

**SURVEY REPORT FOR
OCPR RESTORATION PROJECT
TERREBONNE BAY MARSH CREATION-NOURISHMENT
PROJECT (TE-83)
TOPOGRAPHIC, BATHYMETRIC, AND MAGNETOMETER
SURVEY
TERREBONNE PARISH, LOUISIANA**

**Under
DNR Contract 2503-11-66**

**Prepared For:
Office of Coastal Protection & Restoration
Baton Rouge Office**



**Ronald E. (Gene) Prather, PLS
Louisiana Registration No. 4643
C&C Technologies, Inc. Reg. No. 330**

December 21, 2011

Introduction

DNR Contract 2503-11-66, directed C&C Technologies, Inc. to perform surveying and mapping services for the State Of Louisiana Office of Coastal Protection and Restoration (OCPR).

Project Calendar

Received Notice to Proceed by email Aug 16, 2011
Conducted Hydro Survey conducted Aug 22-25, 2011
Survey Permission obtained from ConocoPhillips Aug 25, 2011
Survey Permission obtained from Apache Corp Aug 26, 2011
Establish control Aug 29, 2011
Begin survey Aug 30-Sep 1, 2011 and Sep 6-9, 2011
Survey Suspended for Teal Season Sep10-25, 2011
Resume survey Sep.27-30, Oct3-7, Oct10-14, Oct17-21, Oct24-27 and Oct 31-Nov 4, 2011

Actual 39 days of field acquisition Estimated 40 days of field acquisition

Additional Request under Task Order to verify tide gauges Dec. 16, 2011

General Outline of Work Performed

- Recovered and confirmed existing horizontal & vertical survey control point "TE32-SM-06 (MINNOW)"
- Established temporary bench marks in work area
- Perform Marsh Elevation Survey
- Collected horizontal & vertical positioning on topographic points along pre-programmed grid lines and perimeter surveys.
- Perform magnetometer survey
- Mapped & reported the results of the survey

Equipment Utilized for Topographic and Bathymetric Survey

All of the marsh survey and transect lines were collected utilizing LEICA GPS1200 Series Receivers and LEICA Smartnet System in the Real Time Kinematic (RTK) mode
Winfrog Navigational Software and C-Nav differentially corrected GPS was utilized on the survey vessel for the collection of single beam bathymetric data.
Survey Vessel with twin outboards was used to access the job site and an air boat to run marsh survey / transect lines.

Datum

Survey and Mapping Datum :
Published DNR Data Sheet, Louisiana Lambert State Coordinate System, NAD 1983, South Zone (1702), Survey Feet, (GEOID09). Vertical Datum: NAVD 1988

Survey Control

Louisiana Coastal Zone (LCZ) GPS Network Point “TE32-SM-06 (MINNOW)” was utilized for primary control. Static satellite observations were collected and processed utilizing Online Positioning Users Service (OPUS) with results listed below:

	X		Y		Elev		Comment
TE32-SM-06 Minnow	3499286.85		294291.06		1.82		From DNR Datasheet Geoid 99
	3499286.75	0.10	294291.11	-0.05	0.98	0.84	OPUS 08/30/2011 Geoid 09
	3499286.75	0.10	294291.12	-0.06	1.05	0.77	OPUS 11/13/2011 Geoid 09
	3499286.75	0.10	294291.1	-0.05	1.02	0.81	Average OPUS Solution
CRMSTE-SM-19	3533118.62		303440.69		1.74		From DNR Datasheet
	3533118.66	-0.04	303440.54	0.15	2.05	-0.31	From 613-590 Base 9/29/11
613-590 Base	3512765.5		296857.72		3.19		Set Base Point from TTE32-SM-06 (Minnow)
	3512765.42	0.08	296857.88	-0.16	2.35	0.84	OPUS 09/06/2011
HELD ADJ POSITION	3512765.42	0.08	296857.86	-0.14	2.34	0.85	OPUS 09/07/2011 Geoid 09
	3512765.39	0.11	296857.92	-0.20	2.45	0.74	OPUS 09/08/2011
	3512765.44	0.06	296857.87	-0.15	2.33	0.86	OPUS 09/09/2011
	3512765.42	0.08	296857.88	-0.16	2.37	0.82	Average OPUS Solution

All vertical data adjusted to NAVD 88, Geoid 09

Narrative

C & C performed the topographic survey of the designated areas prescribed in the scope of work. The field acquisition was performed from August 22, 2011 through November 4, 2011 with work being suspended during waterfowl season at landowners' request. The survey data along designated transects was electronically collected by utilizing RTK GPS techniques. Field books were completed by the party chief to document information about the survey denoting such things as: check ins and outs, antenna heights, base station information, topographic features, sketches and other pertinent information. The survey data was processed utilizing SURVCE Carlson export software.

Shot points were obtained at approximate twenty-five foot (25') intervals and breaks in terrain with the 25' interval along the prescribed transect lines of each reach.

The hydrographic and magnetometer survey was conducted utilizing C-Nav differentially corrected GPS, Winfrog navigation software, Odom Hydrotrac Single Beam Fathometer with a 200 kHz transducer and Geometrics 882 Cesium Magnetometer to collect data on designated transects.

The magnetometer was operated in a towed configuration with the tow point at the stern of the vessel. The magnetometer dataset was collected at a sampling rate

of 10 Hz and a very high sensitivity of less than 0.1 gammas. Proprietary C&C Autolisp routines were used to interpret the magnetometer dataset.

Sixty Three (63) unidentified magnetic anomalies were noted within the proposed borrow area, none of which were deemed to be associated with a possible pipeline. The anomalies exhibit amplitudes between 4 and 32,767 gammas and durations between 8 and 361 feet. A 25 foot radius search was performed around each anomaly in an effort to verify whether it was a pipeline or not. One pipeline was located within the marsh restoration area, an additional line which (Fina 6" P19920176) was found to not have been laid (permit was withdrawn). Three pipelines were located along proposed access route from the South (in area less than -10' elevation) and 126 unidentified magnetic anomalies were found along the route. The magnetic anomalies exhibit amplitudes between 4 and 27,968 gammas and durations between 8 and 246 feet. Seventy-one (71) unidentified magnetic anomalies were noted along the proposed access route from the North. The magnetic anomalies exhibit amplitudes between 5 and 7,393 gammas and durations between 10 and 144 feet. The amplitude and duration of a magnetic anomaly are dependent on several factors such as the ferromagnetic content of the object, it's shape, size and distance from sensor. Some of the magnetic anomalies are relatively small (less than 10 gammas) and are likely geologic in origin or noise. The location of all magnetic anomalies should be taken into consideration during the planned dredging-related activities and farther investigated or avoided as deemed appropriate by OCPR.

OCPR representative Darin Lee was met on site to locate and approve areas to conduct Average Marsh Elevation Surveys. The survey crew took random shots on natural ground between the clumps of marsh grass as directed.

Results as follows:

Marsh Elevation Survey Site #1	0.64 foot average elevation
Marsh Elevation Survey Site#2	0.53 foot average elevation
Marsh Elevation Survey Site#3	0.92 foot average elevation

Top of water elevations were recorded utilizing RTK GPS each day and compared to local tide gage Bayou Petit Caillou at Cocodrie (76305).

Tide Gage Comparison

Bayou Petit Caillou at Cocodrie (76305)						
	At Project Site		WSE		Diff In	
	WSE RTK	Time	At Gage	Time	Elev	
9/1/2011	1.00	AM	1.19	8:00	-0.19	
9/7/2011	1.31	AM	1.56	8:00	-0.25	
9/9/2011	0.78	AM	1.01	8:00	-0.23	
9/27/2011	0.39	AM	0.65	8:00	-0.26	
9/28/2011	0.27	AM	0.37	8:00	-0.10	
9/29/2011	0.01	AM	0.53	8:00	-0.52	
10/3/2011	0.1	AM	0.36	8:00	-0.26	
10/4/2011	0.49	AM	0.85	8:00	-0.36	
					-0.27	Avg. Diff

Staff Gage Manuel Reading	1.53	8:30 AM	8/23/2011
RiverGages.COM	1.24	8:00 AM	8/23/2011
	0.29	Diff	

Result of Gauge Verification Survey Dec. 16, 2011.

Staff Gauge	X		Y		Elev.Top Post		Water Elev		Comment
TE45-SG-H02	3,524,306.93		293,950.00		6.17		1.0		OCPR Published Data Sheet
	3,524,306.79	0.14	293,950.21	-0.21	5.54	0.63	0.31	0.69	By RTK GPS Observation From TE32-SM-06
TE45-CR-H02	3,524,303.03		293,954.11		6.50				OCPR Pulished Data Sheet
	3,524,303.07	-0.04	293,954.79	-0.68	5.78	0.72			By RTK GPS Obeservation From TE32-SM-06
DCPTE04-CR	3,513,776.37		316,306.17		11.95		0.90		OCPR Pulished Data Sheet
	3,513,775.47	0.90	316,306.68	-0.51	11.22	0.73	0.27	0.63	By RTK GPS Obeservation From TE32-SM-06
TE45-SG-H01	3,509,016.13		286,455.19		6.75		0.82		OCPR Pulished Data Sheet
	3,509,015.85	0.28	286,455.35	-0.16	6.05	0.70	0.17	0.65	By RTK GPS Obeservation From TE32-SM-06
TE45-CR-H01	3,509,013.81		286,450.93		6.69				OCPR Pulished Data Sheet
	3,509,013.71	0.10	286,450.76	0.17	5.99	0.70			By RTK GPS Obeservation From TE32-SM-06

The project control was found by GPS OPUS observations to be 0.81 foot lower than the published data sheet elevation for TE32-SM-06 Minnow, which is somewhat consistent with our finding on the staff gauge verification being found to be approximately 0.7 feet lower than published data sheet elevations.

Acquired survey data being more fully shown on attached plats.

Deliverables

Basic Survey Report

Survey Plats

Field Notes

ASCII Point File (On disk)

CD Containing all of above

C&C TECHNOLOGIES, INC.

Ronald E. (Gene) Prather, PLS

VP, Manager Land Survey Services

LA Registration Number 4643

C&C Technologies, Inc. LA Reg.# 330

OFFICE OF COASTAL PROTECTION & RESTORATION
TERREBONNE BAY MARSH CREATION NOURISHMENT PROJECT (TE-83)
TOPOGRAPHIC, BATHYMETRIC, AND MAGNETOMETER SURVEY
TERREBONNE PARISH, LOUISIANA

SURVEYED BY C&C TECHNOLOGIES INC.

DATUMS

HORIZONTAL: NAD 1983 LA. SOUTH ZONE 1702 FEET

VERTICAL: NAVD 88 FEET

DATA FORMAT:

PT#,X,Y,Amplitude (Gamma),Duration in feet,DESCRIPTION

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Bathymetric Magnetometer Survey

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OFFICE OF COASTAL PROTECTION & RESTORATION
TERREBONNE BAY MARSH CREATION NOURISHMENT PROJECT (TE-83)
TOPOGRAPHIC, BATHYMETRIC, AND MAGNETOMETER SURVEY
TERREBONNE PARISH, LOUISIANA

SURVEYED BY C&C TECHNOLOGIES INC.

DATUMS

HORIZONTAL: NAD 1983 LA. SOUTH ZONE 1702 FEET

VERTICAL: NAVD 88 FEET

DATA FORMAT:

PT#,X,Y,Z,DESCRIPTION

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Land Mag

Magnetometer Survey for FINA O&CHEM 6" GAS Pipeline (P19920176)

Pipeline was permitted and never constructed, well it was gonna
service was a dry hole and permit was withdrawn October 29, 1992.

Magnetometer survey was done to prove pipeline was not there

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