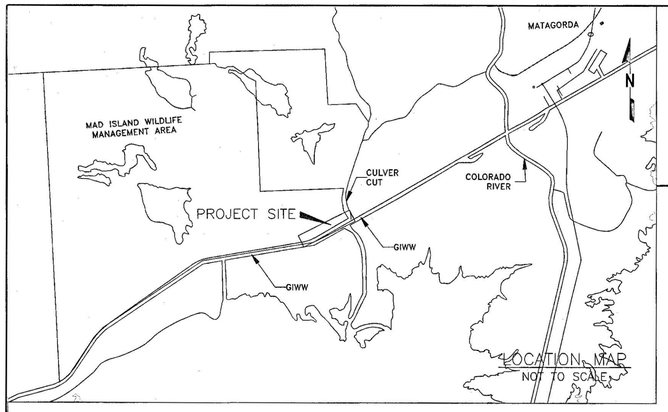
120091 569-B



TRACT LINE

MHHW SURVEYED APRIL 2017

LINE	BEARING	DISTANCE	VARAS
L1	N 70°42'47" E	61.94'	22.30V
L2	S 69°28'51" E	66.22'	23.84V
L3	N 72°03'40" E	99.29'	35.74V
L4	N 25°17'18" E	67.81'	24.41V
L5	N 65°07'39" E	58.58'	21.09V
L6	N 77°27'53" E	100.67'	36.24V
L7	N 63°02'12" E	80.48'	28.97V
L8	N 88°19'12" E	85.61'	30.82V
L9	N 59°42'10" E	188.87'	67.99V
L10	N 67°12'37" E	130.73'	47.06V
L11	N 59°16'35" E	81.95'	29.50V
L12	N 72°28'59" E	203.26'	73.17V
L13	N 62°49'58" E	108.79'	39.16V
L14	N 56°24'43" E	202.67'	72.96V
L15	N 53°43'50" E	190.98'	68.75V
L16	N 56°23'44" E	307.03'	110.53V
L17	N 46°31'21" E	103.52'	37.27V
L18	N 57°53'46" E	95.06'	34.22V
L19	N 69°40'58" E	71.42'	25.71V
L20	N 56°11'34" E	214.56'	77.24V
L21	N 53°47'46" E	144.89'	52.16V
L22	N 76°57'51" E	33.96'	12.23V
L23	N 42°23'15" E	141.90'	51.09V
L24	N 74°14'10" E	53.04'	19.10V
L25	S 48°00'09" E	60.54'	21.80V
L26	N 81°02'12" E	32.80'	11.81V
L27	N 37°55'23" E	73.04'	26.30V
L28	N 21°52'24" E	117.54'	42.32V
L29	N 38°33'50" E	158.70'	57.13V
L30	N 51°49'08" E	118.21'	42.55V
L31	N 63°03'25" E	61.29'	22.06V
L32	S 71°19'04" E	51.23'	18.44V
L33	N 48°27'05" E	37.84'	13.62V
L34	N 00°27'08" W	29.26'	10.53V
L35	N 24°50'13" W	101.13'	36.41V
L36	N 34°47'02" W	112.70'	40.57V

TEXAS GENERAL LAND OFFICE
Art. 33.136, Natural Resources Code
Co. Matagorda, Sketch No. 12
File Date 09/12/2017 by E. Burke
See Report

FND 8" CEDAR POST

VOL. 155, PG. 827; JUNE, 1987 OFFICIAL PUBLIC RECORDS MATAGORDA COUNTY, TEXAS

CULVER CUT

N 54°00'49" E 16,748.72' 6,079.54V TO MATAGORDA LONGITUDE STA

MHHW END N:13,438,827.51 E: 2,926,584.69

SAMUEL RHOADS FISHER SURVEYED 1832 A-36

5700.00 ACRES MORE OR LESS
TEXAS PARKS & WILDLIFE
4200 SMITH SCHOOL RD.
AUSTIN, TX 78744
WILDLIFE MANAGEMENT AREA (WMA)
VOL. 155, PG. 827; JUNE, 1987
OFFICIAL PUBLIC RECORDS
MATAGORDA COUNTY, TEXAS

MHHW 2017 SHORELINE SURVEYED APRIL 11, 2017

MHHW 2008 GEO. RUBALCABA

TO MATAGORDA LONGITUDE STA

N 54°21'17" E 20,191.16' 7,268.82V

USACE GIWW CENTERLINE (2017)

MHHW START N:13,436,902.30 E: 2,923,728.83

EAST MATAGORDA BAY TRACT 4

EAST MATAGORDA BAY TRACT 5

USACE SPOIL EASEMENT

GIWW EASEMENT FROM PIERCE TO MATAGORDA COUNTY VOL. 128, PG. 357 OPRMCTX (1939)

GIWW CENTER LINE

APPROXIMATE SHORELINE POSITION FROM USACE MAP "LOUISIANA AND TEXAS INTRACOASTAL WATERWAY" (1935) PLAT 69A-76A MAP RECORDS OF MATAGORDA TEXAS.

RUNNELLS TO YALE UNIVERSITY EAST ONE-HALF OF 1,019 ACRES SOUTH OF LAND SOUTH OF GIWW VOL. 560, PG. 90 OPRMCTX

1,500' SPOIL EASEMENT PIERCE ESTATES INC. TO MATAGORDA CO. VOL. 129, PG. 61 (1939)

APPROXIMATE POSITION NGS "DEVIL"

EAST LINE OF EAST MATAGORDA BAY TRACT 5

WEST LINE OF STATE TRACT 4

EAST MATAGORDA BAY TRACT 4

EAST MATAGORDA BAY TRACT 5

SOUTHWEST CORNER STATE TRACT 3

SOUTHWEST CORNER STATE TRACT 4

DOG ISLAND

SOUTHEAST CORNER STATE TRACT 4

SOUTHWEST CORNER STATE TRACT 5

SCALE 0' 400' 800'

- MHHW SURVEYED APRIL 11, 2017
- MHHW SURVEYED 2008
- SHORELINE SHOWN ON 1935 GIWW "LA & TX INTRACOASTAL WATERWAY" MAP
- GIWW CENTERLINE
- GIWW SPOIL EASEMENT

NOTES:
1. FIELD SURVEY CONDUCTED APRIL 4 & 11, 2017.
2. ALL BEARINGS, DISTANCES, AND COORDINATES ARE GRID AND REFERENCED TO THE TEXAS COORDINATE SYSTEM-SOUTH CENTRAL ZONE 4204, NORTH AMERICAN DATUM OF 1983, U.S. SURVEY FEET.
3. THE AVERAGE COMBINED SCALE FACTOR FROM SURFACE TO GRID IS EQUAL TO 0.9999311.
4. MAPPING ANGLE: 1°27'45"
5. ELEVATIONS REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
6. COORDINATES AND ELEVATIONS ARE BASED ON NGS MONUMENT DESIGNATION: "MATAGORDA LONGITUDE STA" PID: "AM0522"
   N: 13,448,668.97 FEET
   E: 2,940,137.01 FEET
   ELEV: 10.65 FEET (NAVD '88, GEOID 2012A)
7. MEAN HIGHER HIGH WATER AT ELEVATION 0.87' DETERMINED FOR PROJECT SITE AT MAD ISLAND BY CORRELATING A WEEK PERIOD OF LOCAL DATA (STATION GAUGE) WITH THE TCOON MATAGORDA CITY TIDE GAUGE (INSTALLED 2012).
8. FEET TO VARAS CONVERSION IS 0.36.
9. THE FOREGOING SURVEY IS IN SUPPORT OF A PROPOSED OFFSHORE BREAKWATER PROJECT SPONSORED BY COASTAL EROSION PLANNING RESPONSE ACT (CEPRA) PROJECT NO. 1612 AND AUTHORIZED BY TEXAS GENERAL LAND OFFICE SPECIAL DOCUMENT: SD20180005
10. SEE ACCOMPANYING SURVEYOR'S REPORT FOR MORE INFORMATION.

I, JAMES M. NAISMITH, HEREBY STATE THAT THIS DRAWING REPRESENTS A SURVEY THAT IS CORRECT; IN ACCORDANCE WITH SECTION 21.042 TEXAS NATURAL RESOURCES CODE, WAS MADE ACCORDING TO LAW; WAS MADE IN THE FIELD UNDER MY DIRECT CONTROL AND SUPERVISION; WAS MADE UTILIZING METHODOLOGY APPROVED BY THE GLO; AND IS RECORDED IN

NOTICE: THIS SURVEY WAS PERFORMED IN ACCORDANCE WITH SECTION 33.136, NATURAL RESOURCES CODE, FOR THE PURPOSE OF EVIDENCING THE LOCATION OF THE SHORELINE IN THE AREA DEPICTED IN THIS SURVEY AS THAT SHORELINE EXISTED BEFORE COMMENCEMENT OF EROSION RESPONSE ACTIVITY, AS REQUIRED BY CHAPTER 33, NATURAL RESOURCES CODE. THE LINE DEPICTED ON THIS SURVEY FIXES THE SHORELINE FOR THE PURPOSE OF LOCATING A SHORELINE BOUNDARY, SUBJECT TO MOVEMENT LANDWARD AS PROVIDED BY SECTION 33.136, NATURAL RESOURCES CODE.

NO ARTIFICIAL FILL IS LOCATED WITHIN THE SURVEYED AREA. NO RETAINING WALLS OR OTHER STRUCTURAL MODIFICATIONS HAVE BEEN PLACED ON OR ALONG THE LITTORAL BOUNDARY.

SURVEYED: APRIL 4 & 11, 2017

SURVEY PERSONNEL:
JAMES M. NAISMITH
J.Z. GIESSEL

9/12/2017

JAMES M. NAISMITH
LICENSED STATE LAND SURVEYOR

FILED FOR RECORD
OCT - 9 2017
Janet Hickl
County Clerk, Matagorda Co., Texas

Naismith Marine
Hydrographic • Geophysical
Environmental
www.naismithmarine.com
(361) 945-0248
FIRM #10078500

NO.	DATE:	REVISION
0	8/17	NAIP BACKGND
1	9/17	PER GLO REV.

COASTAL BOUNDARY SURVEY
OF THE LITTORAL BOUNDARY OF A PORTION
OF THE TEXAS PARKS & WILDLIFE
WILDLIFE MANAGEMENT AREA - MAD ISLAND
BEING LOCATED ON THE SAMUEL RHOADS FISHER, A-36
ADJACENT TO STATE TRACTS 4 & 5
MATAGORDA COUNTY, TEXAS

SCALE:	1" = 400'	DATE:	SHEET:
DRAWN BY:	JZG	APR 2017	1 OF 1

NRC Art. 33.136 Matagorda Co. Sketch 12 94980

TEXAS GENERAL LAND OFFICE
GEORGE P. BUSH, COMMISSIONER

Surveying Division
Coastal Boundary Survey Approval

Project: Mad Island WMA Shoreline Protection II

Project No: CEPRA 1612 (GLO); SD20180005 (GLO)

Project Manager: Caroline Brooks GLO/Coastal Resources

Surveyor: James M. Naismith, Licensed State Land Surveyor

Description: Coastal Boundary Survey, dated April 4 & 11, 2017, by James M. Naismith LSLS, delineating the line of Mean Higher High Water, along the northerly shore of East Matagorda Bay and the Gulf Intracoastal Water Way (GIWW), same line being the littoral boundary line of the Samuel Rhoads Fisher Survey, Abstract 36, and the northerly boundary line of East Matagorda Bay Submerged Land Tracts 4 & 5. The survey extends southwesterly, along the northerly shore of the GIWW, approximately 2500 feet from the mouth of Culver Cut and is centered on coordinates N28°39'51" (28.664206°) / W96°00'17" (96.004969°) WGS 84.

A Coastal Boundary Survey for the above-referenced project has been reviewed and accepted; upon completion of public notice requirements, the survey will be filed in the Texas General Land Office, Archives and Records, in accordance with provisions of the *Texas Natural Resources Code*, Chapter 33.136.

Approved:

Signed: _____ Oct. 12, 2017
Surveying Division — Date

Approval Filed as:

Tex.Nat.Res.Code Article 33.136 Matagorda County, Sketch No. 12

TEXAS GENERAL LAND OFFICE
Art. 33.136, Natural Resources Code
Co. Matagorda, Sketch No. 12
File Date 06/20/2018 by R. Kartye

1700 North Congress Avenue, Austin, Texas 78701-1495
P.O. Box 12873, Austin, Texas 78711-2873
512-463-5001 glo.texas.gov

94781

120091 slide #569 B

Naismith Marine Services, Inc.
www.naismithmarine.com
(361) 945-0248
FIRM #10078500

Naismith Marine
Hydrographic • Geophysical
Environmental

April 2017

COASTAL BOUNDARY SURVEY
OF THE LITTORAL BOUNDARY OF A PORTION
OF THE TEXAS PARKS & WILDLIFE
WILDLIFE MANAGEMENT AREA - MAD ISLAND
BEING LOCATED ON THE SAMUEL RHOADS FISHER, A-36
ADJACENT TO STATE TRACTS 4 & 5
MATAGORDA COUNTY, TEXAS

This report accompanies a map of survey with field notes dated April 2017.

SURVEY CONTROL: The survey along the north shoreline of the GIWW was performed using survey grade RTK base and rover GPS (Hemisphere S320 and Trimble R8). Survey was conducted April 4-5, and 11, 2017 based on NGS benchmark monument **"MATAGORDA LONGITUDE STA" (PID, AM0148)** (OPUS, N: 13448668.97, E: 2940137.01, Z : 10.65' NAVD88) and tidal reference benchmark **"877 3146 B" (PID, DP0706)** (N: 13,455,336.76, 2,957,220.10', Z:2.3' NAVD88). Static GPS observations and OPUS solutions were used to compute coordinates in the South Central Zone of the Texas Coordinate System and NAVD88 orthometric height using geoid 2012b. Datum is NAD 83 (2011), US Feet.

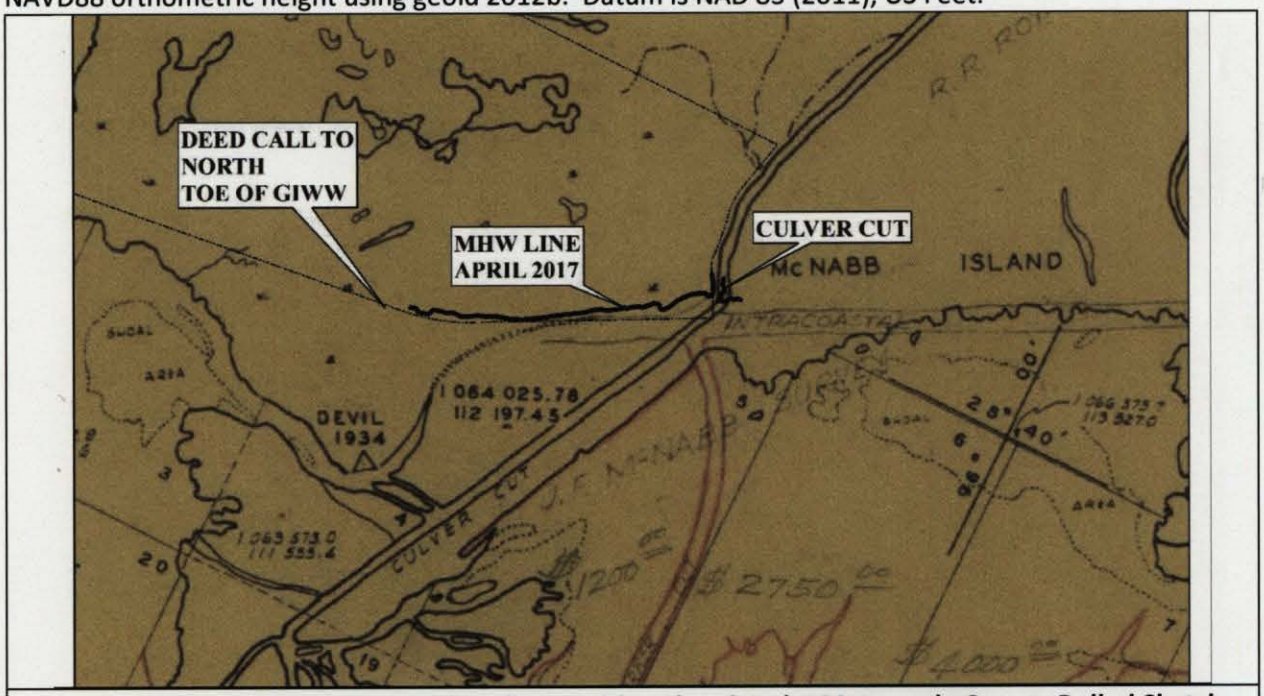


Figure 1: Project area and current shoreline position showing the Matagorda County Rolled Sketch 28.

94782

STATE OWNERSHIP BOUNDARY: Around 1940, the Intracoastal Canal was dredged by the U.S. Corps of Engineers. Rapid human-caused buildup has occurred south of the project area across swaths of state owned bay bottom which are now uplands, mudflats, and marsh/wetlands. The boundary between historic state submerged land (Matagorda tracts 4 & 5) was determined by examining the historical record including historic topographic maps as well as United States Corps of Engineers (USACE) design maps and survey of the proposed Gulf Intracoastal Waterway (GIWW).

The 1935 historical shoreline was digitized from USACE map "Louisiana and Texas Intracoastal Waterway" found in map records 69a-76a of the Official Public Records Matagorda Texas which shows the GIWW easement and proposed channel over original surveys with the shoreline shown as it existed at the time. The GIWW easement from Pierce Estates to Matagorda County describes the GIWW footprint across the original tract of land beginning at the boundary of J.F. McNabb and S.R. Fisher Survey and terminating at the west end of the Pierce Estates tract (Mad Island Wildlife Refuge) and is filed in Volume 128, Page 357 of the Official Public Records of Matagorda County, Texas (OPRMCTX). The State of Texas lays claim to submerged land covered by the GIWW in areas where the channel was constructed along shoreline or across submerged land (per telephone conversation with GLO Surveying Services). The surveyed portion of the north shoreline of the GIWW is part of State submerged tracts (Matagorda tracts 4 & 5) and subject to the landward migration of the mean higher high water (MHHW) line.

The S.R. Fisher abstract was originally surveyed in October 1832, and must be surveyed according to the Spanish and Mexican Civil Laws which place the littoral boundary along the Mean High Higher Water (MHHW) line. The MHHW line was established along the north edge of the GIWW; this line represents the littoral boundary between state submerged land and upland owners in the surveyed area. To determine MHHW along the project area the TCOON tide gauge "Matagorda City" was used as control gauge for a 7 day tidal study. Tidal data was collected onsite (station gauge) and a MHHW elevation in NAVD88 was calculated using two onsite TBMs with OPUS solution as well as a network of checks to other OPUS solution monuments in the vicinity. MHHW elevation of 0.87 NAVD88 was calculated at the project site at Mad Island by correlating a week period of local data (station gauge) with the TCOON Matagorda City tide gauge (control gauge, installed 2012). The Matagorda local Station Datum was used to convert and correlate the onsite tidal data. MHHW elevation for Matagorda City TCOON is not published in NAVD88, nor are the leveling benchmarks published on NOAA website.

George Rubalcaba, L.S.L.S. calculated 0.58' NAVD88 for MHHW in 2008 for the same project area as well as for another site 6 miles southwest of this project in 2005 also along the GIWW. MHHW along the banks of the Colorado river at Bragg's Cut was calculated at 1.35' in 2010 relative to the mentioned Matagorda Longitude Sta benchmark (2010 elevation was 10.8' NAVD88). The 2010 MHHW at Bragg's Cut adjusted to updated elevation at the Matagorda Longitude Sta. benchmark (10.65' NAVD88, geoid 2012A) would be 1.2' NAVD88.

Onsite datums were calculated by adjusting short term onsite observed amplitude and mean water level height to established control gauge datum values. Adjustments are determined by comparing a coinciding short observation period (April 4-11, 2017) for both gauges and adjusting the onsite observed values to the control gauge long-term epoch parameters. As referenced for this survey, the elevation of MHHW along the site shoreline was 0.87' NAVD88.

Figure 2: Onsite (station) tide gauge setup on a piling alongside the GIWW on existing breakwater adjacent the north GIWW shoreline of Mad Island.

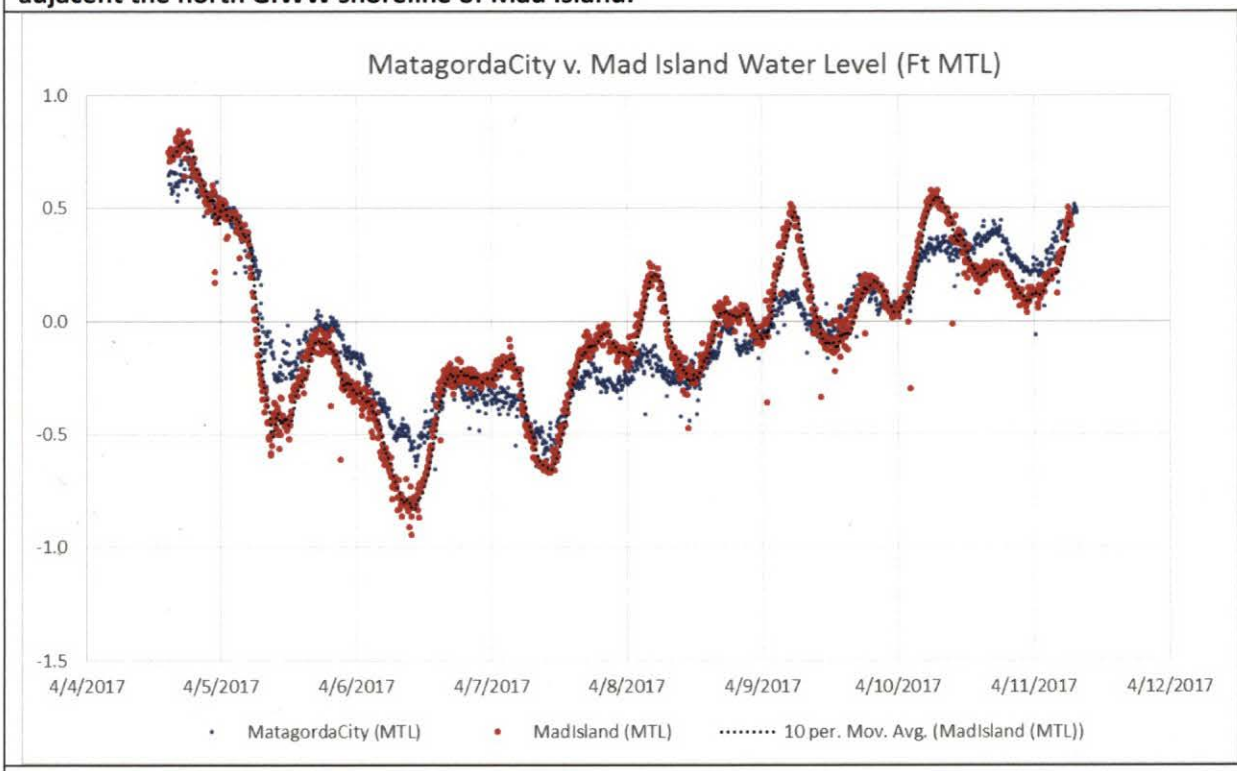


Figure 3: Graph of temporary Bayside station tide gauge (station) data superimposed over NOAA Copano data; same sample period (March 21-27) and vertical datum (NAVD88)

94784

FIELD NOTES for the MHHW line and littoral boundary along a portion of the Samuel Rhoads Fisher, A-36, adjacent to the GIWW and state tracts 4 & 5, Matagorda County, Texas. MHHW line along the Gulf Intracoastal Waterway (GIWW) in this area represents the littoral boundary between state submerged tracts (Matagorda tracts 4 & 5) and upland owner. Distances, bearings, and coordinates are grid, North American Datum of 1983 (2011), South Central zone of the Texas Coordinate System;

Beginning at a point (N: 13,436,902.30, E: 2,923,728.83) on the MHHW line of the S.R. Fisher Survey A-36 as described in the Texas General Land Office records from which NGS reference monument **"MATAGORDA LONGITUDE STA"** (N: 13,448,668.97, E: 2,940,137.01, Z:10.65) bears N 54°21'17" E a distance of 20,191.16' (7,268.82V);

thence N 70°42'47" E along the MHHW line a distance of 61.94' (22.30V) and for the following calls;

thence S 69°28'51" E a distance of 66.22' (23.84V);
thence N 72°03'40" E a distance of 99.29' (35.74V);
thence N 25°17'18" E a distance of 67.81' (24.41V);
thence N 65°07'39" E a distance of 58.58' (21.09V);
thence N 77°27'53" E a distance of 100.67' (36.24V);
thence N 63°02'12" E a distance of 80.48' (28.97V);
thence N 88°19'12" E a distance of 85.61' (30.82V);
thence N 59°42'10" E a distance of 188.87' (67.99V);
thence N 67°12'37" E a distance of 130.73' (47.06V);
thence N 59°16'35" E a distance of 81.95' (29.50V);
thence N 72°28'59" E a distance of 203.26' (73.17V);
thence N 62°49'58" E a distance of 108.79' (39.16V);
thence N 56°24'43" E a distance of 202.67' (72.96V);
thence N 53°43'50" E a distance of 190.98' (68.75V);
thence N 56°23'44" E a distance of 307.03' (110.53V);
thence N 46°31'21" E a distance of 103.52' (37.27V);
thence N 57°53'46" E a distance of 95.06' (34.22V);
thence N 69°40'58" E a distance of 71.42' (25.71V);
thence N 56°11'34" E a distance of 214.56' (77.24V);
thence N 53°47'46" E a distance of 144.89' (52.16V);
thence N 76°57'51" E a distance of 33.96' (12.23V);
thence N 42°23'15" E a distance of 141.90' (51.08V);
thence N 74°14'10" E a distance of 53.04' (19.09V);
thence S 48°00'09" E a distance of 60.54' (21.79V);
thence N 81°02'12" E a distance of 32.80' (11.81V);
thence N 37°55'23" E a distance of 73.04' (26.29V);
thence N 21°52'24" E a distance of 117.54' (42.31V);
thence N 38°33'50" E a distance of 158.70' (57.13V);
thence N 51°49'08" E a distance of 118.21' (42.56V);
thence N 63°03'25" E a distance of 61.29' (22.06V);
thence S 71°19'04" E a distance of 51.23' (18.44V) to a point along the MHHW line of Culver Creek;

thence N 48°27'05" E continuing along the west bank of Culver Creek a distance of 37.84' (13.62V) and for the following calls;

thence N 00°27'08" W a distance of 29.26' (10.53V);
thence N 24°50'13" W a distance of 101.13' (36.41V);
thence N 34°47'02" W a distance of 112.70' (40.57V) which is the **end point** (N: 13,438,827.51, E: 2,926,584.69) from which NGS reference monument **"MATAGORDA LONGITUDE STA"** bears N 54°00'49" E a distance of 16,748.72' (6,029.54V).

9/19/2017

James M. Naismith, RPLS, LSLS

Naismith Marine Services, Inc.

FILED FOR RECORI

OCT - 9 2017

Janet Hickl

County Clerk, Matagorda Co. Texas

14786