TECHNICAL MEMORANDUM

CP#101-55 - W-03 – Martin Luther King: Fairfax to Brentwood Water Main Replacement

PREPARED FOR: JEA CAPITAL BUDGET PLANNING

PREPARED BY: ARCADIS
REVISION PREPARED BY: JEA

DATE: April 11, 2019
REVISED: December 27, 2019, David McDermet

Introduction & Background

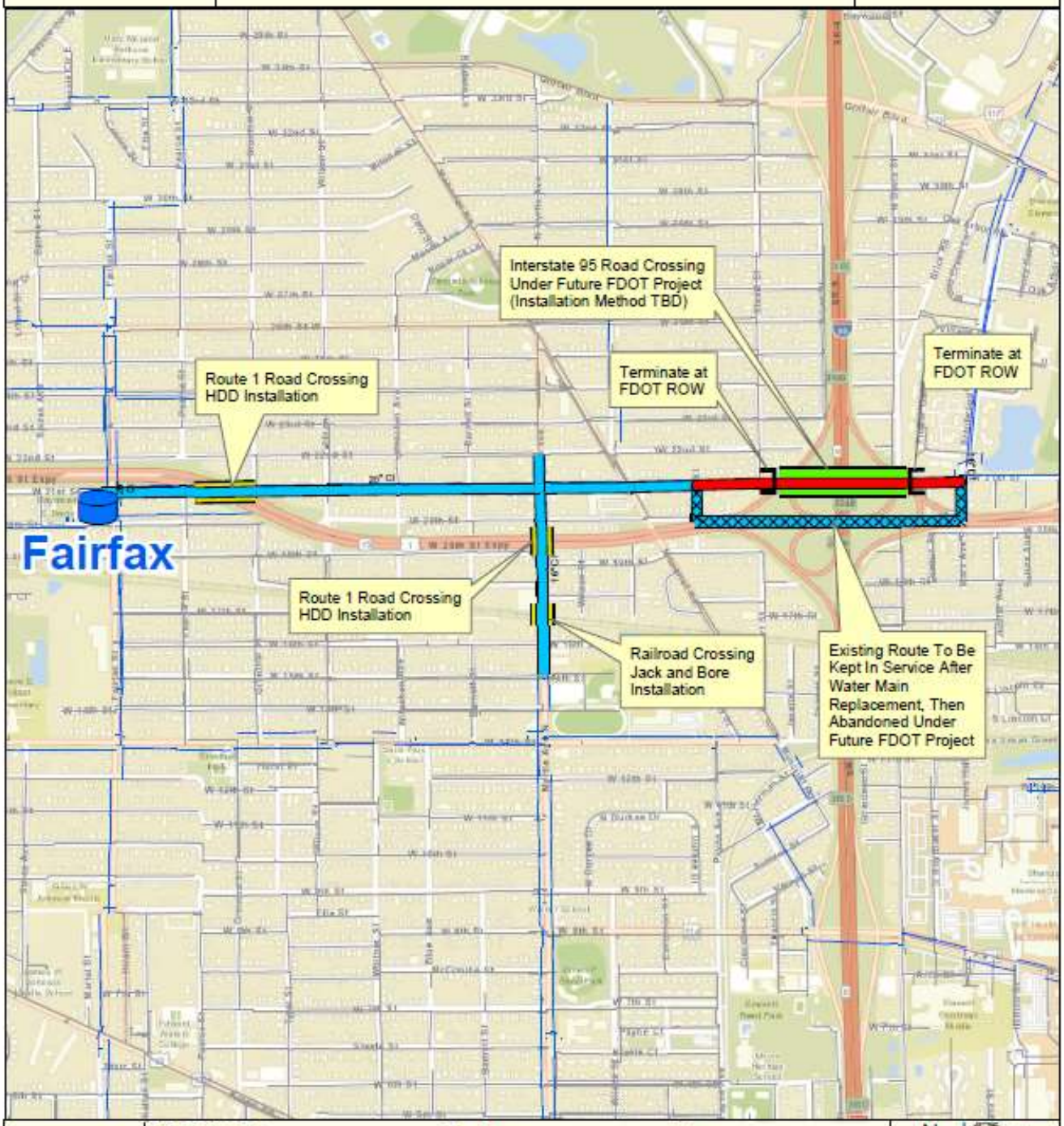
This Technical Memorandum (TM) provides a recommendation for the replacement of a 20-inch water main along Martin Luther King Jr Parkway (MLK) between the Fairfax water treatment plant (WTP) and Brentwood Boulevard and replacement of a 16-inch water main along Myrtle Ave N as shown on Exhibit 1. These water mains serve residential areas north of downtown Jacksonville. 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 water main along Myrtle Ave N and along MLK between the Fairfax WTP and Brentwood Boulevard as the sixth highest-risk water main based on the pipe material and age, location of the pipes in relation to key roadways, schools, and the consequences of a pipe failure.

The water main consists of approximately 9,000 feet of 20-inch cast iron (CI) pipe and 16-inch CI pipe installed before 1950 with a history of failures. The purpose of this project is to cost effectively replace the water main to achieve a minimum 50-year life cycle and to decrease of the likelihood of failure. This will increase the reliability of this section of the water supply system and avoid unscheduled service interruptions. The project bounds are shown in Exhibit 1.

The existing 20-inch and 16-inch CI water mains will be replaced with the same diameter ductile iron pipe (DIP) through open-cut construction, horizontal directional drilling (HDD) and jack and bore. The majority of the new line is proposed to be installed along the same alignment as existing; however, the alignment for crossing the MLK and Interstate 95 interchange is to be determined by a future FDOT project. The existing pipelines will be properly removed or abandoned in place in accordance with the latest edition of the JEA Water & Sewer Standards Manual after construction of the new pipeline.

W-03	*Martin Luther King: Fairfax to Brentwood*	Exhibit 1



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Justification

The water main along MLK, serves as a source of potable water for residential communities north of downtown Jacksonville. The as-builts on this water main indicate that this pipe was installed before 1950 thus making it one of the oldest water mains in JEA's water system. This line is also one of the two primary transmission mains coming from the Fairfax WTP. There have also been multiple failures identified on this line, including a major failure at the Martin Luther King and I-95 interchange.

Non-destructive testing (NDT) has also been performed on this water main by using acoustic thickness testing. The testing was performed on approximately half of the length and results indicated that the average thickness loss throughout the section tested was up to 50% of the pipe wall.

Scope

Capacity

No potable or fire flow capacity complaints have been reported for this line. There have been four tests conducted along the line from 2016 and 2017 and the tests showed flows greater than 2,000 gallons per minute (GPM) at 20 psi. Thus, it is recommended that the existing water main be replaced with the same diameter pipe.

Route & Alignment

JEA's MLK- Fairfax to Brentwood Water Main Replacement project will require coordination with FDOT's MLK and I-95 Interchange Modification project for the section of water main crossing the interchange. FDOT is currently conducting a Project Development and Environment Study (PD&E) to determine the location and conceptual design of feasible build alternatives for the MLK and I-95 interchange improvements. The outcome of this study will identify alternatives for routing the water main through the interchange to accommodate connections to the existing water main. Information is not available at this time for when this study will be complete.

A pipeline routing study (10% Design) shall be prepared to evaluate the most feasible and practical final pipe alignment along the project corridor. This study will consider all variables and constraints; such as site conditions and restrictions, existing/proposed utilities and electrical systems, economic factors, local laws and regulations, environmental impacts, pipeline O&M procedures, Fairfax WTP operations, connections to the existing water main, minimizing shutdowns, construction sequencing, maintenance of traffic, real estate requirements, special crossings, and any other potential impacts.

It is recommended to replace the entire section of water main along Myrtle Ave N and along MLK, between the Fairfax WTP and Brentwood Blvd. The existing 9,000 linear feet of 20-inch and 16-inch CI is recommended to be replaced with new DIP with sections of HDPE and sections with steel encasement. The new water main route will generally follow the existing water main's alignment. It is recommended, where possible, that the new line be installed parallel to the existing line, and once in service, individual water services moved to the new line prior to abandonment of the old line. The water main along MLK from the Fairfax WTP to the west side of the MLK and I-95 interchange will have to be installed by open-cut direct bury and by HDD underneath MLK just east of the Fairfax WTP. The water main on the east side of the interchange will also have to be installed by open-cut direct bury from Brentwood Blvd to the interchange. For The I-95 and MLK interchange crossing, the water mains will need to terminate at the westerly and easterly FDOT right-of-way. The route along Myrtle Ave N will also be open-cut direct bury with jack and bore underneath the CSX railroad utilizing a 30-inch steel casing, and by HDD underneath MLK.

Installation of the crossing of MLK and I-95 interchange and abandonment of the existing main in the interchange will be done under a separate contract as part of the future FDOT project. The FDOT crossing will be coordinated through JEA Joint Projects Group.

Method of Construction

The method of installation for the proposed water main shall be as recommended from the pipeline route study, and in accordance with the latest edition of the JEA Water & Sewer Standards Manual. Open-cut direct bury will be the preferred installation method. However, jack and bore installation will be required underneath the CSX railroad and HDD will be required underneath MLK crossing east of the Fairfax WTP. Other methods may be utilized as needed to avoid conflicts with other utilities. Along MLK and Myrtle Ave N, 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, then repair it once the water main installation is complete. Also, because the new water main is going along the same alignment for most of its length, existing water lines that currently connect with the existing water main will have to be reconnected to the new water main being installed.

Land Ownership/Real Estate Issues

The existing water main along MLK between the Fairfax WTP and Brentwood Blvd is in the right-of-way. Right-of-way is owned by either the City of Jacksonville, FDOT, other counties, or rail. It is anticipated that the new water main will be constructed within the limits of the existing rights-of-way.

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), railroad, and FDOT (Utility Permit). A permit from the Florida Department of Environmental Protection (FDEP) is not anticipated because this is considered an in-kind replacement with the same diameter ductile iron pipe (DIP), however a permit determination will need to be made. Impact to FDOT right of way is expected to be minimal; however multiple lane closures and potential temporary road closures will be required on City of Jacksonville streets. Other permits may be determined necessary during the design process and shall be obtained by the design team.

Assumptions

The cost estimate developed is based on the conceptual route identified in Exhibit 1 assuming open-cut direct bury as the preferred method of installation; utilizing jack and bore installation underneath the CSX railroad and HDD underneath MLK crossing east of the Fairfax WTP and at Myrtle Ave.

Delivery Method

This project will be executed by utilizing the Jacob's Engineering Group (Jacob's) Water/Wastewater Capital Program Management Contract, CPA#182848. The delivery method will be an "at-risk". All project phases such as pipe route study, design, permitting, procurement, construction, services during construction, CEI/Management and construction closeout will be the responsibility of Jacob's.

Risks

The combination of age of the existing 20-inch and 16-inch CI water mains and continued deterioration of the pipes possibly resulting in leaks or failures presents evident risk. It is expected that the line 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. Additionally, the planned road construction by FDOT at the Martin Luther King and I-95 interchange represent an increased risk of failure of the existing main if it is not removed from service prior to heavy construction commencing.

The primary risks associated with the water main replacement include the FDOT interchange project, future COJ/JTA road project(s), and constructability issues common for most water main replacements and installations; especially in heavily built-out urban environments. These risks are:

- FDOT Interchange Project
    - Project Development and Environment Study (PD&E) – potential impacts unknown for selected pipe route
    - Points of water main connection unknown at FDOT right-of-way
- Pipe Routing Study – potential impact to cost and schedule dependent upon selected route
- COJ/JTA Planned Road Projects – coordination and potential impact to construction schedule
- CSX Railroad Crossing – potential impact to construction schedule dependent on availability of CSX personnel for inspection
- Integrity of existing water main pipe at connection points
- 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, jack and bore, and HDD. 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
David McDermet	11/25/2019	1	Updated scope, schedule, and estimate
David McDermet	12/27/2019	2	Updated scope & schedule

Security Signoff

Does this project have potential Security impacts such as fencing, camera, monitoring, etc.?

Date: _____

Scope Approval –The signatures below represent approval for this project. The groups represented must approve in writing changes to the scope, cost, or schedule, prior to implementing those changes.

_____	_____	_____	_____
Shared Services	Date	Security	Date
_____	_____	_____	_____
PEC	Date	Other	Date