



9/16/2021

To: Mayor and City Council members

Memo detailing an upcoming contract to evaluate alternative options for the Barry Rose and Longwood Water Reclamation Facility projects. The study will utilize our existing Wastewater Model to analyze the feasibility of options and develop life cycle cost for the alternatives. The goal is to determine the most cost effective long term option with the least impact on rates.

-Trent

To: Clay Pearson, City Manager
From: Skipper Jones, Assistant Director Projects
CC: Trent Epperson, Deputy City Manager
Robert Upton, Director Engineering and Public Works
Date: September 16, 2021
Re: Barry Rose Expansion Alternatives Evaluation Study

Executive Summary

This memo provides information about the forthcoming award of an engineering contract for the proposed Barry Rose Water Reclamation Facility (WRF) Expansion Alternatives Study to be conducted by Freese & Nichols (FNI). The purpose of the contract is to conduct an in-depth review of the alternatives to the expansion of the Barry Rose Water Reclamation Facility (WRF) as proposed in the July 12th Ardurra "WWTP Master-Plan Cost Saving Alternatives" presentation to Staff. The Ardurra presentation provided an alternative to expanding the Barry Rose WRF. The alternative initially redirects flows from the Longwood WRF to the JHEC WRF, and ultimately builds a new plant on a new location for the Longwood and Barry Rose flows with the intent of reducing costs and significantly delaying the debt needed to build the planned capacity. Additionally, the Ardurra presentation analyzed the cost of converting the Barry Rose WRF from a conventional activated sludge process to a Membrane Bio-Reactor (MBR) process versus Sequencing Batch Reactor (SBR).

The FNI study will explore the feasibility of the Alternatives identified (Option 2 & 3 Maps attached) and provide a detailed assessment of those alternatives for consolidating wastewater treatment for the Longwood and Barry Rose basins in order to identify the best overall value to the City.

The contract is scheduled for presentation to Council on the September 27th meeting agenda. Staff will recommend that Council award the contract for this study to Freese & Nichols in the amount of \$497,835. The cost of the study is within the funds currently budgeted for design of the Barry Rose/ Longwood project.

Background

The subject of how to handle the Barry Rose WRF has been in discussion since June 2012 when the HDR Study "Wastewater Planning for the Longwood Service Area" (the Study) was completed. The Study followed a 2010 study performed by Arcadis/ Malcom Pirnie that found the Longwood plant would be unsustainable in its present location. The HDR Study recommended creating several small flow diversion projects to remove minor flows from the Longwood plant and to divert all remaining flows to the Barry Rose WRF. Several of these small flow diversion projects were completed in 2013 – 2015 and shortly thereafter a decision was made to discontinue these smaller projects in favor of a plan to construct a force main from the Longwood facility to Barry Rose to transfer all remaining flows and to expand the Barry Rose plant.

In October 2016, Council awarded a contract to MWH/ Stantec to prepare a Preliminary Engineering Report for the expansion of the Barry Rose plant. The scope of that contract included the performance of a flow study in both Barry Rose and Longwood basins and the analysis of the Sequential Batch Reactor (SBR) and Membrane Bio-Reactor (MBR) treatment processes to inform the final selected treatment process recommendation. An amendment, authorized in April 2017, approved the additional costs to install a pilot MBR unit on site for testing. The final revised PER was delivered in February 2019. The PER noted that the

Barry Rose Plant site was within the AE flood zone per the Sept. 1999 FEMA flood plain map (48039C0035) which, at that time, showed a 100-year base flood elevation of 41.58 feet. The PER recommended that the facility be designed to operate at the 500-year flood elevation of 42.83, 3 feet above the base flood elevation.

In September 2018 Council awarded a final design contract to Stantec for the design of the Barry Rose Expansion project including the construction of a regional lift station at the Longwood facility and connected to Barry Rose by a force main. The design effort proceeded until early March 2021 when the Stantec contract was terminated after Stantec requested additional fees for their work. In August 2020 Council awarded a contract to McCarthy Building Companies for Construction Manager At Risk (CMAR) for pre-construction services to work alongside Stantec during final design.

Proposed Study

Staff has proposed a third-party engineering firm (FNI) to perform a detailed examination of three alternatives to the original plan to expand the Barry Rose Water Reclamation Facility in its present location. The study would also review treatment costs, conveyance costs, costs associated with life cycles of the treatment processes and review the feasibility of these proposed alternatives. The study has been specifically scoped to determine which alternatives offer potential savings and the costs of building new treatment facilities versus expanding existing facilities which may lie within the floodplain/floodway.

FNI was selected to perform this work based on their previous work to develop the City's wastewater modeling which provided the Wastewater Master Plan and they are familiar with the peaking factors for these receiving plants resulting from inflow and infiltration into the collections systems of each basin. FNI has performed numerous projects modeling the collection systems in the City and possess strong qualifications for performing this study. Intimate knowledge of the model is critical to analyzing the system capacity, flows, redirection of those flows, and system changes necessary to implement any of the alternatives.

Scope of the Work

The Scope of Work for the FNI Study consists of six Tasks; Tasks A through D constitute the data collection and preparation of factors to perform a comparative analysis. Task E constitutes the bulk of the comparative work and Task F contains the reporting activities.

Task A: Project Management and coordination of up to eight (8) workshops in which critical information will be transferred between the City and the Engineer on initial and final recommendations.

Task B: The Engineer will perform a Site Analysis to identify specific constraints, determining the impacts on the use of the proposed new site and to determine whether there are fatal flaws associated with the site or caused by existing geographical or locational conditions. This will include assessment of the usable space, access to utilities and roadways, required set-backs and buffer easements, flood ways, whether or not there are any factors that preclude the site's use or impose additional requirements or restrictions. This task includes a meeting and discussions with Brazoria Drainage District for input on discharge to existing streams.

Task C: The Engineer will perform a review of the existing infrastructure and condition assessment of the equipment and facilities of the Barry Rose plant to update the condition report provided in the Stantec PER performed nearly five years ago in 2017. The information will be used to determine what improvements will be required to maintain existing plant operations for the extended length of time associated with the alternative plans.

Task D: The Engineer will establish a baseline set of assumptions by which all alternatives will be measured. These will include; assumptions for determining remaining useful life and replacement schedules; common flow criteria and treatment capacities; common cost estimating data, determining standard capital expense and operating expense based on a unit cost to obtain the City's effluent water quality objectives and how site-specific costs will be treated in the comparison.

Task E: The Engineer will perform an Alternative Identification consisting of a qualitative analysis of the sites identified in the Ardurra presentation. Highlights of this task include model runs, alternative phasing considerations, force main size and route analysis, lift station size analysis, impact on treatment requirements due to changed wastewater age and odor levels, and lifecycle costs for SBR versus MBR technology.

Task F: The Engineer will provide a draft report on the findings of the analysis and study for Staff review and comments. Upon incorporation of those comments a final report will be prepared. The final task is the presentation of an executive summary of the findings to City Council at a scheduled meeting.

Schedule

The work is scheduled to require approximately 8 months to analyze, develop, review and address report comments. With an NTP anticipated in early October the work is expected to be completion in April and ready for a presentation to Council in May 2022.

Current Status and Next Steps

The project is effectively on-hold until the results of the study guide our next steps. McCarthy Building Companies is under contract as the Construction Manager At-Risk (CMAR) and is currently in a stand-by mode until a clear path has been determined. Once we have clear direction a design firm will need to be selected to complete the project design along side our CMAR.

Conclusion

The FNI study will result in actionable information pointing to a conclusive direction for the location and process for handling and treatment of the growing wastewater flows from these two major basins while still pursuing the objective of an overall reduction in the number of treatment plants the city continues to operate.

While the Study represents a temporary diversion from the initial schedule and possibly major changes to the overall plan for managing the growing demand for treatment capacity, the information that results from this investigation could reduce the cost of the finally identified project and more importantly could spread the costs out over a longer period of time which will positively impact sewer rates.

Budget Info

Funding Sources	Series	To Date	Future	Total Budget
General Revenue - Cash				-
Certificates of Obligation				-
W/S Revenue Bonds	2017C	400,000		400,000
W/S Revenue Bonds	2018B	2,990,000		2,990,000
W/S Revenue Bonds	2020B	620,000		620,000
W/S Revenue Bonds			55,565,000	55,565,000
W/S Revenue Bonds		6,364,026		

Impact Fee - Cash	4,488,352		4,488,352
Impact Fee - Debt	4,252,500	55,565,000	59,817,500
Other Funding Sources - Fund Balance	513,209		513,209
Total Funding Sources	19,628,087	111,130,000	130,758,087

Expenditures	To Date	Future	Total
PER	758,087		758,087
Land			-
Design	5,112,366	497,835	5,610,201
Construction	942,336		942,336
Construction Management/Inspection			-
Construction Materials Testing			-
FF&E			-
Total Expenditures	6,812,789	497,835	7,310,624

Project Contingency	0%	
Project Balance		123,447,463

Schedule Info

The Study is expected to require approximately eight (8) months to complete the work, address comments and prepare a presentation for Council's considerations of the resulting data.

Previous Memos

09.21.2016, 05.04.2017, 03.08.2018, 11.08.2018, 10.10.2019, 07.30.20, 6.24.21, 7.13.21,

Project Map

Option 1: Expand the Barry Rose Plant per plan with force main from existing Longwood plant (current plan).

EXHIBIT A PROJECT LOCATION MAP



Barry Rose Water Reclamation Facility



1:4,800
1 inch = 400 feet



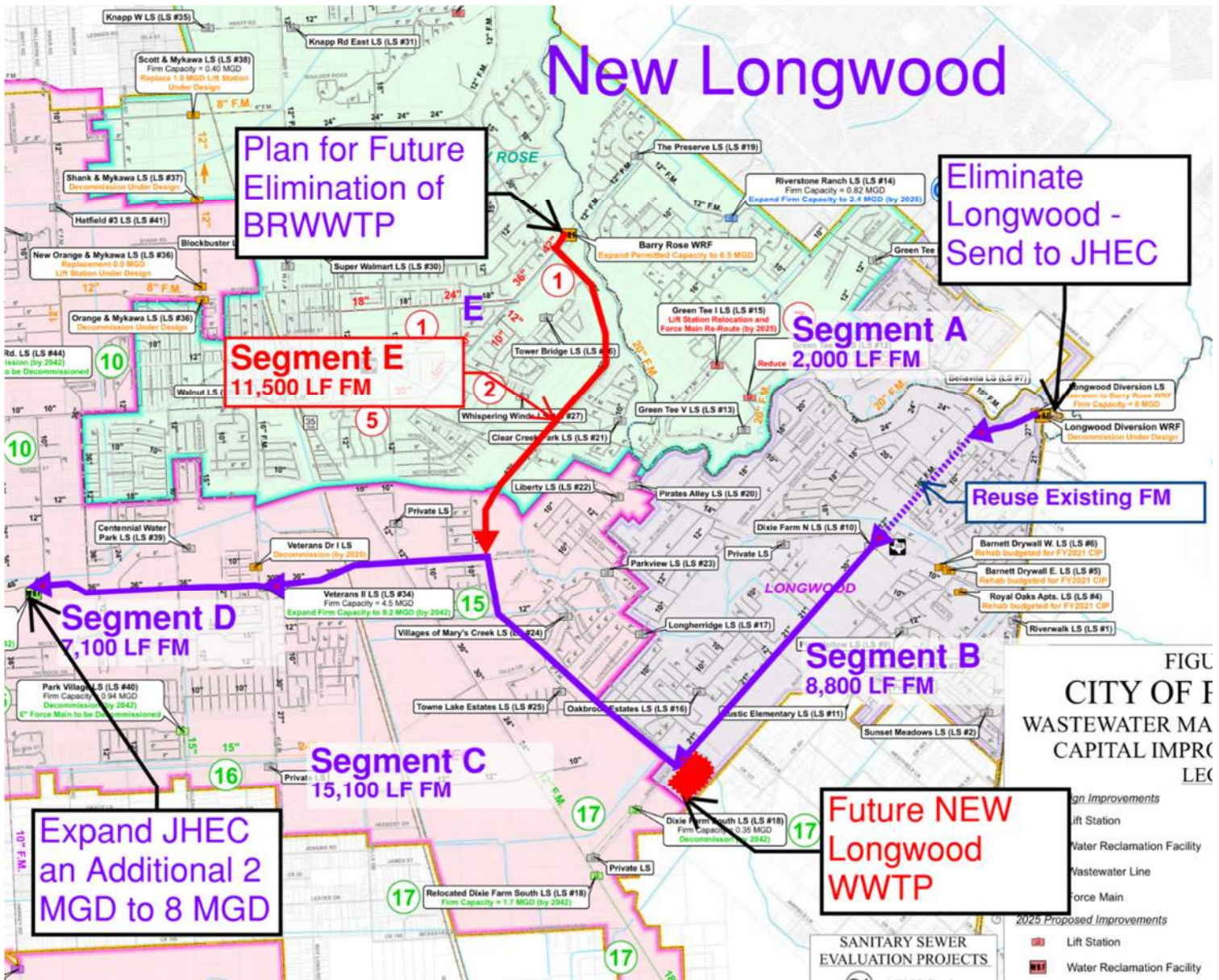
NORTH
This product is for informational purposes only and may not be prepared or be suitable for legal, engineering, or surveying purposes.

MAP PREPARED: SEPTEMBER 15, 2014
GIS DEPARTMENT

Alternative Options Maps:

These maps show the alternatives options. These can be configured to work individually or in combination with others depending on the option chosen and the growth of basin flows.

Option 2: Pump Longwood to JHEC plant. Expand JHEC adding the 2 mgd when flows require. Rehabilitate and delay Barry Rose, Construct new Plant on Dixie Farm (labeled as New Longwood) then divert Longwood flows to New Plant on Dixie Farm plant. Then Divert Barry Rose flows to new Dixie Farm plant and abandon Segment D force main



Option 3: With Longwood flows going to JHEC and delay Barry Rose and then evaluate Barry Rose flows to JHEC. Initially expand JHEC to 8 MGD and final JHEC plant capacity will be evaluated and determined.

