
TECHNICAL MEMORANDUM

Index Number 129-15 – District II Primary Clarifier #2 and #3 Rehabilitation Project Definition – FINAL

PREPARED FOR: JEA Capital Budget Group

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DATE: November 17, 2016

REVISED DATE: January 31, 2017

Introduction & Background

The District II WRF provides advanced secondary treatment with nitrogen reduction for a permitted flow of 10.0 MGD. Its process includes screening, primary clarification, activated sludge with a fine bubble aeration system, secondary clarification, UV disinfection, biosolids holding, and reuse effluent pumping. Conceptually the site is divided into two plants (North and South). The influent is routed through two separate barscreens before entering each plant and then the effluent flow from each of the Secondary Clarifiers is combined. All of the flow is normally filtered (except in high flow situations where part of the flow bypasses the filters) for reuse where it is distributed to the Northside Generating Station and St. Johns River Power Park. The remaining flow is discharged to surface water.

Primary treatment is the first process in the wastewater treatment plant to remove a significant portion of organic particulate matter (suspended solids), which include settleable solids and floating material. These suspended solids contribute to the biochemical oxygen demand (BOD₅) of the wastewater. As suspended solids are removed, BOD₅ is also reduced. The process is important because the lowering the oxygen demand decreases the rate of energy consumption and reduces operational problems with downstream biological treatment processes. Primary treatment also serves the important function of removing scum and inert particulate matter. The scum consists of grease, oil, plastic, leaves, rags, hair, and other floatable material.

Justification

The South Plant has one 0.646 Million Gallon (MG) clarifier that maintains approximately 55% of the total plant flow. The North Plant has two 0.248 MG clarifiers and averages 60% less flow per tank. The northern most clarifier, Primary Clarifier No.3, is currently out of service. Both North Plant Clarifiers (No.2 and 3) need to be rehabbed and there are also peripheral areas that need attention as well.

In October of 2016, during Hurricane Matthew, the northern Headworks sustained damage to influent channels, as well as the barscreen and rake apparatus. Primary Clarifier No.3 was also damaged, resulting in the center ring being dislodged. Prior to the storm, both North Plant clarifiers needed mechanism repair as a result of exposure to Hydrogen Sulfide gas. Access to each clarifier needs to be upgraded as well.

Stairways need to be replaced at both north and south Headworks, and on westward side of the Aeration Tank. Yard piping between north Headworks and north clarifiers needs to be replaced, along with the mag meter and two (2) inoperable valves. Currently, the mag meter is inaccurate

most likely due to fitting interference. Northwest of clarifiers there is a tin roof building and concrete saddle supports that need to be removed.

Scope

1. HEADWORKS
 - a. South - Remove/replace existing concrete stairway with aluminum stairway
 - b. North
 - i. Remove/replace existing concrete stairway with aluminum stairway
 - ii. Rehab channels one at a time by hydroblast, concrete repair, and lining
 - iii. Replace one mechanical screen: easterly Bar and Rake (Waste-Tech preferred)
 - iv. Replace all slide gates
2. YARD PIPING (between northerly headworks and two primary clarifiers)
 - a. Replace mag meter and vault – reconfigure piping arrangement with bypass to eliminate interference with accuracy
 - b. Remove/replace inoperable yard valves
 - c. Remove/replace yard piping as required
 - d. Cured-in-place the 24" influent pipe for primary clarifiers No. 1 and No. 2
 - e. Yard piping from Clarifiers No. 1 and No. 2 to North Aeration Basin including the North Aeration Basin yard piping.
3. NORTH PRIMARY CLARIFIERS (No.2 and No.3)
 - a. Rehab one clarifier at a time; replace mechanisms and walkway; existing scum baffle and weir to remain
 - b. Hydro blast then Spectrashield scum box structure interior
 - c. Remove and replace clarifier mechanism: use hot dipped galvanized coating
 - d. Remove/replace walkway/handrails with aluminum
 - e. Hydro blast interior wall, concrete shall be min 4000 psi pressure wash, then apply Sherwin Williams Duraplate 2300
 - f. Remove/replace concrete stairway with aluminum stairway at each clarifier
 - g. Add two (2) each aluminum access stairs with platform, complete with reuse hose station (compare to southerly clarifier on train 1) at each clarifier
 - h. Remove/replace scum trough, interior piping and outside piping and fittings from tank to a point into the ground
 - i. Replace the guide rail system and the base elbow/plate pump
 - j. Mild hydro blast of tank exteriors then provide industrial coating

- k. Rehab floor drain from the WAS P.S. to clarifier No.3 and the receiving pit including the piping from the sump pump to scum box
 - l. Install 1" RW main along walkway with a spray nozzle at the end of the line
 - m. Replace the light at the end of the walkway and entrance of each clarifier
4. DEMOLITION OF ADDITIONAL STRUCTURES
- a. Concrete saddle supports, etc. – located northwest of clarifiers
 - b. Tin roof building – located northwest of clarifiers
5. AERATION TANK
- a. Remove/replace existing concrete stairway with aluminum stairway at each end
 - b. Exterior repair of concrete cracks and coating of exterior only.

Implementation Schedule

District II Primary Clarifier #2 and #3 Rehabilitation	FY 2017											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Procurement – Designer = 150 Days												

District II Primary Clarifier #2 and #3 Rehabilitation	FY 2018											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Engineering – Design Duration = 240 Days												
Procurement – Bid Duration = 120 Days												

District II Primary Clarifier #2 and #3 Rehabilitation	FY 2019											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Ma	Jun	Jul	Aug	Sep
Procurement – Bid Duration = 30 Days												
Construction Duration = 330 Days												

District II Primary Clarifier #2 and #3 Rehabilitation	FY 2020											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Ma	Jun	Jul	Aug	Sep
Closeout Duration = 90 Days												

Project Management & Delivery

Stage	Project Definition	10% Schematic Design	30% Conceptual Design	90% Detail Design	100% Final Design	Bid	Construction
To Project Delivery	PEC	PEC	PEC	PEC	PEC	PEC	PEC
OPB Established		Trend		Trend		Trend	

Cost Estimate and Expenditure Forecast (Current \$)

ACTIVITY/DESCRIPTION	SUB-TOTAL	TOTAL
Contractor Direct Cost		2,749,480
Contractor Indirect Cost		-
Overhead & Profit	-	
Miscellaneous-General/Special Conditions	-	
Supplemental Work Allowance -10% max	-	
JEA Cost & Engineering		577,390
Engineering	357,432	
Project Management	82,484	
Services During Construction	96,232	
Project Support	41,242	
Real Estate	-	
TOTAL PROJECT COST		3,326,870

PROJECTED EXPENDITURE FORECAST BY FISCAL YEAR									
ACTIVITY	FY 2017				FY 2018				TOTAL
QUARTER	1ST	2ND	3RD	4TH	1ST	2ND	3RD	4TH	
JEA Cost & Engineering 10%			5,155	7,732	74,866				87,754
JEA Cost & Engineering 30%						149,926			149,926
JEA Cost & Engineering Final							151,713	12,315	164,029
TOTAL									401,710

PROJECTED EXPENDITURE FORECAST BY FISCAL YEAR									
ACTIVITY	FY 2019				FY 2020				TOTAL
QUARTER	1ST	2ND	3RD	4TH	1ST	2ND	3RD	4TH	
JEA Cost & Engineering Final	26,081								26,081
Construction	93,992	1,051,830	1,381,768	336,965					2,864,556
Project Closeout					34,522				34,522
TOTAL									2,925,160

SIGNIFICANT MATERIAL SUMMARY			
DESCRIPTION	UNIT MEASURE	QUANTITY	CONSTRUCTION
Automatic Bar Screen	EA	1	\$151,733
36"x60" Slide Gates	EA	2	\$47,904
30"x48" Slide Gates	EA	2	\$45,988
24" Magnetic Flow Meter	EA	1	\$17,336
65' Clarifiers	EA	2	\$305,464

Risks

Revision History

Name	Date	Version	Revision Notes
Samuel Ramirez	1/19/17	1	Add Aeration Basin and yard piping
Samuel Ramirez	1/31/17	2	Revised project schedule and cash flow