ALABAMA STATE EXPENDITURE PLAN (SEP)

Project #12: Perch Creek Area Sanitary Sewer Trunk Line CIPP

Project Description/Summary

a) This project proposes the engineering and design and construction of innovative trenchless technology called Cured In Place Pipe (CIPP) to address sanitary sewer inflow and infiltration (I and I) in the City of Mobile's Perch Creek area. CIPP is an efficient way to extend the useful life of existing infrastructure while decreasing treatment costs due to the elimination of inflow and infiltration with minimal damage to the environment. Implementation of this project will lead to a reduction of sanitary sewer overflows improving overall water quality in the Perch Creek area. Perch Creek is the eastern-most downstream tributary in the Dog River watershed which empties directly into Mobile Bay.

   Activities also include the comprehensive administration of this grant, including, but not limited to, project development and oversight, contracting, and sub-recipient monitoring.

   a. **Need** - The Dauphin Island Parkway Community was developed after World War II to provide housing for the employees and contractors associated with Brookley Air Force Base. Gravity sewer lines and manholes were installed in the low-lying drainage basins to serve the coastal residential community. On-site septic tanks were not feasible due to the poor soils, small lots, and high groundwater levels. Just north of the Dog River Bridge, there are 25,398 linear feet of original sewer trunk lines that have long outlived their useful life and are causing environmental and public health problems in the form of sanitary sewer overflows into Dog River and Mobile Bay as well as exceeding the limits of treatment at the Wastewater Treatment Plant. These trunk lines are located in four (4) sub-basins along Perch Creek and vary from 16-inches to 48-inches in diameter.

      Groundwater entering sanitary sewer lines through defective pipe joints and broken pipes is called infiltration. The volume of leakage increases over time due to damage caused by tree roots, faulty installation, and aged materials. Damaged and broken sewer cleanouts are a major cause of infiltration in the Perch Creek Basins. Furthermore, infiltration occurs where groundwater elevation is higher than the gravity sewer line. Many of these trunk lines are located in the centerlines of the streams and in wetlands. Water entering sanitary sewers from inappropriate connections is called inflow. Typical sources include compromised manholes, roof drains, and alteration of natural drainage from filling lots for construction. In some older sewer systems, the storm drains have been found to be connected directly to the sewer gravity lines. Inflow tends to peak during precipitation events and causes greater flow variation than infiltration. Mobile, Alabama is one of the rainiest cities in the U.S., and high volume intense rainfall events are very common throughout the year, causing peak inflow during storm events. The wastewater effluent collected in the Perch Creek area is pumped to the C.C. Williams Wastewater Treatment Facility (WWTF). This facility underwent a major $27.5 million upgrade in 2016 and has a designed capacity of 28

million gallons per day (MGD), however, during storm events, it is common to reach discharge up to 83 MGD. This large spike signifies inflow of rainwater in the collection system.

Inflow and Infiltration in the Mobile Area Water and Sewer System's (MAWSS) sanitary sewer collections system causes numerous severe problems for the C.C. Williams WWTF. First, it causes dilution of sanitary sewer effluent. Dilution of sewage decreases the efficiency of treatment and may cause sewage volumes to exceed design capacity. Dilution of sewage directly increases costs of pumping and chlorination, ozonation, or ultraviolet disinfection. Physical treatment structures, including screens and pumps, have been enlarged to handle the peak flow. Biological secondary treatment is effective only while the concentration of soluble and colloidal pollutants (typically measured as biochemical oxygen demand or BOD) remains high enough to sustain a population of microorganisms digesting those pollutants. High rates of infiltration/inflow may make the sanitary sewer incapable of carrying sewage from the Dauphin Island Parkway community to the C.C. Williams WWTF. It is common for sewage to back up into the lowest homes during wet weather. Also, street manholes overflow into the streets, causing environmental and public health threats. Smoke testing conducted by MAWSS indicates that numerous manholes along these trunk lines have been compromised and are a main source of inflow.

This area was selected because residents often complain of sewer odors and frequent backups, and it is located in a Federal Emergency Management Agency (FEMA) designated floodplain adjacent to Dog River and Mobile Bay. Installing the 25,398 linear feet of CIPP and rehabbing 95 manholes will result in a significant improvement to the quality of life for the residents in the area by removing negative environmental and public health impacts. Further, the newly lined pipe and manholes will lead to a reduction of sanitary sewer overflows and I and I resulting in improved treatment of wastewater at the C.C. Williams WWTF.

Purpose: This purpose of this project is to improve water quality by preventing sanitary sewer overflows into Dog River and Mobile Bay and to prevent inflow and infiltration in the Perch Creek area through innovative trenchless technology called Cured-In-Place Pipe (CIPP).

Objectives: The primary objectives of this project are to:

- Complete engineering and design;
- Complete installation of approximately 195 linear feet of 16-inch trunk line, 19,086 linear feet of 18-inch trunk line, 4584 linear feet of 30-inch trunk line, 1423 linear feet of 36-inch trunk line and 110 linear feet of 48-inch trunk line for a total of 25,398 linear feet of sealed sanitary sewer collection lines; and
- Complete rehabilitation and sealing of 95 manholes to prevent inflow and infiltration.

b. This project is located in the Gulf Coast region and will be implemented in the City of Mobile in Mobile County, Alabama, just north of the Dog River Bridge on Dauphin Island Parkway.

c. The proposed project is anticipated to begin on 7/1/19 and end on 12/31/21 (2.5 years).

d. The project will be implemented by the Mobile Area Water & Sewer Authority.

b) This project will assist in the economic and ecological recovery of the Gulf Coast by helping to prevent sewage overflows and leaks into the local soils and waters, and by updating and increasing the integrity of MAWSS's sewer system. It also has the potential to create short-term construction job opportunities.

Eligibility and Statutory Requirements

This activity is located in the Gulf Coast Region and is eligible for Spill Impact Component funding under Category #1 – Restoration and protection of the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches and coastal wetlands of the Gulf Coast region (primary). Secondary activities include Category #3 - Implementation of a federally approved marine, coastal, or comprehensive conservation management plan, including fisheries monitoring; and Category #6 - Infrastructure projects benefiting the economy or ecological resources, including port infrastructure.

Comprehensive Plan Goals and Objectives

This project is consistent with the following Comprehensive Plan goals:

- Goal 2: Restore Water Quality and Quantity – Restore and protect water quality of the Gulf Coast region's fresh, estuarine, and marine waters;
- Goal 4: Enhance Community Resilience – Build upon and sustain communities with capacity to adapt to short- and long-term changes; and
- Goal 5: Restore and Revitalize the Gulf Economy – Enhance the sustainability and resiliency of the Gulf economy.

This project supports the following Comprehensive Plan objectives:

- Objective 1: Restore, Enhance, and Protect Habitats - Restore, enhance, and protect the extent, functionality, resiliency, and sustainability of coastal, freshwater, estuarine, wildlife, and marine habitats; and
- Objective 5: Promote Community Resilience – Build and sustain Gulf Coast communities' capacity to adapt to short- and long-term natural and man-made hazards, particularly increased flood risks associated with sea-level rise and environmental stressors. Promote ecosystem restoration that enhances community resilience through the re-establishment of non-structural, natural buffers against storms and flooding.

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Major Milestones

a) Milestone 1: Professional services procurement

b) Milestone 2: Engineering and design

c) Milestone 3: Complete bidding process for construction

d) Milestone 4: Construction

e) Milestone 5: Project close-out

Success Criteria/Metrics/Outcomes

The anticipated outcome of the Perch Creek Sanitary Sewer Trunk Line Project will be:

- Repair/replacement of 25,398 linear feet of sanitary sewer collection lines and 95 manholes

Table 13. Proposed Projects Success Criteria/Metrics/Outcomes

Activity	Anticipated Project Success Criteria/Metrics	Short-term outcome	Long-term outcome
Repair/replace sewer lines and manholes in the Perch Creek area in the City of Mobile	Complete engineering and design Replace 25,398 LF of sewer lines Repair 95 manholes Develop monitoring plan to assess water quality improvements	Significantly reduce inflow and infiltration Reduced number of sanitary sewer overflows	Reduced collection and treatment costs Improved water quality in Perch Creek, Dog River, and Mobile Bay

Additional success criteria capturing the ecological benefits of this project will be selected at the grant application stage.

Monitoring and Evaluation

a) Submission of final E&D to ADCNR for review and approval

b) Provide evidence to ADCNR that all required permits were obtained (including SHPO)

c) Submit results of bid process to ADCNR prior to awarding contracts

d) ADCNR will conduct periodic onsite reviews

e) Submission of quarterly and final reports

f) Post construction monitoring as required

Best Available Science

The Dog River Watershed covers 55,000 acres in southwest Mobile County. The northern portion of the watershed includes part of downtown Mobile and is highly urbanized.

ADEM classifies the lower portion of Dog River, from its confluence with Halls Mill Creek to its mouth at Mobile Bay, for use as Swimming & Whole Body Contact. The upper portion of Dog River and its tributaries are classified for Fish & Wildlife. There are currently two approved TMDLs for Organic Enrichment/Dissolved Oxygen, two approved TMDLs for Pathogens, and the River is 303(d) listed for sedimentation (TMDL scheduled for 2018). The watershed is significantly impacted by nonpoint source pollution, including sedimentation from erosion, litter from storm water runoff, nutrient enrichment, and elevated levels of fecal coliform bacteria.

While MAWSS has not been cited by the Alabama Department of Environmental Management (ADEM) or other regulatory agencies for issues along the Perch Creek line, the utility has had sanitary sewer overflows along the line as a result of failures and inflow and infiltration resulting in penalties being paid to Baykeeper, a local environmental non-governmental organization (NGO). There is evidence from the inflow and infiltration to indicate the pipes are in poor condition. In 2017, MAWSS had a major failure on a portion of this line and manhole failure resulting in an emergency repair in excess of $1 million. There was also a severe failure about 3 years ago resulting in an emergency repair due to a large cave-in outside the sewer lift station in this area. Due to the aforementioned issues and an assessment of the pipes in this area, it was determined lining the upstream pipe is necessary to prevent future failures.

This project is consistent with the values and recommendations set forth in the MBNEP's Comprehensive Conservation and Management Plan 2013-2018, available on the MBNEP website and the Dog River Watershed Management Plan, also available on the MBNEP website.

Budget/Funding

a) Estimated cost of the project and amount to be requested from Spill Impact Component Funds: $3,665,048 (10-15% - Planning, 90-85% - Implementation). While it is noted that funding available under a grant award cannot exceed the amount described in the SEP for this project, the percentages listed in this section are estimated and will be more clearly cultivated in the grant application.

b) No other funding sources are anticipated at this time

Partnerships/Collaboration (if applicable)

Not applicable at this time.

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Leveraged Resources (if applicable)

Not applicable at this time.

Funds Used As Non-Federal Match (if applicable)

Not applicable at this time.

Other

Not applicable at this time.

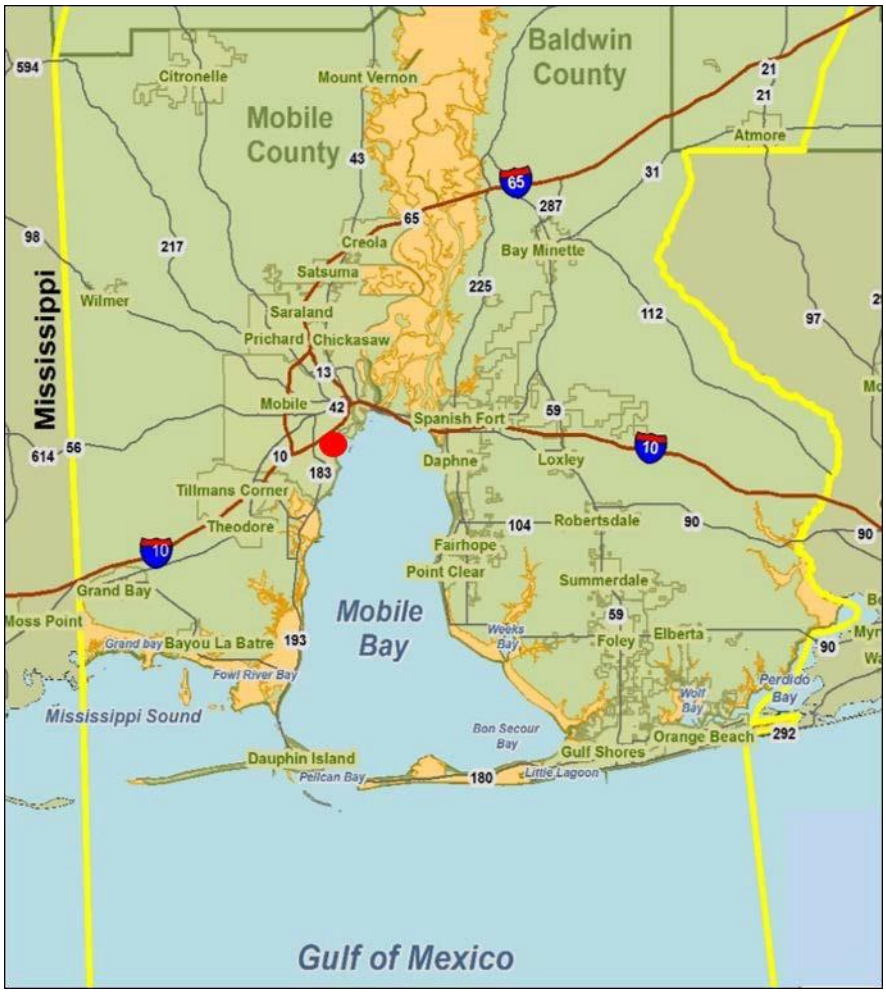

Figure 12. The Perch Creek Area Sanitary Sewer Trunk Line CIPP will be implemented in the City of Mobile, Alabama in Mobile County.