Flotation Device
- ☐ Probe (non-conductive)
- ☑ Appropriate clothing for weather
- ☐ Other: _____
- ☐ Other: _____

### Ergonomics

- ☑ Prolonged body position
- ☐ Tight area
- ☐ Parts of body in line of fire
- ☐ Manual Handling

### Work Environment

- ☐ Uneven Surfaces or Housekeeping (Slips, Trips and Falls)
- ☐ Limited Access / Egress
- ☐ Ground Conditions
- ☐ Lighting levels (too low or bright, glare)
- ☐ Other work in area (site Congestion)
- ☑ Working over water
- ☐ Tools
- ☐ Delayed response time for medical services
- ☐ Excavations barricaded
- ☐ Hole cover in place
- ☑ Vehicle traffic
- ☐ Pinch Points
- ☐ Equipment without guarding
- ☐ Communication
- ☐ Moving Equipment
- ☑ Possible Exposure to:
  - ☑ Heat / Cold
  - ☐ Chemicals
  - ☐ Steam
  - ☐ Noise
  - ☐ Dust
  - ☐ Other: _____

### Personal Limitations

- ☐ No training, procedure, risk analysis
- ☐ Confusing instructions, repeat back use
- ☐ Distractions
- ☐ Personal Problems
- ☐ Physical limitations

### Behavioral Based Safety Tools

- ☐ Toolbox Talk Leader Rotations
- ☐ HSSE Observation (HOC)
- ☐ Task Observation (Co-worker observation)
- ☐ Crew Lead Kick-Off Meeting


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| Work to be done/Notes: | | | |
|---|---|---|---|
| Single Beam<br>Mag<br>RTK | | | |
| Prepared by: | Tyler Hebert | Date: | 10/15/2021 |

Identify the task and hazards then identify the plans to eliminate or control the hazards

It is important that all hazards have plans to eliminate or control them, and that these plans are put in place prior to the start of task.

Stop Work Authority can be used by any employee at any time during the operation

| TASK | HAZARD | CONTROL |
|---|---|---|
| driving | accidents | smith system |
| surveying | weather, submerged objects | checks for weather take time |
| | | |
| | | |
| | | |
| | | |
| | | |

☐ All tools and garbage removed from the site.

| Worker's Name | Worker's Signature |
|---|---|
| Tyler Hebert | |
| Jason Grauper | |
| | |

| Supervisor's Signature | Date Reviewed: |
|---|---|
| | |


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# Jobsite Hazard Analysis - JHA

| | | | |
|---|---|---|---|
| **Location:** | KENNER, LA | **Site:** | CCW MARSH CREATION |
| **Emergency Response:** | OSCHNER URGENT CARE | **Phone #:** | 504-461-9660 |
| **Emergency Meeting Point:** | TRUCK | **Supervisor:** | J PATIN |

**Put a mark beside all that apply to your job. On the other side of this document, identify and list all hazards that may be present during each task and the plans to eliminate or control them.**

## Permits

- ☑ Reviewed the TRA Risk Assessments(s)
- ☑ Read, reviewed and signed JHA
- ☐ Taken a site-specific orientation
- ☐ Proper safety certification for this site (confined space, H2S, fall protection, etc.)
- ☐ Communication work with others in the area
- ☐ Reviewed applicable client permits
- ☐ Management of Change (discuss any processes that will differ from usual procedures

## PPE

- ☐ Hard hat
- ☐ Hearing protection
- ☐ Double hearing protection
- ☐ Safety eye protection
- ☐ High visibility clothing or vest
- ☐ Appropriate gloves
- ☐ Safety footwear
- ☐ Fall restraint system
- ☐ Gas detector
- ☐ Personal Flotation Device
- ☐ Probe (non-conductive)
- ☐ Appropriate clothing for weather
- ☐ Other: _____
- ☐ Other: _____

## Ergonomics

- ☐ Prolonged body position
- ☐ Tight area
- ☐ Parts of body in line of fire
- ☐ Manual Handling

## Work Environment

- ☑ Uneven Surfaces or Housekeeping (Slips, Trips and Falls)
- ☐ Limited Access / Egress
- ☐ Ground Conditions
- ☐ Lighting levels (too low or bright, glare)
- ☐ Other work in area (site Congestion)
- ☑ Working over water
- ☐ Tools
- ☐ Delayed response time for medical services
- ☐ Excavations barricaded
- ☐ Hole cover in place
- ☑ Vehicle traffic
- ☑ Pinch Points
- ☐ Equipment without guarding
- ☐ Communication
- ☐ Moving Equipment
- ☐ Possible Exposure to:
  - ☐ Heat / Cold
  - ☐ Chemicals
  - ☐ Steam
  - ☐ Noise
  - ☐ Dust
  - ☐ Other: _____

## Personal Limitations

- ☐ No training, procedure, risk analysis
- ☐ Confusing instructions, repeat back use
- ☐ Distractions
- ☐ Personal Problems
- ☐ Physical limitations

## Behavioral Based Safety Tools

- ☐ Toolbox Talk Leader Rotations
- ☐ HSSE Observation (HOC)
- ☐ Task Observation (Co-worker observation)
- ☐ Crew Lead Kick-Off Meeting

TRA-- LA - OPS- 0006


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FUGRO

**Work to be done/Notes:**

DRONE SURVEY

**Prepared by:** JEREMY PATIN **Date:** 11/1/21

**Identify the task and hazards then identify the plans to eliminate or control the hazards**

It is important that all hazards have plans to eliminate or control them, and that these plans are put in place prior to the start of task.

Stop Work Authority can be used by any employee at any time during the operation

| TASK | HAZARD | CONTROL |
|---|---|---|
| DRIVING TO JOBSITE | CONGESTION / TRAFFIC | USE SMITH SYSTEM. FOLLOW SPEED LIMITS AND TRAFFIC SIGNS. |
| SETTING UP EQUIPMENT | PINCH POINTS | WATCH HAND PLACEMENT. USE GLOVES WHEN SETTING UP. |
| WALKING TO AREA TO SURVEY | SLIPS, TRIPS, AND FALLS | WATCH FOOT PLACEMENT. BE AWARE OF UNEVEN OR MUDDY TERRAIN |
| SURVEYING OVER WATER | MAN OVERBOARD | DO NOT OVER LOAD BOAT. WEAR PFD WHILE IN THE BOAT. |
| | | |
| | | |
| | | |

☑ All tools and garbage removed from the site.

| Worker's Name | Worker's Signature |
|---|---|
| JEREMY PATIN | |
| Ronald Bertucci | |
| | |

| Supervisor's Signature | Date Reviewed: |
|---|---|
| | |


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FUGRO

# Jobsite Hazard Analysis - JHA

| | | | |
|---|---|---|---|
| **Location:** | KENNER, LA | **Site:** | CCW MARSH CREATION |
| **Emergency Response:** | OSCHNER URGENT CARE | **Phone #:** | 504-461-9660 |
| **Emergency Meeting Point:** | TRUCK | **Supervisor:** | J PATIN |

**Put a mark beside all that apply to your job. On the other side of this document, identify and list all hazards that may be present during each task and the plans to eliminate or control them.**

## Permits

- ☑ Reviewed the TRA Risk Assessments(s)
- ☑ Read, reviewed and signed JHA
- ☐ Taken a site-specific orientation
- ☐ Proper safety certification for this site (confined space, H2S, fall protection, etc.)
- ☐ Communication work with others in the area
- ☐ Reviewed applicable client permits
- ☐ Management of Change (discuss any processes that will differ from usual procedures

## PPE

- ☐ Hard hat
- ☐ Hearing protection
- ☐ Double hearing protection
- ☐ Safety eye protection
- ☐ High visibility clothing or vest
- ☐ Appropriate gloves
- ☐ Safety footwear
- ☐ Fall restraint system
- ☐ Gas detector
- ☐ Personal Flotation Device
- ☐ Probe (non-conductive)
- ☐ Appropriate clothing for weather
- ☐ Other: _____
- ☐ Other: _____

## Ergonomics

- ☐ Prolonged body position
- ☐ Tight area
- ☐ Parts of body in line of fire
- ☐ Manual Handling

## Work Environment

- ☑ Uneven Surfaces or Housekeeping (Slips, Trips and Falls)
- ☐ Limited Access / Egress
- ☐ Ground Conditions
- ☐ Lighting levels (too low or bright, glare)
- ☐ Other work in area (site Congestion)
- ☑ Working over water
- ☐ Tools
- ☐ Delayed response time for medical services
- ☐ Excavations barricaded
- ☐ Hole cover in place
- ☑ Vehicle traffic
- ☑ Pinch Points
- ☐ Equipment without guarding
- ☐ Communication
- ☐ Moving Equipment
- ☐ Possible Exposure to:
  - ☐ Heat / Cold
  - ☐ Chemicals
  - ☐ Steam
  - ☐ Noise
  - ☐ Dust
  - ☐ Other: _____

## Personal Limitations

- ☐ No training, procedure, risk analysis
- ☐ Confusing instructions, repeat back use
- ☐ Distractions
- ☐ Personal Problems
- ☐ Physical limitations

## Behavioral Based Safety Tools

- ☐ Toolbox Talk Leader Rotations
- ☐ HSSE Observation (HOC)
- ☐ Task Observation (Co-worker observation)
- ☐ Crew Lead Kick-Off Meeting

TRA-- LA - OPS- 0006


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FUGRO

**Work to be done/Notes:**

DRONE SURVEY

**Prepared by:** JEREMY PATIN **Date:** 11/1/21

**Identify the task and hazards then identify the plans to eliminate or control the hazards**

It is important that all hazards have plans to eliminate or control them, and that these plans are put in place prior to the start of task.

Stop Work Authority can be used by any employee at any time during the operation

| TASK | HAZARD | CONTROL |
|---|---|---|
| DRIVING TO JOBSITE | CONGESTION / TRAFFIC | USE SMITH SYSTEM. FOLLOW SPEED LIMITS AND TRAFFIC SIGNS. |
| SETTING UP EQUIPMENT | PINCH POINTS | WATCH HAND PLACEMENT. USE GLOVES WHEN SETTING UP. |
| WALKING TO AREA TO SURVEY | SLIPS, TRIPS, AND FALLS | WATCH FOOT PLACEMENT. BE AWARE OF UNEVEN OR MUDDY TERRAIN |
| SURVEYING OVER WATER | MAN OVERBOARD | DO NOT OVER LOAD BOAT. WEAR PFD WHILE IN THE BOAT. |
| | | |
| | | |
| | | |

☑ All tools and garbage removed from the site.

| Worker's Name | Worker's Signature |
|---|---|
| JEREMY PATIN | |
| Ronald Bertucci | |
| | |

| Supervisor's Signature | Date Reviewed: |
|---|---|
| | |


*This document is uncontrolled once printed or downloaded and may not reflect the latest version.*

FUGRO

# APPENDIX H: EQUIPMENT DATA SHEET

# EQUIPMENT DATA SHEET

## LABRANCHE SHORELINE PROTECTION PROJECT (PO-0194)

The Contractor shall submit the following Equipment Data Sheet in the Work Plan for each piece of heavy construction equipment (I.E., barge, track hoe, dozer, pile hammer, etc.) that is proposed to be utilized to perform the Work. The Equipment Data Sheet shall only be utilized for informational purposes. The submitted information is pertinent to the evaluation of the proposed equipment and their capability to perform the Work. The Contractor shall only omit data or information considered to be proprietary. The Equipment Data Sheet shall constitute a certification that the proposed equipment is available to and under control of the Contractor during the Work.

| | |
|---|---|
| Type of Equipment | |
| Manufacturer and Manufacture Date | |
| Condition | |
| Current Location | |
| Description of Use on Project | |

| | |
|---|---|
| Owner/Lease (specify) Name | |
| Contact person | |
| Contact address | |
| Contact phone number | |

| | |
|---|---|
| Expected Production Rate (Daily or Hourly) | |
| Weight (tons) | |
| Dimensions (ft) | |
| Method of Mobilization and Demobilization | |

# APPENDIX I: DAVIS BACON ACT

"General Decision Number: LA20220005 01/07/2022

Superseded General Decision Number: LA20210005

State: Louisiana

Construction Type: Heavy

Counties: Jefferson, Orleans, Plaquemines, St Bernard, St Charles, St James, St John the Baptist and St Tammany Counties in Louisiana.

HEAVY CONSTRUCTION PROJECTS (Includes flood control, water & sewer lines, and water wells. Also includes elevated storage tanks in all listed parishes except Plaquemines and St. James. Excludes industrial construction-chemical processing, power plants, and refineries.)

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022, Executive Order 14026 generally applies to the contract. The contractor must pay all covered workers at least $15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022, Executive Order 13658 generally applies to the contract. The contractor must pay all covered workers at least $11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at www.dol.gov/whd/govcontracts.

Modification Number  Publication Date
0  01/07/2022

CARP0729-001 01/01/2021

| | Rates | Fringes |
|---|---|---|
| MILLWRIGHT | $ 32.61 | 13.39 |

---

CARP1846-006 07/01/2021

| | Rates | Fringes |
|---|---|---|
| CARPENTER (formbuilding/formsetting and Piledrivers) | $ 28.29 | 9.97 |

---

* ELEC0130-005 12/06/2021

JEFFERSON, ORLEANS, PLAQUEMINES, ST. BERNARD, ST. CHARLES, ST. JAMES, AND ST. JOHN THE BAPTIST PARISHES

| | Rates | Fringes |
|---|---|---|
| ELECTRICIAN (including low voltage wiring) | $ 32.25 | 13.75 |

---

* ELEC1077-002 12/06/2021

ST. TAMMANY PARISH

| | Rates | Fringes |
|---|---|---|
| ELECTRICIAN (including low voltage wiring) | $ 26.39 | 3%+9.42 |

---

ENGI0406-018 07/01/2009

| | Rates | Fringes |
|---|---|---|
| OPERATOR: Power Equipment | | |
| Bulldozer | $ 21.26 | 6.70 |
| Mechanic | $ 23.31 | 6.70 |

---

PLAS0567-003 08/01/2018

JEFFERSON, ORLEANS, PLAQUEMINES, ST. BERNARD, ST. CHARLES, ST. JOHN THE BAPTIST, and ST. TAMMANY PARISHES

| | Rates | Fringes |
|---|---|---|

Cement Mason/Concrete Finisher...$ 26.74 7.62

---

PLAS0812-003 01/01/2021

ST. JAMES PARISH

| | Rates | Fringes |
|---|---|---|
| Cement Mason/Concrete Finisher... | $ 30.91 | 5.40 |

---

PLUM0060-002 06/07/2021

JEFFERSON, ORLEANS, PLAQUEMINES, ST. BERNARD, ST. CHARLES, ST. JAMES (Southeastern Portion), ST. JOHN THE BAPTIST, and ST. TAMMANY PARISHES

| | Rates | Fringes |
|---|---|---|
| Plumbers (excluding pipe laying)..... | $ 29.90 | 13.29 |

---

PLUM0198-005 09/01/2021

ST. JAMES PARISH (Northwestern Portion)

| | Rates | Fringes |
|---|---|---|
| PLUMBER (excluding pipe laying)..... | $ 27.29 | 15.69 |

---

SULA2004-007 05/13/2004

| | Rates | Fringes |
|---|---|---|
| CARPENTER (all other work)..... | $ 13.75 | 2.60 |
| Laborers: | | |
| Common/Landscape..... | $ 9.88 | 0.00 |
| Fence..... | $ 11.24 | 0.00 |
| Flagger..... | $ 8.58 | 0.00 |
| Mason Tender..... | $ 7.25 | 0.00 |
| Pipelayer..... | $ 9.84 | 0.00 |
| PIPEFITTER (excluding pipelaying)..... | $ 17.52 | 4.51 |
| Power equipment operators: | | |
| Backhoe/Excavator..... | $ 14.42 | 0.00 |
| Crane..... | $ 16.34 | 3.30 |
| Dragline..... | $ 16.50 | 0.00 |
| Front End Loader..... | $ 13.89 | 0.00 |
| Oiler..... | $ 10.03 | 0.00 |

Truck drivers:

| | | |
|---|---|---|
| Dump | $ 11.01 | 0.00 |
| Pickup | $ 12.25 | 0.00 |

---

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

==========

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

---

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union, which prevailed in the survey for this

classification, which in this example would be Plumbers 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

---

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Division National Office Branch of Wage Surveys. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

==========

END OF GENERAL DECISION"

# APPENDIX J: LASARD STANDARD OPERATING PROCEDURE

# Standard Operating Procedures for Geo-scientific Data Management

# Louisiana Sand Resources Database (LASARD)

Syed Khalil[1], Ed Haywood[1], and Beth Forrest[2]
[1] *CPRA*, [2] *CB&I*

Coastal Protection and Restoration Authority of Louisiana

June 14, 2016

## Revision History

| Version | Date | Description |
|---|---|---|
| 1 | 10/01/2015 | Original Issue |
| 2 | 10/23/2015 | Added language on control establishment, navigation and water level corrections |
| 3 | 06/14/2016 | Updated Appendix 4 - File Naming Convention; Changed Appendix 2 - FGDB Templates to Shapefile Templates; Updated Data Submittal Format paragraph on page 27. Removed references to geodatabase throughout. |
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**Acknowledgment**

This document is a product of team work and collaboration amongst individuals and institutions. The authors wish to acknowledge the help of Boyd Professor Dr. Harry Roberts and Mr. DeWitt Braud of Coastal Studies Institute, Louisiana State University for their help in developing the LASARD and its attribute table in the initial phases. We also thank Mr. Braud with his review of the current updated attribute tables. Mr. Rocky Wager and Ms. Christina Hunnicutt of USGS are an integral part of the team that helped compile and develop this SOP especially the GIS data attributes and file naming convention.

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## INTRODUCTION

Globally, shorelines are degrading due to increased high energy events and rising sea level and require frequent replacement of sediment. It is well documented that during the past half century, coastal Louisiana has experienced rates of land loss that are considered to be the highest in the nation (Khalil *et al.,* 2010). Since the 1930s, Louisiana has lost over 1,883 square miles of coastal land and is losing land at a rate of 24 square miles/year (Couvillion *et al*., 2011). Land loss, in particular the loss of coastal wetlands, threatens the sustainability of Louisiana's coastal ecosystem.

The success of a Louisiana coastal restoration effort depends on locating sufficient volumes of sand and mixed sediment that are suitable for placement on beaches and dunes, and for creating/nourishing marshes. Thus, locating potential borrow sites with suitable sediment resources that are extractable at acceptable costs is crucial to the success of restoration goals (e.g., Finkl and Khalil, 2005).

Sand and sediment resources in Louisiana are limited but crucial for barrier island and marsh restoration. In addition, knowledge of sediment budget and inventory is essential for regional sediment management (Khalil, 2012). To help facilitate the identification and management of nearshore, offshore and riverine sediment resources, the Coastal Protection and Restoration Authority (CPRA) developed the LouisianA SAnd Resources Database (LASARD). This database is used to manage, archive, and maintain geological, geophysical, geotechnical and other related data pertaining to the exploration of sand/sediment in various environments (Khalil *et al*., 2010). In LASARD, the geoscientific and related data acquired for ecosystem restoration are archived, populated, and maintained on a GIS platform. Once standardized, LASARD data are made available to users through the CPRA publically accessible spatial viewer. The overall objective of LASARD is to centralize relevant data from various sources for better project coordination and to facilitate future planning for delineating and utilizing sediment resources for a sustainable ecosystem restoration in coastal Louisiana (Khalil *et al*, 2010).

Data collected over the course of sand and sediment search investigations were identified for incorporation into the LASARD database. Data collected during these investigations typically includes geophysical (seismic, sidescan sonar, magnetometer, and bathymetric) and geological (vibracore and grab sample) information. Oil and gas infrastructure data are also included in the database since they affect the delineation of borrow areas, quantities of available sand/sediment, and subsequent dredging.

## GEOSCIENTIFIC DATA COLLECTION METHODOLOGIES

The identification of sediment resources and final design of borrow areas is achieved through the integration of geophysical surveys and geotechnical investigations. Each data type incorporated into LASARD plays a unique role in delineating sediment resources and finally designing a borrow area. The resulting data are analyzed to identify the most compatible sediment for a specific restoration project while avoiding potential cultural resources, existing infrastructure and environmental impacts. This section describes various geoscientific data collection methodologies, for marine/coastal and riverine geophysical surveys using acoustic remote sensing techniques as well as other remote sensing techniques including Light Detection and Ranging (LiDAR), aerial photography or traditional topographic surveys.

**Acoustic Remote Sensing Data – Marine/Coastal/Riverine Surveys**[1]

Measurements taken using methods that do not directly contact the object being studied are considered remotely sensed data. To distinguish between LiDAR and other remote sensing applications using electromagnetic waves, remote sensing activities conducted underwater are termed "Acoustic Remote Sensing" as the sensors use acoustic waves. Echo sounders, sidescan sonar, and subbottom profilers are three commonly used non-intrusive acoustic remote sensing systems. These systems use electrically powered acoustic devices that propagate acoustic pulses in the water and measure the lapsed time between pulse initiation and return signals that are reflected from features on or beneath the seafloor. They are widely deployed to obtain information that is useful in the interpretation of seafloor geomorphology, for delineation of bottom features (e.g., ripple marks, sand waves, rock outcrops), and for estimating the nature (grain size, composition) of underlying rock and sedimentary units. Acoustic depth sounders are used for bathymetric surveys. Sidescan sonar images show the spatial distribution of bottom sediments, sub-surface bedforms (e.g., wave or current asymmetrical ripples, low-relief bedforms, sand waves), and macromorphological features such as shoals and channels. Subbottom profilers show near-surface stratigraphy (sedimentary layering) below the seafloor in a cross sectional manner along with subsurface geomorphology (e.g., buried paleo-channels), and/or subsurface geological structures (e.g., faults). An integrated seafloor (river bottom) mapping for sediment evaluation and characterization uses non-intrusive geophysical surveys followed by intrusive geotechnical investigation to complete a marine/coastal/riverine survey.

Geophysical data populated and archived in LASARD are comprised mainly of bathymetric, seismic, sidescan sonar and magnetometer data. This data is often, but not always, collected during a joint geophysical survey investigation. Normally these data are collected from a survey vessel along pre-defined tracklines. A trackline is a linear feature that represents the path of the vessel that is towing the instrumentation. Trackline spacing varies depending on the objectives of the survey. Data collected during a reconnaissance level investigation covering a large area will be more widely spaced than data collected for a cultural resource investigation that targets a small area. All data that is collected during a geophysical survey should be accurately located for the purpose of analysis (Khalil, 2012). It is necessary to establish positions for seabed features so that they can be mapped and correlated to features from different surveys. During survey operations Differential Global Positioning System (DGPS) navigation provides these accurate positions. DGPS receivers typically have a horizontal positional accuracy of less than 1 m. During a geophysical survey differential corrections are applied that increase the accuracy to about 0.3 m to 1.0 m. The differential corrections are broadcast from U.S. Coast Guard stations and are received by special antennas that are integrated into the GPS receivers. For nearshore geophysical surveys, Real Time Kinematic (RTK) techniques are typically used to further increase the horizontal accuracy to 2–3 cm. The locations of the tracklines typically represent the location of the GPS, not the location of the towfish. Appropriate correction must be made by using the positioning data that is collected to correct for the layback position of the towfish, for accurate data analysis and interpretation. A typical geophysical survey is conducted using the instrumentation illustrated in Figure 1.

[1] Initially used for marine/coastal surveys, the same set of equipment and protocols are also used for geophysical surveys conducted in riverine/fluvial environments.

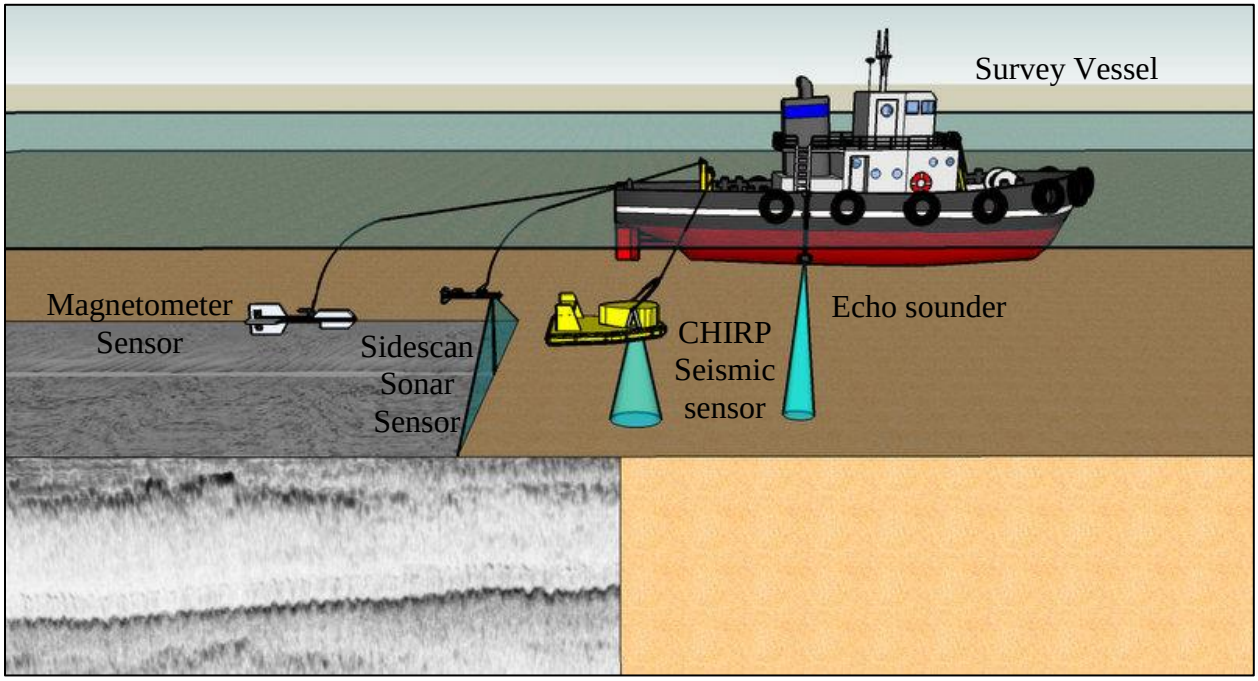


**Figure 1. Schematic diagram showing a typical deployment of sensors for a geophysical survey.**

The various methods of collecting acoustic remote sensing data are described below.

**Control Establishment**

A reconnaissance survey of local survey control must be performed prior to geophysical and hydrographic data collection if RTK GPS is used for vessel navigation, positioning, or water level corrections. Local control should be verified using RTK GPS and/or Static GPS methods to ensure the control is stable and relative to the coordinate systems and vertical heights used for the survey. All monuments recovered by Static methods should be processed in accordance with the *CPRA Guide to Minimum standards for performing GPS surveys and Determining GPS derived Orthometric Heights within the Louisiana Coastal Zone.*

**Navigation and Water Level Corrections**

Appropriate number of tide gauges should be deployed in all survey areas and set relative to local control established or recovered by the static sessions and/or verified local control for the survey in case DGPS is deployed for vessel navigation.

Water level corrections may also be acquired using RTK GPS tide methods in areas under RTK GPS coverage. All GPS derived water levels will be compared to NOAA or locally set tide gauges for comparison and quality control purposes.

Horizontal positioning for areas outside the range of RTK GPS corrections, or in critical areas collected using DGPS, may be supplemented by Post Processed Kinematic (PPK) methods. GPS receivers capable of logging data will be used onboard the survey vessel acquiring data at 1 Hz. Base lines will be post-processed using local NGS CORS

stations. Corrected GPS strings will be input into post processing software to increase the horizontal and vertical accuracies of data collected outside the range of RTK GPS or in critical areas where DGPS was utilized.

**Bathymetric Data**

Bathymetry is a measurement of the elevation of the seafloor. Bathymetric data can be collected using a variety of methods which result in variable data densities. In single beam systems, an acoustic pulse is emitted from a transducer and propagated in a single, narrow cone of energy directed downward toward the seafloor, providing a single depth measurement for a location directly beneath the survey vessel. The transducer(s) then "listen(s)" for the reflected energy from the seafloor. Water depth is calculated by using the travel time of the emitted pulse. Two-way travel time is multiplied by the speed of sound in the ambient water and divided by two. Data are often collected in straight lines with many measurements recorded along that line. The individual values of depth to the seafloor thus obtained are subsequently contoured to generate bathymetric maps.

Dual frequency bathymetry is similar to single beam bathymetry, but an additional beam is added often at a lower frequency which allows the user to collect two separate returns. This is helpful in areas that have muddy bottoms where the higher frequency captures the surface and the lower frequency measures the mud interface with an underlying layer, assuming the mud is not too deep and the underlying layer (e.g., sand, rock) has a clear signature difference when compared to the mud layer.

A multibeam echo sounder is a device typically used by hydrographic surveyors to determine the depth of water and the water bottom features. Most modern systems work by transmitting a broad acoustic pulse from a specially designed transducer across the full swath across-track then forming a return signal beam that is much narrower (around 1 degree depending on the system) to establish a two-way travel time of the acoustic pulse (e.g. Lurton, 2002). If the speed of sound in water is known for the full water column, the depth and position of the return signal can be determined from the receive angle and the two-way travel time. High-resolution multibeam systems are used to accurately map features on the seafloor/riverbed (e.g., sand waves).

Interferometric bathymetry is also used to determine the depth of water and the water bottom features. It's a sonar system based on the process by which two or more sonar waves of the same frequency combine to reinforce or cancel each other, the amplitude of the resulting wave being equal to the sum of the amplitude of the combining waves. Because the angle of interference can be determined, these sonar systems provide bathymetric information over a wide swath. Interferometric systems typically have a wider swath than multibeam systems. Interferometer, much like multibeam, is used when the project requires 100% coverage of the seafloor and has the ability to map locations of hard bottom or coral reefs, image wrecks or other bottom obstructions or debris, and also provide 100% coverage of borrow areas for highly accurate volume calculations. The XYZ point files produced from interferometer systems are similar to LiDAR data and are extremely large. Although the data is referred to as sidescan, the imagery produced by interferometric sonars is graphically flawed. Because of the interferometry, light and dark banding persists across the record making the depiction of an even seabed reverberation difficult.

Regardless of the collection method, the bathymetric data that is collected is in the form of a series of XYZ data points. In order to better visualize the geomorphology, XYZ data is often interpolated to provide a 3-D representation of the seafloor. Due to the variety of methodologies used to process and interpret these data types, a detailed discussion of data interpolation is presented in the "Data Formatting Protocols" section of this document.

**Seismic/Sub-Bottom Profile Data**

Seismic data, sometimes called sub-bottom profile or seismic reflection profile data, is used to visualize subsurface settings or subsurface sedimentary stratigraphy and identify potential project compatible sediment resources. The use of seismic data allows common stratigraphic layers to be mapped throughout the study area while determining the thickness and extent of potential project compatible sediment. An example of a seismic cross-section is shown in Figure 2.

Seismic data is obtained using a sub-bottom profiler that produces sound waves to penetrate the seafloor (Khalil, 2012). The basic principles of subbottom seismic profiling and acoustic depth sounding are essentially the same. A lower frequency and higher power signal (to penetrate the seafloor) is employed in subbottom seismic devices. The transmission of the waves through subsurface sediments depends on properties such as density and composition of substrate. The signal is reflected from interfaces between sediment layers of different acoustic impedance (Sheriff and Geldart, 1982). Coarse sand and gravel, glacial till, and highly organic sediments are often difficult to penetrate with conventional subbottom profilers, resulting in poor records with data gaps. Digital signal processing of multichannel data can sometimes provide useful data despite poor signal penetration. Seismic reflection profiles are roughly analogous to geological cross sections of subbottom sediment because acoustic characteristics are usually related to lithology (Verma, 1986). The two most important parameters of subbottom seismic reflection systems are vertical resolution (*e.g.*, the ability to differentiate closely spaced reflectors) and depth of penetration (*e.g.*, Parkes and Hatton, 1986). The dominant frequency of acoustic pulses increases signal attenuation and consequently decreases the effective penetration. In order to carry out operations in different environments, a variety of seismic sources are used viz. Water gun (20-1500 Hz), Air Gun (100-1500 Hz), Sparker (50-4000 Hz), Boomer (300-3000 Hz), and the latest development Chirp systems (500 Hz-12 kHz; 2 - 7 kHz; 4 - 24 kHz; 3.5 kHz and 200 kHz). The Chirp system has an advantage over single-frequency (3.5 kHz) subbottom profilers and boomer systems in sediment delineation because the reflectors are more discrete and less susceptible to ringing from both vessel and ambient noise.

Seismic reflections indicate changes in sediment within the stratigraphic sequence. Seismic images can be used to delineate stratigraphic boundaries, however the quality of the sediment above and below those boundaries must be field verified by obtaining a physical sample. Vibracores are therefore commonly used to groundtruth seismic data. The final product of seismic interpretation is a three dimensional representation of the sediment thickness, called an isopach.

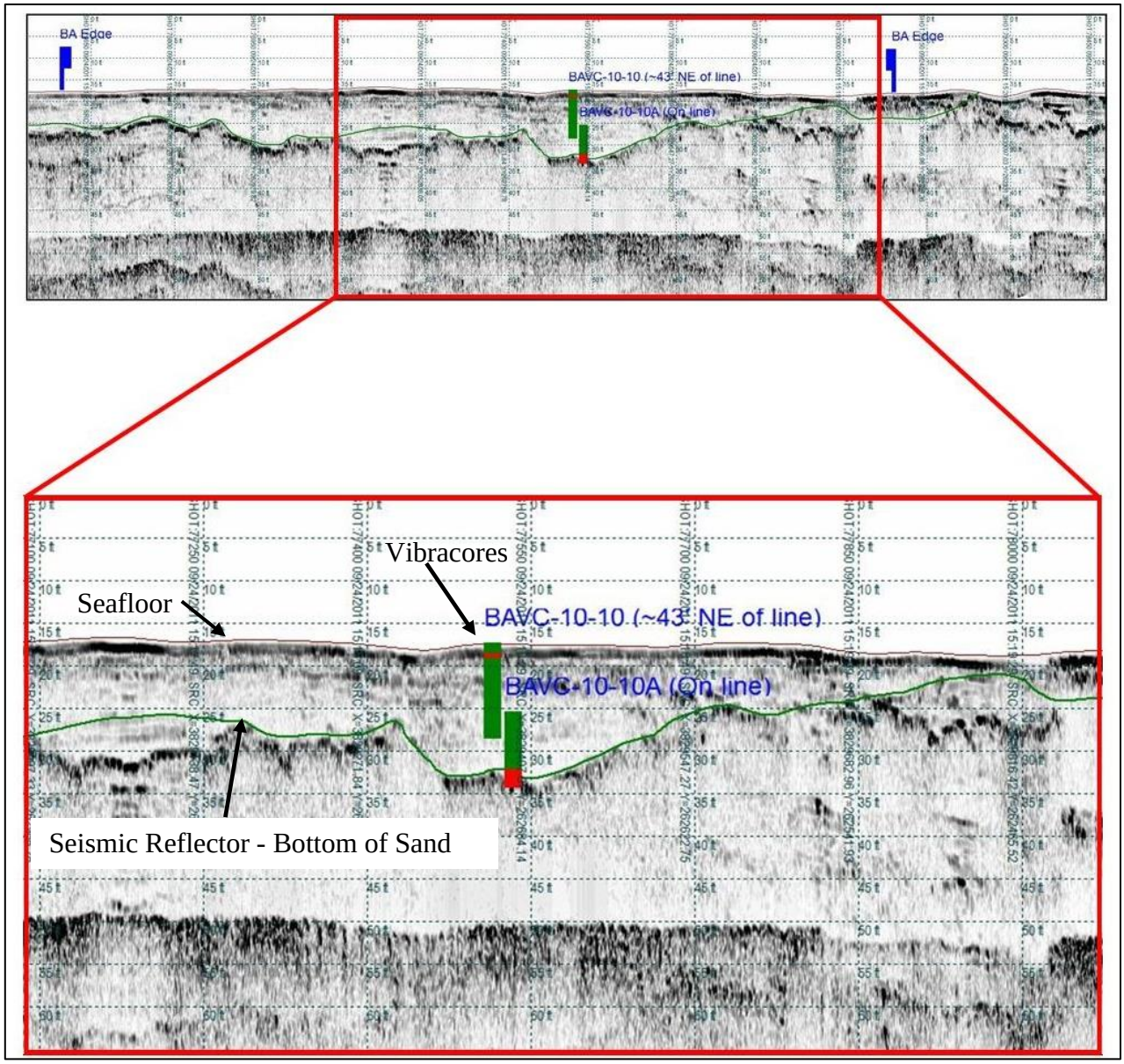


**Figure 2. Interpreted sub-bottom profile that correlates seismic-stratigraphy with litho-stratigraphy. Green represents sand and red represents fine grained sediment (most likely clay or silt)**.

**Sidescan Sonar Data**

Imaging the seafloor with a sidescan-sonar system is accomplished by towing a sonar "tow-fish" or sensor. The tow-fish is equipped with a linear array of transducers that emit, and later receive, an acoustic energy pulse in a specific frequency range. In general, if all other parameters are constant, a rougher surface will backscatter more energy than a smooth surface and therefore, return higher amplitude signals (Fish and Carr, 1991). Shadows result from areas of no energy return, such as shadows from large boulders or sunken ships. These shadows aid in the interpretation of the sonogram (after Urick, 1983).

Sidescan data provides an acoustically generated image of the seafloor or riverbed as well as to verify the location and extent of unconsolidated sediment and to map water bottom features such as benthic habitats, exposed pipelines, cables, underwater wrecks, potential cultural resources, etc. Sidescan sonar can also be used to confirm or improve interpretation of the sub-bottom seismic records (Khalil, 2012). The sidescan survey is conducted to identify features that may affect borrow area delineation, introduce hazards to dredging, or adversely impact the environment. An example of a sidescan sonar image of a shipwreck is presented in Figure 3.

**Figure 3. Sidescan sonar image showing a shipwreck and adjacent seafloor, offshore Louisiana in approximately 35 feet of water.**

Sidescan sonar is used to distinguish topographic elements on the seafloor or riverbed. Acoustic signals from a ‘‘fish’’ towed below the water surface are directed at a low angle to both sides of a trackline, in contrast to downward-directed echo sounder and seismic reflection signals (Fish, 1990; Mazel, 1985a, 1985b; Sheriff and Geldart, 1982). The resulting image of the bottom is similar in many respects to a continuous aerial photograph. Commonly available sidescan sonar systems operate at 100 kHz frequency and have swath widths of 500 meters or more on either side of the vessel trackline. Depending upon the water depth it is thus possible to image the water bottom/seafloor with 1-kilometer swaths in each pass (Fish, 1990; Morang, Larson, and Gorman, 1997a, 1997b). Advanced digital sidescan sonar systems perform signal processing that corrects for the slant range to seafloor targets and survey vessel speed. A dual-frequency sidescan sonar system (*e.g.*, Klein model 590) can be used simultaneously with a subbottom system to map hardbottom.

**Magnetometer Data**

A proton or cesium marine magnetometer is typically used for a high-resolution magnetic remote sensing which is needed to identify any metallic objects that could represent a

potential cultural resource or hazard to dredging. The purpose of the magnetometer survey is generally to establish the presence and subsequent exclusion zones around any potential underwater wrecks, submerged hazards (debris, pipeline), surface structures or any other features that would affect future sediment/sand borrow area delineation and dredging activities (e.g. Keary *et al*., 2003). The magnetometer provides a measurement of the earth's magnetic field intensity expressed in gammas. Metallic man-made objects and geologic features can create a measurable disturbance in the earth's magnetic field. This data is used to identify potentially significant cultural resources, submerged hazards (pipelines and cables), and modern debris that should be avoided during borrow area design (Khalil, 2012).

Magnetic anomalies can be viewed with seismic and sidescan data to gain additional information about the objects identified. Sidescan sonar may provide images of objects if they are on the surface. Items at depth may be seen in the seismic data. Magnetometer surveys along with sidescan sonar are required for hazard and archaeological assessment survey/cultural resources survey and are conducted on closer line spacing. Normally for such surveys, the specifications and guidelines are provided by the permitting agency. In order to produce a magnetic record of sufficient resolution, the sensor is deployed and maintained in the water column at a depth of approximately +1 to 3 meters below the water surface. A computer record provides a continuous record of magnetic background and target signatures. Positioning data from the navigation system is tied to the magnetometer as it is with any other sensor by regular annotations to facilitate target location and anomaly analyses. When magnetic data is interpreted by a qualified marine archaeologist, avoidance areas are delineated.

**ADCP Data**

An acoustic Doppler current profiler (ADCP) is similar to sonar. It is used to measure water current velocities over a depth range using the Doppler effect of sound waves scattered back from particles within the water column. ADCP can be used in rivers to continuously measure discharge or sediment flux. ADCP can also be used in the ocean to measure currents, salinity, dissolved oxygen etc. ADCP instrumentation can be mounted on moorings within the water column or can be mounted on a moving vessel.

**Other Remote Sensing Data**

Other remote sensing techniques are used to obtain information about areas from a distance (*e.g.* using satellites or aircraft). Some of the methods commonly used are described below.

**Airborne LiDAR Surveys**

Light detection and ranging (LiDAR) measures the elevation of the ground using a scanning laser. LiDAR is a remote sensing technology that measures distance by illuminating a target with a laser and analyzing the reflected light. This method uses ultraviolet, visible or near infrared light to image objects. It can target a wide range of materials including non-metallic objects like rock or sediment. It is an approach commonly used to develop terrain models. Aerial LiDAR collects measurements from an aircraft that has the capability to map large areas in relatively short time intervals. LiDAR can also be attached to a vehicle or mounted on a tripod to measure a localized study area.

Bathymetric LiDAR measures the elevation of the seafloor using a scanning laser. The systems are almost identical to topographic LiDAR systems, but bathymetric LiDAR utilizes blue-green lasers as opposed to the near-infrared lasers used in topographic systems. Bathymetric LiDAR systems have slower pulse rates and collect relatively smaller density of points when compared to topographic LiDAR due to the larger wavelengths of the blue-green lasers combined with the need to correct for angular distortions when measuring light through air and water. Bathymetric LiDAR collects measurements from an aircraft that has the capability to map large areas in relatively short time intervals. Bathymetric LiDAR is used to determine water depth by measuring the time delay between the transmission of a pulse and its return signal. Bathymetric LiDAR techniques are not effective in the turbid water off Louisiana. However, during periods of the year when the water is less turbid, the USGS has reported successfully using LiDAR to depths of up to 3m in some parts of the Chandeleur Islands.

**Aerial Photographs**

Aerial photographs are photographs of the ground taken from an elevated position. The camera is typically not supported by a ground-based structure but rather by platforms such as helicopters or airplanes. Aerial photographs are often used to identify land features and often form the basis for topographic maps.

**Topographic Survey**

Coastal profiles are the backbone to measuring change along the coastline. Conventional beach profiles start at installed monuments and are surveyed seaward of the monument at a defined azimuth. The beach profiles measure both the dune and berm and are often combined with bathymetric data in order to capture the entire active profile. When the same profile is measured repeatedly at different times, a time series can be developed that enables quantification of coastal change and represents the performance of the section of beach over the measured time period. Beach profiles are often measured using RTK GPS and differential leveling techniques. The RTK GPS provides centimeter-accuracy with respect to elevations with real time horizontal positioning provided to the surveyor to ensure on line measurements. Differential leveling techniques are typically used in upland areas that are inaccessible to RTK GPS systems. Elevations are typically taken at fixed intervals along each profile line and at all grade breaks.

**Shoreline Position**

Shoreline data are influenced by a multitude of geomorphological (exogenic), hydrological (tidal), and anthropogenic processes. Capturing and recording these dynamic data are critical to understanding and assessing coastal erosion. Recording and tracking accurate shoreline positioning is critical to calculating shoreline change rates.

Various techniques are implemented for shoreline mapping including remote sensing, LiDAR, analytical photogrammetry, differential global positioning (DGPS), and more. Shoreline change is often quantified by measuring horizontal differences between Mean High Water (MHW) positions along a transect over time (Figure 4). MHW is a tidal datum that often translates to a legal boundary that represents the land-sea interface. Since the datum is tidal, the elevation of MHW changes spatially depending on local tidal conditions. There are three primary methods for measuring MHW: conventional survey, aerial photography, and LiDAR. Conventional surveys use leveling, total station, and

more recently RTK GPS to measure points along the coastline that are approximately 1 foot above and 1 foot below the local MHW level. The position and elevation of the MHW point is then interpolated between the pairs of points. Aerial photography significantly increased the ability to map MHW spatially by digitizing the wet-dry line that is imaged by an orthophotograph mosaic. More recently, MHW has been extracted from LiDAR data by contouring a LiDAR derived digital elevation model (DEM) at the locally determined MHW level.

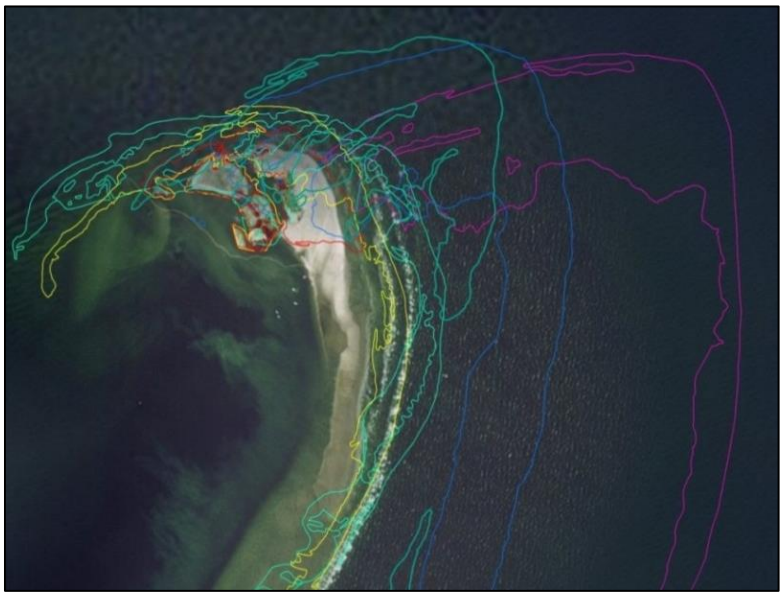

**Figure 4. Evolution of shoreline position at Breton Island. Each colored line represents the position of the shoreline at a specific time.**

**Geotechnical Investigation/Sediment Sample Data**

Seafloor sediments on the inner continental shelf, especially in deltaic environments, display great spatial and temporal variation. Sediment samples are used to determine sediment quality and to verify the remotely sensed data. The two main types of physical samples are grab samples and core borings.

**Surficial Sampling/Grab Samples**

The nature of surficial sediment may provide information about the energy of the environment as well as the long-term processes and movement of sediment, such as sediment transport pathways, sources and sinks (Morang *et al*., 1993). Surficial sediments are typically collected using grab samplers. These samplers basically consist of opposing, articulated scoop-shaped jaws that are lowered to the bottom in an open position and are then closed by various trip mechanisms to retrieve a sample (Morang *et al*., 1993) (Figure 5). There are a number of methods also used to collect grab samples including ponar, auger, box core, dredge, Ekman, rotary wash, scoop, Van Veen and Young. The method used depends on the nature of the seafloor and thickness of the sediment sample required. Grab samples are typically used for reconnaissance level investigations to determine surficial sediment characteristics/distribution.

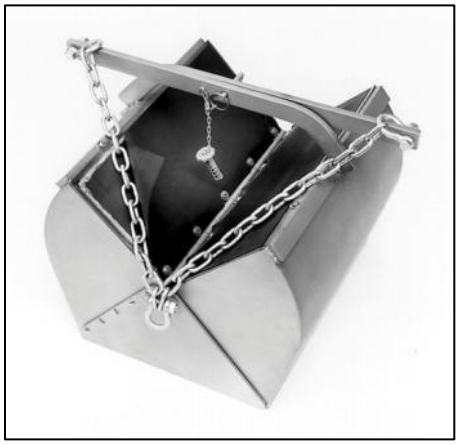

**Figure 5. Ponar sampler used to collect grab samples.**

**Core Borings**

Although obtaining surficial samples is helpful for assessing recent processes, it does not provide sufficient details about stratigraphy and sediment thickness. Direct sampling of subbottom materials is often essential for stratigraphic studies that extend beyond historic time scales (Morang *et al*., 1993). There are various subaqueous sediment-sampling systems that do not require drill rigs. Exploration for offshore sand and delineation of potential borrow sites mainly involve geotechnical or sediment-sampling programs in addition to geophysical surveys mentioned earlier. The geotechnical operations include surface sampling, jet probes, and vibracores (Finkl and Khalil, 2004). Vibracores, are commonly used for obtaining sand samples in marine and coastal environment and now frequently used in riverine environment too. Core borings provide sediment samples at depth, and are therefore used to characterize sediment in a deposit and correlate sediment types to seismic records in order to map specific deposits. There are several core boring methods, however vibracores are typically used for sediment search investigations, and they are the most prevalent in the LASARD database. Vibracores provide a continuous physical sample. A core barrel is driven into the seafloor through the use of a vibrating head. Once the core barrel has reached maximum penetration, the vibrating head is stopped and the core is extracted. Other core boring methods include Cone Penetrometer (CPT), Gravity Cores, Kasten Cores, Piston Cores, Push Cores, Split Spoon Cores and Standard Penetrometer (SPT).

Cores can be invaluable because they allow a direct, detailed examination of the layering and sequences of the subsurface sediment in the study area. The sequences provide information regarding the history of the depositional environment and the physical processes during the time of sedimentation.

Depending upon the information required, the types of analysis that may be performed on cores include grain size, sedimentary structures, identification of minerals and shells, organic content, microfaunal identification, x-ray radiographs and other geotechnical studies. Cores are split lengthwise and logged by describing sedimentary properties by layer in terms of layer thickness, color, texture (grain size), composition and presence of clay, silt, gravel, or shell and any other identifying features (Figure 6). Sub samples are

generally collected from the cores for laboratory analysis and vibracores may be photographed in sections.

**Figure 6. Vibracore logging and sub-sample collection.**

**Other Data Supported by LASARD**

In addition to remote sensing data and geotechnical data, LASARD houses the locations of known shipwrecks, oil and gas infrastructure (*e.g.*, pipelines and platforms) and existing deposits/borrow areas. This data is used for borrow area design and is also important in investigation planning.

## GEOSCIENTIFIC DATA MANAGEMENT PROCEDURES

Data submitted for incorporation into LASARD must meet all of the guidelines and requirements established by CPRA. To meet these guidelines, procedures have been developed for the standardization of geoscientific data. This section describes the data formatting and quality assurance/quality control procedures and protocols established by CPRA.

**Data Formatting Standards**

All data must be provided in a GIS format according to the attribute table specifications provided in Appendix 1 (Tables 1 through 12). Points, lines and polygons should be created in shapefile format with their respective attributes and hyperlinks to the associated data as appropriate and as indicated in the attribute table specifications. Original bathymetric XYZ data should be provided to CPRA for archival. CPRA will provide a link to the original bathymetric data. Shapefiles and raster imagery must be projected in UTM Zone 15N and referenced to the NAD83 horizontal datum and to the NAVD88 vertical datum. Metadata for each data set must be provided in a Federal Geographic Data Committee (FGDC) compatible format. Metadata should be provided in both xml and html format. All data formatting should be conducted following the quality assurance and quality control procedures described below.

**Quality Assurance/Quality Control Standards**

Quality assurance should be considered during the planning, design, development and production phases of each data collection effort. Each phase of the effort should be designed and modified, where necessary, to produce a high quality end-product. Each phase should be carried out by a surveyor, geoscientist or geologist and overseen by a licensed Professional Geologist and/or

Professional Surveyor and Mapper. It is the responsibility of the surveyor to provide accurate and high quality XYZ data.

The datasets should be formatted following CPRA guidelines for delivery and import into the CPRA GIS database. Wherever possible, the geoscientists and geologists collecting and processing the data should populate the attribute table associated with each data type following the attribute specifications provided in Appendix 1. FGDC compatible metadata is required to be created for each dataset in both xml and html format.

Following shapefile and metadata creation, an independent review should be conducted by a GIS analyst or equivalent. All files (attribute tables and metadata) should be reviewed for data integrity and completeness. This extensive review should include a comparison between the attribute tables and the original PDF or paper copies (if data were entered manually), verification of the projection (UTM Zone 15N) and datum, testing of the functionality of hyperlinks and a comparison between the attribute tables created and attribute specification tables to ensure completeness and accuracy. In addition, each dataset should be plotted to visually verify that the data are in a reasonable geographic location. Any quality issues that are identified by the reviewer should be corrected by respective surveyors, hydrographers, geoscientists and geologists. The corrected files should then be re-submitted to the original reviewer for additional review and finalization.

**Data Formatting Protocols**

The data formatting protocols developed by CPRA for each data type are discussed below.

**Topographic, Bathymetric and Isopach Data**

A major component of LASARD is topographic and bathymetric survey data. Topographic and bathymetric data are collected using multiple platforms and their final products are provided in several formats (Table 1). Some data (e.g., LiDAR) are storage intensive and difficult to manipulate. These larger data sets require a more manageable format that does not sacrifice the resolution necessary to yield meaningful information. This section describes the procedures for processing and storing/archiving topographic and bathymetric data.

**Table 1. LASARD topographic and hydrographic data sets**

| | Type | Approximate Density | Raw Data Format | Approximate Full Resolution File Size | Recommendations | Approximate Recommended File Size |
|---|---|---|---|---|---|---|
| Topographic | Profiles | < 8 meters in Line | ASCII XYZ | 10 MB | XYZ Point and Linked Polyline Transect (if available) | 10 MB |
| Topographic | Shoreline Position | < 15 meters in Line | ASCII XYZ | 10 MB | XYZ Point and/or Polyline Contour | 10 MB |
| Topographic | LiDAR | 0.5-20 Points/Square Meter | LAS and/or ASCII XYZ | > 1 GB | Polyline Contour; 1 m GeoTIFF; link to compressed XYZ | 10 MB |
| Bathymetric | Single Beam; Dual Frequency | < 0.3 meters in Line | ASCII XYZ | 100 MB | XYZ Point; Polyline Contour; 10 m GeoTIFF | 10 MB |
| Bathymetric | Multibeam; Interferometer | 20 Points/Square Meter | ASCII XYZ | > 1 GB | Polyline Contour; 1 m GeoTIFF; link to compressed XYZ | 10 MB |
| Bathymetric | LiDAR | 0.25 Points/Square Meter | ASCII XYZ | > 1 GB | Polyline Contour; 1 m GeoTIFF; link to compressed XYZ | 10 MB |

**Topographic Profiles.** Profile data are provided as XYZ points or range and elevation based on monument positions and azimuths. Sometimes profiles are displayed on two-dimensional plots (Figure 7) that show cross sections of the measured environment. Although the along-profile density of points is sufficient to derive localized surfaces, interpolation between transects is often too large to accurately represent the morphology between profiles. Thus, it is not recommended to derive surfaces or contours from the measured profiles. Profile data should be stored as XYZ points within the GIS database, and should profile plots exist, the plots shall be linked in the GIS database to a polyline representing the location and extent of the measured profile.

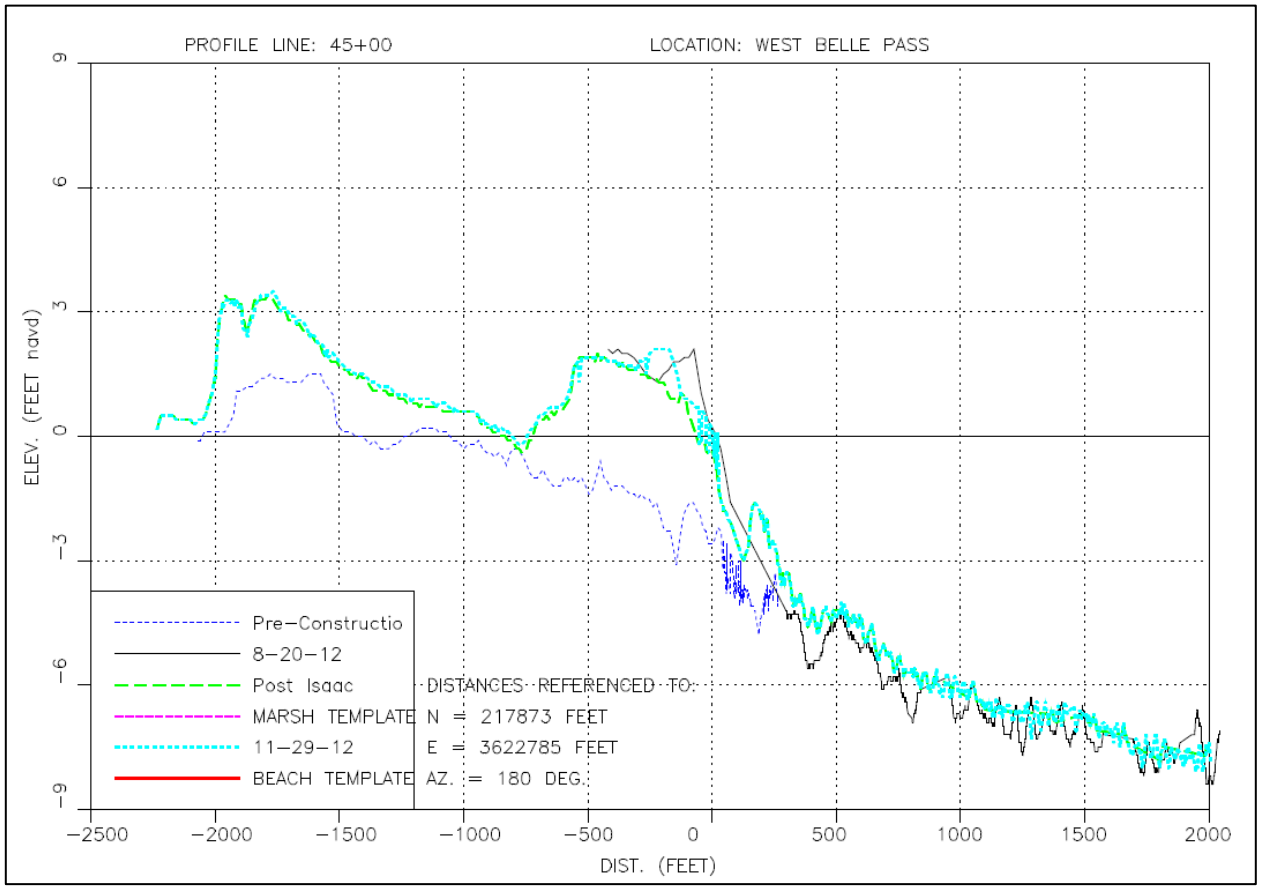


**Figure 7. Topographic profiles surveys on West Belle Pass.**

**Topographic Shoreline Position.** Shoreline change is often quantified by measuring horizontal differences between Mean High Water (MHW) positions along a transect over time. As previously discussed, there are three primary methods for measuring MHW: conventional survey, aerial photography, and LiDAR. The display and storage of MHW data within a GIS involves both XYZ points and lines. Both data formats have relatively small file sizes, thus, all XYZ and line data is stored as points or polylines with their associated attributes.

**Topographic LiDAR**. The high pulse rate of LiDAR systems combined with an aerial platform translates to a significant amount of data that measures large areas. These data are often processed by the data provider and provided to the client as XYZ or LAS points. The point cloud data produced by LiDAR are often provided as sets of very dense (XYZ) points or in a more complex, public file binary format called LAS that may include multiple returns as well as intensities. A typical file size of a single LiDAR project in point format often exceeds 1 GB. Despite Esri's ability to load and display the LAS format, it is both time and storage prohibitive to work with LiDAR data at the point level. A sample of processed LiDAR data is provided in Figure 8.

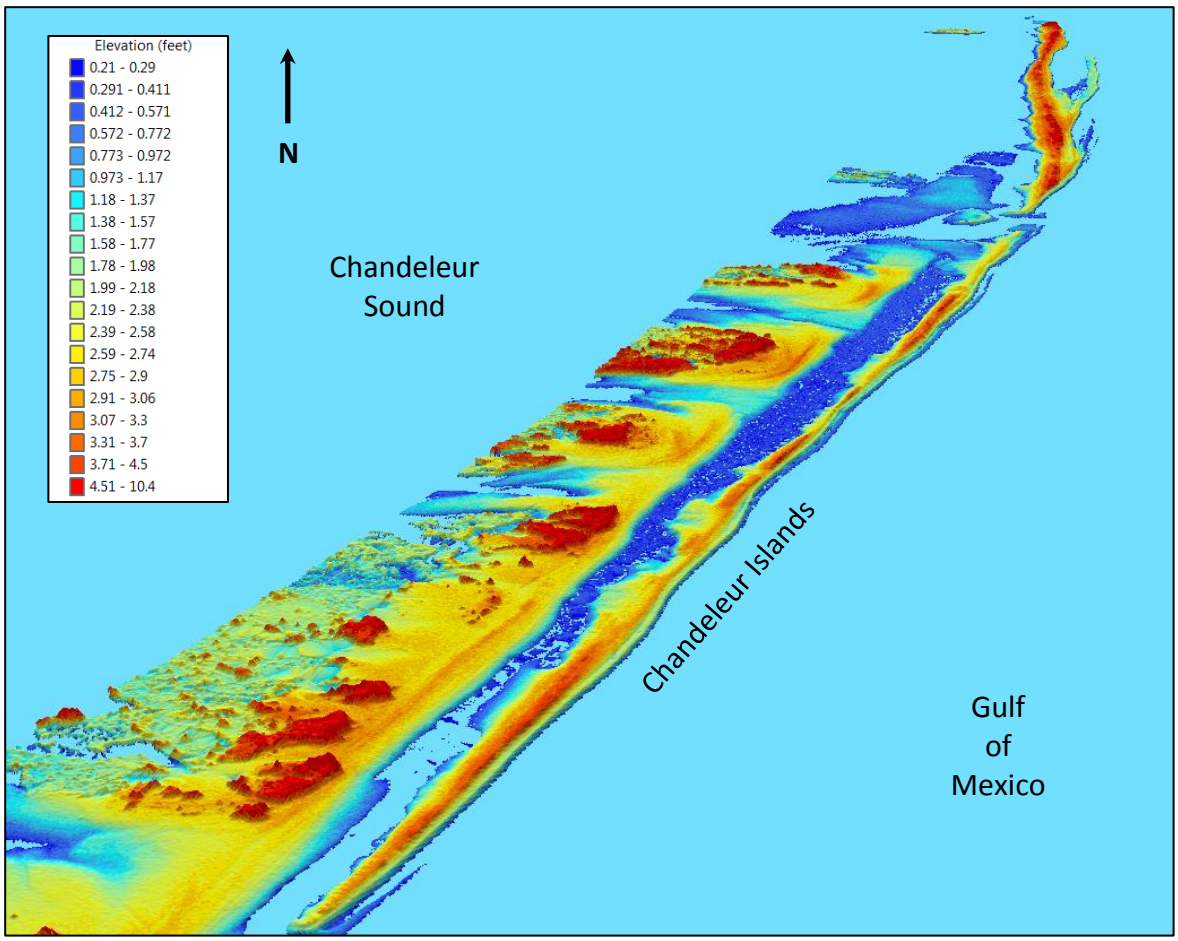


**Figure 8. Three-dimensional oblique view of the Chandeleur Islands using topographic LiDAR elevation data.**

Given the scientific and management standard of working with LiDAR data at the surface level, LASARD stores LiDAR data as surfaces and contours. Both the surface and contour formats require significantly smaller disk space and quantifications from surfaces and contours are easier when working in a GIS environment. Interpolated surfaces are regularly spaced and the equal area properties of the UTM datum assure accurate area and volume calculations.

The final LiDAR surface can be saved in GeoTIFF format at 1 meter resolution. The final contours should be in polyline format with attributes that indicate elevation in 1 foot intervals. Although data are formatted into contours, raw XYZ data are also being maintained. A link to the raw XYZ data is provided in the attributes.

**Single Beam and Dual Frequency Bathymetry.** In LASARD, all XYZ single beam bathymetry data is stored as points with their associated attributes. A sample of spot elevations derived from single beam data is provided in Figure 9.

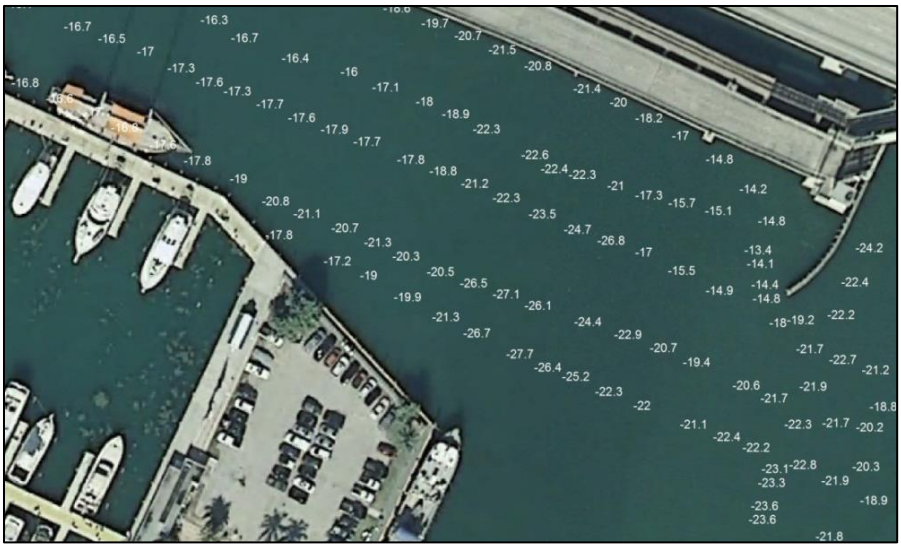

**Figure 9. Spot elevations derived from single beam data overlain on an aerial photograph.**

Dual frequency data should be stored the same as single beam data, but the points must represent the seafloor. Should the single beam or dual frequency datum be interpolated into surfaces and contoured, the data should be stored as a 10 meter GeoTIFF along with the attributed polyline contours.

**Multibeam and Interferometer Bathymetry.** The XYZ point files produced from these systems are similar to LiDAR data and are extremely large due to the potentially large areas of swath bathymetry that multibeam systems are able to collect. Figure 10 is an example of processed multibeam bathymetry collected in the Wax Lake Outlet area.

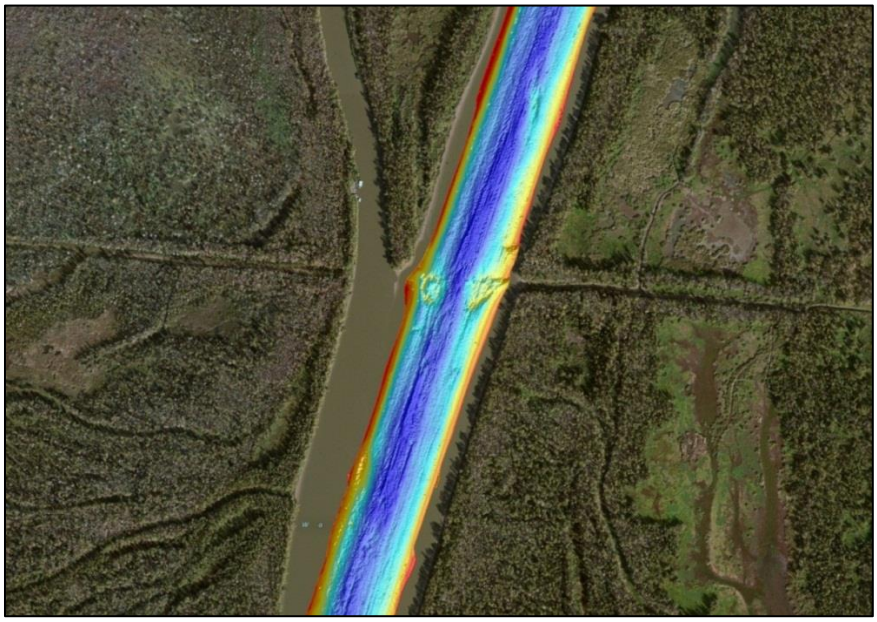

**Figure 10. Color-shaded relief image of multibeam data collected in the Wax Lake Outlet area of the Atchafalaya River combined with an aerial photograph to provide orientation.**

Given the scientific and management standard of working with multibeam or interferometer data at the surface level, it is stored as surfaces and contours. Both the surface and contour formats require significantly smaller disk space and quantifications from surfaces and contours are easier when working in a GIS environment. Interpolated surfaces are regularly spaced and the equal area properties of the UTM datum assure accurate area and volume calculations. The final multibeam or interferometer surface can be saved in GeoTIFF format at 1 meter resolution. The final contours should be in polyline format with attributes that indicate elevation in 1 foot intervals. It is important to note that although data is being formatted into contours, a link to the raw XYZ data is included in the attributes as indicated in Appendix 1, Table 1.

**Bathymetric LiDAR**. These data are often processed by the data provider and produced to the client as XYZ or LAS points. A typical file size of a single bathymetric LiDAR project in point format often exceeds 1 GB. Even with Esri's ability to load and display the LAS format, it is both time and storage prohibitive to work with bathymetric LiDAR data at the point level. Figure 11 shows an example of bathymetric and topographic LiDAR data collected in Florida.

Given the scientific and management standard of working with bathymetric LiDAR data at the surface level, bathymetric LiDAR data are stored as surfaces and contours. Both the surface and contour formats require significantly smaller disk space and quantifications from surfaces and contours are easier when working in a GIS environment. Interpolated surfaces are regularly spaced and the equal area properties of the UTM datum assure accurate area and volume calculations. It is recommended that the final bathymetric LiDAR surface be saved in GeoTIFF format at 1 meter resolution. The final contours should be in polyline format with attributes that indicate elevation in 1 foot intervals. As previously indicated, although data is being formatted into contours, a link to the raw XYZ data is included in the attributes as indicated in Appendix 1, Table 1.

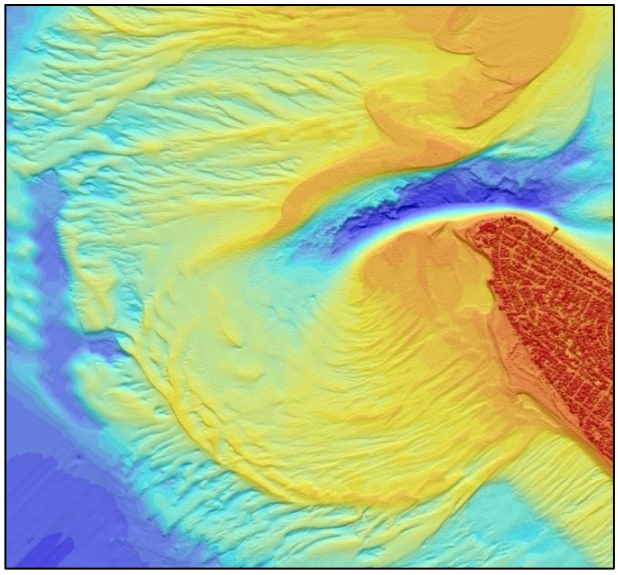

**Figure 11. Bathymetric and topographic LiDAR data collected on the west coast of Florida.**

Special care must be taken when interpolating topographic and bathymetric data to surfaces (DEMs) and deriving contours. It is not appropriate to apply a single interpolation technique to all data types and environments. Open flat areas with several hills should be interpolated differently than river channels. Although the high density of LiDAR points minimizes the need to interpolate over large distances, the final surface shall represent the measured ground or seafloor and every effort should be taken to minimize artifacts. For example, single beam measurements along profiles that map the Mississippi River have large gaps to be interpolated between the transects, and these data should use different methods for generating DEMs. Typical interpolation algorithms include kriging or a triangulated irregular network (TIN), as long as the TIN surface does not result in unrealistic angular surfaces. Kriging tends to work best for high density measurements like multibeam and LiDAR. TIN tends to perform best when interpolating between transects, assuming the elevations between transects trends perpendicular to the transect direction like the Mississippi River or any featureless water bottom. Contours/isobaths should not contain angular deviations that do not exist on the measured surface. Finally, interpolations outside the measured area should be removed to ensure the user is working with measured areas and not misleading interpolation. The final surface derived from high-density data should be provided in GeoTIFF format at 1 meter resolution. Other formats like Esri Grid or ER Mapper have limited portability due to their multiple linked files and directories.

**Isopach Data.** Using the seafloor and the reflector representing non project-compatible material (*e.g.* high rock content), the thickness of the sediment deposit can be calculated and exported in order to develop an isopach (sediment thickness) map of each potential resource area. The maps that are created may be verified by importing and gridding the thickness data in Golden Software Inc's Surfer 8®. After gridding the data, contour maps showing sediment thickness are produced. The contour maps should be checked for discrepancies in the data. Once the data has been verified, final thicknesses can be exported and used in the borrow area design process. Isopach data are stored in LASARD as XYZ points and polylines, using the attribute formats provided in Appendix 1, Tables 1 and 2.

**Magnetic Anomaly Data**

Upon completion of a general magnetometer survey, the data are examined/analyzed by a marine geologist and also by a qualified marine archaeologist (as required by state/federal agencies), who provides the locations of magnetic anomalies, indicates whether they are significant or not and provides recommendations regarding avoidance buffers. Magnetic anomaly data are stored in LASARD as XY points, using the attribute formats provided in Appendix 1, Table 3.

**Survey Tracklines/Transects**

As previously discussed, geophysical data including seismic, sidescan sonar, magnetometer and bathymetric data as well as some Acoustic Doppler Current Profiler (ADCP) data are collected along pre-defined tracklines. Topographic data is also collected along transect lines. Due to the linear nature of these features, trackline and transect data are stored as polylines, using the attribute formats provided in Appendix 1, Table 4. Links to associated sidescan sonar images, seismic profiles and ADCP survey data are also provided.

**Sediment Samples/Grain Size**
Vibracores and grab samples are typically analyzed for physical parameters of the sediment (e.g., color, texture/grain size, composition and presence of clay, silt, gravel or shell). The products of these analyses may include core logs, photographs, granularmetric reports and grain size distribution curves. Sediment sample locations are stored as XY points, using the attribute formats provided in Appendix 1, Table 5. Any available elevation information is stored within the attribute table. Links to any associated sediment analysis products (*e.g.* core logs, photographs etc.) are also provided.

**Deposit/Borrow Areas**
Sediment resource data are stored as polygons, using the attribute formats provided in Appendix 1, Table 6 and are classified as potential deposits, borrow areas, offshore disposal sites, rehandling areas or staging areas based on their use.

**Oil/Gas Infrastructure**
Oil and gas infrastructure data (*e.g.* platforms, wells etc.) are stored as XY points, using the attribute formats provided in Appendix 1, Table 7.

**Oil/Gas Pipelines**
Oil and gas pipeline data are stored as polylines, using the attribute formats provided in Appendix 1, Table 8.

**Cultural Resources**
Cultural resources typically include cemeteries, mounds, plantations, shell middens and shipwrecks. Since these are discrete locations, cultural resource data are stored as XY points, using the attribute formats provided in Appendix 1, Table 9.

**Shoreline Position**
As previously discussed, shoreline position is based on measuring Mean High Water (MHW) positions along a transect over time. The display and storage of MHW data within a GIS involves both XYZ points and lines. Both data formats have relatively small file sizes, however, shoreline position is stored as polylines with their associated attributes, using Table 10 in Appendix 1. Although shoreline position is used to analyze shoreline change (Figure 12), shoreline change data is not being stored in LASARD.

**Sidescan Sonar Contacts**
Sidescan sonar contacts are stored as points using the attribute formats provided in Appendix 1, Table 11. Information provided for each contact includes the dimensions of the target, the location of the target, the type of feature represented by the target (if known) and the frequency of the sonar system used to detect the target. Links to sidescan sonar contact images such as that shown in Figure 3 (if available), are also provided. The contact images are typically provided in pdf, jpeg or tiff format.

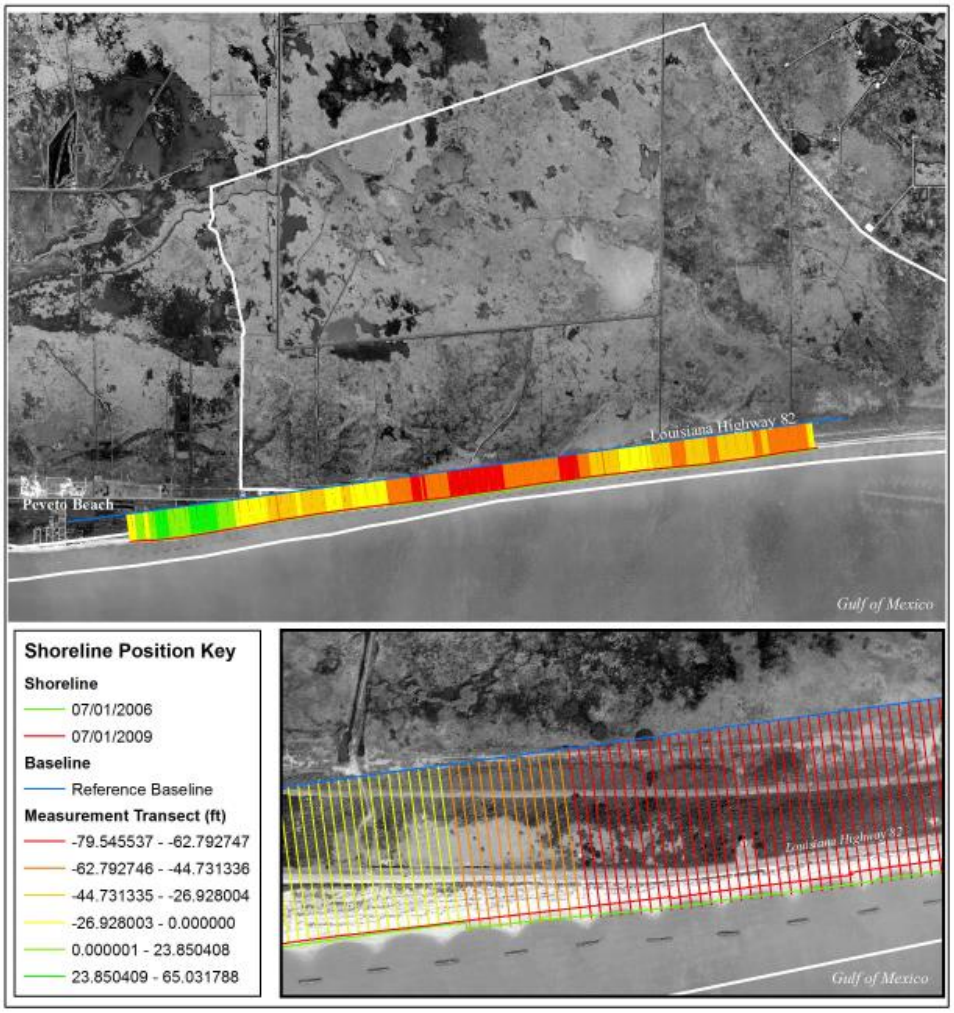


**Figure 12. Shoreline-change map used for CWPPRA project analysis Holly Beach Sand Management (CS-31)**

## CPRA Geospatial Standards

All geospatial data must meet the requirements outlined below. The required projection is NAD 83 UTM Zone 15N Meters GRS 1980 as shown in the table below.

**Table 2. Projection Requirements.**

| | |
|---|---|
| **Horizontal Datum** | Units: Units of XY data (meters)<br>Coordinate System: Universal Transverse Mercator (UTM) Zone 15 N<br>Datum: North American Datum 1983 (NAD 83) |
| **Vertical Datum** | Z_Unit: feet or meters are acceptable<br>Datum: NAVD 88 |
| **Geodetics** | GEOID12A : Geodetic Reference System 1980 (GRS 80) |

**Vector Data**
All vector data should be provided in Esri shapefile format.

**Raster Data**
All raster data should be provided in GeoTIFF or ERDAS Imagine (.img) format. Data may also be provided as a compressed FGDB or ArcGIS raster (mosaic, catalog, dataset). If provided as a raster, compression must be lossless.

**Map Documents**
Map documents should be provided in MXD format using Arc10.1 or newer. All data should be packaged and provided with the MXD. Data within the MXD (shapefiles, rasters, tables, etc.) should be linked to the correct source file.

**Map Elements**
All map documents must include the following elements: title, legend, map date, citation for background imagery, scale bar, scale text (absolute scale) and north arrow. Map documents should also include a logo and an inset map that shows location.

All data must be provided with Federal Geographic Data Committee (FGDC) compliant metadata in both XML and HTML format. All data must be reviewed prior to submittal to ensure that the data is topologically correct, accurate and complete.

## GEOSCIENTIFIC DATA DELIVERY PROTOCOLS

In addition to the formatting guidelines discussed above, additional procedures have been developed for the delivery/submittal of geoscientific data. This section describes the data delivery protocols established by CPRA.

### Data Submittal Format

All data submittals should include raw data and shapefiles formatted to the LASARD specifications described previously as well as in "data packages" which CPRA uses to aid in data visualization and dissemination. Shapefile templates for each of the data types represented in Appendix 1, are provided in Appendix 2. Appendix 2 contains a total of 12 templates created using Esri ArcGIS 10.3.1 software.

Data packages typically consist of a zipped folder containing the processed data (shapefile and associated xml and html data) and a zipped folder containing the raw data (*e.g.*, XYZ data, magnetic anomaly table, map etc.). Some data types will have links in their attributes to additional data (*e.g.*, to vibracore logs or seismic reflection profiles). In these cases, there will be additional zipped folders that contain the hyperlinked files.

### Data Delivery Grid

CPRA has developed a data delivery grid that covers the entire state of Louisiana. This grid is used to identify the location of the data based on cells that have been assigned numeric identifiers. The identifier is the absolute value of the concatenation of the ulx and uly fields which represent the upper left x and y coordinates of the grid cell. A dataset is assigned the identifier of the grid cell that it falls within. If a dataset does not fall completely within a single grid cell it is assigned "0000000000". Figure 13 provides an example of the data delivery grid in

the vicinity of Barataria Bay and the Mississippi River delta. Processed raster deliverables must also be subsetted using the data delivery grid and delivered within an appropriately named data package.

All modeling output grids must use the same origin when submitting data to CPRA. The origin (lower left coordinate) for raster data (in UTM Zone 15N) must be (400000.0 (Easting), 3000000.0 (Northing)). The shape of the raster cells must be square with cell height equaling cell width. Raster cells will be in multiples of 1 meter. Standard cell size shall be 1 meter, 10 meters and 30 meters to ensure that each will completely nest with the next highest cell size. The data delivery grid is provided with this document in shapefile format and is called "CPRADataDeliveryGrid.shp.zip" (Appendix 3).

**Figure 13. Data delivery grid in the vicinity of Barataria Bay and the Mississippi River Delta.**

**File Naming Convention**

CPRA has also established a file naming convention that all data deliverables must comply with. This nomenclature is designed to describe the data files, with or without the presence of a sub-folder structure, through the use of naming elements which are summarized in the table below. In the naming convention, each of the elements summarized in Table 3 is separated by an underscore. A detailed description of the naming convention and its use is provided in Appendix 4.

**Table 3. Summary of File Naming Convention Elements**

| Element | Description | Maximum Characters | Example |
|---|---|---|---|
| 1 | Identifies the specific project for which the data collection was completed. If known, this should be a CPRA assigned project ID. | 20 | LA-0026 |
| 2 | Identifies the type of data being delivered within the file. Data type codes are provided in the document in Appendix 4. | 5 | ELMBB |
| 3 | Identifies the location of the data within the data package based on a CPRA defined data delivery grid (Appendix 2). | 10 | 9500028125 |
| 4 | Identifies the collection date or range of the data within the file. | 16 | 2011051420110514 |
| 5 | Provides a sequence element to distinguish data packages that might otherwise have the same name. The first character in this sequence indicates whether the data is processed, raw or an analysis product. The remaining sequence is typically the ID of the dataset. | 7 | PBF0003 |
| 6 | This is optional and may be used to capture any additional information that might be useful to help identify the data. | 10 | CHANDELEUR |

Note: based on the examples provided in the table above, the data package containing the processed data would be named "LA-0026_ELMBB_9500028125_2011051420110514_PBF0003_CHANDELEUR.zip"

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