

Memo



To: Clay Pearson, City Manager

From: Cara Davis, Sr Project Manager – Engineering & Capital Projects

CC: Trent Epperson, Assistant City Manager
Robert D Upton, P.E., Director of Engineering
Skipper Jones, Assistant Director of Capital P
Clarence Wittwer, Director of Public Works

2/21/2019
To: Mayor and City
Council members
Preparing for expansion of our
JHEC wastewater treatment plant.
Clay

Date: February 21, 2019

Re: John Hargrove Environmental Center (JHEC) Wastewater
Treatment Plant Expansion

Purpose

This memo provides advanced notice of the proposed engineering services contract award for Final Design Services for the 2 million gallon per day (MGD) expansion of the John Hargrove Water Reclamation Facility (JHWRF).

Background

The initial facility was constructed in 1998 and was designed to treat 2 MGD average daily flow (ADF) and was laid out to allow for the ultimate expansion to 8 MGD. In 2007 a 2 MGD expansion was constructed to 4 MGD ADF. Current flow data indicates that the monthly average influent flow during recent wet weather has met or exceeded the 75% ADF rule. TCEQ requires that planning for plant expansion begin when flows reach 75% of plant rated capacity. This prompted the City to begin preliminary engineering in 2016.

The JHEC Water Reclamation Facility (JHWRF) Preliminary Engineering Report (PER) submitted in January 2017 and subsequent Technical Memorandum Amendment finalized in September 2018 were performed by Ardurra Group. The study updated the JHWRF collection basin flow model to include flows from the Southdown basin, Longwood basin and the Brazoria County Municipal Utility Districts (BCMUD) 2, 3, and 6 service areas, to determine the necessary plant capacity for the 10-year and ultimate build-out scenarios. Additionally, the study projected how those expansions would be incorporated in the existing site. Although other treatment technologies were considered the existing Sequencing Batch Reactors (SBR) technology is currently planned as the primary treatment process for the JHWRF plant expansion.

PER Findings

Originally, the JHWRF expansion planned to take flows from BCMUDs 2, 3 and 6 and areas within the City's existing ETJ. With the passing of Senate Bill 6, the City's ability to annex unincorporated areas was limited resulting in the reduction of required design capacity for the 10 year planning period. This reduced the originally anticipated expansion of 5 MGD to 2 MGD and decreased the

required design flows by approximately 1.3 MGD for the current project as detailed in the September 2018 Technical Memorandum.

Exhibit A indicates the current flows, plus those from Southdown, Longwood and the growth in the City limits that will cause the JHWRF to approach the current design capacity (4 MGD) in the next 5 years. TCEQ requires that construction of the plant expansion begin when flows reach 90% of capacity, which is projected to be in 2021 according to Exhibit A. To ensure the design is complete and the City is able to complete construction ahead of the need for additional capacity, it is necessary to begin the final design work for the expansion of JHWRF.

The findings in the Technical Memorandum recommend to expand the plant by 2 MGD to a total capacity of 6 MGD to meet the 10 year requirement. This will also assist with operational continuity and improve facility operation by allowing the sequencing batch reactors (SBRs) to operate in pairs. The 2 MGD expansion will allow for additional capacity to accept flows from moderate growth within the service area and some areas in the ETJ that may request annexation. This expansion accommodates both the Intermediate (10-year) requirements and the current City Limits Build-out flows within the JHWRF service area. Should State rules change regarding annexation the JHWRF will need to be reevaluated at that time for additional future expansions.

In addition to adding the 2 MGD of capacity to the facility, the existing 4 MGD will be rehabilitated to replace equipment that has reached the end of its service life. This includes the Influent Pump Stations where pumps 6 and 7 will be replaced at Station No. 1 and a new pump 8 will be installed at Station No. 2. All piping, valves and coatings will be replaced as well. Demo of the existing SBR equipment, pumps and piping at SBR's No. 1, 2, 3 and 4 with modifications to convert the system to continuous flow tanks is proposed. Two new tanks for SBR Nos. 5 and 6 with all related equipment and 8 new blowers for all SBR's will be installed. The tertiary filter basins will be expanded and a flow splitter box will be constructed to distribute flows to the existing SBR Nos. 3 & 4, proposed Nos. 5 & 6, and future Nos. 7 & 8.

New structures and systems proposed at the facility include a single story Solids Handling Facility, a single story Operations Building, Maintenance Shop and Covered Storage Area. Depending on the outcome of programming during design, the Operations, Maintenance Shop and Covered Storage area may be combined into one building. This can also serve as a staging area during a City wide Emergency Response situation. A Non-Potable Water (NPW) System is proposed with transfer pumps, ground storage tank and distribution pumping system. A corrosion/odor control system is also recommended for the facility.

Other site improvements included renovations to the existing laboratory building, site security and building automation upgrades, electrical improvements with re-routed electrical service, equipment upgrades and a new emergency generator, as well as SCADA and yard piping improvements.

Previous cost estimates included in the current CIP budget were established prior to completion of the Technical Memorandum. Refinement of the construction cost estimate based on market

forces and project scope definition during the engineering contract negotiations estimate the project value at \$45 million. The CIP is being revised to \$45 million to reflect the new estimated construction budget. When the PER was in progress in 2017 the Consultant, at the direction of the City, initiated a funding request with the Texas Water Development Board (TWDB) for the original cost estimate amount of \$75 million (based on a larger plant expansion) to assist with the cost of the then 5 MGD planned expansion. Now that the scope has been reduced, it is being discussed with TWDB that any excess funds from this request could possibly be diverted to the Longwood Decommissioning portion of the Barry Rose WRF project since some of the flows being diverted from Longwood are also going to JHWRF.

Scope of the Contract

The scope of the proposed work will include preparation of the contract package including drawings and specifications for the JHWRF treatment plant work. Ardurra will provide support services through the bidding phase up to providing the Letter of Recommendation to Council under this contract. Construction phase services are not included at this time and will be added as an amendment once design is completed and tailored to the construction methodology used.

Basic Services

Task 1 – Project Management and Coordination

Task 2 – Final Design Phase Services

Task 3 – Bid Phase Services

Additional Services

Task 4 – Additional Topographic Survey

Task 5 – Additional Geotechnical Investigation

Task 6 – Influent Lift Station Physical Model

Task 1 and Task 2 as proposed for the contract are \$3,584,000.00 and will be performed on a lump sum basis per the provided fee schedule and level of effort. Task 3 will be performed on an hourly not to exceed basis for a fee of \$75,000.00. Additional services are estimated at \$116,000.00 and will be performed on a time and material basis as authorized by the City. The total contract value to encompass the work for design of the JHWRF is \$3,775,000.00.

Schedule

Staff expects to bring this proposal to Council in March for consideration and award. The proposal includes a high level “milestone” schedule for each of the tasks involved. That schedule includes approximately 12 months of work to complete all of the tasks and finalize the design. Staff will coordinate the start of bid and construction phase services with the Barry Rose WRF/Longwood Decommissioning project. Construction of the expansion is projected to require 24-30 months. During the design, staff and the consultant will also explore the option of alternative delivery methods for construction, such as Construction Manager at Risk, which could reduce the overall construction schedule moderately and deliver the finished plant slightly earlier.

| | Base Line | Current |
|---|------------------|----------------|
| Design Start | March-19 | |
| Bid Start | November-20 | |
| Construction Start | January-21 | |
| Proposed Construction Completion | July-22 | |

Budget Info

| Funding Sources | Series | To Date | Future | Total Budget |
|----------------------------------|--------|------------------|-------------------|-------------------|
| General Revenue - Cash | | | | - |
| Certificates of Obligation Bonds | | | | - |
| W/S Revenue Bonds | 2016A | 1,505,000 | | 1,505,000 |
| W/S Revenue Bonds | 2018B | 2,111,526 | | 2,111,526 |
| W/S Revenue Bonds | | | 36,249,025 | 36,249,025 |
| Impact Fee - Cash | | 2,111,525 | | 2,111,525 |
| Impact Fee - Debt | | | 6,950,975 | 6,950,975 |
| Other Funding Sources | | 146,949 | | 146,949 |
| Total Funding Sources | | 5,875,000 | 43,200,000 | 49,075,000 |


| Expenditures | To Date | Future | Total |
|------------------------------------|----------------|-------------------|-------------------|
| PER | 475,000 | | 475,000 |
| Land | | | - |
| Design | | 4,435,000 | 4,435,000 |
| Construction | | 44,930,000 | 44,930,000 |
| Construction Management/Inspection | | 1,800,000 | 1,800,000 |
| Construction Materials Testing | | 400,000 | 400,000 |
| FF&E | | | - |
| Total Expenditures | 475,000 | 51,565,000 | 52,040,000 |

| | |
|------------------------------------|--------------------|
| Project Balance/Contingency | (2,965,000) |
|------------------------------------|--------------------|

JOHN HARGROVE WATER RECLAMATION FACILITY



Legend/Notes

 Wastewater Treatment Plant



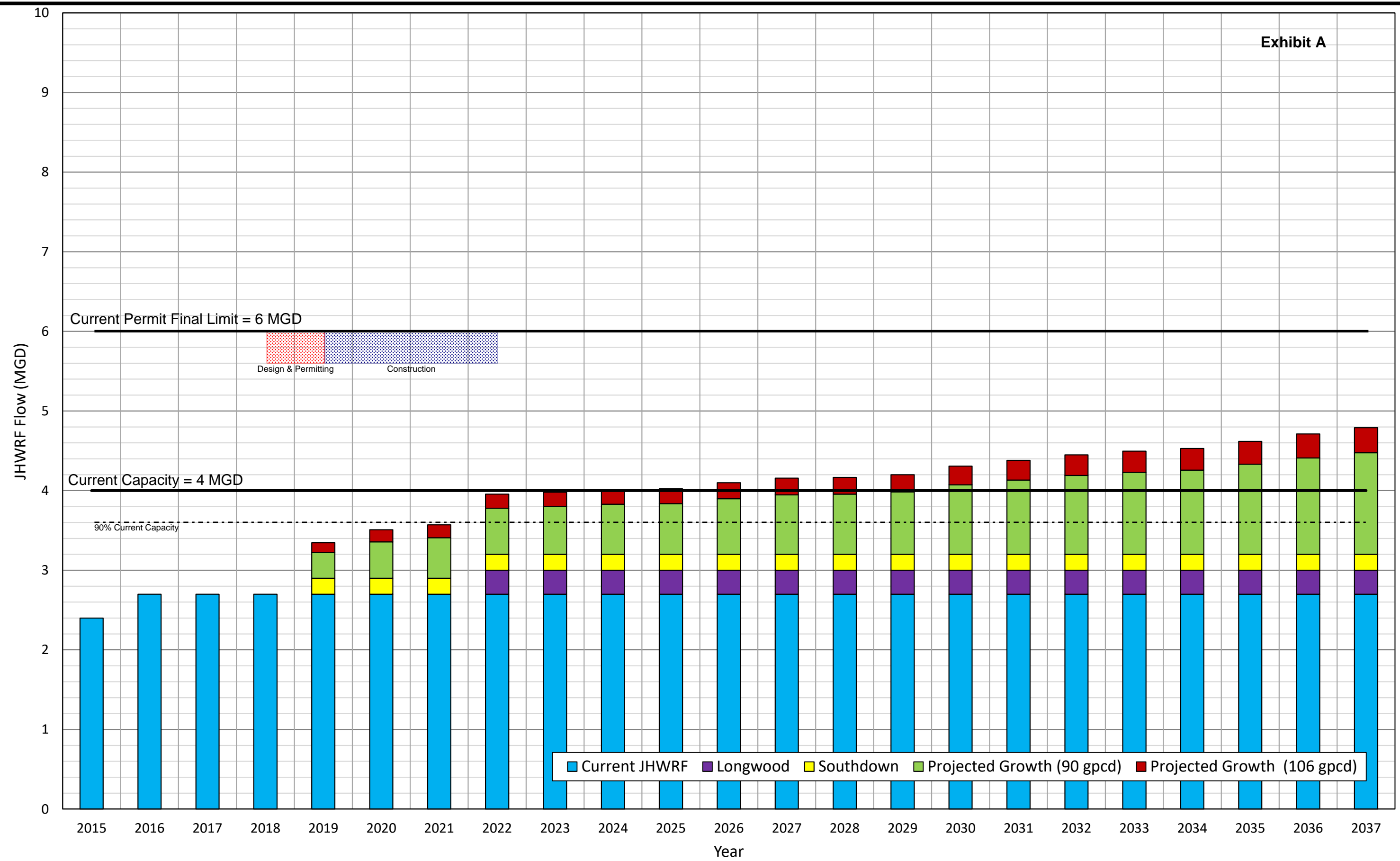
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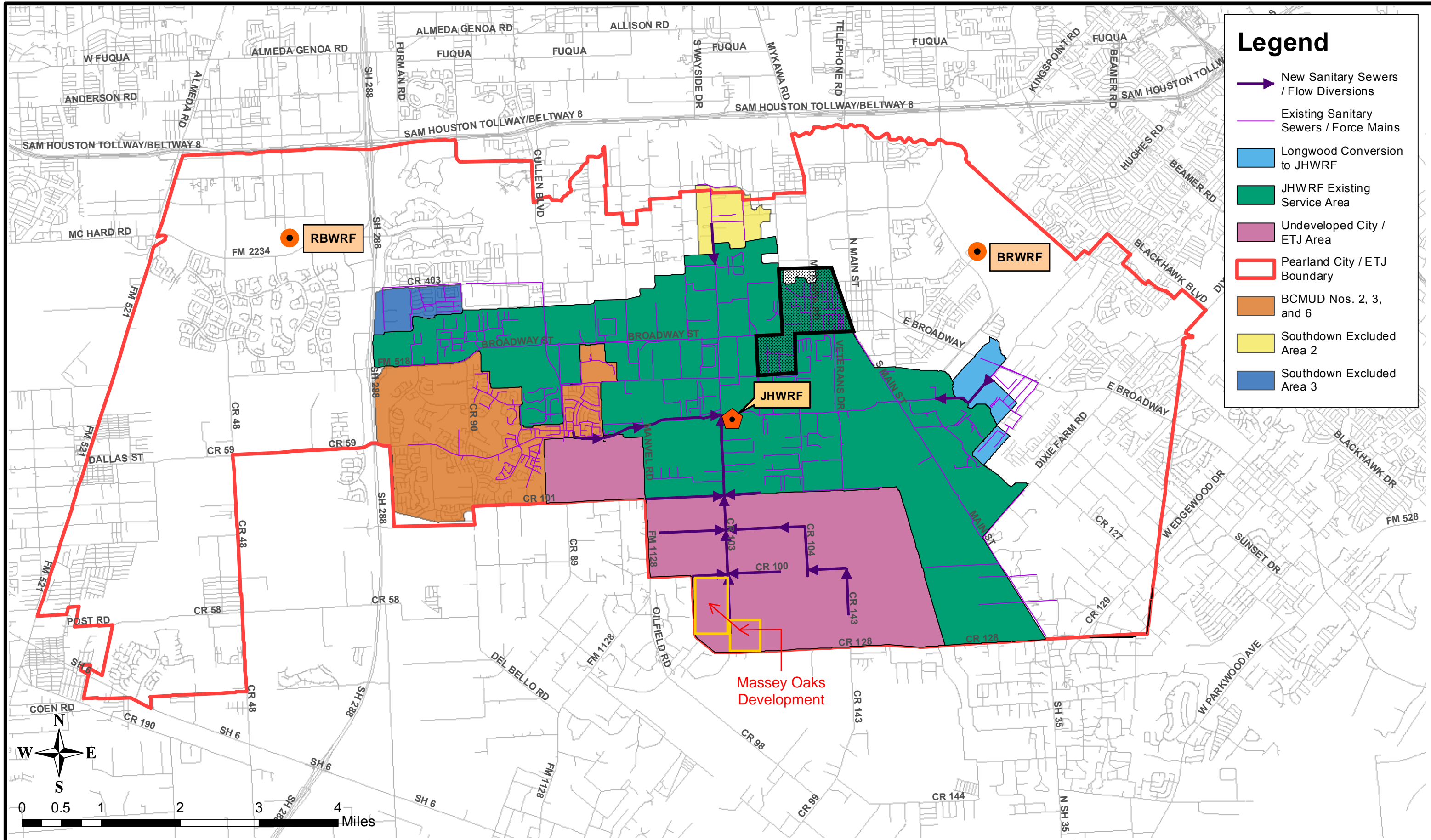
1 inch = 640 feet












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

MAP PREPARED: JANUARY 24, 2018





Legend

-  New Sanitary Sewers / Flow Diversions
-  Existing Sanitary Sewers / Force Mains
-  Longwood Conversion to JHWRF
-  JHWRF Existing Service Area
-  Undeveloped City / ETJ Area
-  Pearland City / ETJ Boundary
-  BCMUD Nos. 2, 3, and 6
-  Southdown Excluded Area 2
-  Southdown Excluded Area 3



0 0.5 1 2 3 4 Miles



2032 Buffalo Terrace
Houston, TX 77019
www.ardurragroup.com
TBPE Firm No. F-17004



CITY OF PEARLAND, TEXAS
JOHN HARGROVE WATER RECLAMATION FACILITY EXPANSION
PRELIMINARY ENGINEERING REPORT

FIGURE 2-9
JHWRF PLANNED FLOW DIVERSION