
TECHNICAL MEMORANDUM

Index Number 101-33 TWMP – Bartram – US1 – Old St Augustine Rd to US 1 - W

PREPARED FOR: JEA CAPITAL BUDGET PLANNING

PREPARED BY: WATER/WASTEWATER SYSTEMS PLANNING

DATE: January 30, 2018 Susan R. West, P.E.

Introduction

This Technical Memorandum (TM) is prepared for a planned water main extension. A 24" water main is planned to provide a dedicated fill line to the Bartram Water Repump station. This TM identifies the preliminary route, itemizes potential design and construction considerations, provides a preliminary opinion of probable cost and includes a proposed project schedule.

Justification & Project Description

This project is part of the Total Water Management Plan (TWMP) for the water South Grid. The influent water main to the Bartram Repump station is currently used for filling the storage tanks and as a distribution main for the surrounding service area. When the main is used to supply water to the Bartram Repump station, the connection to the distribution system must be closed. As a result, a portion of the southern service area is isolated from the rest of the distribution network and low water pressures (routinely 35 – 40 psi) occur in the grid. As growth continues in the southern portion of the water service area (including Bartram and Nocatee areas), a dedicated feed line will be needed to serve the repump station and improve the low pressure problem. This project will allow the southern service area to remain interconnected thus providing redundancy and increasing system reliability. It is proposed to install 17,450 lf of 24" water main from US 1 to the Bartram Repump station and 200 lf of 16" water main bypass at the St. Johns Forest Water Treatment Plant (WTP). Figures 1, 2 & 3 provide maps of the work areas.

Scope

Capacity

The water main sizing is based on the recommendations of the iWater Project.

Route & Alignment

It is proposed to install 17,450 feet of 24" water main from US 1 at the JEA transmission line just south of the Greenland Energy Center to the Bartram Repump station along the JEA transmission line just north of Racetrack Road. This water main corridor will follow the JEA transmission line from start to finish and will parallel the existing 20" reclaimed water main installed along the same corridor. Multiple road crossings including I-95 are required as well as a railroad crossing adjacent to US 1. Wetland and floodway crossings will also be required. This project is located in Duval County.

The proposed water main should be connected on the north end to both the 24" and 20" water mains on the north side of the US1 (Phillips Highway) right-of-way. It is estimated 3,600 LF of HDD will be required. The proposed pipe corridor is mostly within either road right-of-ways or within JEA owned property. A small portion is within the transmission easement on private property and the Durbin

Creek crossing will be under waters of the State. Coordination with the electrical transmission group will be required. This project should include the necessary piping modifications to the Bartram Repump station intake to accept the new feed line.

In conjunction with this project, a short segment of 16" water main is required at the St. Johns Forest WTP. Approximately 200 feet of 16" pipe will allow water from Bartram to bypass the St. Johns Forest WTP and connect directly to the discharge water main from the St. Johns Forest WTP. Figures 2 and 3 detail the work area.

Figure 1 – Overall Water Main Route

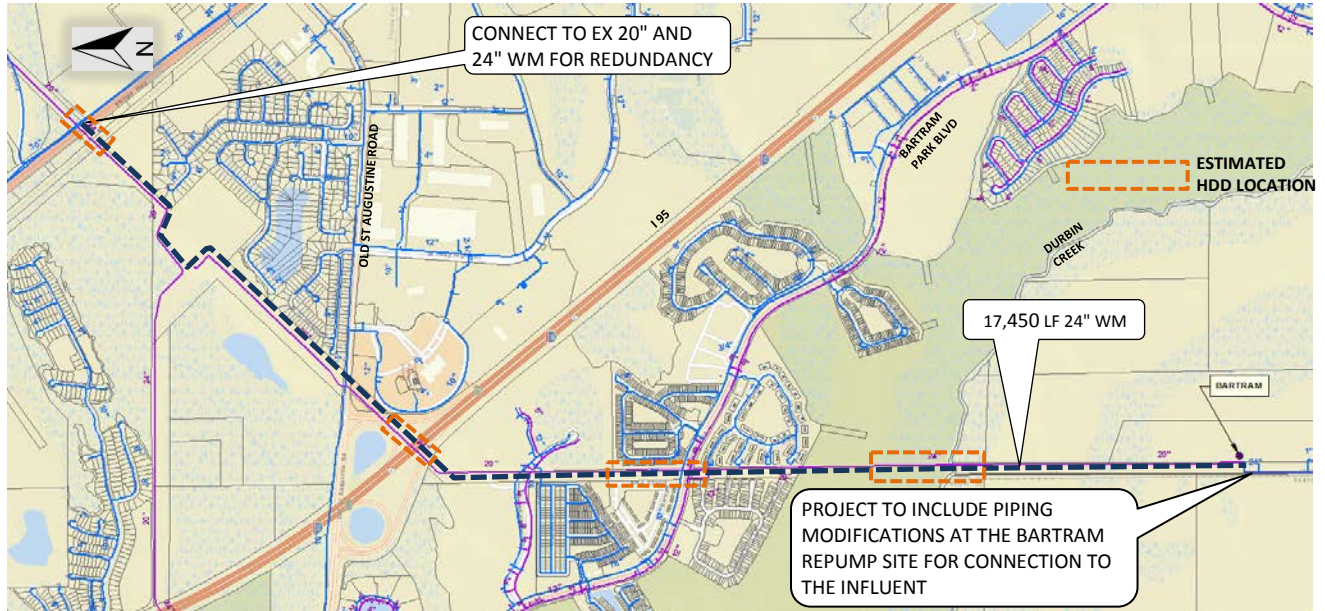


Figure 2 – St. Johns Forest Water Main Bypass Location

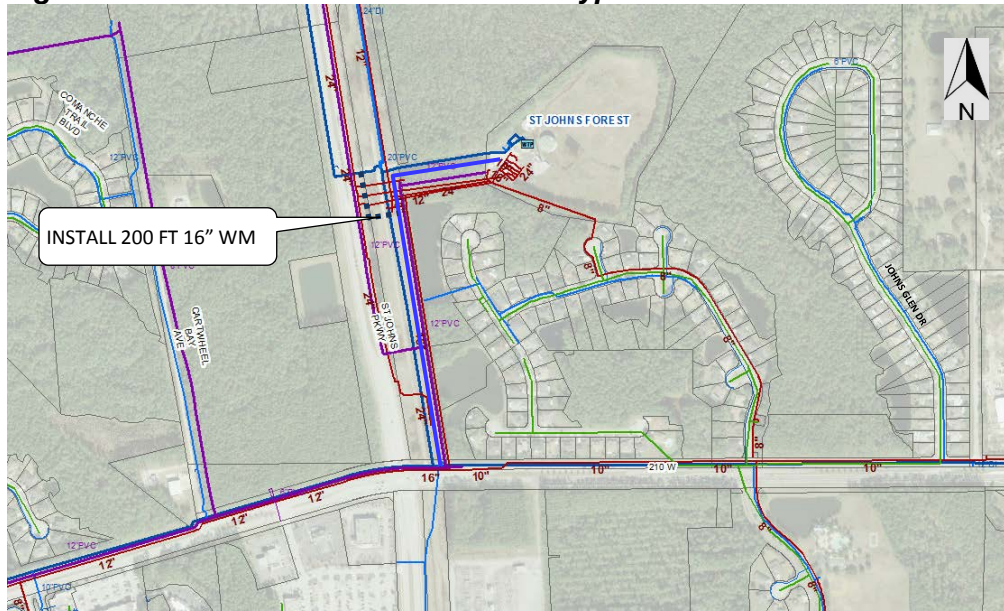
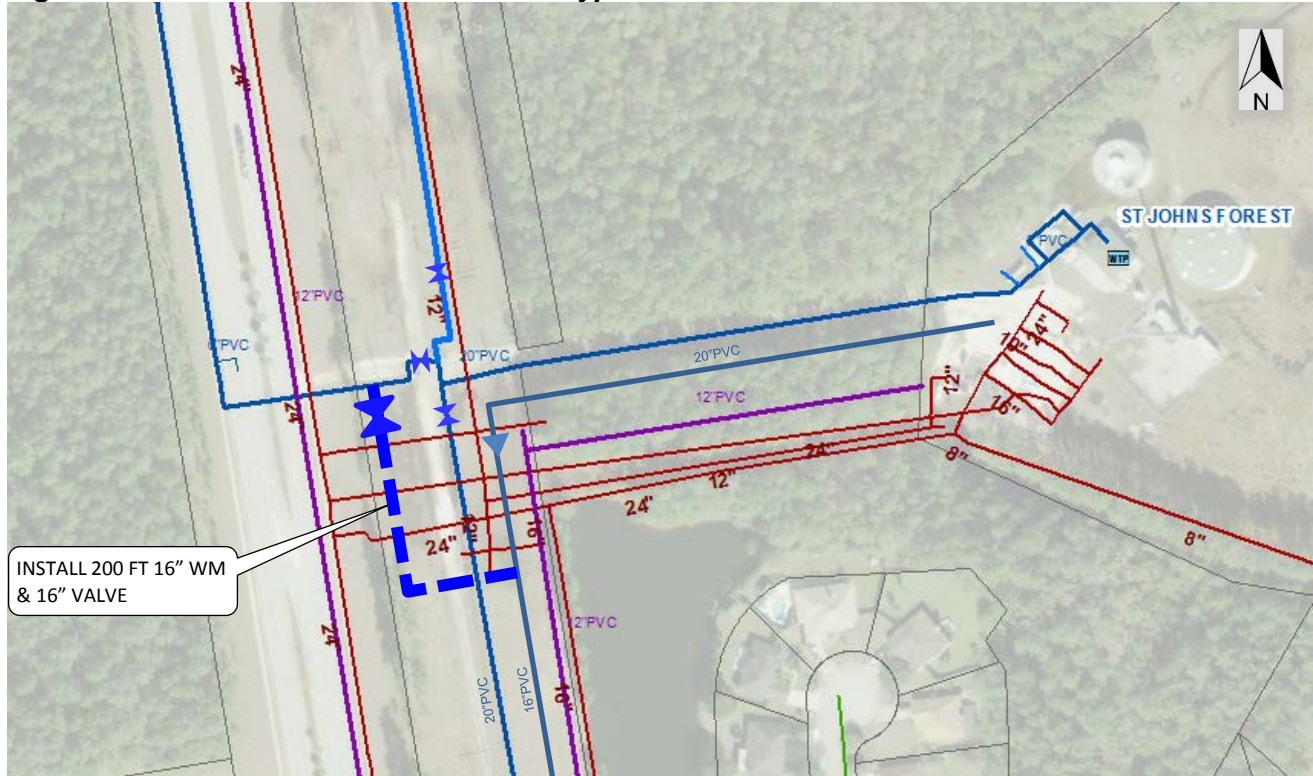


Figure 3 – St. Johns Forest Water Main Bypass Detail



Method of Construction

The methods of installation for the proposed force main shall be by any means necessary in accordance with the latest edition of the JEA Water & Sewer Standards Manual and as allowed by the City of Jacksonville and other applicable governing agencies. The project engineer should determine the most economical pipe routing and installation methods while remaining consistent with the JEA standards and specifications. An equivalent pipe diameter of 24" PVC should be maintained when selecting pipe size and material for the Bartram section and 16" PVC for the St. Johns Forest Bypass.

Special Crossings

The installation route will require crossings of City of Jacksonville roadways (Old St. Augustine Road, Bartram Park Blvd), the I-95 corridor and Durbin Creek. Other JEA water, sewer and electric facilities are located along the proposed corridor. It is expected other utilities such as gas, phone, fiber optic and cable are also present in some locations. In areas of limited space, travel lane encroachment or temporary construction easements may be required. It is expected that horizontal directional drills (HDD) will be required in some locations as evidenced by the location of the HDDs of the existing parallel reclaimed water main.

Land Ownership/Real Estate Issues

It is anticipated the pipe installation will occur within public rights-of-way, JEA fee simple owned tracts and within JEA easements on private properties. The need for any temporary construction or permanent easements should be evaluated early in the design process to allow time for acquisition. All easements and right-of-way issues will be coordinated by the design team and addressed during the project design phase. JEA Real Estate has been engaged to confirm easement rights within the existing electrical transmission corridor.

Survey Requirements

Final design of the project should be based on field survey data including horizontal and vertical locations and identification of existing utilities, pavement, guardrail, structures, electrical power poles, mail boxes and drainage features within the project area limits. Right-of-way boundary limits, existing easements and parcel ownership lines should be included on the survey as well as any vegetation deemed 'protected' by the governing jurisdictions including City of Jacksonville protected trees. Any wetland lines or significant habitat community limits should be flagged prior to survey commencement.

Site Development Characteristics

The project area includes work within public right-of-ways. The presence of environmentally sensitive wetlands within the project corridor should be evaluated. The presence of any listed species should be evaluated concurrently with the wetland line review.

Limits of Flood Plain

The project corridor crosses multiple flood plain areas per FEMA FIRM panels 568 and 635 for Duval County (see Figure 4). While work will likely occur within the 100 year flood plain, no additional permitting is anticipated as the finished grade of the work limits should be consistent with the original elevations.

Figure 4. FEMA Flood Zone – Site Overlay



Permit List

It is anticipated that at a minimum permits will be required by the City of Jacksonville (10 set review and Right-of-Way permit), Florida Department of Environmental Protection, FDOT, St. Johns River

Water Management District and the Army Corps of Engineers. For the St. Johns Forest bypass portion, it is anticipated a right of way permit for St. Johns County will be required. The project corridor should be evaluated for the presence of jurisdictional wetlands, listed species and protected trees. The need for any associated permitting should be addressed during the design phase. Other permits may be determined necessary during the design process and will be obtained by the design team.

Project Schedule

Major activities are as follows:

- Engineer Selection – March 2018 to July 2018
- Survey, Design & Permitting – August 2018 to March 2019
- Procurement, Construction & Closeout – April 2019 to September 2021

Project Management & Delivery

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

Cost Estimate and Expenditure Forecast (Current \$)

The cost of this project is \$8,700,000 as determined by a JEA planning level estimate. A copy of the estimate is provided in Appendix A.

| Current Estimate | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 |
|------------------|-----------|-----------|-------------|-------------|-------|
| \$8,700,000 | \$106,000 | \$619,000 | \$5,403,000 | \$2,572,000 | \$0 |

Risks

The purpose of this project is to provide a dedicated fill line to the Bartram Repump Station. The current water supply source is also used as a distribution main for the surrounding area. When the station is filling, the existing main can no longer meet the demands of the surrounding area which results in low water pressures within the grid. As development continues in the area, the duration of low water pressures will continue to increase further decreasing system reliability.

Revision History

| Name | Date | Version | Revision Notes |
|------|------|---------|----------------|
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Appendix A

Supporting Cost Estimate Information

Project: T-Line - US 1 to Bartram Repump - Trans - New - W
CIP Cat: Water Distribution
File Name: WS17100 T-Line - US 1 to Bartram Repump - Trans - New - W

CP No: 101-33



Project Mgr: Susan R. West
Estimator: D Jones
Estimate No: WS17100
Rev. No: 0
Date: 10/23/2017

PROJECT DEFINITION

CLASS 4

DIRECT CONSTRUCTION COSTS

| Contractor Cost | Material | Labor | Equipment | Other/Sub-Cont. | TOTAL |
|----------------------------------|--------------------|--------------------|------------------|--------------------|--------------------|
| Total From Estimate Details | \$2,646,249 | \$1,567,407 | \$83,917 | \$1,648,523 | \$5,946,097 |
| Escalation | \$174,652 | \$103,449 | \$5,539 | \$108,803 | \$392,442 |
| Subtotal Contractor Cost | \$2,820,902 | \$1,670,856 | \$89,456 | \$1,757,326 | \$6,338,539 |
| Contingency (Contractors Risk) | \$423,135 | \$250,628 | \$13,418 | \$263,599 | \$950,781 |
| Contingency (Contract SWA) | \$0 | \$0 | \$0 | \$0 | \$0 |
| Total Contractor Costs | \$3,244,037 | \$1,921,484 | \$102,874 | \$2,020,925 | \$7,289,320 |

Additional Direct Costs

| | | | | | |
|-----------------------------------|--------------------|--------------------|------------------|--------------------|--------------------|
| JEA Supplied Material and Other | Material | Labor | Equipment | Other/Sub-Cont. | TOTAL |
| JEA Other Contract Costs | \$0 | \$0 | \$0 | \$0 | \$0 |
| Subtotal: Additional Direct Costs | \$0 | \$0 | \$0 | \$0 | \$0 |
| Total Direct Costs | \$3,244,037 | \$1,921,484 | \$102,874 | \$2,020,925 | \$7,289,320 |

JEA Cost & Engineering

| | | | |
|------------------------------------|-----------|-------------|-------------|
| Project Management | Labor | Sub-Cont. | TOTAL |
| Engineering | \$167,654 | \$0 | \$167,654 |
| Services During Construction | \$0 | \$1,020,505 | \$1,020,505 |
| Project Support | \$145,786 | \$0 | \$145,786 |
| Real Estate | \$21,868 | \$0 | \$21,868 |
| Subtotal: JEA Cost and Engineering | \$335,309 | \$37,176 | \$37,176 |
| | | \$1,057,680 | \$1,392,989 |

Total Project Costs

| | | | | | |
|---|--------------------|--------------------|------------------|--------------------|--------------------|
| Total Project Costs | \$3,244,037 | \$2,256,793 | \$102,874 | \$3,078,605 | \$8,682,310 |
| 13,850 LF 24" CLDI WM Open Cut, 3,600 LL 30" HDPE Directional Drill | | | | | |
| CLASS 4 Accuracy Range -30% to +50% | | | | | |

TECHNICAL MEMORANDUM

**101-44: 103rd Street (Cecil Field) Water Main Replacement:
Aviation Avenue to Cecil Commerce Center Parkway**

PREPARED FOR: JEA CAPITAL BUDGET PLANNING

PREPARED BY: ARCADIS

DATE: February 2, 2018

Introduction & Background

This Technical Memorandum (TM) provides a recommendation for the replacement of a 24-inch water main along 103rd Street between Aviation Avenue and Cecil Commerce Center Parkway as shown on Exhibit 1. This water main serves western areas of Jacksonville, including residential areas, recreational facilities and Cecil Field Airport. This TM identifies potential design and construction considerations, includes a proposed project schedule, and provides a preliminary cost estimate.

A risk assessment performed by Arcadis, as a part of the Large Diameter Pipe Evaluation and Rehabilitation Program, rated the 103rd Street water main between Aviation Avenue and Cecil Commerce Center Parkway as the seventh highest-risk water main based on multiple recent failures. These failures are believed to be due to potential installation issues, and the risk concerns the frequency of pipe repairs as a result of these failures, the location of the pipe in relation to key roadways, and the consequences of future pipe failures.

The water main consists of approximately 11,050 feet of 24-inch PVC installed in 2002.

The existing 24-inch PVC water main will be replaced with the same diameter ductile iron piping (DIP) through open-cut construction. The existing pipelines will be properly removed or abandoned in place and filled with grout after construction of the new pipeline.

W-57

103rd St: Aviation to Cecil Commerce Center

Exhibit 1**Pipes In Project:**

Existing Route

Other Pipes

Water Mains > 16"

Water Mains < 16"

Other:

WTP



Justification

The water main along Cecil Field Perimeter Road, south of 103rd Street, serves as a source of potable water for western area of Jacksonville residential communities, recreation facilities and the Cecil Field Airport. Since its installation in 2002, this segment of water main has failed five times. Based on reports of repair crews, these repeated failures are likely due to poor backfilling, resulting in unintended pipe movement and damage to the pipe wall at the joint of two pipe segments during installation. Given the repeated failures at multiple locations in the first two decades of the pipe segment's life, the replacement of the entire section of 2002 vintage water main is amongst the highest priority water projects in the Large Diameter Pipe Evaluation and Replacement Program.

Scope

Capacity

No potable or fire flow capacity complaints have been reported for this line. Thus, it is recommended that the existing water main be replaced with the same diameter pipe.

Route & Alignment

It is recommended to replace the entire section of water main along Cecil Field Perimeter Road, between Aviation Ave and Cecil Commerce Center Parkway, south of 103rd Street. The existing 11,050 linear feet of 24-inch PVC is recommended to be replaced with 24-inch DIP. The new water main route will generally follow the existing water main's alignment. Depending on constraints identified during design (i.e. existing utilities, storm conveyance structures, power poles, guy wires, and trees), the new water main can either be installed in a parallel trench or be installed by same-trench replacement. Given the ample space in the roadway shoulder and lack of existing infrastructure, it is likely that parallel trenching will be utilized and the existing water main will be abandoned in place.

Method of Construction

The method of installation for the proposed water main shall be by any means necessary in accordance with the latest edition of the JEA Water & Sewer Standards Manual. Open-cut direct bury will be the preferred installation method. However, other methods may be utilized as needed to avoid conflicts with other utilities. Along Cecil Field Perimeter Road, there are areas where the existing water main intersects with other utilities. In the case of intersection with existing stormwater conveyances, it is recommended for the replacement water main to either be pushed below the existing pipe, or to saw-cut the existing stormwater pipe and install a conflict structure.

Land Ownership/Real Estate Issues

The existing water main along Cecil Field Perimeter Road, south of 103rd Street, between Aviation Avenue and Cecil Commerce Center Parkway is in the right-of-way. It is anticipated that the new water main can be constructed within the limits of the existing rights-of-way and easements.

Survey Requirements

Final design of the project should be based on field survey data including horizontal and vertical locations and identification of existing utilities, pavement, sidewalk, structures, and drainage features within the project area limits. Rights-of-way boundary limits and parcel ownership lines should be included on the survey, as well as any easements.

Permit List

It is anticipated that permits will be required by the City of Jacksonville (10-set review and/or rights-of-way permit) and FDOT (Utility Permit). A permit from the Florida Department of Environmental Protection (FDEP) is also required when installing new water mains. Other permits may be determined necessary during the design process and shall be obtained by the design team.

Implementation Schedule

Major activities are as follows:

- Survey, Design and Permitting – October 2018 to June 2019.
- Procurement, Construction and Closeout – July 2019 to February 2021.

| | | | | | | | | | | | | |
|--|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 103 rd Street (Cecil Field) Water Main Replacement | FY 2019 | | | | | | | | | | | |
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
| Engineering – Design Duration = 270 Days | | | | | | | | | | | | |
| Procurement – Bid Duration = 90 Days | | | | | | | | | | | | |

| 103 rd Street (Cecil Field) Water Main Replacement | FY 2020 | | | | | | | | | | | |
|--|---------|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | Ma | Jun | Jul | Aug | Sep |
| Construction Duration = 330 Days | | | | | | | | | | | | |

| 103 rd Street (Cecil Field) Water Main Replacement | FY 2021 | | | | | | | | | | | |
|--|---------|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | Ma | Jun | Jul | Aug | Sep |
| Construction Duration = 90 Days | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| Closeout Duration = 60 Days | | | | | | | | | | | | |

Project Management & Delivery

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

Cost Estimate and Expenditure Forecast (Current \$)

The cost of this project is estimated to be approximately \$5,612,519 as determined by an internal estimate. A copy of the estimate is provided in Appendix A.

| | PROJECTED EXPENDITURE FORECAST BY FISCAL YEAR (\$ in Thousands) | | | | | | | | | | |
|----------------------------|---|-------|-----|-----|---------|-----|-----|-----|---------|-----|-------|
| ACTIVITY | FY 2019 | | | | FY 2020 | | | | FY 2021 | | TOTAL |
| QUARTER | 1ST | 2ND | 3RD | 4TH | 1ST | 2ND | 3RD | 4TH | 1ST | 2ND | |
| JEA Cost & Engineering 10% | \$200 | | | | | | | | | | \$200 |
| JEA Cost & Engineering 30% | | \$280 | | | | | | | | | \$280 |

| | | | | | | | | | | | |
|------------------------------|--------------|--------------|--------------|-------------|--------------|----------------|----------------|----------------|----------------|-------------|----------------|
| JEA Cost & Engineering Final | | | \$100 | \$20 | | | | | | | \$120 |
| Construction | | | | | \$200 | \$1,204 | \$1,204 | \$1,204 | \$1,180 | | \$4,992 |
| Project Closeout | | | | | | | | | | \$21 | \$21 |
| TOTAL | \$200 | \$280 | \$100 | \$20 | \$200 | \$1,204 | \$1,204 | \$1,204 | \$1,180 | \$21 | \$5,613 |

Risks

It is expected that the water main will continue to fail, and such failures could result in private-property damage and/or loss of service. Both of which are significant reasons to preempt future failures with a planned replacement of the water main.

The primary risks associated with the water main replacement are constructability issues common for most water main replacements and installations; especially in heavily built-out urban environments. These risks are:

- Conflict with existing utilities: water main, sewer-force main, gravity sewer, storm-water drainage system, gas, street lighting, telecommunications, irrigation, and other buried-underground cables
- Ensuring continuity of water and sewer service, particularly to businesses and residences in the surrounding area (shown on Exhibit 1)
- Ensuring maintenance of traffic during construction
- Accommodation of pedestrian traffic, especially at cross-walks and bus pick-up/drop-off locations
- Off pavement construction in FDOT rights-of-way
- Localized dewatering and trench excavation protection

It is anticipated that the replacement water main would primarily be constructed using open-cut trenching. This method of construction allows the contractor to adjust to in-situ conditions and provides a low-risk installation option. Special attention is required to avoid damage to the existing main where the replacement main will parallel the existing main and the exiting main will remain in operation during construction.

Revision History

| Name | Date | Version | Revision Notes |
|--------------|-----------|---------|--------------------------|
| Robert Cadle | 3/28/2018 | 2 | Revised Project Schedule |
| | | | |
| | | | |
| | | | |

Appendix A

Supporting Cost Estimate Information

| 103rd Street (Cecil Field) Water Main Replacement | | | | |
|---|--------|------|---------------|---------------------|
| Direct Construction Costs | Qty | Unit | Unit Price | Extended |
| 24" Ductile Iron Pipe | 11,050 | LF | \$ 325.00 | \$ 3,591,250 |
| 2" Asphalt Pavement | 300 | SY | \$ 25.00 | \$ 7,500 |
| Limerock Base | 100 | CY | \$ 45.00 | \$ 4,500 |
| 6' Concrete Sidewalk | 0 | SY | \$ 18.00 | \$ - |
| Concrete Driveways | 0 | SY | \$ 165.00 | \$ - |
| Sodding | 0 | SY | \$ 3.50 | \$ - |
| Abandon and grout existing pipe | 1,285 | CY | \$ 150.00 | \$ 192,750 |
| Allowances (Permitting, Testing, etc.) | - | LS | - | - |
| Subtotal | | | | \$ 3,796,000 |
| General Conditions | | | 0.00% | \$ - |
| Subtotal | | | | \$ 3,796,000 |
| Escalation | | | 2.70% | \$ 102,492 |
| Contingency | | | 20.00% | \$ 759,200 |
| Total Contractor Cost | | | | \$ 4,657,692 |
| Additional Direct Costs | | | | |
| JEA Supplied Material & Labor | | | | \$ - |
| Subtotal | | | | \$ - |
| Total Direct Cost | | | | \$ 4,657,692 |
| Indirect Costs² | | | | |
| Project Management | | | 2.5% | \$ 116,442 |
| Engineering | | | 12% | \$ 558,923 |
| Services During Construction | | | 5% | \$ 232,885 |
| Project Support/Misc. | | | 1% | \$ 46,577 |
| Real Estate | | | | \$ - |
| Subtotal | | | | \$ 954,827 |
| Total Indirect Cost | | | | \$ 954,827 |
| Total Project Cost | | | | \$ 5,612,519 |

Date: _____

| Shared Services | Date |
|-----------------|------|
|-----------------|------|

| | |
|----------|------|
| Security | Date |
|----------|------|

PEC Date

Other _____ Date _____