



**Caminada Headlands Back Barrier Marsh  
Creation Project (BA-171)  
Lafourche Parish, Louisiana**

**2015 Methodology Report**

**PREPARED FOR:**

**State of Louisiana**

**Coastal Protection and Restoration Authority  
(CPRA)**

**PREPARED BY:**

**Morris P. Hebert, Inc.**

**July 6, 2015**

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**SECTION 1**  
**METHODOLOGY REPORT**

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Morris P. Hebert, Inc. (MPH) has been contracted by the Coastal Protection and Restoration Authority (CPRA) to perform surveying and mapping services for the Caminada Headlands Back Barrier Marsh Creation Project (BA-171)

## 1.0 Introduction:

The Caminada Headlands Back Barrier Marsh Creation Project (BA-171) is funded under the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) in Priority Project List 23. The Coastal Protection and Restoration Authority (CPRA), in partnership with the Environmental Protection Agency (EPA), have been authorized to execute Phase I (Engineering and Design) of BA-171. The objective of this project is to create, maintain and nourish existing deteriorating wetlands through hydraulic dredging.

## 1.1 Proposed Features:

Approximately 430 acres of marsh will be created/nourished in a marsh fill area adjacent to Caminada Headlands. This scope of services involved topographic, bathymetric, magnetometer, and geophysical investigations within the marsh fill area, the pipeline access corridors and the offshore borrow area of the project.

## 1.2 Location:

The BA-171 Project is located in Lafourche Parish, Louisiana, west of the city of Port Fourchon, adjacent to Caminada. Approximate coordinates for the center of the project are 29°07'41.35"N and 90°09'19.66"W (NAD83).

## 2.0 MPH's Scope of Services:

- 2.0.1 Permission and Access
- 2.0.2 Navigable Waterway Hazard Notification
- 2.0.3 Horizontal and Vertical Control
- 2.0.4 Marsh Creation and Fill Area Surveys
- 2.0.5 Healthy Marsh Elevation Surveys
- 2.0.6 Borrow Area Survey
- 2.0.7 Pipeline Access Corridor Survey
- 2.0.8 Magnetometer Survey
- 2.0.9 Geophysical Survey
- 2.0.10 Aerial Photography Survey
- 2.0.11 Preliminary Submittal
- 2.0.12 Key Personnel

## 2.1 Permission and Access:

MPH has contacted the landowners and secured access permission prior to performing the surveys in the project area from:

Amanda Phillips  
Edward Wisner Donation (See Appendix D for Right-of-Access Agreement)  
PO Box 55204  
New Orleans, LA 70152  
504-210-1152

Jay Caillouet  
Caillouet Land Corporation  
PO Box 292  
Thibodaux, LA 70302  
985-665-2123

## 2.2 Navigable Waterway Hazard Notification:

MPH has notified and coordinated with the USACE and Coast Guard and have determined that no further actions needed to be taken in order for MPH to conduct the surveys as described further in the sections below:

## 2.3 Horizontal and Vertical Control:

MPH has conducted a field survey in order to re-establish coordinate positions of TE23 SM-01 which are adjusted to NAD 83(2011) using Geoid 12A. The field surveying was accomplished utilizing standard RTK surveying procedures and checked using Gulfnet Virtual Real-time Network (VRS). The data sheet for the project survey monument is provided in Appendix B.

## 2.4 Marsh Creation and Fill Area Surveys:

MPH performed topographic/bathymetric surveys within the marsh creation fill area. Survey transects were laid out in the open water, broken marsh, and across pipeline canals at the proposed marsh creation locations and were spaced every 250 ft as shown in Appendix A, Sheet 1 – “Marsh Creation Area Transect Layout”. Transects were run beginning at the centerline of the crown of the BA-45 (Caminada Headlines Beach and Dune Restoration Increment 1) dune and extended to the south bank of the waterway bordering the north side of the fill area. Position, elevation and water depths were recorded at a minimum of every 25ft along each transect or where elevation changes of greater than 0.5ft occurred. An appropriate topo shoe was attached to the bottom of the survey rod/range pole to prevent the rod/range pole from sinking. Side shots were taken to pick up variations in topographic features such as bank lines, utility lines, rock dikes and signage which may affect project design implementation.

Bathymetric and magnetometer surveys were conducted in the two pipeline canals that run through the fill area, in the canal adjacent to the servitude boundary, and along the

alignment of Bayou Moreau from the headland to the southernmost bank of the canal adjacent to the servitude boundary. The topographic portions of all transects were merged with the bathymetric portion of transects at the land/water interface. Airboats were used to access the shallow areas in the marsh creation/fill area. Trimble Survey Controller (TSC3) Data Collectors were used in conjunction with Combination Trimble R8 GNSS (base)/R8 GNSS (rover) GPS Receivers to collect all GPS data. Trimble Business Center was used to process all GPS survey data collected. In areas with sufficient water depth to permit the use of an automated hydrographic survey system to collect bathymetric survey data, a 4° Beam width Transducer w/Odom Echotrac was utilized to collect single-beam bathymetric survey data. All single-beam bathymetric survey data was collected and processed in HYPACK®.

#### 2.5 Healthy Marsh Elevation Surveys:

Average healthy marsh elevation surveys performed by MPH under the direction of Todd Hubbell with CPRA at three sites identified as Sites 1, 5 and 7. The average healthy marsh elevation is defined as the point where a survey rod is resting among living vegetative stems and is supported by soil containing living vegetative roots.

#### 2.6 Borrow Area Survey:

MPH performed a bathymetric and magnetometer survey of the borrow area in the form of transecting cross-sections. Survey transects were spaced at approximately 200ft as shown in Appendix A, Sheet 3-“Borrow Area Transect Layout”. Mudline elevations and bathymetry were recorded every one (1) second along the survey. Calibration of the fathometer was performed for the verification of accuracy at the beginning of each day through the use of a bar check plate. Latency checks were also conducted periodically throughout each day. Latency corrections were calculated and adjustments were made to the data. Trimble Survey Controller (TSC2) Data Collectors were used in conjunction with Combination Trimble R8 GNSS (base)/R8 GNSS (rover) GPS Receivers to collect all GPS data. Trimble Business Center was used to process all GPS survey data collected. An automated hydrographic survey system to collect bathymetric survey data, a 4° Beam width Transducer w/Odom Echotrac was utilized to collect single-beam bathymetric survey data. All single-beam bathymetric survey data was collected and processed in HYPACK®. Magnetometer data was collected to measure the total magnetic field strength both collected and processed in HYPACK® survey software using a Geometrics model G-882 cesium-vapor marine magnetometer. The magnetometer was towed behind a 26’ marine survey vessel with a cable out of 24-ft (behind the GPS antenna).

Magnetic anomalies were determined from processing magnetometer data and interpretation. The magnetometer gamma baseline during the field geohazard survey was 47,000 gammas. The amplitude and signature width of a magnetic deflection are dependent on a variety of factors that include object size and configuration, ferrous

content, and distance from the sensor. Generally speaking, inflections  $\leq 30$  gammas are considered too low to signify a large ferrous object. Inflections 30 to 100 gammas are considered small to medium strength. And inflections  $\geq 100$  gammas are indicative of moderate to large ferrous objects. Please refer to Appendix C for Magnetometer nomogram.

## 2.7 Pipeline Access Corridor Surveys:

Bathymetric/side-scan, seismic sub-bottom profiler and magnetometer surveys were performed within the marine portion of the pipeline access corridors. Topographic and magnetometer surveys were performed within the terrestrial portion of the pipeline access corridors. The transect/track lines were spaced at 98 foot intervals shown in Appendix A, Sheet 2 "Pipeline Access Corridor Transect Layout".

For the topographic surveys, positions and elevations were recorded at a minimum of 25 feet along each transect or where elevation changes of greater than 0.5 ft occurred, where possible. An appropriate topo shoe was attached to the bottom of the survey rod to prevent the rod from sinking. Bathymetric and topographic surveys overlapped by 50 feet at the land/water interface, where possible; however, due to tidal fluctuation and on site conditions, MPH was unable to overlap the surveys along every transect line.

## 2.8 Magnetometer Surveys:

MPH performed a magnetometer survey in the borrow area, pipeline access corridors, the two fill area pipeline canals, the northern canal adjacent to the servitude boundary, and Bayou Moreau as shown on the Survey Layouts in Appendix A to locate any pipelines or obstructions on the area. For each magnetic finding greater than 100 gammas, MPH ran a closed loop path with a Geometrics G882 Magnetometer. Manual probing methods were utilized to determine the source (e.g., pipeline, well, etc.) of each finding. All detected pipelines were probed and depth of cover and position was recorded at each probed location.

MPH performed a 250' radius magnetometer survey around 19 geotechnical boring locations located in either the marsh creation fill area or borrow areas. Survey data resulting from the boring location surveys were provided to CPRA in advance of submittal of the preliminary document submittals.

Magnetometer data was collected to measure the total magnetic field strength both collected and processed in HYPACK® survey software using a Geometrics model G-882 cesium-vapor marine magnetometer. The magnetometer was fixed-mounted on the front of an airboat at 8-ft (forward of the GPS antenna). In addition, it was also towed behind a 26' marine survey vessel with a cable out of 24-ft (behind the GPS antenna).

Magnetic anomalies were determined from processing magnetometer data and interpretation. The magnetometer gamma baseline during the field geohazard survey was 47,000 gammas. The amplitude and signature width of a magnetic deflection are

dependent on a variety of factors that include object size and configuration, ferrous content, and distance from the sensor. Generally speaking, inflections  $\leq 30$  gammas are considered too low to signify a large ferrous object. Inflections 30 to 100 gammas are considered small to medium strength. And inflections  $\geq 100$  gammas are indicative of moderate to large ferrous objects. Please refer to Appendix C for Magnetometer nomogram.

## 2.9 Geophysical Survey:

MPH performed a high resolution (3.5 kHz or greater) seismic survey using a sub-bottom profiler and side-scan sonar in the pipeline access corridors. A chirp sub-bottom profiler was utilized for proper depth-penetration and enhanced resolution. Seismic stratigraphy was developed on the basis of the sub-bottom profiles obtained. See Exhibit E for Geohazard and Archaeological Assessment.

## 2.10 Aerial Photograph Overlay:

All survey lines were overlaid on 2015 geo-rectified Google Earth high-resolution (4,800 x 3,195) aerial photography, utilizing Google Earth Pro and AutoCAD Civil 3D 2014.

## 2.11 Preliminary Submittals:

In addition to the deliverables requested in the CPRA scope of services, a set of 11"x17" preliminary drawings were delivered to Amanda Taylor, E.I. for technical review and comment. All project deliverables adhere to Section 5.0 (Deliverables) as described in the CPRA scope of services.

## 2.12 Key Personnel:

Surveyor in Charge of Project:	Gerard Legendre
Survey Project Manager:	Aric Gisclair
Project Draftsman:	Tim Crosby
Project Draftsman:	Liz Vela
Survey Party Chief:	Drake Dupre
Survey Party Chief:	Chris Breaux
Survey Party Chief:	Robbie Boudreaux
Survey Party Chief:	Aaron Beal
Survey Party Chief:	Patrick Mokhtarnejad
Hydrographic Survey Party Chief:	Patrick Mokhtarnejad
Hydrographic Survey Party Chief:	Stuart Babin
Hydrographic Survey Party Chief:	Jonathan Morris
Hydrographic Survey Data Analyst:	Patrick Mokhtarnejad
Hydrographic Survey Data Analyst:	Jonathan Morris
Hydrographic Survey Data Analyst:	Stuart Babin



## **6.0 CERTIFICATION**

I hereby certify that the report, data and drawings referenced herein were prepared from a field survey conducted on the ground by me or under my direct supervision and control and that the report, data and drawings accurately depict the result of said survey.

Morris P. Hebert, Inc.

283 Corporate Drive

Houma, LA 70360

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Gerard Legendre, P.L.S.

Louisiana Registration Number 4966