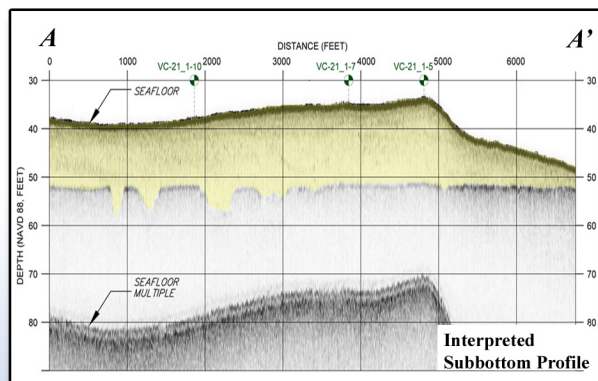
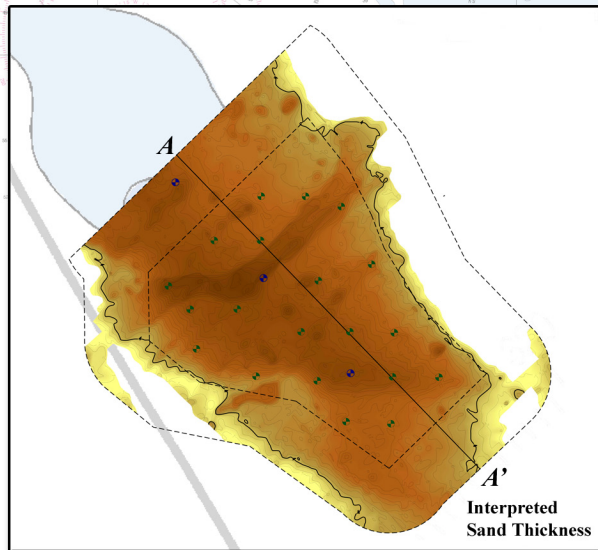


Final Report

Detailed Geophysical/Cultural Resource Surveys To Support Lee County Lovers Key Beach Nourishment Project

Gulf of Mexico, Florida

OSI Report No. 20ES002-2



FINAL REPORT

**DETAILED GEOPHYSICAL/CULTURAL RESOURCE SURVEYS
TO SUPPORT LEE COUNTY LOVERS KEY BEACH NOURISHMENT PROJECT
GULF OF MEXICO, FLORIDA**

OSI REPORT NO. 20ES002-2

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9 March 2022

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Final Detailed Geophysical/Cultural Resource Surveys Report and Project Drawing files (AutoCAD and PDF formats), subbottom profiles (jpg format), survey trackline log (PDF format), ASCII files containing processed soundings and interpreted sand thickness, OSI Technical Memorandum and Project Drawings for the Reconnaissance Survey, OSI survey & vessel float plans, AIS PSO reports,, RCG&A Phase I Project Report and vibratory clearance letters and Technical Recon Memorandum, Amrill Inc. Reconnaissance and Detailed Vibratory Coring Reports, FL 1A-32 Archaeological Research Permit and all BOEM Authorization permits associated with M20-001 & M20-002, shp file of LK-P1 vessel tracklines.



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OCEAN SURVEYS, INC.

FINAL REPORT

DETAILED GEOPHYSICAL/CULTURAL RESOURCE SURVEYS TO SUPPORT LEE COUNTY LOVERS KEY BEACH NOURISHMENT PROJECT GULF OF MEXICO, FLORIDA

1.0 INTRODUCTION

During the period 13-18 July 2021, Ocean Surveys, Inc. (OSI) performed a detailed level geophysical and cultural resource survey of a proposed offshore borrow area (referred to as LK-P1) on the Outer Continental Shelf (OSC), a proposed pipeline corridor and two potential pump-out areas located offshore of Lovers Key (Figure 1). These investigations were performed under subcontract to Coastal Engineering Consultants, Inc. (CEC) for Lee County (County), FL to support the Lovers Key Beach Nourishment Project (Project).

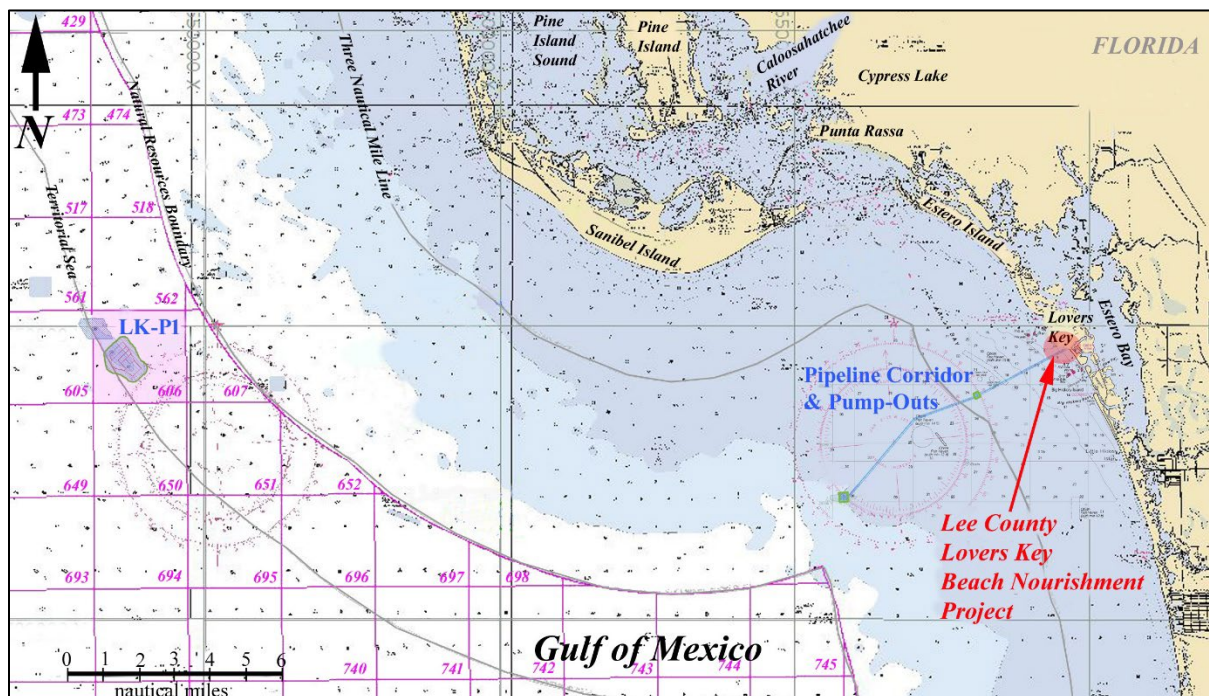


Figure 1. Chart section illustrating the location of the LK-P1 borrow area, pipeline corridor and pump-out areas proposed to support the Lovers Key Nourishment Project where detailed geophysical survey data were acquired. Background image based on NOAA Chart No. 11426, Estero Bay to Lemon Bay. BOEM lease blocks (magenta) downloaded from BOEM's GOMR GIS Data and Maps website.

2.0 PROJECT SUMMARY

2.1 Project Background and Objectives

The County has tasked the CEC Project Team comprised of CEC, OSI, R. Christopher Goodwin and Associates, Inc. (RCG&A) and American Vibracore Services, a division of Amdrill Inc. (Amdrill) with conducting a sand search study to identify an offshore sediment resource in the Gulf of Mexico that can be used to re-nourish Lovers Key for the next 50 years. OSI has been subcontracted by CEC to perform all reconnaissance and detailed level geophysical/cultural resource surveys to support the Project. RCG&A has been subcontracted to perform all Project related cultural resource assessments and has worked closely with OSI in reviewing data acquired during these investigations. Amdrill has been subcontracted to acquire and analyze all Project reconnaissance and detailed level geotechnical samples (vibratory cores).

The reconnaissance geophysical survey to identify a potential suitable offshore sand resource was performed by OSI in June 2020 and permitted/authorized by Florida Bureau of Archaeological Research (BAR), Division of Historical Resources (DHR) Archaeological Research Permit (No. 1920.081) and Bureau of Ocean Energy Management (BOEM) OCS Authorization M20-001. Geotechnical investigations, designed to groundtruth the reconnaissance geophysical survey interpretation, were then conducted by Amdrill under BOEM OCS Authorization M20-002 in October 2020. The results of these investigations have been reported under separate covers and have informed the operations performed during this investigation (OSI, 2020, RCG&A, 2020, GFA International, Inc. & Amdrill, 2021, CEC, 2021).

This report provides a summary of the detailed level geophysical and cultural resource survey performed by OSI in the proposed offshore LK-P1 borrow area (located in federal waters (BOEM protraction polygon NG17-04 (Charlotte Harbor) Block 606)) and within a proposed pipeline corridor and two potential pump-out areas located in Florida State waters offshore of Lovers Key.

Prior to the detailed level survey, OSI worked with archaeologists from RCG&A and developed a survey data collection plan (Data Collection Plan 2, 2021). Surveys were planned in accordance with current FL BAR DHR and BOEM guidelines. This data collection plan was shared with FL BAR DHR and BOEM offices to comply with State and Federal permitting requirements. In addition to the survey plan, OSI and CEC made a formal request to BOEM to modify the overall permitted activity area around the LK-P1 borrow area (to encompass the entire block of Charlotte Harbor 606) and to use a different survey vessel than was originally approved in OCS Authorization M20-001. The survey plan and expanded activity area limits and vessel change were approved by BOEM, 25 May and 9 July 2021, respectively. With permits and approvals in-hand the geophysical survey was kicked off on the 13th of July 2021.

2.2 Summary of Geophysical Survey and Equipment

The detailed level geophysical and cultural resource survey concentrated on acquiring high resolution geophysical (HRG) data (sounding, subbottom profiling, magnetometer, and side scan sonar imagery) on the OCS within the LK-P1 borrow area, as well as within FL state waters in a pipeline corridor and two pump-out areas offshore of Lovers Key. The LK-P1 resource survey area, irregularly shaped, encompasses approximately 770 acres, includes the borrow area and a 1,000-foot (305-meter) buffer around its limits. The pipeline corridor is generally 394 feet (120 meters) wide but expands in size in several places along its route and adjacent to the pump-out areas. The offshore pump-out area is approximately 1,500 feet (457 meters) by 1,750 feet (533 meters) and the nearshore pump-out area is approximately 1,000 feet (305 meters) by 1,000 feet in size.

The trackline layout within the Project areas consisted of a series of parallel primary survey lines spaced 98 feet (30 meters) apart. As a means of providing quality control and confirmation of data acquired along the primary tracklines, additional data were acquired along a series of cross or “tie” lines set perpendicular to the primary tracks. Within the borrow area tie lines spacing was established at 500 feet (152 meters) intervals, and within the corridor it was established at 1,000 feet (~305 meters). One tie line was investigated within each pump-

out area. Within the corridor and offshore pump-out areas survey coverage was supplemented with lines investigated during the 2020 reconnaissance geophysical survey.

Along all tracklines, single beam depth sounding, subbottom profiling, marine magnetometer data and side scan sonar imagery were acquired simultaneously. In the borrow area both a high-frequency Chirp and a lower frequency Boomer type profiler were used to acquire subbottom data. The intent was that the two instruments would provide a broad range of energy and frequency to investigate the expected variable sequence of sediments expected in the area. Boomer subbottom data were not acquired within the proposed pipeline corridor.

Survey operations were performed by a three-person field crew under the supervision of an ACSM/NSPS Certified Hydrographer and a Professional Geologist (PG) onboard the *R/V North Cove*. The *R/V North Cove* is a 34-foot custom design aluminum hull research vessel owned and operated by OSI. The vessel is equipped with a fully enclosed cabin, dual-outboard motors, stern and midship mounted davits, winches for towing subsurface gear, and all USCG safety equipment appropriate for the vessel employed, including an Automatic Identification System (AIS). Survey investigations were planned for daylight operations only and were based out of a marina in Matanzas Pass on the north side of Estero Island.

To comply with BOEM's OCS Authorization permit, two trained protected species observers (PSO) from A.I.S., Inc. (AIS) accompanied the survey crew on the vessel to visually monitor an acoustic exclusion zone around the low frequency sound sources (subbottom profilers) during survey activities. Following conclusion of the survey, AIS prepared a Protected Species Monitoring Report documenting activities and observations made during the course of the survey and submitted it to BOEM to be in compliance with the permit (2021, AIS).

The primary equipment systems that were employed to complete the investigation are listed below:

Navigation and Positioning:

- *Applanix POS MV Global Positioning System (GPS), Orientation and Heading Sensor Operating in Network Real Time Kinematic (NRTK) mode*
- *Hydrographic Survey Products, Inc. Smart Sensor Cable Layback Measurement System*
- *HYPACK Navigation and Data Logging Computer System*

Seafloor Mapping:

- *Odom Echotrac MK III Digital Depth Sounder (200 kHz employed)*
- *Klein 3000 Digital Side Scan Sonar System (500 kHz employed)*
- *Geometrics G882 Cesium Marine Magnetometer*

Subbottom Profiling:

- *EdgeTech 3200-XS Chirp Subbottom Profiling System equipped with a SB216 Tow Vehicle (2-16 kHz)*
- *Applied Acoustics 200J high-resolution “Boomer” Subbottom Profiling System (0.5-8 kHz) interfaced with a CSP-P Seismic Energy Source and Coda DAG4G Shallow Seismic Processor/Heave Compensator/Data Logger and 10 element hydrophone streamer*

Figure 2 (upper panel) provides a photograph of the survey vessel, *R/V North Cove*. Survey equipment was configured onboard the vessel to optimize data quality, reduce ambient noise and cross talk, and maximize survey efficiency. Figure 3 (lower panel) provides an illustration of the general equipment configuration used onboard the survey vessel.

The single-frequency Odom depth sounder transducer (200 kHz.) was hard mounted to the starboard side of the vessel. The Klein side scan sonar towfish (500 kHz.) was towed astern of the vessel by means of a cable run through a block (sheave) hung from a stern mounted swing arm davit and attached to a deck mounted slipring winch. The magnetometer sensor was towed in tandem behind the side scan sonar towfish. To accurately calculate the side scan sonar and magnetometer towfish positions behind the survey vessel a sheave-mounted “smart” cable layback measurement system (digital cable counter) was utilized.

The side scan sonar system employed an approximate 164-foot (50-meter) sweep range. The side scan sonar and magnetometer sensors were maintained at an approximate 20-foot (6 meters) tow height above the seabed during acquisition. The Chirp SB216 was towed from a davit located approximately midships on the port side of the vessel. The Boomer subbottom

profiling system was towed from a spreader bar fixed to the stern A-frame and laid back approximately 30 feet. During the survey, vessel speed was maintained as high as possible without affecting the quality of the data, typically at 3-4 knots. Once online, no course changes were made, other than to maintain proposed trackline alignment. Survey direction and vessel speed were recorded in a detailed field line log. Subbottom boomer data was only acquired within the LK-P1 borrow area.

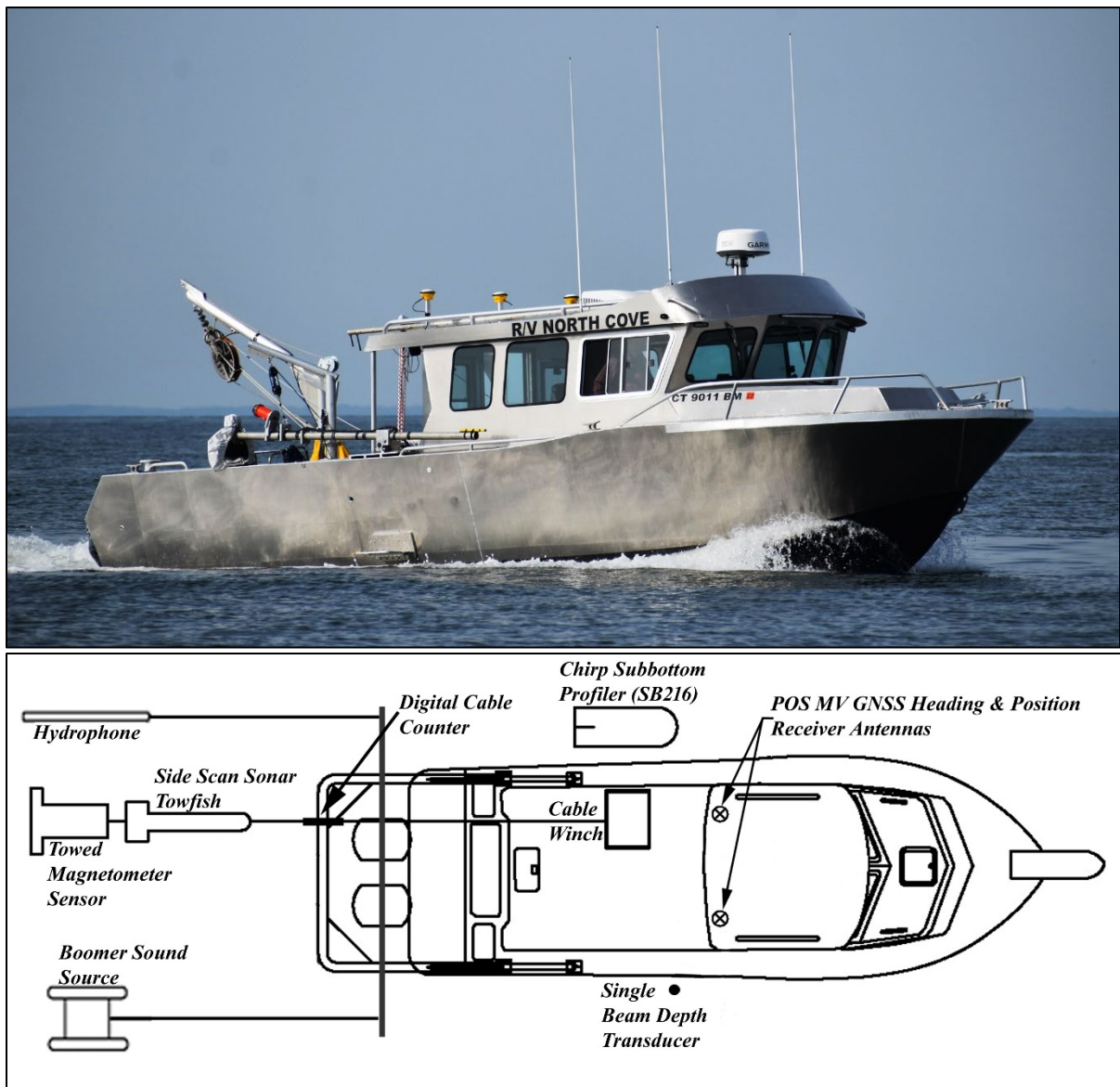


Figure 2. OSI survey vessel *R/V North Cove* that was used to complete the investigation (upper) and overview of equipment layout and general sensor configuration maintained onboard the vessel (lower). Note vessel sketch not to scale.

2.2.1 Horizontal and Vertical Control

Project horizontal reference is Florida State Plane Coordinate System, West Zone (0902), NAD 83 in US Survey Feet. Project vertical reference is the North American Vertical Datum of 1988 (NAVD88), feet. Water depths were corrected for tidal variations and reduced to Project vertical datum based on Network Real-Time Kinematic (NRTK) water levels recorded on the survey vessel during data acquisition.

Three-dimensional (3-D) positioning of the survey vessel was accomplished utilizing an Applanix POS MV GPS interfaced with a computer running HYPACK, a PC-based navigation and data logging software package. Correctors from the Florida Department of Transportation Permanent Reference Network (FPRN) were employed resulting in nearly full time NRTK-quality 3-D positioning throughout the survey.

Prior to commencing the survey, an NRTK Global Navigation Satellite System (GNSS) rover (Trimble R10 with a TSC3 Data Collector) was employed to confirm the suitability of the FPRN correctors. The rover was used to occupy a local U.S. Army Corps of Engineers (ACOE) Online Positioning Users Service (OPUS) Shared Solution control point, “Estero 101” (PID: BBDV83). The coordinates of the ACOE control point are provided in Table 1 below.

Table 1 - Survey Control

Designation (PID)	Latitude (N)	Longitude (W)	NAVD88
ESTERO 101 (BBDV83)	29° 26' 12.15899"	-081° 55' 20.90810"	4.73'

Once the 3-D positioning accuracy of the NRTK GNSS rover was verified at the local ACOE control point, the rover was used to establish a convenient, temporary, dockside point at the Project marina against which the vessel’s positioning system 3-D accuracy could be confirmed. The temporary point was set on a piling at the vessel’s dock slip. Aboard the vessel, horizontal positioning was confirmed via a physical measurement between the vessel’s reference point (RP) and the temporary point. The physical measurement was compared to the calculated difference as displayed by the onboard data acquisition software and an assessment of horizontal positioning accuracy was derived. The vertical positioning accuracy of the onboard

navigation system was verified as follows: A direct measurement between the respective temporary point and the water surface was used to calculate water level. The calculated water level was compared to the HYPACK-displayed “tide” value and an assessment of vertical positioning accuracy derived thus. The horizontal and vertical checks were accomplished each survey day both before and after daily operations. In all cases the vertical and horizontal checks confirmed that the onboard navigation system was operating within expected 3-D accuracy limits, i.e. sub-decimeter X, Y, Z performance.

2.2.2 Chronology of Geophysical Survey Field Operations and Acquisition Summary

In total, approximately 120 nautical miles (nm) of multi-sensor HRG survey tracklines were investigated during this task in the LK-P1 borrow area, pipeline corridor and pump-out areas including reruns, overruns beyond the end of the planned lines and additional survey work. Table 2 provides a general chronology of the fieldwork, including vessel mobilization and demobilization.

Table 2 - General Chronology of Reconnaissance Field Investigation

Task	2021 Dates	Description
Survey crew and vessel mobilized on site	11 July	OSI vessel and crew arrive on site (Estero Island, FL), perform presurvey control work and launch survey vessel (<i>R/V North Cove</i>).
Equipment Calibrations/Testing	12 July	Perform initial on-site calibration and testing of HRG survey equipment.
Survey operations	13-16 July	Perform HRG survey investigations in the LK-P1 borrow area on the OCS.
Survey operations	17-18 July	Perform HRG survey investigations within the proposed corridor and pump-out areas within FL state waters offshore Lovers Key.
Conclude survey operations and demobilize	19 July	Complete HRG survey investigation. Perform final close out control work, pull survey vessel and prepare for overland transit. OSI vessel and crew depart site, investigation concluded.

3.0 DATA PROCESSING AND PRODUCTS

Throughout the course of the investigation, data were continually reviewed by the field team to ensure coverage and data quality. Following conclusion of the survey, the acquired data sets were more fully processed and interpreted with the initial focus to identify vibratory core

locations in the borrow area (to be sampled by Amdrill during their detailed level geotechnical task) to groundtruth the results of the HRG survey. Table 3 lists the processing software used for each data set. Appendix 1 provides tables summarizing the magnetic anomalies and side scan sonar targets identified during this investigation (and those identified during the reconnaissance survey that plot on the Detailed Project drawings) along with thumbnail images for each sonar target presented in the summary tables. To aid in review, magnetic anomalies have been grouped into three classes based on amplitude [Class 1: ≤ 25 gammas, Class 2: >25 -100 gammas, Class 3: >100 gammas].

Table 3 - Data Processing Software

Data Set	Processing Software
Navigation & Hydrographic Data	HYPACK single beam editor software (tracklines and depth soundings). QuickSurf digital terrain modeling and Blue Marble's Geographics Global Mapper software packages were used to generate the hydrographic contours and the sun-illuminated sounding surface.
Magnetometer Data	HYPACK magnetometer editor software. QuickSurf digital terrain modeling and Blue Marble Geographics Global Mapper software package were used to generate the magnetic contours.
Side Scan Sonar Imagery	Chesapeake Technologies, Inc. SonarWiz side scan sonar processing software.
Subbottom Profile Data	Chesapeake Technologies, Inc. SonarWiz subbottom processing software.

In order to expedite the review process, data products were shared with the CEC Team as soon as completed. Several online meetings were conducted (between OSI and CEC) to review the preliminary findings and finalize the detailed level geotechnical (vibratory coring) sampling plan. RCG&A project archaeologists were provided processed data to review and determine if the proposed bottom-disturbing activities (vibratory coring) might impact any potential submerged archaeological/cultural resources identified during the detailed survey. Their geoarchaeological review concluded that the proposed sampling activities would have no impact on any potential archaeological resources and that no historic properties that are eligible for the National Register of Historic Places were detected at the proposed sampling locations (RCG&A, 2021). The proposed sampling plan and RCG&A review were presented to BOEM by CEC to support a modification to the existing BOEM OCS Authorization M20-002 for additional sampling activities on the OCS in the LK-P1 borrow area. The modification was approved by BOEM on September 23, 2021. Sampling in the LK-P1 borrow area was

conducted by Amdril on 26 and 27 October 2021. The results of this detailed geotechnical sampling investigation have been reported under separate cover (GFA International, Inc. & Amdril, Inc., 2022) and have been incorporated into the interpretation presented herein.

To illustrate the results of the investigation and data analysis, six (6) Project drawings (which include a total of ten (10) Project drawing sheets) were constructed on ANSI B size drawing sheets (11 by 17 inches). Drawing 1 provides an overview of the detailed survey areas and drawing layout, Drawings 2 presents data for the LK-P1 borrow area and Drawings 3-6 present data for the pipeline corridor and pump-out areas. Drawing 2 includes sheets A-E presenting tracklines, hydrography, side scan sonar and magnetometer results, interpreted sand thickness and represented profiles, respectively. Table 4 summarizes scales and the data presented on each drawing sheet.

Table 4 - Summary of Project Drawings

Project Drawing	Drawing Designation (scale)	Data Presented
1	Overview (1 inch = 12,000 feet)	LK-P1 borrow area, pipeline corridor and pump-out areas survey limits, survey vessel tracklines, BOEM lease blocks and charted features. USGS aerial photograph and NOAA chart of area shown in background.
2A	LK-P1 Survey Vessel Tracklines (1 inch = 1,000 feet)	Survey vessel tracklines (with events and run/line designations), including historic jet probe locations, as-sampled reconnaissance and detailed vibratory core locations and charted obstructions included as overlay. NOAA chart of area shown in background.
2B	LK-P1 Hydrography (1 inch = 1,000 feet)	One-foot depth contours (referenced to NAVD88) overlain on colorized image of modeled depth surface based on processed sounding data. As-sampled reconnaissance and detailed vibratory core locations included as overlay. NOAA chart of area shown in background.
2C	LK-P1 Side Scan Sonar Mosaic, Magnetic Data and Features (1 inch = 1,000 feet)	Side scan sonar mosaic overlain by individual sonar target and magnetic anomaly locations and designations. Magnetic anomalies grouped into three Classes based on amplitude. Historic jet probe and as-sampled reconnaissance and detailed vibratory core locations included as overlay. NOAA chart of area shown in background.

Project Drawing	Drawing Designation (scale)	Data Presented
2D	LK-P1 Interpreted Sand Thickness (1 inch = 1,000 feet)	One-foot contours of interpreted sand thickness (based on subbottom data and Project vibratory cores) overlain on a colorized image of modeled thickness. Historic jet probe and as-sampled reconnaissance and detailed vibratory core locations and interpreted profile sections (presented on the E sheet) included as an overlay. NOAA chart of area shown in background.
2E	LK-P1 Representative Subbottom Profiles (horizontal 1 inch = 1,000 feet, vertical 1 inch = 20 feet)	Representative chirp subbottom profile sections for the LK-P1 borrow area, where interpreted sand thickness is highlighted in yellow. Overview of profile locations included on drawing sheet 2D.
3-6	Pipeline Corridor & Pump-Out Areas (1 inch = 1,000 feet)	Two-panel drawing of pipeline corridor: Upper panel presents survey vessel tracklines (with events and run/line designations) and one-foot depth contours (referenced to NAVD88) overlain on colorized image of modeled depth surface. The lower panel presents side scan sonar mosaic overlain by individual sonar target and magnetic anomaly locations and designations. Magnetic anomalies grouped into three Classes based on amplitude. NOAA chart of area shown in background of both panels.

All drawings are presented in full size in Appendix 2. Digital drawing files (AutoCAD and PDF formats), a copy of this report (PDF format), subbottom profiles (jpg format) and a survey trackline log (PDF format) are provided in the report's digital appendix along with ASCII files containing processed soundings and interpreted sand thickness. Also included in the digital appendix is: OSI's Technical Memorandum and Project Drawings for the Reconnaissance Survey, OSI survey & vessel float plans, AIS PSO reports, RCG&A Phase I Project Report and vibratory clearance letters and Technical Recon Memorandum, Amrdrill Inc. Reconnaissance and Detailed Vibratory Coring Reports, FL 1A-32 Archaeological Research Permit, all BOEM Authorization permits associated with M20-001 & M20-002, shp file of LK-P1 vessel tracklines. All raw digital data files acquired during the survey (HYPACK, side scan sonar, and subbottom profile) will be archived in-house.

4.0 DATA ANALYSIS AND DISCUSSION

Hydrographic, magnetometer and subbottom profile data together with side scan sonar imagery and vibratory cores documented current seafloor and subsurface conditions within the LK-P1 borrow area, Lovers Key pipeline corridor and pump-out areas proposed to support the Project. The primary objectives of these investigations were twofold: first to better delineate the potential sediment borrow area source for the Project (mapping and estimating the volume of sand resources available in LK-P1); and second to identify potential cultural resources and obstructions that might be impacted or impact future Project activities. All data and analysis have been submitted to the project archaeologist (RCG&A) to perform a cultural resource assessment of the survey areas. The discussion presented herein does not include their full assessment.

The following sections present the findings of this investigation. Seasonal variations, storm events, and/or anthropogenic influence since the time of these investigations may have altered conditions reported herein. Depth references are in feet relative to NAVD88. Stationing in the corridor is in feet and originates on Lovers Key.

4.1 LK-P1 Borrow Area

4.1.1 Surface Data Review

The LK-P1 borrow area is situated on a northwest-southeast oriented ridge exhibiting approximately 20 feet of relief from the surrounding seafloor. Water depths within the detailed LK-P1 resource survey limits ranged from approximately 32 to 54 feet below NAVD88 (Drawing 2B). Maximum depth recorded in the borrow area was approximately 48 feet along its western border. Side scan sonar imagery shows the seafloor within the borrow area limits to be generally featureless with no large scale bedforms or recognizable features present (Drawing 2C). Sonar imagery acquired within the buffer area, specifically in the northwest and southeastern corners, exhibits variations in reflectivity and small scale sandwaves.

Although the seafloor appears slightly mottled in this area no areas of clear hardbottom exposure were identified within the resource survey limits.

Side scan sonar imagery and magnetometer data were reviewed to identify features that potentially could impact the Project. Two sonar targets (S101 & 102) and five magnetic anomalies (M201-205) were identified within the resource survey limits. Only S102 was detected within the LK-P1 borrow area limits. Both sonar targets are described as linear objects with no measurable relief. Neither sonar target had a correlative magnetic anomaly association. All five magnetic anomalies were detected within the buffer area. In general, the magnetic anomalies detected are small in amplitude and Class 1 (<25 gammas). Only M202 was Class 2 and it only exhibited 33 gammas in amplitude. M202 and 204 appear to have detected the same ferrous object from different survey trackline.

RCG&A archaeologists have reviewed all the side scan sonar and magnetometer data acquired in the LK-P1 borrow area and have concluded, no targets indicative of a submerged cultural resource were identified within the Project's Area of Potential Effect (APE).

4.1.2 Subsurface Data Review

Subbottom profile data (boomer and chirp) acquired throughout the LK-P1 borrow area showed good subsurface penetration and resolution of reflectors at depth. Subbottom data were analyzed with the focus to map the reflector at the base of the surficial sand ridge. This basal reflector is interpreted as the interface between sandy sediments and a fragmented or a semi-lithified limestone layer at depth. In general, the boomer subbottom profiler attained deeper penetration than the chirp profiler and often resolved reflectors below the basal reflector whereas the chirp profiler attained less penetration but was of higher resolution in the shallow subsurface. Since the chirp profiler was able to resolve the basal reflector and its records were of higher resolution than the boomer profiler the chirp profiles were used as the primary basis for mapping the sand resource presented herein.

Project vibratory cores attained during the reconnaissance and detailed sampling investigations provided groundtruthing of the interpreted sediment types and were relied on heavily during both subbottom data review and the detailed mapping of the resource. In general, Project cores documented a sequence of light gray silica sand with varying shell content in the borrow area (GFA International, Inc. & Amdrill, Inc., 2021 & 2022). Many of the Project cores encountered refusal before reaching their target depth (20 feet below the seafloor) and two cores (VC-21_5 & VC-21_1-22) recovered rock and/or rock fragments at their final penetration.

Figure 3 presents a section of chirp and boomer subbottom profile data acquired along the same northwest-southwest oriented survey line run along the axis of the LK-P1 borrow area. This figure provides a good illustration of the resolution of each subbottom profiling system and the mapping of the resource. In these profiles the interpreted basal reflector and mapped sand body are highlighted in yellow. Note the location of Project vibratory cores VC21-1-05, -07 and -10 which provide good evidence to corroborate the interpretation. All of these cores recovered sand and encountered refusal at their final depth of penetration at the approximate depth of the basal reflector. As illustrated in Figure 3 and the representative profiles presented in Drawing 2E the basal reflector is generally flat-lying but has what appears to be numerous relict channels, often several feet deep, incised into it.

During the task of subsurface review, the basal reflector was mapped for each detailed survey line in the borrow area and cross checked for consistency by review of the intersecting tie lines and Project core logs. Project Drawing 2D present the sand thickness contours generated for the LK-P1 borrow area and the subbottom profiles presented in Drawing 2E provide example of the resource that was mapped. As illustrated by the thickness contours sand thins off the shoal to the southwest and northeast (within the buffer area). Note the sand fill in the incised channels has been included in the sand thickness contours. One of these relict channels appears to have been mapped across the northern end of the borrow area, in vicinity of the B-B' profile, as shown by the interpreted sand thickness contours.

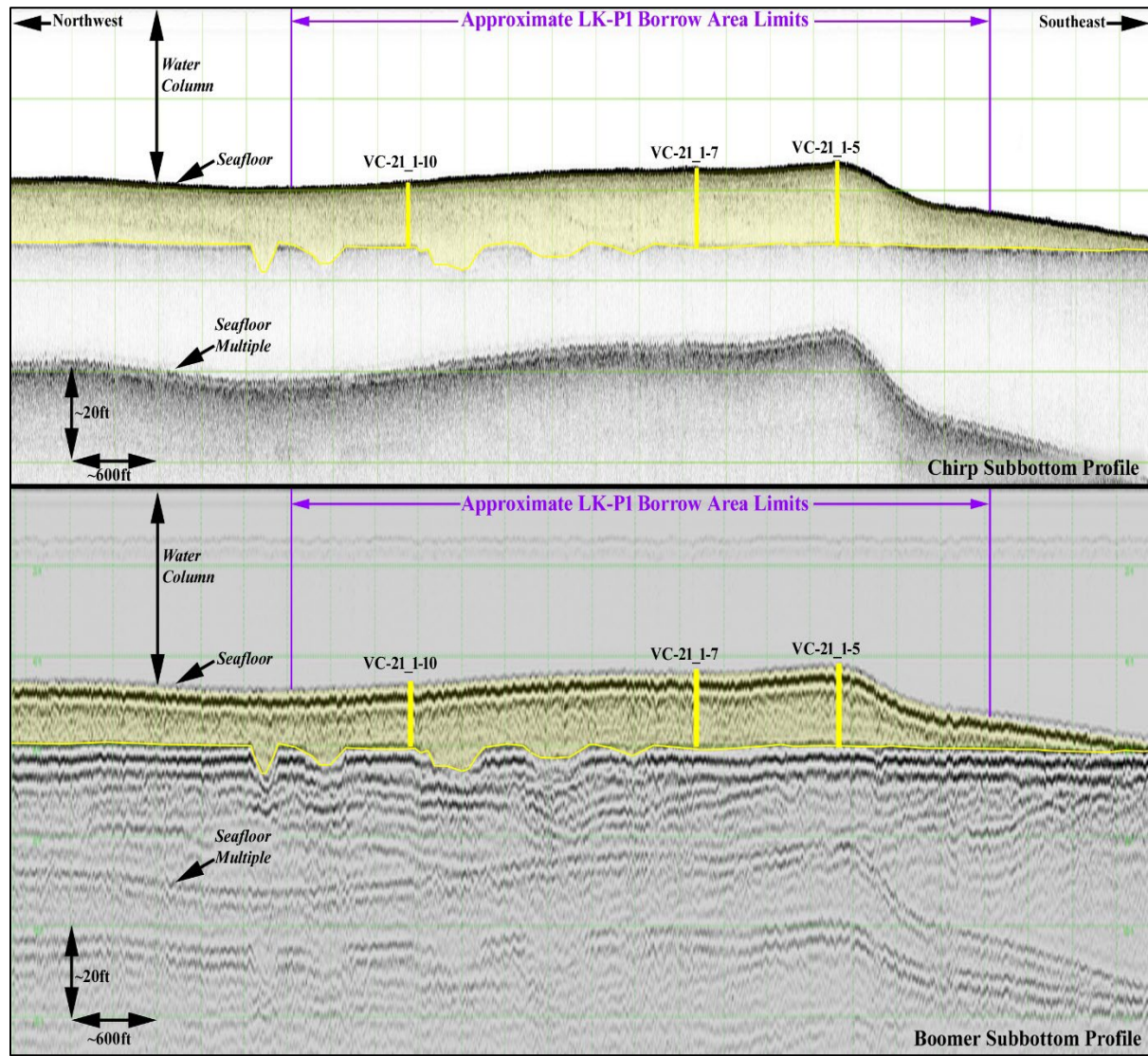


Figure 3. Chirp (upper) and boomer (lower) subbottom profiles acquired in the LK-P1 borrow area illustrating the resolution of the subbottom profiling systems, basal reflector and interpreted surficial sand deposit (shaded yellow). Note the location of Project vibratory cores VC21-1-5, -7 and -10 which provide good evidence to corroborate the interpretation.

Based on this interpretive sand thickness mapping a volume estimate was calculated for the LK-P1 borrow area. This estimate assumes that all sands identified (where minimum thickness is 4.0 feet) are deemed Project suitable and are recoverable. Actual recovered sand volume may be less based on Project suitability of the sands, final engineering design of the dredge template and the methodology chosen to mine the resource. The result of this volume calculation is presented in Table 5.

Table 5 – LK-P1 Sand Volume Estimate
Based on Detailed Geophysical Survey & Geotechnical Sampling Programs

Area Designation	Area Contained w/i Minimum 4 ft Thickness (sqft)	Total Volume w/i Minimum 4 ft Thickness Area (cyd)	Max Thickness	Average Thickness >4 ft
LK-P1	14,522,562	7,020,448	25.3	12.7

RCG&A archaeologists have reviewed all the subbottom profile data acquired in the LK-P1 borrow area and have concluded that there is no evidence within the borrow area, specifically the relict channels of preserved landforms with the potential for cultural resources.

4.2 Pipeline Corridor and Pump-Out Areas

Water depths within the proposed pipeline corridor shoal toward shore from approximately 33 feet at the offshore pump-out (STA 465+50) to 24 feet in the nearshore pump-out (STA 175+00), to 20 feet at STA 53+00, to less than 9 feet just 200 feet offshore of the Lovers Key beachface (STA 2+00). Both the depth surface generated from the hydrographic data, and the side scan sonar mosaic, show the seabed is generally smooth and regular throughout the corridor and pump-outs, with an absence of complex bedforms and relief. Side scan sonar imagery documents slight changes in reflectivity (from light to dark returns) within the corridor from off to onshore. These changes in reflectivity suggest variability in the near surface sediments from silts and clays to sand. There are no NOAA charted utilities crossings around the current proposed pipeline corridor or pump-outs. The only charted feature known in the area is a Obstr Fish Haven (authorized min 14ft) that crosses the proposed corridor in the vicinity of STA 123+00. Nothing was detected within the charted limits of the fish haven as it crossed the pipeline corridor and depths of 21.5 feet were recorded.

Although no areas of obvious hard bottom exposure were mapped within the corridor or pump-out areas by the side scan sonar the chirp subbottom profiler imaged a reflector in the shallow subsurface that might be related to hardbottom and/or a change in sediment type or compaction just below the seafloor. Several areas were identified within the corridor where the reflector

appears to be overlain by only a veneer of sediment (< 3 feet). Figure 4 provides a section of chirp subbottom profiler data acquired within the corridor that identifies the shallow subbottom reflector interpreted as possible hardbottom or a change in sediment type/compaction. The most notable areas were located nearby STAs 140+00, 130+00, 102+50, 89+00 and 80+00. Following the conclusion of the OSI field investigation CEC contracted Coastal Eco-Group Inc. (CEG) to conduct a diver verification survey of these possible nearsurface hardbottom areas (Coastal Eco-Group Inc., 2021). The CEG divers found coarse shell interspersed with sand in these areas but no exposed area of hardbottom at any of the stations investigated. Several probes near STAs 80+00 and 89+00 encountered a hard substrate in the shallow subsurface, most likely correlative with the reflector resolved by the subbottom profiler but nothing exposed on the seafloor.

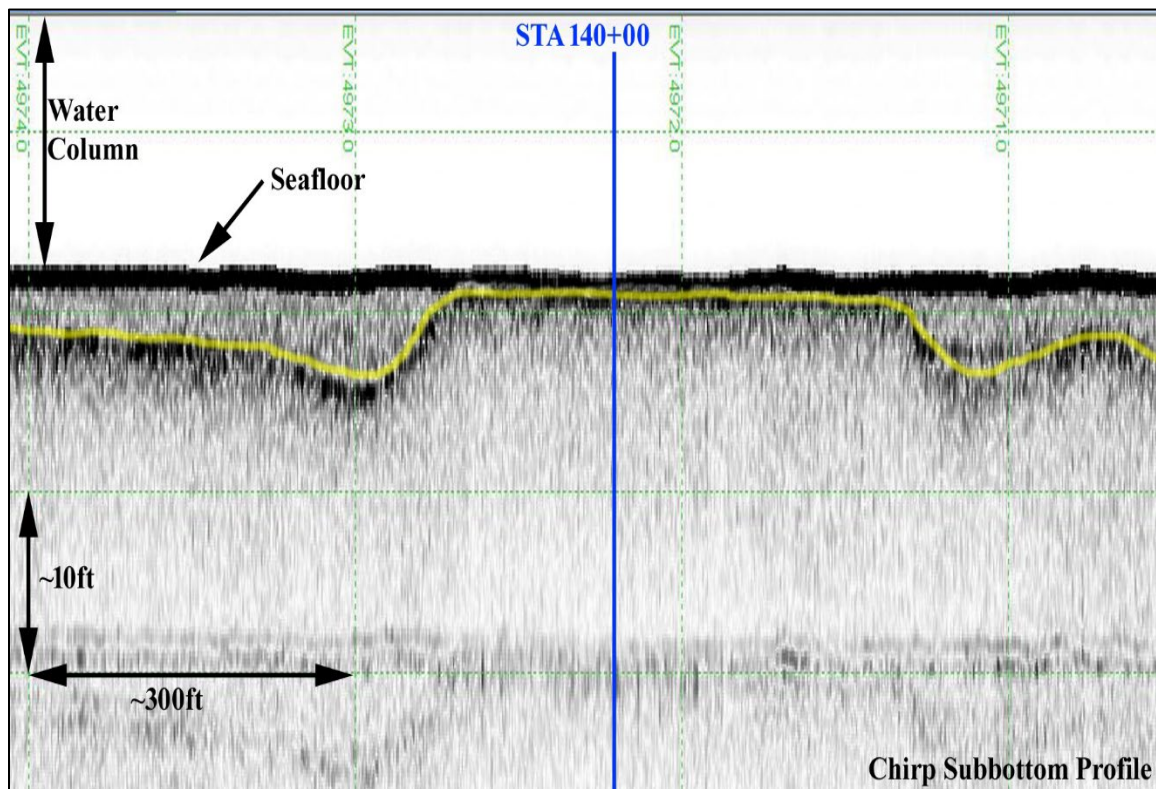


Figure 4. Chirp subbottom profile acquired along the centerline of the pipeline corridor near STA 140+00 identifying the shallow reflector (yellow) resolved possibly correlative with hard bottom in the shallow subsurface.

Thirty-two magnetic anomalies and twenty-seven side scan sonar targets were detected within or adjacent to the proposed Project pipeline corridor and pump-out areas during the detailed survey. An additional five anomalies and five targets had been previously detected during the reconnaissance survey. Most anomalies and targets are isolated and scattered throughout the corridor and only two clear sonar target and magnetic anomaly associations resolved. Anomalies were classed as either 1 or 2 and side scan sonar targets are generally described as nondescript exhibiting minimal relief (<2ft). None of the sonar targets identified appear as a recognizable manmade feature. Only one sonar target (S103) was detected in the offshore pump-out area and only one anomaly (M213) was detected in the near shore pump-out area. Three groups of anomalies (near STAs 442+00, 370+00 and 337+00) form suspect alignments across the corridor which extend to the north into the area investigated during the reconnaissance survey.

The anomalies detected in the alignments near STAs 337+00 & 370+00 were all Class 1 ($\leq 25\text{g}$) whereas those detected near State 442+00 were slightly larger (Class 1 & 2). Side scan sonar and subbottom profiling data did not resolve anything near the magnetic alignments suggesting the features being detected are masked in their surroundings and/or are too small to be detected by the other geophysical sensors. During the CEG diver verification survey of the proposed pipeline corridor (mentioned above) divers swam several transects in the vicinity of the magnetic anomaly alignments detected by OSI (in vicinity of STAs 442+00, 370+00 and 337+00). Divers were unsuccessful in locating the source of the anomalies near STAs 442+00 and 370+00 suggesting it is buried, but they did locate a 3-4-inch diameter pipe near STA 337+00 thought to be the source of the of anomalies in that area.

RCG&A archaeologists have reviewed all the HRG data acquired in the pipeline corridor and pump-out areas and have concluded, no targets indicative of a submerged cultural resource and no relict geomorphic features deemed potentially archaeologically significant were identified within the Project's APE around these areas.

5.0 SUMMARY AND RECOMMENDATIONS

Current Lee County plans are to identify an offshore sediment resource in the Gulf of Mexico that can be permitted and used to re-nourish Lovers Key for the next 50 years. The CEC Project Team comprised of CEC, OSI, RCG&A and Amdrill were contracted to support the County in this work.

This report provides a summary of the detailed level geophysical and cultural resource survey performed by OSI in the proposed offshore LK-P1 borrow area (located on the OCS in federal waters), as well as within a proposed pipeline corridor and two potential pump-out areas in Florida State waters offshore of Lovers Key. This survey is the last in a multi-task investigation performed by OSI and the Project Team designed to characterize the seafloor and subsurface conditions in order to delineate a sediment resource for use on the Project. This final survey task focused on mapping the sediment resources available to support the Project and identifying obstructions and potential cultural resources that could be impacted by the Project. Data from these surveys have been processed, analyzed, and integrated into a series of project drawings designed to document current conditions within the Project areas and meet BOEM and state archaeological permitting requirements.

Water depths within the limits of the LK-P1 borrow area range from approximately 32 to 48 feet below NAVD88 and within the pipeline corridor range from approximately 33 at the proposed offshore pump-out area to less than 9 feet below NAVD88 just offshore of the Lovers Key beachface. The seafloor within both areas appears to be generally featureless with no large scale bedforms present. Twenty-nine sides scan sonar targets and thirty-seven magnetic anomalies were identified during this survey. Only two of these targets and five of the anomalies were identified within the LK-P1 resource survey limits (borrow area including 1,000-foot buffer around its perimeter). Most side scan sonar targets are described as nondescript exhibiting minimal relief (<2ft), and none appear as a recognizable manmade feature. Three groups of aligned magnetic anomalies were identified across the proposed pipeline corridor. One of the alignments may be related to a 3-4-inch diameter pipe in the area,

but it is unclear what is being detected along the other two alignments. In excess of 7 million cubic yards (MCY) of sand have been identified in LK-P1 borrow area. Actual recovered sand volume may be less based Project suitability of the sands, final engineering design of the dredge template and the methodology chosen to mine the resource.

The results of these investigations were provided to RCG&A project archaeologists to review. Their review, which focused on potential cultural resources within the LK-P1 sediment borrow area, pipeline corridor and pump-out areas, is presented under separate cover. Their overall conclusion is that no targets indicative of a submerged cultural resource and no relict geomorphic features deemed potentially archaeologically significant were identified within the Project's APE. Therefore, a determination of "No historic properties affected" (36 CFR 800.4) is being recommended.

The scope of RCG&A's evaluation is limited to items of potential archaeological/cultural significance and may not include items with no cultural significance which may impact the Project. Therefore, it is recommended that prior to construction activities all targets and anomalies identified during the course of OSI's investigation, be more fully investigated/evaluated prior to performing any project related activities in their vicinity.

5.0 REFERENCES

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APPENDIX 1

**SUMMARY TABLES OF
MAGNETIC ANOMALIES, SIDE SCAN SONAR TARGETS
AND SIDE SCAN SONAR TARGET REPORTS**

NOTE: Tables included for Detailed & Reconnaissance Surveys

DETAILED SURVEY MAGNETIC ANOMALIES

Magnetic Anomaly	Easting¹	Northing¹	Latitude²	Longitude²	Type³	Amplitude⁴	Duration⁵	Sensor Altitude⁵	Event	Sonar Target Correlation	Area⁶	Class⁷	Run/Line
M201	535859	746328	26.386463	82.367498	Di	9	71	15	3665.3		P1	1	55/61
M202	535947	747120	26.388643	82.367236	M-	33	116	16	4279		P1	2	87/79
M203	534089	743370	26.378311	82.372879	M-	17	73	18	4527.7		P1	1	97/52
M204	535956	747123	26.388651	82.367209	Di	22	143	15	4681.3		P1	1	104/66
M205	534525	745990	26.385523	82.371570	M-	6	54	16	4699.6		P1	1	105/68
M206	694337	744938	26.383063	81.883406	Di	10	71	8	4751		C	1	108/38
M207	693747	744630	26.382217	81.885209	M+	6	37	11	4753.3		C	1	108/38
M208	690406	742857	26.377347	81.895419	Di	16	88	17	4765.6	S125	C	1	108/38
M209	694360	745193	26.383765	81.883335	M-	9	35	9	4812		C	1	109/30
M210	695793	745938	26.385811	81.878956	M+	12	37	7	4817.4		C	1	109/30
M211	696052	746072	26.386179	81.878164	M+	12	48	8	4818.5		C	1	109/30
M212	692490	744301	26.381315	81.889049	M-	28	69	12	4910.1		C	2	112/31
M213	681060	738176	26.364487	81.923974	Di	17	114	18	4960.8		NPO	1	114/30
M214	688895	742203	26.375551	81.900035	Di	28	92	14	5125.3		C	2	135/39
M215	690242	742911	26.377496	81.895919	M+	52	56	14	5130.4	S123	C	2	135/39
M216	693886	744781	26.382633	81.884784	M-	11	33	9	5147.5		C	1	140/44
M217	671529	734530	26.354468	81.953086	M+	6	116	15	5205.4		C	1	145/23
M218	671531	734421	26.354168	81.953080	M+	6	73	16	5289.3		C	1	148/22
M219	671510	734618	26.354710	81.953144	M-	13	140	16	5356		C	1	149/24
M220	667198	730313	26.342870	81.966316	M-	13	142	18	5380.2		C	1	150/17
M221	665857	728749	26.338568	81.970411	Di	16	214	18	5387.2		C	1	150/17
M222	665073	727819	26.336010	81.972806	M+	10	94	16	5391.2		C	1	150/17
M223	660405	722315	26.320869	81.987061	M-	26	203	17	5415.2		C	2	150/17
M224	660311	722693	26.321909	81.987347	M+	54	195	19	5433.8		C	2	151/20

Magnetic Anomaly	Easting ¹	Northing ¹	Latitude ²	Longitude ²	Type ³	Amplitude ⁴	Duration ⁵	Sensor Altitude ⁵	Event	Sonar Target Correlation	Area ⁶	Class ⁷	Run/ Line
M225	660044	722352	26.320971	81.988163	M+	7	82	19	5432.4		C	1	151/20
M226	664654	727797	26.335950	81.974085	M-	18	116	16	5456.2		C	1	151/20
M227	665033	728243	26.337176	81.972928	M+	22	136	16	5458		C	1	151/20
M228	667147	730731	26.344020	81.966471	M+	18	148	14	5469		C	1	151/20
M229	667834	731547	26.346265	81.964373	M-	23	117	14	5472.5		C	1	151/20
M230	667164	730585	26.343618	81.966419	CD	5	75	17	5502.6		C	1	152/19
M231	665036	728085	26.336742	81.972919	Di	13	96	16	5513.7		C	1	152/19
M232	660322	722531	26.321463	81.987314	M-	15	275	17	5538		C	1	152/19
M233	658943	720897	26.316968	81.991524	M+	22	110	17	5545.2		C	1	152/19
M234	660278	722706	26.321945	81.987448	M+	50	120	16	5550.6		C	2	154/21
M235	660035	722422	26.321164	81.988190	M+	20	90	16	5551.8		C	1	154/21
M236	660379	722462	26.321274	81.987140	M+	34	64	16	5570.5		C	2	156/18
M237	665446	728910	26.339011	81.971666	M+	23	39	14	5739.7		C	1	183/75

¹Coordinates are in feet in the FL State Plane Coordinate System, West Zone, NAD 83.

²Geographical coordinates are decimal degrees referenced to NAD 83.

³M+ - positive monopole, M- - negative monopole, Di – dipole, Cd – complex dipole.

⁴Amplitude is measured in Gammas (note: 1Gamma (Y) = 1 Nanotesla (nT))

⁵Duration and Sensor Altitude are measured in feet.

⁶Area: P1 = LK-P1; C = Conveyance Corridor; OPO = Offshore Pump-Out Area; NPO = Nearshore Pump-Out Area.

⁷Class 1: ≤ 25 gammas, Class 2: >25 -100 gammas, Class 3: >100 gammas.

DETAILED SURVEY SIDE SCAN SONAR TARGETS

Sonar Target	Easting¹	Northing¹	Latitude²	Longitude²	Length³	Width³	Height³	Area⁴	Description	Magnetic Anomaly
S101	533793	743395	26.378379	82.373783	25.2	0.8	0.0	P1	Linear Object	
S102	538335	743561	26.378871	82.359911	85.4	3.7	0.0	P1	Linear Object	
S103	657691	720810	26.316729	81.995348	3.1	1.7	1.3	OPO	Rectangular Object	
S104	663262	725993	26.330988	81.978336	2	1.8	1.2	C	Round Object	
S105	663301	726361	26.331999	81.978216	3	1.6	1.4	C	Irregular Object	
S106	663544	726691	26.332907	81.977476	3.5	0.4	1.6	C	Linear Object	
S107	665334	728783	26.338662	81.97201	4.2	2.5	1	C	Irregular Object	
S108	665340	728777	26.338644	81.971991	4.2	0.9	0.1	C	Oblong Object	
S109	665415	728325	26.337401	81.971762	4.2	0.9	1.6	C	Linear Object	
S110	675279	735710	26.357711	81.941631	24.8	20.6	5.1	C	Large Irregular Object	
S111	677320	736445	26.35973	81.935399	42.3	2	0	C	Linear Object, possible drag mark	
S112	678858	737215	26.361847	81.9307	3.2	0.7	1.3	C	Small Linear Object	
S113	681676	738233	26.364643	81.922092	19.4	0.8	0.4	C	Elongate object possibly related to S40	
S114	684560	740246	26.370175	81.91328	3.1	2.2	0.8	C	Round Object	
S115	687569	741470	26.373538	81.904087	51.9	1.9	0.6	C	Linear Object	
S116	687870	741668	26.374082	81.903167	5	11.2	2	C	Oblong Object	
S117	688584	742048	26.375127	81.900986	4.8	2.1	5.6	C	Oblong Object	
S118	688795	742164	26.375445	81.90034	1.9	1.8	0.6	C	Small Object	
S119	689127	742328	26.375895	81.899325	2.3	2.1	0.9	C	Irregular Object	
S120	689491	742953	26.377612	81.898212	2.9	2	0.9	C	Irregular Object	
S121	689495	742539	26.376475	81.898202	4.4	2.3	1.4	C	Small Object	
S122	689520	742361	26.375984	81.898127	1.6	0.7	1.6	C	Irregular Object	
S123	690252	742904	26.377477	81.895889	4.6	1	1.1	C	Irregular Object	M215
S124	690340	742884	26.37742	81.89562	2	1.2	1.5	C	Irregular Object	
S125	690410	742875	26.377397	81.895407	7.4	1.1	1.6	C	Irregular Object	M208
S126	693237	744890	26.382933	81.886765	92.2	1	0	C	Linear Object	

Sonar Target	Easting¹	Northing¹	Latitude²	Longitude²	Length³	Width³	Height³	Area⁴	Description	Magnetic Anomaly
S127	693422	744519	26.381914	81.886201	76.9	2.3	0.2	C	Linear Object	
S128	693599	744938	26.383064	81.88566	15.7	3.9	1.7	C	Oblong Object	
S129	694799	745224	26.38385	81.881995	41.1	1	0	C	Linear Object	

¹Coordinates are in feet in the FL State Plane Coordinate System, West Zone, NAD 83.

²Geographical coordinates are decimal degrees referenced to NAD 83.

³All measurements are in feet.

⁴Area: P1 = LK-P1; C = Conveyance Corridor; OPO = Offshore Pump-Out Area; NPO = Nearshore Pump-Out Area.

RECONNAISSANCE SURVEY MAGNETIC ANOMALIES
(Plotted on Detailed Project Drawings)

Magnetic Anomaly¹	Easting²	Northing²	Latitude³	Longitude³	Type⁴	Amplitude⁵	Duration⁶	Sensor Altitude⁶	Event	Sonar Target Correlation	Area⁷	Class⁸	Run/Line
M75	660286.6	723766.4	26.324862	81.987422	M-	14	77	16	2630.7		4	1	55/32
M76	660306.5	722636.1	26.321753	81.987361	M-	12	71	15	2705.1		4	1	57/49
M77	660053.5	722480.5	26.321325	81.988134	M-	11	76	15	2708.1		4	1	57/49
M78	655005.9	719480.4	26.313071	82.003544	Di	12	86	16	2781.7		4	1	58/71
M79	660040.6	722440.3	26.321214	81.988173	M+	28	80	14	2842.8		4	2	61/1
M80	660291.7	722731.5	26.322015	81.987406	M+	49	78	14	2846.6		4	2	61/1
M81	667146.8	730784.2	26.344167	81.966472	M-	17	52	15	2952.4		c	1	61/1
M82	683250.1	741194.6	26.372788	81.917279	M+	7	38	15	3175.7		c	1	63/1
M83	683379.1	741275.5	26.373010	81.916885	M+	27	58	15	3177.2		c	2	63/1
M84	692631.8	745856.2	26.385594	81.888612	Di	392	58	7	3301.7		c	3	64/4
M85	683623.6	741102.8	26.372535	81.916138	M-	9	31	18	3403.6		c	1	64/4
M86	683532.7	741055.6	26.372405	81.916416	M+	14	32	19	3404.6		c	1	64/4
M87	683475.4	741019.5	26.372306	81.916591	Di	38	47	18	3405.3		c	2	64/4
M88	683335.1	740946.9	26.372106	81.917020	Cd	300	122	18	3406.9		c	3	64/4
M89	683246.1	740901.8	26.371982	81.917292	M+	27	30	19	3407.9		c	2	64/4
M90	660193.6	723379.9	26.323799	81.987706	M-	33	78	14	3544.2		4	2	65/3
M91	664954.5	728996.9	26.339251	81.973167	M+	9	50	14	3623.7		c	1	66/3
M92	665385.0	729495.7	26.340623	81.971852	Di	37	79	14	3630.3		c	2	66/3
M93	667070.9	731490.9	26.346111	81.966703	M+	20	88	15	3656.4		c	1	66/3
M94	667322.6	731772.5	26.346885	81.965934	M-	13	81	15	3660.2		c	1	66/3
M95	673631.2	736693.8	26.360419	81.946664	M-	45	76	14	3741.7		c	2	66/3
M96	682713.3	741480.1	26.373574	81.918918	Di	30	77	17	3874.3		c	2	68/3
M97	682929.5	741594.8	26.373890	81.918257	Cd	20	117	16	3876.7		c	1	68/3

Magnetic Anomaly ¹	Easting ²	Northing ²	Latitude ³	Longitude ³	Type ⁴	Amplitude ⁵	Duration ⁶	Sensor Altitude ⁶	Event	Sonar Target Correlation	Area ⁷	Class ⁸	Run/ Line
M98	690889.9	745784.3	26.385400	81.893933	M+	18	44	6	3981.7		c	1	69/3
M99	692099.5	746440.0	26.387201	81.890237	Di	10	35	3	4001.2		c	1	70/16
M100	692328.2	746128.6	26.386344	81.889539	M+	27	37	3	4005.1		c	2	70/16
M101	692414.8	746001.3	26.385993	81.889275	M-	13	28	3	4006.6		c	1	70/16
M102	692576.1	745775.6	26.385372	81.888782	M+	5	13	3	4009.4		c	1	70/16
M103	692627.1	745707.9	26.385186	81.888627	M-	6	22	5	4010.3		c	1	70/16
M104	693676.9	746124.4	26.386329	81.885419	Di	12	18	4	4022.2		c	1	71/5
M105	693138.2	745838.2	26.385543	81.887065	M+	6	11	3	4028.3		c	1	71/5
M106	692474.4	745485.5	26.384574	81.889094	M+	128	31	4	4035.8		c	3	71/5
M107	691970.1	745221.3	26.383848	81.890635	M-	41	24	5	4041.4		c	2	71/5
M108	683592.1	740807.7	26.371723	81.916235	M-	10	39	14	4136.2		c	1	71/5
M109	668344.9	731441.1	26.345973	81.962813	M-	18	62	16	4342.2		c	1	73/5
M110	667490.9	730430.4	26.343193	81.965421	M+	26	72	16	4355.4		c	2	73/5
M111	665097.3	727609.9	26.335435	81.972732	M+	10	58	16	4392.4		c	1	73/5
M112	667227.9	730117.4	26.342332	81.966224	Di	20	56	16	4395.5		c	1	73/5
M113	660239.1	723059.2	26.322917	81.987567	M-	22	90	15	4480.9		4	1	75/2
M114	664967.0	728616.7	26.338205	81.973129	M-	18	89	13	4553.8		c	1	75/2
M115	665415.9	729149.7	26.339671	81.971758	M+	9	39	15	4560.8		c	1	75/2
M116	667108.8	731147.6	26.345166	81.966587	M-	20	72	15	4587.0		c	1	75/2
M117	683565.1	741648.3	26.374036	81.916316	M-	12	30	13	4813.6		c	1	78/2
M118	691183.8	745657.9	26.385051	81.893036	M+	15	19	8	4899.6		c	1	78/2
M119	691187.5	745660.0	26.385057	81.893024	Di	15	26	8	4899.7		c	1	78/2
M120	692704.9	746456.6	26.387245	81.888387	Di	485	53	5	4916.8		c	3	78/2
M121	693330.4	746774.3	26.388118	81.886476	M+	16	11	3	4923.8		c	1	78/2
M122	692143.2	746449.1	26.387226	81.890103	M-	5	7	3	4944.3		c	1	79/3
M123	683540.5	740492.4	26.370856	81.916393	M+	33	54	15	5024.8		c	2	80/101

Magnetic Anomaly¹	Easting²	Northing²	Latitude³	Longitude³	Type⁴	Amplitude⁵	Duration⁶	Sensor Altitude⁶	Event	Sonar Target Correlation	Area⁷	Class⁸	Run/ Line
M124	683500.4	740469.9	26.370794	81.916516	M+	5	25	15	5025.3		c	1	80/101
M125	681865.2	739338.9	26.367685	81.921512	Di	8	31	15	5105.2		c	1	81/102
M126	683040.2	739955.3	26.369379	81.917922	M+	8	28	16	5118.5		c	1	81/102
M127	683553.7	740223.4	26.370115	81.916354	Di	414	132	15	5124.3		c	3	81/102
M128	683704.9	740303.9	26.370337	81.915892	M+	14	27	16	5125.9		c	1	81/102
M129	683788.5	740346.5	26.370454	81.915636	M-	27	36	16	5126.9		c	2	81/102
M130	684261.2	740312.3	26.370359	81.914193	M-	11	44	15	5201.3		c	1	82/103
M131	683863.1	740100.6	26.369777	81.915409	M+	5	54	16	5205.8		c	1	82/103
M132	683822.2	740079.4	26.369719	81.915534	Di	12	59	15	5206.3		c	1	82/103
M133	667183.9	730462.3	26.343281	81.966359	M-	22	54	13	5609.1		c	1	89/4

¹Magnetic anomaly designation. Designation shaded infers anomaly detected within detailed survey limits.

²Coordinates are in feet in the FL State Plane Coordinate System, West Zone, NAD 83.

³Geographical coordinates are decimal degrees referenced to NAD 83.

⁴M+ - positive monopole, M- - negative monopole, Di – dipole, Cd – complex dipole.

⁵Amplitude is measured in Gammas (note: 1Gamma (Y) = 1 Nanotesla (nT))

⁶Duration and Sensor Altitude are measured in feet.

⁷Area 4 = Recon LK-P4; C = Conveyance Corridor (Note: no anomalies detected in Area LK-P1).

⁸Class 1: ≤ 25 gammas, Class 2: >25 -100 gammas, Class 3: >100 gammas.

RECONNAISSANCE SURVEY SIDE SCAN SONAR TARGETS
(Plotted on Detailed Project Drawings)

Sonar Target	Easting ¹	Northing ¹	Latitude ²	Longitude ²	Length ²	Width ²	Height ²	Area ³	Description	Magnetic Anomaly
S15	657821.3	719830.9	26.314035	81.994949	4.6	0.7	0.8	4	Oblong object	
S20	661533.7	722037.6	26.320105	81.983615	5.4	1.4	0.6	4	Oblong object	
S21	661551.1	722027.4	26.320078	81.983562	3.5	0.9	1.3	4	Oblong object	
S24	661929.1	724421.5	26.326664	81.982407	2.1	1.8	0.7	C	Oblong object	
S29	662960.7	726726.0	26.333004	81.979256	20.0	4.7	3.5	C	Oblong object	
S38	681029.1	739566.9	26.368314	81.924065	7.1	2.6	1.1	C	Oblong object	
S39	681574.4	738100.8	26.364279	81.922403	16.5	1.0	1.0	C	Linear object	
S40	681592.3	738246.3	26.364679	81.922348	28.1	1.0	0.8	C	Oblong object	
S41	682632.0	741643.0	26.374023	81.919166	79.3	20.0	2.0	C	Group of oblong objects	
S42	682881.2	741691.7	26.374156	81.918405	35.0	9.7	2.8	C	Group of oblong objects	
S43	683274.9	740974.1	26.372181	81.917204	79.6	69.9	1.1	C	Group of oblong objects	
S44	683298.7	741049.9	26.372390	81.917131	6.6	6.6	0.8	C	Two oblong objects	
S45	683380.4	741082.7	26.372480	81.916881	19.7	8.4	3.2	C	Group of oblong objects	
S46	683408.5	740897.7	26.371971	81.916796	51.2	35.3	2.7	C	Group of oblong objects	
S47	683448.0	740850.2	26.371840	81.916675	47.6	13.1	4.5	C	Group of oblong objects	
S48	683493.6	741004.6	26.372265	81.916536	12.4	0.6	3.6	C	Group of oblong objects	
S49	683498.0	740945.0	26.372101	81.916522	2.5	1.4	1.0	C	Oblong object	
S50	683500.5	741222.9	26.372865	81.916514	8.5	2.7	1.6	C	Two oblong objects	
S51	683540.7	740252.3	26.370195	81.916393	37.4	5.8	0.8	C	Group of oblong objects	
S52	683558.4	740594.4	26.371136	81.916339	38.4	5.3	1.2	C	Oblong object	
S53	683598.9	740293.3	26.370308	81.916215	35.3	4.0	1.5	C	Group of oblong objects	
S54	683705.1	741979.3	26.374946	81.915888	23.9	0.6	1.0	C	Linear object	
S55	683755.6	740229.5	26.370132	81.915737	34.7	10.7	4.7	C	Group of oblong objects	
S56	683757.7	741924.5	26.374795	81.915727	3.3	2.3	1.1	C	Oblong object	
S57	683914.1	740316.0	26.370369	81.915253	5.8	2.9	1.0	C	Oblong object	

Sonar Target	Easting ¹	Northing ¹	Latitude ²	Longitude ²	Length ²	Width ²	Height ²	Area ³	Description	Magnetic Anomaly
S58	684066.9	740342.6	26.370443	81.914786	4.1	1.8	1.4	C	Oblong object	
S59	685277.3	740486.1	26.370835	81.911089	26.7	3.5	1.1	C	Linear object	
S60	686317.2	741174.9	26.372728	81.907911	4.6	2.1	0.8	C	Oblong object	
S61	686451.4	742470.5	26.376292	81.907498	3.0	1.6	1.2	C	Oblong object	
S62	687175.0	742039.8	26.375106	81.905289	6.3	4.4	1.5	C	Oblong object	
S63	687216.2	741983.5	26.374951	81.905164	24.7	5.2	1.7	C	Oblong object	
S64	687960.6	743252.9	26.378442	81.902887	6.0	1.0	0.6	C	Oblong object	
S65	689253.9	743982.4	26.380446	81.898935	3.3	1.5	0.6	C	Oblong object	
S66	689334.9	744529.3	26.381951	81.898686	8.9	2.1	1.2	C	Oblong object	
S67	689440.8	744345.1	26.381443	81.898363	1.6	2.2	1.4	C	Oblong object	
S68	689697.6	744393.5	26.381576	81.897578	3.3	0.7	1.2	C	Oblong object	
S69	691138.8	744824.1	26.382757	81.893175	2.8	2.1	1.5	C	Oblong object	
S70	691281.9	745528.8	26.384696	81.892736	9.6	3.2	0.9	C	Oblong object	

¹Side scan sonar target designation. Designation shaded infers target detected within detailed survey limits.

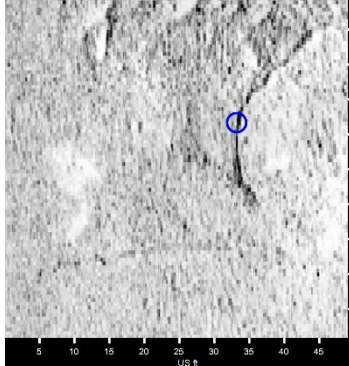
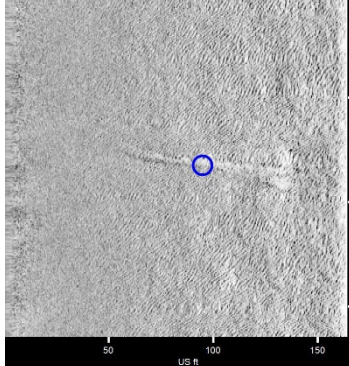
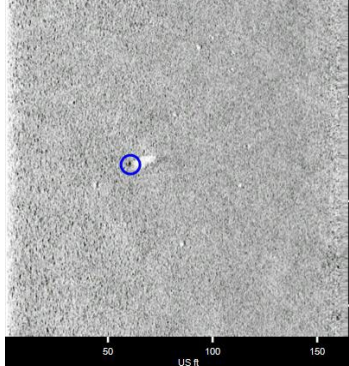
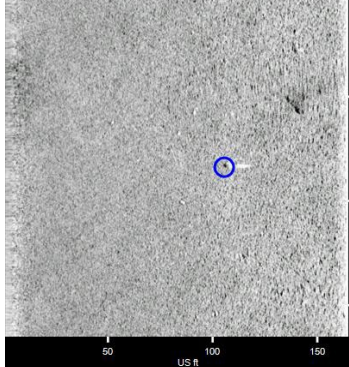
¹Coordinates are in feet in the FL State Plane Coordinate System, West Zone, NAD 83.

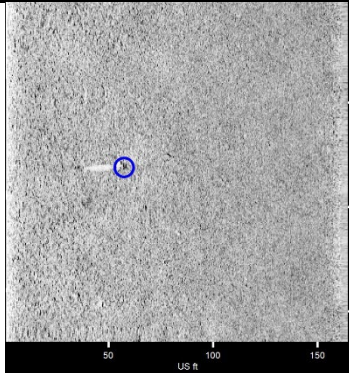
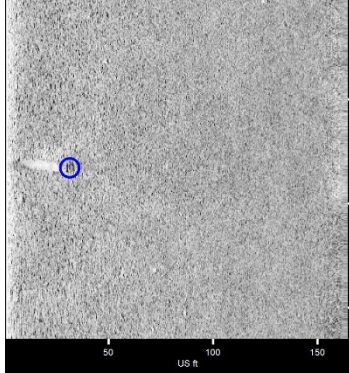
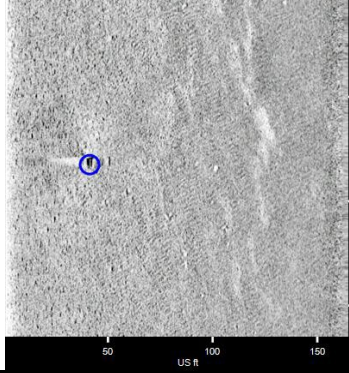
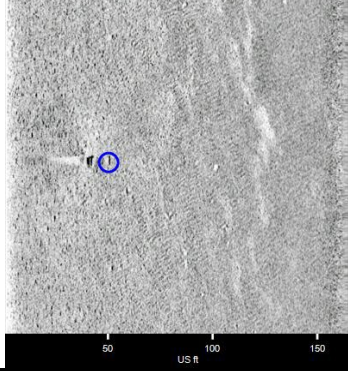
²Geographical coordinates are decimal degrees referenced to NAD 83.


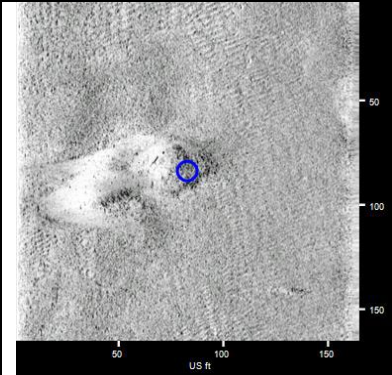
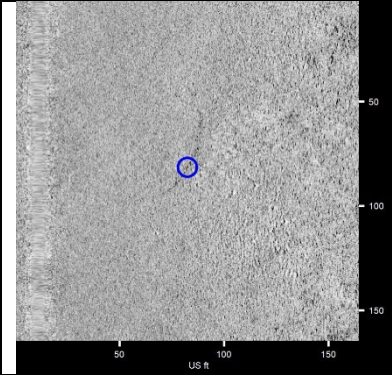
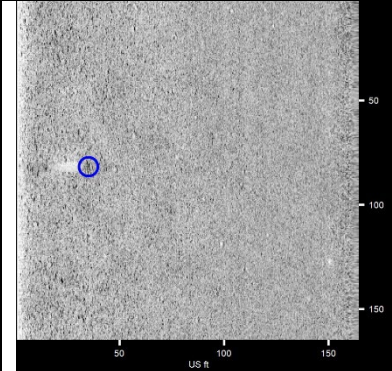
³All measurements are in feet.

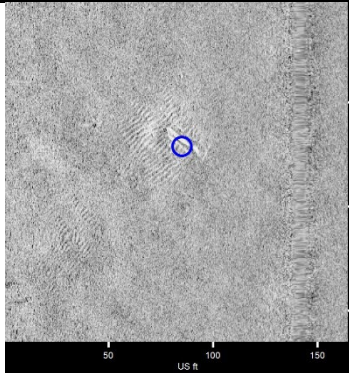
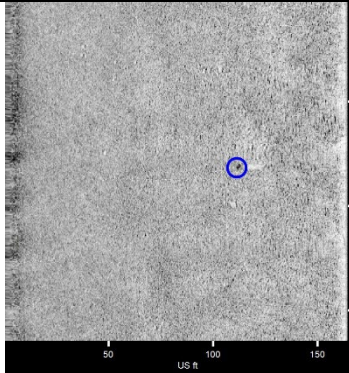
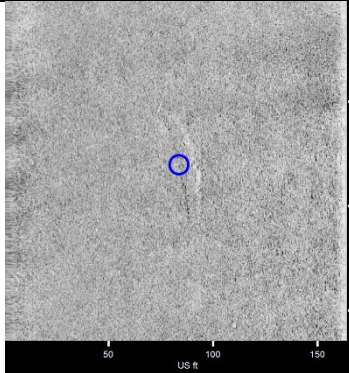
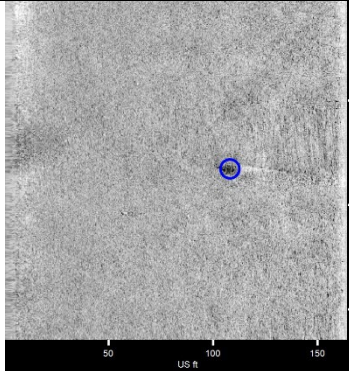
⁴Area: 4 = Recon LK-P4; C = Conveyance Corridor (Note no targets detected in Area LK-P1).

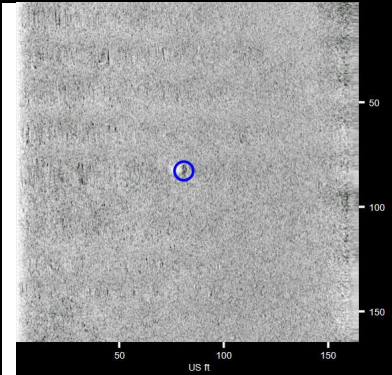
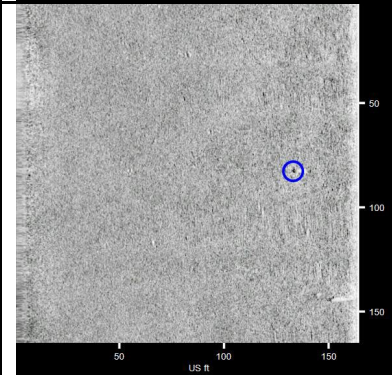
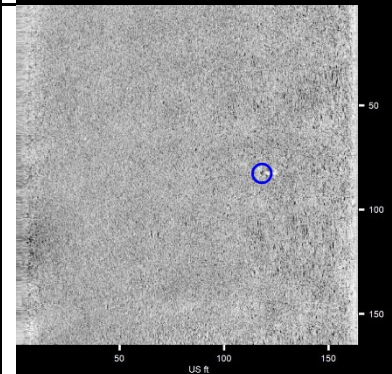
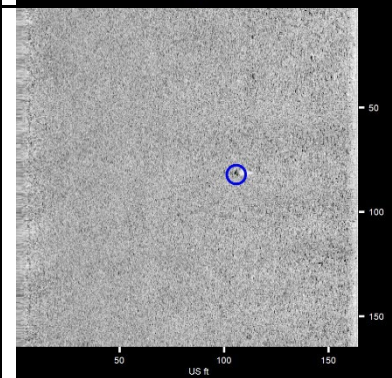
DETAILED SURVEY SIDE SCAN SONAR TARGET REPORTS

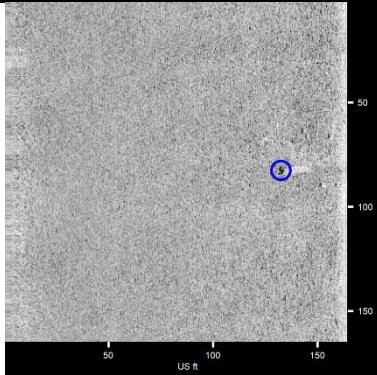
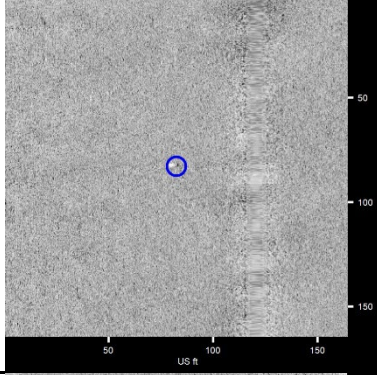
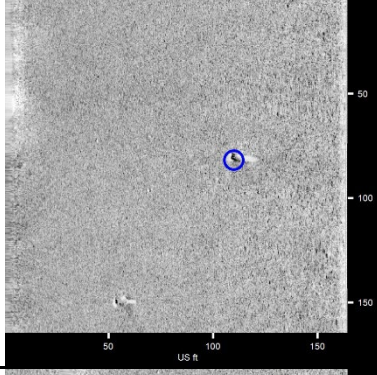
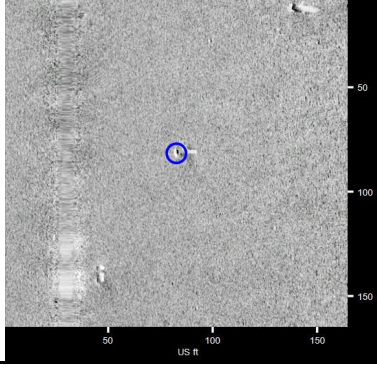
Target Image	Target Info	Description
	<p>S101</p> <p>26.3783785032 -82.3737830839 (WGS84) (X) 533792.97 (Y) 743395.27 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 21ES020_SSS210714173500 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 25.2 US ft Target Width: 0.8 US ft Target Height: 0.0 US ft Area: LK-P1 Description: Linear Object
	<p>S102</p> <p>26.3788713667 -82.3599106207 (WGS84) (X) 538335.24 (Y) 743561.50 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 21ES020_SSS210715165300 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 85.4 US ft Target Width: 3.7 US ft Target Height: 0.0 US ft Area: LK-P1 Description: Linear Object
	<p>S103</p> <p>26.3167289801 -81.9953479379 (WGS84) (X) 657690.52 (Y) 720810.01 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210718180200 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 3.1 US ft Target Width: 1.7 US ft Target Height: 1.3 US ft Area: Description: Rectangular Object
	<p>S104</p> <p>26.3309880750 -81.9783360152 (WGS84) (X) 663262.15 (Y) 725993.36 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210718144900 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 2.0 US ft Target Width: 1.8 US ft Target Height: 1.2 US ft Area: Description: Round Object

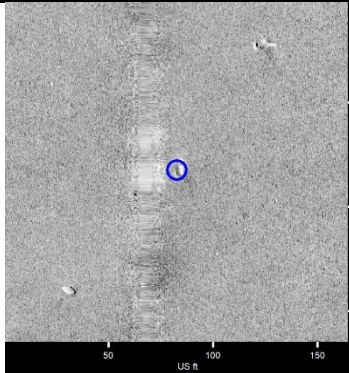
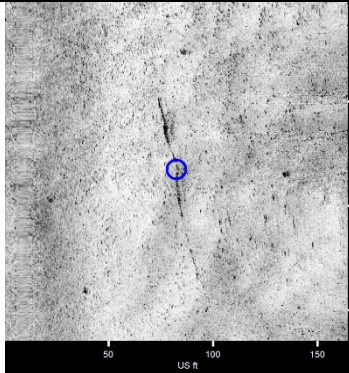
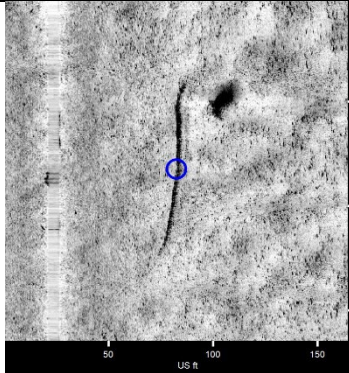
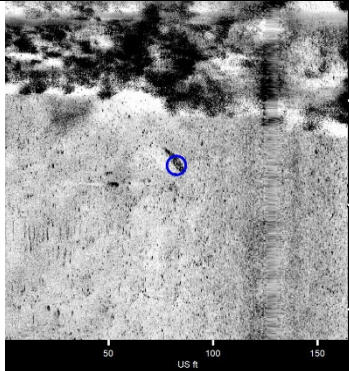
Target Image	Target Info	Description
	<p>S105</p> <p>26.3319993426 -81.9782164842 (WGS84) (X) 663301.24 (Y) 726360.93 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210718144900 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 3.0 US ft Target Width: 1.6 US ft Target Height: 1.4 US ft Area: Description: Irregular Object
	<p>S106</p> <p>26.3329065320 -81.9774761650 (WGS84) (X) 663543.65 (Y) 726690.71 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210718144900 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 3.5 US ft Target Width: 0.4 US ft Target Height: 1.6 US ft Area: Description: Linear Object
	<p>S107</p> <p>26.3386616215 -81.9720097289 (WGS84) (X) 665333.56 (Y) 728782.88 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210718144900 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 4.2 US ft Target Width: 2.5 US ft Target Height: 1.0 US ft Area: Description: Irregular Object
	<p>S108</p> <p>26.3386441146 -81.9719908391 (WGS84) (X) 665339.75 (Y) 728776.51 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210718144900 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 4.2 US ft Target Width: 0.9 US ft Target Height: 0.1 US ft Area: Description: Oblong Object

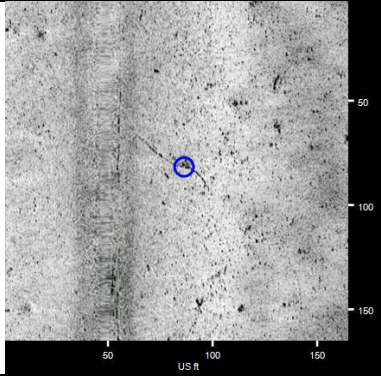
Target Image	Target Info	Description
	<p>S109</p> <p>26.3374013206 -81.9717616034 (WGS84) (X) 665414.92 (Y) 728324.81 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210718153900 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 4.2 US ft Target Width: 0.9 US ft Target Height: 1.6 US ft Area: Description: Linear Object
	<p>S110</p> <p>26.3577107551 -81.9416312209 (WGS84) (X) 675279.47 (Y) 735710.05 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210718131200 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 24.8 US ft Target Width: 20.6 US ft Target Height: 5.1 US ft Area: Description: Large Irregular Object
	<p>S111</p> <p>26.3597302898 -81.9353989522 (WGS84) (X) 677319.86 (Y) 736445.07 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210718131200 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 42.3 US ft Target Width: 2.0 US ft Target Height: 0.0 US ft Area: Description: Linear Object, possible drag mark
	<p>S112</p> <p>26.3618473635 -81.9306997123 (WGS84) (X) 678858.18 (Y) 737215.37 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210718131200 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 3.2 US ft Target Width: 0.7 US ft Target Height: 1.3 US ft Area: Description: Small Linear Object

Target Image	Target Info	Description
	<p>S113</p> <p>26.3646431165 -81.9220915274 (WGS84) (X) 681676.21 (Y) 738233.17 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210717170800 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 19.4 US ft Target Width: 0.8 US ft Target Height: 0.4 US ft Area: Description: Elongate object, possibly related to S40
	<p>S114</p> <p>26.3701746418 -81.9132804222 (WGS84) (X) 684559.88 (Y) 740245.57 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210717163200 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 3.1 US ft Target Width: 2.2 US ft Target Height: 0.8 US ft Area: Description: Round Object
	<p>S115</p> <p>26.3735379559 -81.9040867999 (WGS84) (X) 687569.09 (Y) 741470.18 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210717132200 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 51.9 US ft Target Width: 1.9 US ft Target Height: 0.6 US ft Area: Description: Linear Object
	<p>S116</p> <p>26.3740823862 -81.9031667821 (WGS84) (X) 687870.16 (Y) 741668.30 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210717132200 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 5.0 US ft Target Width: 11.2 US ft Target Height: 2.0 US ft Area: Description: Oblong Object

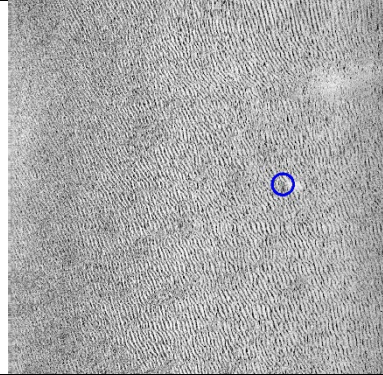
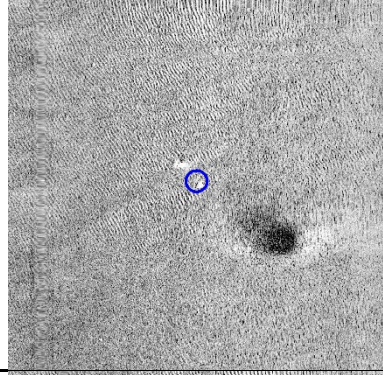
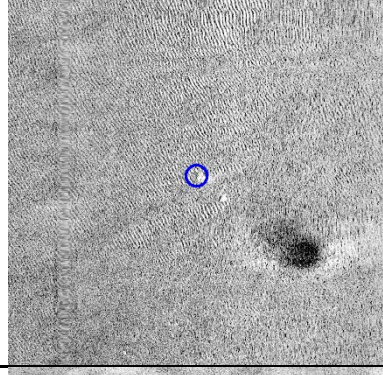
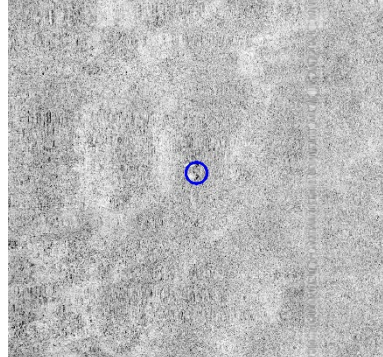
Target Image	Target Info	Description
	<p>S117</p> <p>26.3751266984 -81.9009862780 (WGS84) (X) 688583.77 (Y) 742048.42 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210717145100 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 4.8 US ft Target Width: 2.1 US ft Target Height: 5.6 US ft Area: Description: Oblong Object
	<p>S118</p> <p>26.3754452739 -81.9003403165 (WGS84) (X) 688795.17 (Y) 742164.38 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210717132200 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 1.9 US ft Target Width: 1.8 US ft Target Height: 0.6 US ft Area: Description: Small Object
	<p>S119</p> <p>26.3758953585 -81.8993252282 (WGS84) (X) 689127.38 (Y) 742328.23 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210717132200 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 2.3 US ft Target Width: 2.1 US ft Target Height: 0.9 US ft Area: Description: Irregular Object
	<p>S120</p> <p>26.3776122536 -81.8982116896 (WGS84) (X) 689491.46 (Y) 742952.56 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210717142300 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 2.9 US ft Target Width: 2.0 US ft Target Height: 0.9 US ft Area: Description: Irregular Object, located outside pipeline corridor

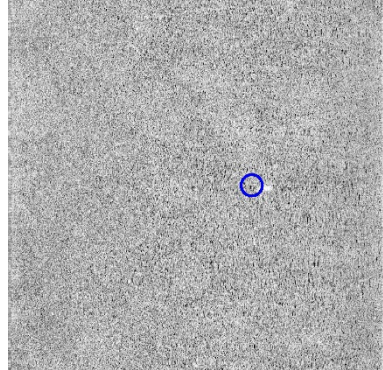
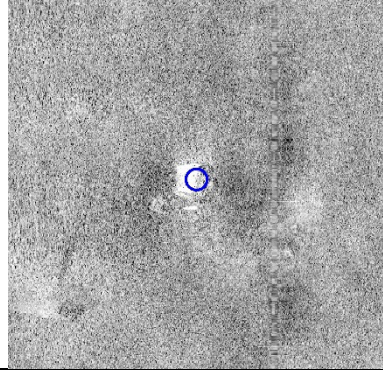
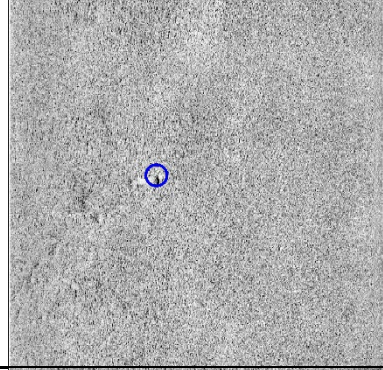
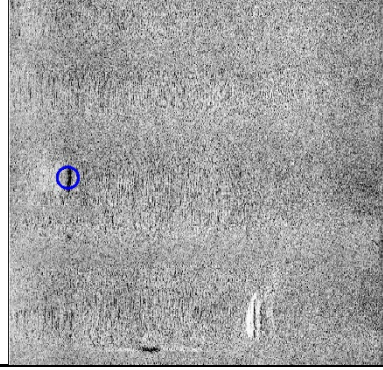
Target Image	Target Info	Description
	<p>S121</p> <p>26.3764745250 -81.8982024157 (WGS84) (X) 689494.82 (Y) 742539.03 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210717132200 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 4.4 US ft Target Width: 2.3 US ft Target Height: 1.4 US ft Area: Description: Small Object
	<p>S122</p> <p>26.3759842706 -81.8981274057 (WGS84) (X) 689519.52 (Y) 742360.85 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210717132200 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 1.6 US ft Target Width: 0.7 US ft Target Height: 1.6 US ft Area: Description: Irregular Object
	<p>S123</p> <p>26.3774774921 -81.8958890096 (WGS84) (X) 690251.93 (Y) 742904.19 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210717132200 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 4.6 US ft Target Width: 1.0 US ft Target Height: 1.1 US ft Area: Description: Irregular Object
	<p>S124</p> <p>26.3774204611 -81.8956195840 (WGS84) (X) 690340.16 (Y) 742883.53 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210717132200 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 2.0 US ft Target Width: 1.2 US ft Target Height: 1.5 US ft Area: Description: Irregular Object

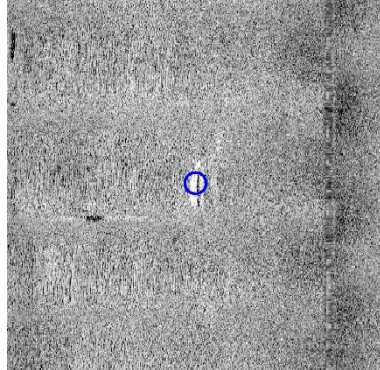
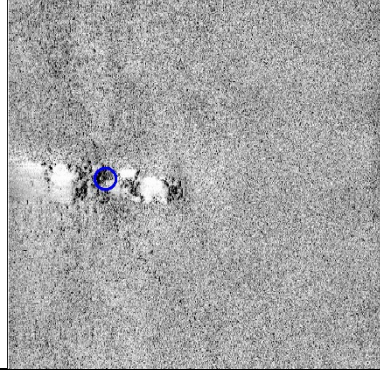
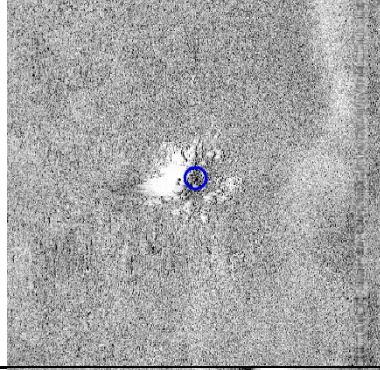
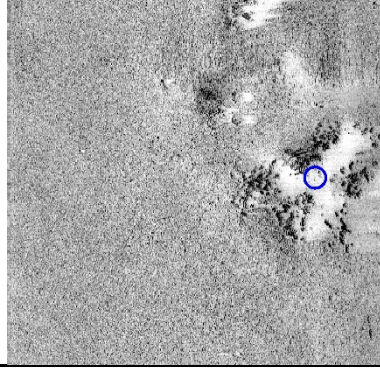
Target Image	Target Info	Description
	<p>S125</p> <p>26.3773972817 -81.8954069537 (WGS84) (X) 690409.78 (Y) 742875.16 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210717132200 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 7.4 US ft Target Width: 1.1 US ft Target Height: 1.6 US ft Area: Description: Irregular Object
	<p>S126</p> <p>26.3829330912 -81.8867648790 (WGS84) (X) 693237.37 (Y) 744889.68 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210717142300 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 92.2 US ft Target Width: 1.0 US ft Target Height: 0.0 US ft Area: Description: Linear Object, located outside pipeline corridor
	<p>S127</p> <p>26.3819141784 -81.8862005988 (WGS84) (X) 693422.43 (Y) 744519.49 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210717132200 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 76.9 US ft Target Width: 2.3 US ft Target Height: 0.2 US ft Area: Description: Linear Object
	<p>S128</p> <p>26.3830642078 -81.8856596710 (WGS84) (X) 693599.15 (Y) 744937.66 (Projected Coordinates)</p> <ul style="list-style-type: none"> Line Name: 20ES002_SSS210717142300 	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> Target Length: 15.7 US ft Target Width: 3.9 US ft Target Height: 1.7 US ft Area: Description: Oblong Object

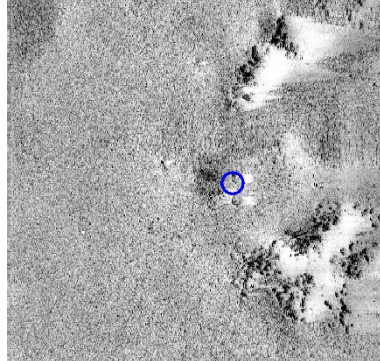
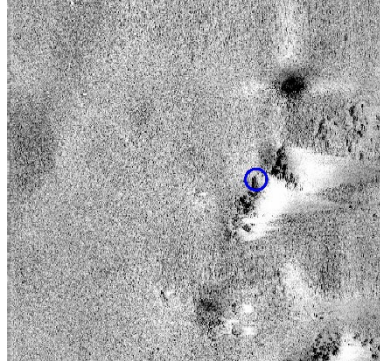
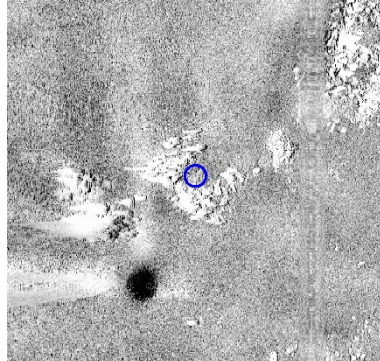

Target Image	Target Info	Description
	<p>S129</p> <p>26.3838495483 -81.8819949767 (WGS84) (X) 694798.63 (Y) 745224.19 (Projected Coordinates) • Line Name: 20ES002_SSS210717132200</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Length: 41.1 US ft • Target Width: 1.0 US ft • Target Height: 0.0 US ft • Area: • Description: Linear Object

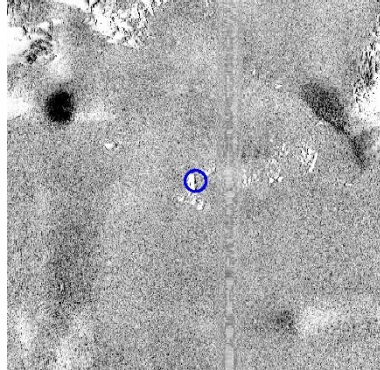
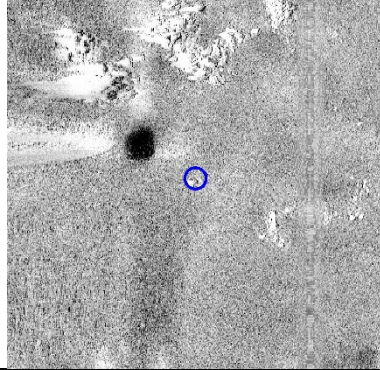
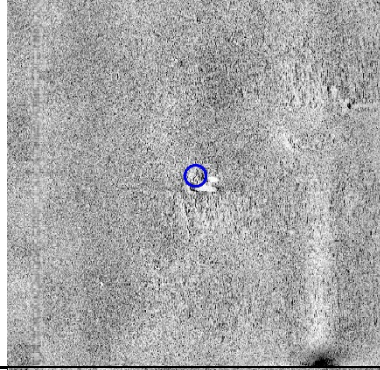
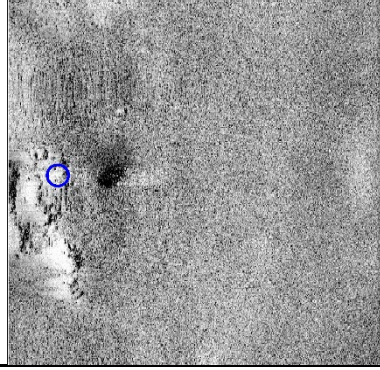
**RECONNAISSANCE SURVEY SIDE SCAN SONAR TARGET REPORTS
(Plotted on Detailed Project Drawings)**

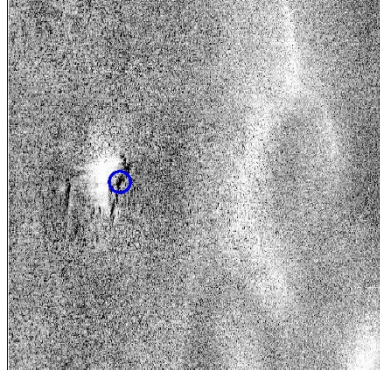
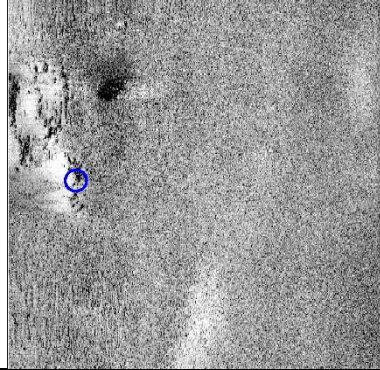
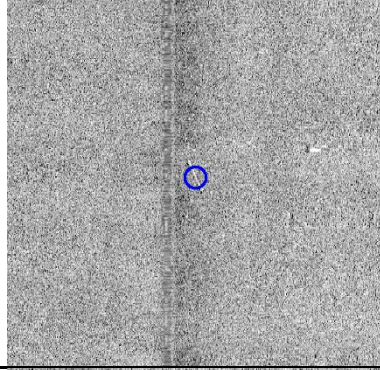
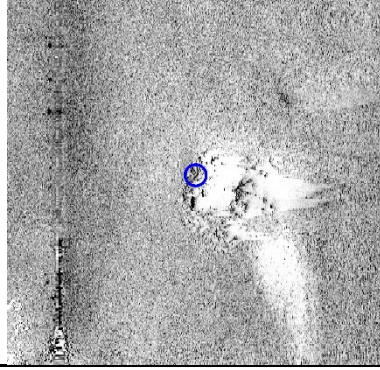
	<p>S15</p> <p>26.3140350954 -81.9949489268 (WGS84) (X) 657821.26 (Y) 719830.86 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 0.7 US ft • Target Height: 0.8 US ft • Target Length: 4.6 US ft • Description: Oblong object
	<p>S20</p> <p>26.3201054414 -81.9836147315 (WGS84) (X) 661533.74 (Y) 722037.57 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 1.4 US ft • Target Height: 0.6 US ft • Target Length: 5.4 US ft • Description: Oblong object
	<p>S21</p> <p>26.3200775281 -81.9835617601 (WGS84) (X) 661551.09 (Y) 722027.42 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 0.9 US ft • Target Height: 1.3 US ft • Target Length: 3.5 US ft • Description: Oblong object
	<p>S22</p> <p>26.4129526817 -81.9834269948 (WGS84) (X) 661590.90 (Y) 755785.14 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 1.6 US ft • Target Height: 1.2 US ft • Target Length: 3.2 US ft • Description: Two oblong objects

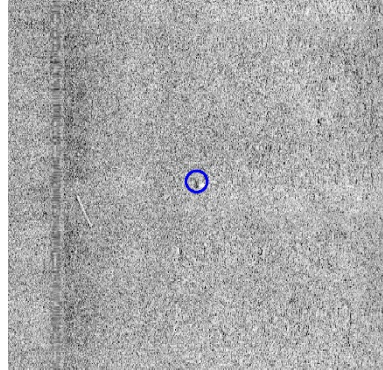
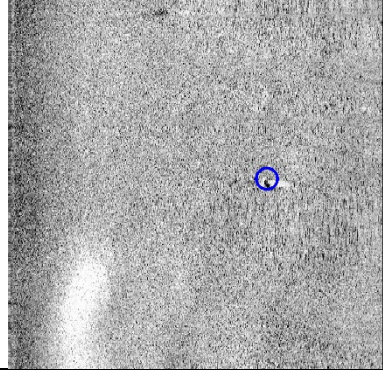
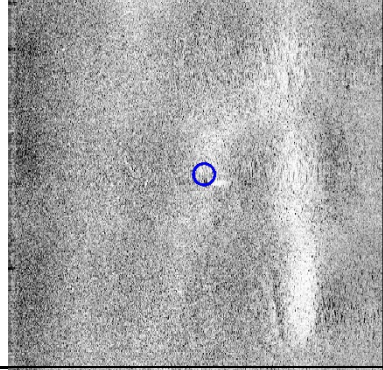
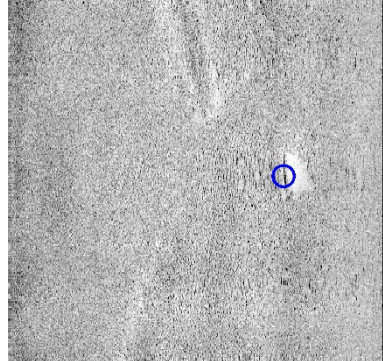
	<p>S24</p> <p>26.3266641948 -81.9824068860 (WGS84) (X) 661929.05 (Y) 724421.54 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 1.8 US ft • Target Height: 0.7 US ft • Target Length: 2.1 US ft • Description:
	<p>S29</p> <p>26.3330038015 -81.9792559390 (WGS84) (X) 662960.73 (Y) 726725.97 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 4.7 US ft • Target Height: 3.5 US ft • Target Length: 20.0 US ft • Description: Oblong object
	<p>S38</p> <p>26.3683135490 -81.9240654177 (WGS84) (X) 681029.11 (Y) 739566.89 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 2.6 US ft • Target Height: 1.1 US ft • Target Length: 7.1 US ft • Description: Oblong object
	<p>S39</p> <p>26.3642791681 -81.9224027540 (WGS84) (X) 681574.38 (Y) 738100.82 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 1.0 US ft • Target Height: 1.0 US ft • Target Length: 16.5 US ft • Description: Linear object

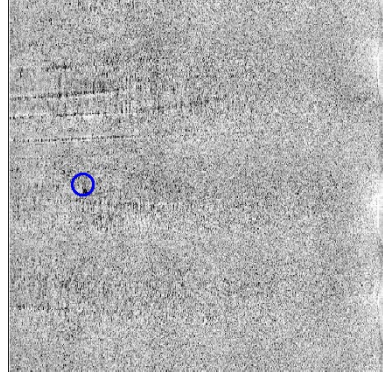
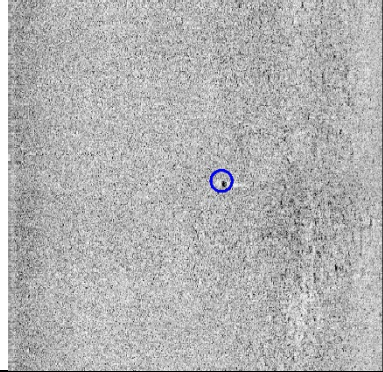

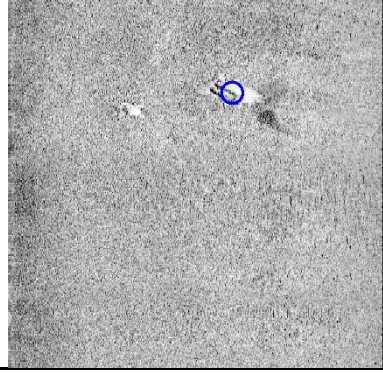
	<p>S40</p> <p>26.3646794935 -81.9223478948 (WGS84) (X) 681592.26 (Y) 738246.34 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 1.0 US ft • Target Height: 0.8 US ft • Target Length: 28.1 US ft • Description: Oblong object
	<p>S41</p> <p>26.3740227996 -81.9191657977 (WGS84) (X) 682632.04 (Y) 741643.03 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 20.0 US ft • Target Height: 2.0 US ft • Target Length: 79.3 US ft • Description: Group of oblong objects
	<p>S42</p> <p>26.3741563385 -81.9184046498 (WGS84) (X) 682881.22 (Y) 741691.72 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 9.7 US ft • Target Height: 2.8 US ft • Target Length: 35.0 US ft • Description: Group of oblong objects
	<p>S43</p> <p>26.3721812627 -81.9172035066 (WGS84) (X) 683274.93 (Y) 740974.09 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 69.9 US ft • Target Height: 1.1 US ft • Target Length: 79.6 US ft • Description: Group of oblong objects

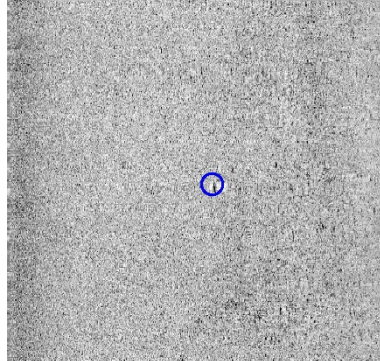
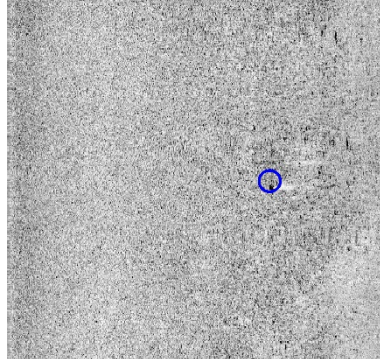
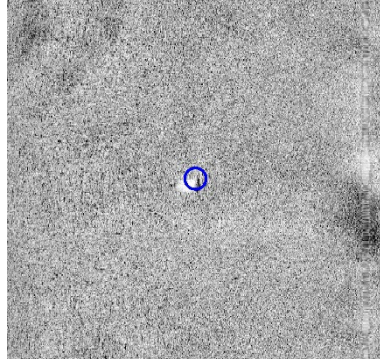
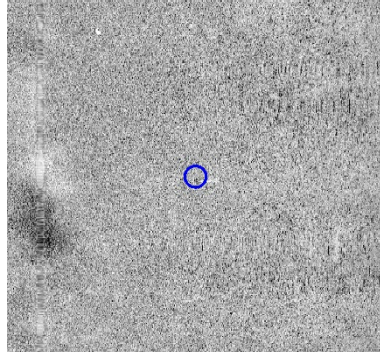
	<p>S44</p> <p>26.3723898850 -81.9171306718 (WGS84) (X) 683298.73 (Y) 741049.93 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 6.6 US ft • Target Height: 0.8 US ft • Target Length: 6.6 US ft • Description: Two oblong objects
	<p>S45</p> <p>26.3724798791 -81.9168811949 (WGS84) (X) 683380.39 (Y) 741082.69 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 8.4 US ft • Target Height: 3.2 US ft • Target Length: 19.7 US ft • Description: Group of oblong objects
	<p>S46</p> <p>26.3719709757 -81.9167958314 (WGS84) (X) 683408.46 (Y) 740897.74 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 35.3 US ft • Target Height: 2.7 US ft • Target Length: 51.2 US ft • Description: Group of oblong objects
	<p>S47</p> <p>26.3718401448 -81.9166750998 (WGS84) (X) 683448.02 (Y) 740850.21 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 13.1 US ft • Target Height: 4.5 US ft • Target Length: 47.6 US ft • Description: Group of oblong objects

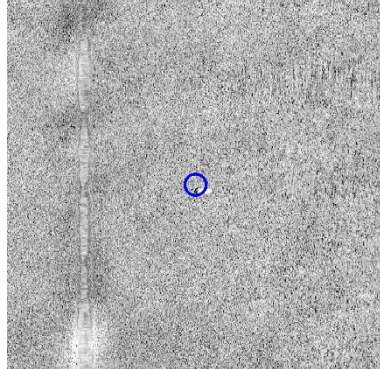
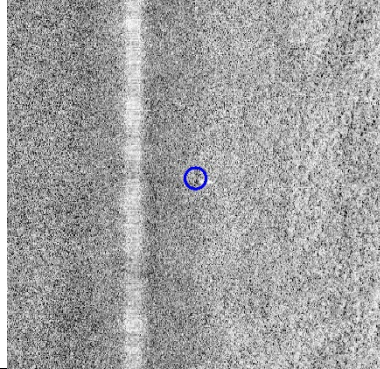
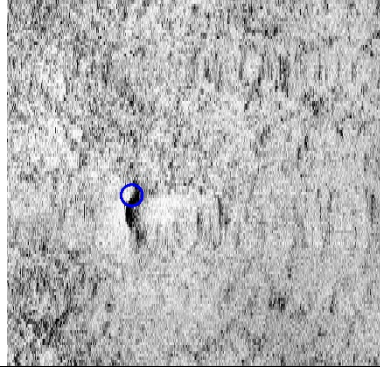
	<p>S48</p> <p>26.3722647722 -81.9165355498 (WGS84) (X) 683493.61 (Y) 741004.58 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 0.6 US ft • Target Height: 3.6 US ft • Target Length: 12.4 US ft • Description: Group of oblong objects
	<p>S49</p> <p>26.3721008563 -81.9165221527 (WGS84) (X) 683498.03 (Y) 740945.00 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 1.4 US ft • Target Height: 1.0 US ft • Target Length: 2.5 US ft • Description: Oblong object
	<p>S50</p> <p>26.3728653264 -81.9165139818 (WGS84) (X) 683500.53 (Y) 741222.87 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 2.7 US ft • Target Height: 1.6 US ft • Target Length: 8.5 US ft • Description: Two oblong objects
	<p>S51</p> <p>26.3701950282 -81.9163931241 (WGS84) (X) 683540.73 (Y) 740252.31 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 5.8 US ft • Target Height: 0.8 US ft • Target Length: 37.4 US ft • Description: Group of oblong objects

	<p>S52</p> <p>26.3711361895 -81.9163385870 (WGS84) (X) 683558.36 (Y) 740594.41 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 5.3 US ft • Target Height: 1.2 US ft • Target Length: 38.4 US ft • Description: Oblong object
	<p>S53</p> <p>26.3703075582 -81.9162154714 (WGS84) (X) 683598.87 (Y) 740293.25 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 4.0 US ft • Target Height: 1.5 US ft • Target Length: 35.3 US ft • Description: Group of oblong objects
	<p>S54</p> <p>26.3749461995 -81.9158876027 (WGS84) (X) 683705.12 (Y) 741979.35 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 0.6 US ft • Target Height: 1.0 US ft • Target Length: 23.9 US ft • Description: Linear object
	<p>S55</p> <p>26.3701317708 -81.9157370054 (WGS84) (X) 683755.57 (Y) 740229.46 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 10.7 US ft • Target Height: 4.7 US ft • Target Length: 34.7 US ft • Description: Group of oblong objects

	<p>S56</p> <p>26.3747951525 -81.9157271879 (WGS84) (X) 683757.67 (Y) 741924.48 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 2.3 US ft • Target Height: 1.1 US ft • Target Length: 3.3 US ft • Description: Oblong object
	<p>S57</p> <p>26.3703694757 -81.9152525584 (WGS84) (X) 683914.12 (Y) 740315.96 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 2.9 US ft • Target Height: 1.0 US ft • Target Length: 5.8 US ft • Description: Oblong object
	<p>S58</p> <p>26.3704425179 -81.9147860277 (WGS84) (X) 684066.86 (Y) 740342.61 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 1.8 US ft • Target Height: 1.4 US ft • Target Length: 4.1 US ft • Description: Oblong object
	<p>S59</p> <p>26.3708349285 -81.9110887792 (WGS84) (X) 685277.29 (Y) 740486.06 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 3.5 US ft • Target Height: 1.1 US ft • Target Length: 26.7 US ft • Description: Linear object

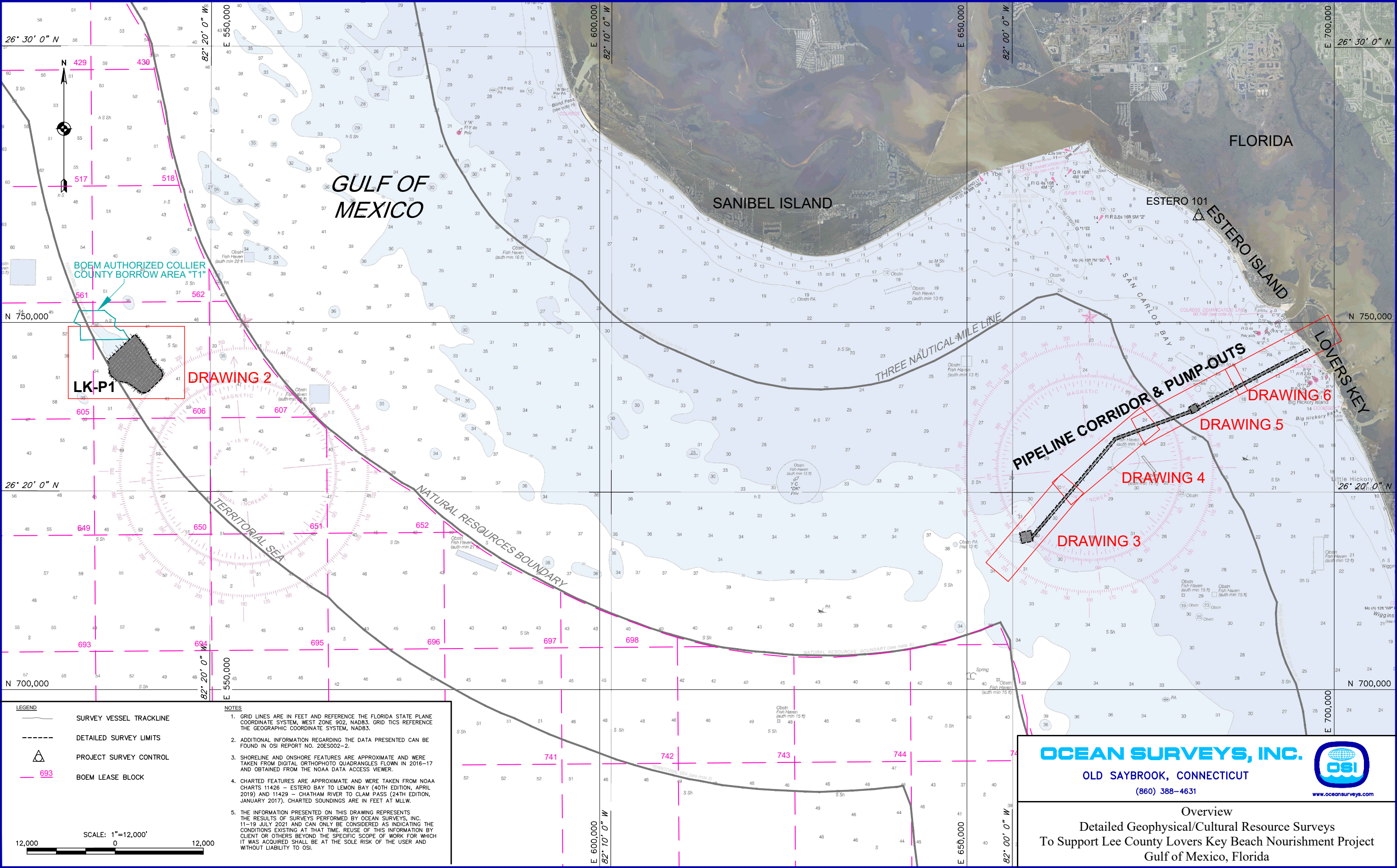
	<p>S60</p> <p>26.3727280385 -81.9079112255 (WGS84) (X) 686317.17 (Y) 741174.89 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 2.1 US ft • Target Height: 0.8 US ft • Target Length: 4.6 US ft • Description: Oblong object
	<p>S61</p> <p>26.3762922840 -81.9074983351 (WGS84) (X) 686451.42 (Y) 742470.50 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 1.6 US ft • Target Height: 1.2 US ft • Target Length: 3.0 US ft • Description: Oblong object
	<p>S62</p> <p>26.3751059832 -81.9052892129 (WGS84) (X) 687175.00 (Y) 742039.83 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 4.4 US ft • Target Height: 1.5 US ft • Target Length: 6.3 US ft • Description: Oblong object
	<p>S63</p> <p>26.3749509056 -81.9051635634 (WGS84) (X) 687216.18 (Y) 741983.49 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 5.2 US ft • Target Height: 1.7 US ft • Target Length: 24.7 US ft • Description: Oblong object

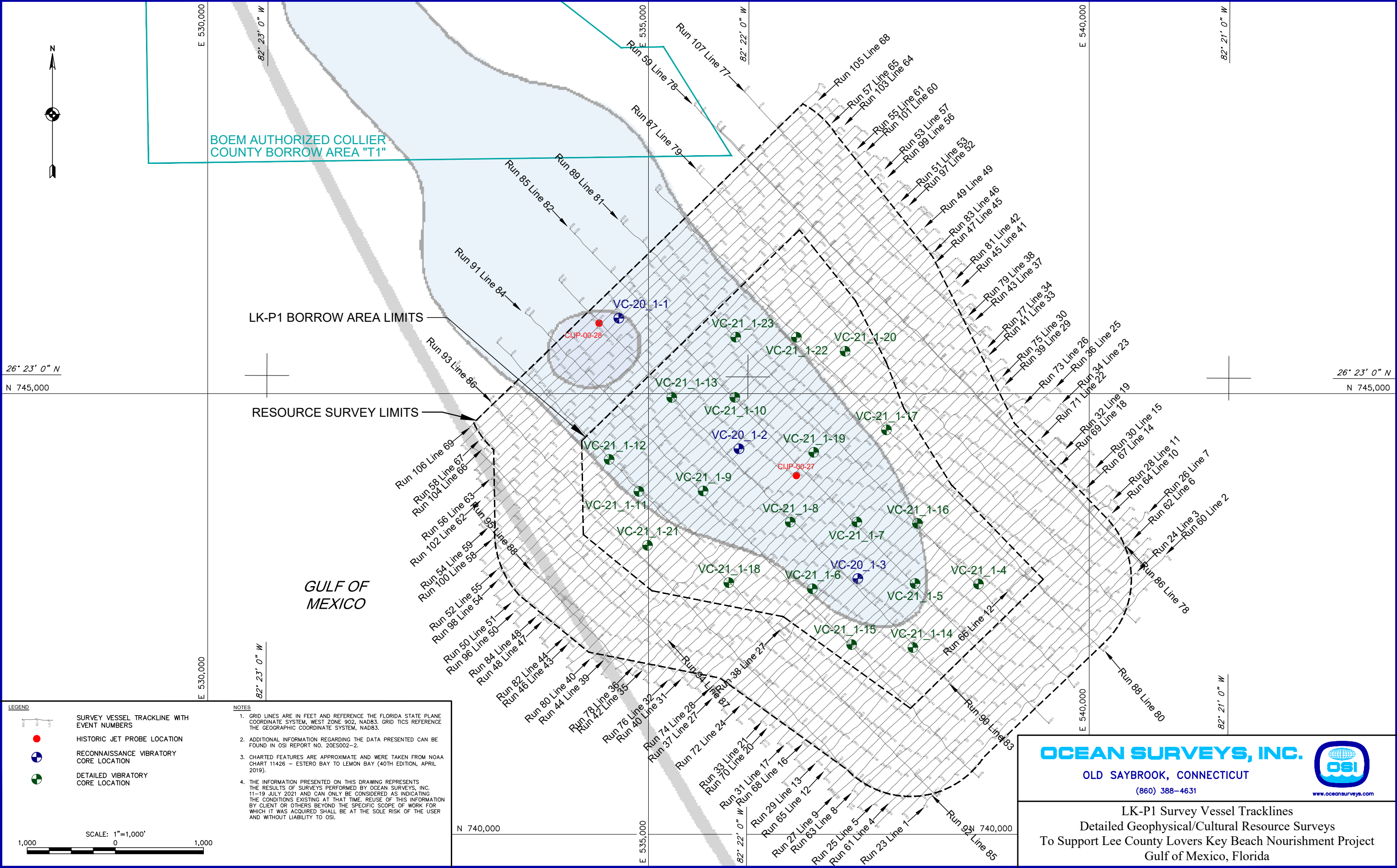
	<p>S64</p> <p>26.3784417691 -81.9028867974 (WGS84) (X) 687960.63 (Y) 743252.89 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 1.0 US ft • Target Height: 0.6 US ft • Target Length: 6.0 US ft • Description: Oblong object
	<p>S65</p> <p>26.3804460809 -81.8989347968 (WGS84) (X) 689253.91 (Y) 743982.40 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 1.5 US ft • Target Height: 0.6 US ft • Target Length: 3.3 US ft • Description: Oblong object
	<p>S66</p> <p>26.3819505708 -81.8986860215 (WGS84) (X) 689334.93 (Y) 744529.31 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 2.1 US ft • Target Height: 1.2 US ft • Target Length: 8.9 US ft • Description: Oblong object
	<p>S67</p> <p>26.3814434151 -81.8983632142 (WGS84) (X) 689440.76 (Y) 744345.06 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 2.2 US ft • Target Height: 1.4 US ft • Target Length: 1.6 US ft • Description: Oblong object

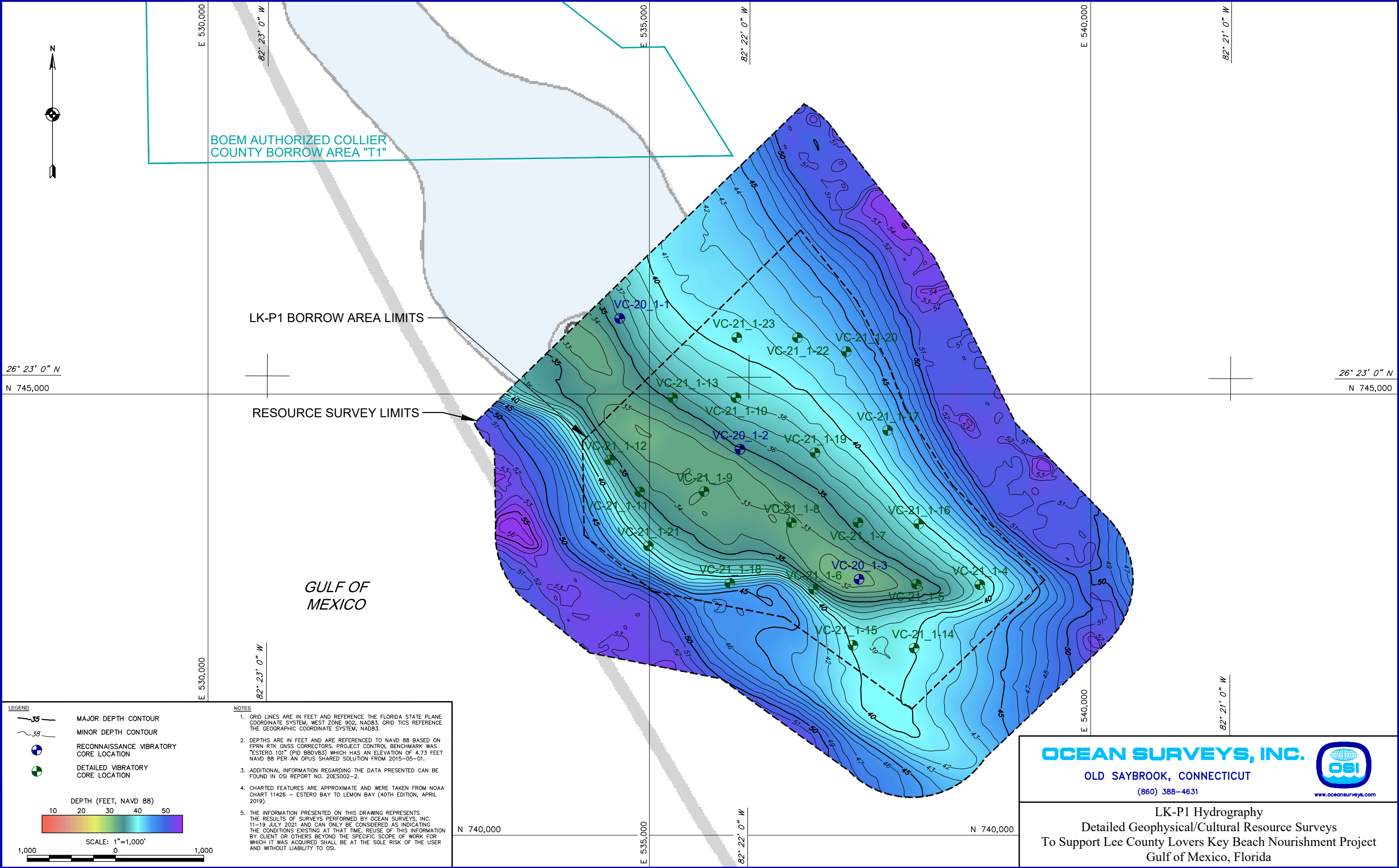
	<p>S68</p> <p>26.3815762675 -81.8975784736 (WGS84) (X) 689697.63 (Y) 744393.55 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 0.7 US ft • Target Height: 1.2 US ft • Target Length: 3.3 US ft • Description: Oblong object
	<p>S69</p> <p>26.3827574809 -81.8931753051 (WGS84) (X) 691138.79 (Y) 744824.06 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 2.1 US ft • Target Height: 1.5 US ft • Target Length: 2.8 US ft • Description: Oblong object
	<p>S70</p> <p>26.3846960088 -81.8927362642 (WGS84) (X) 691281.94 (Y) 745528.79 (Projected Coordinates)</p>	<p>Dimensions and attributes</p> <ul style="list-style-type: none"> • Target Width: 3.2 US ft • Target Height: 0.9 US ft • Target Length: 9.6 US ft • Description: Oblong object

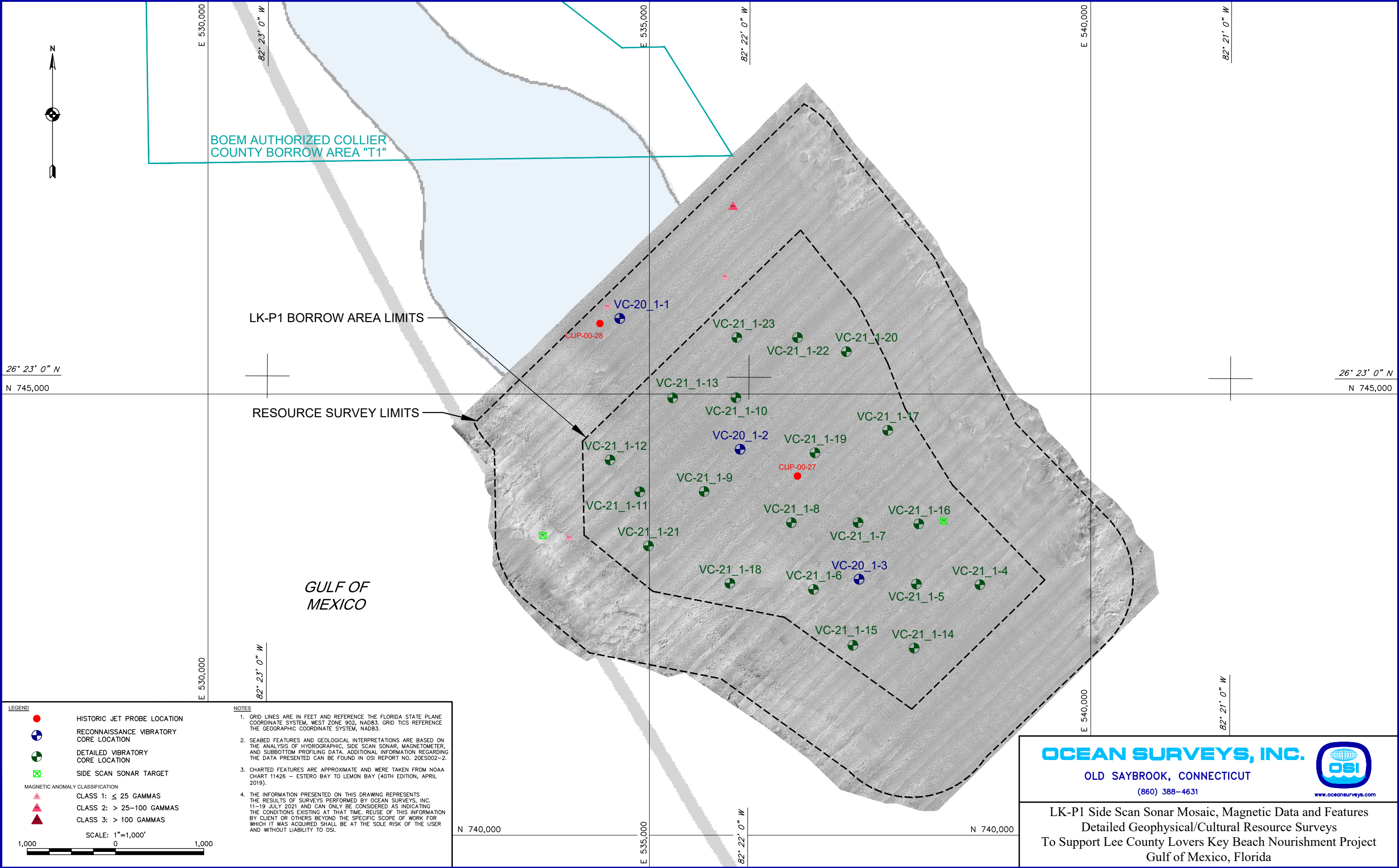
APPENDIX 2

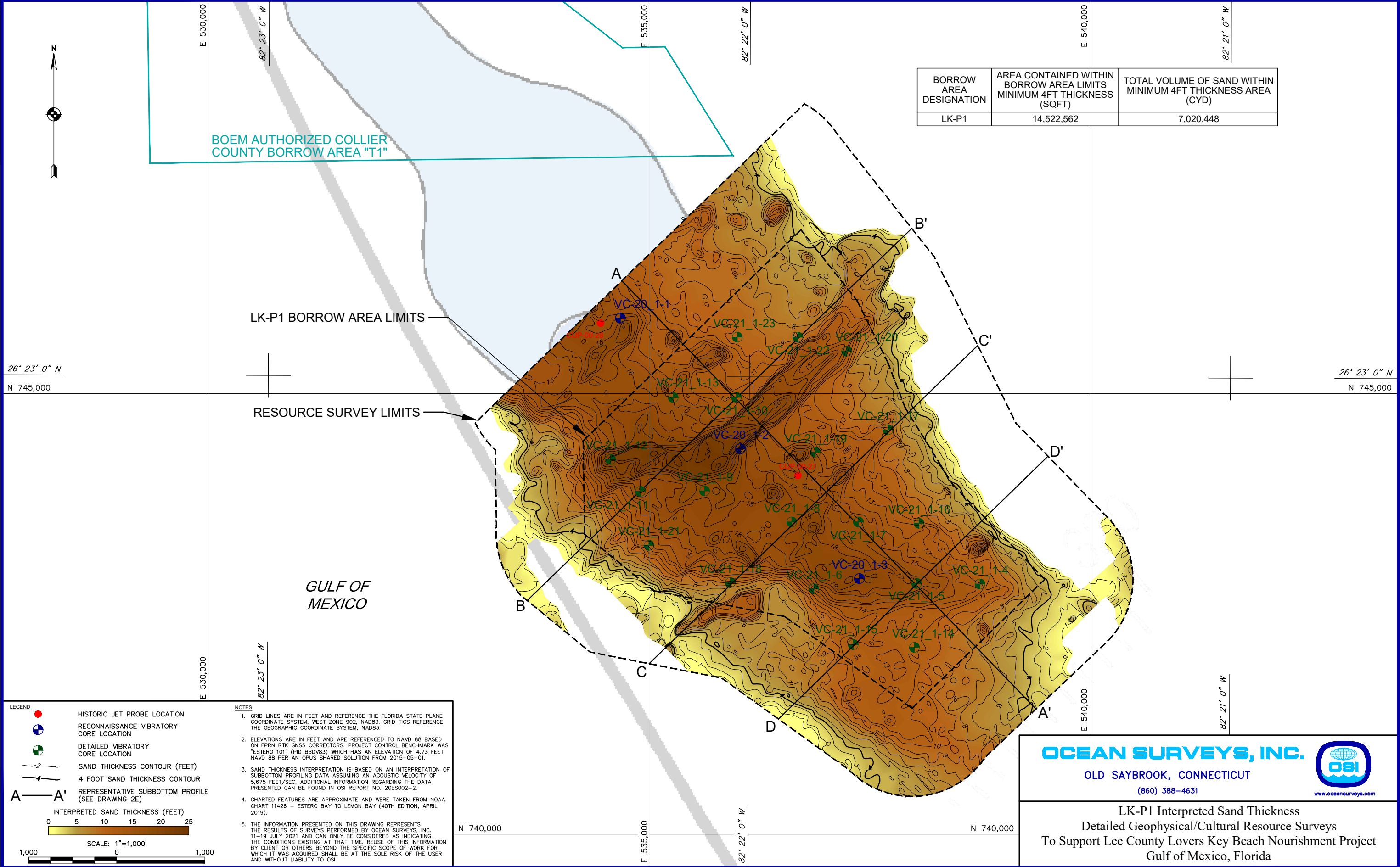
PROJECT DRAWINGS

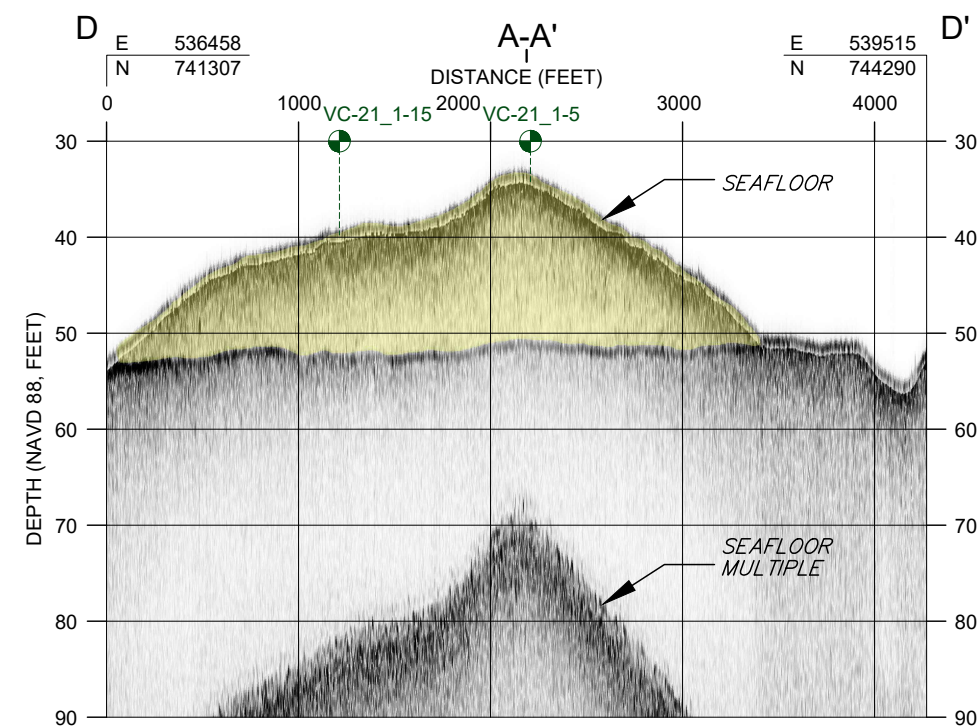
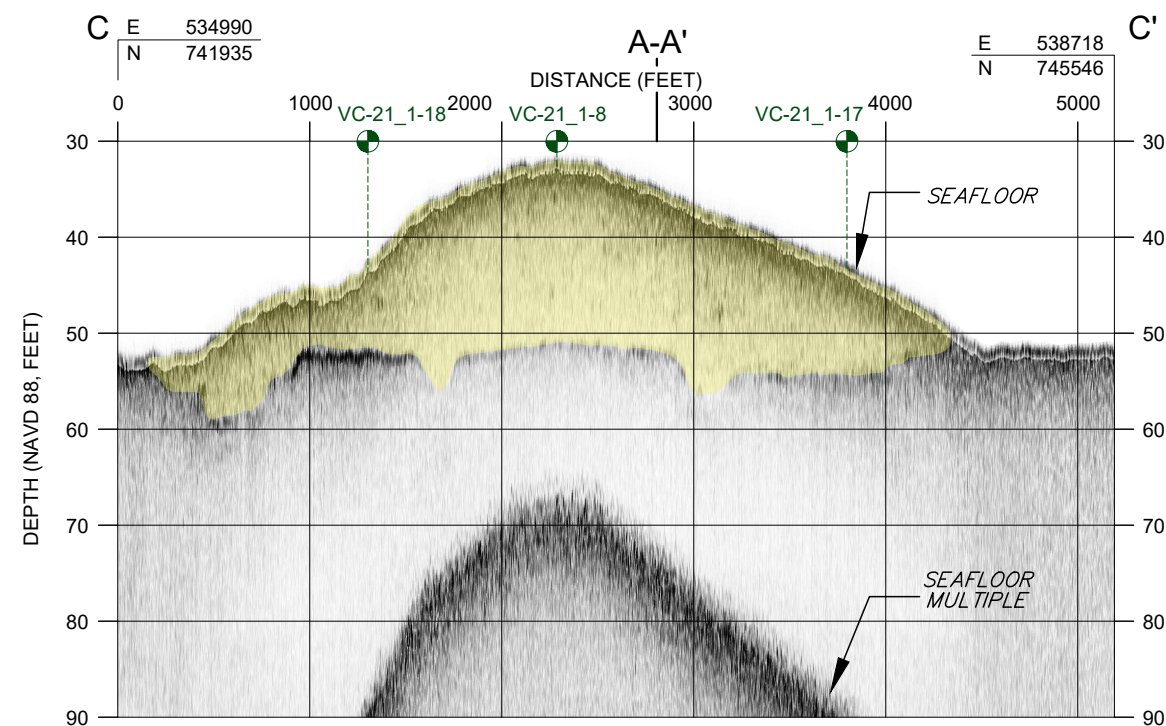
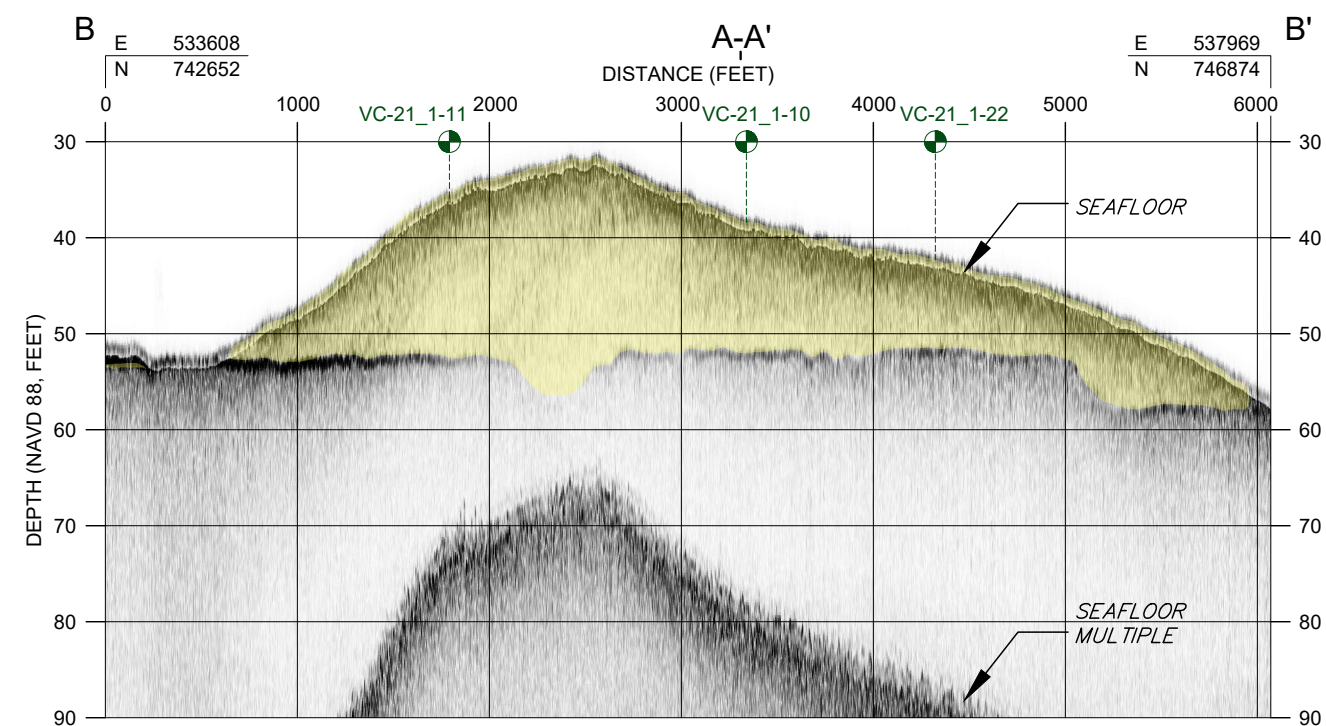
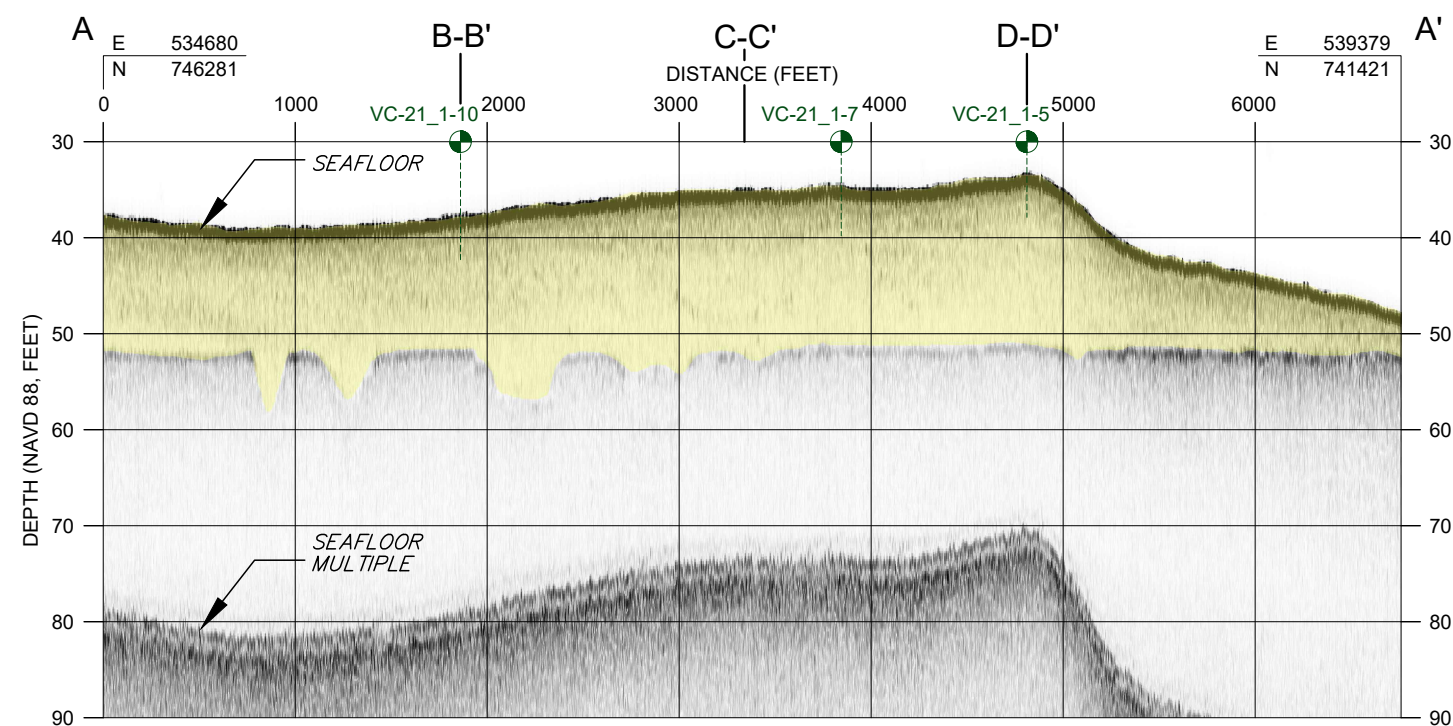












- LEGEND**
- RECONNAISSANCE VIBRATORY CORE LOCATION
 - DETAILED VIBRATORY CORE LOCATION
 - INTERPRETED SAND THICKNESS
- *SEE DRAWING 2D FOR PROFILE LOCATIONS
- NOTES**
- GRID LABELS ARE IN FEET AND REFERENCE THE FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE 902, NAD83.
 - DEPTHS ARE IN FEET AND ARE REFERENCED TO NAVD 88 BASED ON FPRN RTK GNSS CORRECTORS. PROJECT CONTROL BENCHMARK WAS "ESTERO 101" (PID BBDV83) WHICH HAS AN ELEVATION OF 4.73 FEET NAVD 88 PER AN OPUS SHARED SOLUTION FROM 2015-05-01.
 - ADDITIONAL INFORMATION REGARDING THE DATA PRESENTED CAN BE FOUND IN OSI REPORT NO. 20ES002-2.
 - THE INFORMATION PRESENTED ON THIS DRAWING REPRESENTS THE RESULTS OF SURVEYS PERFORMED BY OCEAN SURVEYS, INC. 11-19 JULY 2021 AND CAN ONLY BE CONSIDERED AS INDICATING THE CONDITIONS EXISTING AT THAT TIME. REUSE OF THIS INFORMATION BY CLIENT OR OTHERS BEYOND THE SPECIFIC SCOPE OF WORK FOR WHICH IT WAS ACQUIRED SHALL BE AT THE SOLE RISK OF THE USER AND WITHOUT LIABILITY TO OSI.

SCALE: 1"=1,000'

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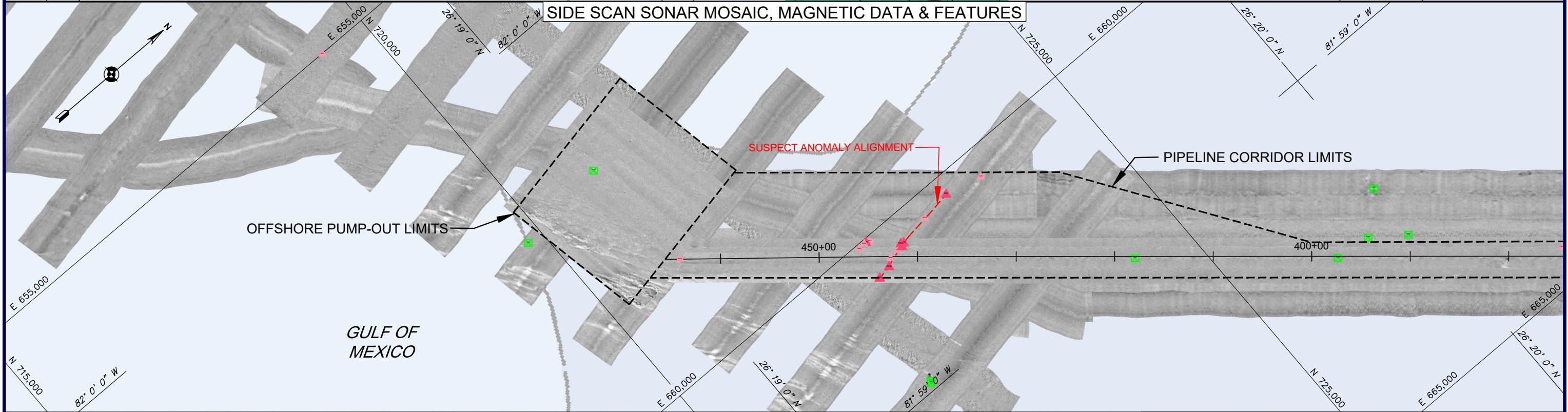
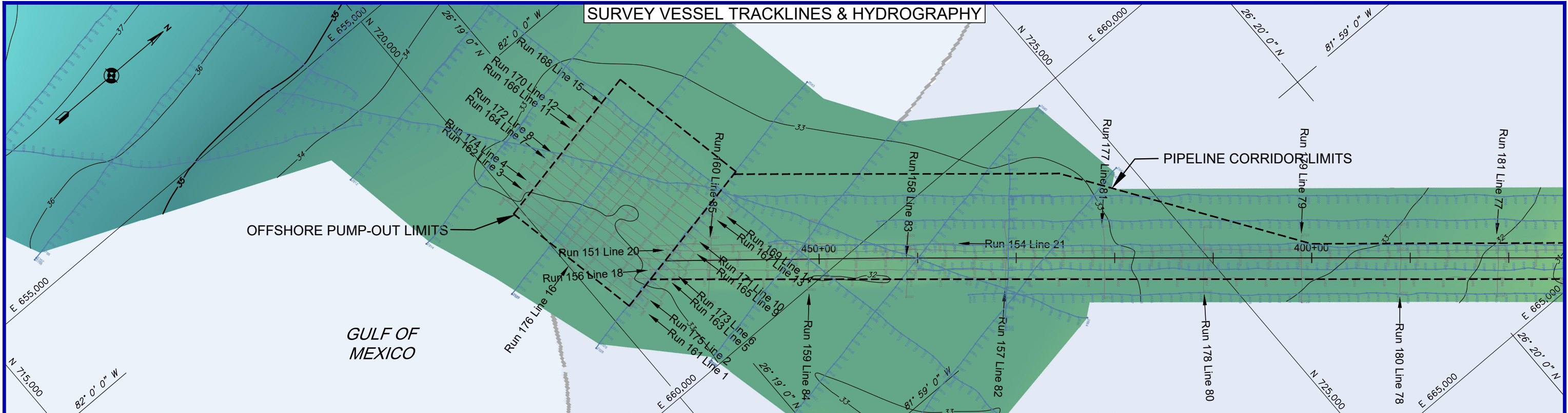
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Detailed Geophysical/Cultural Resource Surveys
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Gulf of Mexico, Florida



LEGEND

SURVEY VESSEL TRACKLINE WITH EVENT NUMBERS (2020 RECON TRACKLINES ARE BLUE)

MAJOR DEPTH CONTOUR

MINOR DEPTH CONTOUR

SIDE SCAN SONAR TARGET

MAGNETIC ANOMALY CLASSIFICATION

CLASS 1: ≤ 25 GAMMAS

CLASS 2: $> 25-100$ GAMMAS

CLASS 3: > 100 GAMMAS

50+00

PIPELINE CORRIDOR CENTERLINE WITH 5000 FT STATIONING

DEPTH (FEET, NAVD 88)

10 20 30 40 50

NOTES

- GRID LINES ARE IN FEET AND REFERENCE THE FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE 902, NAD83. GRID TICS REFERENCE THE GEOGRAPHIC COORDINATE SYSTEM, NAD83.
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- CHARTED FEATURES ARE APPROXIMATE AND WERE TAKEN FROM NOAA CHARTS 11426 - ESTERO BAY TO LEMON BAY (40TH EDITION, APRIL AND 11427 - FORT MYERS TO CHARLOTTE HARBOR AND WIGGINS PASS (38TH EDITION, APRIL 2018).
- THE INFORMATION PRESENTED ON THIS DRAWING REPRESENTS THE RESULTS OF SURVEYS PERFORMED BY OCEAN SURVEYS, INC. 11-19 JULY 2021 AND 19-26 JUNE 2020 AND CAN ONLY BE CONSIDERED AS INDICATING THE CONDITIONS EXISTING AT THAT TIME. REUSE OF THIS INFORMATION BY CLIENT OR OTHERS BEYOND THE SPECIFIC SCOPE OF WORK FOR WHICH IT WAS ACQUIRED SHALL BE AT THE SOLE RISK OF THE USER AND WITHOUT LIABILITY TO OSI.

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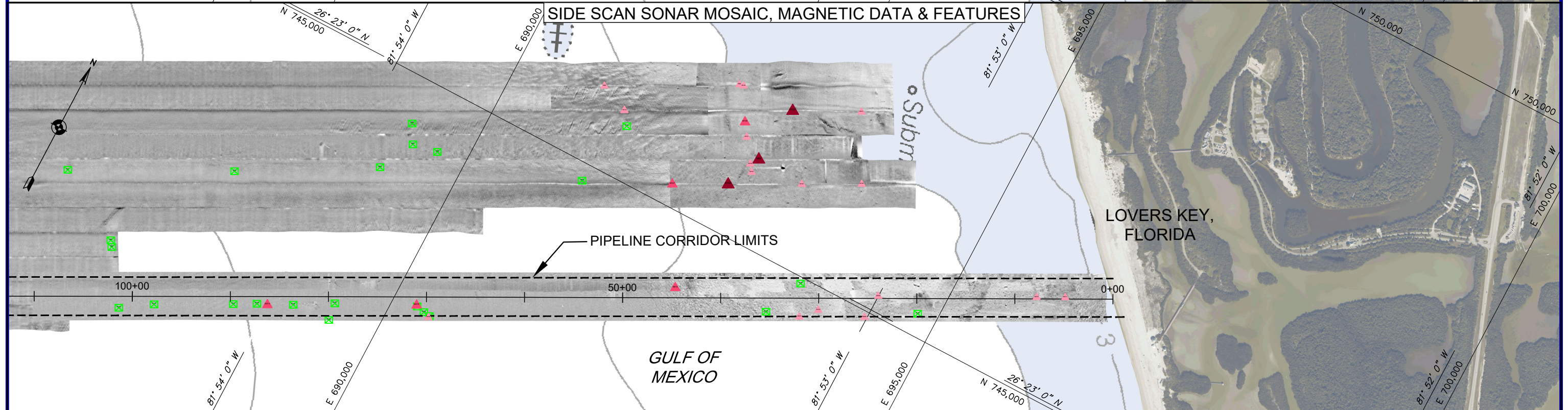
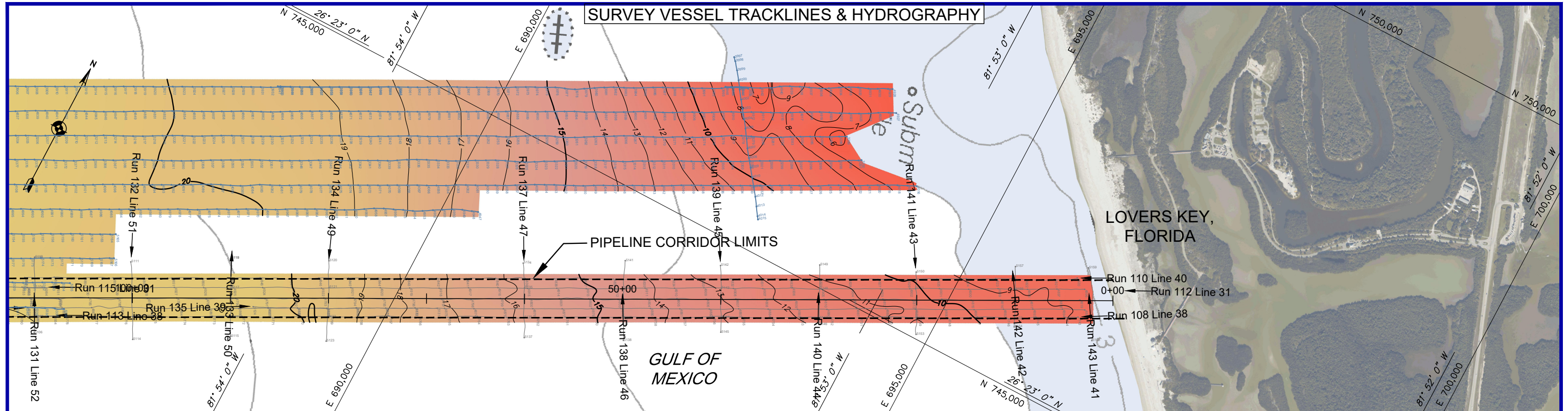
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Pipeline Corridor & Pump-Outs

Detailed & Reconnaissance Geophysical/Cultural Resource Surveys

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Gulf of Mexico, Florida



LEGEND

SURVEY VESSEL TRACKLINE WITH EVENT NUMBERS (2020 RECON TRACKLINES ARE BLUE)

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MINOR DEPTH CONTOUR

SIDE SCAN SONAR TARGET

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PIPELINE CORRIDOR CENTERLINE WITH 5000 FT STATIONING

DEPTH (FEET, NAVD 88)

10 20 30 40 50

NOTES

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2. DEPTHS ARE IN FEET AND ARE REFERENCED TO NAVD 88 BASED ON FPN RTK GNSS CORRECTORS. PROJECT CONTROL BENCHMARK WAS "ESTERO 101" (PID BBDV83) WHICH HAS AN ELEVATION OF 4.73 FEET NAVD 88 PER AN OPUS SHARED SOLUTION FROM 2015-05-01.

3. SEABED FEATURES AND GEOLOGICAL INTERPRETATIONS ARE BASED ON THE ANALYSIS OF HYDROGRAPHIC, SIDE SCAN SONAR, MAGNETOMETER, AND SUBBOTTOM PROFILING DATA. ADDITIONAL INFORMATION REGARDING THE DATA PRESENTED CAN BE FOUND IN OSI REPORT NO. 20ES002-2.

4. CHARTED FEATURES ARE APPROXIMATE AND WERE TAKEN FROM NOAA CHARTS 11426 - ESTERO BAY TO LEMON BAY (40TH EDITION, APRIL AND 11427 - FORT MYERS TO CHARLOTTE HARBOR AND WIGGINS PASS (38TH EDITION, APRIL 2018).

5. THE INFORMATION PRESENTED ON THIS DRAWING REPRESENTS THE RESULTS OF SURVEYS PERFORMED BY OCEAN SURVEYS, INC. 11-19 JULY 2021 AND 19-26 JUNE 2020 AND CAN ONLY BE CONSIDERED AS INDICATING THE CONDITIONS EXISTING AT THAT TIME. REUSE OF THIS INFORMATION BY CLIENT OR OTHERS BEYOND THE SPECIFIC SCOPE OF WORK FOR WHICH IT WAS ACQUIRED SHALL BE AT THE SOLE RISK OF THE USER AND WITHOUT LIABILITY TO OSI.

SCALE: 1"=1,000'

1,000 0 1,000

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