

Technical Report Entitled:

*A Submerged Cultural Resource Remote-Sensing Survey of the
Winyah Bay Marina Expansion Project Site at South Island Plantation
Georgetown County, South Carolina*

U.S. Army Corps of Engineers Project No.: SAC-2005-35717

**South Carolina Department of Health and Environmental Control (Ocean & Coastal
Resource Management) Project No.: HP2-4ZF6-CYXD5**

Volume I: Remote-Sensing Survey Assessment

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Submittal Date:

19 January 2021

Abstract

South Island Plantation Association, Inc. (SIPA) of Georgetown, South Carolina is working with The EARTHWORKS Group of Murrells Inlet, South Carolina on design and Section 106 compliance for expansion of the former's marina located on the Winyah Bay waterfront, Georgetown County, South Carolina. An assessment of any impacts on submerged cultural resources associated with construction is an integral part of the U.S. Army Corps of Engineers and South Carolina Department of Health and Environmental Control (Ocean & Coastal Resource Management) permitting process. To identify submerged cultural resources and assess any impacts of proposed project activities on those resources, SIPA requested that Tidewater Atlantic Research, Inc. of Washington, North Carolina conduct a remote-sensing survey of the Winyah Bay Area of Potential Effect. That investigation was carried out on 2 December 2020. The remote-sensing investigation was carried out with a cesium vapor magnetometer, a high-resolution sidescan sonar, and CHIRP digital sub-bottom profiler. Differential Global Positioning was used to control navigation and data collection. Analysis of the magnetic and acoustic data generated by the survey identified no potentially significant magnetic anomalies or sonar targets within the area surveyed. Based on those findings, construction of expanded dock facilities will have no impact on submerged archaeological resources. As no submerged cultural resources eligible for nomination to the National Register of Historic Places were identified, no additional investigation is recommended.

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Introduction

South Island Plantation Association, Inc. (SIPA) of Georgetown, South Carolina is collaborating with The EARTHWORKS Group (TEG) of Murrells Inlet, South Carolina on design and Section 106 compliance for expansion of the former's marina located on the Winyah Bay waterfront, Georgetown County, South Carolina. An assessment of any impacts on submerged cultural resources associated with construction is an integral part of mandatory U.S. Army Corps of Engineers (USACE) and South Carolina Department of Health and Environmental Control (Ocean & Coastal Resource Management) [SCDHEC-OCRM] permitting protocols. To identify submerged cultural resources and assess any impacts of proposed project activities on those resources, SIPA requested that Tidewater Atlantic Research, Inc. (TAR) of Washington, North Carolina conduct a remote-sensing survey of the subject Winyah Bay Area of Potential Effect (APE).

The remote-sensing investigation carried out by TAR was designed to adhere to the survey requirements of the USACE-Charleston District and the South Carolina State Historic Preservation Office (SHPO), and guidelines recommended by the South Carolina Institute of Archaeology and Anthropology (SCIAA), Maritime Research Division (MRD). The survey methodology and equipment were selected to comply with the National Historic Preservation Act of 1966, as amended, through 1992 (36 CFR 800, *Protection of Historic Properties*), the Abandoned Shipwreck Act of 1987 (*Abandoned Shipwreck Act Guidelines*, National Park Service, *Federal Register*, Vol. 55, No. 3, December 4, 1990, pages 50116-50145), the National Environmental Policy Act of 1969 (Public Law 11-190), Executive Order 11593, the Advisory Council on Historic Preservation Procedures for the protection of historic and cultural properties (36 CFR Part 800), and the updated guidelines described in 36 CFR 64 and CFR 66. Results of the remote-sensing investigation will provide SIPA and TEG with the archaeological data essential for complying with Federal and state submerged cultural resource legislation and regulations.

Remote-Sensing Survey Equipment

The submerged cultural resource remote-sensing survey was carried out using a Geometrics 881 cesium vapor magnetometer, a Klein 3900 high-resolution digital sidescan sonar, and an EdgeTech 3100P CHIRP sub-bottom profiler. Both vessel positioning and remote-sensing data collection were controlled by HYPACK survey software running on an onboard laptop. That computer georeferenced all data collection using a Differential Global Positioning System (DGPS).

Project Personnel

Fieldwork was carried out on 2 December 2020. Project personnel consisted of Principal Investigator Gordon Watts, Field Director Ralph Wilbanks, Remote-Sensing Equipment Operator Patrick Cleary, and Vessel Captain Steve Howard. Data analysis and GIS based illustrations were prepared by Dr. Watts. Dr. Watts and Robin Arnold prepared this report.

Project Location

The South Island Plantation marina site is located on the west shoreline of Winyah Bay, south of Georgetown in Georgetown County, South Carolina (Figure 1).



Figure 1. Winyah Bay marina project location (Courtesy of TEG).

The proposed marina improvements consist of modifying a previously authorized private marina. In detail, the existing fixed dock and pierhead will remain the same. The proposed work is the additional construction of 4,912 square feet (SF) of floating docks and sixty 11' 8" x 26' 8" floating drive-on boat lifts totaling 18,666 SF. The proposed floating docks and floating drive-on boat lifts will be secured by 12" class B timber piles at 10-foot spacing for an approximate total of 120 pilings (Figure 2).

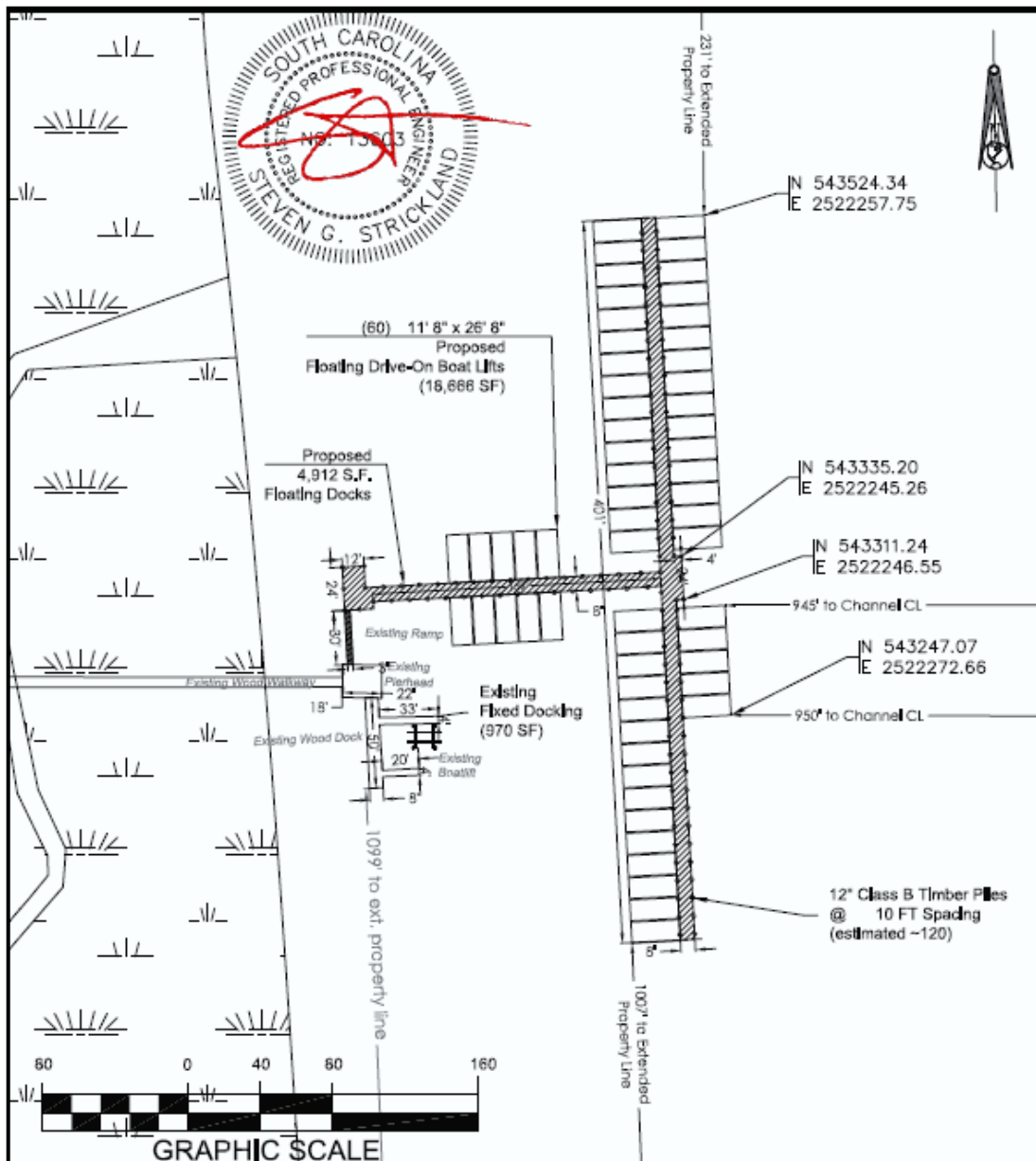


Figure 2. Proposed marina improvement plan (Courtesy of TEG).

The remote-sensing survey focused on the marina construction APE identified by a HYPACK border file (Figure 3). The APE border was roughly 500 feet in length, north to south; and 270 feet in width, east to west.

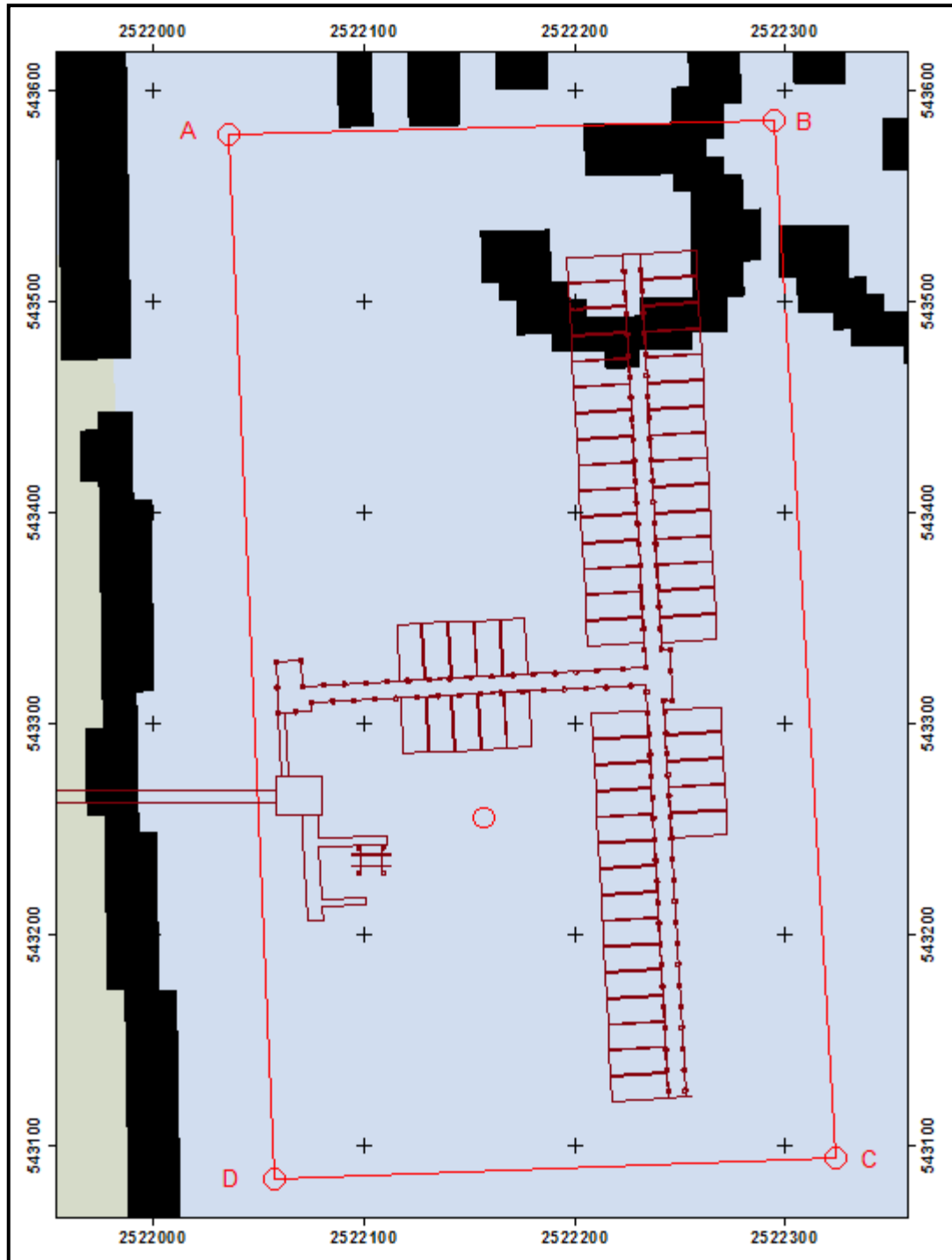


Figure 3. South Island Marina APE remote-sensing survey area and border points.

The South Island Plantation survey was carried out and collected data was recorded in South Carolina State Plane, NAD 83, US Survey Foot coordinates. Border points of the survey area are defined by coordinates within that geographical system (Table 1).

Point	X Coordinate	Y Coordinate
A	2522035.6	543580.2
B	2522294.6	543586.5
C	2522323.9	543093.5
D	2522057.6	543084.1

Table 1. Survey area border points.

Remote-Sensing Survey Methodology

In order to reliably identify submerged cultural resources, TAR personnel conducted a systematic remote-sensing survey of the proposed APE. All survey activities were conducted from a 25-foot survey vessel (Figure 4). In order to fulfill the requirements for survey activities in South Carolina, magnetic and acoustic remote-sensing equipment were employed. This combination of remote sensing represents the “state of the art” in submerged cultural resource location technology and offers the most reliable and cost effective method of locating and identifying potentially significant targets. Data collection was controlled using a DGPS. DGPS produces the highly accurate coordinates necessary to support a sophisticated navigation program and assure reliable target location.



Figure 4. 25-foot survey vessel.

An EG&G GEOMETRICS G-881 marine-cesium magnetometer, capable of plus or minus 0.001 gamma resolution, was employed to collect magnetic data in the survey area (Figure 5).



Figure 5. GEOMETRICS G-881 cesium vapor magnetometer.

To produce the most comprehensive magnetic record, data was collected at 10 samples per second. Due to shallow water within the project area, the magnetometer sensor was towed just below the water surface at a speed of approximately 3 to 4 knots. Magnetic data were recorded as a data file associated with the computer navigation system. Data from the survey were contour plotted using QUICKSURF software to facilitate anomaly location and definition of target signature characteristics. All magnetic data were correlated with the acoustic remote-sensing records. A 450/900 kHz KLEIN 3900 digital sidescan sonar (interfaced with SONARPRO data acquisition software) was employed to collect acoustic data in the survey area (Figure 6).



Figure 6. KLEIN SYSTEM 3900 digital sidescan sonar.

Due to shallow water within the project area, the sidescan sonar transducer was deployed and maintained between four to five feet below the water surface. Acoustic data were collected using a range scale of 50 meters to provide a combination of 300% coverage and high-target signature definition. Acoustic data were recorded as a digital file with SONARPRO and tied to the magnetic and positioning data by the computer navigation system. These data were imported into CHESAPEAKE TECHNOLOGY SONARWIZ.MAP for additional review and to create a mosaic.

Acoustic sub-bottom data was collected using an EDGETECH 3100P Portable sub-bottom profiler with an SB-216S tow vehicle (Figure 7). The SB-216S provides three frequency spectrums between 2 and 15kHz with a pulse length of 20 msec. Penetration in coarse and calcareous sand is factory rated at 6 meters with from 2 to 10cm of vertical resolution. During the survey the sub-bottom transducer was deployed and maintained between 4 to 5 feet below the water surface. To facilitate target identification, sub-bottom sonar records were electronically tied to DGPS coordinates. Sub-bottom data was recorded as a digital file using EDGETECH's Discover software and DGPS provided record positioning.

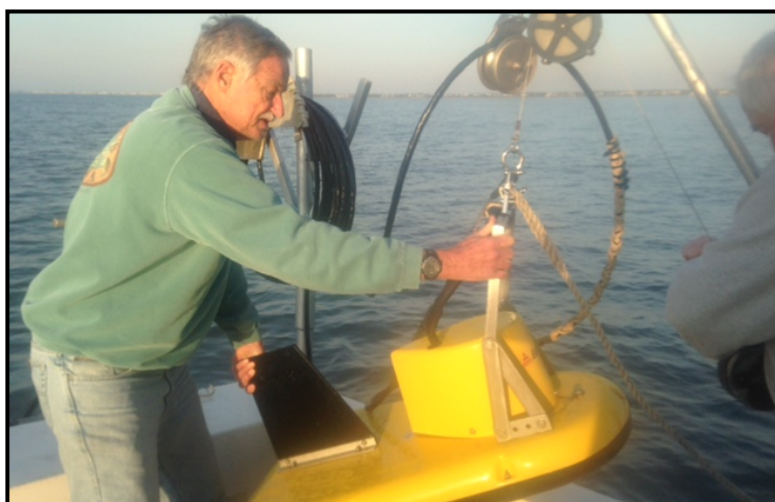


Figure 7. EDGETECH SB-216S tow vehicle.

A TRIMBLE DGPS was used to control navigation and data collection in the survey area. That system has an accuracy of plus or minus three feet and can be used to generate highly accurate coordinates for the computer navigation system. The DGPS was employed in conjunction with an on-board laptop loaded with HYPACK navigation and data collection software (Figure 8). All magnetic and acoustic records were tied to positioning events generated by HYPACK. Positioning data generated by the navigation system were tied to magnetometer records by regular annotations to facilitate target location and anomaly analysis. All data is related to the South Carolina State Plane Coordinate System.



Figure 8. Computer navigation and data collection systems located on the research vessel bridge.

Remote-Sensing Data Analysis

Magnetometer data was collected in the form of HYPACK raw data files. Each line file was reviewed by the principal investigator to identify and characterize anomalies that could be generated by submerged cultural resources. Anomaly signatures suggestive of significant submerged cultural material were isolated and analyzed in accordance with anomaly intensity, duration, areal extent and signature characteristics suggestive of the material generating the anomalies. Using QUICKSURF software, magnetic contour maps of the survey areas were produced to aid in analysis and data representation.

Acoustic sidescan sonar data was collected in the form of raw SonarPro XTF data files. Acoustic sub-bottom profiler data was also collected in the form of raw Explorer XTF data files. Each line of acoustic data was reviewed by the principal investigator using SONARWIZ software to identify and characterize targets that could be generated by submerged cultural resources. Using SONARWIZ software a sonar coverage mosaic map of the survey area was produced to aid in analysis and data representation.

Magnetic and acoustic data were collected on seven survey lines in the South Island marina project area (Figure 9). Line-by-line analysis of the magnetometer data and contouring at two gammas confirmed that no potentially significant magnetic anomalies were identified in the APE (Figure 10). All of the magnetic anomalies within the survey area are associated with the extant pier and dock structures. Anomalies outside the east border of the survey area represent debris beyond the APE. Line-by-line analysis and mosaicking of the sonar data also confirmed that no potentially significant targets were identified in the survey area (Figure 11). No evidence of potentially significant targets or relict landform features were identified in the associated sub-bottom profiler records (Figure 12).

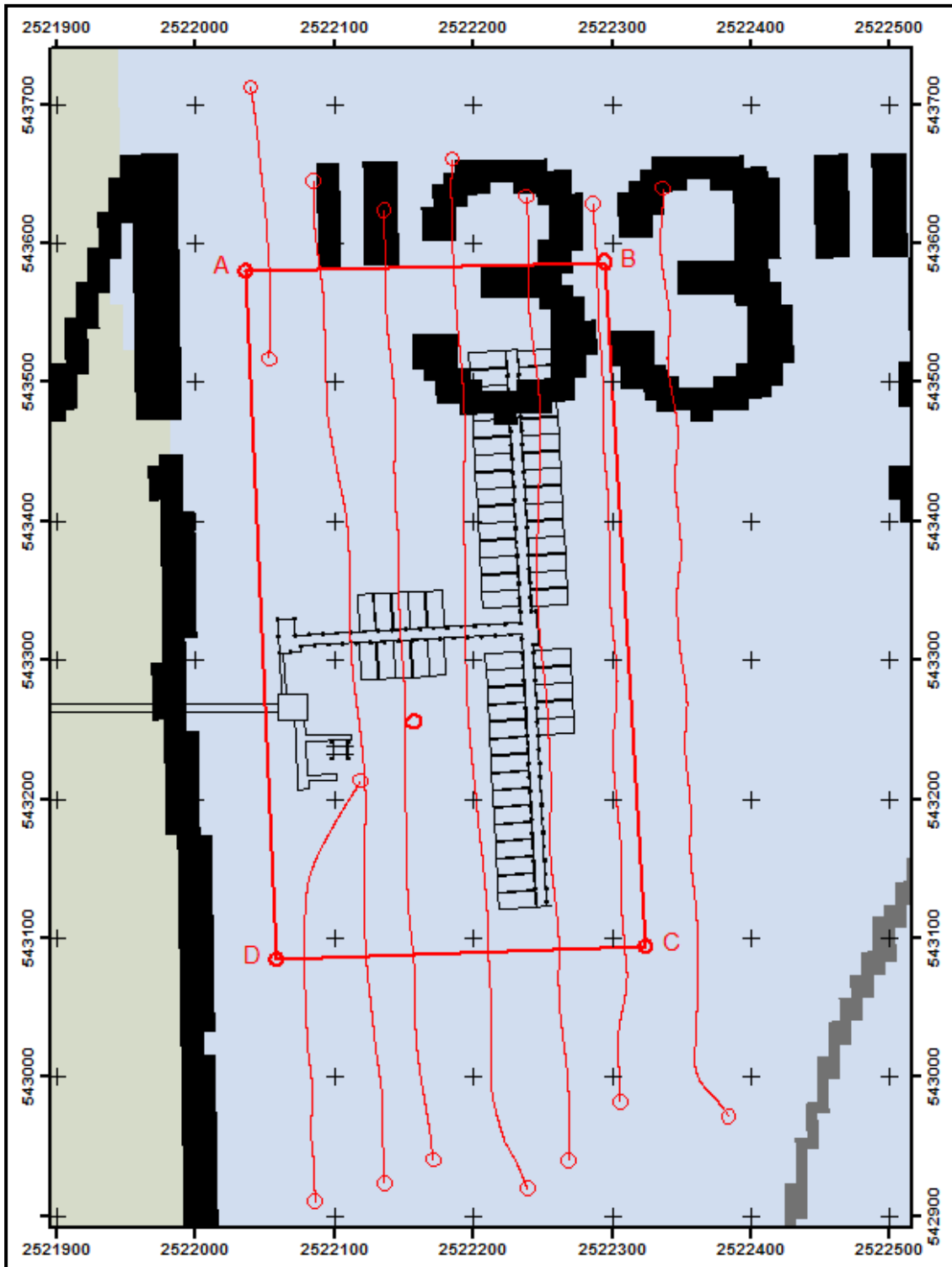


Figure 9. South Island Marina project survey tracklines.

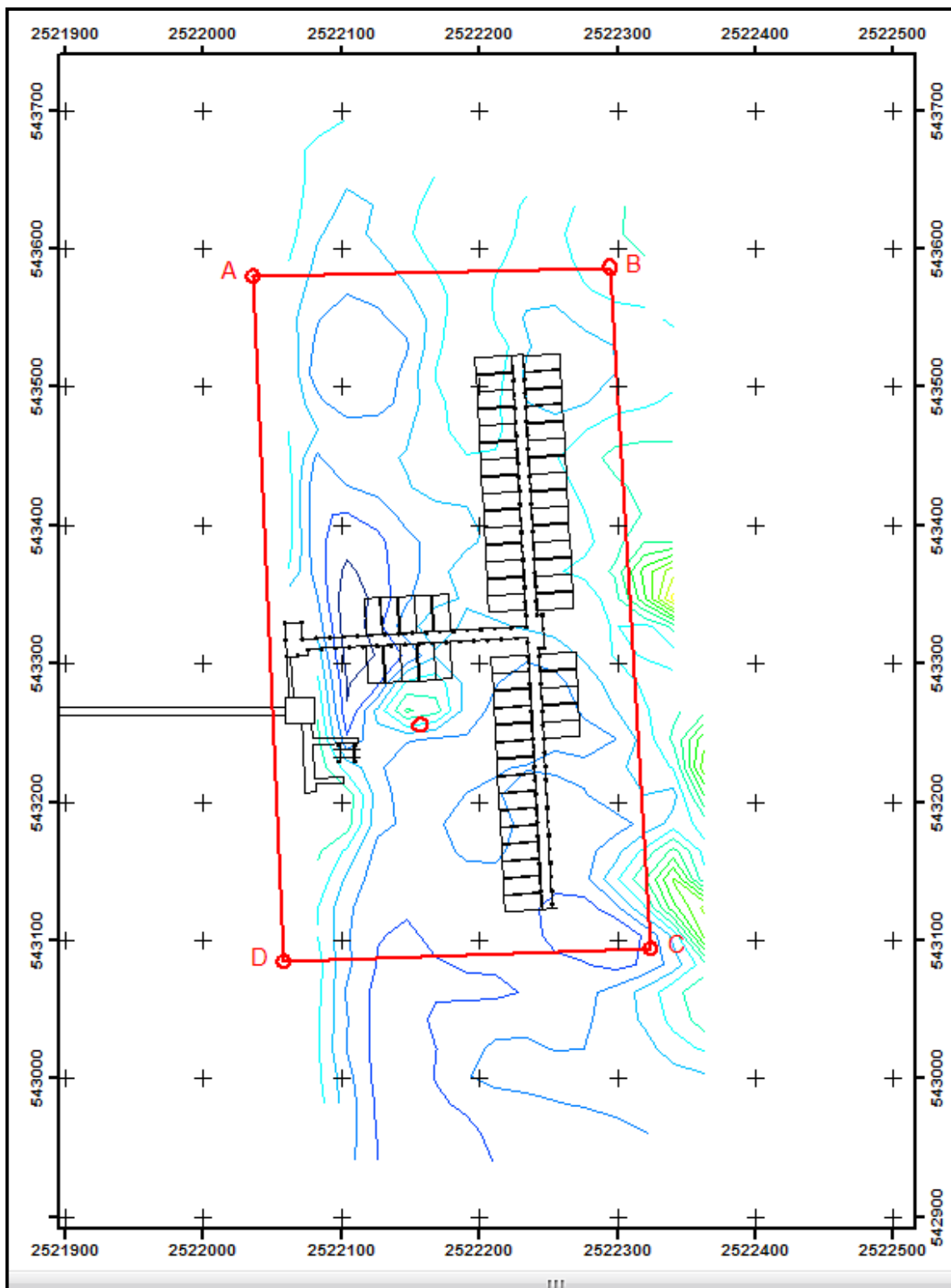


Figure 10. South Island Marina project two-gamma magnetic contours.

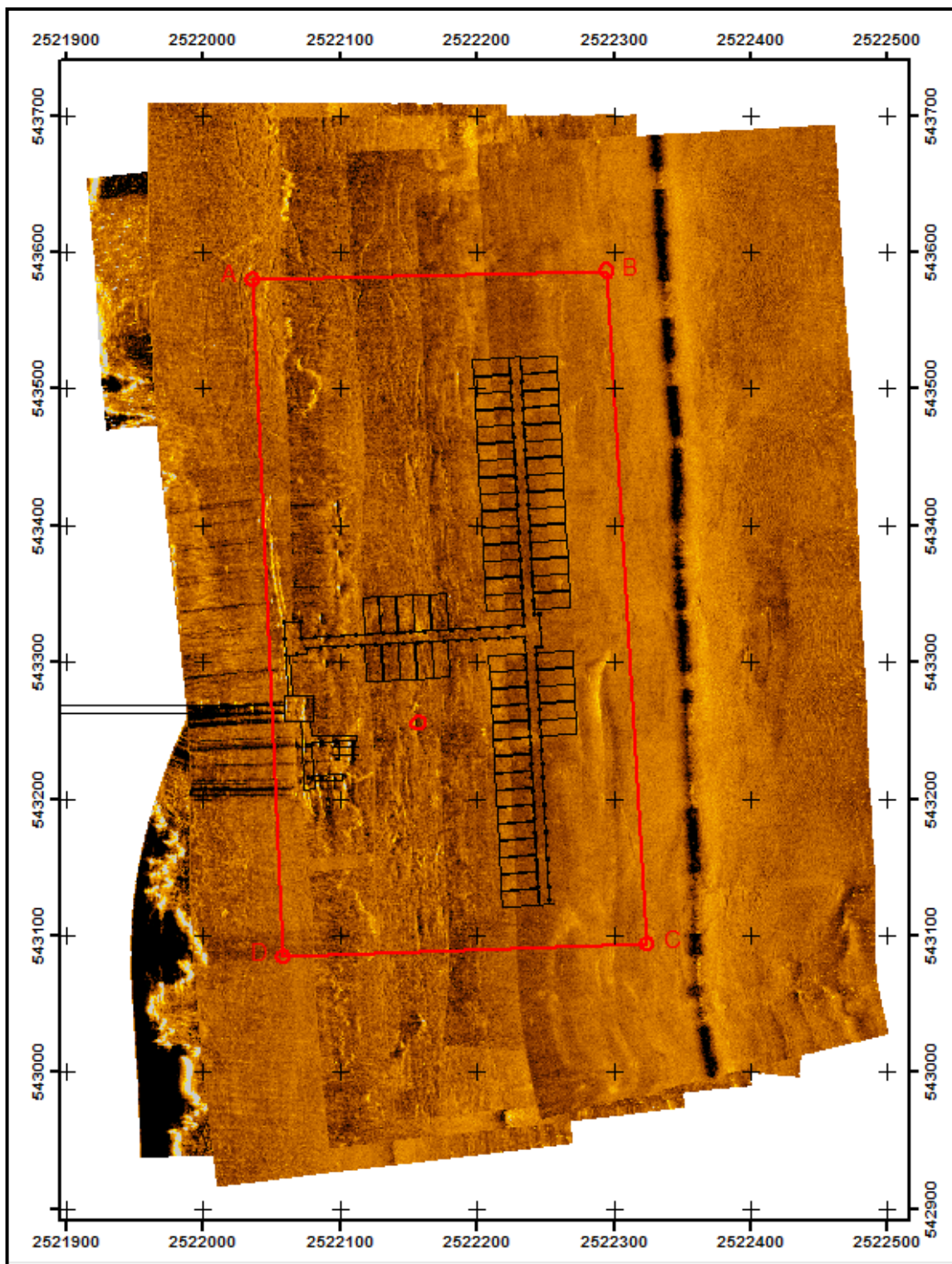


Figure 11. South Island Marina project sonar coverage mosaic.

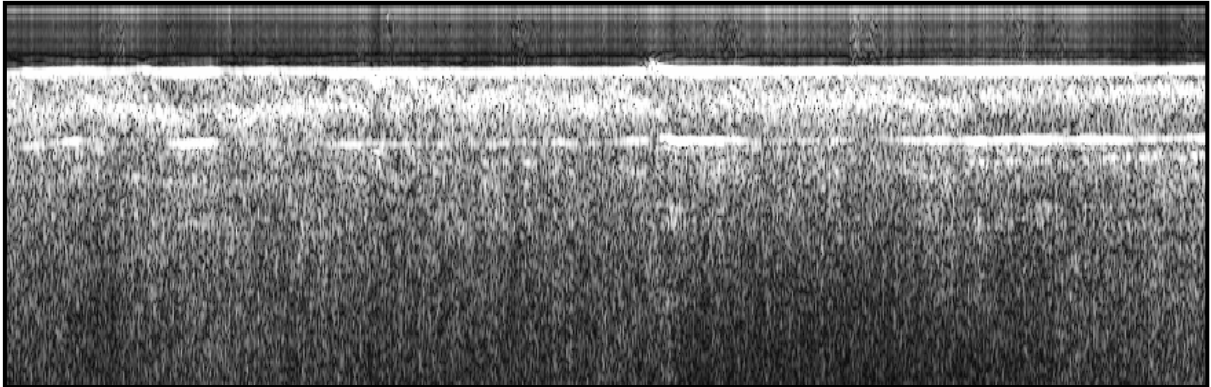


Figure 12. South Island Marina project sub-bottom profiler data example from Survey Line No. 7.

Conclusions and Recommendations

Data produced by the remote-sensing survey of the South Island Marina APE identified no magnetic anomalies, sonar targets, or sub-bottom features with signature characteristics indicative of association with submerged cultural resources. As the data confirmed that no National Register of Historic Places eligible submerged cultural resources are present in the project APE, no additional investigation is recommended in conjunction with the marina expansion as proposed.

Unexpected Discovery Protocol

In the event that any project activities expose potential prehistoric or historic cultural material not identified during the subject remote-sensing survey, the construction company under contract to SIPA should *immediately* shift operations away from the site and inform the respective Point of Contact for the USACE, the SCDHEC-OCRM, the South Carolina SHPO, and SCIAA [MRD]. Notification should address the exact location, where possible, the nature of material exposed by project activities, and options for immediate archaeological inspection and assessment of the site(s).