1/16/2020
To: Mayor and City Council members
Memo regarding **two** upcoming agenda items for the large project to expand and rehabilitate the JHEC Wastewater plant. 1) Specific to this memo: Approve submitting an application for a low interest TWDB loan; 2) Detailed in the November 14, 2019 memo: Award of the CMAR contract for construction of the project. For background information the project scope is significantly detailed in the attached May 2, 2019 memo. -Trent

# 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 & Projects
Skipper Jones, Assistant Director of Capital Projects
Cynthia Pearson, Director of Finance
Clarence Wittwer, Director of Public Works

Date: January 16, 2020

Re: John Hargrove Environmental Center (JHEC) Wastewater Treatment Plant Expansion – **TWDB Funding Application**

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**Purpose**

This memo provides information about progress on the John Hargrove Environmental Center (JHEC) Wastewater Treatment Plant Expansion project and the proposed request to Council authorizing staff to **submit an application for Texas Water Development Board (TWDB) funding for the project at the January 27th City Council meeting concurrently with Council approval and award of the CMAR contract to Pepper Lawson Waterworks (PLW)**.

**Background**

The JHEC Water Reclamation Facility (JHWRF) currently has a capacity of 4 million gallons per day (MGD). Ardurra Group provided the engineering services for a Preliminary Engineering Report (PER) submitted in January 2017 and subsequent Technical Memorandum Amendment, submitted in September 2018. The results were a recommended capacity expansion of 2 MGD for a total of 6 MGD capacity which is adequate to meet current growth requirements for the 10 year planning period and 8 MGD capacity for the City Limit build-out capacity requirements, assuming no annexation of large areas currently outside of the existing city limits. If annexation laws changed and the entire ETJ were eventually annexed, the plant can be expanded again to accommodate the "Ultimate" service area. Planning and design for this expansion also includes significant rehabilitation of the existing plant and preparation of certain critical components to be sized to the full City Limit build out capacity of 8 MGD (these include Influent lift station, headworks structure and screens, grit removal, tertiary treatment basin) to accommodate future expansion without impacts to operations. The project scope and component sizing information is detailed in the attached memo published on May 2, 2019

A Project Information Form (PIF) requesting $75 million in loan funds was originally submitted to Texas Water Development Board (TWDB) and accepted in March 2017. The PIF provides preliminary project information and estimated loan requirements and must be approved for an

actual loan application to be filed later in the process. The JHEC project was included in the Clean Water State Revolving Fund (CWSRF) Intended Use Plan and ranked number 5 in the project priority list. The pre-application conference was held with TWDB in September 2017 to discuss the loan requirements. Finalization of the report and submittal of the funding application was delayed due to completing an assessment of the membrane bioreactor (MBR) technology conducted in a pilot study at the Barry Rose WRF. Final results of that assessment were then delayed by Hurricane Harvey and not completed until February 2018.

When originally submitted prior to the annexation law change, a larger expansion of 5 MGD was being considered. The reduction of the capacity expansion, from 5 MGD to 2 MGD reduced the PIF form request amount from $75 million to $64 million when the request was rolled over for consideration in the new funding year cycle. TWDB has responded positively to the City's updated PIF and revised project information and has forwarded its invitation to apply for funding through the Clean Water State Revolving Fund (CWSRF) in second round invitations received in November 2019. Applications can be submitted on a rolling basis throughout the year as long as they are submitted by August 1, 2020 for this fiscal year. Although the expansion capacity was reduced, the scope of the rehabilitation of existing structures (most have been in service for over 20 years) remained the same and some structures will be built for the future 8 MGD capacity.

**Current Status**

The TWDB loan application will be for $64 million which will cover costs for engineering design, CMAR pre-construction services and construction phase services for the 2 MGD expansion. At the 30% milestone in September when Staff advertised for the CMAR, the Engineer's construction estimate projected costs to be $56.6 million. The full amount of $64 million will be maintained as the ultimate loan amount to account for any further market driven cost increases between the start of the loan application process and final closing given current market conditions. Requesting additional TWDB funds after award is subject to the availability of funds and is not guaranteed. The total loan funding request can and will be adjusted down at the time of closing, based on more accurate pricing after the CMAR is on board.

Depending on the loan structure, the TWDB loan will be at 1.3 to 1.65 basis points below market rates. The loan requirements include a 1.75% loan origination fee, the adoption of Water Conservation and Drought Contingency Plans (which are in place), the preparation of an Environmental Assessment (completed with the Expansion design), and construction requirements such as Davis-Bacon wage rates, and compliance with the EPA's American Iron and Steel provisions that are not required for the City's normal bond funding.

**Recommendation**

At the January 27, 2020 City Council meeting, Staff will recommend a resolution to authorize the submittal of an application for TWDB funding. Following this authorization, the full application will be completed and submitted. Council will have an additional opportunity to approve the loan application when the loan is scheduled for closing later in 2020.

Staff will also recommend a resolution to authorize the approval of the selection process and award the contract for Pre-Construction services to PLW Waterworks in the Lump Sum amount of $828,960 as outlined in the November 14, 2019 memo to Council. The Agenda Request will provide the full scope of work included and the proposed schedule of values for the contract. A revision to the funding request of $728,960 that was stated in the memo will be that an additional $100,000.00 in owner's allowance will be added as was the methodology utilized for the Surface Water Plant.

**Budget Information**

Current budget information reflects very early construction costs estimated from the design engineer. This estimate was developed during the Preliminary engineering phase and contains a significant contingency to cover unknowns. As with other CMAR led projects cost estimating and refinement of cost-effective design and construction methodologies are primary scope components for the CMAR. These figures will change as the project progresses and ultimately produces the CMAR's GMP at which time the City may accept that price and issue a contract for construction.

| Funding Sources | Series | To Date | Future | Total Budget |
|---|---|---|---|---|
| General Revenue - Cash | | | | - |
| W/S Revenue Bonds | 2016A | 752,500 | | 752,500 |
| W/S Revenue Bonds | 2018B | 2,111,526 | | 2,111,526 |
| W/S Revenue Bonds | | | 26,305,000 | 26,305,000 |
| Impact Fee - Cash | | 2,111,525 | | 2,111,525 |
| Impact Fee - Debt | 2016A | 752,500 | | 752,500 |
| Impact Fee - Debt | | | 26,305,000 | 26,305,000 |
| Other Funding Sources | | 386,949 | | 386,949 |
| **Total Funding Sources** | | **6,115,000** | **52,610,000** | **58,725,000** |

| Expenditures | To Date | Future | Total |
|---|---|---|---|
| PER | 475,000 | | 475,000 |
| Land | | | - |
| Design | 3,775,000 | 710,000 | 4,485,000 |
| Construction | | 47,380,000 | 47,380,000 |
| Construction Management/Inspection | | 1,800,000 | 1,800,000 |
| Construction Materials Testing | | 400,000 | 400,000 |
| FF&E | | | - |
| **Total Expenditures** | **4,250,000** | **50,290,000** | **54,540,000** |

| | |
|---|---|
| **Project Balance/Contingency** | **4,185,000** |

**Schedule Info:**

| | ***Base Line*** | ***Current*** |
|---|---|---|
| ***Design Start*** | March-19 | April-19 |
| ***Bid Start*** | November-20 | September-19 |
| ***Construction Start*** | November-20 | May-20 |
| ***Proposed Construction Completion*** | January-23 | May-23 |

# JOHN HARGROVE WATER RECLAMATION FACILITY


**Legend/Notes**

WTP Wastewater Treatment Plant

1:7,715

1 inch = 640 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: JANUARY 24, 2018

11/14/2019
To: Mayor and City Council members
Solid progress moving forward to expand our existing water reclamation plant at JHEC on Magnolia. Clay

# 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 & Projects
Skipper Jones, Assistant Director of Capital Projects
Clarence Wittwer, Director of Public Works

Date: November 14, 2019

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

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**Purpose**

This memo provides information about progress on the John Hargrove Environmental Center (JHEC) Wastewater Treatment Plant Expansion project and the proposed award of a Construction Manager at Risk (CMAR) contract for Pre-Construction Services for the project at the November 25th City Council meeting.

**Background**

The JHEC Wastewater Treatment Plant Expansion is being designed to expand the plant by 2 million gallons per day (MGD) to a total capacity of 6 MGD to meet the projected growth over the next 10-years and to meet the Texas Commission on Environmental Quality (TCEQ) requirement to begin the design when current flows to the plant exceed 75% of capacity. Current flows are expected to be above the 90% requirement for expansion within the next 3 years based upon the land development projections and model information. The proposed 2 MGD expansion accommodates the current City Limits Build-out flows within the JHWRF service area which includes the Massey Oaks and the surrounding area located in the city limits. The expansion does have some remaining capacity but does not accommodate for properties in the ETJ nor for the service area of the Municipal Utility District Nos. 2, 3 & 6. Should State rules for annexation change or new areas seek annexation, the JHWRF will need to be re-evaluated at that time for the proposed needs and current capacity demands. Planning and design for this expansion currently includes preparation of certain critical components (Influent lift station, headworks) to accommodate future expansion without impacts to operations.

The project is planned to be constructed using the Construction Manager at Risk (CMAR) delivery as outlined in Local Government Code, Chapter 252 and Government Code, Title 10, Subtitle F, Chapter 2269.251. The process requires the contractor to work hand-in-hand with the Owner and designers during the design process to generate cost-efficient plans, resolve constructability issues and reduce the risk of costly and time-consuming change orders before presenting a

Guaranteed Maximum Price (GMP) for the project. Staff's procedures to make this selection have carefully followed statutory guidelines for this process to ensure compliance with financing requirements from Texas Water Development Board (TWDB). A Project Information Form (PIF) was submitted last year (2018), which is the initial step in the loan application process, was accepted by TWDB. Staff is currently awaiting the formal Invitation to Apply to start the formal loan application process. TWDB delayed the second round of loan application processes due to Imelda and is now scheduled for late November.

On September 11, 2019, Staff advertised the JHEC and Barry Rose Water Reclamation Facility Request for Proposal (RFP) for CMAR to include pre-construction services and, by planned future contract amendment, construction phase services. A pre-proposal conference was held on September 24th for potential proposers to get a better understanding of the projects through a short presentation, question/answer session and site visits to the project sites for a guided tour. Six general contractor entities along with several subs and suppliers attended the meeting. Two well qualified CMAR firms responded, Pepper Lawson Waterworks (PLW), a Texas firm with a long history in our region, a recent successfully completed project (Reflection Bay WRF) with the City of Pearland and the current CMAR contractor for the Surface Water Treatment Plant. McCarthy Building Companies, a nationwide heavy construction firm, responded with a letter stating that their work load had prevented them from proposing.

The current contract includes Pre-Construction services only. The CMAR is to include provisions for project management and cost estimation personnel, continuous design review, constructability recommendations to ensure a complete set of plans. The design/review process will benefit from contractor input through on-going value engineering. The CMAR will assist in developing cost-effective design alternatives, construction method recommendations, bidding and sub-contracting portions of the work not self-performed and the development of detailed cost estimates leading up to the provision of a GMP at completion of the 90% plans.

Construction Phase Services will be added to the contract by amendment upon acceptance of the GMP. All work packages and equipment purchases will be bid through competitive open book bidding against market conditions. Management oriented tasks such as awarding and managing subcontracts for construction activities, accepting assignment of pre-purchased equipment procured by the City, management of all other equipment and material procurement, and maintenance of quality controls and schedules are included. Other tasks to facilitate construction and startup include conducting monthly progress meetings with on-site trades, processing subcontractor pay applications, shop drawings and submittals, implementing plant commissioning and start-up, performance testing and providing operations and maintenance manuals. Lastly, the CMAR is expected to provide warranty work and maintenance for a period of two years upon completion. Construction Phase services are NOT a component of the current contract scheduled for the current award.

**Current Status**

The Selection Committee reviewed the qualifications of the responsive proposal which included Experience with previous projects of similar size and scope, quality and experience of key personnel assigned, history of meeting or exceeding cost and schedule targets, safety records, project approach, self-performance capabilities.

The fee proposal was unsealed and reviewed for compliance with instructions within the request. Part One requested respondents provide the billing rate for each team member and the estimated man/hours required to perform Pre-Construction Services. This information was then extrapolated to provide an estimated Pre-Construction Fee. Pepper Lawson (PLW) estimated approximately 8,104 man/hours at an average rate of $89.95 dollars per hour totaling $728,960.00.

Part Two requested provision of a Construction Phase Services Fee expressed as a percentage of the cost of construction based on an estimated $60 million-dollar construction cost. PLW proposed a fee of 4.85% and is in line with other City CMAR projects.

PLW performed very well on the Reflection Bay Water Reclamation plant project developing a $400,000 cost savings option in the first weeks of construction. Additionally, when one of their sub-contractors made a mistake that required a re-design effort by the Engineer of Record, Pepper Lawson paid for the additional work, no questions asked. This project was delivered almost six months ahead of schedule and well within budget.

**Recommendation**

On November 25th, Staff will bring the final negotiated CMAR contract for the JHEC Wastewater Treatment Plant Expansion to Council with the recommendation to approve the selection process and award the contract for Pre-Construction services to PLW Waterworks in the Lump Sum amount of $728,960. The Agenda Request will provide the full scope of work included and the proposed schedule of values for the contract.

A notice to Proceed would be issued immediately and the CMAR will begin work with Ardurra Group, the designer for the plant.

**Budget Information**

Current budget information reflects very early construction costs estimated from the design engineer. This estimate was developed during the Preliminary engineering phase and contains a significant contingency to cover unknowns. As with other CMAR led projects cost estimating and refinement of cost-effective design and construction methodologies are primary scope components for the CMAR. These figures will change as the project progresses and ultimately produces the CMAR's GMP at which time the City may accept that price and issue a contract for construction.

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| FF&E | | | - |
| **Total Expenditures** | **4,250,000** | **50,290,000** | **54,540,000** |

| | |
|---|---|
| **Project Balance/Contingency** | **4,185,000** |

# JOHN HARGROVE WATER RECLAMATION FACILITY


**Legend/Notes**

WTP Wastewater Treatment Plant

1:7,715

1 inch = 640 feet

NORTH

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MAP PREPARED: JANUARY 24, 2018

# Memo

To: Clay Pearson, City Manager

From: Cara Davis, Sr. Project Manager – Engineering

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

Date: May 2, 2019

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

5/2/2019
To: Mayor and City Council members
Good run-through of the JHEC wastewater treatment plant capcity assumptions and various components what's sized now and for future capacity. Clay

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**Purpose**

This memo provides additional information on the proposed 2 million gallon per day (MGD) expansion of the John Hargrove Water Reclamation Facility (JHWRF) in response to a Council question received during the discussion of the award of the design contract to Ardurra Group on March 4, 2019.

**Background**

The JHEC Water Reclamation Facility (JHWRF) Preliminary Engineering Report (PER) submitted in January 2017 recommended a 5 million gallon per day (MGD) expansion to a total of 9 MGD (4 MGD existing plus 5 MGD expansion) for the "Intermediate" (10 year) design based on the additional flows anticipated from growth and the inclusion of MUDs 2, 3 and 6. If annexation of all outlying areas located in the Extraterritorial Jurisdiction (ETJ) were to occur, the "Ultimate" service area build-out expansion flows were projected to reach 11 MGD. The PER work was completed before Senate Bill 6 passed in 2017 limiting the City's ability to annex unincorporated.

Subsequently, a Technical Memorandum Amendment, finalized in September 2018, revised the expansion recommendations for the 10 year planning period, City Limit build-out, and Ultimate build-out capacities. **The revised recommendations serve as the current basis of design expand the plant by only 2 MGD to a total capacity of 6 MGD for the "Intermediate" (10 year) design and 8 MGD for the City Limit build-out service area.** Due to Senate Bill 6 limiting the City's ability to annex unincorporated areas, the required design capacity for the 10-year planning period as well as the Ultimate 11 MGD plant capacity is greatly reduced due to the current unlikelihood of future annexations. Therefore, the 6 MGD capacity will be adequate to meet current growth requirements for the 10 year planning period and 8 MGD capacity for the City Limit build-out capacity requirements, assuming no annexation of large areas currently outside of the existing city limits. If annexation laws changed and the entire ETJ were eventually annexed, the plant can be expanded again to accommodate the "Ultimate" service area.

Outlined below is a discussion of the preparations made in the current design phase to accommodate possible future expansion that might be required by changes to the current annexation laws or will allow for limited voluntary annexation requests in these areas to accommodate additional flows.

**Planning for Future Expansion**

The current planned expansion will provide additional pumping capacity in the influent lift station, additional treatment capacity in the plant, additional tertiary filter capacity and additional UV disinfection for 6 MGD. Plant piping in this expansion would be extended to the final expansion location for 8MGD. The expansion to 6MGD requires new blowers, expansion of the blower building, additional electrical supply and control, additional sludge handling capabilities as well as expansion of the buildings and structures housing these operations.

The Preliminary Engineering Report, as amended, anticipated expanding the existing 4 MGD sequencing batch reactor (SBR) treatment by adding two SBR basins and associated piping and equipment. Because this intermediate 2 MGD expansion would require a moderate increase of pumping capacity in the influent lift station, the project will replace the two existing pumps (Pump No. 6 and 7) at Lift Station No. 2 with new higher duty pumps and install an identical spare in slot No. 8. For the City Limit build-out (8 MGD) one additional (identical) pump will be required in slot No. 9 along with a new 30" diameter force main to the headworks. Headworks screening capacity and flow splitter operations, as well as odor control, will require the reconstruction and relocation for these processes. For that reason, the new headworks screening and flow splitter would be sized and configured to provide for the 8 MGD City Limit build-out service area capacity avoiding the need to modify later. Additional blowers will be required for the intermediate expansion requiring the blower building to be increased. Air piping, electrical capacity and blower building space will be configured for additional blowers to accommodate the future installation of additional blowers to meet the City Limit build-out service area capacity. The tertiary filter basin structure will be upgraded to provide the City Limit build-out service area capacity with the addition of a new cloth filter without additional structural concrete work in the future. In all cases these processes are planned to allow for an expansion to the 8 MGD City Limit capacity requirements to avoid the expense of a full plant expansion in the future. This same philosophy has been applied to the planned aerated sludge holding tanks, the non-potable water system and relocation of the Centerpoint Energy electrical service for the site.

While the solids handling facility will be upsized to manage the City Limit build-out service area requirements, only the belt press capacity necessary for the Interim expansion will be installed at this time. Likewise, while the generator size will be increased to provide backup power for the Interim expansion any future expansion would need to review the benefit of retaining a ten-plus year old generator versus replacing it with a slightly upsized generator or run multiple generators in parallel. The following table outlines the major components of the facility and how they are affected by the Intermediate 10-year and the City Limit build-out Service Area build-out scenarios.

**John Hargrove Environment Complex (JHEC)**
**Water Reclamation Facility (WRF) Expansion Project**
**Process Unit Capacities**

| Process Unit or Item | Capacity |
|---|---|
| Site Work/Yard Piping | Varies[1] |
| Influent Lift Stations | 10-year[2] |
| Headworks | City Limit Build-out |
| Odor Control | City Limit Build-out |
| SBR Influent Splitter Box | City Limit Build-out |
| Sequencing Batch Reactors and Blowers | 10-year[3] |
| Cloth Disk Filters | 10-year[4] |
| UV Disinfection System | 10-year[5] |
| Aerated Sludge Holding Tanks | City Limit Build-out |
| Solids Handling Facility | City Limit Build-out |
| NPW System | City Limit Build-out |
| CenterPoint Energy Service | City Limit Build-out |
| Emergency Generators | 10-year |

[1]Piping sized for City Limit build-out Capacity where appropriate or required with fittings for future connections.
[2]Installation of additional pumps required for expansion to City Limit Build-out.
[3]Two additional SBRs to be constructed for City Limit Build-out.
[4]Structure sized for City Limit Build-out with filter equipment installed for 10-year Capacity.
[5]Exising UV System sized for 10-year Capacity. One new UV disinfection channel and equipment required for City Limit Build-out.

In this manner the planned 2MGD expansion accommodates both the (10-year) requirements and the current City Limits flows within the JHWRF service area. This 2 MGD expansion is being planned to mitigate and reduce the costs of a possible future expansion to add another 2 MGD for the full City Limit build-out of 8 MGD.

# JOHN HARGROVE WATER RECLAMATION FACILITY


**Legend/Notes**

WTP Wastewater Treatment Plant

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NORTH

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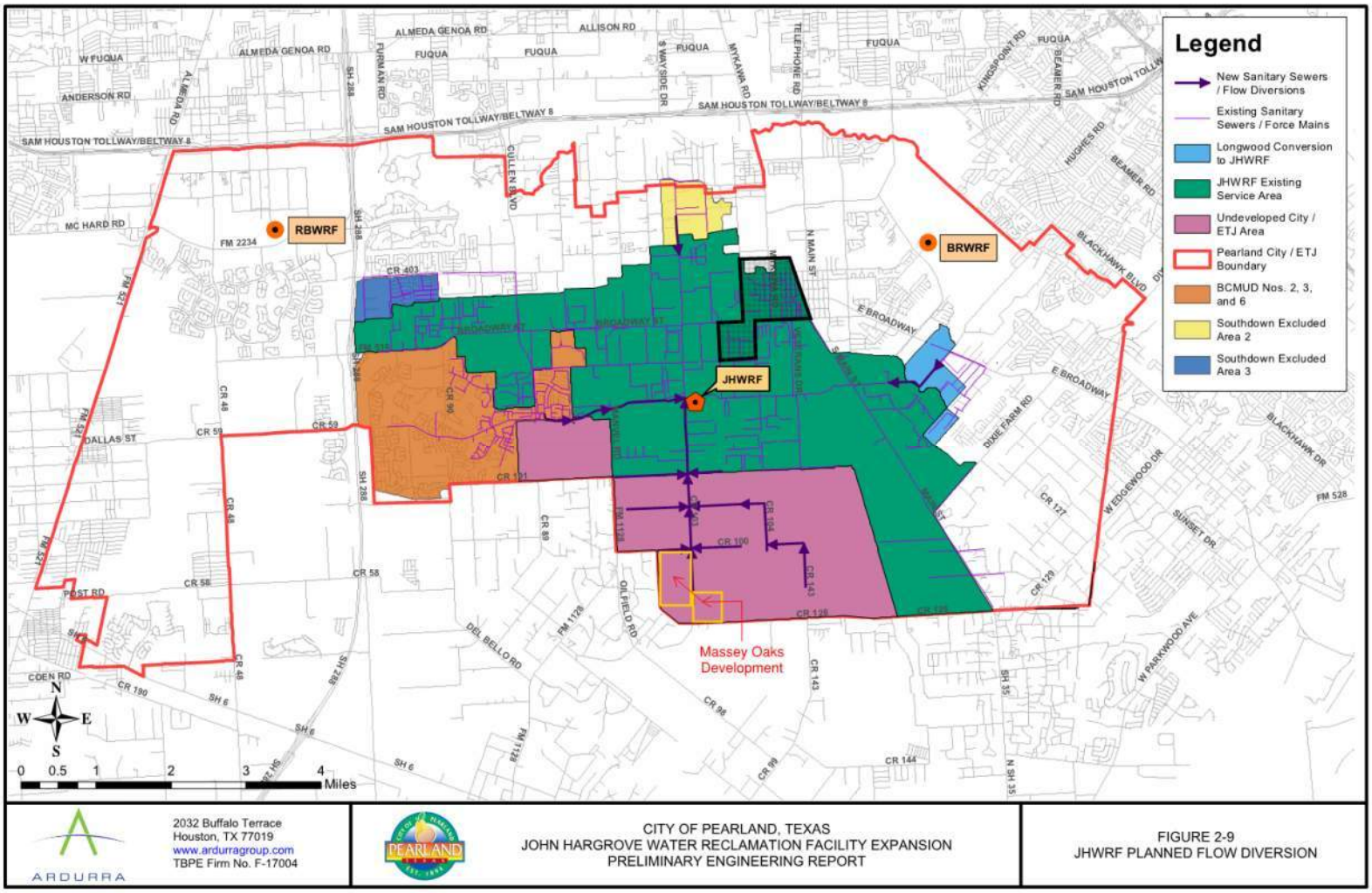
MAP PREPARED: JANUARY 24, 2018

Service Area Map





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Houston, TX 77019
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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