



State of Louisiana

**Coastal Protection and Restoration
Authority of Louisiana (CPRA)**

**2014/2015 Annual Inspection
Report**

for

**HWY 384 HYDROLOGIC
RESTORATION PROJECT
(CS-21)**

State Project Number CS-21
Priority Project List 2

May 11, 2015
Cameron Parish

Prepared by:

Jody Roger-White, P.E.
CPRA
Lafayette Field Office
635 Cajundome Blvd.
Lafayette, LA 70506



Table of Contents

I. Introduction.....	1
II. Inspection Purpose and Procedures	1
III. Project Description and History.....	1
IV. Summary of Past Operation and Maintenance Projects.....	3
V. Inspection Results	5
VI Conclusions and Recommendations	7

Appendices

Appendix A	Project Features Map
Appendix B	Photographs
Appendix C	Three Year Budget Projections
Appendix D	Field Inspection Notes

I. Introduction

The Hwy. 384 Hydrologic Restoration project (State Project No. CS-21) is located in the Calcasieu-Sabine Basin on the northeast side of Calcasieu Lake in Cameron Parish. The 1,125 acre project area extends from the northeast shore of Calcasieu Lake in a southeasterly direction to the Gulf Intracoastal Waterway and generally parallels LA Hwy. 384 in the vicinity of the Grand Lake community. The area is bounded on the north and south by higher elevation prairie formations. (See Appendix A).

The Hwy. 384 Hydrologic Restoration Project was authorized by Section 303(a) of Title III Public Law 101-646, the Coastal Wetlands Planning Protection and Restoration Act (CWPPRA) enacted on November 29, 1990 as amended and approved on the second Priority Project List. The Hwy. 384 Project has a twenty-year (20 year) project life, which began in January 2000.

II. Inspection Purpose and Procedures

The purpose of the annual inspection of the Hwy. 384 Hydrologic Restoration Project (CS-21) is to evaluate the constructed project features to identify any deficiencies and prepare a report detailing the condition of project features and recommended corrective actions needed. Should it be determined that corrective actions are needed, CPRA shall provide, in the report, a detailed cost estimate for engineering, design, supervision, inspection, and construction contingencies, and an assessment of the urgency of such repairs (O&M Plan, 2003). The annual inspection report also contains a summary of maintenance projects, if any, which were completed since completion of constructed project features and an estimated projected budget for the upcoming three (3) years for operation, maintenance and rehabilitation. The three (3) year projected operation and maintenance budget is shown in Appendix C.

An inspection of the Hwy. 384 Hydrologic Restoration Project (CS-21) was held on May 11, 2015 under rainy conditions. In attendance were Darrell Pontiff and Jody Roger-White of CPRA, along with Loland Broussard representing NRCS. The annual inspection began at approximately 11:30 a.m. at Structure No. 1. The other project features were not inspected.

The field inspection included a complete visual inspection of the project features. Staff gauge readings where available were used to determine approximate elevations of water, rock plugs, earthen embankments, and other project features. Photographs were taken at each project feature (See Appendix B) and Field Inspection Notes were completed in the field to record measurements and deficiencies (See Appendix D).

III. Project Description and History

Historically, the western portion of the project area was intermediate marsh with slightly brackish marsh immediately adjacent to Calcasieu Lake (U. S. Department of Agriculture, Natural Resources Conservation Service [USDA/NRCS] 1995, 1996a, 1996b). The eastern

portion of the project area was fresh marsh up to the GIWW. In the late 1980's, Chabreck and Linscombe (1988) characterized the La. Highway 384 wetlands as brackish and intermediate.

Increased tidal volumes, enlargement of tidal exchange routes, and salt water intrusion resulting from human-induced changes to the area's hydrology are the primary causes of wetland loss in the project area (Louisiana Coastal Wetlands Conservation and Restoration Task Force [LCWCRTF] 1993). The Calcasieu Ship Channel was constructed in 1941 and redredged to its current depth of 40 ft (12.2 m) and bottom width of 400 ft (122 m) in 1968 (Good et al. 1995). This channel radically altered the area's hydrology by increasing the height and duration of tidal fluctuations, which in turn increased water levels and saltwater intrusion into the low salinity marshes surrounding Calcasieu Lake (Suhayda et al. 1988). Spoil banks along the GIWW, constructed in the 1940's, have effectively blocked the project area's historical connection to the Mermentau River Basin, and now block off the major source of freshwater for the project area, the GIWW East of Calcasieu Lock. Construction of a drainage canal through the project area prior to 1940, and construction of an oil field road before 1963 both provided hydrologic exchange points connecting the fragile interior marsh soils of the project area to Calcasieu Lake (USDA/NRCS 1995, 1996a, 1996b).

Hydrologic exchange between the project area and Calcasieu Lake allowed salt water to eradicate much of the non-salt tolerant emergent vegetation, exposing the fragile organic surface layer of the marsh soil to erosion and tidal scour. As a result, the organic surface layer has been largely transported out of the project area and into Calcasieu Lake. The loss in elevation of the soil surface provided by the organic surface layer of the soil has led to prolonged inundation of the emergent vegetation, which causes die-back of many wetland plant species (Mendelssohn and McKee 1988), and finally, the conversion of emergent marsh to open water (Gosselink et al. 1979).

Construction of the Hwy. 384 Hydrologic Restoration Project was completed in January 2000. The project has a 20-year project life which began in January 2000.

The principal project features include:

- Structure No.1 (Freshwater Introduction Structure) - 3-24" Aluminum culverts with Interior 24" Flapgates and Exterior 24" Sluice Gates.
- Structure No. 12 (Salinity Control Structure) - 2-48" Aluminum culverts, each w/ an Interior 10' Variable-Crested Weir Inlet with a 4" vertical slot and an Exterior 48" Flapgate.
- Site No.8 (Rock Plug) - Approximately 100 linear feet of earth fill and rock plug on the eastern shore of Calcasieu Lake.
- Existing Access Road No. 1 (West of Hwy 384) - approximately 4,000 linear feet in length, which serves as a hydrologic boundary on the northwestern edge of the project boundary between La. Hwy 384 and Calcasieu Lake.
- Existing Access Road No. 2 (East of Hwy 384) - approximately 6,000 linear feet in length, which serves as a hydrologic boundary on the southeastern edge of the project boundary between La. Hwy. 384 and the Gulf Intracoastal Waterway.

IV. Summary of Past Operation and Maintenance Projects

General Maintenance: Several maintenance projects have been completed since the original project's construction completion. Engineering and design as well as construction oversight on some of these maintenance projects were provided by Abbeville/Lafayette field office personnel so no exact costs related to these activities are available. The maintenance projects that were performed were as follows:

Nov. 2000- Glenn Lege Construction

- Placed 40.32 cy. of #610 limestone on the road near Structure #12 due to some overtopping of the road during high tidal events
- Placed 12 cy. of man size rip-rap on the inlet side of Structure #12 due to some scouring of the bankline around the structure.

TOTAL CONSTRUCTION COST- \$3,461.14

June 2002- Glenn Lege Construction

- Provided labor and materials to construct a "hyacinth fence" on the inlet side of Structure No. 1. The fence is constructed of galvanized woven wire and CCA treated timber piles and whalers.
- Provided labor and materials to reinforce the existing levee around Structure No. 1 with graded crushed stone.
- Provided labor and materials to repair the rock plug at Site No. 8 that had been leaking and also had been vandalized. The plug was repaired by hauling in earth fill from an off-site location and pushing it over the existing rock plug with a bulldozer. The earthen plug was then planted under separate contract by DNR plantings group.

TOTAL CONSTRUCTION COST- \$14,386.87

February 2004 – Lonnie G. Harper and Associates

Provided a survey of the existing shoreline to determine lake rim elevations within the project area along the eastern side of Calcasieu Lake.

TOTAL COST- \$3,345.00

May 2005- Bertucci Construction

Provided labor, material and equipment to repair thirteen linear feet of the rock plug at Site No. 8. The rock was removed by vandals. 39.9 tons of 1200# rip rap stone was used to repair the thirteen foot gap. A four foot thick layer of 150# stone was applied to the marsh side slope of the plug to prevent water flow through the plug. This required 343.4 tons of rock. Completion and final acceptance was on May 15, 2005.

TOTAL CONSTRUCTION COST- \$45,090.00

May 2006- F. Miller & Sons

Provided labor, material and equipment to repair the existing access roads to permit elevations (+3.0 on Existing Access Road No.1 West side of Hwy 384, +2.5 on Existing Access Road No. 2, East side of Hwy 384). Approximately 3,225 tons of recycled concrete were used to elevate the roadways. Two Portable Multi-Parameter Water Quality Troll 9500 units were provided through this contract and installed by Simon & DeLany for operation of Structures No. 1 and No. 12. Completion and final acceptance was on June 28, 2006.

Engineering, Design ,Surveying,	
Construction Oversight & As-Builts	\$ 26,705.00
Construction Cost	\$150,000.00

TOTAL CONSTRUCTION COST \$176,705.00

June 2006 – F. Miller & Sons

Provide labor, material and equipment to refurbish and install flap gate on west culvert of Structure No. 12. This flap gate was vandalized during spring of 2006. Completion and final acceptance was on June 28, 2006.

TOTAL CONSTRUCTION COST \$1,600.00

March 2007 – Simon & Delany

Provide labor necessary to remove and dispose of trash and debris which has accumulated within the hyacinth fence and adjacent to the sluice gates at Structure No.1

TOTAL CONSTRUCTION COST \$900.00

May 2010 – Simon & Delany

Provide labor necessary to remove and dispose of trash and debris which has accumulated within the hyacinth fence and adjacent to the sluice gates at Structure No.1

TOTAL CONSTRUCTION COST \$2,000.00

October 2011 – Simon & Delany

Provide labor necessary to install bird excluder devices on the solar panels and install plastic pile caps on Structures No. 1 and No. 12.

TOTAL CONSTRUCTION COST \$1,300.00

November 2013 – Simon & Delany

Provide labor and equipment necessary to remove vegetation and debris adjacent to the hyacinth fence, inlet sluice gates, and outlet flap gates at Structure No. 1.

TOTAL CONSTRUCTION COST \$2800.00

Structure Operations: In accordance with the operation schedule outlined in the Operation and Maintenance Plan and USACE Permit, structures were manipulated by Simon & DeLany, Resource Management personnel who are under contract with DNR, now CPRA, since 2005. Copies of the quarterly reports that are provided as well as a copy of the operations contract between CPRA and Simon & DeLany are attached in the “Structure Operations” section of the CS-21 Hwy. 384 Operation & Maintenance Plan. The original operating procedures for the Structure No. 1 was based on water level only, there was no provision for salinity control. Historical records for the structure showed salinities of 9+ ppt. The procedure was modified to close the #1 Structure sluice gates at 7 ppt. Operations for the Structure No. 12 was not changed. To view the real time conditions at Structures No.1 or No. 12, log on to www.isi-data.com and use ocpgrquest for both the username and pass word. Station 15r is located near Structure No.12, and Station 29r is located at structure No.1.

V. Inspection Results

Structure No.1 (Freshwater Introduction Structure)

The structure is in good condition; however, the inlet channel has silted in. The outline of the channel is no longer visibly distinguishable through the vegetation. There is still freshwater entering the structure from the GIWW at higher water elevations. The water level on the inside of the project at Structure No. 1 was at 1.1ft elevation.

The plastic pile caps are present and working as intended. The two of the three sluice gates were open. The area in the vicinity of the hyacinth fence and culverts again has an accumulation of sediment and vegetation after being cleaned up on November 14, 2013. A contract has been awarded to Patriot Construction to perform the upcoming maintenance work including cleaning out the inlet channel and the culverts, replacing the wood walkways and hyacinth fence, and repairing the levee northwest of the structure. (See Appendix B, Photos 1-4)

The levee (previously noted as Existing Access Road No.2) leading up to the structure is in good condition since it was repaired in June 2006.

Structure No. 12 (Salinity Control Structure)

This structure was not visited during the inspection; however, the operations contractor has not reported any problems. (Appendix B, Photos 5&6)

Site No. 8

The rock plug was not visited during this inspection. (Appendix B, Photos 7&8)

VI. Conclusions and Recommendations

Overall, the Hwy. 384 Hydrologic Restoration Project is in good condition and functioning as designed. The expansion of vegetation within the project has been prevalent and appears to be filling in areas which were visibly open water during the previous inspection.

The following improvements have performed well in this project and should be considered in future projects of this type:

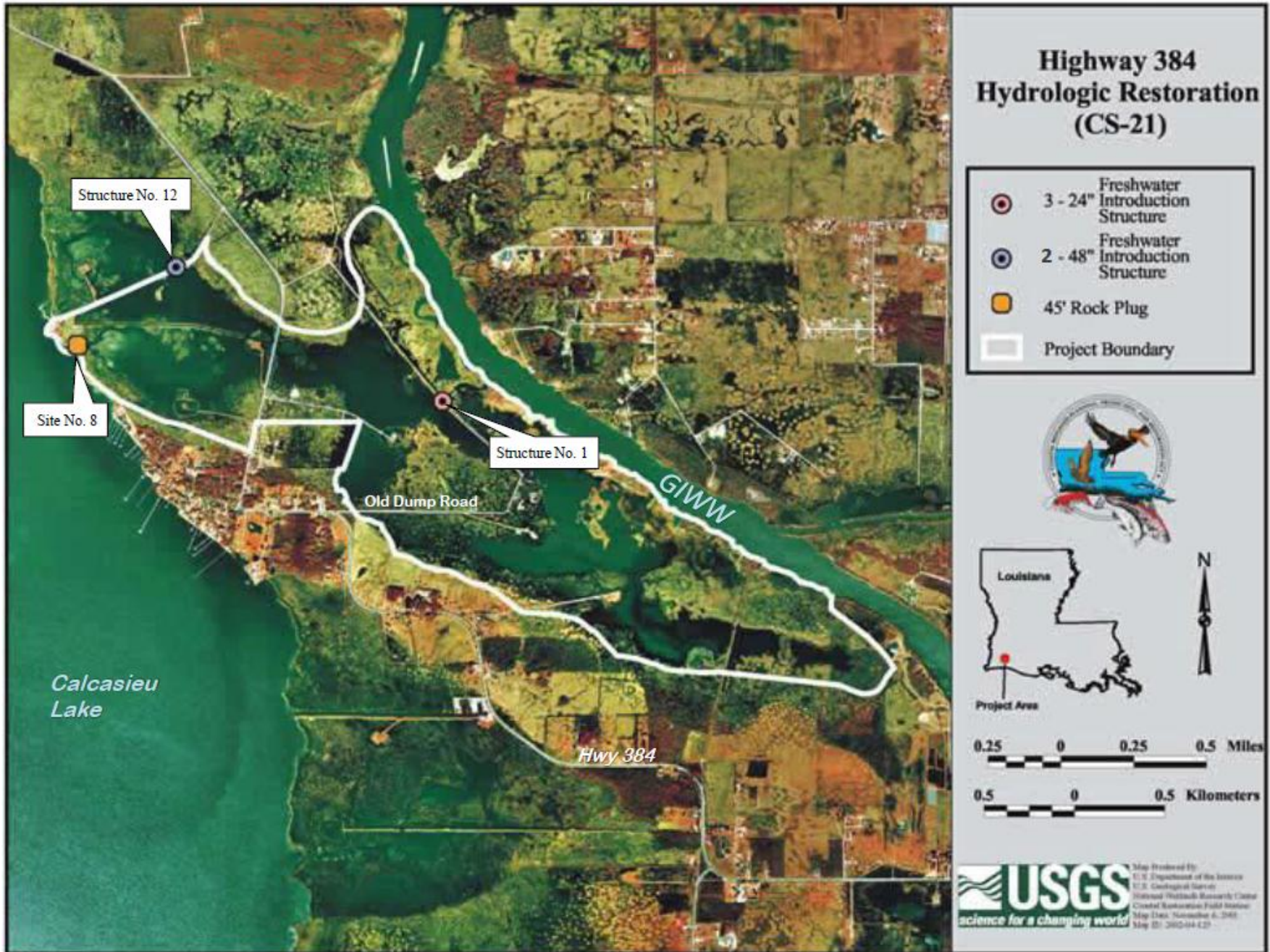
- The hyacinth fence installed during the maintenance project of June 2002
- The rock reinforcement of the bankline at the structures
- The use of recycled concrete material used to repair the access road
- The two InSitu Aqua Troll 200 Sonde units used for operation of the structures

The following maintenance work will begin in August 2015:

Structure No. 1

- Remove sediment in the inlet channel from the GIWW to the structure.
- Remove sediment and debris adjacent to the hyacinth fence.
- Flush the three 24" culverts to clear away any sediment present.
- Clear any obstructions preventing the flap gates from closing properly.
- Replace any missing wire on the hyacinth fence.
- Replace or repair any loose or deteriorating boards on the walkway to the sonde.
- Repair the levee north of the structure to elevation +3.5.

Appendix A
Project Features Map



Highway 384 Hydrologic Restoration (CS-21)

-  3 - 24" Freshwater Introduction Structure
-  2 - 48" Freshwater Introduction Structure
-  45' Rock Plug
-  Project Boundary



0.25 0 0.25 0.5 Miles

0.5 0 0.5 Kilometers

USGS
 science for a changing world
 Map Produced By:
 U.S. Department of the Interior
 U.S. Geological Survey
 Wetland Hydrology Research Center
 Coastal Wetlands Field Station
 Map Date: November 6, 2010
 Map ID: 2010-04-ED

Appendix B
Photographs



Photo No. 1, Structure No.1, Outlet Side



Photo No. 2, Structure No.1, Inlet Side- Inlet Channel, Hyacinth Fence and Operations Equipment



Photo No.3, Structure No.1, Walkway Looking Northwest – Vegetation in Channel



Photo No. 4, Vegetation in Inlet Channel to Structure No.1



Photo No. 5, Structure No. 12, Inlet Side- New Staff Gauge (April 2014)



Photo No. 6, Structure No. 12, Outlet Side- Water Flowing Out to Lakeside (April 2014)



Photo No. 7, Structure No. 8, Rock Plug Looking South (April 2014)



Photo No. 8, Structure No. 8, Rock Plug - Vegetation on Project Interior (April 2014)

Appendix C

Three Year Budget Projection

HWY 384/ CS-21 / PPL 2

Three-Year Operations & Maintenance Budgets 07/01/2015 - 06/30/2018

<u>Project Manager</u> Pat Landry	<u>O & M Manager</u> Jody White	<u>Federal Sponsor</u> NRCS	<u>Prepared By</u> Jody White
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	2015/2016 (-16)	2016/2017 (-17)	2017/2018 (-18)
Maintenance Inspection	\$ 6,851.00	\$ 7,057.00	\$ 7,269.00
Structure Operation	\$ 10,600.00	\$ 12,000.00	\$ 12,600.00
State Administration	\$ 5,000.00		\$ -
Federal Administration	\$ 2,000.00		\$ -

Maintenance/Rehabilitation

15/16 Description: Repair levee and channel excavation, misc. maintenance on structures.

E&D	
Construction	\$ 62,750.00
Construction Oversight	\$ 20,000.00
Sub Total - Maint. And Rehab.	\$ 82,750.00

16/17 Description:

E&D	\$ -
Construction	
Construction Oversight	
Sub Total - Maint. And Rehab.	\$ -

17/18 Description:

E&D	\$ -
Construction	\$ -
Construction Oversight	\$ -
Sub Total - Maint. And Rehab.	\$ -

	2015/2016 (-16)	2016/2017 (-17)	2017/2018 (-18)
Total O&M Budgets	\$ 107,201.00	\$ 19,057.00	\$ 19,869.00

O & M Budget (3 yr Total)	\$ 146,127.00
Unexpended O & M Budget	\$ 206,692.00
Remaining O & M Budget (Projected)	\$ 60,565.00

Annual Inspection Report
 HWY. 384 HYDROLOGIC RESTORATION PROJECT
 State Project No. CS-21

OPERATION AND MAINTENANCE BUDGET WORKSHEET
 HWY 384 HR / PROJECT NO. CS-21/ PPL NO. 2/2015-2016

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	\$6,851.00	\$6,851.00
General Structure Maintenance	LUMP	0	\$0.00	\$0.00
Engineering and Design	LUMP	0		\$0.00
Operations Contract	LUMP	1	\$10,600.00	\$10,600.00
Construction Oversight	LUMP	1	\$20,000.00	\$20,000.00

ADMINISTRATION

STATE Admin.	LUMP	1	\$5,000.00	\$5,000.00
FEDERAL SPONSOR Admin.	LUMP	1	\$2,000.00	\$2,000.00
SURVEY Admin.	LUMP	0	\$0.00	\$0.00
OTHER				\$0.00
TOTAL ADMINISTRATION COSTS:				\$7,000.00

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:				
Secondary Monument	EACH	0	\$0.00	\$0.00
Staff Gauge / Recorders	EACH	0	\$0.00	\$0.00
Marsh Elevation / Topography	LUMP	0	\$0.00	\$0.00
TBM Installation	EACH	0	\$0.00	\$0.00
OTHER				\$0.00
TOTAL SURVEY COSTS:				\$0.00

GEOTECHNICAL

GEOTECH DESCRIPTION:				
Borings	EACH	0	\$0.00	\$0.00
OTHER				\$0.00
TOTAL GEOTECHNICAL COSTS:				\$0.00

CONSTRUCTION

CONSTRUCTION DESCRIPTION:	Levee repair and inlet channel dredging.				
Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
	0	0.0	0	\$0.00	\$0.00
	0	0.0	0	\$0.00	\$0.00
	0	0.0	0	\$0.00	\$0.00
Filter Cloth / Geogrid Fabric	SQ YD	0		\$0.00	\$0.00
Navigation Aid	EACH	0		\$0.00	\$0.00
Signage	EACH	0		\$0.00	\$0.00
General Excavation / Fill	CU YD	700		\$26.00	\$18,200.00
Dredging	CU YD	2,000		\$5.00	\$10,000.00
Sheet Piles (Lin Ft or Sq Yds)		0		\$0.00	\$0.00
Timber Piles (each or lump sum)		0		\$0.00	\$0.00
Timber Members (each or lump sum)		0		\$0.00	\$0.00
Hardware	LUMP	0		\$0.00	\$0.00
Materials	LUMP	0		\$0.00	\$0.00
Mob / Demob	LUMP	1		\$10,000.00	\$10,000.00
Contingency (25%)	LUMP	1		\$12,550.00	\$12,550.00
General Structure Maintenance	LUMP	0		\$0.00	\$0.00
Construction Surveys	LUMP	1		\$10,000.00	\$10,000.00
Seeding	LUMP	1		\$2,000.00	\$2,000.00
OTHER				\$0.00	\$0.00
TOTAL CONSTRUCTION COSTS:					\$62,750.00

TOTAL OPERATIONS AND MAINTENANCE BUDGET: \$107,201.00

Appendix D
Field Inspection Form

Annual Inspection Report
 HWY. 384 HYDROLOGIC RESTORATION PROJECT
 State Project No. CS-21

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: CS-21 Hwy. 384

Date of Inspection: May 11, 2015 Time: 11:30am

Structure No. 1

Inspector(s): Jody White and Darrell Pontiff (CPRA)
 Loland Broussard - NRCS

Structure Description: 3-24" Culverts

Water Level: Inside 1.1 Outside

Type of Inspection: Annual

Weather Conditions: rainy

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Flapgates/Outlet Pipe	Good			1	Water was flowing into the structure from the GIWW. Flaps were below water.
Inlet Channel	Poor			2-4	Then inlet channel and area near the hyacinth fence have silted in significantly and require cleaning.
Hardware/Sluiceways	Good			2	Two gates were open and flowing water. Flow is being restricted by sedimentation, vegetation and debris.
Hyacinth Fence	Fair			2 & 4	Debris, sediment, and vegetation have accumulated significantly since the last cleaning in November 2013.
Timber Piles	Good			2 & 4	
Timber Wales	N/A				
Plastic Pile Caps	Good			2 & 4	Plastic pile caps are present.
Cables	N/A				
Signage /Supports				1 & 2	Staff Gauges have been replaced on the inlet and outlet side with reference to NAVD88 Geoid12A
Staff Gauges	Poor				
Rip Rap embankment	Good				
InSitu AquaTroll 200 - 29r	Good			2	Sonde was operational.
Access Roadway	Fair				Levee north of Str. No. 1 has washed out and is overtopped by water from the GIWW. Other portions of roadway are in good condition where prior repairs had been made.

What are the conditions of the existing levees?
 Are there any noticeable breaches?
 Settlement of rock plugs and rock weirs?
 Position of stoplogs at the time of the inspection?
 Are there any signs of vandalism?

Good where previously repaired. New area north of structure has eroded and needs repair.
 yes even at low tides

Annual Inspection Report
 HWY. 384 HYDROLOGIC RESTORATION PROJECT
 State Project No. CS-21

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: CS-21 Hwy. 384

Date of Inspection: April 15, 2014 (last inspection) Time: 11:20 am

Structure No. 8

Inspector(s): Jody White and Dion Broussard (CPRA)
 Brandon Samson - NRCS

Structure Description: Rock plug

Water Level: Inside Outside

Type of Inspection: Annual

Weather Conditions: Sunny and Cold

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	N/A				
Stop Logs	N/A				
Hardware	N/A				
Timber Piles	N/A				
Timber Wales	N/A				
Galv. Pile Caps	N/A				
Cables	N/A				
Signage /Supports Staff Gages	N/A				Both staff gages missing, it was decided not to replace either one due to no flow through plug.
Rip Rap (plug)	Good			7 & 8	The rock plug is in tact and vegetation has started rooting into the crevices of the rock. Interior project area also has new growth where there was previously open water. Lakeside area is continuing to silt in and is vegetating.
Earthen Embankment					

What are the conditions of the existing levees?

- Are there any noticeable breaches? no
- Settlement of rock plugs and rock weirs? no
- Position of stoplogs at the time of the inspection?
- Are there any signs of vandalism? no

Annual Inspection Report
 HWY. 384 HYDROLOGIC RESTORATION PROJECT
 State Project No. CS-21

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: CS-21 Hwy. 384

Date of Inspection: April 15, 2014 (last inspection) Time: 11:00 am

Structure No. 12

Inspector(s): Jody White and Dion Broussard (CPRA)

Brandon Samson - NRCS

Structure Description: 2-48" Culverts

Water Level: Inside -0.8 ft Outside -1.0 ft

Type of Inspection: Annual

Weather Conditions: Sunny and Cold

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	Good			5	
Stop Logs	Good			5	Water was flowing from within the project area to the lakeside.
Hardware/Flapgates	Good			6	Flap gates were open.
Timber Piles	Good			5	
Timber Wales	N/A				
Plastic Pile Caps	Good			5 & 6	Plastic pile caps were in place.
Cables	N/A				
Staff Gages	Fair			5 & 6	Staff gauges on the inlet and outlet side need cleaning or replacement. They are encrusted and/or covered in scum.
Rip Rap embankment	Good			5 & 6	Embankment was in good condition.
InSitu AquaTroll 200 - 15r	Good				The sonde was operational.
Access Roadway	Good				The access road was in good condition. New limestone was placed in sections on the road by others, possibly due to monitoring well work in the project area and use of the road for access.

What are the conditions of the existing levees? good

Are there any noticeable breaches?

Settlement of rock plugs and rock weirs?

Position of stoplogs at the time of the inspection?

Are there any signs of vandalism? no