PL-646 CWPPRA
PROJECT COMPLETION REPORT

PROJECT NAME	Non-Rock Alternatives to Shoreline Protection Demonstration Project
CWPPRA/STATE PROJECT NO	LA-16 (Royal Engineers)

Report Date: July 27, 2015 By: Natural Resources Conservation Service

1. Project Personnel

CPRA Project Manager	Garvin Pitman	(225) 932-5898
CPRA Construction Project Mgr	Jody White	(337) 482-0664
CPRA Monitoring Manager	Thomas McGinnis	(337) 482-0665
Federal Agency Project Manager	Loland Broussard	(337) 291-3069
Federal Agency Contracting Officer	Vicki Supler	(318) 473-7645
Federal Agency Design Engineer	Dain Gillen	(225) 665-4253
Federal Agency COR	Loland Broussard	(337) 291-3069
Federal Agency Inspector	Carol Clement	(337) 783-1257
Federal Agency Inspector	Cody LaFleur	(337) 783-1257
Federal Agency Inspector	Mike Ryder	(337) 783-1257
Federal Agency Inspector	Nathan Richard	(337) 893-5781

2. Project Location & Description

The project is located along the eastern shoreline of Vermilion Bay, on Shark Island, in Iberia Parish, Louisiana.

The project consisted of constructing a continuous linear feature consisting of two parallel vertical walls of perforated HDPE sheeting supported by steel pilings, referred to as a "Wave Screen System".

3. Contract Phases

The LA-16 Non-Rock Demonstration Project was approved for funding on Priority Project List 18 by the CWPPRA Task Force. The NRCS/CPRA project team decided to pursue the project in four (4) phases as described below:

Phase 1 – Request for Proposals: NRCS posted a Request for Proposals (RFP) on the Federal Business Opportunities website with a deadline date for submittals due March 15, 2012. Of the 17 proposals received, 14 qualified for further evaluation. The project team selected 5 proposals to advance to the next phase.
Phase 2 – Engineering and Design: Funding was provided via contracts to the 5 offerors to develop a comprehensive design report and complete set of construction plans and specifications. Each proposal was further evaluated and prioritized based on the information provided.

Phase 3 – Construction: Predicated on funding available, the top 4 offerors received contracts to fabricate and install 500 linear feet of their product at the Shark Island site in Iberia Parish, Louisiana. Of the 4 contractors, 3 successfully executed their contracts.
Phase 4 – Monitoring: A 3-year monitoring period has been established for each product to determine their effectiveness in providing shoreline protection and durability to last a 20-year life. The monitoring period began May 5, 2014 and will end on May 5, 2017.

4. Final Constructed Features

The final constructed features consisted of 502 linear feet of Wave Screen System. The bottoms of the vertical walls were positioned 1-1.5' above the bay bottom. Two walls were installed parallel to each other in a straight configuration parallel to the shoreline an in approximately 4-4.5' of water.

5. Task Force Funding Approval

	Project Cost Estimates*
Construction	$ 1,159,869.00
E & D	$ 504,307.00
Landrights	$ 10,373.00
Monitoring	$ 10,787.00
O&M	$ 220,901.00
Total	$ 1,906,237.00

*Note: The above cost estimates reflect the total initial funds for the LA-16 Project and not individual contracts.

6. Items of Work

				Original Award		Final Amount		
Item	Work	Estimated Quantity	Unit	Unit Bid Price	Bid Amount	Final Quantity	Final Amount	% Over/ Under
1	Mobilization and Demobilization to Shark Island Site	1	Job	$28,528.22	$28,528.22	1	$28,528.22	100.00%
2	Installation of Shoreline Protection System at Shark Island Site	500	LF	$1,443.89	$721,946.47	500	$721,946.47	100.00%
3	Removal of Shoreline Protection System at Shark Island (Option)	1	Job	$40,710.65	$40,710.65			
			Total	**$791,185.34**		**$750,474.69**		

***NOTE:** The contract will remain open for 3 years after the installation of the last product. Contract funds will remain obligated until May 5, 2017 for CLIN 3.
***NOTE:** No Government Estimate was established. Costs were established based on the design estimate produced during Phase II.

7. Construction and Construction Oversight

Prime construction contractor	Royal Engineers & Consultants, Inc.
Subcontractor	Cajun Maritime, LLC
Original construction contract	$ 791,185.34
Change orders	$ 0.00
Over/Under runs	$ 0.00
Final construction contract	$ 750,474.69 *

***NOTE:** The contract will remain open for 3 years after the installation of the last product. Contract funds will remain obligated until May 5, 2017 for CLIN 3.

8. Major Equipment Used

Spud Equipment Barge "Fathom Innovation"
Link Belt Crane (LS-248H II)
Spud Supply Barge (CSB-03)
Supply Barge (Foam Barge)
Tug Boat "Ms Addi"
Cabin Boat w/ twin engines (LA-6502-FB)
Large Generator & Hydraulic Engine MKT(060106)Vibrating Hammer MKT (V35)
JLG Bucket Lifter 600A(976199)

9. Construction Sequence

Prior to construction beginning on the Wave Screen System, NRCS released a contract to American Contractor and Technology, Inc. (ACT) to dredge an access channel perpendicular then parallel to (i.e. "T" formation) Royal's work site. Temporary navaids were used to mark spoil disposal areas as a warning to marine traffic. Following construction completion of all LA-16 products, ACT returned to the Royal job site to backfill the previously dredged access channel and install permanent warning signs bayward and adjacent to the LA-16 products.

Royal Engineers subcontracted the services of Cajun Maritime, LLC (Cajun) for all activities relative to the fabrication and installation of their Wave Screen System. On February 14, 2014, Cajun began mobilizing equipment and supply barges to the job site. All work at the job site was conducted via marine equipment due to the fact land access was prohibited. Installation began on February 17th with a survey crew from Royal Engineers staking out the horizontal position of the first six pilings at the southern end of the job site. The correct positioning and installation of the first modular unit was critical due to solid connections of one unit to the next. A slight deviation in alignment of the first module could cause a large distance offset in the planned position of the last module.

Once the first module was positioned correctly, Cajun inserted the vertical 24" steel piles (6) inside the receptive jackets of the module. Each piling was then driven with a hydraulic vibratory hammer to within 5-6 feet of vertical grade which was near or at refusal. Royal's initial plan was to have the final crest elevation of the pilings the same as the crest elevation

of the modules, +2.0' NAVD88. However they quickly realized the possible navigational hazard the structure would pose and modified the plans to keep a minimum 4 feet of piling above module grade. Once each module was set in place, pilings were inserted, module was set to grade, bolted to the previously set module, pin holes were cut with a torch and 1.5" steel rods were used to pin the modules to the steel pilings to provide vertical support. Cajun installed a total of 10 modules and 42 pilings in a linear alignment and adhered to the proper vertical and horizontal grade throughout.

10. Contract Modifications & Field Changes

Modification #1 – The purpose of this modification was to provide revised wall profiles to the contractor. There was no change to the contract amount or performance time. Drawing sheets 4 and 5 were revised. No specifications were changed.

Modification #2 – The purpose of this modification was to increase the performance time due to an error in the calculation of the performance time by the contractor with the submission of their final plans and specifications. There was no change to the contract amount. The performance time was increased from 62 calendar days to 118 calendar days. No drawings or specifications were changed.

Modification #3 – The purpose of this modification was to change the payment method on CLIN 2 – Installation of Shoreline Protection System at Shark Island Site to allow for partial payments after the approval of certain milestones. There was no change to the contract amount or performance time. Construction Specification 452 – Shoreline Protection System was revised. No material specifications or drawings were changed.

Modification #4 – The purpose of this modification was to change the thickness of the circular steel piles. There was no change to the contract amount or performance time. Construction Specifications 13 – Pilings and 452 – Shoreline Protection System were revised. No material specifications or drawings were changed.

Modification #5 – The purpose of this modification was to provide for the use of Xylan coated bolts, washers, and lock nuts in order to prevent galling; for all steel piles to be driven to the lowest point of refusal and for the remainder of the pile to be cut off; for all piles to have a top elevation the same with a 3-4" tolerance; and for the pile cap to be welded to top of pile instead of pile jacket. There was no change to the contract amount or performance time. No drawings or specifications were changed.

11. Pipeline and Utility Crossings

Utility Type	Owner	Rep. To Contact
N/A	N/A	N/A

12. Construction Safety

No safety issues occurred.

13. Additional Comments

See attached NRCS Supplement

14. Significant Construction Dates:

	Date	Bid I.D.
Site Showing 1/	November 16, 2011	
Bid Opening 2/	March 15, 2012	AG-7217-S-12-0003
Construction Contract Award	9/9/2013	AG-7217-C-13-0010
Preconstruction Conference	9/27/2013	
Notice to Proceed	11/15/2013	
Mobilization	02/14/2014	
Construction Start	02/17/2014	
Construction Completion	3/21/2014	
Final Inspection	3/10/2014	
Release of Claims	3/	
Close-out Meeting	6/25/2014	

1/ Refer to Item #3 in this report. A site showing was held for all potential offerors submitting proposals for Phase 1.

2/ Refer to Item #3 in this report. An RFP was posted on FedBizOps for Phase 1 with proposals due on the date shown.

3/ This item will be completed after the contract is closed (after 3 yr monitoring).

LESSONS LEARNED MEETING MINUTES

Project:	*LA-16 Non-Rock Alternative to Shoreline Protection Project*	**Date:**	*June 16, 2014*
Location:	*Royal Engineers Lafayette Office*	**Time:**	*9:00 a.m.*

Attendees:	Royal – Mitch Andrus, Beau Tate, Philip Mestayer, Bryon Richard Cajun Maritime – Saul Prejean
Summary:	I. Discuss Issues/Ways to Improve for Design/Fabrication A. Bolt hole diameter/Bolt diameter - This was not much of an issue. In the future, the diameter of the hole sizes can increase 1/32" for ease of installation. B. Bolt plate alignment considering the open ended sections were able to bend/move - Three options to consider: 1) Add a smaller temporary structural member to the top and bottom of the open end section to prevent movement and twisting. The temporary members are to be bolted on the end of the open end section and removed prior to installing subsequent section. 2) Permanent top and bottom members should be added to the open end sections and recessed back 6"-1' to allow installation of bolts or 3) Incorporate top and bottom members into the design of alternate section provided within Exhibit A attached. C. Closed in I-beams with no way for water to escape on top of the structure - Drill small holes in the web of the I beam to allow water to escape D. Pad eye location/on open ended sections - Provide locations of pad eyes on the plans based on temporary bracing weight of open end sections. Provide explanation of size of members and calculated weight for possible temporary bracing. E. Width dimensions (spacing) on angle/length of sheet wall - Either 1) Increase the section spans to account for usage of three 10' star board sections and adjust vertical angles spacing based on locations of starboard ends or 2) Leave the section spans the same and incorporate actual vertical angle spacing based on the as-built drawings. F. Weld patterns throughout - Incorporate changes as indicated on as-built drawings G. Others 1) Obtain deeper geotechnical borings to determine pile size (diameter and length). 2) Add jacket to open end sections which is to be set on top of the pervious section's lower jacket. Seal weld the two jackets together in the field after installation. See Exhibit A attached for typical drawing. 3) Real data of actual structure installed at LA-16 should be reviewed to compare what is installed currently to reasonableness of member sizes used. 4) Incorporate installation of anodes onto structure prior to coating and installation. Size and space anodes in accordance with manufacturer's specifications. 5) Compare different coatings for structure. Use either thicker mills or different coating to prevent corrosion. 6) Include installation of conspicuity tape within plan set. Conspicuity tape are to be 2 strips of 2" wide conspicuity tape spaced 8" apart that wraps completely around the top portion of all pilings. 7) Reduce size of top plate to be same diameter of pile (not diameter of jacket). II. Discuss Issues/Ways to Improve for Installation A. Temp bolt up section for easier installation/layout of piles to be driven - If the design is to stay the same, a typical temporary section should be drawn up and the weight calculated into the locations of the lifting pad eyes B. Pad eye location for level lifting - Previously discussed in item I. D.

C. Usage of floating mats during installation to level sections for pile driving accuracy
- This gets into the contractor's means and methods and should not be put into the plan set. This is only an issue if water depth is less than 6 feet.

D. Access channel/size of vessels used
- Smaller barges and equipment could be used but it is recommended that minimum 6' deep channel be dug for access of tug boats. If access channel is required, increase the radius between the access channel and the work area to allow for easy of turning barges/equipment into place.

E. Bench mark location too far and not easily accessible from install location (time)
- We can look into setting up a closer temporary bench mark on the land to speed the survey process.

F. Dual crane would speed up installation process
- This item would not be feasible or necessary.

G. Bolt plates (bottom) only accessible during low tide/no tide would be almost impossible
- See design alternative in Exhibit A which does not contain any bolts or work required under water.
- We can look into designing the elevation between the two jackets (assuming the section within Exhibit A is used) to be above high mean water to allow for ease of seal welding jackets to one another while not being under water.

H. Survey performed on a moving vessel
- No ways to improve unless a larger boat is used but still would be dealing with tide/waves.

I. Reflective tape installation
- Conspicuity tape should be included within the design set as it has its advantages. See item I. G. 5)

J. Drive depth of piles/pile caps/adjustable structure
- The 4' higher elevation of the piles than the jacket provides the possibility to adjust the structure higher in the future to account for raising sea level. Include this revision in the design set.

May want to make pins longer or tack weld them - worked their way out during installation

K. Welded pins
- No issues. See alternate section within Exhibit A for a welded pin on each of the jackets.

L. Use of come alongs for alignment
- This is the contractor's means and methods. Come alongs will be used regardless.

M. Others
1) To decrease costs, we can look into 1) Reducing the number of piles increase the span length, 2) Increase span length and keep individual member sizes, or 3) Keep 25' span length and decrease individual member sizes.
2) Address perforated panel length from manufacturer and adjust vertical strut locations.
3) Adjust span length in relation to vertical struts to have each starboard hole pattern the same for all panels, rather than eight different hole patterns as it is now.
4) Perform cost analysis to see if we can reduce the overall linear foot cost by any of the options listed above.
5) Make sure all parties are clear of the schedule that can and cannot be worked as per contract.

III. Discuss Issues/Ways to Improve for Maintenance

A. Look into placing wedges between the two I beams at the bottom of each section to keep spacing throughout. Perforated plate to sit on top of wedges and will allow for ease of removing/replacing starboard if ever needed.

Cost Per Linear Ft.: $1,200.00 approx.

Exhibit A
LA–16 Alternate Connection Configuration